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SAWN
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(page 30)

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- Min. stock length: 8"
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- Feed rate: 16 FPM & 30 FPM
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- Max. cutting width: 20"
- Max. cutting height: 8"
- Min. stock thickness: ¾"
- Min. stock length: 8"
- Max. cutting depth: ½"
- Feed rate: 16 FPM & 20 FPM
- Cutterhead diameter: 3½"
- Cutterhead speed: 4800 RPM
- Feed rolls: solid serrated steel
- Overall dimensions: 55½" L x 39½" W x 45½" H
- Approximate shipping weight: 920 lbs.

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G0454 \$1650.00 SALE \$1595.00

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- Motor: 1 HP, TEFC, 110V/220V, single-phase (prewired 110V)
- Amps: 11 at 110V, 5.5 at 220V
- Blade size: 93½" long (½"-¾" wide)
- Cutting capacity/throat: 13½"
- Max. cutting height: 6"
- Overall size: 27" W x 67½" H x 30" D
- Footprint: 23½" x 16½"
- Table height above floor: 43"
- Table tilt: 45° right, 10° left
- Approximate shipping weight: 247 lbs.

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- Motor: 1 HP, TEFC, 110V/220V, single-phase, 1725 RPM
- 4" Dust port
- Cutting capacity/throat: 13½"
- Max. cutting height: 6"
- Overall size: 27" W x 67½" H x 30" D
- Precision-ground cast iron table size 14" x 14"
- Table height: 43½"
- Tilt: 45° R, 15° L
- Fence construction: Deluxe extruded aluminum
- Blade speeds: 1500 & 3200 FPM
- Blade size: 92½"-93½" (½" to ¾" wide)
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Woodworker's Journal

Contents

December 2013

Volume 37, Number 6



Page 36



Page 30



Page 44



30 Holiday Gift Box **GIFT!**

By Carole Rothman

This gift box is tied up with a bow — made from laminated strips of wood.

36 Knockdown Desk

By Ralph Bagnall

Classic Arts & Crafts style that knocks down for easy transport. Perfect for college kids!

42 Fridge Magnets **GIFT!**

By Rob Johnstone

Tiny turnings use scrap wood to create super-strong magnets.

44 Jigsaw Puzzle Tray **GIFT!**

By Chris Marshall

Puzzle no longer over storage space: this portable tray and its two pull-outs offer ample room for at least 500 pieces.

Departments



6 Editor's Note and Letters

Gift-giver's epiphany.

12 Tricks of the Trade

Sign your work with style.

14 Questions & Answers

Why band saw and table saw blades are sized as they are.

18 Stumpers

Mystery tool solution: it's riveting.

20 Shop Talk

Safety tool is literally lifesaving.

26 Woodturning **GIFT!**

Yarn bowl stores needles and more.

50 Shop Test

New tools to use with your router.

60 Today's Shop

Cool technology in your tools.

70 What's In Store

More new tools, new upgrades.

76 Small Shop Journal **GIFT!**

Router techniques give you traditional or contemporary style options for a picture frame.

82 Finishing Thoughts

Small projects take a dip in the finish.

CUTTING EDGE RESULTS



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Make the Perfect Gift



NO ... NOT A CUTTING BOARD

There is no use trying to hide the fact: I am a changed man. Years ago, as the holiday gift-giving season approached, my countenance fell and my attitude soured. With a meager bank account and a long list of family and friends, gift building often seemed like a tedious harbinger of fall and winter. And, while it would be untruthful to say that I resented the situation,

there were definite Scrooge-like moments while burning the midnight oil. But some time in the last 30 years or so, a shift occurred, and now the time that I spend building gifts for those I care about is something I treasure. Which is not to say that paradise is untroubled. Because, when you stop and think about it, if you spent the last 30 years making gifts for the same group of people, there is a good chance that they might have seen your best and most creative work a while ago. Alas, that is the sad fact that I confront this year. I am a bit worried that if I give one of my children another turned wooden bowl, I may be wearing it home from our holiday gathering as a kind of skullcap.

And I don't think I am alone in this situation. So, with that in mind, for this issue I put out the call for a group of projects that are perfect to give as gifts — but are not your run-of-the-mill cutting board or jewelry box. They are practical and beautiful and a little whimsical ... and here is the real kicker: they're fun to make. I hope that you find them as useful as I will this gift building season.

— Rob Johnstone

Totable Table Saw Thoughts

I use one of the Bosch systems you tested for your article ["Portable 10-inch Table Saw Test: From Exceptional to Mediocre," *August 2013*] and am quite pleased with how it works.



One issue I had with it, and hope to not repeat: while trying to loosen the angle adjustment lever blind (not looking but simply putting my hand under the table edge and pushing the lever), I drove the angle indicator up under my thumbnail to the quick. Being on a jobsite by myself, I did not have anyone to take my place to finish the task, so I just wrapped my thumb in a paper towel and kept working. I did lose the thumbnail for a while, and I certainly make sure to look under the table and carefully watch how my hand is positioned for this operation!

Paul Perrine
Killeen, Texas

I just read your recent issue with the comparison of portable table saws. I was puzzled at your choice

Letters continues on page 8 ...

DECEMBER 2013

Volume 37, Number 6

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Woodworker's Journal (ISSN: 0199-1892), is published in February, April, June, August, October and December by Rockler Press Inc., 4365 Willow Dr., Medina, MN 55340. Periodical postage paid at Medina, Minnesota and additional mailing offices. Postmaster: Send all address changes to Woodworker's Journal, P.O. Box 6211, Harlan, IA 51593-1711. Subscription Rates: One-year, \$19.95 (U.S.); \$28.95 U.S. funds (Canada and other countries). Single copy price, \$5.99. Reproduction without permission prohibited. Publications Mail Agreement Number 0861065. Canadian Publication Agreement #40009401.

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These articles
in this issue
have more
online:

Woodturning (page 26):
knitting bowl construction video
Small Shop Journal (page 76):
video on gluing up moldings

QUICK-LINK



Click through
Quick-Link on our
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information on

the tools featured in these articles:
Shop Test (page 50)
What's In Store (page 70)

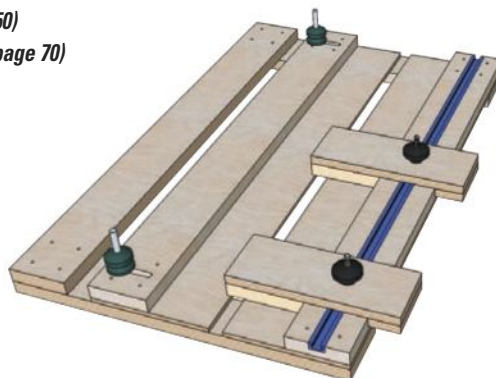
of the cheap lightweight saw from Craftsman that you chose for comparison. I have used the model 21829 for quite a few years, and it would have been a much more appropriate candidate for your article.

Gerry Geddings
Jacksonville, Florida

Improvements to Hylton's Router Dado Jig

I saw a YouTube video by, I believe, Bill Hylton on a router jig for making dados. [Editor's Note: You can find the video and the jig in the February 2012 portion of the More on the Web section of woodworkersjournal.com]. I built one of these and it works very well, but I added a couple of stops to make stopped dados and thought that he may be interested. I have attached a rough sketch that I did on SketchUp with no claim of ownership.

Oliver Willard
Greenwood, South Carolina



Happy with His New Tool

After reading your review on compact router kits ["Compact Plunge Router Kits," December 2012] I requested, nay, pleaded, for the DeWALT setup. I had disposed of a newish Ryobi and an ancient Craftsman router and needed an addition to the RIDGID mounted in my router table. I have rarely been so thrilled with a new acquisition. It's lightweight, fits my not-so-large hand and performs beautifully. Thanks for the review and advice.

Don Radke
Snowflake, Arizona

Advice: Watch Fortune's Band Saw Demo

On page 6 of the August 2013 issue of *Woodworker's Journal* ["Calling All Band Sawyers"], you ask for tips for using the band saw.

A little background: I am a 73-year-old woodworker/wood butcher who has been making shavings and sawdust for over 35 years. I have had a Delta 14" band saw for well over 25 years and, for the most part, have been very happy with it.

Now that Sam Maloof is no longer with us, I would suggest that one of the foremost experts

on the band saw has to be Michael Fortune. I have seen Michael give his 20-minute demonstration on the band saw three times: twice at the Marc Adams School of Woodworking and once at the fall seminar of the Minnesota Woodworkers Guild. If you haven't had the pleasure of viewing this demonstration, I would highly recommend finding a way to do so — it's well worth the effort.

Until I saw Michael's demo, I was ready to invest in either an aftermarket set of blade guides or even a bigger, better band saw. The demo saved me a lot of money and aggravation!

Wayne Stump
Apple Valley, Minnesota

Letters continues on page 10 ...



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How This Reader Finishes Comb Hinges

Hey guys, great magazine! I was just wondering how to make wooden hinges, and the April issue comes out with the article by Paul Austin on comb hinges ["How to Make a Classic Comb Hinge"]. Perfect timing. I made some new boxes and retrofitted some old ones. They sure do make a box look great.

It wasn't until I got the August issue and read James King's letter [*Letters*] that I thought about [his question of

how to apply finish and not get it onto the hinge]. I just epoxied the hinges on, then sprayed them with lacquer. They work fine with about six or seven coats. I'm making another one now. The curly maple from Rockler I used for the lid is so beautiful that I hate to put the hinges on.

Oh well, just thought I'd put my two cents in.

Charlie Lancaster
Daytona Beach, Florida

Silver Storage

I thought you'd like to know that I have made the silverware box using the plan from your August edition [*Small Shop Journal*, "Silverware Chest"] for the cutlery I have inherited. Thank you. Here are a couple of pictures.

Radomar Samardzic
Los Angeles, California

I enjoyed the article about the silverware chest. I plan to make one; this is just the

motivation I probably need. I also very much appreciated the lesson on the differences that come from different drying methods: very informative.

It was surprising, in light of the otherwise excellent article, that you did not mention that traditionally the best silverware chests were made of camphor wood, or at least lined with camphor. This wood generally comes from Asia, and was used by the old-time sailors for their toolboxes, because tools kept in a camphor box will not rust, and silver will not tarnish in a camphor box.

Besides the benefits to the silver (or tool) owner, camphor is wonderful to work and is a very attractive wood. The big side benefit is that your shop will smell wonderful from the first cut until you take the project out to the lucky owner.

Mike Brady
Pasadena, California



Reader Radomar Samardzic recently completed our silverware box.



Feedback! We want to know what you think of the projects and other stories in this issue, and we're willing to give one lucky reader a **FREE PRIZE** just for participating. (We'll put all the entries into a digital hat and pick a winner!)

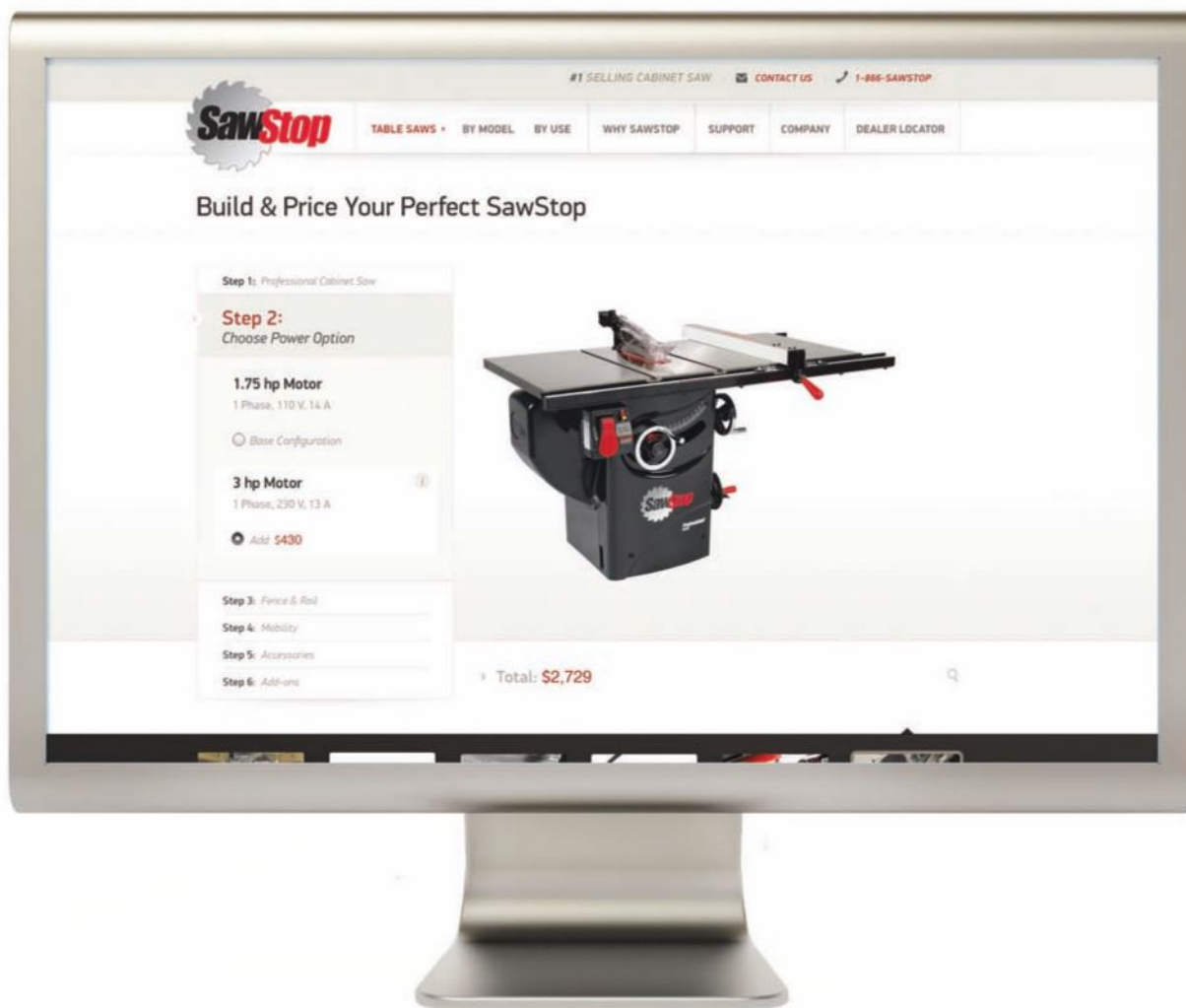
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Tricks of the Trade

Practical Tips for Flattening, Finishing



Flattening Dowels at the Router Table

Lately I've wanted to use dowels with a flat edge on them for handles and pulls or as decorative moldings on my projects. But how would I mill that flat edge safely? Here's one way: at the router table using a parallel bar clamp. Position the dowel inside the clamp so its bottom edge and the bottom faces of the clamp are flush against the router table top. Tighten the dowel in the clamp. Then, use the clamp as a carrier to slide the dowel along the router table fence. Make the cut with a straight bit extending just beyond the fence faces. The dowel must be several inches longer than necessary: you need to leave a round portion on the infeed and outfeed ends to serve as bearing surfaces against the fence. Make the flat profile wider and deeper by resetting the fence a little further back from the



bit with each pass. Limit these depth-of-cut changes to not more than about 1/16" with each pass. When you're done routing, just cut off the round, un-flattened ends (see inset photo).

Serge Duclos
Delson, Quebec



Air Hose Stopper

With several air hoses but only one compressor in my shop, the hoses that aren't being used gather debris — in my case, two spiders, a spider nest and a ball of mud. As a remedy, now I cap the open ends of my hoses with a plastic wine cork drilled with a blind hole in one end. It stretches and fits over the male coupling perfectly and costs me nothing to make.

Laura Ousset
McNeill, Mississippi

Measure the Cut, Not the Bit

Here's a tip I've learned from many years of routing: when you prepare to make a cut, always cut a test piece first, and measure the result to evaluate your bit setting. There are all sorts of variables that can impact why the bit setting you've painstakingly dialed in may not produce the actual cut you want (insert plate isn't flat with tabletop; bit slips in the router; workpiece is slightly out of flat; feed pressure is uneven, etc.). So, set the bit height to approximately where you want it, cut, measure the cut, adjust the bit, and cut again to fine-tune your bit setting. After all, what ends up in the workpiece is all that really matters.

Bill Wells
Olympia, Washington



Laminate Your Finishing Table

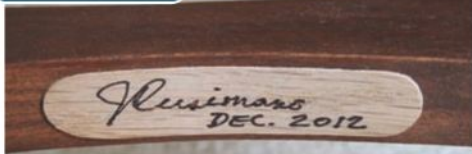
I covered the outfeed table of my table saw with plastic laminate. It not only helps workpieces slide over it more easily during sawing, but it also makes an ideal surface for finishing small projects.

Once I've applied the stain or finish, cleanup is simple. I just wipe away any drips with a paper towel and the appropriate solvent for the finish I'm using.

Bob Mohalski
Hebron, Kentucky



PICK OF THE TRICKS



Safe Sealer for Signatures

I like to personalize my projects by signing my name in an obscure place on the item with a permanent marker. For dark-stained projects, like the music stand you see here, I make a nameplate from lighter veneer and sign this instead. It's a good idea to seal in your signature with a clear finish, but be careful: "permanent" marker will actually bleed and smear under oil-based varnish, shellac or lacquer because of their solvents. Instead, use water-based polyurethane. It won't affect the marker at all.

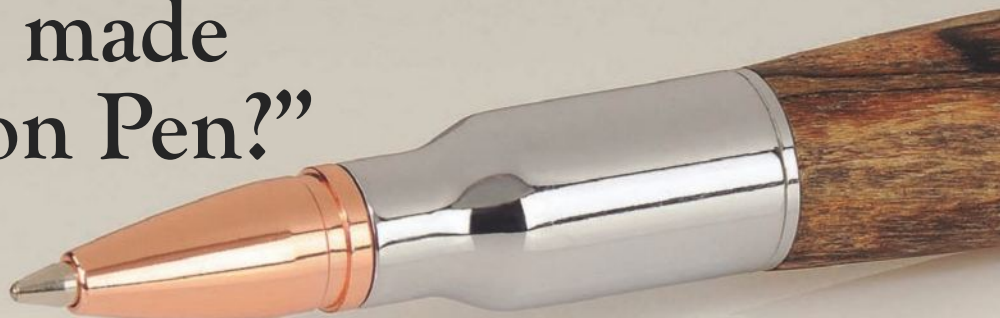
John Cusimano
Lansdale, Pennsylvania



In addition to our standard payment (below), John Cusimano of Lansdale, Pennsylvania, will also receive a Lamello Vario Box 440 Piece Set of Biscuits and Joining Elements from Colonial Saw (www.csaw.com) for being selected as the "Pick of the Tricks" winner. We pay from \$100 to \$200 for all tricks used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. Submit your Tricks to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340. Or send us an email: tricks@woodworkersjournal.com

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

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Questions & Answers

Does Size Really Matter in the Shop?

THIS ISSUE'S EXPERTS

Chris Marshall is a senior editor of *Woodworker's Journal* and author of several books on woodworking.

Rob Johnstone is editor in chief of *Woodworker's Journal*.

Sandor Nagyszalanczy is a writer/photographer of several woodworking books and a frequent contributor to *Woodworker's Journal*.

Contact us

by writing to "Q&A,"

Woodworker's Journal,

4365 Willow Drive,

Medina, MN 55340,

by faxing us at (763) 478-8396

or by emailing us at:

QandA@woodworkersjournal.com

Please include your home

address, phone number and

email address (if you have one)

with your question.

Q I've been reading articles on router tables and routers for a while now. But nowhere did I find whether it is possible (and practical) to mount one of the smaller routers in a table. DeWALT has a compact router that comes with a fixed and a plunge base that I think would be perfect for making bonsai display stands. Or am I beating a dead horse?

Wally Glasgow
Flowery Branch, Georgia

A Go for it. Not only is it possible to invert DeWALT's DWP611 Compact Router for use in a router table, but Rockler has already done it with their Trim Router Table (item 43550). The round acrylic insert plate that comes with it is already pre-drilled to accept DeWALT's fixed baseplate, or mount it to other small routers by marking and drilling the screw holes yourself. DeWALT's DWP611 is powerful and, used within reasonable limits, it should serve you well for light, table-mounted use. Other newer compact routers from Bosch, Makita, PORTER-CABLE or Trend could also work well under a table.

— Chris Marshall

Continues on page 16 ...

Are the smaller (1 to 1½ hp range) routers up to the challenge of light router table use? Our senior editor says, "Absolutely."





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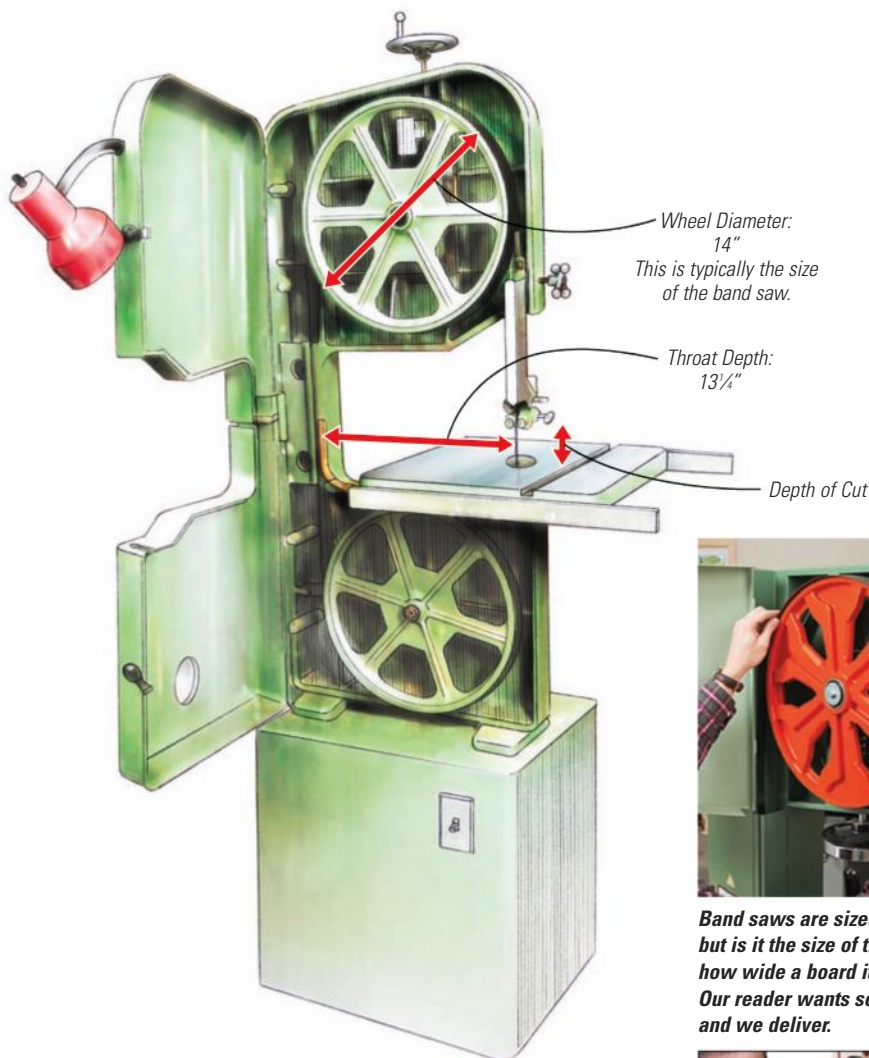
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Questions & Answers continued



Winner!

For simply sending in his question on band saw sizes, Lewis Kougher of Meadville, Pennsylvania, wins an Osborne Miter Gage by Excalibur (from General International). Each issue we toss new questions into a hat and draw a winner.



Band saws are sized in inches ... but is it the size of the wheel or how wide a board it can resaw? Our reader wants some answers, and we deliver.

No one around here seems to be able to answer my biggest question about newer band saws, so I'm wondering if you can give me a logical answer. After reading and looking through numerous books, magazines and catalogs, I find no explanation why or how they can list a saw as one size when it is not. If the saw is listed as 14", it should be able to cut 14", or 14 inches plus, on its table between the inside face of the blade and the saw's frame. The same with an 18" or 24". I would not buy a 1/2" drill bit if it would only make a 3/8" hole any more than I would buy 2" screws if they were only 1 1/2". Hope you can help me with this dilemma.

Lewis Kougher
Meadville, Pennsylvania

Band saw sizes are derived from the diameter of the wheels in the saw. So a 14" band saw will have wheels that are 14" in diameter. But to clarify (we hope!), according to Rod Burrow, of RIKON Power Tools: "Band saws are sized by both wheel diameter and throat depth (blade to column). However, there is a guard on the column that protects the end user from the blade as it travels from the lower wheel to the upper wheel. The thickness of the guard is subtracted from the 'size' of the saw, resulting in the true throat depth." For that reason, a 14" band saw will usually have a throat depth (from the blade to the saw's frame) of around 13 to 13 1/4".

There is another measure that indicates how wide a



board you can resaw. This will vary within a category — take the 14" class for example. Many 14" band saws can only resaw boards about 6" wide, while the newest JET 14" band saw will resaw boards up to 13 1/2" wide — more than twice as wide.

— Rob Johnstone

Continues on page 18 ...

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Stumpers

Up in the Air?

Flyboys and their ground crews easily I.D. our last mystery tool.



Dennis Beadles of Mount Juliet, Tennessee, worked on aircraft in the Marines back in the 1960s, and was one of many readers who could I.D. the mystery tool submitted by **Louis Dupree** of Homer, Alaska in our August issue.

"In the aircraft industry, we refer to this tool as a Cleco clamp," said **Jeremiah Williams** of Ladson, South Carolina.

Gerald Gagnon of Lake Zurich, Illinois, said his father "was a line troubleshooter at the Willow Run B-24 production plant during WWII. His job called for on-the-spot repairs, so he carried a

supply in his coveralls and my mom used to find them in the wash. By war's end, there was a coffee can full."

What are they for? Former Navy mechanic **Jose M. Alvarez** of La Mesa, California, says, "It is used to hold the parts together, then drill another hole without the part moving on you."

"In the open position, the extended pins, or 'key,' can

be maneuvered through a lined-up hole in the two flanges to be clamped together," said **Damien Kurrin** of Krugerville, Texas. **Greg Kuklinski** of St. Ann, Missouri, continued, "When the bent portion is retracted, the diameter of the shaft increases slightly." "Think of it as a temporary pop rivet," said **Steve Althaus** of Austin, Texas.

"The new ones use pliers to compress a springloaded button," said **Marvin "Butch" Ostman** of Baldwin, Wisconsin. "They come in different sizes, ranging up to 1/4"," said **David Preputnik** of Bellmore, New York. "They are usually color-coded to make identification easier."

William Gruesbeck of Beavercreek, Ohio, said, "The fuselage of an aircraft being re-skinned looks like a porcupine when all of the clamps are installed."

LaVerne Anderson of Des Moines, Iowa, would agree. He says he "used about 13,000 rivets building this airplane" (seen in photo above).

—Joanna Werch Takes

Winner! Timothy Carter, Jr. of Darlington, South Carolina, wins a **PORTER-CABLE Tiger Saw**.

We toss all the Stumpers letters into a hat to select a winner.



Questions & Answers

continued

Q Why do table saws and radial arm saws come in 10" blade sizes? Why not larger? Also, I don't see any 8" saws anymore.

Ray Jodoin
North Port, Florida



A The answer to your question is part "Goldilocks and the Three Bears" and part "VHS vs. Beta videotape." Simply put, 10" in diameter is a good middle-of-the-road size that's pretty much just right for a stationary saw's blade. A 10" saw can cut workpieces more than 3"-thick, enough for the great majority of woodworking cutting tasks. In contrast, an 8" blade won't even cut through 3/4 stock, so it's too small to be practical. A 12" blade, great for big industrial uses, is a bit oversized for most small shop uses.

As to the VHS vs. Beta part of the answer, once a popular style or size of just about any product has won the public over (and they've voted with their checkbooks), the industry is quick to embrace and capitalize on the winner, be it a video format, type of vehicle (minivan, SUV, etc.) or saw blade size. Most saw blades carried by Internet retailers and building supply stores are 10", with variations made to handle just about every cutting situation and material. I think that their domination of the marketplace explains why 10" blades have become the standard, not only for table saws, but for many radial arm and miter saws as well. Maybe this is why 8" table saws are now as rare as AMC Pacers.

— Sandor Nagyszalanczy

What's This?



A shop buddy of Jeffrey Saylor of Mifflintown, Pennsylvania, brought him this thing to identify. "I can't, and I've been around tools all my life!" is his cry for help. Can you come to Jeffrey's aid?

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"Game On" was the theme of the 2013 32nd Annual Design in Wood competition. The show is a project of the San Diego Fine Woodworkers Association and regularly displays woodworking of the highest quality at each summer's San Diego County Fair. *Woodworker's Journal* is one of the award sponsors, offering two-year subscriptions to the winners. To find out details on entering or attending the 2014 show, visit www.sdfwa.org or call 619-422-7338.

photos by Andrew Patterson



*"Unfinished Table -
With Table Cloth"*
by Boris Khechoyan



"7-String Electric Guitar"
by Scott Lienhard



"Cherry Platter" by Tom Edwards



"Splines Galore" by Peter Schultheiss



"6 Slat Ladderback Cherry Rocker"
by Terry Sullivan



Woodturning Safety **Helmet Saved His Life**



Iowa Falls firefighters struggled to find Arick Baker (inset above), who was trapped in a grain bin for over two hours. Luckily, Arick had an air-circulating face shield ... it (and the exhausted firefighters) saved his life.

photo by Roger Lugo, Iowa Falls Times Citizen Communications



When most woodworkers call their tools "lifesaving," they don't mean it as literally as Iowa farmer Arick Baker. Arick's family had given him a Trend Airshield Pro, an air-circulating face shield, to assist with his asthma. Luckily, Arick was wearing the face shield when the corn beneath him collapsed as he cleared a blockage from a grain bin.

Arick was trapped beneath the corn, its crushing weight pressing upon him. Although he was completely buried for over two hours, wearing the Trend Airshield Pro allowed him to concentrate on breathing. When uncovered by the Iowa Falls firefighters, Arick had only minor cuts and bruises. Find out more about the Trend Airshield Pro and Arick's story at trend-usa.com and about grain safety at farmsafety.mo.gov.

Continues on page 22 ...

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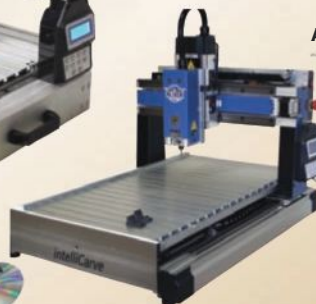
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Shop Talk continued

Two Pieces, Two Cultures: One Designer



LiLi Jackson and Santiago Miguel Salamanca worked together to create the Malinalli Table, shown above, from cedar, glass and iron.



Former *Woodworker's Journal* reporter LiLi Jackson is now pursuing a master's degree in industrial design at the Pratt Institute. She's also exploring and participating in the woodworking of various cultures; most recently, she made a table in Mexico and a chair in Denmark. "With both pieces, the idea is to be inspired by where I am," LiLi said.

She found inspiration for the Tilia chair from the strength, flexibility and lightness of *Tilia* (linden or basswood) trees she biked under on her way to the Danish shop. The chair's laminations find strength in their flexibility and, since the laminated back slats move, "When you sit in the chair, you become stronger, less passive and more active as a sitter." She also employed processes typical to the Scandinavian area, such as soap sand finishing: "Sand to 200-grit, then put on a bunch of soap with a sponge, suds up the whole thing." After drying, sand at a higher grit; repeat until finished for a soft, white, matte finish.

LiLi's table, on the other hand, reflects Mexican culture. She and other Pratt graduate students participated in the Malinalco Project working with local artisans from the town of Malinalco to invigorate the economy by creating items that could be sold to a wider market (themalinalcoproject.wordpress.com).

The table's base is constructed of one piece of iron, which starts as a circle and twists together to hold the tabletop. It's evocative of the malinalli plant, a twisted grass that, in the belief patterns of the area's Nahua Aztec culture, is also the medium that connects the planes of the universe: the underworld, the earth surface and the celestial world. Gilded carvings on an unfinished cedar ring represent Aztec celestial symbols.

With both the table and the chair, according to master woodworker Ian Kirby, LiLi's mentor, "She really captured the essence of both cultures."



The Tilia chair's veneers have maple exteriors and ash interiors. The backrest slats are tied on with elastic bands, allowing them to adjust up and down, or face the other direction.



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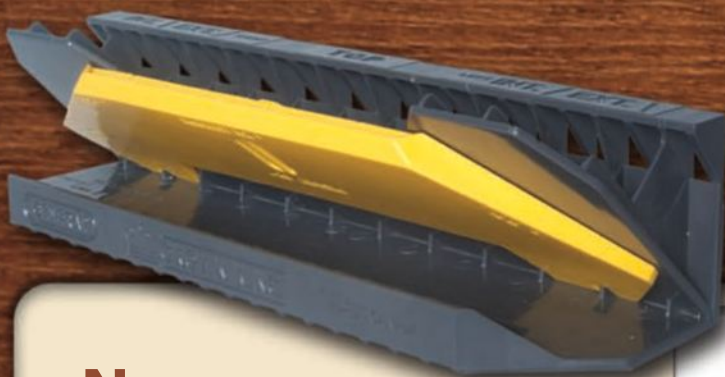


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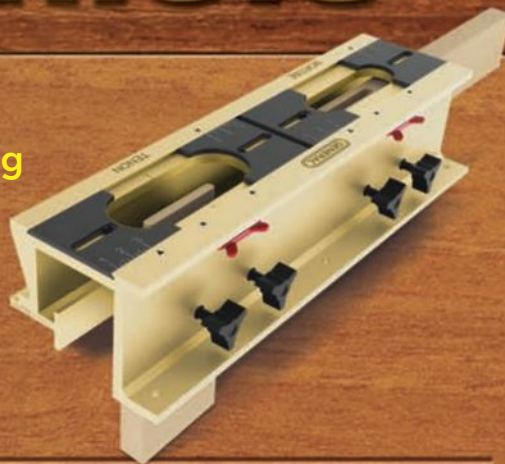
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Woodturning

A Turned Knitting Bowl and Stand

By Ernie Conover



www.woodworkersjournal.com MORE ON THE WEB

For a video of the author making a knitting bowl with the scroll cut, visit woodworkersjournal.com and click on the "More on the Web" tab shown above.

I have been exposed to spinning, weaving, knitting and needlework all my life, for my wife is a talented fiber artist. I say "all my life," for fiber art was my mother's passion as well. In many years of teaching woodworking and woodturning classes, I have found a lot of my students have spouses who engage in some form of fiber art. Therefore, a knitting bowl seemed a good project. It is a simple bowl that will hold one or several balls of yarn and has a scroll-shaped cutout and holes to dispense yarn without

allowing it to tangle. The holes also allow storing of a pair of knitting needles. You skewer the yarn ball with the needles and pass them through the holes.

It is a practical, attractive and fun gift for the knitters in your life — and I even came up with a way to "take it mobile."

Knitting Bowl

Depending on your knitter, the bowl should be between 5" and 7" in diameter and 3" to 4" tall. It can be from green or kiln-dried wood but should

be sanded to a very smooth surface and a slippery finish applied. I recommend a shellac-based friction finish. Polish it out nicely with some 0000 steel wool. While it is important that it look nice, it is more imperative that it be smooth. Yarn cannot snag anywhere! (If your knitter uses wool yarn, the lanolin in the yarn will add a smoothness all its own after a while.) The wall thickness is not very important, but a thinner wall looks nicer and it is much easier to cut the scroll-shaped opening if the wood is not too



The bowl should have fairly straight sides, or it can even be a slightly closed-in form (the rim is smaller than the biggest diameter). A jam chuck that is faceplate-mounted will allow you to refine the bottom of the bowl to accept the riser base you'll turn later. A closed grain wood like maple is a good choice for a yarn bowl. It lends itself to a smooth surface, which is an important design aspect.



A base that's perfectly sized to fit into your car's cup holder will allow the knitter to make effective use of time in the car while keeping the yarn under control.

thick. If you want to keep it really simple, in place of the scroll you can simply drill a hole of generous diameter for the yarn to go through, but your knitter will have a bit more rigamarole in starting the yarn. In any event, you will need two additional holes near the scroll. They are to store the knitting needles when not knitting. The knitter skewers the ball and then passes the needle through the holes. A 3/8"-diameter hole will allow needles up to Number 13 to pass. The biggest needle is a #19 and

will require a 3/4" diameter hole, but a hole that size may well be impractical for a bowl like this. These holes can also be handy if a knitter is working with multiple balls of yarn (they can put a different colored yarn in each hole to keep them separate but under control).

Base for Use in a Car

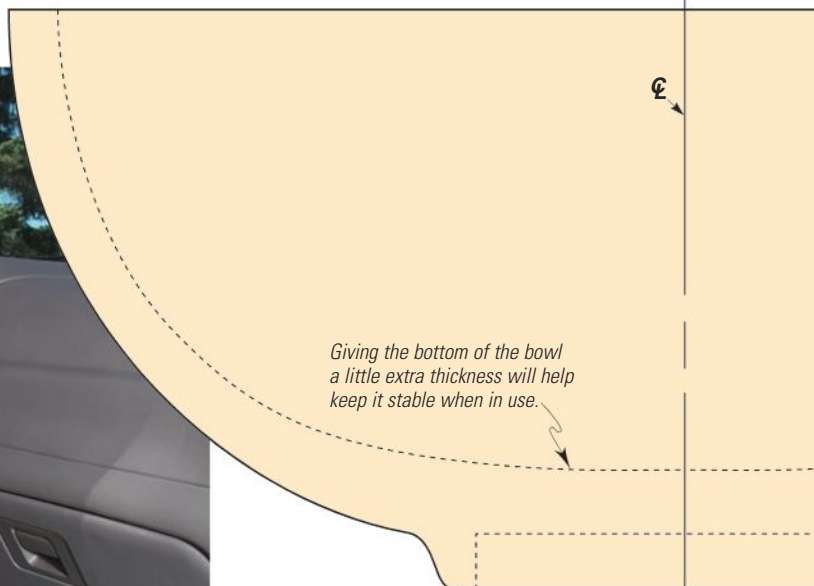
My mother always knitted when riding in the car, so a good design addition is to make a base with a long foot that is the diameter of the cup holder. This allows the bowl to

fit in the drink holder, thereby elevating and immobilizing it during travel. Turning the bowl and base from one piece is impractical, so the base is spindle turned as a separate piece.

The extended base needs to be 5" to 8" high, around 2" in diameter at the bottom, with about a 3" shoulder to stabilize it, depending on your car. Careful measurement of your car's cup holder is imperative for this scheme to work well — it needs to be a firm friction fit to keep the whole assembly secure.



The base is turned separately, as it would be impractical as a bowl-base turning. Test-fit it to your car's cup holder to be certain that the fit is tight enough to hold well, but loose enough to slide in and out of the hole. An oil finish for the base is recommended. Allow it to cure well before putting it into use in your car.

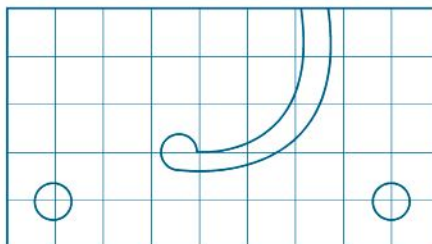


Giving the bottom of the bowl a little extra thickness will help keep it stable when in use.

Full Size (Bowl and Base)

Shoulder

Remember! Measure your car's cup holder and size this extended foot to fit perfectly.



Full Size

Note: Be sure to practice on some scrap wood before trying a coping saw on your turned project!



Carving the Scroll

The scroll for the yarn can be made in a number of ways. I used a coping saw to remove the bulk of the material. I then employed a rotary tool to smooth and fair the scroll and chamfer all the edges. It leaves a superlative finish that needs less sanding. Once sawn and carved, the scroll must be sanded very smooth, especially at the edges, so that yarn slides smoothly at all times.

Pattern for Scroll

On one of the two face grain sides of the bowl, lay out the hole that is the terminus of the scroll plus a hole to either side for knitting needles or more balls of yarn to come through. Do not lay this out on the end grain sides, as this will cause structural problems (the edges of the scroll can

easily break when cutting and machining the shape). Center punch the hole centers and bore the openings. (See the photo sequence at left.) Using a drill with a brad point, drill carefully from the outside until the point just pokes through the inside. Now drill from the inside where the point poked through. The result is a perfect breakout on both sides.

Use a coping saw to follow the outline of the J-shaped design. I use a blade that cuts in any direction, as the frame cannot clear a bowl with a normal blade. Follow up with the rotary tool to refine the shape and smooth the edges. Files are useful here as well. Getting a good, smooth edge is a bit trickier in practice than it may seem. I am afraid that you will need to hand sand the form as well. Any rough bit of edge will snag the yarn and cause troubles for your favorite knitter. Don't forget to apply finish to the edge of the cutout scroll.

I hope that next holiday season your effort gets you a nice pair of hand knitted socks or a hat to keep you warm. After all, one good turn deserves another.

For the scroll cut's terminal hole, drill carefully with a brad point from the outside until the point just pokes through (top photo), then drill from the inside for a perfect breakout (inset photo). Lay out the design for the scroll itself in pencil (second photo at left).

Cut to the layout lines with a coping saw (third photo), using a blade that cuts in any direction. Finally, smooth saw marks and break edges. The author used a Dremel rotary tool (bottom photo).



Ernie Conover is the author of The Lathe Book, Turn a Bowl with Ernie Conover and The Frugal Woodturner.

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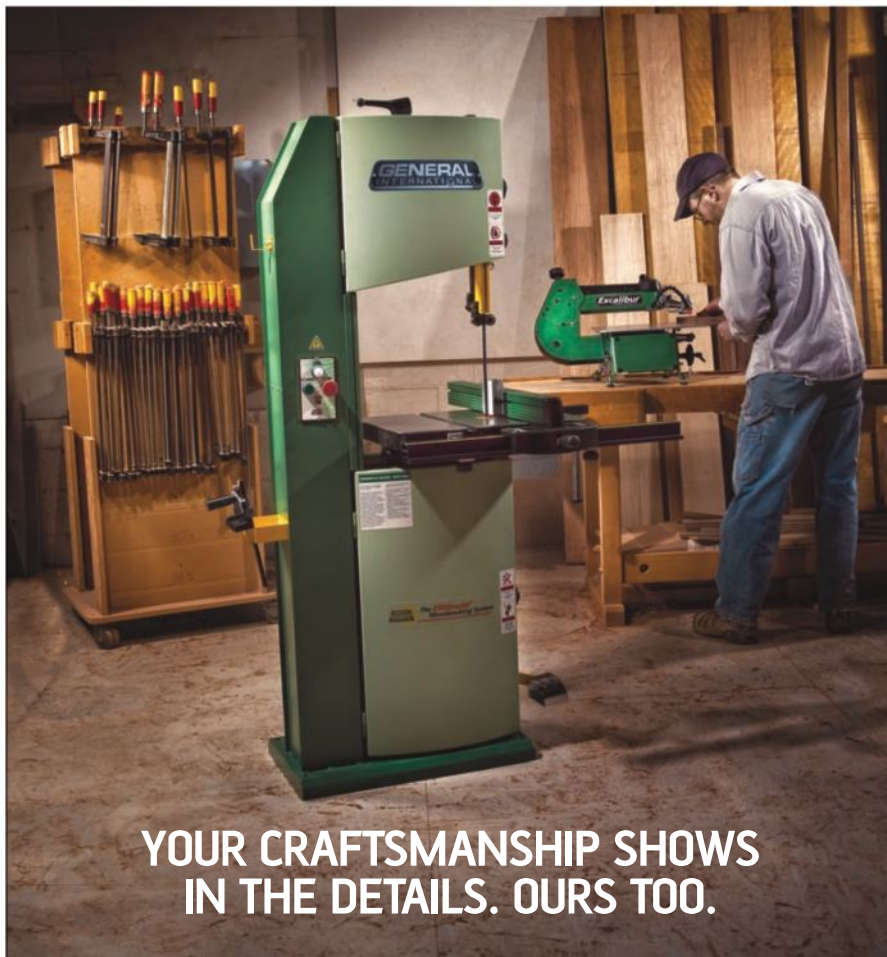
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Holiday Gift Box

By Carole Rothman

Tie this “present” up with a festive ribbon and bow you make from dyed veneer using a scroll saw.



Needing something different for holiday giving, I decided on a box that could either stand alone or serve to contain an additional gift. This mahogany box is the perfect showcase for its colorful adornment — a festive striped bow that looks complex, but is easily made with some patience, care and a lamination of maple and dyed veneers.

Laminating the Ribbon Stock

Begin by creating the stock for your ribbon/bow lamination. Although I generally use natural wood colors for my projects,

dyed-through veneers are ideal for setting a holiday theme. I decided that red and green veneer combined with strips of light, clear maple would be colorful and festive, and they contrast well with the mahogany box. I buy my thin maple veneer, which is typically about 1/32" thick or slightly less, but I make the thicker 1/16" veneer stock myself from resawn wood that is dimensioned with my SuperMax drum sander. For the dyed veneer, I ordered several pieces in red and bright green from a woodworking supply company.



Multiple laminations of clear maple and both dyed and plain veneer form blanks for the patterned ribbons, bow loops and tails.



Mount the paper pattern (page 32) to a 1"-thick square of mahogany that will become the walls of the box. Cut along the inside line to remove the large center waste piece.

I developed my lamination pattern by dry-stacking different pieces of wood until it looked like a real ribbon. Ribbons tend to be symmetrical, so I started at the center with a 3/8"-thick piece of maple. To make the first side of the lamination, I added a "sandwich" of one piece of maple and two pieces of green veneer, a 1/16"-thick piece of maple, another "sandwich" of one piece of maple and two pieces of red veneer, and another piece of 1/16"-thick maple. This completed the first side. I then added the same sequence of veneer to the other side of the center strip of maple. The final thickness of the lamination was 7/8". If, as a result of veneer thicknesses, your results are more than 1/16" off in either direction, you have two simple options. You can adjust your lamination by adding or removing wood symmetrically to reach 7/8", or redraw the "face" side of the loops and tails pattern to match the lamination thickness. Either option is fine.

Because the block has many layers,

glue it up in stages, working from the center and alternating sides to equalize the moisture added by the glue, and to minimize warping. I used a catalyzed PVA glue called Weldbond® which has a good "grab," dries clear, and cleans up easily, but any good quality wood glue should work. Apply the glue generously to one side of the maple and spread it evenly. Attach the first piece of veneer and slide it back and forth until it starts to drag. Add one or two more pieces and clamp tightly. I used a small veneer press made of 3/4" plywood and carriage bolts to clamp up my glue assemblies. To control slippage, glue no more than two or three pieces at a time. Let each stage dry thoroughly.

Cut the finished lamination into two strips, each 9 3/4" x 1". One strip is for the six loops needed for the bow. Cut a 5 3/4"-long piece from the other strip for the ribbons. The remainder of that strip is for the tails and one extra loop.



Spread glue around the bottom edges of the box wall workpiece, and clamp on the 1/4"-thick bottom panel.



Cut along the pattern's middle line to reduce the box walls to 1/8" thickness and to trim the box to final size. Already installed, the bottom will match perfectly.

Building the Box

Making the box is mostly a scroll sawing and sanding operation. First, make two copies of the paper pattern on the next page and spray mount one to a block of 1"-thick mahogany measuring at least 5 3/4" square. Drill an entry hole, and cut along the inside line with a #9 blade (it cuts thick stock quickly) to open up the box's center. For the sharp inside corners, cut to the end of a side, back up a bit, then cut a curve to the next side. Once



Smooth and square up the box lid with some careful work at the disc sander (right). When fitted on the box (above), the lid should slip into place with minimal side-to-side play.





Mark layout lines (left) for cutting strips of 1/16"-thick ribbon (top). Before sawing, sand the blank to smooth one of each ribbon's faces.



Glue and clamp one ribbon across the top of the lid, and clean up any squeeze-out (top). Line up and glue on two more ribbons to form a crisscross pattern (bottom).

the waste piece is removed, you can cut into the corners to remove the remaining small pieces. Sand the inside walls smooth. Next, keeping the grain aligned, glue and clamp a square of 1/4"-thick mahogany to the box walls (opposite the patterned face) for the box bottom. Clean up squeeze-out before it dries. To complete the box body, cut along the middle line of the pattern, just to the waste side of the line. Remove the pattern and sand the box faces smooth.

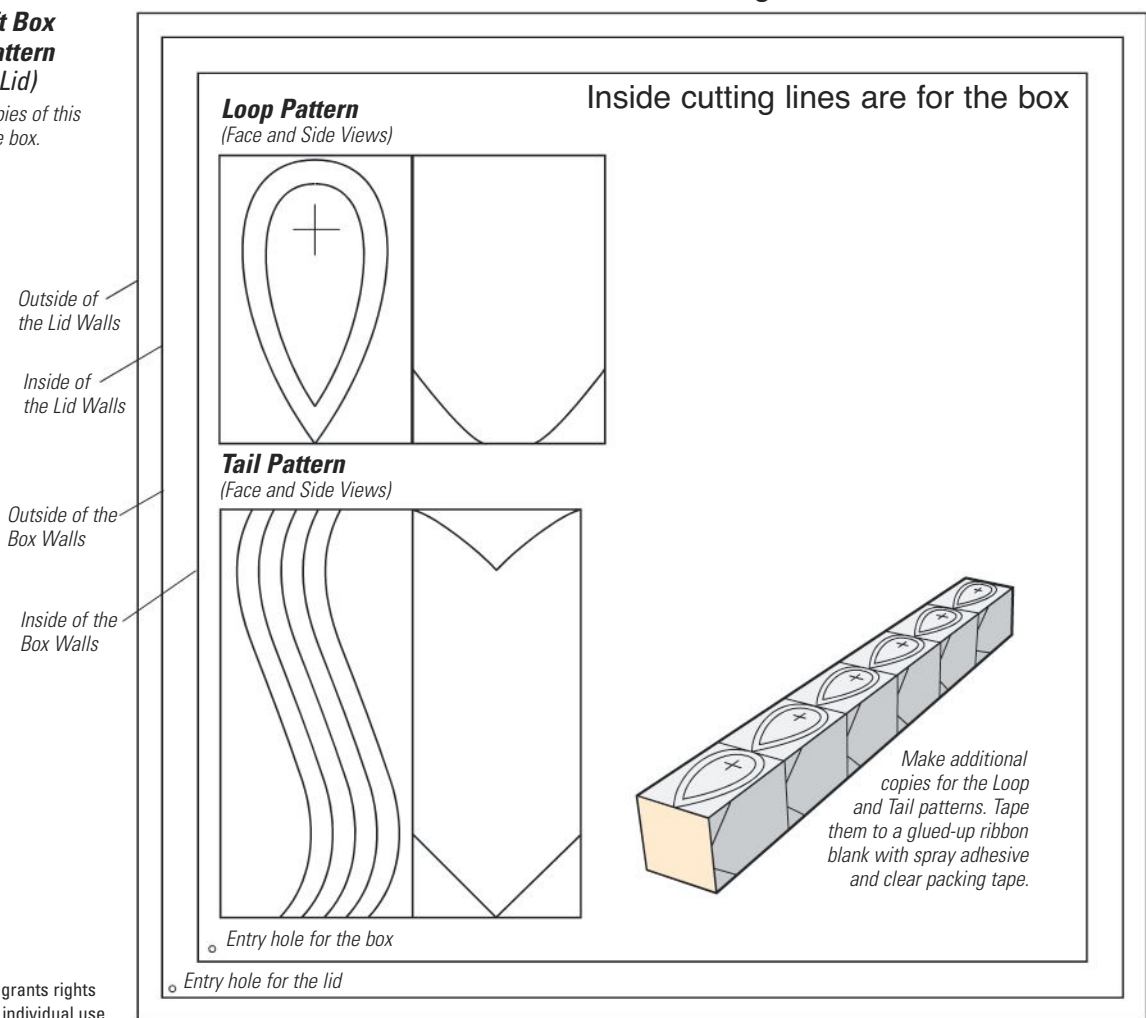
Follow the same process for making the lid: mount a fresh pattern to a second piece of 1/4-in. stock to form the lid walls. Drill an entry hole and saw along the center pattern line, using a #3 blade to create a smoother cut on the thin stock. Glue a third 1/4-in. blank to the lid walls for a top. When it dries, cut along the outer line and sand the lid to final size and shape.

Place the lid on the box body

Outside cutting lines are for the lid

Holiday Gift Box Full-size Pattern (Box and Lid)

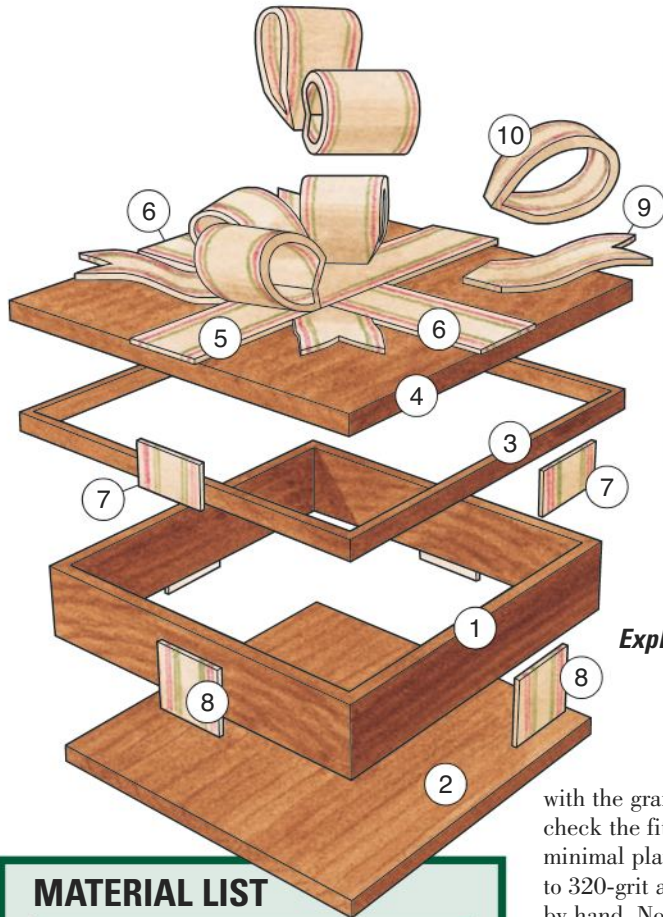
You'll need two copies of this pattern for the box.



Woodworker's Journal grants rights to copy this pattern for individual use.



Trim off the lid's overhanging crisscross ribbons, leaving them 1/16" proud of the edges (left). These ends will overlap the lid's side ribbons. When fitting them, hold a strip of ribbon in place and mark its length carefully, leaving a bit of overhang here (right). Cut and glue the short ribbons in place.



Exploded View



Sand the bottom ends of the ribbons flush with the box bottom. Then gently ease the corners of all the ribbons by hand with sandpaper to simulate that they are folded around the lid and bottom edges of the box.

MATERIAL LIST

	T x W x L
1 Box Walls (1)	1" x 5" x 5"
2 Bottom (1)	1/4" x 5" x 5"
3 Lid Walls (1)	1/4" x 5/4" x 5/4"
4 Top (1)	1/4" x 5/4" x 5/4"
5 Cross Ribbon, Long* (1)	1/16" x 7/8" x 5/8"
6 Cross Ribbons, Short* (2)	1/16" x 7/8" x 2/4"
7 Lid Side Ribbons* (4)	1/16" x 7/8" x 9/16"
8 Box Side Ribbons* (4)	1/16" x 7/8" x 1 1/16"
9 Tails* (4)	7/8" x 1" x 2/8"
10 Loops* (6)	1" x 1" x 1 1/2"

* Pieces 5-10 are cut from two blanks 7/8" x 1" x 9/4".
(See inset photo, page 30.)

with the grain aligned, and check the fit. It should have minimal play. Sand both pieces to 320-grit and soften all edges by hand. Now draw two intersecting pencil lines across the center of the lid and down the sides to guide the placement of the flat ribbon sections.

"Wrapping" the Box

You'll need to cut four flat ribbons to wrap around the box and lid. Cut these from the striped face of the 5/4"-long piece of the lamination, following a straight layout line for each cut. Sand the face of the blank before the first cut, then between each of the remaining

cuts so one face of the ribbons will be smooth. You'll glue the sanded face to the box; the other faces get sanded later.

Once the ribbons are cut, draw a line down the center of the sanded face of two of them. Center one ribbon across the top of the lid, matching the layout line on the lid. Glue and clamp this ribbon in place.

Cut the other ribbon in half and butt the pieces against the first ribbon, crosswise. Glue these shorter ribbons to the lid, making sure the stripes are continuous across the lid. When the ribbons dry, invert the lid and trim them so they overhang about 1/16" beyond the lid edges.

To make the lid's side ribbons, cut the remaining two ribbons in half. Invert the lid and align each piece vertically on the overhanging cross ribbons. Mark their lengths and cut the pieces slightly long. Glue them in place by rubbing them against the lid until the glue grabs, then clamp them briefly. Let the glue dry.

Now place the lid on the box and invert the assembly. Fit the remaining pieces of ribbon on the sides of the box, aligned



Mount a folded paper pattern of the bow tails around a blank of lamination so you can reference both the face and edge layout lines for cutting. Cut away the wedge first (left), then flip the blank on its side to make five curved cuts for the four tail workpieces (right).



with the lid ribbons and butted against the bottom edge of the lid. Mark where each ribbon meets the bottom of the box and cut them slightly proud. Glue them in place. When dry, sand the surface of the ribbons smooth and to uniform thickness, and sand all ribbon ends flush with the edges of the box and lid. Soften the ends of the ribbons so they appear to fold



Refine the contoured faces of the tails using a spindle sander or sanding drums in the drill press (left) and a belt sander (right). Smooth and shape the parts into flowing curves.



Glue the tails to the lid where the ribbons intersect. Small pieces of sponge can help keep these parts elevated while the glue sets.

around the top of the lid and box bottom. Then use painter's tape to mask off the center area of the lid where the loops and tails will be glued. Apply a sealer coat of shellac to the rest of the box and lid surfaces. When it dries, smooth the finish with 320-grit paper and peel off the tape.

Topping It Off with a Bow

The loops and tails of the bow are made with scroll sawn compound cuts. If you're new to this technique, try making some practice cuts with plain wood first. To make the tails, cut a piece 2½" long from the remainder of the strip you used for the flat ribbons. Fold the tails pattern and attach it with spray adhesive so that the side of the pattern labeled "face" is on the striped side of the strip. With the face side up, cut out the wedge from the top of the tails. Then turn the strip on its side and cut along the five curved lines to cut the four tails. Tape the tails and waste piece together again, so you can cut the pointed "bottom" end of the tails. Separate the pieces, and use spindle and belt sanders to shape them further.

Mask off the undersides of the tails at the bottom and spray-shellac the bare wood. After smoothing the finish with 320-grit sandpaper or 0000 steel wool, coat the bottoms of the tails with spray lacquer. Remove the tape and place the tails into position at the intersection of the lid ribbons. If needed, sand the tail undersides slightly to flatten them for gluing. Glue the tails into place, supporting their raised ends until the glue sets.

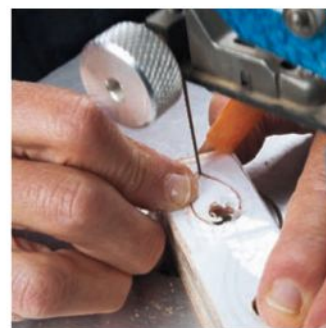
Now it's time for the loops. Photocopy and attach six Loop Patterns to the remaining laminated strip, face side of the pattern on the striped side of the strip. Cover the side to be drilled with clear packing tape to hold the paper securely. Drill 7/16"-diameter holes



Apply a piece of clear packing tape to hold the folded paper bow patterns in place on the lamination. The face side of the patterns should be oriented on the face side of the veneer.



Drill a 7/16"-diameter through hole at the crosshairs on each bow pattern to remove much of the inside waste.



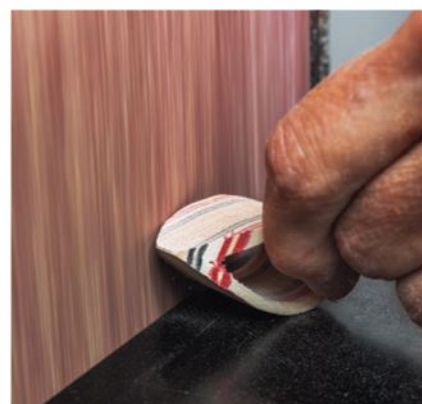
Cut away the remaining waste from inside the loops, then saw along the outer lines. Save the offcut.



Complete the compound cuts for the loops with the pattern's face side up. This will require that the offcut be taped back in place first.



Smooth the inside cutouts of the bow loops using a small diameter sanding drum for the curve and a file to refine the tapered end.



Shape the outside surfaces of the loops at a belt or disc sander. Work carefully to keep from sanding your fingers in the process.

where indicated to remove the bulk of the inside waste. Then cut out the loop centers with a #9 blade. To cut the outer line of the first loop, start at the bottom of the strip. Cut around the loop, remove it, then cut to the bottom of the next loop. Repeat until all loops are cut. Return the loops to their original positions on the blank and secure them with packing tape. Turn the strip face-side-up. Starting at the bottom, cut along the side lines to complete the tapered ends, then along the top straight line to free the loop.

Sand and shape each loop, and select one for the bow's center. Sand its point flat to form a gluing surface and mask that off. Mask the first 5/8" of the undersides of the other loops, too. Seal them all with shellac, and remove the tape when the finish dries. Glue the five loops, evenly spaced, to the center of the lid, then glue the center loop into place, and clean up any squeeze-out. Now you can finish the outside of the box and bow with several light coats of spray lacquer. Complete the box interior as you like, either with red- or green-colored flocking and paint or a clear lacquer.



Mask off the contact surface of each loop, and seal the wood with a coating of spray shellac. Then glue on the loops to form the bow. Small pieces of sponge are useful again to hold the loops in position. When the glue dries, finish your gift box with several light coats of spray lacquer.

Carole Rothman is the author of Wooden Bowls from the Scroll Saw (Fox Chapel).

Mission Oak Desk

By Ralph Bagnall



Inspired by designs from 1910, our author built these knockdown desks for his daughters as they headed off to college. They save space and are easy to assemble and disassemble by college kids on the move!

This year, both of my daughters were off to college in two different cities, so moving furniture was much on my mind. I wanted them to have a nice desk to work at, but I certainly did not want to burden them (or myself) with having to lug a large unwieldy piece up and down stairs. I collect antique woodworking books and found the answer in G. A. Raeth's book, *Home Furniture Making*. In it, he provided instructions and drawings for two different writing desks. Published in 1910 at the height of the Craftsman movement, one design features wedged through tenon construction, making it ideal as a "knockdown" piece that can be easily disassembled with no tools, and shipped flat (way ahead of IKEA). I knew that this design would have great appeal for young adults who want quality furniture but tend to move a lot, so I set to work updating the design.

In order to make the desk more stable and accommodate a typical laptop, I increased the depth to 16". I added a second tenon to the bottom shelf to stiffen the desk, and included a cutout for more leg room under the desk, along with some other minor changes.

Not every woodworker has a shop equipped to easily handle sizing and flattening large glued-up panels, so I decided to order two sets of panels from online sources to see how much they would cost and to test the quality of panels bought this way. You certainly can lay up your own, but if large, flat solid-wood panels are hard for you to deal with, ordering your panels pre-made may be an option (see page 40).

Large Solid-wood Panels

If you decide to glue up your own panels, make them just over the actual part sizes shown in the *Material List* on page 39. Not knowing exactly what I would receive in terms of quality, I ordered the pre-made panels well oversized. The panels for the middle and upper shelf were sized to include enough stock for the door frame, so I did not need to buy and size rough oak lumber. This also helps ensure that the door will match the color and grain of the desk. You will also need a half sheet of 1/2"-thick oak plywood for the door panels and the back of the desk.

The panels were delivered from both vendors in multiple packages. They were very well wrapped and protected, and none of them suffered any damage in shipping. One vendor provided me with quartersawn white oak, and the other with plainsawn. I unpacked the panels and laid them flat with stickers in between for a couple of days to allow them to acclimate. Both sets were uniform in thickness and sanded to what looked like about 80-grit. There was some minor bowing in the plainsawn panels not seen in the quartersawn stock, but that is as expected, and none of the bowing was enough to worry about. I was very pleased with the quality of what I received. The quartersawn set was \$409 with shipping and the plainsawn ended up at \$337.



Joint one edge of each side panel to ensure a straight reference edge for ripping these workpieces to width. A magnetic featherboard on the jointer table helps keep the tall panels pressed against the fence.



Use a template to draw the shapes of the desk sides on the panels, and cut them slightly oversize with a jigsaw. Any resulting tearout from the blade can be cleaned up with a router.



A router and a flush-trim bit removes waste from the mortises before squaring them up with a chisel. The bit's bearing follows cutouts in the template, which is clamped below the workpiece.



The sides need a groove to receive the back. A router and straightedge are the best way to make this cut. Here, the author's router attaches to a base that rides along the straightedge.

The Side Template

In order for the desk to come out square and straight, the two sides must be exactly the same, so taking the time to make a full-scale template pays off. I laid out the dimensions on a quarter sheet of 1/2" plywood. I cut and sanded the profile and mortise locations. Make sure that everything is true: any flaws in the template will be repeated on the parts. Also be sure that the mortises are sized properly for the thickness of the panels you are using. You want the tenons to be a bit loose in the mortises. And do not forget to drill the hinge location hole as well.

When the template is ready, clamp it in place and mark the outline of the sides on both larger (18" x 50") panels. Removing the template for now, use a jigsaw or band saw to cut out the side shape, being careful to leave about 1/16" extra around the outside edges in case of some splintering here or there.

Once again, clamp the template to the side, making sure it is within the rough cut just made. Chuck a 1/2"-diameter flush-trim bit into a handheld router, then trim the side to the template, being careful that the template does not shift as you are working. Before removing the template, you can also rout out the mortises. Use a 1/16" pilot bit to drill through the center of each mortise location on the template, then drill a 5/8" hole with a Forstner bit, using the pilot hole as your guide. Drill halfway through with the Forstner, then flip the part and drill through from the other side. This prevents tearout as the bit cuts through the other side.

With the router turned off, set the flush-trim bit through the hole, ensuring that the bit is not touching the wood. Hold the router steady as you turn it on and remove the waste inside the mortise (photo above left). Now the template can be removed and the mortises squared up with a chisel. If you try to chop through from one side, the grain can break away as you reach the bottom of the mortise. Work through from both faces toward the middle for the best results.

Next, mill a groove to accept the back. This is the point where the sides become left and right, so lay them out carefully. The important thing is that the sides are mirrored to each other. Use a straightedge and rout a 1/2" groove from the top of the part to the mid-point of the bottom mortises. The groove should be 1/2" in from the back and 3/8" deep (see photo at left).

The last step is to drill the pivot hole for the hinge. Lay the template on each inside face and drill the 9mm pivot hole 1/2" deep into each side part. Be careful not to drill all the way through the sides.

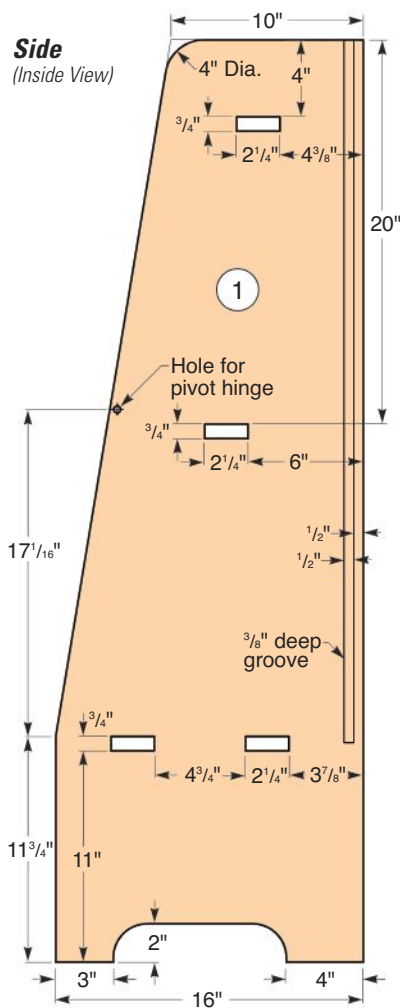
The Shelves

Take your panels to the jointer to straighten one edge, and rip them to final width at the table saw. The bottom shelf is ripped to 16", the middle to 12 3/4" and the top shelf to 9" wide. Save the offcuts, especially from the middle and top shelves, and set them aside for now. (This will be the stock for the door's frame.) Now crosscut the shelves to 34 1/2" long.

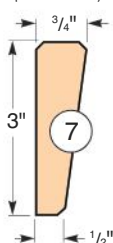
The middle and top shelf get a single tenon on each end, exactly centered. (See the *Drawings* for details.) Each tenon gets a through mortise for the wedge. These will need to be chiseled out from both faces, just as you did with the mortises in the sides, so be sure to mark both shelf faces before you cut the tenon shoulders to shape.

Since all the tenons are the same size, I made a story stick to

Side
(Inside View)



Wedge
(Side View)



speed the layout. Mark the shoulder line and three lines for the through mortise, as shown in the dimensioned *Drawings*. Cut the shoulders away, being careful to keep them square to the face of the shelf. Once the shoulders are removed, you can cut the outside corners of the tenon at 45 degrees using the layout lines.

The mortises can now be chopped through. You want to cut the mortises 3/4" across the grain, but only 5/8" along the grain. The outside face of the mortise is cut at an angle to match the wedges, but for now just cut them 5/8" wide. Again working from both faces to the center, drill a 1/2" hole through the waste, and square up with a chisel.

To create the angle for the wedge, choose the best face to be the top of the shelf. With this face up, use a chisel to chop from the outer line of the mortise down to the existing opening at the bottom of the mortise.

The bottom shelf gets two tenons on each end. They are made the same as those on the other shelves, but they are NOT centered. The back panel of the desk sits on top of the lower shelf, so be sure to lay out the tenons so that the back shoulder of the shelf is 1" longer than the front.

The top shelf gets a 9-degree bevel cut along the front edge for the door to rest against when it is closed. Be sure to orient this cut so that the bottom face of the shelf is wider than the top face.

The bottom shelf gets a section cut out of the front edge for some extra leg clearance. Use a jigsaw to cut this out, and sand the edge smooth. This is a good time to dry-fit the desk and confirm that all the tenons line up properly and fit in their mortises.



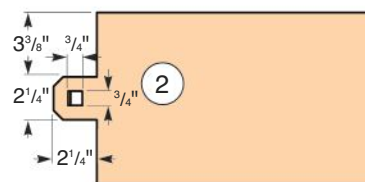
Exploded View

MATERIAL LIST (Desk)

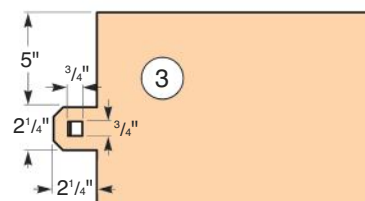
	T x W x L
1 Sides (2)	3/4" x 16" x 48"
2 Top Shelf (1)	3/4" x 9" x 34 1/2"
3 Middle Shelf (1)	3/4" x 12 1/4" x 34 1/2"
4 Bottom Shelf (1)	3/4" x 16" x 34 1/2"
5 Back Panel (1)	1/2" x 30 1/2" x 36"
6 Back Panel Edge Band (1)	1/4" x 1/2" x 36"
7 Wedges (8)	3/4" x 3/4" x 3"

Shelf Details

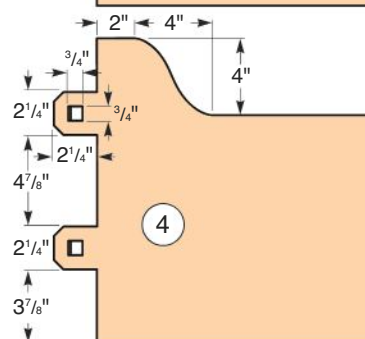
Top Shelf
(Top View)



Middle Shelf
(Top View)



Bottom Shelf
(Top View)





A simple two-piece story stick is helpful for marking the mortise shapes on the shelves. It provides dimensional reference marks for uniformity as well as a square edge for drawing lines.



The outer walls of the mortises need to be angled by 1/8", top to bottom, to accommodate the tapered wedges. A chisel makes short work of these cuts. Two layout lines establish the limits of these angles.



The door is a standard frame-and-panel construction. Make the inside face of the panel flush with the frame to create a flat work surface.

Desk Hard-to-Find Hardware

The following supplies are available from Woodworker's Journal.

Pivot Hinges (2) #30007 \$4.19 pr.

Threaded Brass Inserts (2) #33183 \$7.39 (8 pk.)

Brass Thumbscrews (2) #70003 \$7.39 (4 pk.)

To purchase products online, visit www.woodworkersjournal.com and click on the "Store" tab. Or, call 800-610-0883 (code WJ1363).

The author purchased plainsawn oak panels from KenCraft Co. (www.kencraftcompany.com, 419-536-0333) and quartersawn panels from Advantage Trim and Lumber (advantagelumber.com, 877-232-3915).



The Back

Rip the 1/2" oak ply to 30 3/4", then crosscut one end square. Edge-band this end with a thin piece of solid oak, left over from ripping the panels, to hide the panel's edge plys. After the glue dries, trim the banding flush if needed and crosscut the panel to 36 1/4" long. The back slides into the grooves in the sides and rests on the bottom shelf. If the fit is snug and the back is square, it will keep the desk square during use.

The Door

The door is a standard frame-and-panel style. The only critical detail is that the back of the door becomes the work surface of the desk when opened. This means that the panels must be flush with the frame in back, and have no real gap between the panel edges and the frame.

Start by cutting two panels, 11 5/8" x 11", from the leftover 1/2" plywood. Next, rip the leftovers from your shelf panels to 3" wide, and crosscut them into two stiles, two rails and one center stile according to the *Material List*. Next, set up a stacked dado and cut a 1/4"-wide by 1/2"-deep groove into one edge of the stiles and rails, and both edges of the mid-stile.

If the ply panel were exactly 1/2" thick, this groove would be centered on the stiles and rails. But you will have to adjust for the actual panel thickness. With the grooves cut, widen the dado stack and cut 1/2"-long tenons on both ends of the rails and mid-stile. Remember, your groove is probably off-center, so you have to cut the tenons in two setups to match any offset.

Once the frame parts fit properly, cut a 1/2"-wide rabbet all the way around your panels. The depth of the rabbet must be the same as the inside shoulder of the frame. This should leave a 1/4"-thick tenon on the panel edge that fits perfectly in the frame groove. Assemble the door and set it aside to dry.

Wedges

You can cut the eight wedges out of the scrap left over from the sides or the bottom shelf. They are 3" long, 3/4" thick and taper from 7/8" at the top to 1/2" at the bottom. They are small, so cutting them out on the band saw and sanding them smooth is the safest way to go.

Finishing

Since the desk is designed to assemble without fasteners, finishing is easy. All the parts were sanded to 120-grit prior to stain-

MATERIAL LIST (Door)

	T x W x L
8 Door Rails (2)	3/4" x 3" x 24 3/4"
9 Door Stiles (2)	3/4" x 3" x 16"
10 Center Door Stile (1)	3/4" x 3" x 11"
11 Door Panels (2)	1/2" x 11" x 11 1/4"
12 Pivot Hinges (2)	Rockler item #30007
13 Door Chains (2)	Brass Sash Chain

ing. I used Minwax® Toffee water-based stain to simulate a traditional fumed oak finish. There are large areas to cover, so apply the stain to small areas, wipe it off right away, and keep a wet edge working to maintain as even a tone as possible.

The water base will raise the grain, so sand again using 220 once the stain is dry, then apply your top coat. I sprayed on several coats of Minwax Polycrylic, sanding with 400-grit between coats. I also applied a generous coat of paste wax to all the parts. This greatly helps with assembly and disassembly when the desk needs to move.

Assembly

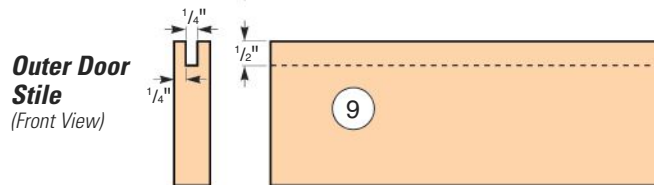
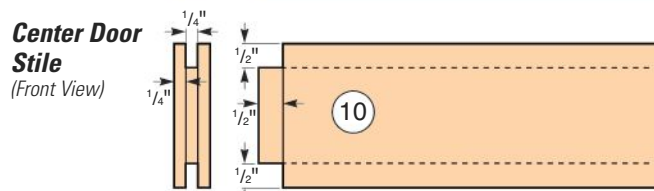
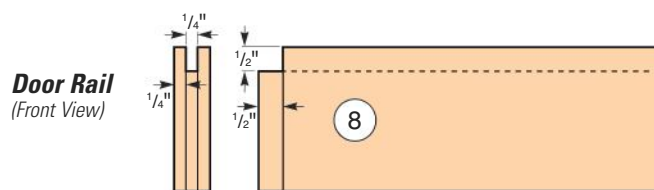
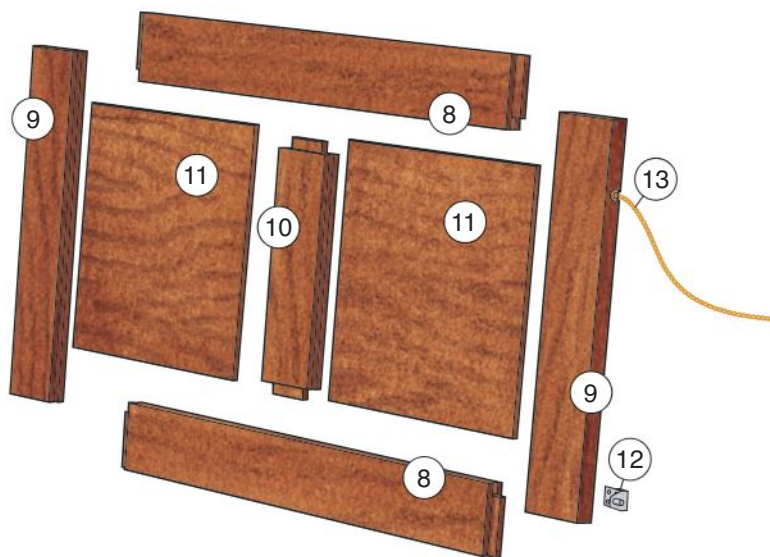
With the finishing done, the door needs hinges added and chains attached to hold it flat when being used. The hinges mount on each end of the door with the pivot pin 1/2" up from the door bottom. They are surface-mounted with two supplied screws, and can be adjusted to square up the door when closed.

The easiest way to assemble the desk is to stand one side on its back edge and slip the bottom shelf through the side, securing it with two wedges. Then the middle and top shelves can be locked in as well. The second side is slid over the shelf tenons and the door pivots inserted into the sides just before the second side is seated. Insert the rest of the wedges and stand the desk up. Lastly, slip the back into place.

The final bit of assembly is to attach support chains for the door. Flat-link brass sash chain is a good choice here. Cut two lengths of chain at 18" long. The chains attach to the door in a small mortise on each side. A 5/8" Forstner bit cuts the mortise. (I used a roller stand to support the door and hold it parallel to the floor as I attached the chains.) Since the mortise is offset to one side, a block clamped to the door keeps the bit from "skating" as you drill about 1/2" deep. Attach the chains with a pan-head screw driven into each mortise. Center the screws.



A scrap block clamped to the door is used to steady the bit for drilling an off-centered mortise for the support chains. A 5/8" Forstner bit will produce nice, flat-bottomed mortises here.



The other end of the chain attaches with a brass thumbscrew to a threaded insert in the desk side. The exact location of the insert will vary depending on your chain and the hinge placement. With the door still supported, simply stretch the chain taut to the inside of the desk at about a 60 degree angle, and mark through the end loop using a punch. This should be about 2" in from the front edge of the side. Drill a 3/8"-diameter hole 1/2" deep and screw the insert in. You may need to widen the end loop of the chain to accept the 1/4-20 thumbscrew. Do this for both sides, and you are done!

You can add a pull to the front of the door if you wish. It is not needed since the top of the door is exposed and can be opened easily. The knob might also be in the way when seated at the desk, and I wanted all the parts to lie as flat as possible when the desk is disassembled.

This is a pretty simple build and looks great. Best of all, it can be taken apart, moved to a new location and reassembled in minutes and with no tools needed.

Ralph Bagnall is a woodworking consultant and author working from his home in Murfreesboro, Tennessee. His website is www.consultingwoodworker.com.



Mighty Mini Fridge Magnets

By Rob Johnstone

Little does not need to mean wimpy, and using rare-earth magnets in these tiny turnings provides plenty of paper-holding power.



How do you define a big winner when it comes to a gift project? Well, one way would be if you can use up some of that “too good to throw away but too small to really use” lumber you’ve squirreled away over the years. Another answer might be that the gift is easy and quick to make. Still another possibility could be that the gift is both practical and pretty. But a surefire big winner would combine all of the above.

These little turned refrigerator magnets are just that. Technically, they are not at all challenging. No one has ever made

the mistake of calling me an expert woodturner. I love to turn wood, but I can almost see the consternation on Ernie Conover’s face when he sees photos of me on the lathe. That’s one of the nice things about these turnings ... they are not precise nor do you feel badly if one of them gets thrown into the burn bin.

The Basic Barrel

Anyone who can rough out a simple cylinder can make a pile of these magnets. You can turn them between centers if you choose, but if you have a scroll chuck on

Even a turner who is more enthusiastic than expert can make these handy magnets. The author uses NOVA’s new pen turning jaws on his scroll chuck to aid this process.

your lathe — that is the clear deal. I was lucky enough to get my hands on NOVA’s new Pen Plus Jaw Set, which made the process even easier (see upper inset photo at left).

All I did to make these pieces was to mount a sticked-up piece of wood in the jaws of the chuck and start out by rounding over the edges with a roughing gouge.



I quickly moved on to a spindle-turning gouge and used it to make the basic shapes. I followed that up in some cases with a square-ended scraper. When I had the shape I wanted, I broke out the sandpaper and smoothed the little piece out. At that point, I parted it off the stock.

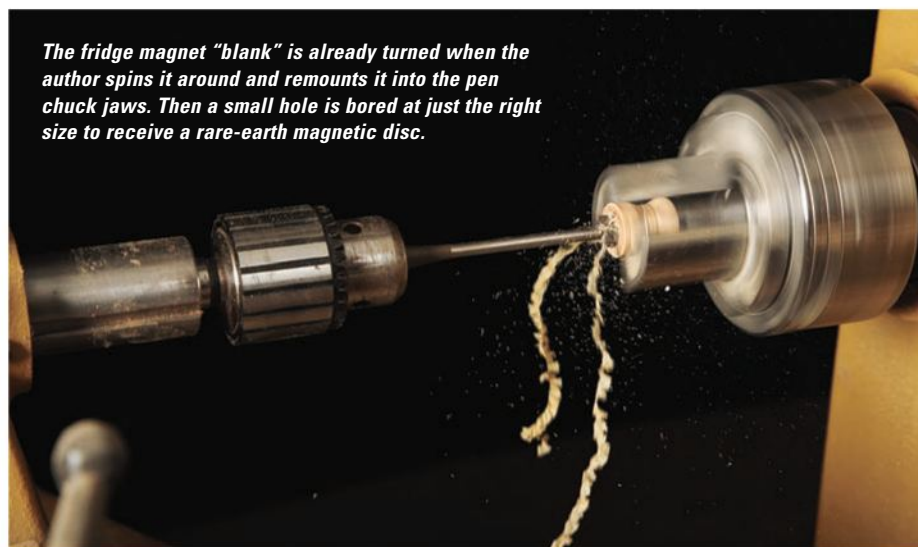
Because I wanted to be able to easily drill out the recess in the bottom of each little turning, I made them all of a size that could be held in place in the pen jaws. You could also make a “universal” jam chuck for the little fellows if you kept them within tolerances to fit into a tapered hole that you can turn into a faceplate-mounted, thick piece of wood. Then, using a drill chuck mounted in your tailstock, tighten an appropriately sized drill bit into the chuck and bore out the magnet hole.

Glue the magnet in the hole with CA glue or two-part epoxy. When it is cured, apply a finish. (See our *Finishing Thoughts* department on page 82 for a slick way to get a finish onto small pieces.)

Making of Many

One of the primary things I liked about this project idea was the fact that I could make a whole bunch of them in a relatively short period of time. To speed the process a bit, I established a systematic approach to making them.

First, I set out my turning tools on a surface close at hand: roughing gouge, spindle gouge, square end scraper and the parting tool. Then I prepared several small pieces of sandpaper — 100-grit,



The fridge magnet “blank” is already turned when the author spins it around and remounts it into the pen chuck jaws. Then a small hole is bored at just the right size to receive a rare-earth magnetic disc.

150-grit and 180-grit — and put them within easy reach. Next, I went on a scavenger hunt through my scrap bin and found appropriately sized chunks of wood. On my band saw, I ripped them square in section to a size easily grabbed by the pen jaws. Now I was ready to spin some wood.

With a blank in the chuck jaws, I roughed the cylinder quickly, then followed with the spindle gouge and scraper. I let the shapes kind of come to me ... and if I didn’t like the outcome, and there was not enough stock remaining to “fix” my errant design, I just turned the lathe off, tossed the piece and started over.

If I liked what I was seeing, I sanded quickly through the grits and parted the piece free. I set the turned pieces aside and started with a new blank until I had a dozen or so ready for drilling. (Sometimes a second look at my completed turnings ended up with an additional

contribution to the burn box. Hey, not all ideas are genius.)

I quickly bored the holes for the magnets in a similar “production line” fashion, and then moved on to gluing the little metal disks in place. Then it was time to dye or stain the pieces, and on to the dipping-and-drying finishing process. Allow the finish to cure, and you’ve got some sweet little fridge magnets that will kick the butts of any of those flat, free, advertising-covered fare. I mean, who wants a wimpy magnet?

Now, for a comment on the rare-earth magnets. I know that they are not cheap. But when you combine your inspired turnings and the power of the rare-earth magnets, you’ve got something that folks will keep around for a long time. And that’s another aspect of a perfect gift!

Rob Johnstone is the editor in chief of Woodworker’s Journal.

Fridge Magnets Hard-to-Find Hardware

The following supplies are available from Woodworker’s Journal.

3/8" Rare-earth Magnets (1) #32907 \$11.99 (10 pk.)

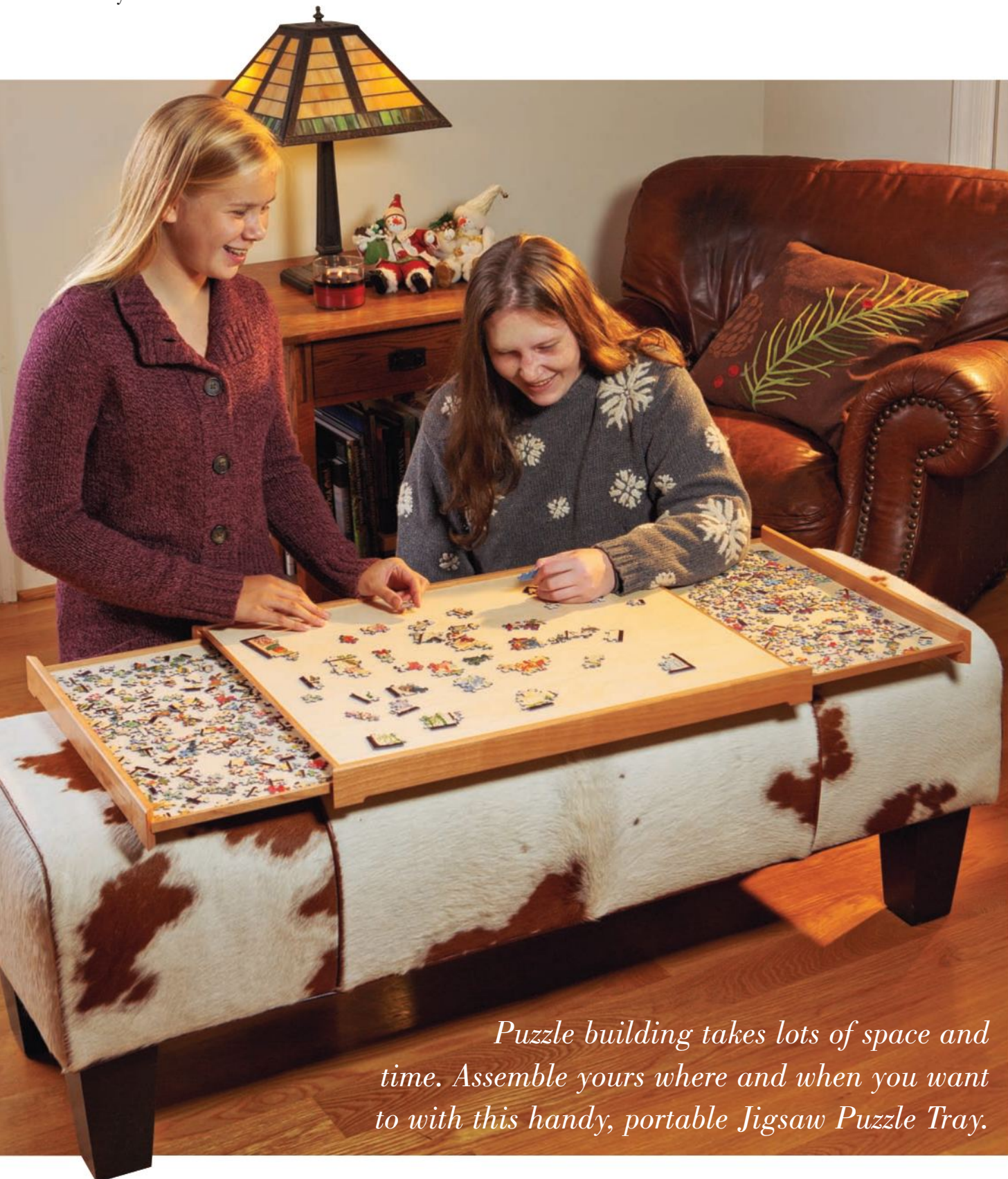
1/2" Rare-earth Magnets (1) #30810 \$14.99 (10 pk.)

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Jigsaw Puzzle Tray

By Chris Marshall



Puzzle building takes lots of space and time. Assemble yours where and when you want to with this handy, portable Jigsaw Puzzle Tray.



Rip overly wide wood strips for capping the ends of the top panel, and glue and tape them in place (left). When the glue dries, rout the overhanging edging flush (center). The author clamped the workpiece against a long, notched scrap to add stability for the router base (right).

When Grandma Jan visits for the holidays, we lose our kitchen table for a week to family puzzle making. I'm all for that tradition, but holding a dinner plate on my lap does get old. If you can relate, then here's a project that can take back your table without ruining the good time. Our Jigsaw Puzzle Tray gives you space to assemble a 500-piece puzzle, and two pullout trays let you spread out the pieces. Now you can do puzzles wherever you like, or pick it all up and move midway through without dismantling it. Portability at last! Here's how to make a tray for your puzzle fans.

Building the Housing

Study the *Exploded View Drawing* on the next page, and you'll see that this project

consists of a main housing with grooved and mitered sides that hold a pair of top and bottom panels in place. A center support helps keep the 1/4"-thick panels flat. The pullout trays slide in and out on a pair of grooves in the sides, and they are held open or closed with magnets recessed in the housing bottom panel and on the bottom inside ends of the trays.

Start by cutting your top (piece 1) to size, according to the *Material List* dimensions. I used Baltic birch plywood throughout. Cut two edging strips (pieces 2) from solid wood to cover the ends of the top panel and dress it up. I made mine 1/4" thick by 3/8" wide before centering and gluing the edging in place. When the glue dries, trim the edging flush with the plywood using a small

router and a flush-trim bit to reduce it to its 1/4" x 1/4" final size. Now measure your top panel's overall length, and cut a bottom panel (piece 3) to match it. The bottom panel has no wood edging.

Next, mill a 32"-long piece of 1/2"-thick, 4 5/8"-wide stock so you can make both side pieces (pieces 4) at the same time. (You'll split them down the middle when you're through.) Notice in the *Drawings* on page 46 that the top and bottom panels fit into 1/4"-deep grooves in the sides. Since plywood is undersized in thickness, even a 1/4"-wide dado blade will be too wide for cutting these grooves. So, I just used a standard ripping blade with flat-topped teeth for this task. Start by setting your rip fence 1/4" away from the blade and cut the outer-

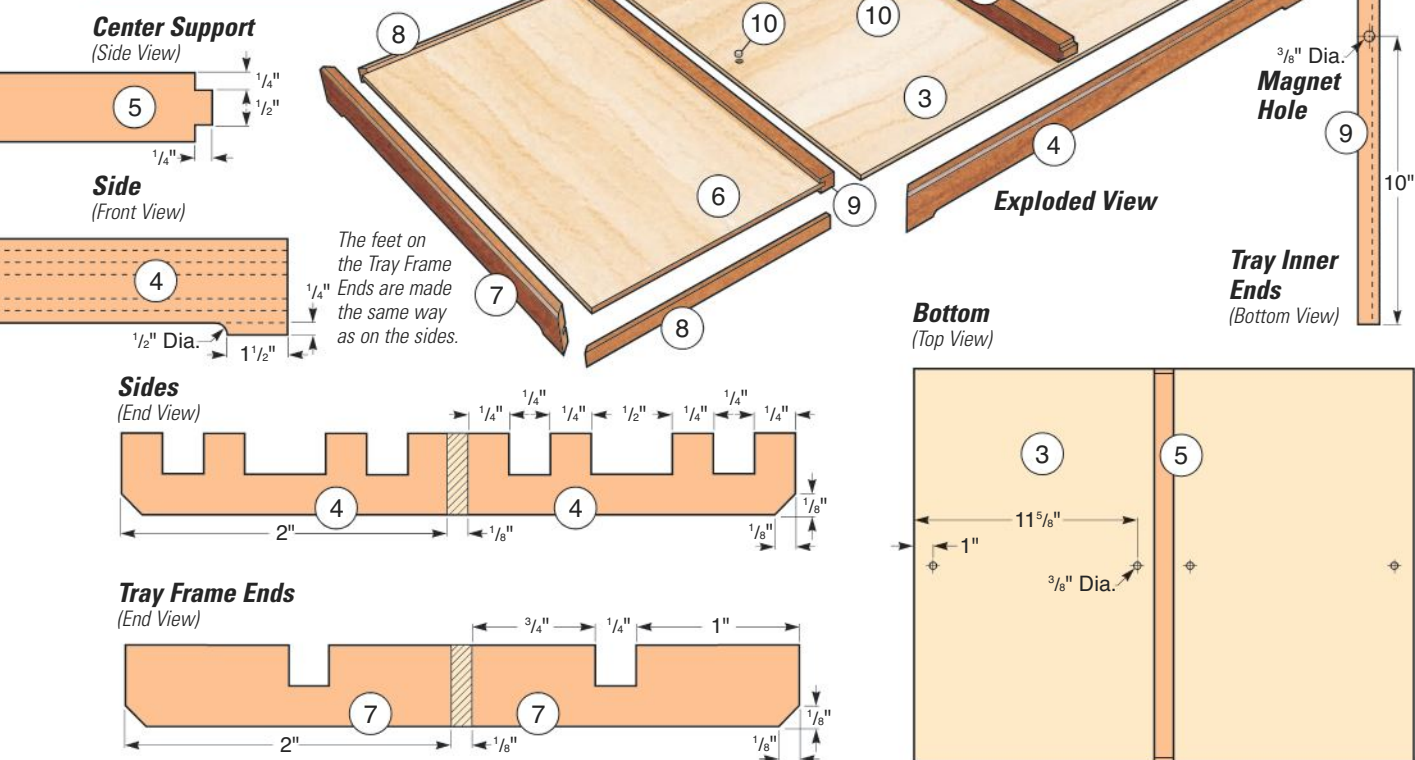


Make a test piece to help dial in your blade settings for cutting snug-fitting grooves in the sides (top left). A standard ripping blade can mill both the narrow panel grooves and the wider tray grooves in the doubled-up blank (top center). Rout a stopped channel along the workpiece to form curved feet on the housing sides (bottom center). Then split the board to form the project's two housing sides (right).



MATERIAL LIST

	T x W x L
1 Top (1)	1/4" x 20 1/2" x 25 1/2"
2 Top Edging (2)	1/4" x 1/4" x 20 1/2"
3 Bottom (1)	1/4" x 20 1/2" x 26"
4 Sides (2)	1/2" x 2" x 27"
5 Center Support (1)	1" x 1" x 20 1/2"
6 Trays (2)	1/4" x 11 5/8" x 20"
7 Tray Frame Ends (2)	1/2" x 2" x 21"
8 Tray Sides (4)	1/4" x 1/2" x 12 1/8"
9 Tray Inner Ends (2)	3/4" x 3/4" x 20"
10 Magnets (6)	1/8" x 3/8" Dia.



most grooves for the top panel first; flip the workpiece end-for-end after the first cut to make a matching cut along the other edge (it will become the second side piece). Shift the fence and cut again

to widen the first cuts until the grooves fit the top panel snugly. When you are satisfied, reset the rip fence 1 1/2" away from the blade and repeat the process for forming a pair of grooves to accept the

bottom panel. Then finish up the side-piece grooves with enough side-by-side passes to create two, 1/2"-wide tracks for the tray side pieces.

Dry-fit the sides, top and bottom panels to check the final size of the center support. It should seat easily in the tray grooves and fit flush between the inside panel faces.

Start these wider grooves with the fence set 3/4" from the blade. I recommend carrying out this grooving process on a matching test piece before you cut each of the grooves on your final workpiece. That way, you'll have your fence settings dialed in and know exactly where each of these grooving cuts will land.

Now head to the router table with your side workpiece so you can rout a channel through the middle of it. We'll use a 1/2" straight bit here as a nifty way to create the curve-ended profile for the feet on the bottoms of the side pieces.

Mark your fence so you can start and stop the cuts accurately to rout a centered, 24"-long channel. Start the milling process with the bit set low, and raise it with each pass until it pops through the top of the workpiece. Flip the wood end-





Drill shallow holes for four rare-earth magnets in the bottom panel, and cement them in with two-part epoxy (left). Glue and clamp the top and bottom panels to each side piece to create the main housing (above). Grooved offcuts left over from mitering the housing sides made handy clamping aids here.



The author found a 23-gauge pin nailer helpful in keeping thin, narrow parts aligned as he glued and attached the tray sides flush with bottom faces of the tray panels.

for-end after each pass to keep the channel centered. Then, widen the slot to 5/8" by shifting the fence 1/16" further away from the bit and making two more passes.

Finally, chuck a chamfering bit into your router, and form 1/8" chamfers along the outside edges of your "sides" workpiece. Rip it in two back at the table saw with a standard 1/8"-kerf blade.

You're ready to miter-cut the ends of your side pieces to 45°, but measure the length of the top and bottom panels carefully to verify where to make these cuts. The inside corners of the miters on the side pieces should just intersect the ends of the top and bottom panels when they're installed in their grooves.

Once the miters are cut, set the sides aside and prepare a piece of 1" x 1" stock for the center support (piece 5). Cut a pair of 1/4"-long, 1/2"-thick tongues on its ends, either with a standard blade or a dado set. These tongues should seat neatly in the wider tray grooves on the housing sides. Glue the center support across the middle of the bottom panel's top face.

Round up four rare-earth magnets (pieces 10) for the bottom panel. They will keep the trays closed during transport or from falling out of the housing when pulled open. Locate them according to the *Bottom Drawing* on the previous page. Use a 3/8" Forstner bit to drill shallow holes that will sink the magnets until they're flush with the panel's top face. Attach them with dabs of epoxy, but first, **make sure** their "face up" polarity

matches, before gluing them in place.

Final-sand the housing parts, and apply a coat of finish onto the top face of the bottom panel and the bottom face of the top panel. When it dries, go ahead and glue the panels into their grooves in the sides to complete the housing. I glued the panels to one side piece at a time — it made the assembly process easier.

Making the Trays

Form the tray frame ends (pieces 7) the same way you made the housing sides: start with a double-wide workpiece plus an eighth inch for blade kerf, mill a 1/4"-deep groove for two tray panels (pieces 6), and cut a centered channel at the router table to create feet on these two parts. Split the workpiece to bring the tray ends to final width. Don't forget to add the top chamfers. They should match the chamfer proportions on the housing sides. Then miter-cut the tray frame ends carefully, "nibbling up" on a good fit against the housing's side miters.

Rip thin strips of solid stock to create four side pieces (pieces 8) for the trays. The last parts yet to make are the 3/4" x 3/4" inner ends of the trays. Take two 20" sticks and plow a 1/4"-deep, centered groove along one edge of each piece to fit over the tray panels. Then recess and glue a single magnet into the bottom faces of these two parts, centered on their length and width. Make sure their polarity will attract the bottom panel magnets first, before attaching them.

Finish-sand the tray components and assemble them in this order: Glue the mitered ends to the panels, making sure the parts are square. When the glue dries, add the inner ends. Then miter-cut one end of the tray sides to fit against the tray end miters, and glue them in place. Align their bottom edges flush with the bottoms of the panels. A few 23-gauge pin nails were a big help for me to keep these thin, narrow parts aligned.

Slip the trays into their openings to check their action in the housing grooves. If there's resistance, hand-sand the tray sides as needed to loosen their fit a tad. Then, topcoat the remaining bare surfaces, and your new Jigsaw Puzzle Tray is ready for many hours of puzzle making to come. I hope it's a holiday hit!

Chris Marshall is a senior editor of Woodworker's Journal.

Jigsaw Puzzle Tray Hard-to-Find Hardware

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Shop Test



What's New in Routing Products

By Chris Marshall

While 2013 hasn't produced much in the way of new routers, here's a look at some fresh bits and accessories that could sweeten up the router you already own.

A year ago at this time, I was unpacking five late-model compact routers and preparing them for a big tool test. It's always a "kid in a candy store" experience for me to share the latest tool news with you, especially after trying out a bunch of recently minted routers.

Well, life is full of ebbs and flows. This year, the router industry has been very quiet on the tool side — just one updated model to report. But, in the absence of other new machines, the routing products industry has been busy in 2013. A variety of new bits and gadgets have come to market, and they could help make your routing time safer, cleaner and more effective — or save you a little cash. Here's this year's freshman class.

Newsworthy Bits

If you've ever been confronted with the limited "reach" of flush-trim bits into the inside corners of a template, Amana Tool just released the smallest diameter flush-trim bit in the industry — its MR0102. This tiny cutter features a 3/16"-diameter pilot bearing and two carbide flutes. The diminutive size should help you sneak that much closer into those really tight corners or nibble away smaller bites on tearout-prone woods. The 1/4"-shank MR0102 is the latest addition to Amana's miniature bit line, which includes four other small-diameter profiles: rabbet, ogee, chamfer and roundover. It sells for \$20.06.

Buoyed by the success of its 1/2"-shank Quadra-Cut™ bits, Freud is continuing to expand the profiling options for routers with 1/4"-capacity collets. This year, Freud has launched four more SKUs, which include 1/2"- and 1/4"-radius beading bits (36-116 and 36-110 respectively), a Roman ogee with 1/4"-radius

curves (38-102) and a 3/8"-radius roundover bit (34-114). Quadra-Cut bits feature a unique four-cutter configuration with two cutters shearing up and two shearing down, lending a cleaner cut with no burn marks. The new 1/4" Quadra-Cut bits range in price from \$32 to \$41.

CMT USA realizes that not every router user needs every production-grade router bits, so its new black-colored Contractor series offers quality features priced for the occasional user. Some 60 different profiles are now available, with heat-treated, 1/4" shanks and bodies for durability. The cutters also feature anti-kickback design and CMT's proprietary Sinterhip Hi-Density Carbide™.

The company calls its new bit line a "premium brand for contractors and remodelers that guarantees reliable, quality woodworking and long-lasting performance." CMT's Contractor bit prices range from \$11 to \$30.



Compared with the typical 3/8" flush-trim bit at left, Amana's new MR0102 cutter is tiny indeed. It's made to hug tighter inside corners.



Freud continues to expand its 1/4"-shank Quadra-Cut bit options with new beading, ogee and roundover profiles.



Cost-conscious but not compromising, CMT's extensive range of new black Contractor bits promise durability and performance for the jobsite or woodworking shop at more affordable prices.



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Credit Card Sized Bit Sharpener

Did you know that you can refresh the edges of a router bit by rubbing the back, flat faces of the carbide against a sharpening stone? For that task, Trend Routing Technology now offers a 600/1,000-grit extra-fine Carvers Stone (model DWS/CS/FF;

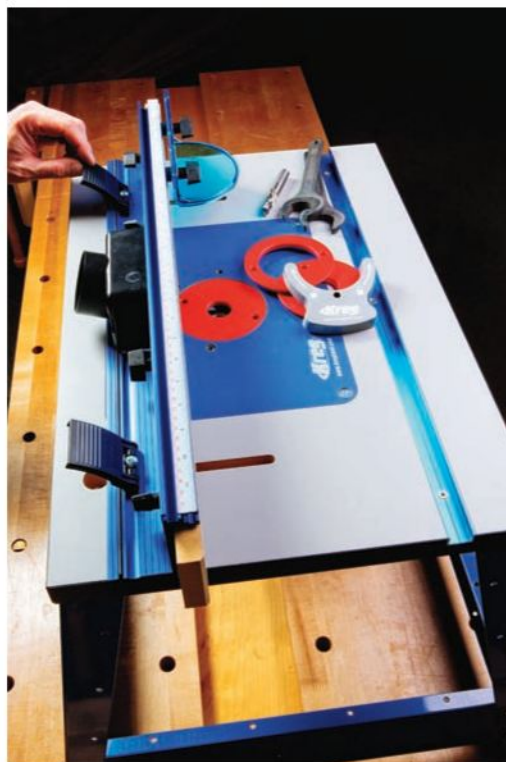
\$35.97). Grit designations are laser-etched into the diamond surface. While pocket-sized, it's thicker than other card sharpeners and suitable for carving tools and carbide jointer or planer inserts, too.



Shop Test continued



INCRA's latest router lift, the Mast-R-Lift II, features adjustable aluminum blocks and a mounting hole system to fit the motor pack diameters of some 18 popular router models.



Kreg Tool is making fence and bit setups even easier on its updated Precision Benchtop Router Table, with interchangeable red insert rings and a cam-lock fence.

Stepped-up Hardware

There's no question that a router lift adds precision and convenience to a router table, and INCRA's new Mast-R-Lift II (\$329.95) has a couple of improvements over other options that make it even more enticing. First, it comes with four aluminum mounting blocks that can be

repositioned in various holes on the undercarriage to accommodate more than 18 popular mid- and full-size routers. No need to buy a special collar to suit your machine. Just position and bolt the blocks on, and clamp the router's motor in place. Second, INCRA has made its interchangeable MagnaLOCK insert rings tool-less. You get five steel rings with various bit openings that nest into the 3/8"-thick, Blanchard-ground aluminum top plate (9 1/4" x 11 3/4"), and they're held fast with four rare-earth magnets. The lift also has a direct-drive 16 tpi screw mechanism that enables height adjustments in as little as .001" increments.

If a new benchtop router table is on your wish list,

GRR-Rip Blocks — new oversized push blocks from Micro Jig — have soft, surface-gripping dimples and four drop-down tabs to catch against workpiece edges or ends.

check out Kreg's updated Precision Benchtop model. While the basic 16" x 24" table has been available for some time, Kreg has improved the locking mechanism of its extruded aluminum fence: instead of star knobs, just flip two cam locks to secure or reposition it. Also, formerly, this table had one bit opening, but the company now provides three Level-Loc insert rings that fit in a removeable 9 1/4" x 11 3/4" insert plate. Sturdy enough for any size router, this laminated MDF and steel table sells for \$229.99.

Our only new-to-report router for this year is Makita's updated 1 1/2hp RT0701CX3 Kit (\$229). I tested the predecessor RT0700CX3 in our December 2012 issue, but this tweaked version comes with the same load of four bases, dust collection hoods, side handle and soft carry case. What distinguishes this revamp is that its sub-base now accepts 1 1/16"-diameter threaded template guides instead of Makita's plate-type steel bushings. It's a subtle but very helpful enhancement.

Micro Jig's success with its GRR-Ripper 3D Pushblock for the table saw has sparked fresh innovation this year with the new GRR-Rip Block. Essentially, it's an oversize push block for the router table, jointer or band saw, with a couple of nifty details. The green bottom is made of a raised, "podular" soft grip material, and there are four "Gravity Hooks" that either recess flat in the base or drop down to catch workpiece ends and edges when needed. These handy safety devices sell for \$29.95 each.

Shop Test continues on page 54 ...



Makita tweaked its recent 1 1/2hp compact router, the RT0700CX3, to fit standard guide bushings. As updated, it's now called the RT0701CX3.



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Bosch will help you whisk away dust and chips from your Colt plunge base with its new vac-assisted Dust Extraction Kit.

Cleaner Air

Until routing evolves from spinning bits to lasers that atomize the waste, it's going to continue to be a dusty, debris-inducing activity for us. So, any inroad you can make to control the mess not only makes for a cleaner and more accurate operation, but also gives your lungs and nasal passages a break. Bosch is helping to "bridle" the waste

produced by its popular Colt compact router by offering a new Dust Extraction Hood Kit (PR012; \$17) for its PR011

plunge base. Two thumbscrews thread it onto the base's casting, and an included adapter enables the hood's clear plastic port to fit either 1/2"- or 1/4"-diameter shop vac hoses. That should help make this potent little machine a much cleaner operator when milling large profiles and grooves and doing other chip-loaded cuts.

INCRA has launched a couple of new dust-containment solutions as well, and the two products are designed to work together. Its CleanSweep MagnaLOCK insert rings are designed to fit the new Mast-R-Lift II router lift (see previous page), plus earlier router plates from INCRA manufactured since

2006 with 3 5/8" openings through the bottom of the plate. What immediately sets these new rings apart is that they're slotted around the bit area to help evacuate chips and dust right at the source. The six-piece set (\$49.95) is laser-cut steel, with inside diameters of 3/8", 5/8", 1", 1 1/4", 1 1/2" and 1 3/4" to suit a variety of bit sizes. There's also a slotted CleanSweep ring, sold separately for \$10.95, that's machined to fit a standard threaded guide bushing for template routing.

Of course the slots will be of little practical value without a vacuum to draw the debris away — and that's

Shop Test continues on page 56 ...

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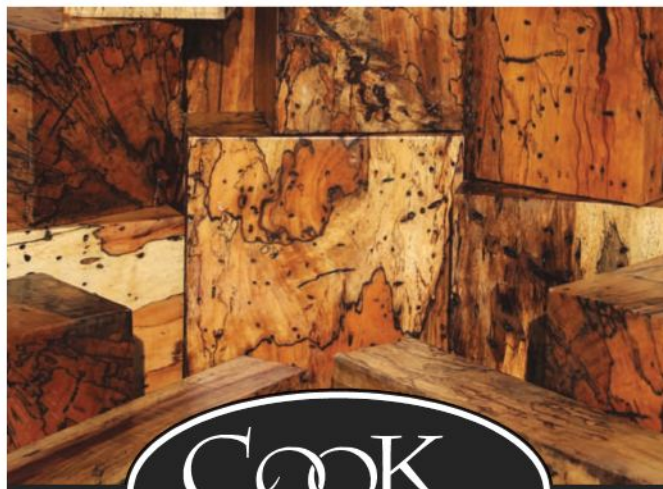
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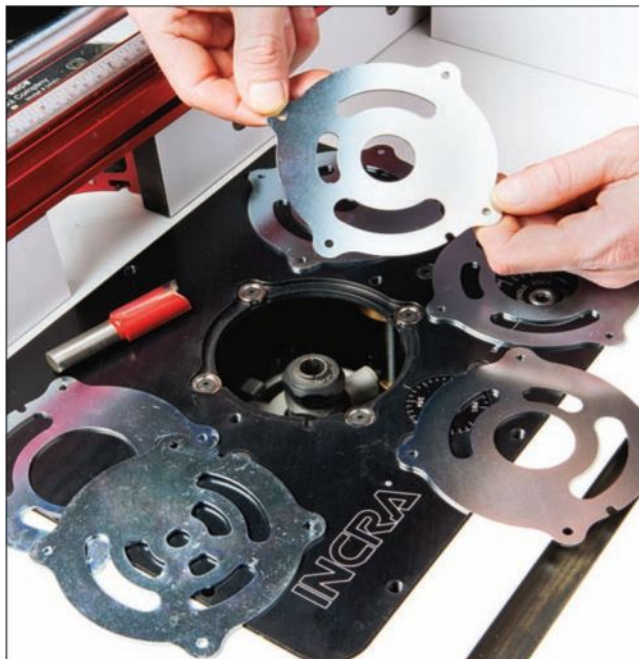
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A downdraft cabinet, such as INCRA's new CleanSweep (left), surrounds a table-mounted router for improved chip collection and noise reduction. CleanSweep MagnaLOCK insert rings (right) have slotted openings to draw debris below the table as soon as it leaves the bit.



where INCRA's CleanSweep Dust Collection Cabinet comes in. It's made of precision molded ABS and

steel and fastens underneath a router table top to surround the router and contain the mess. It measures 9 1/4" x 12 3/4"

inside the housing, with an overall height of 15 1/4". Those dimensions make it a suitable retrofit for many routers and router table systems including, of course, all those made by INCRA. A large, vertically sliding door in front enables easy router access and prevents the door from slamming closed. A steel blast gate, hose clamp and other mounting hardware are also included for hooking the cabinet up to a 4" dust collection system. The CleanSweep Dust Collection Cabinet sells for \$99.95.

Shop Test continues on page 58 ...

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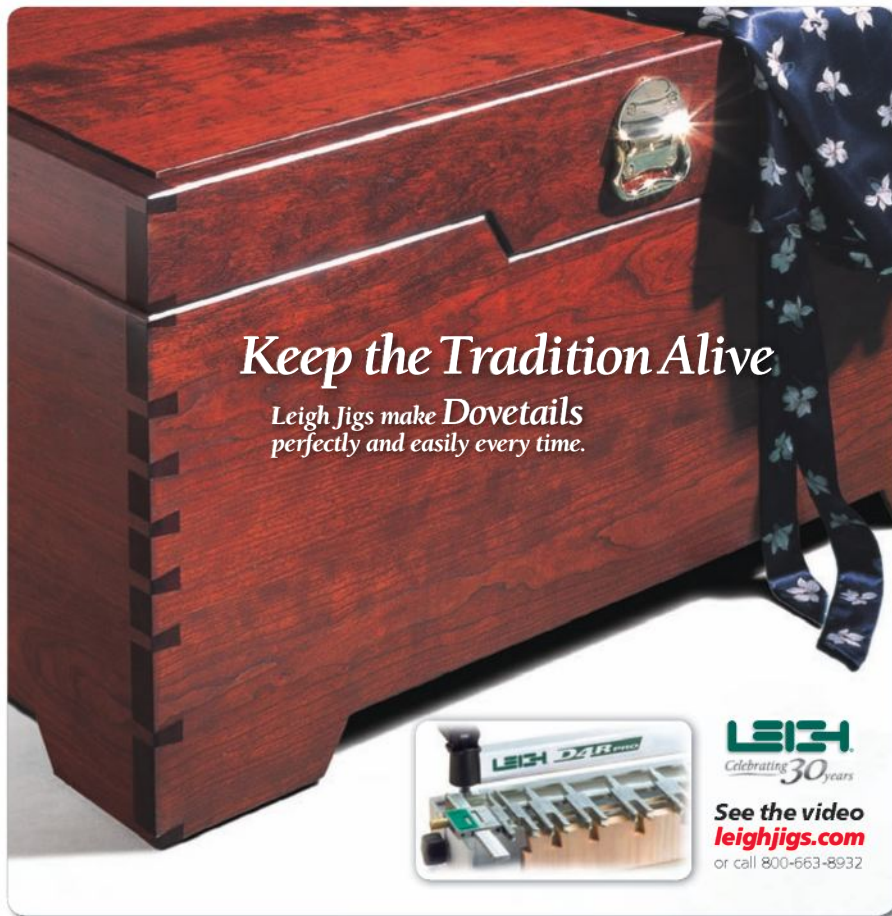
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Among other functions, Trend's Combination Router Base can be configured for mortising, using a pair of included, screw-in guide pins.



Large or small lock miter bits should be easier to set up accurately, thanks to Infinity's magnetic Lock Miter Master Jig Set.



Spruce up the appearance of your signage with Rockler's innovative State Park letter templates and free online design wizard.

"Sometimes the right accessory or jig can help unlock new possibilities for your router or give that 'hardly-ever-use-it' bit a new lease on life."

Performance Boosters

Sometimes the right accessory or jig can help unlock new possibilities for your router or give that "hardly-ever-use-it" bit a new lease on life. Trend Routing Technology hopes its acrylic and aluminum CRB Combination Router Base will offer seven more reasons to reach for your router. The accessory comes with a pair of 5/16"-diameter steel rods that fit into a slotted plate and the edge-guide mounting holes of your router base. The rods can be adjusted between 3 1/16" and 5 1/8" apart to suit the hole configuration of many popular models. Once in place, Trend's CRB can be set up for offset or edge routing and provides a broader footing for the tool. Use it as a compass for making circles with radii up to about 8 13/16". Two screw-in pins turn it into a mortising guide, or use the base for panel-cutting and grooving in several different setups. Trend offers a compatibility chart on its website to see if the new CRB (\$79.95) will fit your machine. A cranked rod set is sold separately to fit routers with smaller-diameter edge guide holes.

In my opinion, the most exciting new gizmo this year is the Lock Miter Master Jig Set (\$49.90) from Infinity Cutting Tools. If you've ever struggled to set up an accurate cut with a lock miter bit, there's finally an easier way. These anodized aluminum jigs are equipped

with rare-earth magnets and are milled to fit against the profile of large or small bits. Just snap them into place on the cutter, and use the white centering lines on the jig to adjust the bit height and extension from the fence. I made a glue-ready joint on the first try — no kidding! And without any expletives.

Rockler has also been busy reinventing snap-together letter templates with its Interlock State Park Signmaking Template kits. For the first time ever, you can adjust the kerning between the letters of your signage, or form unbroken letter shapes from what previously was split-letter styling, by combining two templates together and routing in stages. A free Sign Making Wizard on Rockler's website provides a setup guide to help you pick the template combinations and order what you need for the words you want to rout. Two 99-piece kit options form either 2 1/4" letters (item 48356; \$49.99) or 3 3/8"-tall letters (item 43820; \$79.99). Now, your signs will look like they came from a CNC machine costing exponentially more.

While 2013 has been lacking in new routers, it's been a pretty good year for accessories. Maybe a few of these newcomers will find a home in your shop and start improving your routing!

Chris Marshall is a senior editor of Woodworker's Journal.

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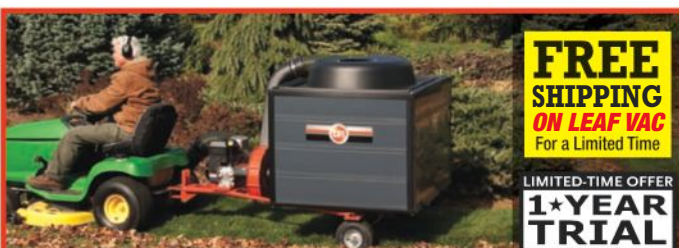
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Today's Shop

What's New in Portable Power Tools?

Despite a sluggish global economy, tool companies still occasionally produce new portable power tool models that boast new technologies, innovative features and cleverly designed accessories.

By Sandor Nagyszalanczy



Did you ever buy a product that you used regularly and discover that the latest box you bought had a “new and improved” sticker on it? When you tried it, did you wonder if there was anything really different about the product, other than perhaps that new sticker on the box?

In the past couple of decades, we've seen some significant developments in the field of woodworking portable power tools: new battery chemistries such as nickel-metal hydride and lithium-ion; sophisticated electronics that improve tool performance and enhance battery life; improved ergonomics that make tools safer and more comfortable to use. But with the recent global economic downturn, relatively few tools released in the last couple of years boast significant new features (with a few notable exceptions, such as Festool's Domino joining system). Portable power tool companies do continue to develop new tool models, but most aren't that much different than previous versions. For example, one company's latest cordless drills feature slide-on battery packs. While slide-on packs

Many of the latest portable power tools feature brushless motors, in lieu of brush motors that have been standard for decades.

are easier to install and remove than the older stick-style packs, this doesn't exactly constitute an earth-shattering innovation. Some portable tool categories are expanding, such as cordless impact drivers, impact wrenches and rotary hammer drills. But these are tools for contractors, tradesmen and mechanics — not woodworkers.

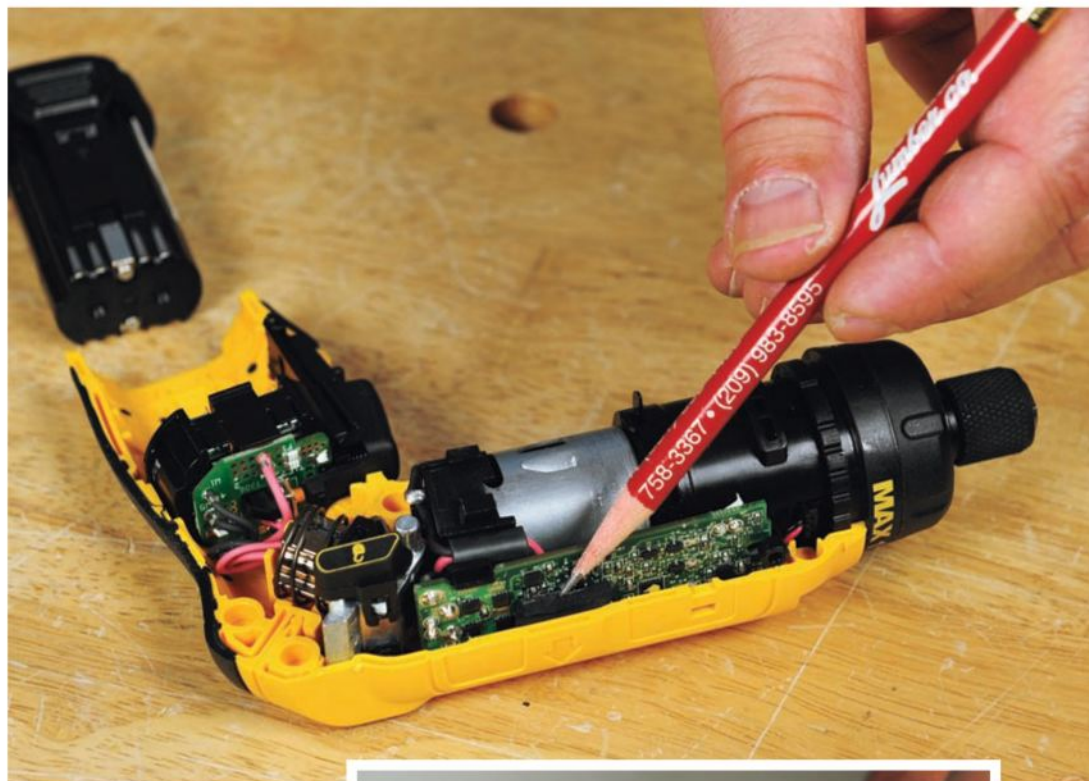
Is there much of anything really new for woodworkers under the portable power tool sun? After taking a trip to this year's AWFS (Association of Woodworking and Furnishings Suppliers) show and scouring the industry for leads, I put together the following roundup of new (and nearly new) portable power tools that boast innovative features, clever designs or groundbreaking technologies. In other words, these are some of the coolest new tools around.

Gyroscopic Twist-Sensing Screwdrivers

Not that many years ago, about the only “sensory feedback” you might have received from a portable power tool was the jolt of pain you felt if you accidentally dropped the thing on your toe. Early attempts at increasing a tool's sensory prowess were somewhat gimmicky. For example, Skil's 7292 palm sander with “Pressure Control Technology”: a series of LEDs light up in response to how hard you bear down on the orbiting sander. One or two

green lights mean you're doing it just right; a glowing yellow or red LED tells you it's time to lighten your touch. Helpful? Maybe.

A more useful and innovative bit of sensory technology is found in DeWALT's new DCF680 cordless screwdriver: a gyroscopic sensor that allows motion control of the tool's rotational direction and speed. (The technology was first featured in Black & Decker's model BDCS40G Gyro 4V Li-ion cordless screwdriver released in 2012). Simply depress the DeWALT's trigger and twist the tool in the direction you want the bit to turn — the same motion you'd use to turn a regular manual screwdriver. The gyro sensor measures the relative motion and adjusts the tool's direction and variable speed automatically: A quick twist of the wrist brings the motor up to full speed, while a more gentle twist (over a range of about 35 degrees) lets you drive at slower speeds. The sensor is surprisingly sensitive, so you can dial in just the right speed for the



The heart of DeWALT's new DCF680 powered screwdriver is a miniature gyroscopic sensor mounted inside the tool (top). The sensor allows speed and direction control with a twist of the wrist.

task at hand, and it works with the tool held at any angle — even at an angle or upside down, say to drive screws into a rafter or the ceiling. Although it can take a bit of getting used to, wrist operation quickly becomes intuitive, and it could save a lot of time, especially when doing jobs where screws must be “finessed” into place (for example, driving flathead screws so that their heads are flush with the work's surface), or when screws need to be removed and then reinstalled, as when mounting and adjusting hardware.

Part of DeWALT's new line of tools that run on compact 8-volt MAX lithium-ion battery packs, the gyroscopic screwdriver features twin LEDs, a 16-position adjustable clutch and a swiveling grip handle. The latter adjusts to either an in-line or a pistol-grip position, to suit your preferences. Although ruggedly built, the small lithium-ion cells used to keep the DCF680's 8-volt MAX pack size compact result in a relatively low torque output for the tool: a maximum of only about 24 in. pounds. That's plenty for



Festool's Carvox jigsaw features (left to right): stroboscopic LEDs that make it easier to see the line of cut; an optional angle-adjustable beveling base; and an innovative circle-cutting jig attachment.



smaller driving jobs, but you'll want to switch to a more powerful drill/driver or impact driver when tackling more serious driving tasks, like running 2-inch-long #10 screws into construction lumber sans pilot holes. Who knows, maybe gyroscopic sensing technology will find its way into higher-voltage, heavier-duty drilling and driving tools in years to come.

Stroboscopic Jigsaws

European tool companies have produced some impressive tools over the years (remember the first Elu plunge routers?). But few new tools have shown as much innovation as Festool's new Carvox jigsaws. The saws, which come in both corded and cordless versions, don't look much different than standard jigsaws, but they share one feature that's totally unique in the world of portables: a stroboscopic work light. Here's how it works: When you first trigger the variable-speed saw at low speed, the LEDs light up the area around the blade, just like with other newer cordless tools. However, when the motor reaches top speed (set by a dial on the side of the tool), the LEDs flash just like mini strobe lights in sync with the reciprocating action of the blade. The blade appears to stand still, thus allowing you to see the surface of the workpiece in front of the blade with great clarity. Coupled with the saw's

excellent dust extraction, the strobe lets you follow even the faintest pencil line, assuring that your cut stays right on track. You can also monitor the quality of the cut the blade is producing, so you can change blades or blade speed and/or orbit settings as needed to reduce splintering and get the cleanest cut.

Festool's engineers also applied their ingenuity to the jigsaw's base and related accessories. Instead of having a fixed base and sole, the Carvox's standard base (used only for 90° square cuts) releases with the flip of a lever, and it may be replaced with any one of a number of accessory bases (it also accepts a number of different sole plates, each specialized to work best in a different cutting situation: rough stock, polished surfaces, etc.). The bevel-cutting base is particularly unique. It is split down the middle, and the halves articulate, like the wings of a butterfly. A single knob at the back lets you dial in any angle between 0 and 45 degrees for standard beveled cuts with the saw tilted either left or right. Further, the base halves also pivot inwards and may be set at any angle up to where they are perpendicular to one another — an adjustment that automatically centers the blade on the outside corner of a board, cabinet, or other construction, allowing you to make an accurate

angled cut right at the corner without the need for a fence or other alignment guide.

Another accessory base adapts the Carvox to ride on Festool's track guide rails, for accurate straight cuts. This base accepts an ultra-cool adjustable circle-cutting jig with a guide arm that's a stiff measuring tape. After snapping the jig into the front end of the guide rail base, you pull out the amount of tape needed to set the jig for cutting the desired radius (metric increments are printed right on the tape; sorry, no inch markings). Lock the tape in place, set the pivot pin (stored onboard the jig) into its pivot hole, and you're ready to cut accurately radiused arcs and circles up to 302 centimeters in diameter.

Glue-less Joinery

Released in 2010 but improved and upgraded this year, Lamello's Zeta P2 joinery machine is another portable power tool with some interesting innovations. Like the familiar Lamello biscuit machines, the primary job of the Zeta is to cut slots for joinery. But instead of glued-in biscuits, this machine works with the P2 detachable joinery and clamping system used extensively in Europe to create knockdown (quick-assembled) furniture, like you'd buy from IKEA. The Zeta machine creates a

Continues on page 64 ...



Lamello's Zeta P2 joinery machine cuts curved T-slots for creating strong, glue-less joints.



Special Clamex fasteners slide into curved T-slots cut into each half of the parts to be joined.

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Once Lamello's Zeta P2 joinery machine has created the slots for interlocking Clamex P connectors, an Allen wrench is used to lock together the two halves of each Clamex fastener.

semicircular "T" slot for special interlocking Clamex P connectors that use no glue and create strong joints that are totally reversible. The system is particularly great for cabinetmakers who build and install large cabinets and built-in furniture. Parts are

transported flat to the jobsite, then rapidly assembled and put in place. Clamex fasteners are also useful when building wine racks, book cabinets or display shelves.

The slotting setup for the P2 system is very similar to that used for regular biscuits: matching layout marks on both workpieces to be joined are used to line up the Lamello machines. But instead of plunge-cutting a simple slot, the Zeta P2 performs an elegant mechanical trick. When the blade has plunged to its deepest point, it trips the Zeta's VMD (Vertical Mechanical Drive) that rapidly oscillates the blade up and down. In a fraction of an

instant, small tips on the top and bottom edges of the blade create a "T" slot. The VMD then re-centers the blade before it is withdrawn. Clamex P connectors are inserted into each slot with an arcing motion. The two joint halves are then brought together and locked in place with cam-locking action operated by an Allen wrench. To access the setscrews, an included jig is used to precisely drill the necessary holes. All this cleverness does come at a price: The basic Zeta P2 machine sells for about \$1,800. The Clamex fasteners cost about \$2.44 per pair.

Continues on page 66 ...

Router tables don't get any better than this

Top of the line from top to bottom, this package delivers unsurpassed precision and durability. It features a pro-quality fence and a cast-iron table that's the largest and flattest on the market, so you get accurate, clean cuts and minimal vibration. The router lift lets you adjust the bit height from above the table, and the steel cabinet offers dust collection and ample storage. It all adds up to high performance that will last a lifetime.



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Makita's latest cordless chainsaw will run on either a single 36-volt battery or a pair of 18-volt packs, attached via an adapter plate.

Battery Flexibility in Cordless Tools

After a series of improvements in cordless tool battery technology which culminated in the development of the modern lithium-ion battery pack, the last couple of years have seen relatively few

breakthroughs in battery chemistry. But that hasn't stopped toolmakers from coming up with more flexible ways to use batteries with their cordless tools.

If one battery pack is good, then two must be better. That seems to be a direction that portable power tool manufacturer Makita has taken with a couple of its latest cordless tools: the HCU02ZX2 X2 LXT chainsaw and HRH01ZX2 rotary hammer drill. Both of these power-hungry tools were originally designed to run on a large 36-volt pack. But in addition to using a single pack to power the tool, you can also run them each on a

pair of 18-volt packs. A special adapter locks into the tool's battery slot to adapt it for twin packs. The 18-volt LXT packs are the same batteries that run an extensive array of tools in Makita's cordless lineup, so the twin-battery scheme makes a lot of sense for woodworkers who already own one or more 18-volt Makita tools. They can use the batteries they have rather than have to buy expensive 36-volt packs that don't work with such a wide selection of other tools. To help keep all your extra battery packs charged up, Makita has also created a new

Continues on page 68 ...



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The Makita DC18SF battery charger has slots for four batteries and can charge two spent packs in about 60 minutes.



Panasonic's new line of dual-voltage tools offers users greater battery flexibility: Each tool can run on either an 18-volt or 14.4-volt pack.



Portable power tools can run on any of three different kinds of motors (left to right): brushed, four-pole or brushless.

multi-battery charger: The DC18SF accommodates up to four 18-volt lithium-ion batteries at a time, and charges two spent packs in about 60 minutes.

Panasonic has taken another approach to adding battery pack flexibility to their line of cordless tools. Their new line of dual-voltage cordless tools includes a pair of drill/drivers, a reciprocating saw, an impact driver and an impact wrench. All of these tools will run on either an 18-volt or a 14.4-volt battery. Electronics in the tool adapt the tool to run properly on either voltage. This strategy allows users to run these tools on older 14.4V packs they may already own, as well as the company's newer 4.2 amp-hour 18-volt batteries. This could be particularly useful with the drill/drivers: Use the more powerful pack when you need more power or longer run times, say for drilling a lot of big holes. Then, switch to a lighter 14.4V pack for lesser tasks, such as driving small screws.

Brushless Motors

Probably the single biggest innovation that's changing the face of the portable power tool is the move towards brushless motors. Motors with brush contacts have been the standard for portable power tools since they were first developed early in the last century. They're simple, compact and inexpensive to manufacture. But used in cordless tools, they suffer from an inefficient use of limited battery power. In a traditional DC tool motor,

carbon brushes ride against a commutator on the rotor (the spinning part of a motor) to complete the electrical circuit that powers the motor and runs the tool. Both brushes and commutator are subject to wear and occasionally need maintenance and eventual replacement. The mechanical contact between brushes and commutator also causes electrical losses and frictional resistance, as well as heat buildup, all of which eat into motor performance and decrease durability.

In a brushless motor, an electronic microprocessor controls the current flow through the motor, thus eliminating the need for carbon brushes. In addition to virtually eliminating motor maintenance, the lack of brushes reduces heat and vastly improves electrical efficiency and power transfer. The design also improves heat dissipation and reduces electrical noise. A brushless motor's increased efficiency is what makes it particularly useful in cordless tools, since it increases the amount of work the tool can perform on a single battery charge.

Intelligent Motor Control

Brushless motors themselves aren't exactly new. They've been used to power computer fans and hard drives, CD and DVD players for decades. They've also been used as servo motors in robotic systems where high torque, speed and durability are essential. But it's the development of intelligent electronics that have made brushless motors practical for use in portable power tools.

Microprocessor controls not only monitor the motor itself but, coupled with electronics in the battery pack, optimize the tool's performance and protect it from overheating and damage. These electronic controls, in their various proprietary configurations specific to each manufacturer, allow for a whole range of innovations in cordless tool performance.

For example, all of Hitachi's brushless-motor-equipped cordless tools feature a micro-processor that allows electronic adjustment of the tool's power output in four



A small button at the base of Hitachi's DS 18DBL brushless-motored cordless drill sets the tool's power output to suit the task.

steps. Settings are selected via a small button on the tool's base. Higher settings yield full power output as necessary for heavy-duty drilling or driving tasks. Lower power settings reduce the tool's battery consumption while performing lighter tasks, like drilling small holes or setting small fasteners.

Festool's line of drill/drivers use their electronically commutated technology (EC-TEC) to sense and regulate

torque output in lieu of a conventional mechanical clutch. A 25-position adjustable electronic dial lets you accurately set the amount of torque that's delivered to the chuck. When the set torque level has been reached, the tool's electronics simply shut off power to the motor and emit a small "beep" to alert the user. Removing frictional losses incurred each time a mechanical clutch hits its release point (that clickity-clacking sound) not only makes Festool drills quieter, but more importantly, it results in a significant energy savings and even longer battery run times when driving fasteners.

The Move to Brushless

Since Festool launched its first brushless-motor-equipped cordless drill/driver to the U.S. mass market in 2005, most cordless power tool manufacturers have climbed aboard the brushless bandwagon. Festool has expanded its EC-TEC cordless tool line to include C-series (10.8V and 14.4V) and T-series (10.8V, 14.4V, and 18V) cordless drill/drivers, a CXS 10.8V compact drill and TI-series 14.4V impact driver. Milwaukee has a full line of lithium-ion-powered M12 FUEL (12-volt) and M18 FUEL (18-volt) drill/drivers, hammer drill, rotary hammers and impact drivers and wrenches. All models feature Milwaukee's POWERSTATE brushless motors and REDLINK intelligence electronics. Hitachi's current



Instead of a traditional mechanical clutch (left), Festool's T18+3 cordless drill uses electronics to monitor and limit torque output, set via a 25-position dial.

brushless offerings include an 18-volt drill/driver, hammer drill, impact driver and impact wrench, and a 14.4-volt impact driver. Makita's entries into brushless include an 18-volt impact driver and a rotary hammer, both of which are part of their extensive LXT lithium-ion platform. DeWALT's 20V MAX and 20V MAX XR platforms currently feature an extensive line of compact drill/drivers, compact and regular hammer drills and impact drivers. Earlier this year, Bosch debuted an 18-volt rotary hammer drill and an oscillating multi-tool that both feature the company's CORE EC brushless motor technology.



These DeWALT and PORTER-CABLE random orbit sanders are two of only a handful of AC-powered tools that employ brushless motors.

AC Brushless Tools

Festool recently released its Carvex line of corded jigsaws (cordless models to come), all of which feature their EC-TEC brushless motors (see the section on stroboscopic jigsaws). Besides these saws, there are currently only a couple of other AC-powered corded tools on the market that feature brushless motors: the near-identical DeWALT D26456 and PORTER-CABLE 390 5-inch random-orbit sanders. Why not more brushless AC tools? The simple answer is that brushless motors cost more to manufacture than

brushed motors, and their power efficiency and battery run time obviously doesn't present an advantage for corded tools. There is one significant advantage for brushless motors in corded tools, especially sanders: better resistance to damage from dust. Fine dust that gets into the regular brush motor of a portable electric sander reduces the life of the brushes and commutator.

Sandor Nagyszalanczy is a furniture designer/craftsman, writer/photographer and contributing editor to Woodworker's Journal.

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New Glues, New Tools

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Rockler's Glue Applicator Set

The *Glue Applicator Set* from **Rockler Woodworking and Hardware** contains an 8-oz. glue bottle and threaded funnel plus five interchangeable threaded applicator heads, each tailored to a specific type of gluing task: a standard glue spout, a center-line glue guide to apply a centered bead of glue on board edges, a silicone brush for wider boards, a ribbed roller with angled head for easy and even glue application on very wide boards, and a mortise tip for traditional mortises, Domino mortises and biscuit slots.

A cleaning brush also comes with the kit, which comes in a box that acts as storage for all components between uses. Cleaning the components for reuse can be done with warm water to rinse off wet glue, or by cracking

and peeling off dried glue. Each applicator head within the kit fits Titebond® 16- and 32-oz. glue bottles. The Glue Applicator Set is priced at \$19.99.

The *E•Z Pro Crown King* (880) from **General Tools & Instruments** is ready for use right out of the box — no assembly required. It's composed of two pieces: the jig itself and an insert/adaptor. Without the insert, the jig is positioned for cutting 45° spring-angle moldings. With the insert, it quickly reconfigures to accommodate 38- or 52-degree spring angles. To use the Crown King, you measure the corner angle, divide it by half, set your miter saw to that angle, cut and fit. The E•Z Pro Crown King is priced at \$29.99.

SENCO'S new 23-gauge pneumatic Micro Pinners, the *FinishPro®23SXP* and *FinishPro®23LXP*, incorporate several upgrades suggested by woodworkers and carpenters.

Among these: they fire headless pins ranging from 1/2" up to 2" long, a self-adjusting magazine eliminates the need to manually reset the tool for different fastener lengths, and the industrial strength motor delivers 70 to 120 pounds per square inch of force. These headless pinners are also the first in the category to have an angled pistol grip design, instead of a 90° straight handle, to reduce wrist fatigue and increase maneuverability. Suggested price for the *FinishPro23SXP*, which accepts fasteners from 1/2" to 1 1/8", is \$159; suggested price for the *FinishPro23LXP*, which accepts fasteners from 1/2" to 2", is \$219.



SENCO's
FinishPro 23LXP



NOTE: See Quik-Link at woodworkersjournal.com for web links to all of these products.

General Tools & Instruments'
E•Z Pro Crown King



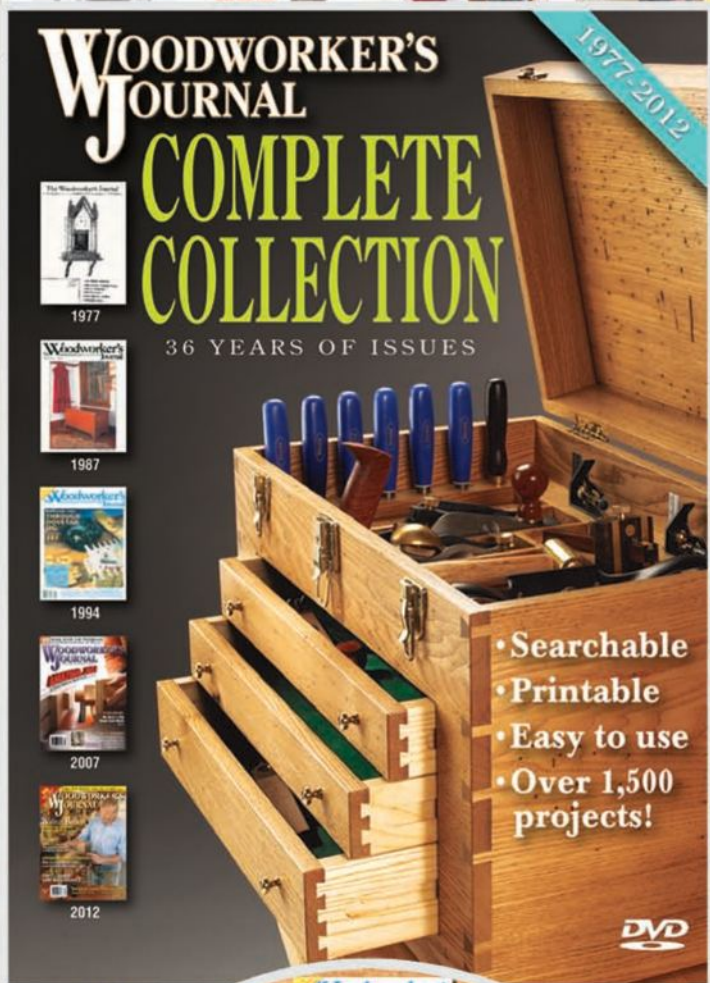
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Laguna's 1412 Bandsaw

Laguna Tools' 1412 Bandsaw, according to sales manager Benjamin Helshoj, is designed so that it "fits both a woodworker's budget and garage perfectly." Features on the 1412 Bandsaw include a brass-tipped lock handle for the rip fence, Euro-style adjustable hinges, tracking and tension windows, an oversized 21½" x 16" table with a height of 38" and a heavy-duty 8" x 13" cast trunnion. It has a magnetic blade guard, quick-release tension and 4" dust port, with a 12" resaw capacity, and accepts 1/8" to 3/4" blades. The saw, with its 1¾hp motor, is wired for any 110-volt outlet instead of 220. "So all a homeowner has to do is plug it in and start wood-working!" said Benjamin Helshoj. The retail price of the 1412 Bandsaw is \$1,400.

Nexabond™ 2500 Instant Wood Adhesive, developed by **Bioformix**, is a water- and solvent-free formula which can achieve high-strength bonds in minutes. Bioformix president Adam Malofsky says, "It combines the speed and versatility of a super glue with the high bond strength of traditional wood glues." Quick bonds reduce or eliminate the need for clamping. Bioformix claims Nexabond bonds regardless of temperature and humidity variations, can bond any wood, and can also be used to attach other items to wood. It also

Nexabond's 2500 Instant Wood Adhesive



accepts most stains and finishes. Recipient of the Visionary New Product Award this summer at the 2013 Association of Woodworking & Furnishings Suppliers (AWFS) show, Nexabond is available in 1-oz., 4-oz. and 16-oz. containers, priced at \$7.78, \$16.50 and \$54.96, respectively.

Amana Tool is now making **CNC Polycrystalline Diamond (PCD) router bits**. Specially designed for industrial CNC applications in tough, abrasive materials like particleboard, MDF, veneer, hardwood, plywood and melamine, the bits are constructed of high-grade PCD for a cutting edge that lasts up to 100 times longer than standard carbide. Pricing for the CNC Polycrystalline Diamond router bits starts at \$143.96.



Amana Tool's CNC router bit

Specifically designed for small workshops with moderate budgets, the **ECO Series** of HVLP turbine systems from **Apollo Sprayers**, under the ASI-HVLP brand name, consists of three-, four- and five-stage turbines. Made in the U.S., they come with a

Apollo Sprayers' ECO-3 HVLP turbine



choice between a bleeder style or non bleeder, Apollo HVLP spray gun and a Handi-Hold™ spray gun docking station and feature quick disconnect and computer-designed Quiet Technology™ to lower decibel levels. The three-stage ECO-3 sprays thin to medium viscosity finishes at 7 pounds per square inch and is priced at \$599. The four-stage ECO-4 sprays a wider range of viscosities at 9 psi and is priced at \$699; the ECO-5 is a five-stage turbine that sprays the widest range of viscosities, including latex paint, at 9.5 psi and is priced at \$849.

The **Accutrax Pencil Blade™** works similar to a razor blade in your utility knife, but it's an actual pencil. The Accutrax Pencil Blade will fit in any standard utility knife in place of the razor blade; when one side wears down, remove it, flip it around and reinsert to begin using the other end. According to **Accutrax** company representative Bob Cummings, testing has indicated that one Accutrax Pencil Blade lasts for about two months of continuous use. The Accutrax Pencil Blade comes in a pack of three blades, priced at \$5 for the pack.



Accutrax's Pencil Blade

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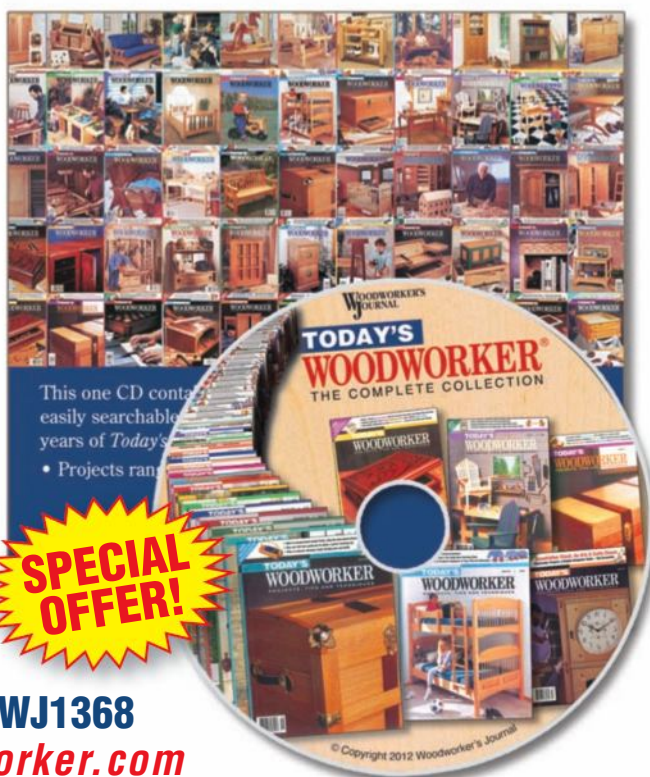
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	Average no. copies each issue during preceding 12 months	Actual no. of single issue pub. nearest to filing date
A. Total no. copies (net press run)	163,906	166,438
B. Paid and/or requested circulation		
1. Mail subscription	160,335	162,853
3. Sales: dealers, carriers, counter & vendors	626	667
C. Total paid and/or requested circulation	160,961	163,520
D. Free distribution		
3. By mail samples, complimentary and other free	237	264
4. Outside the mail	61	30
E. Total free distribution	297	294
F. Total distribution	161,258	163,814
G. Total distribution	2,647	2,624
H. Total	163,906	166,438
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Small Shop Journal

Router-Made Picture Frames

As a fitting end to the Small Shop Journal series for this year, we provide the know-how for some gift-appropriate, custom-built picture frames.

This Small Shop...

SHOP SIZE:

9' X 18'

PRIMARY TOOLS:

Band Saw
Miter Saw
Router Table
Drill Press
Handheld Router
Disc Sander
Hand Plane
Drill/Driver

ACCESSORIES USED:

Quick-Grip Clamps
Band Clamp
Router Bits



When it comes to creating picture frames on a router table, the options become nearly overwhelming — after all, a picture frame is simply a molding mitered to surround art of some sort.

After working on many samples using a multitude of router bits, we focused on creating interesting frames with a minimum number of bits, as shown at left.



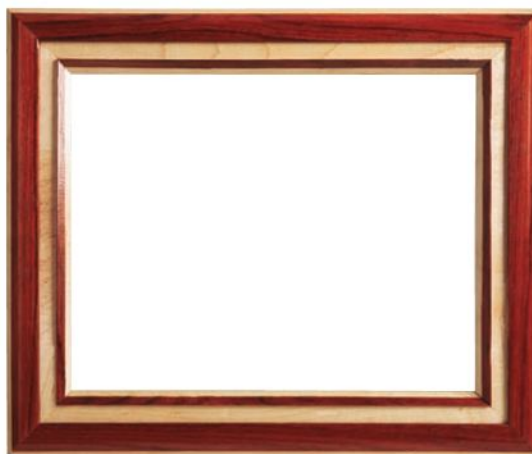
Picture frames are essentially made from long strips of molding. The end views of these two moldings show the structure from which the two frames (below) are constructed.



Classic



Contemporary



Framing a piece of art, be it an original oil painting by an established artist, a favorite photo, or even a masterpiece from the hand of a grandchild, requires making some choices. Do you want a classic-looking frame with major molded accents and multiple shadow lines built in? Or would simple lines and basic shapes set off the art in a more pleasing way? The choices are highly subjective and will vary from one person to the next. Curiously, that same level of subjectivity is in play when it comes to making a picture frame. Which is one reason that, when it came to designing a couple of picture frames for our year-end *Small Shop Journal* article, it was a very difficult effort. Everyone in the room had good ideas, strong opinions and arguments in their favor. Which, of course, meant that nothing was agreed upon.

So, with that in mind we decided to just go into the shop and proceed with two main goals. The first, to come up with two attractive but very different styles of picture frames. The second was that they should not require a builder to purchase 10 additional router bits just to make them.

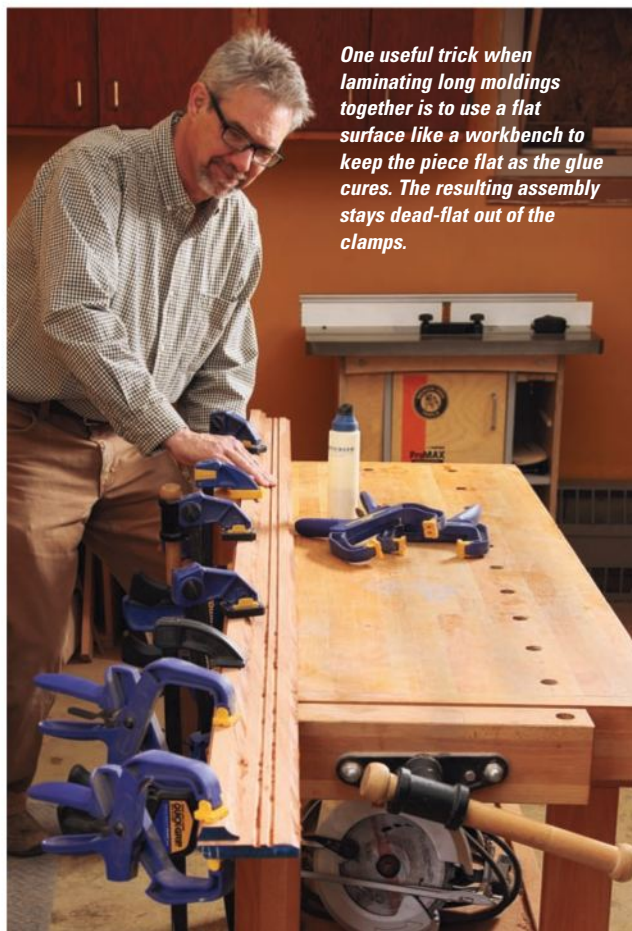
After a few false starts and several mock-ups, those goals

were achieved in the two frames you see at the top of this page: one a more traditional-looking frame made from mahogany, and one more modern-looking, made from maple and padauk. In total, they use four different router bits. The “classic” picture frame uses three cutters and the “contemporary” uses only two.

Wood species choice is another variable that is fairly subjective.

If the padauk stock in the contemporary picture frame looks a tad too orange for you, perhaps by substituting cherry you can achieve a nice contrast with a more subdued hue. Or maybe you like a strong contrast but would prefer it to be domestic walnut — that’s your call.

In the same way, you may prefer walnut over mahogany in the classic frame, or red oak, ash or cherry, to name a few. Some might make the picture frame from yellow poplar and paint it.



One useful trick when laminating long moldings together is to use a flat surface like a workbench to keep the piece flat as the glue cures. The resulting assembly stays dead-flat out of the clamps.

Milling the Classic Frame

The main molding of the classic frame is formed in six steps. See the *Drawings* on page 80 for details. With the 1/2"-thick stock cut to width, set up a 3/4" radiused cove bit in your router table. As you can see in the photos on the next page, how you hold the stock against

Mock-ups Make Setup Easier:

Without the router bit spinning and with the guards removed, the frame mock-ups are used to set up the router table. The photos also demonstrate that by changing the orientation of the stock on the router table, the author was able to create different shapes with the same bit.



A mock-up of the main piece of molding for the classic picture frame was made from MDF. The mock-up helps set up the cove bit in the router table to form the mahogany molding. Note the orientation of the stock.



The cove cut on the outside edge of the classic frame's main molding is made by changing the stock's orientation — running it flat on the table's surface. No change to the fence or the bit's height is required.



Use the same bit and settings to make the first cut on the classic frame's accent molding. One of the advantages of this design is that you can achieve varied-looking coves with only a few bit adjustments.



Only when making this last cut with the cove bit do you need to change the setup. And all that is required is lowering the bit by about 1/16" to get the last shape on the accent molding.

the fence will affect the shape of the cove you form on the wood. Start with the wide face of the stock held against the face of the fence and run the length of the stock through the bit. Although not shown in the photos, a featherboard (or even two) will give you added control if you are shaping long pieces of stock. How much stock you need to shape will be determined by the size of the photo or piece of art that you will be framing. It's a good idea to figure that out before you get started. Now before you get worried, the photos above were shot to show you proper stock orientation. The bit was not spinning and the guards are removed so you can see things clearly. (No fingers were injured during the making of these moldings.)

The next cut will form the back (outside) edge of the main molding. Make this with the face of the wood flat against the

router table top. Take a minute to inspect the cuts you have made, to be certain that you did not waver in your cut. You can go back and fix any high spots if you need to.

Now grab the accent molding stock, which you will need to have cut to width from 1/2"-thick stock as well. Again, look to the photos above and the *Drawings* on the next page for details. For the last cut (photo, lower right), you will need to drop the router bit just a hair to get the shape right. With that done, chuck a core box bit in the router and shape the flutes into the main molding. Take some time to sand your pieces and then get ready to glue them together. This is best done on a workbench as shown in the photo on page 77. Your last routing step is to

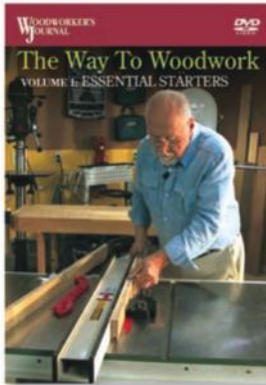
Small Shop Journal continues on page 80 ...

The Way To Woodwork

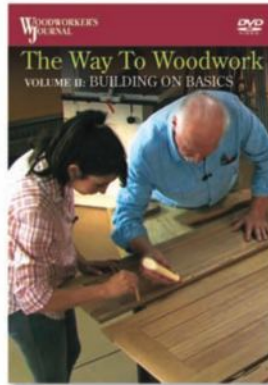


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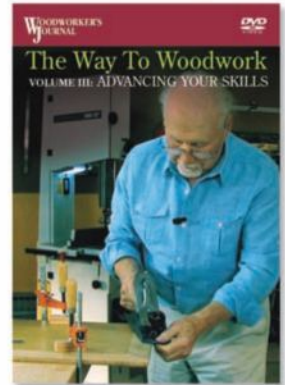
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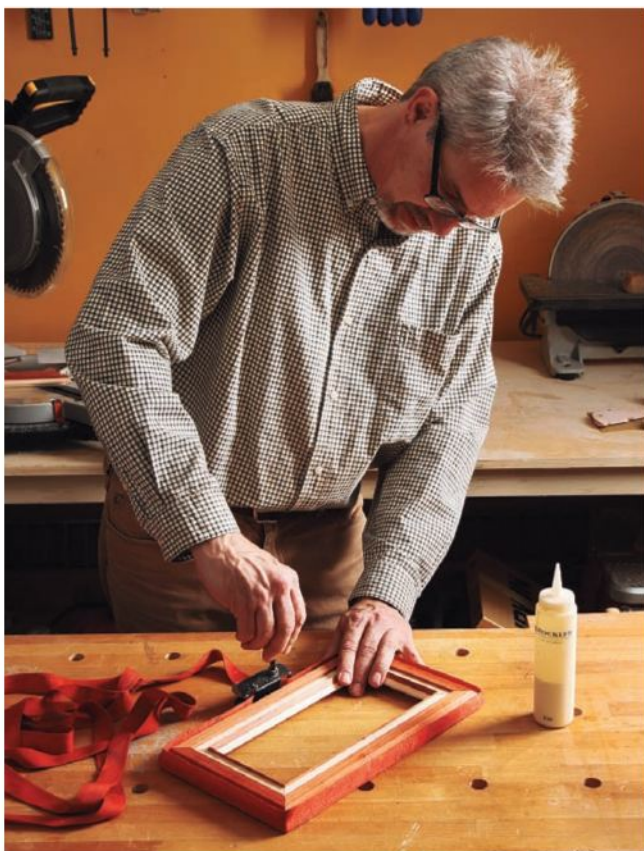
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Band clamps work well for frame glue-ups. After the glue cures, remove squeeze-out, give your frame a final sanding, apply the finish and voila: you're done!



Router Bits

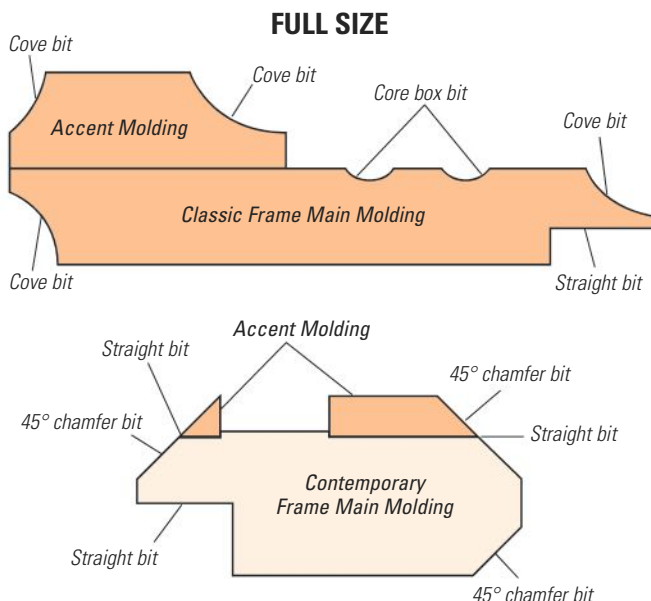
A total of four router bits were used to make the two picture frames above. The contemporary frame used only a straight bit and a chamfering bit. The classic frame used the core box bit, straight bit and the bearing-guided cove bit.

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MORE ON THE WEB

For a video of tips on gluing up molding in the shop, visit woodworkersjournal.com and click on the "More on the Web" tab shown above.



use a straight bit to form the rabbet for the back of the frame, which will capture the art. The depth of the rabbet will be determined by how the art will be mounted and whether there will be glass in front of the art. You will need to figure that out before you cut the rabbet.

Miter-cut the frame molding you've just completed to length. A miter saw works well for this precise task. Now glue and clamp the pieces together, and you are nearly done. Give the frame a final sanding and apply your choice of finish to complete the project. A hanger strip is a good way to make the task of hanging the frame on the wall easier.

Contemporary Frame

The process of making the contemporary frame is even easier than making the classic frame. You only need a 3/4"-diameter straight bit and a piloted 45° chamfer bit.

With the 3/4"-thick stock ripped to its proper width, form the first of three rabbets in the wood, using the *Drawings* as a guide. When you've completed all the rabbets, rip the 1/4"-thick accent stock to width and glue it in place, in a manner similar to the photo on page 77. When the glue on the last piece has cured, chuck the chamfer bit in the router table and shape the three edges as shown in the *Drawing*. Once again, some sanding before you cut the pieces to length is a good idea, then step to the miter saw to cut your miters. Miter-cut the molding pieces to length, dry fitting the joints to test the accuracy of the miters. A band clamp is one preferred method for gluing and clamping up miter joints.

When the glue has cured, remove the squeeze-out and do a final sanding. Apply your finish, and the project is complete.

Picture frames make great gifts and are fun projects to do. And they are well-suited to a small shop environment.

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Finishing Thoughts

Foolproof Finish for Small Items

By Michael Dresdner

Let your completed small projects take an overnight dip in oil, then dry on coarse sandpaper, and you'll get an attractive, sturdy coating.

When holiday projects are done and the wood chips swept up, it's time to apply finish. One of the quickest, easiest, and most foolproof ways to finish small items is to dip them in a finish.

Jewelry, hanging ornaments, espresso tampers, toys and other small wood parts present both a challenge and an opportunity. They get blown about by spray finish and can be swamped by brushes that both miss areas and leave drips and runs. However, if they are small enough, you can dip them in finish.

Reach for the Oil

My first choice for dipping is pure boiled linseed oil. Immerse small parts and let them soak overnight in a

plastic zip-sealed bag filled with oil. Squeeze out most of the air before sealing the bag so that a minimum amount of oil is needed to completely engulf the parts.

Wood will absorb oil deep into its pores, adding richness to the color and impregnating the wood below the surface. Pure oil is 100 percent solids with no solvents to evaporate off. That means whatever amount the wood holds will cure to a solid film once it's exposed to the air.

Take the parts out of the bag, wipe all the excess off completely, and either hang the part or set it gently onto the rough side of very coarse (24- or 36-grit) sandpaper. Wiping thoroughly will prevent any drips or marks where it hangs or touches the sandpaper, and the large grit particles allow air to circulate so even the bottom cures.

One dip may be enough, but if you prefer, you can re-wet and re-wipe the parts again and again, adding one thin coat per day until you are happy with the results. Once the wood stops absorbing the oil it will start building a thin surface film.

The same technique works for oil varnishes, polyurethanes, and oil-based paints. These don't need a long soak; simply dip and wipe. Varnish and paint won't impregnate as deeply, but will create a thin film on the surface. Oil-based coatings will not re-dissolve themselves after drying, so as long as you wait a day between coats, you won't be inadvertently wiping off the already cured finish.

Once dry, oil is attractive, natural-looking and safe for toys and food items, and will stand up to heat, chemicals and washing. Handle the item often and the sebaceous



The "dip" finishing method worked great on this maple burl espresso tamper.

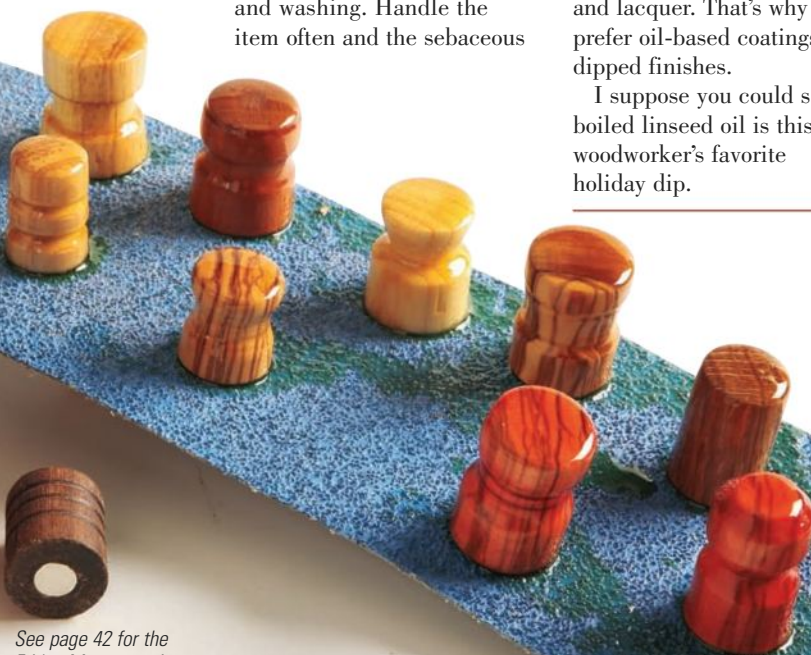
oil from your skin will add to the patina instead of eroding it. Frequent washing will eventually rub off some of the finish, but you can rejuvenate it the same way you applied it in the first place.

Other Options

Of course, you can always dip into shellac or lacquer, but they are less durable and each coat re-dissolves the previous one, so you end up wiping off everything but the first coat each time. Simply hanging them to dry without wiping off the excess may cause a dried knob of finish to form at the bottom where gravity causes the flowing finish to collect and harden.

Water-based coatings and paints may work a bit better, but many suffer some of the same drawbacks as shellac and lacquer. That's why I prefer oil-based coatings for dipped finishes.

I suppose you could say boiled linseed oil is this woodworker's favorite holiday dip.



See page 42 for the Fridge Magnet project.

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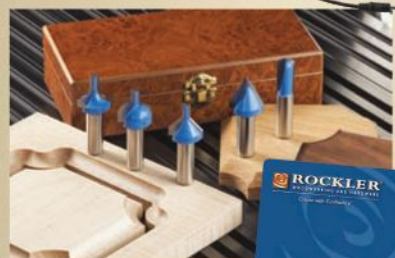
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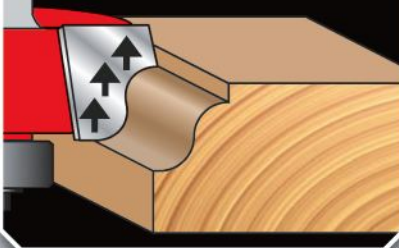


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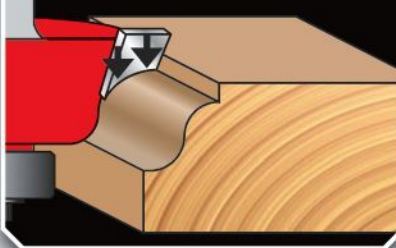
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