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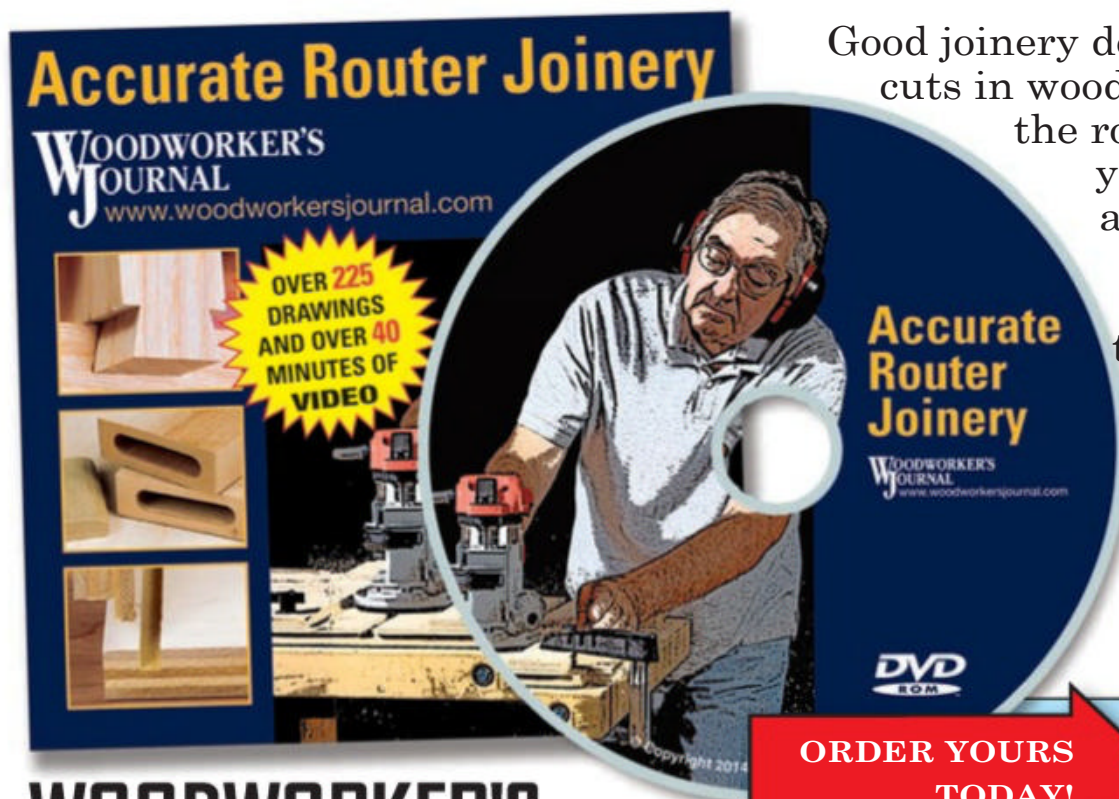
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WOODWORKER'S JOURNAL

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By Nick Brady

If you're a fan of floating shelves but not the "slab wood" variety, here's a visually lighter, cross-lapped alternative that's fun to build.



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Making a Lamp and Shade

By Rob Johnstone and Nick Brady

Our custom light will put mileage on your lathe and challenge your joint-making skills.



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Cloud Lift Chair

By Chris Marshall

Made with Rockler's Beadlock joinery, this comfortable oak chair complements our Cloud Lift Dining Table project featured in the June 2021 issue.



Scandinavian Modern Steam Bent Coat Hooks

By WJ Staff

Turn up the heat on an entryway accent when you apply steam to air-dried wood. Will it bend? You bet!

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Templated Plans to the Rescue!

Rockler Woodworking and Hardware, in conjunction with *Woodworker's Journal*, have come up with a way to make building projects easier. For a couple of years now, Rockler has been selling Adirondack and other outdoor furniture plans that include cardboard templates to help make the shaped parts. Builders can



use the cardboard templates to create their own MDF or plywood templates or just use the cardboard to trace the needed part shapes. Now Rockler has started to create plans with templates for fine furniture, like the table and chairs shown here. The plans and the templates are sold together. And coming soon, perhaps in the fall, you'll have the option of ordering these templated plans with the templates custom-made of MDF. It's another real solution to a real woodworking problem from Rockler, and you are the first to know about it!

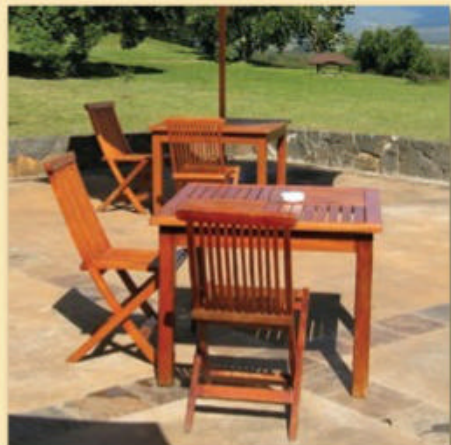
—Rob Johnstone



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FROM OUR READERS

Putting it all Together



BUILDING ON SATISFACTION

On occasion, I am reminded that to some folks, the projects we create are objects of wonder. There are people for whom cutting a piece of wood and gluing it together to make something is as out of reach as me dancing in a ballet. (Me in tights is just not going to happen, and everyone is better for it.)

Recently I was considering how best to advise someone to get started in woodworking. My goal was to make a project that required a few pieces of dimension lumber from Rockler, a handsaw, a drill/driver and a couple of clamps. The simple little tray project I devised was practical, attractive and super easy to make. I am convinced that almost anyone could build it. But the knowledge required to come up with a simple project was actually significant. I had to consider wood species and wood movement, how to shape the parts attractively with straight cuts, what a serving tray's practical size should be ... the list continued on.

I am not mentioning this to highlight my skill and knowledge but rather pointing it out for you to consider your own. Sometimes I think to myself, "Oh, it's only woodworking." But woodworking is a true craft requiring skill, precision and a good deal of peripheral knowledge. What we create with this wonderful medium — wood — can indeed be things of wonder. So here's to you, maker of complex, wonderful things!

And for great examples of exactly what I'm talking about here, I hope you'll enjoy perusing a selection of projects built by fellow woodworkers and readers who participated in a contest we held for "National Woodworking Month" (see below).

Correction: In my April issue editorial, I incorrectly stated that Nordy Rockler started what would become Rockler Woodworking and Hardware with his brothers. He actually started the business on his own in 1954, and his brothers joined the company later for a time. I apologize for the mistake. Our company founder was indeed a pioneer and innovator in woodworking.

— Rob Johnstone

READER PROJECTS

"Weekly" Readers Share Their Latest Projects

To help celebrate "National Woodworking Month" last April, Rob Johnstone asked *Woodworker's Journal's Weekly* online newsletter readers to share photos of their recent projects. Nearly 70 of them did. In case you missed the fun, pages 9 through 11 of this issue showcase a sampling of our favorites from that contest.

Space doesn't allow for use to share every entry in print, unfortunately, but you can see them by visiting woodworkersjournal.com and doing a search for "National Woodworking Month projects." You'll find a wide range of furniture, cabinetry, miniatures, knickknacks, turned offerings and much more. Thanks to all who shared their fine projects and descriptions! We enjoyed seeing them all.

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AUGUST 2021

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

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August 2021 *Woodworker's Journal*



Mythical-themed Carving

“Here’s a mythical creature carving I made from a piece of wood I found in the forest.” – **Scott Beyer**



Pinecone Pens

“Here are some pens I’ve turned recently from pinecones stabilized in resin with various color pigments added. Lots of fun and resin shavings all over the place!” – **Jarrett Piner**



Cypress Rockers

“While we were stuck at home during the pandemic, we built 30 of these cypress rockers and had a lot of fun doing it.” – **Ryan Barbier**

Segmented Bowl

“A Ring Master machine helped me create this bowl from various domestic and exotic hardwoods.” – **Robert Newton**



Sapele and Maple Chest of Drawers

“I made this sapele and maple chest for my wife after building a similar dresser for her. I like how it came out so well that I smile every time I walk into the room. Honestly, it makes my face hurt!” – **Jeff Edenfield**



Band Saw Box

“Last winter I focused on smaller projects, including this two-drawer band saw box made from several species of wood.” – **Don Gwinn**



Beer Paddles
“My ash and cherry beer paddles are assembled with box joints and through tenons that form handles on their ends.” – **Brian Kise**

There's more online at woodworkersjournal.com

Check online for more content covering the articles below:

- Shop Talk (page 16):**
In-depth report discusses current lumber shortage (PDF)
- Woodturning (page 18):**
Ernie Conover turns a tray from board lumber (video)
- Cloud Lift Chair (page 24):**
Chris Marshall builds a chair from start to finish (video)
- Turned Lamp (page 38):**
Rob Johnstone demonstrates turning a box elder lamp body and wiring it (video)
- Steam Bent Coat Hooks (page 46):** Steam bending primer (video); downloadable coat hook drawing (PDF)
- What's in Store (page 62):**
Featured tools in action (videos)

SURVEY

WE ASKED OUR SURVEY GROUP ABOUT DUST CONTROL

Machining wood creates copious dust, and there's no way around that fact. How woodworkers deal with wood dust varies significantly.

How important do you think dust control is in a woodworking shop?

Very important	75.51%
Somewhat important	21.47%
Not too important	0.9%
Not at all important	0.13%

What type of dust control machines do you have in your shop?

Ambient air filter	17.61%
Shop vac style vacuum	36.08%
Dust extractor style vacuum	8.44%
Wall-mounted dust collector	4.22%
Stationary cyclone dust collector	11.08%
None of the above	3.96%

What tools do you connect to dust collection?

Table saw	19.04%
Jointer	12.37%
Planer	15.85%
Router/router table	16.9%
Handheld/benchttop/stationary sanders	12.8%
CNC machine	1.08%
Other handheld power tools	5.48%
I don't use dust collection	2.17%

Have you purchased ductwork, hoses and fittings to help you be more effective in your dust control efforts?

Yes	62.57%
No	37.43%

Are you planning on adding more dust control machines, ductwork, hoses, fittings or other gear to help control dust in your shop in the next six months?

Yes	32.37%
No	67.63%





Miniature Steam Engine

"This 27"-long steam engine replica is made of black walnut and white oak. I don't have a lathe, so I used a scroll saw and table saw to cut the parts." – **A. Willis**



Daughter's African Mahogany Porch Glider

"I built this front porch glider for my daughter. It's made of African mahogany and finished with spar varnish." – **Will Henderson**



Deluxe Oak Chest

"Here's a red oak chest I made for my wife. I added a lift mechanism, antique metal corner hardware and faux straps to the design." – **Jerry Land**



Cutting Boards

"I usually make eight of these multispecies cutting boards at a time and donate them to a local nonprofit called VISTE (Volunteers in Service to the Elderly). I don't own a CNC machine. All the cutting is done free-style, so no two boards are alike. My 'secret sauce' for the curved cutting process is double-stick tape." – **Don Van Houtte**



Display Table for Fossils

"I made this display table from wormy chestnut to showcase a neighbor's fossil collection. It's the first time I've used this wood and made a table from my own plans!" – **Jeffery Jones**

STUMPERS

April Tool's Grind

No mystery here!

What's This?



Chris Ericson's garage sale find is made of cast-iron and measures about 5" x 6½", not counting the handle. Its center screw stops about 1" from the base, and the inner circular head is made of aluminum.

The casting reads "C D MFG CO" with a copyright symbol on one side and "CLEVD OHIO" on the other. Do you know what this clamp-like mystery tool is intended to do?

Email your answer to stumpers@woodworkersjournal.com or write to "Stumpers," Woodworker's Journal, 4365 Willow Drive, Medina, MN 55340.

Perhaps **Sanjay Savla** is pulling our leg when he guesses that Gary Sima's April mystery tool is an early "rotary hammer drill." But for 166 others of you, however, the purpose of this tool is crystal clear, and **Elmer W. Palmer** of Lolo, Montana, sums it up: It's a valve seat lapping tool for early automobile valve seats that were built into the engine block or head.

Art Thell, hailing from St. Paul, Minnesota, adds that the angled valve seats became deformed or "burned" through hours of running an engine, "after which they would not seat properly, resulting in blow-by. One would then have to go in for a valve job." **Jeffrey W. Gehm**, a retired technical education teacher in Syracuse, New York, says the old flathead or L-head straight six- or eight-cylinder engines, as well as older Briggs & Stratton small engines, were "somewhat notorious for burned valves" of this sort.

Grinding and lapping was also necessary for new valve retrofits, because "a straight-out-of-the-box valve didn't always make a good seal with the valve seat," adds **Dean Adams**, another retired agricultural teacher.

A valve job involved applying a greasy, gritty, valve-grinding compound to the mating valve seat and face. "Then this tool was



David W. Young shares his over 30-year-old Reciprocating and Progressive Valve Grinder, complete with accessories — it's a Sears Craftsman version of Gary's Sima's mystery tool in the April issue.

used to rotate the valve in its seat and mate the two," says **Mike Anderson** of Sacramento, California. Once done, a valve job "improved a valve's sealing ability to keep combustion gases at high pressure from leaking into the exhaust system," clarifies fellow Californian **Charles Mueller** of Chico.

But Gary's April tool is missing a few critical parts that don't make it much more than the "mixer" he thought it might be. "It should have a suction cup tip on the end that sticks to the valve while it's inserted in the head," points out **Kevin Fear** of Salem, Oregon. **Gary Barnabe** says those "high-grade rubber" suction cups came in a range of diameters from 7/8" to 1¾" to fit a wide range of valve sizes, and **Dave Williams** of Sheboygan, Wisconsin, concurs with him.

Or, the slotted end of the shaft could also take several sizes of H-shaped steel inserts with two prongs on a plate, adds **Brian Gustin**. "They engaged the little metal divots in the heads of (several) valve styles."

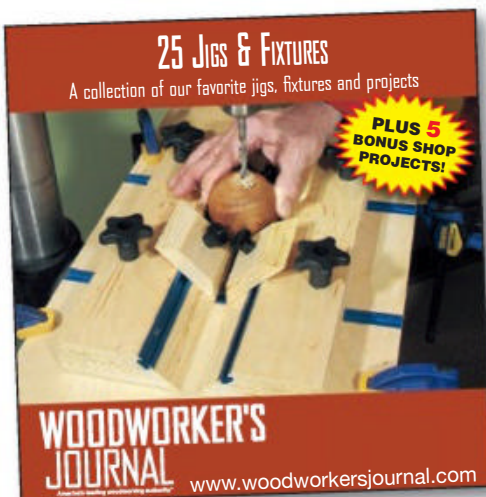
Regardless of the appendage required, the oscillating action created by cranking the tool's handle helped to distribute the lapping compound, offers **Stanley Brown** of Drury, Massachusetts. "And if Gary looks carefully at the spindle when turning it," adds **Denny Mandeville** of Sedona, Arizona, it will also move upwards between the rotations, "lifting and relocating the valve in its seat to ensure a full rotation in the process."

"Lapping compound came in different grades like sandpaper, from coarse to fine," shares **Chet McCord**, to smooth and polish those critical contact surfaces.

Several companies made these valve lapping tools, including Sears Craftsman, Sioux/Albertson and ZIM Manufacturing. Gary Sima's is likely a ZIM tool, speculates **Ken Kukla**, who worked for ZIM in Chicago.

While space doesn't allow for a full share, thanks to your many guesses and reflections about this important mechanic's helper.

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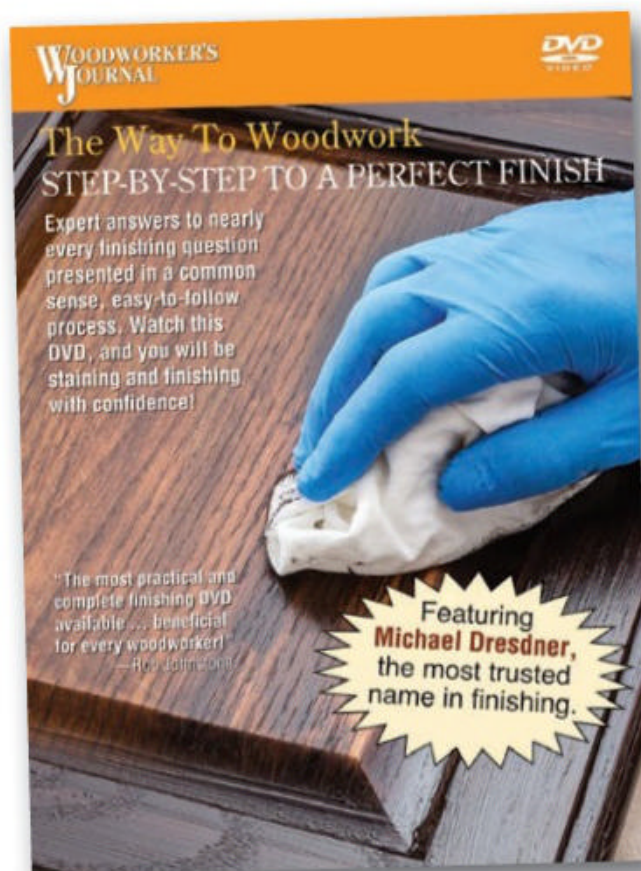
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TRICKS OF THE TRADE

Straps, Spreader Clamps Come in Handy



Golf Tee Inlet Plugs

The little rubber or plastic caps that cover the air inlet holes on nail guns are easy to lose. It's important to keep these airways clean, so here's an economical solution I've used for years when the caps go missing: golf tees. Just push the tee in until its tapered head seats in the hole. It will keep dust out of the airway and prolong the life of the nailer's inner seals.

Will Foster
Galena, Ohio



Save Those Chisel Caps

Installing or removing mortiser chisels is a clumsy job, and it can lead to poked fingers or damaged points if the bit drops down and hits the mortiser's metal table. My cheap fix is to protect the sharp points (and my fingers!) with the plastic cap that comes with most new mortiser bits. I install the cap to help push the auger and chisel up into place. Then I put it back on when I'm through mortising to prevent the bit and chisel from falling as I'm removing it from the machine.

Charles Mak
Calgary, Alberta



Tie-downs to the Rescue

Recently I built the English Garden Bench featured in the June 2020 issue. I didn't have long pipe clamps shown in the above photo for pulling the joints closed while the glue dried, so I used a couple of ratcheting strap tie-downs I had on hand instead. They prevented me from having to buy new pipe clamps, and the straps pulled the joints together securely.

Paul Honl
Le Center, Washington

Third Hand for Jointer Maintenance

On some models of jointers like mine, it's really tough to hold the motor in position with its belt straight and under tension while also trying to tighten the motor mounting bolts. After almost giving up in frustration, it dawned



on me to reverse the head on one of my parallel bar clamps so it works as a spreader. Setting the clamp's head on the floor, the adjustable jaw acted like a jack for lifting and positioning the motor while I made my adjustments. It was the third hand I really needed and worked like a charm!

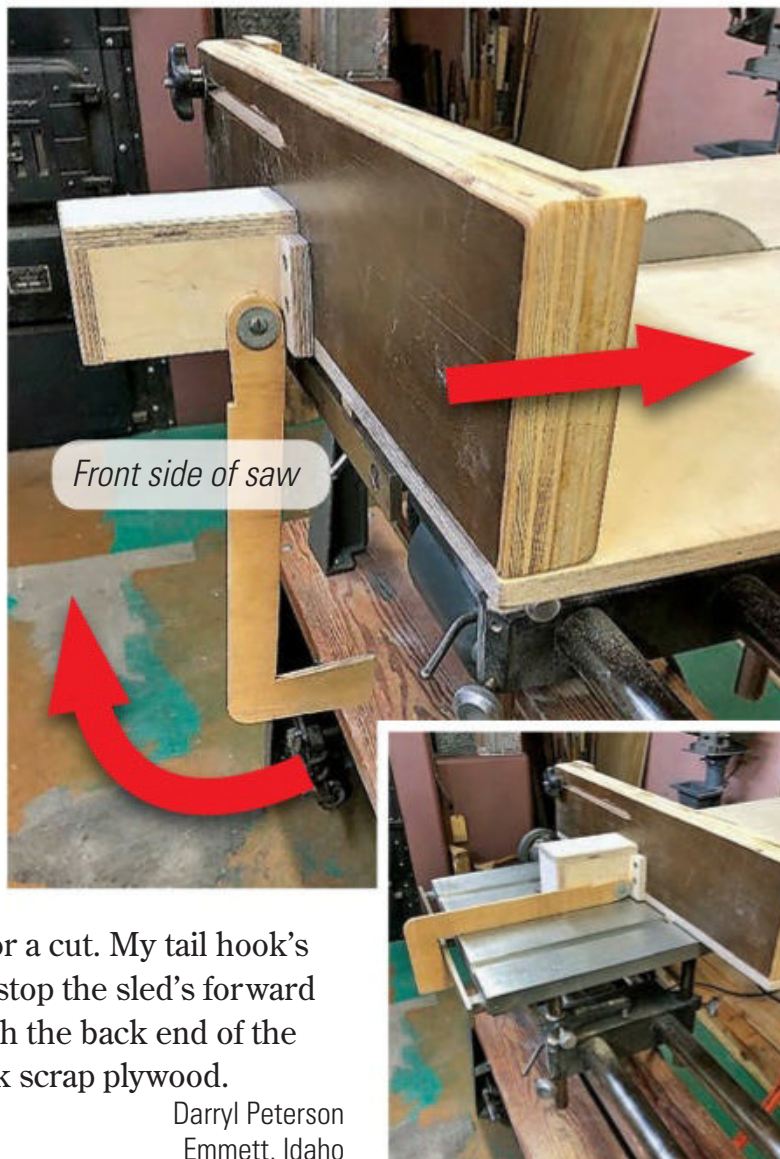
Father Chrysanthos
Etna, California

PICK OF THE TRICKS

Plywood Tail Hook Enhances Crosscut Sled Safety

Most crosscut sled designs have wood or plastic guards to act as a barrier against the blade protruding through the rear fence and causing injury. While these barriers are certainly necessary, they do not stop the forward travel of the sled, which can lead to a false sense of security. So I've added an "L"-shaped "tail hook" that automatically flips up and engages the infeed/front of the saw table each time I push the sled forward for a cut. My tail hook's 12" length and pivot screw location stop the sled's forward travel before the saw blade can reach the back end of the rear guard. I made it from 1/4"-thick scrap plywood.

Darryl Peterson
Emmett, Idaho



In addition to our standard payment (below), Darryl Peterson of Emmett, Idaho, will also receive a Milwaukee PACKOUT™ 3-Drawer Tool Box for being selected as the "Pick of the Tricks" winner. We pay from \$100 to \$200 for all tricks used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. For your chance to win, submit your Tricks to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340. Or send us an email: tricks@woodworkersjournal.com

WOODWORKER'S JOURNAL 2020 DIGITAL COLLECTION

This downloadable collection includes every project, technique and tool review published in *Woodworker's Journal* throughout 2020, including a Miter Saw Station, English Garden Bench, Five-Spindle Bench and suggestions for gifts from a serving tray to a candlelit centerpiece! We also have plans that include epoxy pouring techniques, tips on moving heavy shop equipment and six guides for getting a perfect finish on any project. Plus, every issue includes tips and tricks to increase your woodturning and finishing skills. This is a perfect addition to any digital woodworking library!

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SHOP TALK

“Building Dreams” One Project at a Time

By Stevie Estler

This Tennessee maker and influencer shares how she got started.



Since 2015, I've been running a full-time custom furniture company called “Built By Stevie” in Nashville. I've always had a knack for building things, and it runs in my family. Both of my grandfathers built things for their families, and two of my uncles currently are builders — one is actually a full-time woodworker in West Virginia.

Growing up in south Florida, I built ramps to ride skateboards when I was young. In college I found myself building and assembling all of my friends' furniture.

I had actually not used an electric saw until 2013 when I bought my first house and decided that it would be my project. First, I learned how to lay hardwood floors and then I googled how to build a headboard. Let's just say, I learned quickly that glue actually does work when you

use it! I filled my home with lots of DIY projects over the next three years, learning and designing my own furniture.

What threw me into full-time building was losing what I thought was my dream job — I worked for a company that created sustainable jobs for crafts-women in Africa selling their products in the U.S. I built things in order to keep busy while looking for a new job, but the business took off in my garage, and within a year I was looking for a bigger shop space.

Creatively Hooked

“Built by Stevie” has seen the wave of house growth, and my crew of three has grown alongside that wave, building about 40 to 50 projects per year. The first time I did a built-in, I stood back and looked at the wall and real-

ized I had actually created art in someone's home. It was a warm and inviting space, and I knew that a family would likely use it for a very long time. I was hooked!

One of my favorite parts of the job is collaborating with clients about what their needs are for a space or a piece of furniture. Sometimes it's a table to host dinner parties, while also serving as the homework desk for their kids. Or it might be a closet that serves two different people and their wants/needs for that space. Other times it might be a bed that's gorgeous to look at but also has storage that flows with the style of the bed.

This work brings me so much more happiness than I could have imagined when I lost my job, so in a sense I've actually created my “dream” job! I love helping other people satisfy their dreams, too.



High Lumber Costs

By Joanna Werch Takes

What's behind these crazy lumber prices? Our former editor reports.

Have you bought lumber lately? Then you've likely encountered some sticker shock. This past spring, the National Association of Home Builders (NAHB) cited a 300 percent increase in lumber prices since April 2020.

These days, woodworkers and builders are posting memes offering to trade 2x4s for late-model Corvettes or, as Clint Miller, a sales representative for Automated Building Components in Chetek, Wisconsin, said, "I could take my wife out for a steak dinner with four 2x4s, 8 feet long ... that's 50 bucks. A year ago, they would have been \$10 or \$15."

So, what's up? Well, you may recall a worldwide pandemic that began in 2020. Lockdowns that spring meant people stayed home, and businesses — including those in the building and lumber industry — shut down for a while. Then, while many people sheltered at home, they decided to remodel. That's the demand.

What about supply? The short answer is: there hasn't been enough of it. Lumber mill shutdowns due to COVID-19 were a factor, according to the NAHB. Plus, there isn't enough domestic supply. The National Lumber and Building Material Dealers Association's (NLBMDA) 2021 National Policy Agenda states that "as much as one-third of the framing lumber

used in the U.S. comes from Canada each year." And the U.S. charges tariffs on Canadian lumber.

Organizations such as NAHB and NLBMDA have been lobbying for reductions in tariffs. They'd also like to expand the domestic lumber supply through such methods as increasing logging from U.S. federal forests — through responsible management and in an environmentally sustainable manner, they're careful to note in their advocacy documents.

Some other factors:

- Domestic producers are selling their lumber abroad.
- The 2008 economic downturn closed many sawmills.
- Remaining mills have limited kiln capacity and face labor shortages.

When Will This End?

What's the solution? It seems we'll have to wait it out. Until when? That answer is tougher to predict.

Clint Miller, whose company works with roof and floor trusses as well as other engineered wood products, thinks that we're facing a "rubber band economy," which will contract, then spring back with elasticity before leveling out at a certain point. For now, though, "Everything is such a mess that it's going to take a while to get there," Miller said.

Read an extended, in-depth version of this article as a "More on the Web" feature for this issue.



WOODTURNING

Turning a Tray, Step by Step

By Ernie Conover

Here's a project that shows off an attractive piece of board lumber, and it can be made entirely by simple scraping on the lathe, if you prefer.



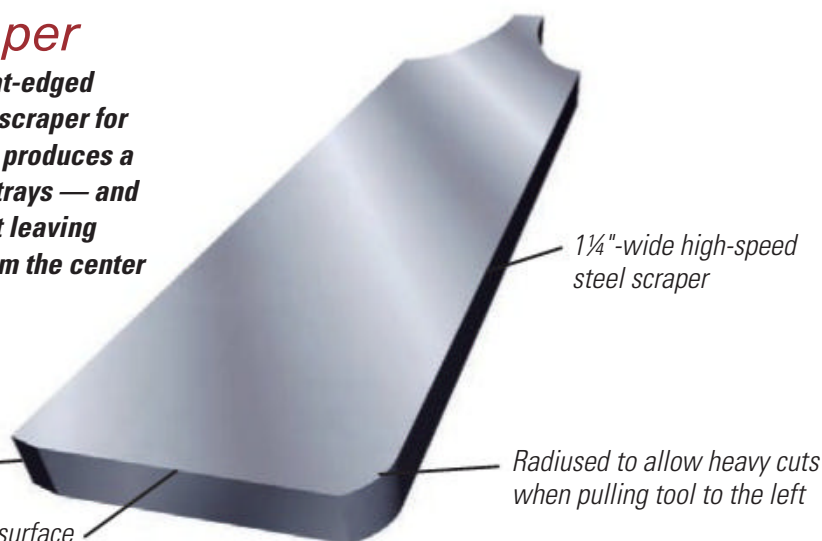
Here is one of a series of trays the author created in 2014 from different woods, each burned with a leaf of the wood species from which it was turned.

Boat-tailed Scraper

The author uses a modified, flat-edged scraper he calls a boat-tailed scraper for turning trays. Its straight edge produces a level surface — important on trays — and the clipped edge assists in not leaving lines in the wake of a pass from the center to the outer rim.

Clipped corner (boat tail) minimizes lines left in the wake of cutting to the left

Straight edge leaves a level surface



A wooden tray is an attractive, useful item. Coffee or tea service can be carried to the table with minimal spillage, and when not in use, it can be propped up on a shelf for all to admire. A tray is a fine gift for a special occasion such as a wedding or anniversary, and it can be adorned with an inscription, carving, drawing or pyrography.

Trays ranging from 6" to 24" in diameter are useful — larger for a tea service and smaller as a cheese board. Although it takes a big lathe to turn a 24" platter, a mini lathe will handle 6" to 10" diameters easily — and if this is your first tray, make it no bigger than 10" so you can get the hang of turning it.

Choosing Tray Lumber

Almost any species of wood makes a fine tray. I have used maple, cherry, oak, sassafras, birch, poplar and mahogany successfully. Mahogany is very nice for large platters because it tends to stay flat. It is also a good wood for the beginner who can turn it entirely by scraping, with the only downside being that it will take a bit longer than using a bowl gouge first.

If you buy lumber for a tray, 4/4 is not thick enough. A 4/4 roughsawn board will finish to about 13/16" — too thin for a tray. You'll need 5/4; its 1 1/4" rough thickness

will turn down to well over an inch and makes a tray that is substantial and much less likely to warp across the grain. To this end, a quartersawn board is ideal — it's less likely to warp in the first place and generally displays better figure.

Tool Choices for Trays

You can scrape a tray entirely to shape, but it will take longer than using a bowl gouge to remove most of the material. A good size square-end scraper (1" to 1 1/4" wide) can be easily ground to my boat-tail scraper shown above. Or the job can be done with just round and square carbide-insert turning tools, but more sanding will be necessary afterward. However, these tools must be presented level on the center line, not downhill as with a conventional turning scraper.

Getting Started

Lay out a circle on the most figured side of your tray board, or in the case of clear wood, the side with the best grain (see photo 1). Be sure to mark the center point where your dividers or trammel point rested. Now hand plane or orbital sand the back side flat (see photo 2).

Band saw the circle to shape. While you're at it, cut a 3" to 4" circle of any durable wood and screw a faceplate to it to serve as a



Use trammel points or a large compass to draw a circle on a suitable board for the tray. Mark this layout on the most figured side, or in the case of clear wood, the side with the best grain. Mark where the center leg of your dividers or trammel points was located, for reference later.



Hand plane or orbital sand the back side flat and cut the tray blank round. Also scribe and cut a 3" to 4" circle of any durable wood (poplar, maple, oak, etc.) to serve as a glue block. A 4" block is better for very large trays.

glue block. Mount the faceplate to the lathe so you can scrape the glue block's outer face flat. That way, once the tray blank is mounted to it, the blank will spin in a true orbit perpendicular to the lathe's axis of rotation.



Mount the faceplate and glue block on the lathe, and scrape the block absolutely flat. Then spread wood glue on its face and cover it with a layer of brown craft paper or grocery bag (left). Spread glue on the paper and press the tray blank against it with the tailstock (right), picking up the original center layout mark.

Paper-joint Chucking

A tray is a poster child for paper-joint chucking, which is a simple and cheap method of holding the work without leaving any marks. Here's how to install the blank on the glue block. Spread Titebond Type I yellow glue on the flattened glue block, and place a piece of brown craft paper on it (grocery store shopping bags work very well). Spread glue on the exposed side of the paper and place your tray blank on it (see photo 3). Press the blank against the glue block with the tailstock live center located on the original penciled center point. Apply firm tailstock pressure to

hold the parts in place, and leave it clamped for at least 12 hours in a warm shop (see photo 4).

Turning the Edge and Base

It's time to start turning! I'll advise you to keep the tailstock in place with pressure on the live center during the first cuts when you level the top face (and make it parallel to the bottom face), cut the edges and undercut the base.

A bowl gouge is the best initial tool. Start by turning the outside edge to a gentle taper such that the top of the platter is bigger than the bottom edge (see photo 5).

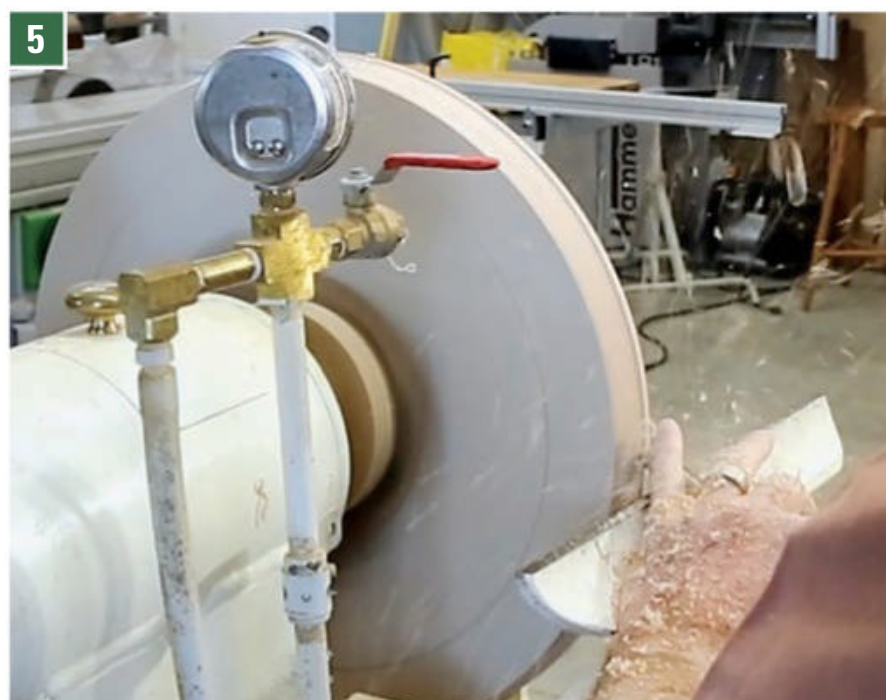
Now make an undercut for the base (see photo 6). It

only needs to extend an inch or so in from the outside. Trays need a large base for greater stability. The pull cut I show on my "More on the Web" video for undercutting the base is an off-the-bevel cut that's the only real option for this step, but it works. A round scraper or carbide-insert tool will also do the same job. Once the undercut is done, remove the tailstock and live center.

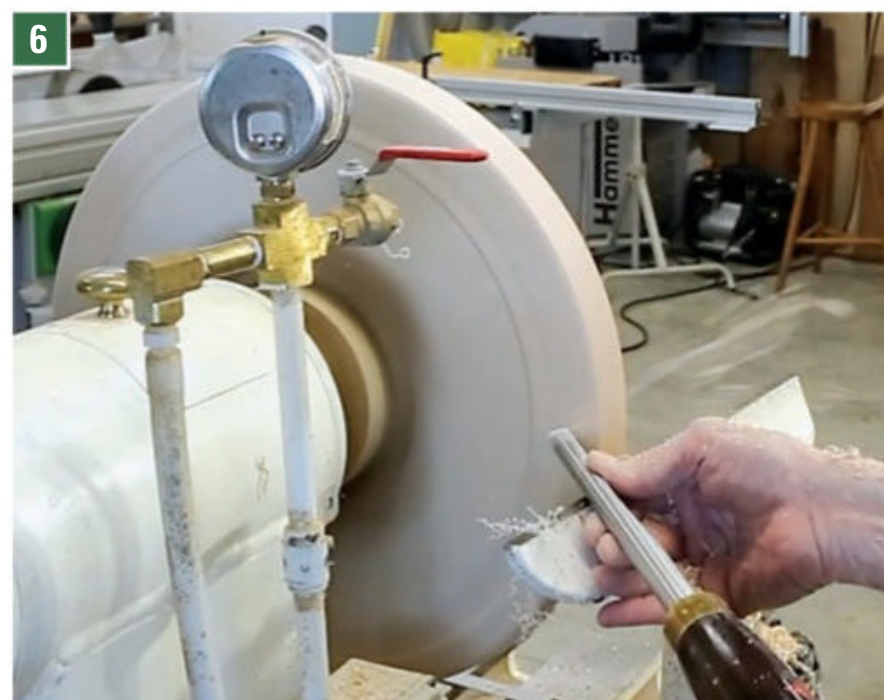
Shaping the Tray's Center

Make a series of passes with a bowl gouge to remove most of the center material from the face of the tray to create its interior floor (see photo 7). When doing this, the nose bevel must rub behind the cut, which has to be parallel to the base. The base wants to be about 1/2" thick in most trays, so stop when you are about 9/16" thick.

Now it's time to finalize the inside walls of the rim (see photo 8). I do this with a 3/8" or a 1/4" bowl gouge, creating an interior slope that matches the outside. I



Use a bowl gouge to flatten the top and bottom faces of the blank, and bring the outer edge into round. Then form the edge into a gentle taper (occurring here), so the top of the platter is bigger than the bottom edge.



Undercut the base. The author uses a bowl gouge and an off-the-bevel cut for this step, shown in his MOW video for this project. A round scraper or carbide-insert tool will do the same job but will require more sanding.

MORE ON THE WEB



Watch the author turn a tray by visiting woodworkersjournal.com and clicking "More on the Web" under the Magazine tab.



7 Use a bowl gouge to remove most of the center material in a series of passes. The nose bevel must rub behind the cut, which has to be parallel to the base. Stop when the base is about 9/16" thick.

also cut down below the floor to create a trough that I call a scupper (see photo 9); it serves to trap small amounts of liquid that may run to the tray's edge.

When that's done, I use the boat-tailed scraper to scrape the floor level (see photo 9). I try to make it have a very slight crown, such that liquid runs to the edges, but the crown is not really noticeable. Use a ruler or a piece of wood as a straightedge to monitor your progress.

Sanding by Power and Hand

Once the tray's interior is the way you want it, it's time to sand (see photo 10). The starting grit will depend on the wood, the tools you've used, their sharpness and your control of them. If all went well, 120 is a good starting grit. But if not, 60- or 80-grit is necessary. This is all to say that the sanding regime should run 60-, 80-, 120- and 180-grits in that order; where you start is dependent on the above-mentioned factors. An orbital sander is immensely helpful to level the floor, but great care must be exercised as you approach the scupper not to touch the inside wall of the rim with the edge of the sanding disk, or it will leave grooves that are very

time-consuming to sand out.

The scupper and the wall need to be hand sanded, as will the rest of the project, if you do not have an orbital sander. Use the same progression of grits.

Finishing and Removal

There are various finish options for a tray. Oil finish such as Waterlox or General's Arm-R-Seal are always a good choice. Sand the first coat in with 220-grit paper. Sand second and third coats in with 320-grit, let dry until a bit tacky and then wipe off with shavings or paper towel. Always let the finish dry 24 hours between coats.

I prefer to apply one coat of Waterlox, followed by shellac padded with the piece slowly rotating in the lathe. This is a French polish where the machine does the work.

A good water-based finish is General Finishes Enduro-Var. It dries fast and imparts some color to the wood that accentuates the grain. Starting with Arm-R-Seal first, followed by Enduro-Var, is a good option, too.

To remove the tray from the lathe, insert a chisel in the glue line on the end-grain side of the tray. Give it a slight tap and the paper joint will tear free. Orbital or



8 Finalize the inside walls with a 3/8" or 1/4" bowl gouge, creating a slope that matches the outside. The author also cuts down below the floor to create a trough that he calls a scupper for catching liquid near the edge.



9 Use a boat-tailed scraper to scrape the floor level. Try to make it have a very slight crown such that liquid runs to the edges but the crown is not really noticeable. Monitor your progress with a straightedge.

hand sand the base and apply finish to it. Now you have a finished tray to delight the family or for a perfect gift.

Ernie Conover is the author of *The Lathe Book and Turn a Bowl with Ernie Conover*.



10 Sand the tray up through the grits to 180 in order. If you power sand, switch to hand sanding in the scupper area and at the inside wall.



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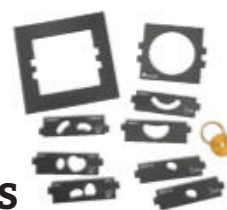


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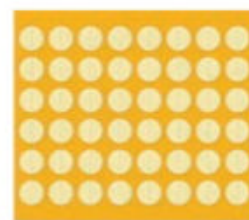
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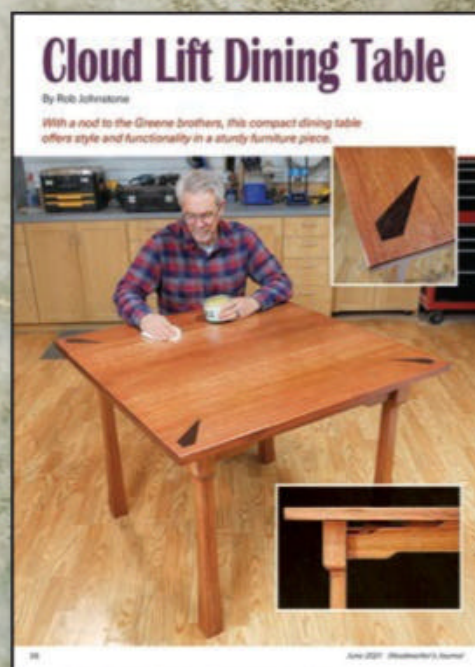
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Cloud Lift Chair

By Chris Marshall

This comfortable oak dining chair uses Rockler's sturdy Beadlock joinery to make it simpler to build.





Glue up a pair of blanks measuring 6" x 46" for each chair you plan to build. These laminated blanks will yield both a back and a front leg. The author started with 5/4 stock here, planed to 1" thick, to create their 2" thickness.



Rough cut the back legs to size, and create a rigid template from MDF or sheet stock. Secure the template to each back leg for template routing using several short strips of double-sided tape.



A 2"-long pattern bit (inset), set to full height, will trim most of the leg's edge to final shape with the template attached (here, it's on the bottom). After the first pass, set the bit higher to reach the remaining waste.

Woodworkers often hesitate to build chairs, either because the construction is complicated or they're concerned the final product won't be comfortable to sit on. But let me assure you, this chair's straightforward design isn't hard to build if you have moderate woodworking experience, and its Beadlock floating tenon joinery couldn't be simpler to master. The tilted backrest, curved back rails and amply padded seat make this chair easy on your backside, too.

If you liked the look of our "Cloud Lift Table" project in the June issue (see facing page), you're in luck: these chairs are designed to complement it. I built this pair from rift- and quartersawn white oak and used the same finishing process as that table. While I prepared my own MDF templates for making the angled and curved parts, Rockler soon will offer a cardboard template kit that will include all the patterns you'll need to trace your workpieces or form rigid templates for easier part duplication. So if you're ready for an involved but fun build, round up some 5/4 and 8/4 white oak, and let's build some chairs!

Starting with the Legs

Glue up 2"-thick blanks for the front and back legs from 5/4 stock planed to 1". A blank measuring 6" x 46" will yield both a front leg and a back leg. Once the blanks come out of the clamps, flatten their edges on a jointer or with a plane.

Use Rockler's cardboard templates to

trace the front and back leg profiles on the blanks. Or create your own template by enlarging the gridded drawing on page 29. When drawing the back leg shapes, position the template so the front edge of the lower portion of the leg is flush with the blank's edge. This way, the upper angled portion of the legs runs diagonally across the blank.

At the band saw, cut the four legs to rough shape, sawing about 1/16" outside your layout lines.

Use your back leg template again to form a rigid template from a piece of scrap plywood or MDF that's at least 1/4" thick. We'll use this rigid template for routing. Carefully cut the template out, following the layout lines. Sand the template's edges smooth and flat.

Adhere the back leg template to one of the leg blanks with double-sided tape so the rough-cut edges of the blank extend beyond the edges of the template. Install a long pattern bit (bearing on the shank) in your router table — I used

Rockler's Double Bearing Flush Trim Bit (item 27867) with the end bearing removed. Adjust the bit's height so the pilot bearing will roll along the edge of the template. Start the router and feed the workpiece and template along the bit, trimming off as much of the overhanging waste as the bit can reach — most pattern bits won't extend all the way across a 2"-thick workpiece.



Make and use a rigid template to trace the cloud lift profile onto the front leg blanks. Notice the extra length the author leaves at the top of each leg — it supports the end grain when drilling the seat rail mortises.

While your feed direction should be from right to left as usual, try at all costs to avoid routing against the grain direction (where the upper portion of the back leg crosses the wood grain at an angle). Run the router at its highest speed and feed very slowly to prevent the bit from tearing out the wood grain in these areas. Then raise the bit and make a second pass to remove the rest of the waste. Repeat the template-rout-

ing process on the second back leg.

With that done, create a plywood or MDF template for the front legs using Rockler's cardboard front leg template as a pattern or by enlarg-

ing the gridded drawing on page 29.

Rip a pair of front leg blanks to 2" wide from the stock remaining from the back leg blanks. Cut these blanks 1/2" to 1" overly long, and trace the cloud lift profile onto the front face of each leg blank. We won't cut and template-route this front edge to shape until much later in the building process, but marking it will help keep the legs' orientation clear and avoid mistakes when marking and cutting the chair frame joinery.

Decide which legs will be left and right for your chair or chairs, and mark the four legs on their ends so you can avoid confusion as you work.

Drilling Mortises

Make blanks for the front, back and side seat rails from 3/4"-thick stock. Use Rockler's cardboard template or the gridded drawing to draw the cloud lift profile onto the bottom edge of the front seat rail.

Rockler's Beadlock Pro drilling jig turns a series of side-by-side holes into mortises for matching Beadlock tenon stock. Shifting the jig's steel guide block forms the overlapping hole pattern.



MORE ON THE WEB



To watch a video of the author building one of these chairs from start to finish, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

We'll be using Rockler's 3/8"-thick hardwood Beadlock loose tenons to assemble most of the major joinery of this chair. Rockler's Beadlock system is very easy to use. If you can drill holes with a drill/driver, you can produce sturdy leg/rail connections without other tools. The Beadlock drilling jig simply clamps onto a workpiece, and shifting a hardened drilling guide within the jig to two positions — A and B — enables you to drill a series of side-by-side holes to create precise mortises for the premade Beadlock tenon stock. Once a pair of mortises are drilled for a joint, assembling legs and rails is as easy as cutting the tenon stock to the correct length and gluing them into place.

We'll use a pair of Beadlock tenons to connect the seat rails to the legs at every joint. Mark a pair of mortise centerlines 15/16" in from the top and bottom edges of each of the four seat rails on their ends. Now carefully transfer these layout marks directly from the seat rails onto the appropriate leg faces. On the front legs, plan for the extra part length to be at the top, and mark the mortises below it.

With the 3/8"-hole guide block installed in the Beadlock jig, bore both mortises into the ends of the seat rails. For each mortise, drill the three "A" series holes first, then the two "B" series holes to complete the five-hole mortise shape. Drill these 16 mortises 1 1/4" deep, using the stop collar provided with the Beadlock drill bit to control the drilling depth. Clean out all the waste inside.

Now carefully cut out the cloud lift profile on the front seat rail at the band saw or using a scroll saw or jigsaw. Sand the profile smooth, up to the layout line.

When the seat rail mortises are done, you can drill corresponding pairs of mortises in the front and back legs. To space these correctly, install 1/4" and



Once you've bored pairs of Beadlock mortises in the ends of the front seat rail, mark and cut its cloud lift profile into the lower edge at the band saw. Sand these contours smooth and even.

1/2" plastic Beadlock spacers inside the Beadlock jig behind the steel drilling guide. Clamp the jig against the *inside* faces of the legs for this operation. Bore the leg mortises 1 1/4" deep for the front and back seat rails. Change the drilling depth to 7/8" when you bore the side seat rail mortises into the legs.

Next, crosscut eight Beadlock tenons for each chair to 2 1/2" long for the front and back seat rail joints, and make eight 2 1/8"-long tenons for the side seat rail joints. Dry fit the legs and seat rails with tenons inserted in the joints, to make sure these joints come together easily and close fully when you clamp them. If all looks good, disassemble the parts so you can trim off the extra material from the tops of the front legs.

Making Crest and Back Rails

The 7/8"-thick crest and back rails are curved on their front and back faces to make the chair back more comfortable to rest against. There are numerous ways to create blanks for these rails, including steam bending or gluing many thin laminations together over a curved form. But for ease of construction, I chose to cut them out of 8/4" solid stock instead. If you decide to do the same thing, prepare a 2"-thick blank for each of these rails, using the *Material List* dimensions on page 29.

The curved profile of these rails will require nearly the full thickness of these blanks, but we'll need to reuse the front and back offcuts several times in the overall machining process. So to

thicken and strengthen what will be the back offcut, face-glue a piece of scrap hardboard or thin plywood to the back face of each blank (you can see it clearly in the photos on page 28).

Trace Rockler's curved, C-shaped cardboard template for the crest and back rails onto the top edge of each blank, or draw the shape from the gridded pattern. Align the front edges of the template with the front corners of the workpieces when laying out the part shapes. Then draw the cloud lift profile on the front face of the crest rail workpiece.

Mark the crest and back rail blanks for a single Beadlock mortise on each end. Locate the centerlines of these mortises 1 1/2" up from the bottom part edges. To position these

Cut both lengths of Beadlock tenons required for the seat rail-to-leg joints, and dry assemble them to see that they close well. You'll fit these parts together many times over during the building process!



Drill pairs of Beadlock mortises into the front and back legs to match those you've drilled in the seat rails. Be sure to install the correct spacers in the jig to position these mortises accurately on the legs.

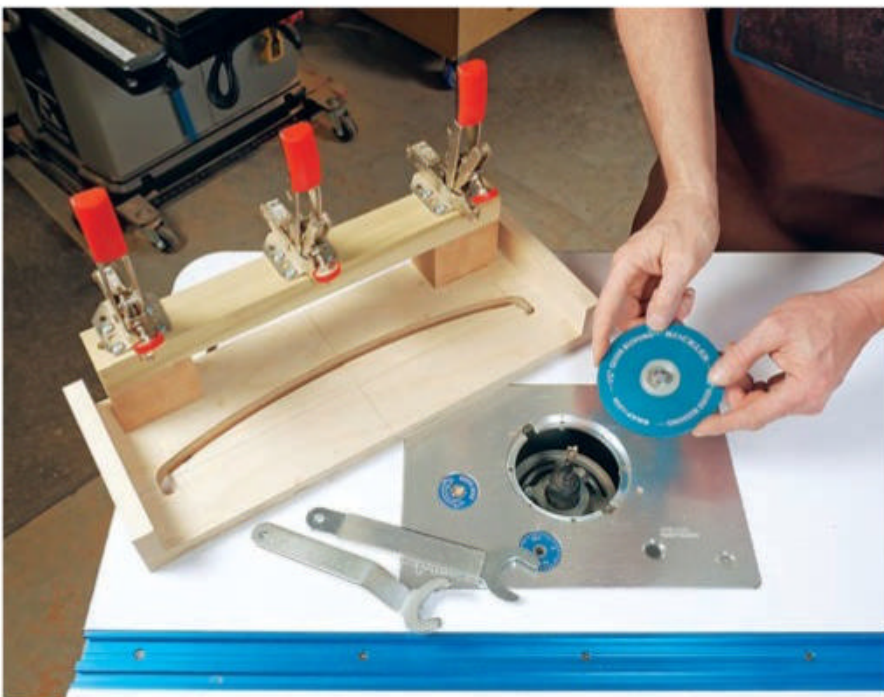
mortises correctly on the rail thickness, install both 1/16" and 1/8" spacers inside the Beadlock jig behind the guide block. Set the drilling depth to 3/4". Clamp the Beadlock jig against the front face of each blank, and drill out the crest and back rail mortises.

Head to the band saw so you can cut the rails' curved profiles. Carefully cut just outside the curved layout lines, and make these long curved cuts in a single





Cut the broad curves of the crest and back rails in one pass so you can save and reattach these offcuts for the routing and sanding steps. Notice the plywood backer piece here, which will keep back offcut in one piece.



The author's routing jig for milling the curved grooves in the crest and back rails follows a 1/2" O.D. guide bushing in the router table to control the cut. Three clamps and some double-sided tape hold workpieces securely.



Mill the 1/2"-deep curved grooves in the crest and back rails with a 3/8"-dia. bit (inset). With each routing pass, move the jig side-to-side so the guide bushing can follow the curved opening in the jig's base.



pass. After you cut each waste piece free, stick the offcut back into place on the blank with pieces of double-sided tape before cutting the second long curve. This way, the blank will retain most of its original thickness so it can stand squarely on the saw table for safer and more accurate cutting now, as well as during routing in the next step.

Notice in the *Drawings* that the crest and back rails have a long curved groove that houses the chair's back slats. We'll rout these grooves into the rails now. This would be a tricky and nearly impossible operation for a handheld router to accomplish, but it's quite easy to do with a purpose-made jig at the router table. The jig I made consists of a 3/4"-thick plywood base with a 1/2"-wide groove routed through it that matches the curves of the crest/back rail. Three clamps on the jig press the rail workpieces down during routing, and I added a couple of strips of double-sided tape to the jig base for even more insurance. To use the jig, I install a 1/2" O.D. guide collar and a 3/8" upcut spiral bit in the router table. The guide collar's bushing fits inside the jig's groove. Sliding the jig from side to side routs the curved grooves consistently and easily.

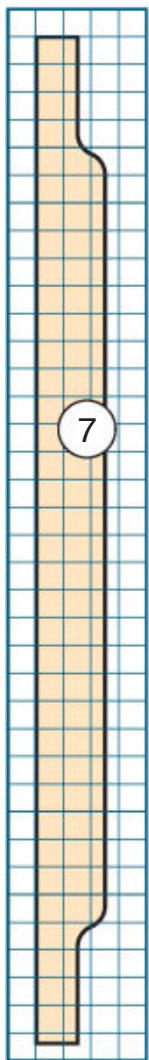
To create the curved groove in the jig's base, I used my MDF crest/back rail template to create a much larger template with a curved edge that was wide enough to support the base of a handheld router. With a 1/2" spiral upcut bit installed in the router and a guide collar surrounding the bit that was just large enough for bit clearance, I attached my larger curved template to the plywood blank for the jig base and template-routed completely through it to form the jig's slotted opening. Keep the router pressed firmly against the larger template as you rout your way through the jig base — the smoothness and accuracy of this groove determines how well the jig will work for routing the grooves in the chair rails.

Assemble the jig and use it to mill a centered, 3/8"-wide, 1/2"-deep slot along the bottom edge of the crest rail and into the top edge of the back rail. Be sure to center the crest and back rails carefully on the routing jig when clamping them to ensure that the grooves will be positioned accurately. Rout these grooves in a series of three or four deepening passes.

It's time to sand the curved faces of the crest and back rails, so take them to your spindle sander or use long sanding drums on a drill press. When you remove the taped offcut to sand each face, stick it back on after sanding to help stabilize the workpiece for sanding the other face. If you have neither machine option for this step, a flexible sanding block will also do the job.

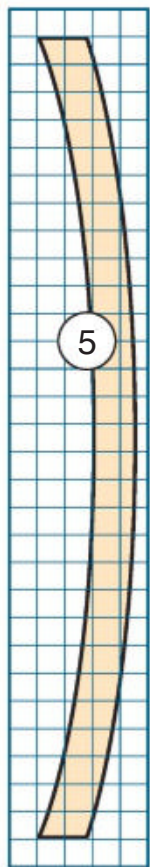
Once that's done, go ahead and cut the top cloud lift profile to shape on the crest rail. Do this with both front and back waste pieces taped in place. Sand this profile smooth before

Outer Back Slat
(Front View)



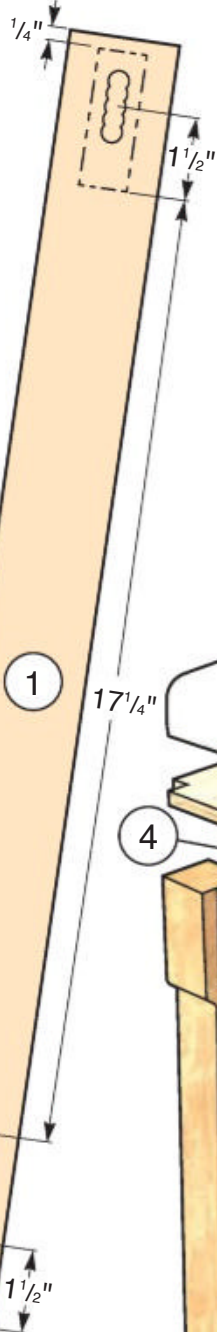
Each square = 1/2"

Rail Curves
(Top View)

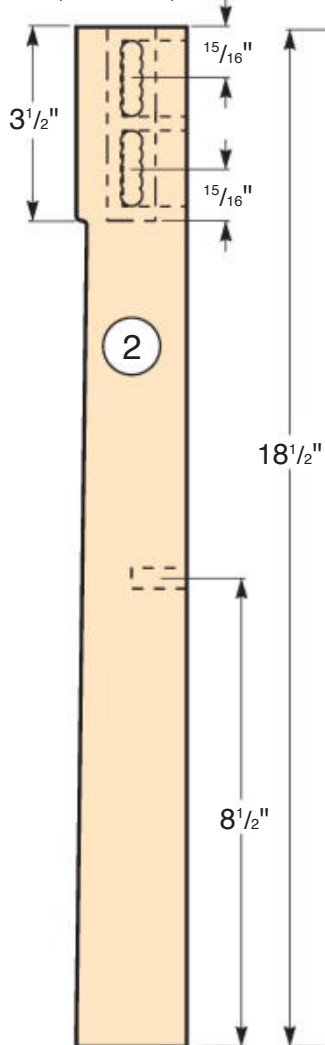


Each square = 1/2"

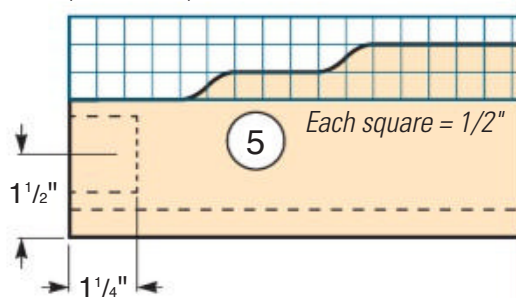
Back Leg
(Side View)



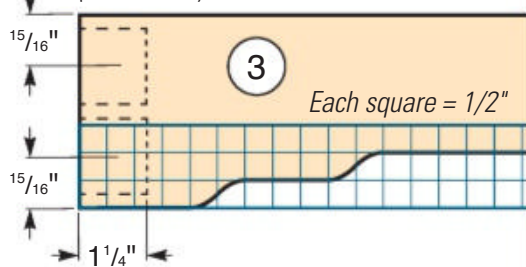
Front Leg
(Side View)



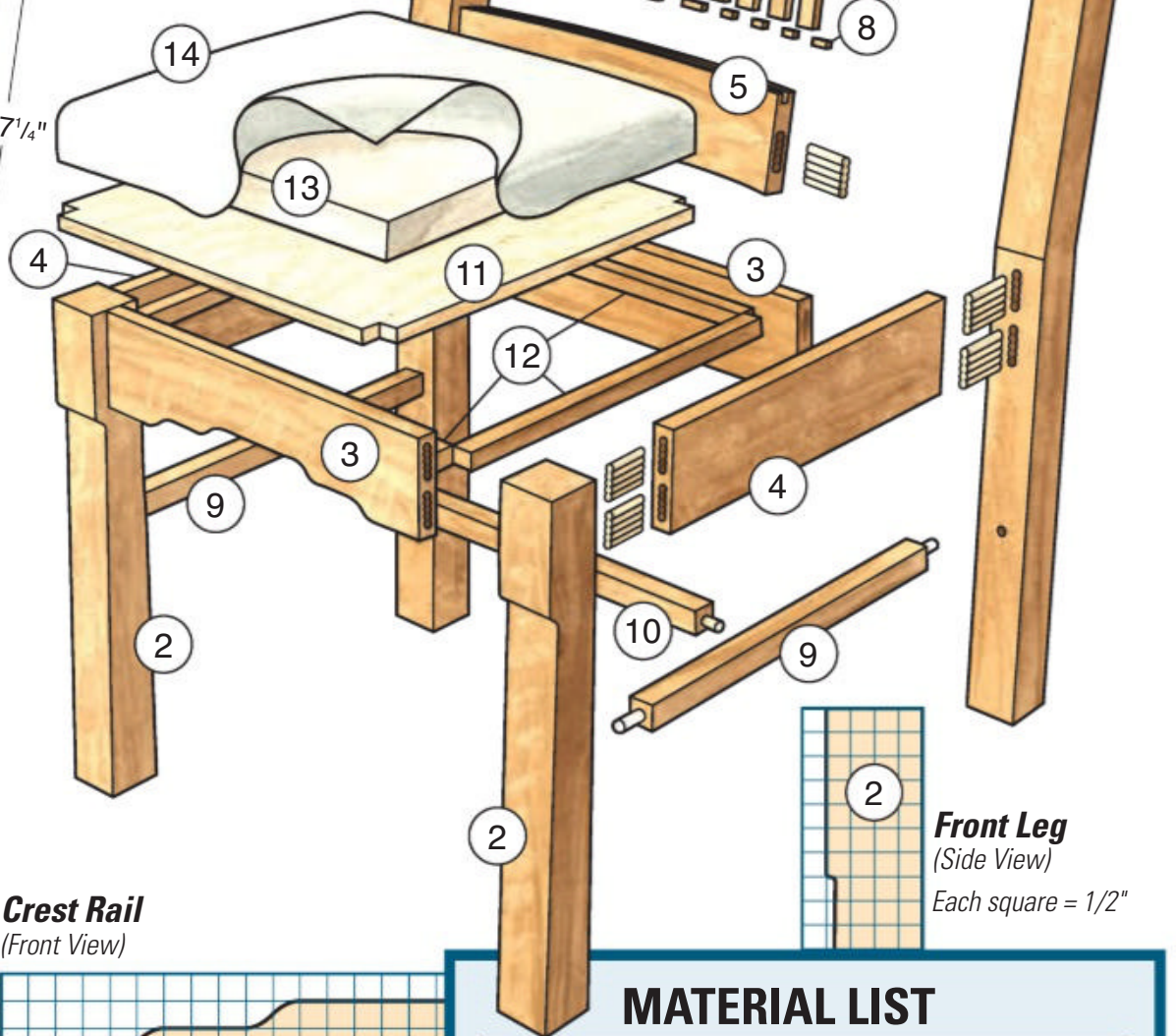
Crest Rail
(Front View)



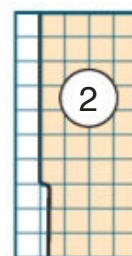
Front Seat Rail
(Front View)



Exploded View



Front Leg
(Side View)



Each square = 1/2"

MATERIAL LIST

	T x W x L
1 Back Legs (2)	2" x 5 5/8" x 43"
2 Front Legs (2)	2" x 2" x 18 1/2"
3 Front, Back Seat Rails (2)	3/4" x 3 1/2" x 14 1/2"
4 Side Seat Rails (2)	3/4" x 3 1/2" x 14 1/2"
5 Crest, Back Rails (2)	2" x 3 1/2" x 14 1/2"
6 Inner Back Slats (6)	3/8" x 3/4" x 18 1/4"
7 Outer Back Slats (2)	3/8" x 1 1/4" x 18 1/4"
8 Slat Spacers (1)	3/8" x 1/2" x 18"
9 Bottom Rails (2)	7/8" x 7/8" x 14 1/2"
10 Bottom Cross Rail (1)	7/8" x 7/8" x 15 3/4"
11 Seat Board (1)	3/4" x 15 3/4" x 15 3/4"
12 Cleats (4)	11/16" x 3/4" x 14 1/2"
13 Seat Foam (1)*	2" x 20" x 20"
14 Seat Covering (1)	23" x 23"

* Oversized; trim to fit



Remove the front or back offcuts from the crest and back rail workpieces in order to sand the broad curves. Reattach the offcuts to optimize support.

removing the front and back waste pieces for the last time.

Next, mark the inside faces of the back legs for the four Beadlock mortises that will attach the crest and back rails to them. Locate centerlines for the crest rail mortises 1¼" down from the top ends of the back legs, and mark the



Bore Beadlock mortises in the back legs for the crest and back rails. Register the jig off of the front faces of the legs for these mortises to keep the process consistent and to avoid the back leg crooks.

centers of the back rail mortises 22" down from the legs' top ends. To drill these 1¼"-deep mortises, install the 1/2" spacer behind the guide block in the Beadlock jig, and clamp the jig to the *front* faces of the back legs this time. (The crook in the back legs doesn't allow the jig to be clamped properly for drilling the back rail mortises; that's the reason for using the front faces of the back legs to register the jig.)

Cut 2"-long Beadlock tenons for the crest and back rail joints, then dry fit these rails in the chair framework with the tenons in place to confirm that the parts go together well.

Creating the Thin Bottom Rails

The two bottom rails and cross rail are 7/8" x 7/8" in section, and they'll be joined together and to the chair legs with 3/8"-dia. dowels. It will be difficult to clamp most doweling jigs to the ends of rails this thin to drill centered holes into them. So start with a piece of 7/8"-thick, 14½"-long stock that's much wider than necessary to create the two bottom rails. Mark center points for drilling that are 7/16" in from both long edges of your workpiece, and clamp your

doweling jig securely to drill 3/8"-dia. holes 3/4" deep. Then take the workpiece to your table saw and rip both 7/8"-wide rails from it. Make these cuts carefully to be certain the dowel holes are centered on the rail ends.

Now drill a 3/8"-dia., 3/4"-deep hole into each bottom rail for the cross rail. Center these holes, lengthwise.

Study the *Drawings* to verify the correct faces of your chair legs for marking the dowel hole locations for the bottom side rails. These dowel holes should be 8½" up from the bottom end and 15/16" in from the outside face of each leg (this will locate the bottom rails 1/2" in from the outside leg faces). Once you've marked the four center points, head to the drill press so you can drill them 3/4" in deep with a brad-point bit.

With that done, dry fit all the chair parts together up to this point with the Beadlock tenons and dowels in place, and clamp the joints. This will help you determine what the final length of the bottom cross rail should be. Make it the same way as you made the two other bottom rails, starting from a piece of wider stock and drilling the dowel holes into its ends before ripping the cross rail free. Test its fit between the bottom rails in the chair with the tenons and dowels fitted into place.



The best way to make the thin bottom rails is to start from an overly wide workpiece. Drill the dowel holes into the ends first so the blank can help you clamp your doweling jig properly. Then rip each rail free.



Drill 3/8"-diameter holes into the front and back legs for the bottom rail dowels. A drill press is the best tool for this job, because it ensures the dowel holes will be uniform and penetrate straight into the leg surfaces.

It's finally time to take the front legs to the band saw and rough cut their front cloud lifted faces. Template-route these profiles to final shape, then sand the legs' front faces smooth using an oscillating spindle sander, sanding drums or by hand sanding.

Installing Back Slats, Spacers

It's time to get those back slats into place! So dry assemble the chair again in order to measure the actual distance between the back and crest rails from the bottom of the curved grooves. Then prepare enough 3/8"-thick stock to rip the six straight slats to size. Rockler's cardboard template kit provides a template for the two curved outer slats, or use our gridded drawing. Trace their shapes on a workpiece that's wide enough to create both slats. Saw the profiles just outside the layout lines, and sand or template-route the cloud lifts smooth and even. Rip the outer slats free. Sand all eight slats up to 180-grit.

Despite the fact that the slat grooves in the crest and back rails are curved, the spacers that fit between the slats and hold them in position can actually be made from straight strips of stock, because the curvature of the grooves is so gradual. Prepare long strips of 3/8"-thick, 1/2"-wide stock. The 18" length that's specified on the *Material List* (page 29) is longer than necessary to allow for a few extra spacers, if needed.

Carefully cut two 1 1/4"-long spacers to fit between the center two slats and a dozen 3/4"-long spacers that fit between the rest of the straight-edged slats.

Finish sand the crest and back rails and the slats, because we'll be installing the slats and spacers permanently



By now, you're an old pro at dry assembling your chair or chairs. Do it again to find the final length of the bottom cross rails before making them. It's always best to measure off of the actual project.

at this point. When those are smooth and ready to go, dry fit all eight slats between the two rails in the grooves, and reinstall this loose assembly back on the chair. Spread the slats out along the grooves so they're roughly in position. Then, starting in the middle of the crest and back rails, insert the two 1 1/4" spacers with dabs of glue into the rail grooves. Double-check that these two spacers are centered on the rail lengths. Slide the adjacent pair of slats against these longer spacers. Now glue and insert 3/4"-long spacers into the grooves alongside the first two slats. Slide the

next slats over, and repeat this process to position and locate the other straight slats, 3/4" spacers and the outer two profiled slats.

The outermost four spacers that fit between the profiled slats and the back legs should be about 1 3/8" long, and you'll need to trim their ends at angles to fit flush against the legs. It's a fussy process, but take your time to get a good fit. Once these four spacers are ready, glue them into place in the grooves to finish the slat installation. Let the glue dry while the backrest subassembly is still dry fitted on the chair.



The author used an MDF template to machine the cloud lift profiles on the outer back slats. He ganged both of these rails on a single wide workpiece to make them safer to rout (left). Once you've sanded the crest and back rails and all eight back slats, install the slats on the rails with spacers in between to create a backrest subassembly (right).





Bring the chair frame together by joining the front and back leg subassemblies and the lower rail glue-up with the side rails and related tenons and dowels. The author used hide glue here, because dried hide glue scrubs away with water.

assembly process by gluing and clamping the backrest subassembly and back seat rail between the two back legs with Beadlock tenons installed. Then glue and clamp the front seat rail and front legs together with their tenons in place. Assemble the lower rails and cross rail with dowels and glue, making sure that

wrap around the edges of the seat board and will take up the extra space inside the frame. Cut the seat board to shape, then mark and cut a 3/4" x 3/4" notch out of each corner at the band saw or with a jigsaw so it can fit around the inside corners of the chair legs.

Sort through your project's scrap lumber for a piece to make the chair's four seat board cleats, and rip and crosscut those to size. Make the thickness of these cleats match the distance from the inside corners of the legs to the seat rails; on my chair, it's 11/16". Position and clamp the cleats against the seat rails inside the chair framework so the top of the seat board will be flush with the tops of the front legs and seat rails. Fasten the cleats to the seat rails with three countersunk screws per cleat.

Old Master's Red Mahogany oil-based stain enriched the color of the white oak I used for my chairs. It also will match the color of the Cloud Lift Table that ran in our June issue, if you're planning to use these chairs as a set with that table. Mix the stain well and wipe it onto all the exposed wood. Allow the stain to absorb for a few minutes, then wipe off the excess. Give oil-based stain at least 24 hours to dry thoroughly. Longer is even better, especially if your shop is humid or cool.

The next day, you can topcoat the chairs with your choice of finish. I started by spraying on two light coats of clear aerosol shellac to enhance the oak's quartersawn figure and to help build a film of finish quickly. When that dried, I followed with aerosol lacquer to change the finish from shellac's low glossiness to a duller satiny sheen.

Simple Upholstery Wraps It Up

Upholstering the square seat boards of these chairs is about as easy as that job can be. Start by breaking their sharp corners with a file or sanding block,

Assembling the Framework

Take the chair apart so you can finish sand all the faces and edges of the legs and rails to 180-grit. I also used a sanding block to break all the sharp edges of the parts to reduce the chances for splinters and to give the chair a softer-looking appeal. Chamfer the top and bottom ends of the back legs and the bottoms of the front legs with a trim router and chamfering bit set for a 1/8"-deep cut. I think chamfering the bottom ends of furniture legs is always a good idea — it safeguards these fragile edges and corners from chipping during use.

With that done, you can start the final

this "H" configuration of parts lays flat on a work surface. I used hide glue for all of these connections because we'll be staining these chairs, and any glue splatches I might have left behind — which stick out like a sore thumb under a stained finish — are easy to clean away by scrubbing with water.

When the back, front and bottom rail subassemblies dry, bring the whole chair frame together by adding the side seat rails and lower rail assembly with their tenons and dowels in place.

Adding the Seat Board and Finish

The upholstered seat consists of a 3/4" plywood seat board with a layer of 2"-thick foam on top, covered with your choice of fabric, vinyl or leather. The seat board rests on four cleats. Make the seat board by measuring its opening on your chair frame — it may vary slightly from the *Material List* size. Make the seat board about 1/8" smaller in both dimensions than its opening in the chair frame, in order to fit the seat covering you have in mind. Whatever covering you choose, it will need to



Prepare a seat board for each chair you make, and cut and install cleats to support it inside the chair frame. Locate the cleats so the seat board will be flush to the tops of the front legs and seat rails.

then skim off the long top and bottom edges as well as the sharp areas in the notched corners with a 1/8" roundover bit in a handheld router. Doing this will prevent tearing the fabric when you're stretching it over the seat board, and soft edges will also prolong the life of the fabric over time. Then draw four layout lines on one face of the seat boards, 2" in from each edge, to create a smaller penciled square layout area.

Ordinary 2"-thick, high-density urethane foam, available at fabric stores, is a good thickness and choice for padding. Mark one face of the foam with a 15 3/4" square — or to match the actual size of your seat boards. You can certainly cut this foam with a long-bladed, sharp utility knife, but a band saw will do the job even better. Tip the saw table to 30 degrees, and carefully cut along the layout lines you've marked on the foam to create a beveled seat pad with its angled edges flaring out from your marked lines (the face opposite the one you marked will end up being a larger square after it's bevel-cut to size).

Cut your fabric or other seat covering to 23" x 23". Lay it face down on a work surface and center the beveled foam on it with the larger face of the foam against the seat covering. Set the seat board on top of the foam with its pencil-marked face up and the edges aligned with the foam's edges. Now gently pull the side flaps of the seat covering up and over the seat board, one side at a time, and staple the flap to the seat board. Pull the covering evenly, aligning its edge to the penciled layout line you drew on the seat board earlier. A helper can make this holding-and-fastening process easier to do.

When stapling, drive a staple in the center of the flap first, then work your way out from there, pulling the covering



Red mahogany stain enhances the figure of this quartersawn white oak and evens out color differences between the lumber (left). Once stained, the author topcoated his chairs with aerosol shellac to build up a film layer quickly (right), followed by satin lacquer to subdue the initial glossy sheen.



Upholster the chairs with 2"-thick foam and the seat covering of your choice. Arrow's PT50 pneumatic stapler (inset) was up to task for driving 3/8" staples into tough Baltic birch ply without a single misfire.

evenly and stapling every 2" or so. Now pull the remaining unstapled areas of seat covering taut, and drive more staples to hold these areas in place, too.

I quickly discovered that while a manual staple gun might be up to task for this operation, mine sure wasn't. The Baltic birch I used for my seat boards just bent the staples. So I switched to a PT50 pneumatic stapler from Arrow (see inset photo, above), which was both inexpensive — around \$40 at a local home center — and worked like a charm to sink the staples properly.

When all four flaps are secured, pull the four corners of the seat covering up and over the seat board notches to form long tongues. Staple these tongues down securely.

Press the upholstered seat board

Finish up this ambitious dining chair project by attaching the upholstered seat to its cleats with several countersunk 1 1/2" wood screws per cleat.

down into place in the chair frame, and drive 1 1/2" wood screws up through the cleats to attach the seat. These new dining room chairs are now ready to use — and you can add them to your proud list of woodworking accomplishments!

Chris Marshall is senior editor of Woodworker's Journal.





Slatted Cherry Shelf



Here's a visually lighter, cross-lapped alternative to today's popular floating slab shelves.

By Nick Brady

Floating shelves hung on hidden supports are really popular these days, particularly those made of thick slabs of natural edge lumber. My wife and I thought they'd be a good solution for our family room, but we wanted a lighter look than chunky slabs. I've seen bench seats made of interlocking slats and crosspieces before, so I mimicked that same concept here. The thin, evenly spaced slats shed weight and add some interesting geometry! Building this shelf will definitely give your dado blade a workout, with lots of repetitive cutting. But ganging the parts together, and using Rockler's Cross Lap Jig (item 56372), will help to speed the process along and ensure accuracy.

Machining the Front Slat

Let's get this project started by making blanks for all the parts you see in the *Material List* on page 36. You'll need



Mill 3/4"-wide, 1/2"-deep notches into the ends of the front slat, using a step-off block clamped to the rip fence for both indexing and safety. Then reset the fence to cut 1"-wide dados for the shelf's two middle supports. Position these 3 1/2" in from the part ends before cutting them.

some 1"-thick stock for the two middle supports, 3/4" stock for the front and back slats and end supports and 1/4"-thick strips for the eight filler slats.

Set up a 3/4"-wide dado blade in your

table saw and raise it to 1/2". With a step-off block clamped to your saw's rip fence for safety, mill a 3/4"-wide notch into each bottom corner of the front slat, flipping the workpiece end-for-end

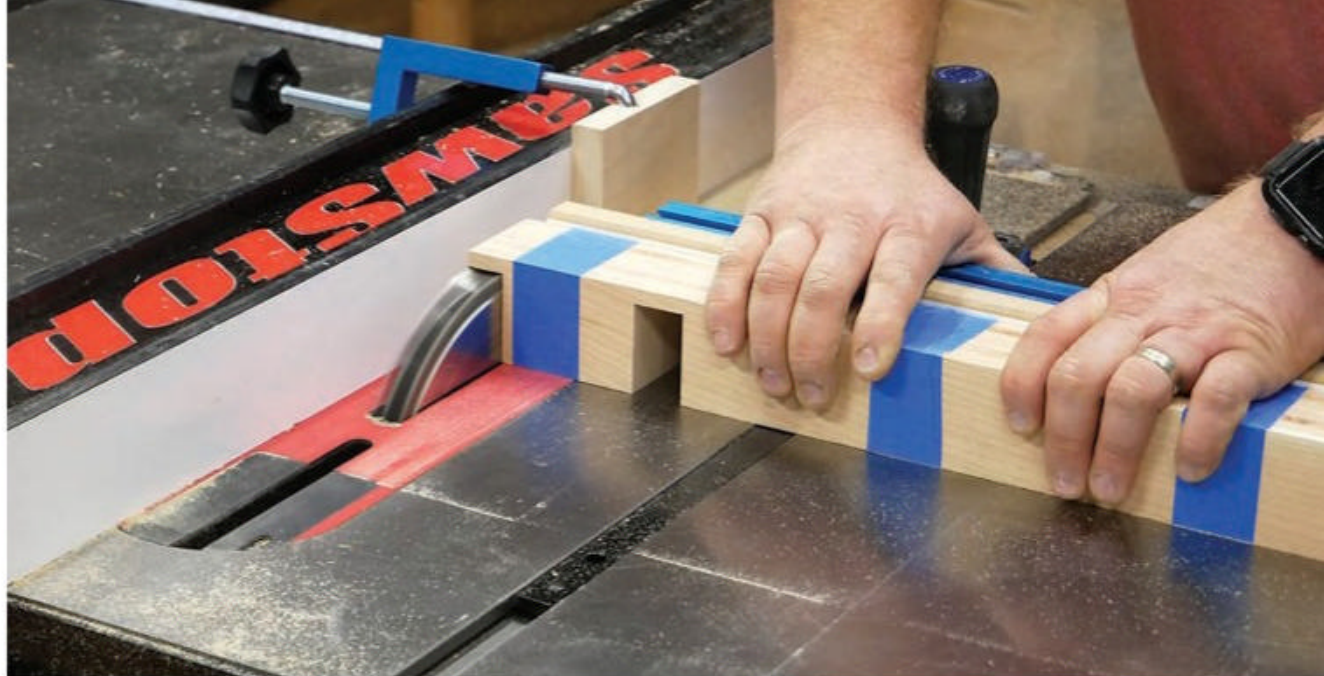
to make these two cuts. Then reset the rip fence so you can cut two 1"-wide, 1/2"-deep dadoes in the front slat that eventually will house tongues on the front ends of the two middle supports.

Gang-Cutting with Painter's Tape

As you can see in several photos here, we'll be gang-cutting groups of similar parts. It's a great way to speed the repetitive cuts along. Gather together the filler and back slats into one bundle, and group the middle and end supports for a second bundle. Align the part ends carefully for each grouping, and wrap tape over their top and front surfaces to secure them. I didn't wrap tape all the way around the bundles in order to keep tape off the saw table and miter gauge fence — all the repetitive cuts will wear through it, leaving tape shreds that can gum up the saw table.

Notching the Filler and Back Slat

Carry out the same process for milling the filler and back slats as you did for the front slat, only this time raise the dado blade to 1 3/4". Use the front slat as a guide to set the rip fence so you can cut a pair of 1"-wide dadoes in the bundle for the middle supports, flipping it end-for-end between cuts. Then reset the fence to cut a 3/4"-wide notch into this group on both ends. You'll know you've tackled this cutting operation correctly if your filler/back slat bundle ends up looking the same as the front slat does, only with much deeper cuts at each location.

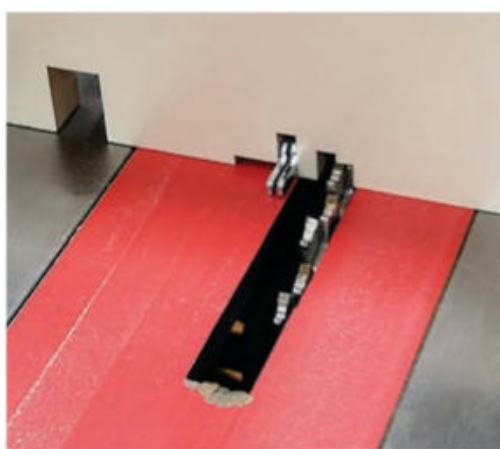


Group the eight filler slats and back slat into a bundle with painter's tape, carefully aligning the part ends. With your dado blade raised to 1 3/4", cut 1"-wide dadoes for the two middle supports and a 3/4"-wide notch into each end, leaving 1/4" tongues.

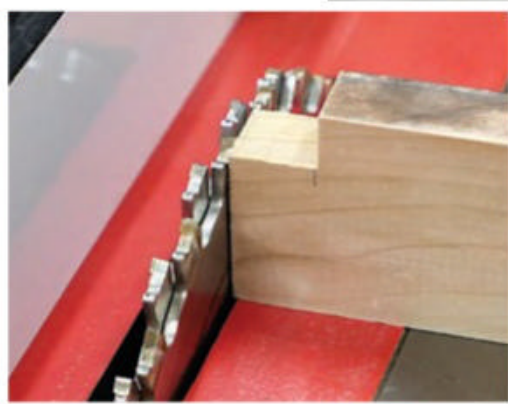
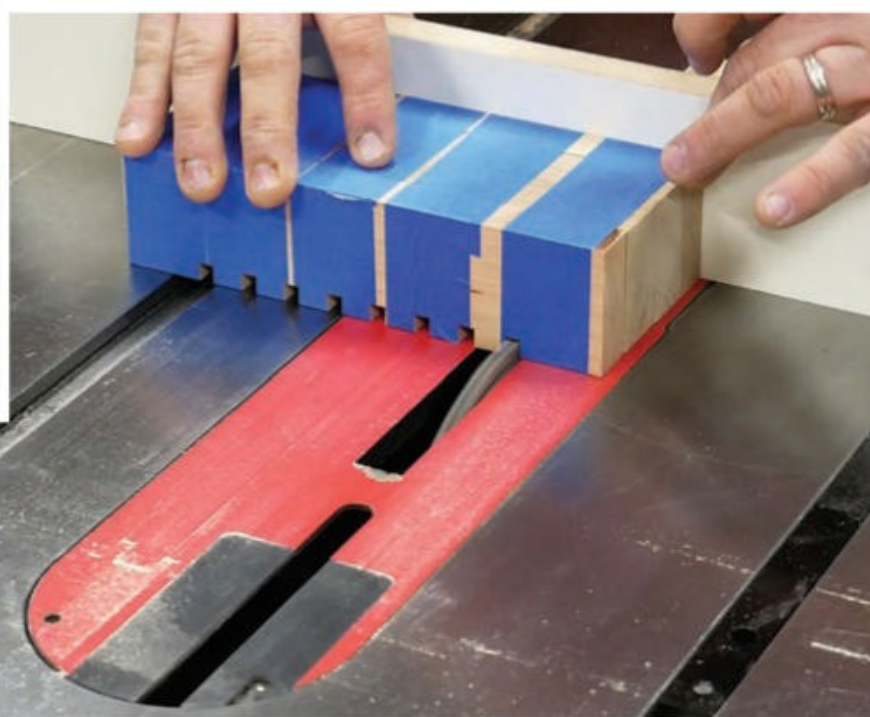
Cross-Lap Jig for Even Spacing

Next, we'll cut a series of eight 1/4"-wide x 1/4"-deep dadoes into the top edges of the middle/end supports bundle to form the cross-lap connections for the filler slats. So change out your 3/4"-wide dado for one that's 1/4" wide,

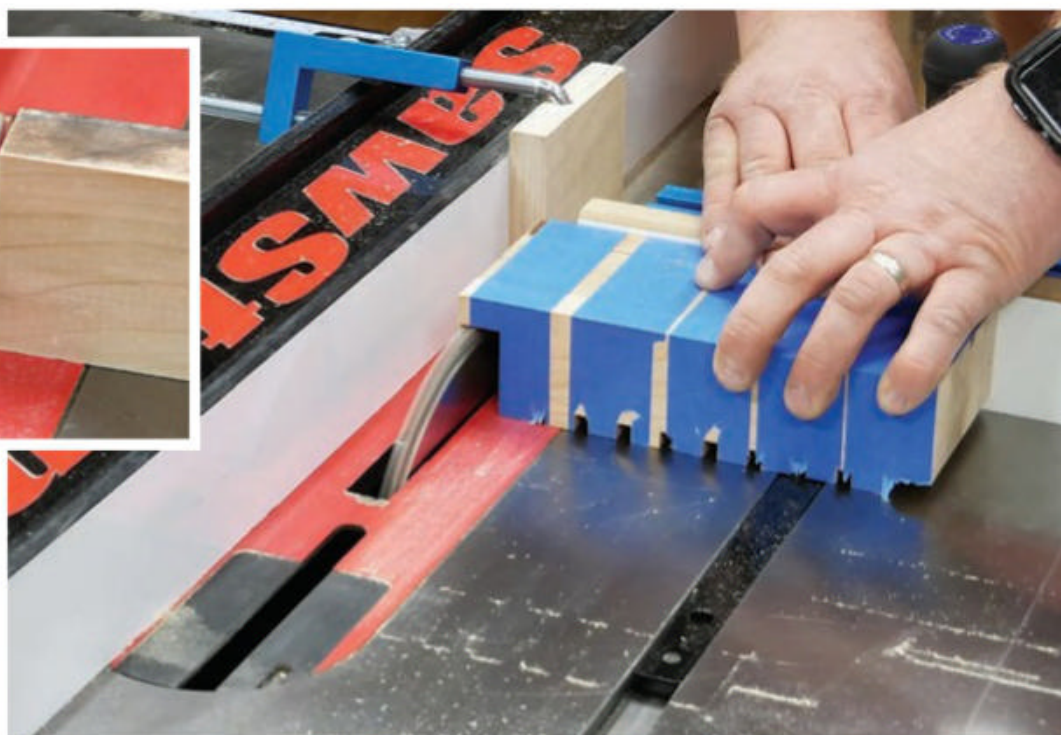
and set it 1/4" high. These dadoes need to be exactly 1/2" apart, which is where Rockler's Cross Lap Jig comes in handy: it has adjustable metal indexing pins that engage each dado you cut to set the spacing for the next dado perfectly. Go ahead and cut these dadoes, positioning them 1 1/4" in from the part ends.

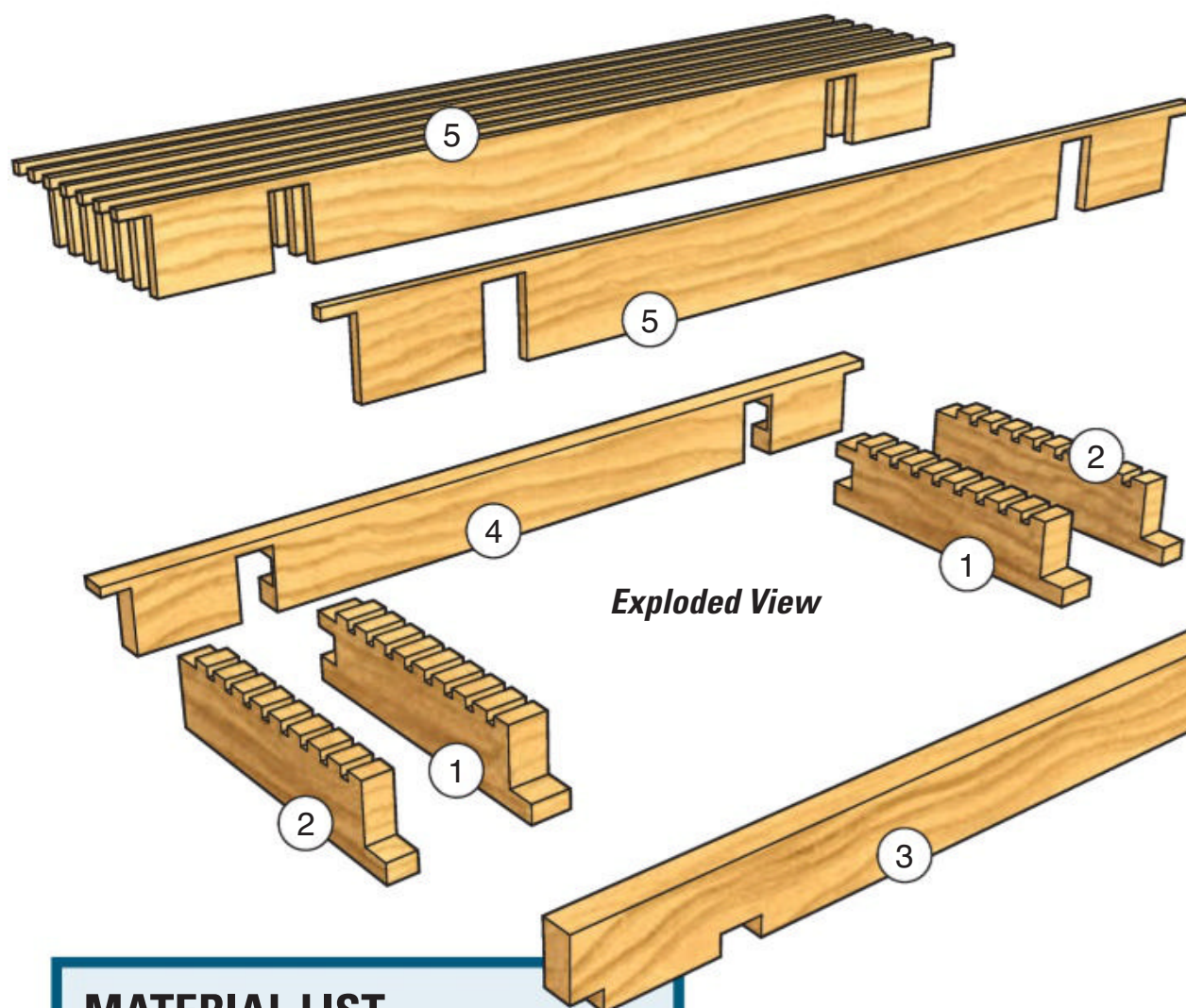


The middle/end support bundle requires a series of 1/4" x 1/4" dadoes cut 1/2" apart to fit the eight filler slats. Rockler's Cross Lap Jig, with indexable pins (inset), makes easy work of it.



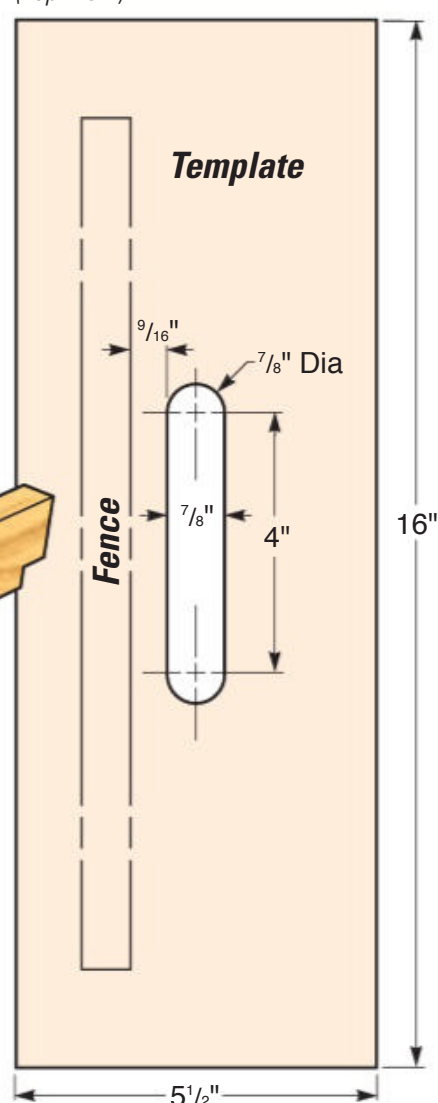
Use the front slat as a reference for setting blade height (inset) before milling a 1 1/2"-deep notch into one end of the middle/end support bundle. The other end receives a 1/4" x 3/4" notch.





Exploded View

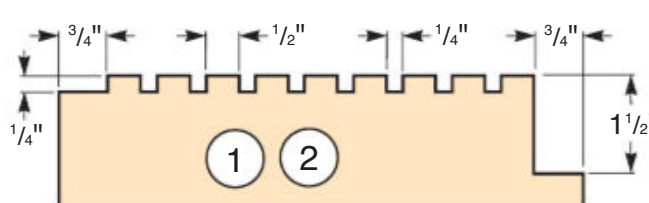
Routing Template
(Top View)



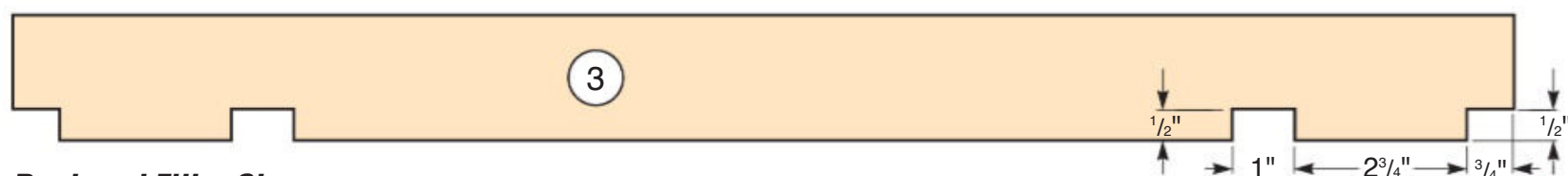
MATERIAL LIST

	T x W x L
1 Middle Supports (2)	1" x 2" x 8"
2 End Supports (2)	3/4" x 2" x 8"
3 Front Slat (1)	3/4" x 2" x 24"
4 Back Slat (1)	3/4" x 2" x 24"
5 Filler Slats (8)	1/4" x 2" x 24"

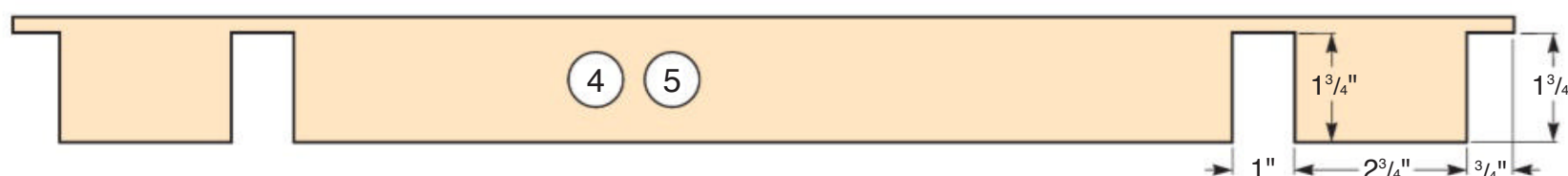
Middle and End Supports
(Side View)



Front Slat
(Front View)



Back and Filler Slats
(Front View)



We still need to cut a 1/4"-deep, 3/4"-wide notch into the top back corner of this bundle to finish the cross-lap joint with the back slat, so install your

3/4"-wide dado blade again and clamp the step-off block to the rip fence to mill the notch. Then, without moving the rip fence, crank up the blade height to 1 1/2"

to cut another 3/4"-wide notch on the other end of this bundle. It will leave a 1/2"-thick tongue on the bottoms

of the middle and end supports that fits into the bottom openings of the front slat to wrap up those cross-lap joints.

Assembly: A Little Glue Will Do

At this point, you've got a lot of loose parts that are just begging to get put together! But don't jump the gun here. Now is the time to carefully finish-sand them all up to 180-grit. While sanding, I made sure to not round over any edges, which could detract from the crisp, clean look of a well-made cross-lap joint.

Slatted Cherry Shelf Hard-to-Find Hardware

I-Semble Heavy-Duty Blind Shelf Supports (1) #59434 ... \$14.99 pr.
21/64" Black Oxide Drill Bit, 4 5/8" length (1) #54702 \$5.99 ea.
14mm HSS Brad Point Drill Bit for Wood (1) #56029 \$10.99 ea.
Blind Shelf Support Drilling Guide (1) #62744 \$4.99 ea.

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

Glue and clamp the shelf's outer framework together. Then install the eight filler slats in their notches in the end and middle supports. Use a tiny dab of glue at each cross-lap location to prevent squeeze-out here where it would be difficult to remove. Long wooden handscrew clamps can hold the filler slats in place while the glue dries (inset).

When you're done sanding, clamp and glue the front and back slats together with the middle and end supports to form your shelf's frame. Apply just enough glue to avoid any glue squeeze-out. Now go ahead and insert the filler slats, applying dabs of glue to each cross-lap surface. As these slats fit into place, you'll notice that the shelf will become more and more rigid. When all the filler slats were in place, I used long wooden handscrew clamps to press them down tightly to the cross supports.

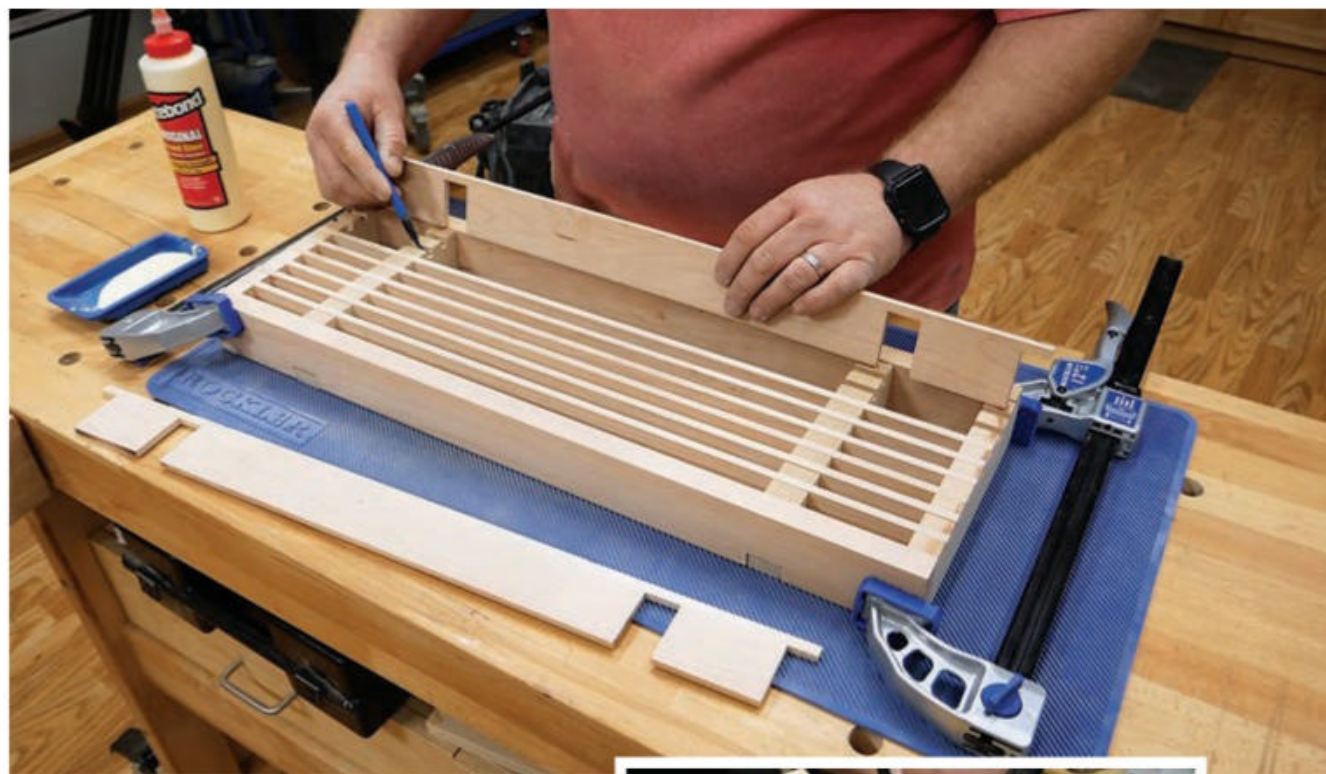
Allow the assembly to dry overnight, then apply finish. I brushed on several coats of Watco® Natural finish, which really seemed to bring the cherry to life!

Installing Blind Shelf Supports

With the assembly process behind you, it's time to hang your new shelf. I opted for Rockler's I-Semble Heavy-Duty Blind Shelf Supports to mount mine to the wall. The hardware consists of two differently-sized steel rods that are each welded to a steel plate. The thinner rod component fits into a hole in the shelf and the thicker rod component goes into a hole in a wall stud. The steel plates screw together and fit into mortises in the shelf back to hide the hardware. These Blind Shelf Supports are rated to hold up to 125 lbs per two supports, when installed into stud locations no more than 32" on center.

Before I routed out mortises in the shelf's back slat, I used Rockler's Blind Shelf Support Drilling Guide to bore 9/16"-diameter holes for the rods that go into the shelf. Start by marking a centerline on the back of the shelf and locating two marks that are 16" on center and align with the centers of the middle supports. Drill the holes 5" deep.

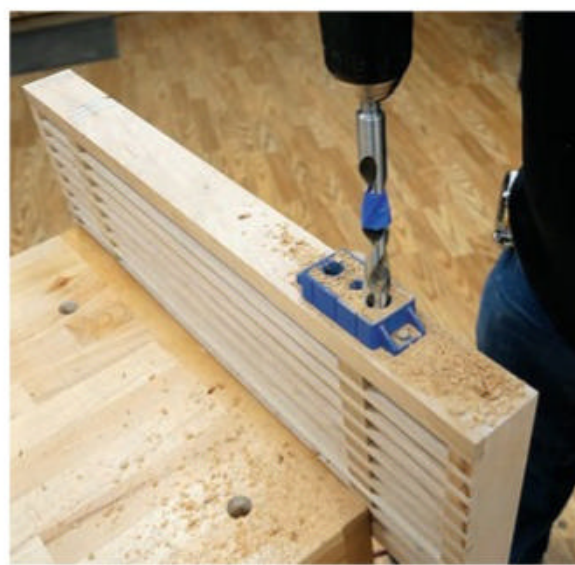
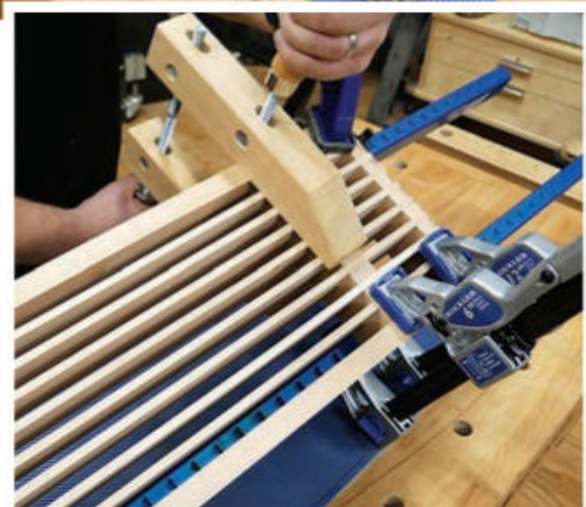
Once those holes are done, it's time to mortise for the hardware plates. To do that, I created a slotted jig from a piece of 1/2" plywood with a fence under-



neath to clamp against the shelf. I routed a 7/8"-wide x 4 1/2"-long slot through the jig's top panel, centered on it.

With the jig clamped in place on the shelf's back edge, a 5/16" guide bushing and a 1/4" straight bit in my router enabled me to cut a 3/4"-wide mortise for each of the two shelf supports. I milled these mortises 5/8" deep.

To hang the shelf, I located two 16" on-center wall studs and established a



Rockler's Blind Shelf Support Drilling Guide (inset) can help ensure that each rod hole is correctly positioned. The author used a shop-made routing jig to rout mortises for blind shelf hardware in the shelf back.

level line between them. Using the Blind Shelf Support Drilling Guide and a 21/64" bit, I drilled 3"-deep holes for the support rods into my wall studs. I assembled and leveled the brackets with their included screws, then slid the shelf onto its rods to hang it.

Nick Brady is a project builder and designer in Rockler's shop.



Making a Lamp and Shade

By Rob Johnstone
and Nick Brady

Making objects that are both functional and beautiful has always been a woodworking objective. This turned lamp with custom shade is a good example.



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MORE ON THE WEB



For a video demonstrating how to turn a lamp body and install the lamp hardware, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.



By a stroke of luck, the author found this large piece of box elder featuring some lovely red color and curly grain. Box elder is a relative of maple.

Sometimes it's better to be lucky than good. I first heard that from a football coach, but it has proven to be true many times in my life. With these turned lamps, I'll admit that I started out very lucky.

I had known that I would be creating a turned lamp for this August issue for quite a while. Many different options were swirling around in my mind: multispecies glue-ups, recycled things like a fence post or barn beam, combining materials like epoxy and punky, rotten wood — they all had some interest to me. Then one day while driving by a municipal lawn waste site, I saw some big sections of tree trunks laying around. I often look for possible turning stock opportunities at this site and mostly I am disappointed, but not this time. I was checking out what I thought was a big chunk of maple when I rolled it over and saw the significant red streaking running through the grain. It was box elder, a relative of maple. And on top of that, the section I was looking at revealed very curly grain; it looked like grain from a burl, but there was no apparent burl. The piece was big and heavy, and I had no chainsaw with me, so I squatted down and used my legs to lift it without sending me to a chiropractor. When I eventually sectioned up the piece, the grain was even better than I had hoped.

With input from Jeff Jacobson, our art director, I figured out how to saw up two large sections and a couple of smaller pieces to get the best yield from this massive log. My cordless chainsaw and a band saw helped me create two pieces that could be mounted on the lathe.

Rough-turning on the Lathe

Next up, how to go about loading the first blank for turning. I chose to use a faceplate to mount the chunk. It was about 9" long, 7" wide and still very green, so it was pretty heavy. The faceplate coupled with pressure from the tailstock held it securely as I started to shape the piece.

Using a spindle roughing-out gouge, I first reduced the blank to a rough cylinder. There were significant bark inclusions and the blank was not remotely balanced. But with a bit



Trimming with a chainsaw started the process of harvesting the parts. Careful planning ahead made it possible to yield several turnable pieces.



Next stop was a large band saw to further break down the box elder into mountable and turnable blanks.

Step 1: Roughing out the blank.



Step 2: Refining the lamp base's outer shape.



Step 3: Sanding the curves smooth.



of patience, I cut enough away for it to spin smoothly. With the rough stuff done, it was time to consider the shape. We decided to build a shop-made lampshade, with its top much narrower than the bottom (you'll see that project on page 42). So I settled on a curved shape for my turning with a similar ratio of narrow top to wide bottom — but whereas the shade would be geometric in composition, the base would be much more organic. Shaped like a vase or wine carafe, it has a short $3\frac{1}{4}$ "-diameter foot, swelling to roughly a $6\frac{1}{2}$ " wide diameter and narrowing down to a small 2" top end.

I really enjoy woodturning but confess I still have much to learn. Using various gouges, square- and round-end scrapers and carbide-insert tools from Rockler, I refined the shape until I was pleased with the results. I'm sure a more experienced turner would have achieved a smoother surface, but this curly green wood was still a bit fuzzy when I was done turning. Luckily, I'm nearly a rocket scientist when it comes to sanding! (Sigh.) While the box elder's figure was fun to see as I turned the rough shape, the figure really showed its stunning character as I smoothed the piece with ever-finer sandpaper. I sanded the lamp body up to 320-grit.

To begin the finishing steps, I decided to use some Glu-Boost Fill n' Finish as a pore filler. It's a cyanoacrylate product that basically does not cure until it is sprayed with a hardener. I turned the lathe down to its slowest speed (56 rpm) and carefully squeezed the product onto the lamp body while holding a clean cloth under the application area. I rubbed the product into the grain and then sprayed the hardener on it. The results were amazing: a super-smooth surface with the pores perfectly filled. I sanded that surface with 320- and 400-grit sandpaper, then wiped on a thin coat of gloss water-based polyurethane. When it dried, I burnished the poly with a coarse paper towel and repeated the process two more times.

Ready for Hardware and Wiring

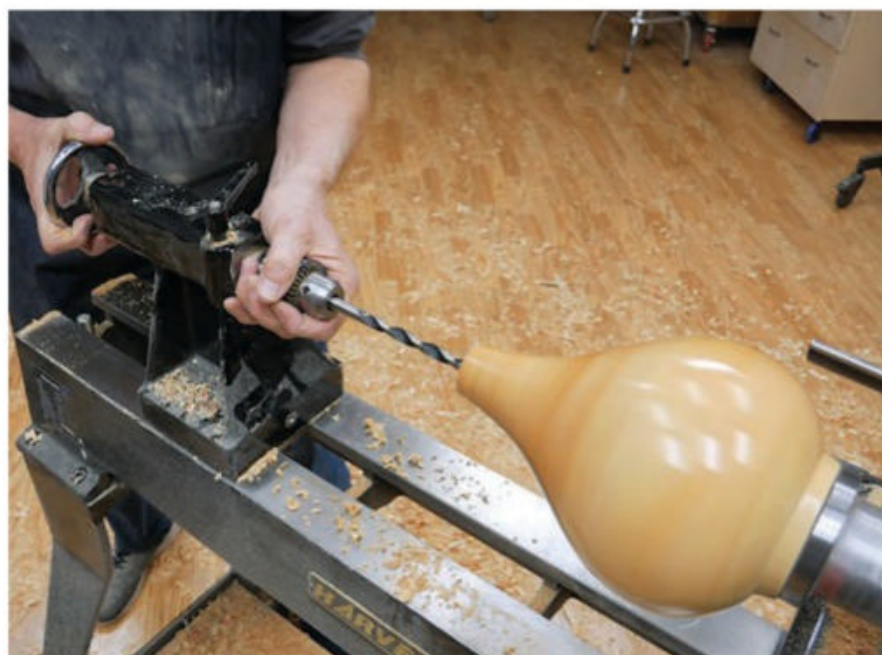
With that completed, I parted off the top of the turning and drilled a $3/8$ "-diameter hole through the lamp body from top to bottom, using a $9\frac{13}{16}$ " Fisch Brad Point Bit (Rockler item 57974) right on the lathe. I unmounted the lamp body and used a Forstner bit to bore a recess into its base. Then on the router table, I formed a shallow slot to allow the lamp cord an exit from the bottom.

Installing the lamp hardware (Rockler item 67833) was super easy; I just followed the package directions. My wooden lamp body was then complete, so I turned another version (see page 45). If you turn a lamp, pages 42 to 45 will teach you how to make a shop-made lampshade to go with it. Rockler offers lamp shade options too, or buy one from other sources.

Once the lamp body was sanded to 320-grit, GluBoost's cyanoacrylate-based Fill n' Finish pore filler was applied as a base coat over the raw wood. It was followed by subsequent coats of gloss water-based polyurethane.



After the finishing process was completed, it was time to part off the end of the lamp body. Doing that shortened its overall length to be less than the 3/8"-diameter drill bit that would be used in the next step.



The author was able to bore a 3/8"-diameter hole through the lamp body using a Jacobs® chuck and long drill bit mounted on the tailstock. The lathe's faceplate has a hole in its center so the bit could exit safely.



With the wire threaded up through the lamp body and the hardware installed, tie a UL knot in the wire (above). Then follow the directions to attach the hot and neutral wires to the appropriate screws on the socket (right). Insert the socket into the hardware to complete the lamp body.



Building a Framed Lampshade

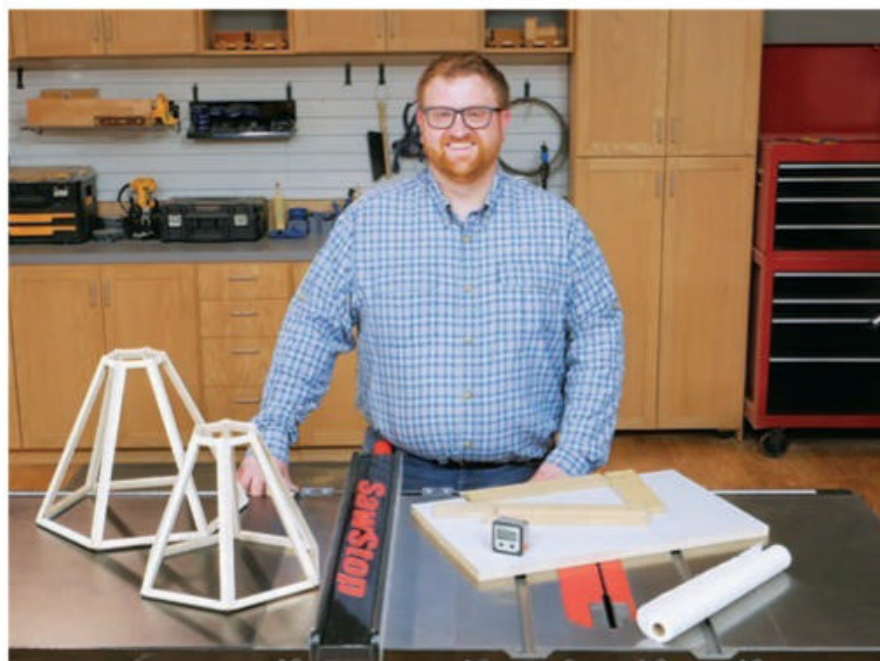


This six-paneled, maple and rice paper lampshade project will test your precision and patience. After experimenting with many different angle combinations for cutting the wooden parts, I was able to put together a list of measurements and a couple of assembly jigs to help improve your success in making a framed shade like mine. Note that the overall height of my shade is intended to complement the size of the box elder lamp Rob made on page 38.

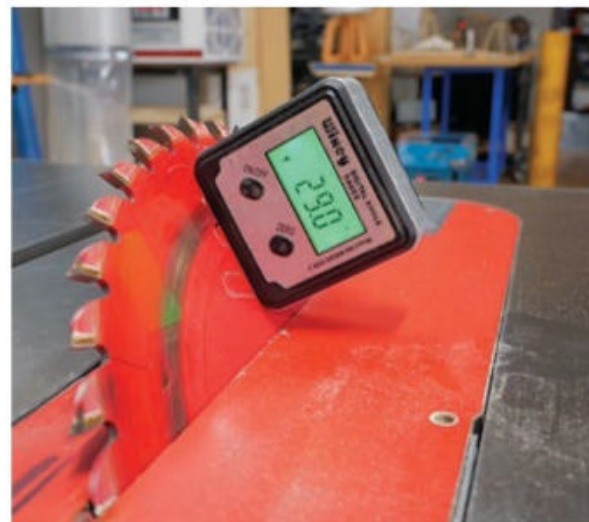
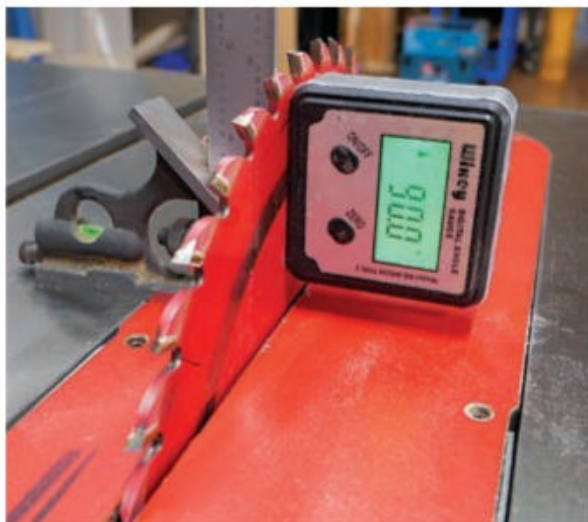
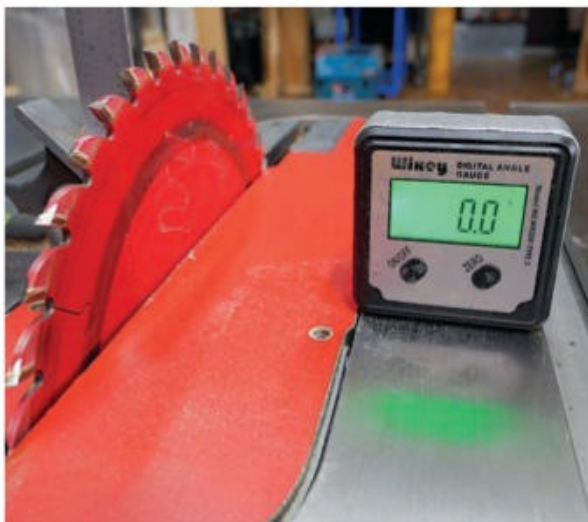
Cutting Panel Sides, Bottoms and Tops

I started by ripping a piece of 1/2"-thick maple stock, measuring 5" x 24", into six long strips that would become the 12 side pieces for the shade's six panels. To do that, I tilted my table saw blade carefully to 29 degrees using a Wixey Digital Angle Gauge (see below), and bevel-ripped both long edges of the board. Returning the saw blade to 90 degrees, I then ripped two 1/2"-wide x 24"-long strips with the bevel cuts on one edge of each. Repeat this process to make four more long strips with one beveled edge and one square edge. Now take what remains of this piece of stock and rip it into six more 1/2"-wide strips with your blade kept at 90 degrees. You can see both groups of long strips in the middle photo, next page.

Each of the bevel-edged strips you just made will become two panel side pieces. Using a miter gauge on the table saw, I cut a dozen of these panel sides to 11" long, carefully squaring up their ends.



Nick Brady is a relatively new builder and project designer in Rockler's shop at company headquarters, but he's been a hobbyist woodworker for a long time and formerly was a middle-school band teacher. This lampshade project proved to be a bit of a mathematical brainteaser, but Nick says he enjoyed the challenge it presented!



Wixey's Digital Angle Gauge (Rockler item 57097) is a helpful battery-powered accessory for setting blade tilt angles without using a protractor or conventional bevel gauge. It features an LED readout that reports angle settings to a tenth of a degree. To use the gauge,

set its magnetized base against a saw blade and zero out the display. When you tilt the blade, the Angle Gauge will report its exact tilt as it changes. For this lampshade project's 29-degree bevels, the gauge's simple and accurate operation came in very handy!

You'll use the remaining six long strips with square edges to make the panel top and bottom pieces. To do this, swivel your miter gauge to 12 degrees and cut six pieces for the panel bottoms to $5\frac{3}{4}$ " long. Cut six pieces for the panel tops to $1\frac{1}{2}$ " long. Use a stop block clamped to your saw's rip fence to control the length of these long and short parts. And when you're orienting the angled cuts on the ends of each bottom or top workpiece, cut them so the angles are facing one another, as shown in the bottom right photo, this page. Finish sand all the wood parts you've made so far.

Panel Gluing and Clamping Jig

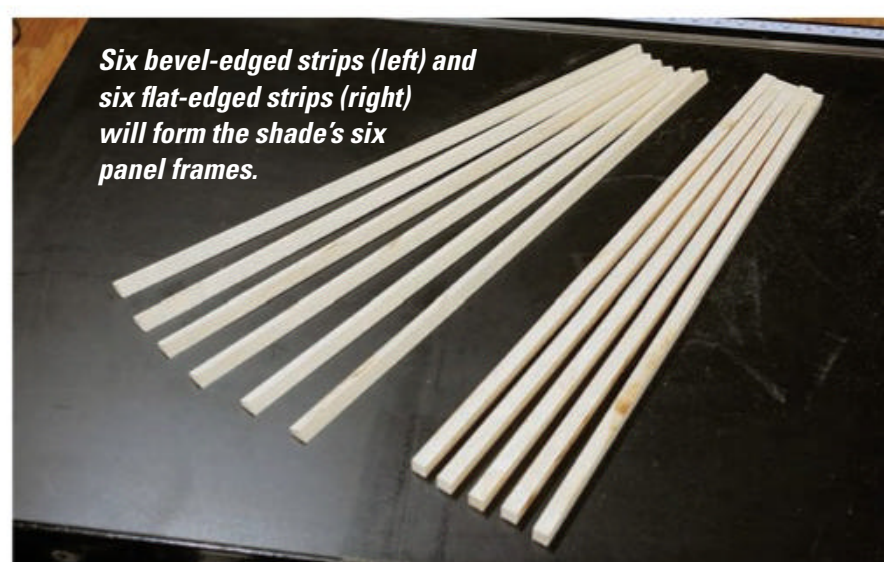
Gluing and clamping these side, top and bottom pieces together to form panels will be a lot easier if you use a simple jig. You can see mine at the top of the next page. It consists of three fixed pieces of $\frac{1}{2}$ " MDF that will form an outer frame around the panel when you assemble it. A wedged piece slides along one of the jig's frame pieces to provide clamping pressure. I used a large piece of melamine as the base for my jig, because glue won't stick to it. Cut three 2"-wide pieces of MDF for the jig frame parts. Bevel one edge of one piece to



Make sides for the shade's six panels by first bevel-ripping both edges of the maple workpiece to 29 degrees.



Reset the blade to 90 degrees, and adjust the rip fence so the beveled offcut will be $\frac{1}{2}$ " wide. Rip this strip free to form two panel sides. Repeat for the other edge.



Six bevel-edged strips (left) and six flat-edged strips (right) will form the shade's six panel frames.

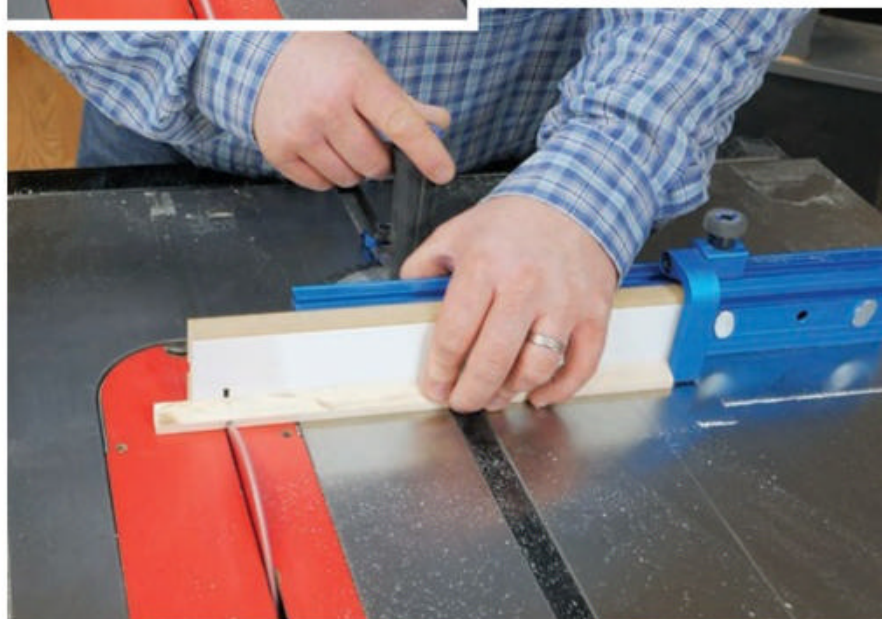
29 degrees, and crosscut it $11\frac{3}{4}$ " long. Fasten this piece to the jig base with screws so its square edge is flush to one of the base's long edges. Orient its beveled edge down so it will press a panel side down and flat when in use. Now miter cut the ends of a second MDF frame piece to 12 degrees, and

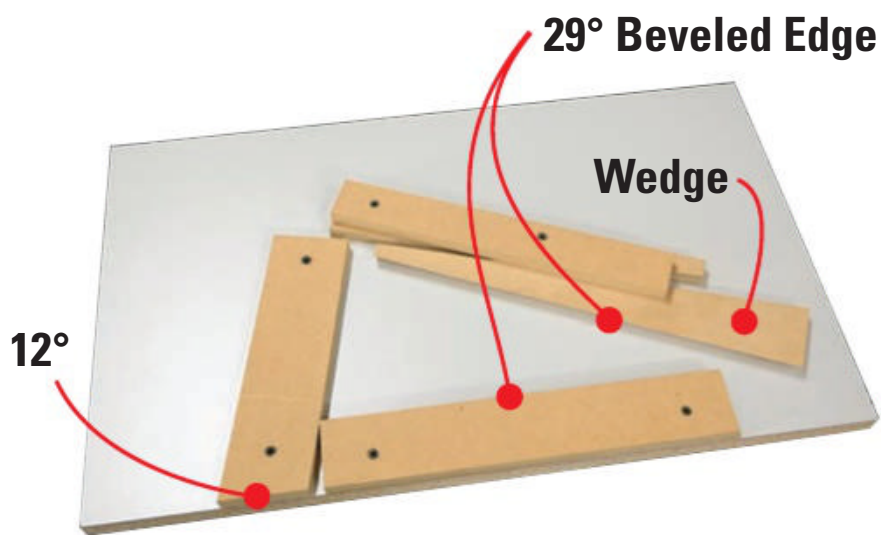


Crosscut the six bevel-edged strips into 12 side pieces for the shade panels. With a miter gauge set square to the blade, trim them each 11" long, making sure to square their ends (inset). The author used a flip stop on his miter gauge to set these part lengths.



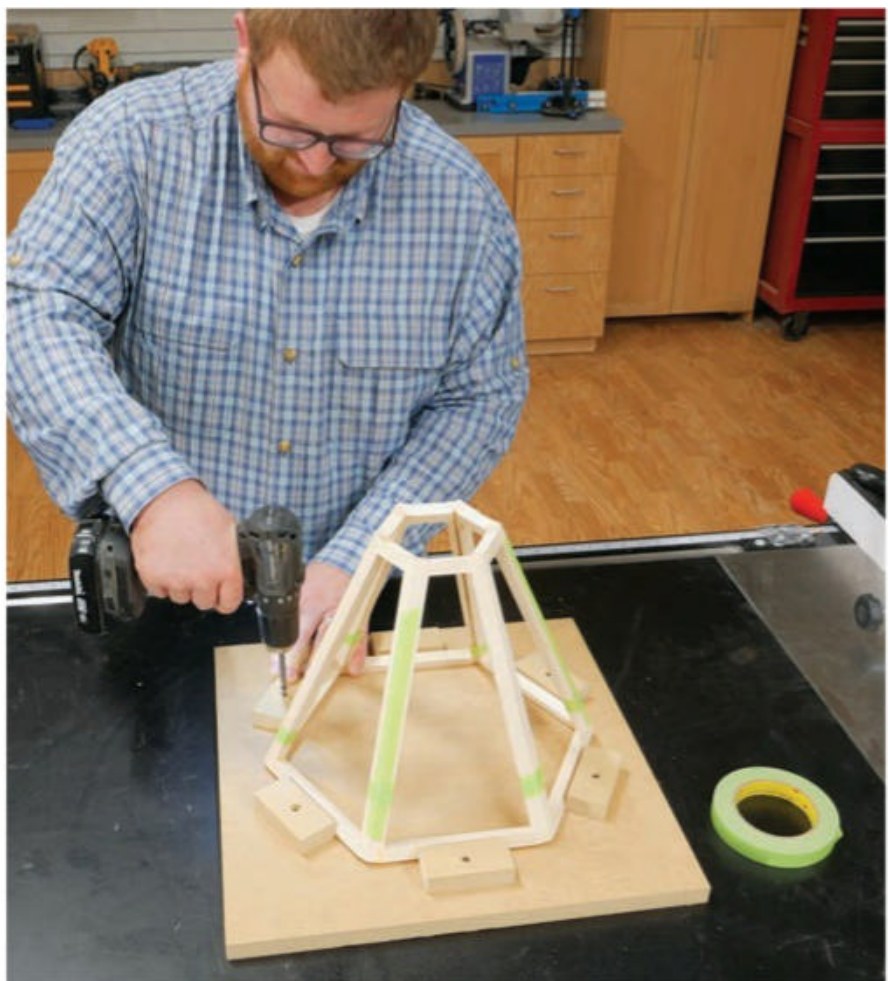
Cut the ends of the panel top and bottom pieces to 12 degrees. Swivel your miter gauge to that angle, and trim one end of the square-edged strips to shape. Then use a step-off block on the rip fence to set the long bottom and short top part lengths.





The author used this melamine and MDF jig to set and hold side, top and bottom pieces in place when gluing up the shade's six panels. One of the jig's three sides consists of a wedged interface to provide progressive clamping pressure.

make it 8⁷/₈" long. Keep its long edges square. Attach this frame piece to the jig with screws so one of its angled ends aligns with the same edge of the jig base as the first frame piece did and so it forms an angle with the first frame piece. The third frame piece I attached was the wedged clamping side. I first beveled the edge of this MDF frame piece to 29 degrees, then split the workpiece across its diagonal with the



This second jig with six blocks will hold the six panel frames together for final assembly after the rice paper is installed. Prepare it for use with the six shade frames dry assembled and taped temporarily together.

blade at 90 degrees to form two wedges. Attach the wedge without the bevel to the jig base so the other wedge (with the beveled edge) can slide along it to provide tension against the panel parts as you glue them up. Cut and screw a cleat over the fixed wedge to hold down the sliding wedge during clamping. Then use your jig to glue and clamp two side pieces, a top and bottom to form each of the six panels (see left photo). When you install the maple parts in the jig, face the bevels on the panel side pieces so they engage the bevels on the jig's side and wedge. Gently tap the wedge into place.

Second Jig Combines Panels into a Shade

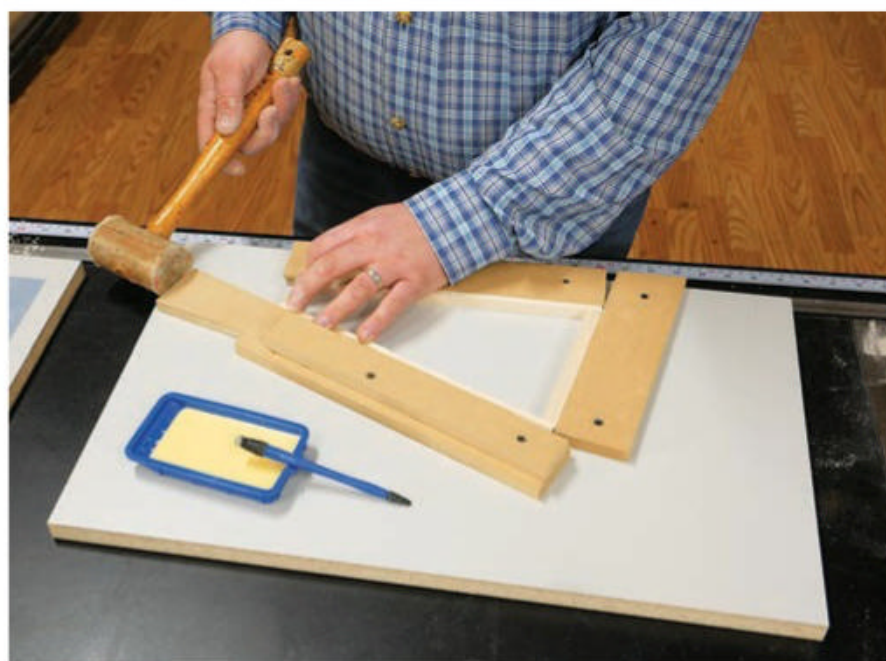
Once the glue dried on my shade's six panels, I created another quick jig from MDF that would be used to glue the panels together in an upright position (see photo, above). To arrange the jig's six blocking pieces into a hexagon shape, I simply taped the panel frames together temporarily, butted the blocks against them and attached the blocks to the jig base with screws. I cut a shallow bevel along the inside edge of each block to improve its hold-down ability.

Ready to Install Rice Paper

The best way to adhere the rice paper to the panels, I learned, is to use a mixture of wood glue and water thinned to the con-



Spread glue on the part ends, and insert the panel workpieces into the jig. The bevels on the panel sides should engage the jig's inner beveled edges.



Tap the jig's adjustable wedge against the fixed wedge to secure the maple parts. Its beveled edge faces down to engage the panel side bevel.

MATERIAL LIST

	T x W x L
1 Panel Sides (12)	1/2" x 1/2" x 11"
2 Panel Bottoms (6)	1/2" x 1/2" x 5 ³ / ₄ "
3 Panel Tops (6)	1/2" x 1/2" x 1 ¹ / ₂ "
4 Mounting Support (1)	1/4" x 1/2" x 3 ⁷ / ₁₆ "

We hope you'll build a shade, but buying is an option, too.

Of course there are plenty of attractive lampshades to choose from if you're not up for the challenge of making your own rice paper lampshade. Be sure to check out Rockler's new lampshade collection as one source for prefabricated options. Visit rockler.com to learn more.



sistency of white school glue. I brushed glue onto the narrower (inner) face of each panel, making sure to not get any glue on the frame edges. I then carefully set the panel down onto flattened rice paper I had taped to a larger melamine surface, making sure there were no ripples in the paper. I found it easiest to place the bottom down first and then gently set the top down.

When gluing the panels to the paper, make sure they don't sit too long, or the glue could soak through to your work surface. As soon as the glue tacks up, trim the rice paper overly large and turn the panels paper-side up. Allow the glue to dry for a few more minutes, then trim off the rest of the extra paper flush to the wood edges.

Final Assembly, Finishing and Hanging

When the paper joints are fully dry, you can proceed to glue the six frames together along their beveled edges, using the upright clamping jig and blocking to align and hold the parts in place. A second set of hands can be helpful for this step! Adjust the joints carefully as you position the six frames on the jig, and don't overtighten the blocking pieces in case you want to make slight adjustments before the glue sets.

After the glue on my lampshade frame joints dried overnight, but before I did any touch-up sanding, I sprayed a very light coat of aerosol lacquer to the inside and outside of the shade. I did this to help prevent any sanding dust from attaching to the rice paper. When that dries, sand the frame where you need to, and touch up any bare wood with more lacquer.



Every lampshade needs to have a support to hang from. For that, I used a simple 1/4" x 1/2" strip of maple with 21-degree bevels cut on each end. Drilling a slightly larger hole than the threaded post on Rob's lamp harp, I was able to make a simple yet effective support for hanging it and wrapping up this project.



The author used a snap-blade knife (inset) to trim the rice paper flush. Cut the top and bottom first, then the sides. A slight sawing motion trimmed the extra paper off cleanly.



Spread glue along the beveled edges of the shade's six panels, then install them in the blocked clamping jig to hold the parts in position. Here's a job for a helper's second set of hands!

Nick Brady is a project builder in Rockler's shop.



Scandinavian Modern Steam Bent Coat Hooks

By WJ Staff

Learn the basics of steam bending by making this lovely and practical coatrack.



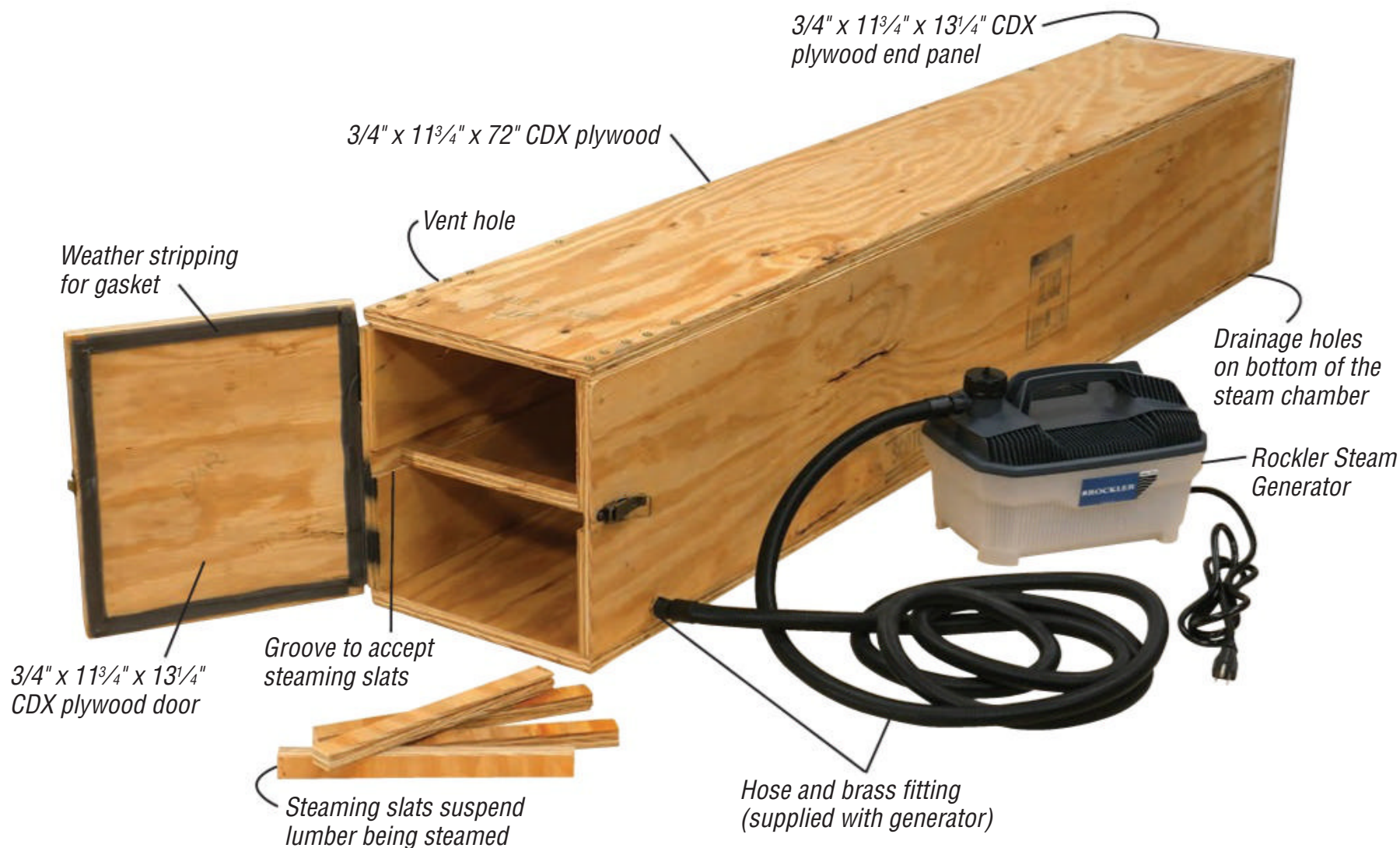
Steam bending wood is not an exact science, despite it being a time-honored process. Wood in most cases just wants to retain its current shape. That's what lignum and those other wood fibers are designed to do. Here's a truism you need to know: if you are going to attempt to steam bend wood, you are going to break some pieces. It's inevitable. But with that said, it is a way to make some beautiful woodworking projects, like these coat hooks. They're a great starter project for getting your feet wet in steam bending, because you'll learn about springback, creating two different-shaped curves on a single piece of wood and how to make a two-piece form. Make while you learn — it's a win-win!

On the opposite page are a list of guidelines that will help familiarize you with the subject. Of course the most basic concept in steam bending is that you are going to need some

steam and a chamber to steam your pieces of wood within.

As to the steam generator, Rockler sells a great one. The company's Steam Bending Kit (item 42826; \$59.99) is safe to use and has all the pieces you need to get started. You can make your own, but there's the risk that it could explode — something to definitely avoid! The steam generator needs to be connected to the steaming chamber with a hose. The chambers themselves can be made from solid wood, CDX exterior plywood (our example on the opposite page) or PVC designed for very hot temperatures. (Some schedules of PVC will go limp when treated to steam.)

The chamber we made is much larger than we needed for these little hooks, so we added a movable chamber divider. Next time we may be making some long table legs or sled runners instead ... who knows?



What About the Wood?

Air-dried wood is a must; the kiln-drying process hardens the lignum when it heats the wood. Green wood is your best bet — wood that has a moisture content of 20 to 30 percent bends most easily. While there are some conflicting opinions as to which species of wood is best for steam bending, most lists include white and red oak, ash, elm, hickory, beach and birch.

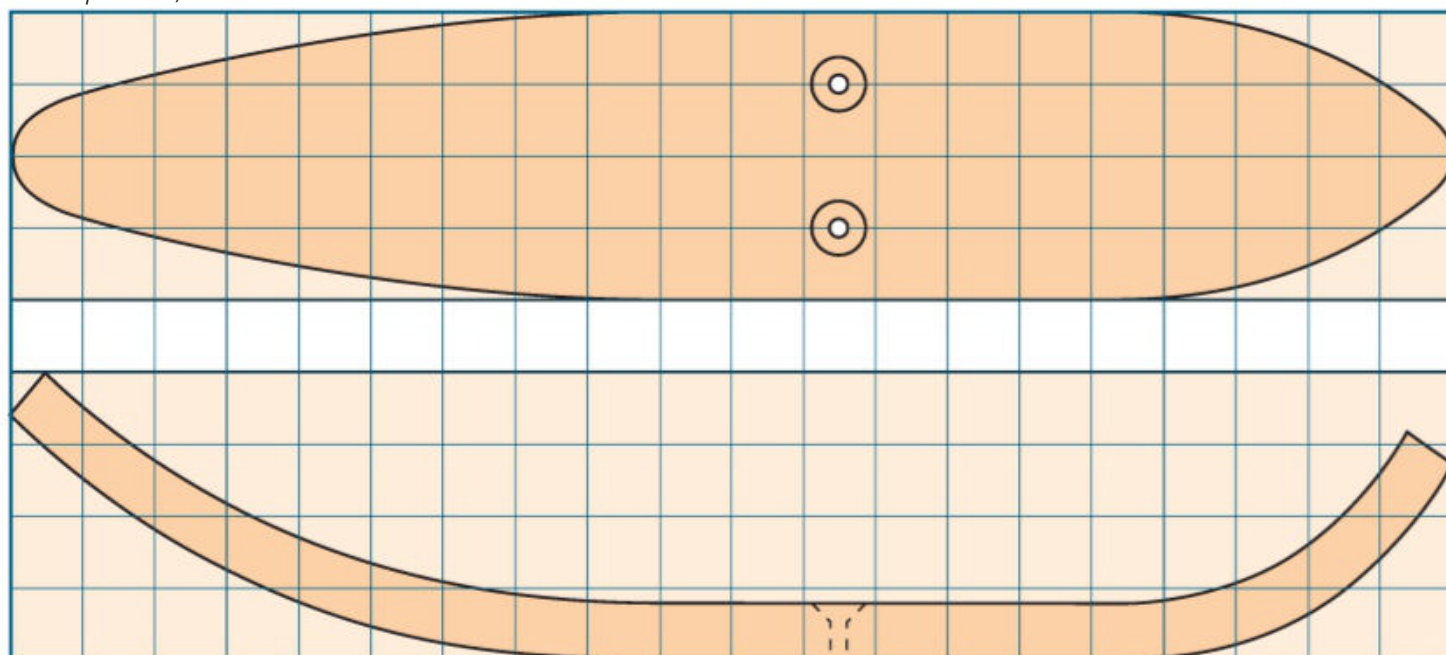
Sourcing green hardwood can be a bit of a challenge, but local saw mills will have a supply. Also, you can look up local woodturners who usually have sources for green lumber. If you are adventuresome and you own a band saw, you can harvest your own pieces from recently downed logs and limbs.

Avoiding a break when you bend is the goal. Your bending blanks should be wider than they are thick, and the bending face should be plainsawn. You'll get the best results when the grain runs the entire length of the blank's edge. If the grain

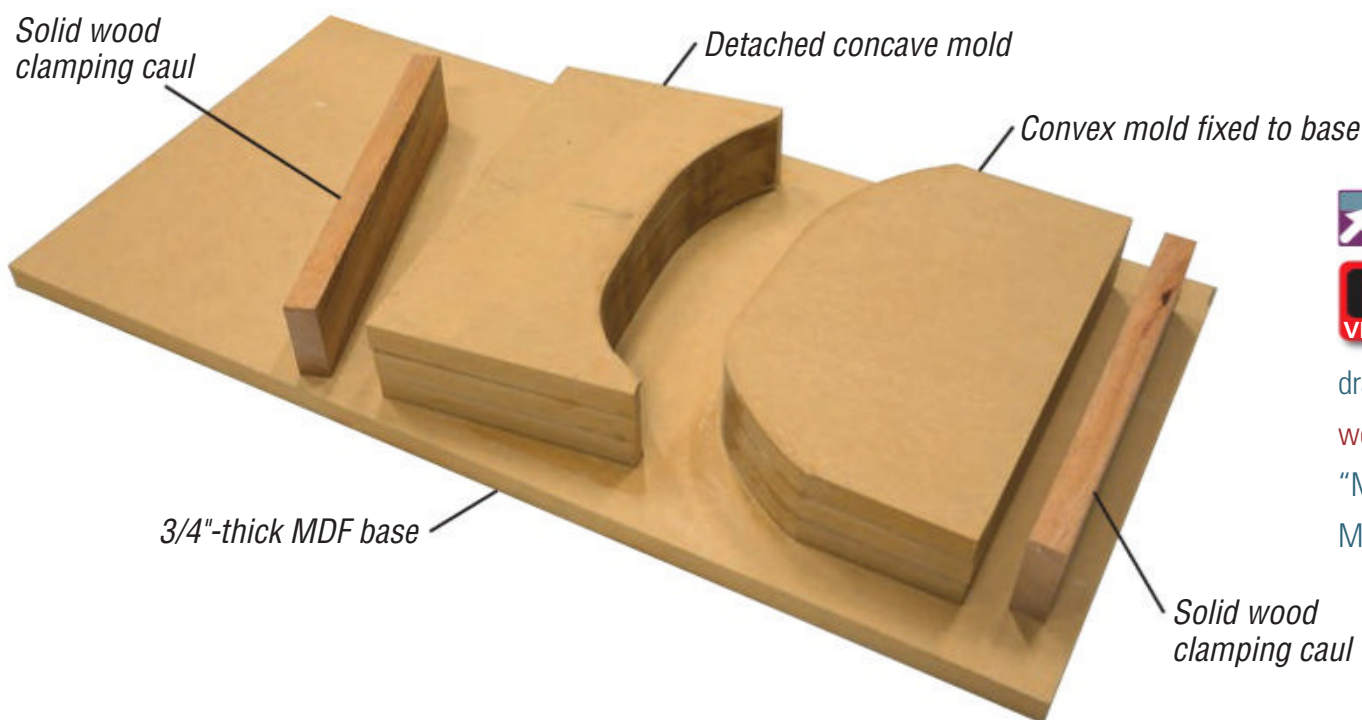
Steam Bending Guidelines

- Presoak wood several hours in water/Downy liquid fabric softener.
- Convex and concave curves on one piece require a two-part form.
- Use air-dried lumber so its lignum is not hardened by heat.
- Lumber with 20 to 30 percent moisture content bends best.
- Lumber drier than 10 percent will not bend without breaking.
- Use plainsawn wood that's wider than it is thick.
- Prepare blanks with vertical grain running the length of the edge.
- Choose straight surfaced wood without knots, rot or other flaws.
- Overly long workpieces helps with leverage when clamping.
- Steam one hour per inch of wood thickness.
- You may need to re-steam large bends (15 minutes per re-steaming).
- Once bent, allow to cool for one hour, then move to a drying form.
- Expect some springback once the wood dries, and plan for it.

Each square = 1/2"



We used these two shapes as the basis for our coat hooks. A full-sized downloadable version of this Drawing is available on our website's "More on the Web" section for this issue.



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MORE ON THE WEB



For a video demonstrating steam bending and a downloadable drawing of the coat hooks, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

runs off the edge, be sure to orient that toward the "inside" of the curve. Here are three tips that proved very useful for us: 1) Sand the blank smooth before you bend it; 2) Chamfer the edges with a block plane and 3) Soak the blank in water with Downy fabric softener. All of these steps reduce breakage.

Making the Bending Form and Hook Blanks

First, you need to make the bending forms. We used 3/4" MDF, but Baltic birch plywood or solid wood will also work. We're providing drawings of the hooks' inside and outside

Cut two pieces of 3/4" stock 7" wide by 11" long, and transfer the two curved shapes for the bending mold onto the pieces. Take them to the band saw and cut as closely to the lines as you can. Then use a drum sander or stationary belt sander to refine the lines. Set the pieces flat on a worktop 3/8" apart and see if their curved edges align well (see photo, below left). If they do not, use a sander to adjust the profiles. These are your bending form templates.

Use the templates to create the mold pieces from six 3/4" x 7" x 11" blanks, as shown in the photo sequence below left. Make three of the concave and three of the convex pieces. Carefully align the curved faces for each form, gluing them together. We secured one of the forms to an additional piece of MDF for a base so that only one of the two curved forms would be able to move when clamping up steamed parts.

With that done, now it's time to make the hook blanks. Ours are 3/8" x 2" x 11" red elm, but the other hardwood species mentioned earlier would be just as good. We cut them from a

section of a log, and it was admittedly a challenge to get pieces with the grain running correctly. We needed three pieces for the coatrack, so we made five blanks to allow for potential fractures.

Once roughed out, we planed and sanded the blanks smooth. Chamfer their edges, then soak them in water with a bit of Downy fabric softener. Experienced steam benders swear by Downy. It apparently softens the lignum. Who knew?



curves and their ovoid shape on a free downloadable PDF at woodworkersjournal.com. Check under the "More on the Web" section.

Use the Drawing on page 47 to lay out the two curves for the convex and concave mold templates. Saw and sand them to shape. Separate their curved edges 3/8" apart to check for proper alignment (top left photo). Use these templates to draw the contoured lines on six 3/4" x 7" x 11" MDF blanks. You need to make three of Template #1 and three of Template #2 (middle left photo). At the band saw, cut close to the line to prepare each of the six blanks for template routing using a flush-trim bit at the router table (bottom photo). Glue two stacks of the three curved parts together to create the bending form's inner and outer curves.





Take care when removing stock from the steam chamber — it is very hot. Note the slat inside the chamber to hold the stock in the middle of the steam.

Turning Up the (Steamy) Heat!

Our steam chamber has grooves on the inside that allow us to insert adjustable slats that suspend the hardwood blanks in the middle of the chamber. We also installed a chamber divider to limit the steaming area inside. Plugging in the steam generator, we waited for about 15 minutes for it to start making a substantial amount of steam, then another 30 minutes to be certain the chamber was up the correct temperature and humidity. We put one hardwood blank into the chamber and set a timer. Steam the wood about one hour per inch of thickness. As these pieces are approximately a third of an inch thick, 20 to 25 minutes of steaming was required.

Before the piece is ready to bend, get three strong clamps ready to go. When the timer rings, carefully open the chamber door and stand back — that steam is hot! Unplug the steam generator. With gloves on, place the blank inside the bending forms and center it. Install a clamp in the center of the forms to start the bending process. You don't need to move quickly, but don't dawdle; the blank begins to cool immediately. Using the other two clamps, continue to squeeze the forms together until the blank is bent to its new shape.

The bent wood needs to stay in the forms for at least an hour. While it is in there, make a cooling form that matches just the concave side of the bending form. Once the piece has cooled for an hour, take it out and clamp it in the cooling form. Let it set at least overnight. When you unclamp it the next day, it might spring back a bit ... that's to be expected.

Complete the coat hook shaping process by tracing the ovoid shape found in the *Drawing* onto the face of the bent blank. Cut out the coat hook shapes on a band saw or scroll saw and sand them smooth. We chose a 1/2" x 2" x 24" piece of wenge for a backboard. To mount the assembly to the wall, we drilled two holes 16" apart. Then we placed the hooks evenly along the 24" board, avoiding the mounting holes. Attach the hooks with a spot of glue and two #8 x 1/2" black washerhead screws. When the glue cures, apply a few coats of Watco oil finish, and fasten your new coatrack to the wall.

We hope that this simple steam bending process and project may entice you to try it out. It's a great way to expand your woodworking horizons by adding more curves!



Once bent, leave the coat hook in the forms for one hour (above). Then transfer it to a cooling form (right). It should remain in the cooling form at least overnight.



Cutting out the coat hook shape on the band saw requires special attention. Rotate the stock so that the section being cut is flat on the table, and cut carefully. A 1/4" blade is a good choice for cutting these tight curves.



Use a stationary belt sander or disc sander to smooth the curves and do any final shaping. Sand the coat hooks smooth before applying a finish.

Sheet Goods: Flat-out Great

By WJ Staff

Plywood, MDF and other varieties of sheet goods are mainstays of woodworking shops.



Modern-design furniture often uses exposed plywood edges as an attractive accent. This desk is made of Baltic birch plywood and covered with pressure-sensitive black walnut veneer.

Plywood — a flat sheet constructed of several thinner layers of wood glued together across grain — has been around since the ancient Egyptians and Greeks. It solves wood movement issues for us now, and clearly that was a problem for their builders, too.

In today's hobby and professional woodshops, plywood and other sheet stock is a very useful, economical and nearly essential product

for solving a variety of construction challenges.

Sheet stock such as MDF or a laminated core covered with a hardwood veneer is ubiquitous in modern cabinetry. We also find plywood sides, backs and tops used to make inexpensive stringed instruments. Thin, smooth plywood is a common underlayment for all sorts of flooring. And CDX plywood used for the exterior of home building is the best sheathing

you can find. The scope of sheet stock's use is pretty amazing. But what about for us home-shop builders? (See "Buying Lumber" on page 58 for additional information.)

In the Home Shop

As most woodworkers know, sheet stock provides wide and long material that is not really affected by the seasonal wood movement of solid woods. A common saying of woodworkers is, "The only things in life you can't avoid are death, taxes and wood movement." The caveat to that is, "Except with plywood."

Given its cross-grain laminated construction, the expansion and contraction of plywood's wood fibers are constrained. That is why it is so useful in creating case-work furniture and cabinetry. If you are building a big box, sheet stock is your friend. But which friend should you choose for which task?

If you are building case-work furniture, veneer-core plywood with a hardwood species that will match your solid wood components is the way to go. Hardwood veneer-covered MDF or lumber core are both suitable for the

Hardwood veneer-covered plywood is the go-to material for casework construction. The edges must be covered in a matching lumber species for best results.



task but are much heavier. Their main advantage is that screws and other fasteners will hold in their edges with greater strength than veneer core. Use grades A/A or A/B for best results. If you are painting your work, grade B/B in a birch-covered plywood or other close-grained species is a great choice.

Covering exposed edges of sheet stock can be done by gluing on strips of solid wood that match the surface veneer. You can also get “iron-on” veneer tape in many species that is fast and easy to apply, but it’s a bit less durable than solid wood.

In modern-styled furniture, exposed edges of veneer-core plywood is a desirable design element. Baltic birch and its cousin, ApplePly®, have thin veneers glued together without voids. They are the go-to materials for this sort of construction.

A Good Cover Up

One big advantage of sheet stock’s dimensional stability is that it makes a great substrate for veneering. You can cover those projects with any species of veneer you’d like — a very economical use of fancy species. MDF is often preferred for a veneer substrate, as its smooth surface is ideal for achieving a flawless veneer layup.

Veneer comes in many varieties of species, figure patterns and product options

— solid wood, paper-backed, peel-and-stick — that add unlimited options for creativity. And the fact that the core will stay flat allows the designer/builder to ignore the limits of solid wood furniture. Some of the most wonderful and expensive furniture in the world is made with veneer-covered sheet stock.

Hardworking

Shelving is another great use of plywood. You can make shelves of differing widths and lengths without having to glue up narrow boards. For utility shelves, you don’t even need to cover the edges — just sand them smooth. MDF or particleboard can work for shorter shelves, but anything over 24" of unsupported length will sag. Veneer-core plywood shelves up to 36" will stay flat in normal use without a center support. If longer than that, glue rabbeted hardwood stiffeners to the front and back, and you can go much longer, up to 6 ft or so. Additional supports are still advisable.

Quality Levels Vary

The quality of plywood can vary, but less so with MDF. Some hardwood-covered plywood has incredibly thin veneer. Internal voids and

“telegraphed” patches are to be avoided. Sadly, quality is often hard to determine. But if the surface veneer looks too thin to you, it probably is. Buying sheet stock from a reputable supplier is a good step toward quality control. “Big box store” quality will be hit-and-miss.



This bedside table is made of MDF covered with veneer — in this case, quartersawn white oak veneer.

TOOL TUTORIAL

Working Under Pressure

By A.J. Hamler



Few tools are more important in a woodshop than clamps, in all their variety and function.



"You can never have enough clamps!" No woodworker in their right mind would argue with that statement, and with good reason. Clamps don't measure, cut, drill, carve, rout, smooth, plane or process wood in any way themselves, and yet they're among the most essential tools for virtually every project involving two or more components. In fact, most joinery would be impossible without clamps. From basic panel glue-ups to the

most intricate dovetailed corners, clamps keep everything tight, align angles, force out excess glue and turn a collection of loose components into a single unified construction. Is there a greater truism than never having enough clamps? If so, it's probably, "You can't do woodworking without them."



Considering the dozens of types and myriad sizes, there are probably hundreds of clamps useful for woodworking. From simple tasks like just gluing two pieces of wood together on up to every holding task imaginable, there's a clamp for the job.

But most woodshops can get by with the most basic clamps that handle the lion's share of projects, then invest in more specialized examples or additional sizes as needed. Here's a concise roundup of what clamps are, how they work and the ones you just can't live without.

What Are They?

Technically, any mechanical device that can be adjusted to apply and hold pressure is a clamp, no matter the application. Your dentist uses clamps. So does your plumber. But for woodworking, clamps fall into a couple of specific areas designed mainly to hold wooden parts for gluing or to secure things for machining.

Clamp design and components vary widely. However, almost all clamps have jaws and a mechanism for opening and closing them. Jaws that function with a sliding action are typically mounted on a bar or pipe. There's a fixed



While not ideal for joinery, C-clamps excel as hold-downs for jigs and fixtures. Here, they're securing a jig for pen blanks to a drill press table.

jaw at one end that faces a movable jaw on the other end. The movable jaw is controlled with either a screw or ratcheting mechanism activated by a handle. Spring clamps, meanwhile, are like scissors, with a strong steel spring that forces the jaws closed. And hand screws feature two movable jaws with a pair of handled screws to set them.

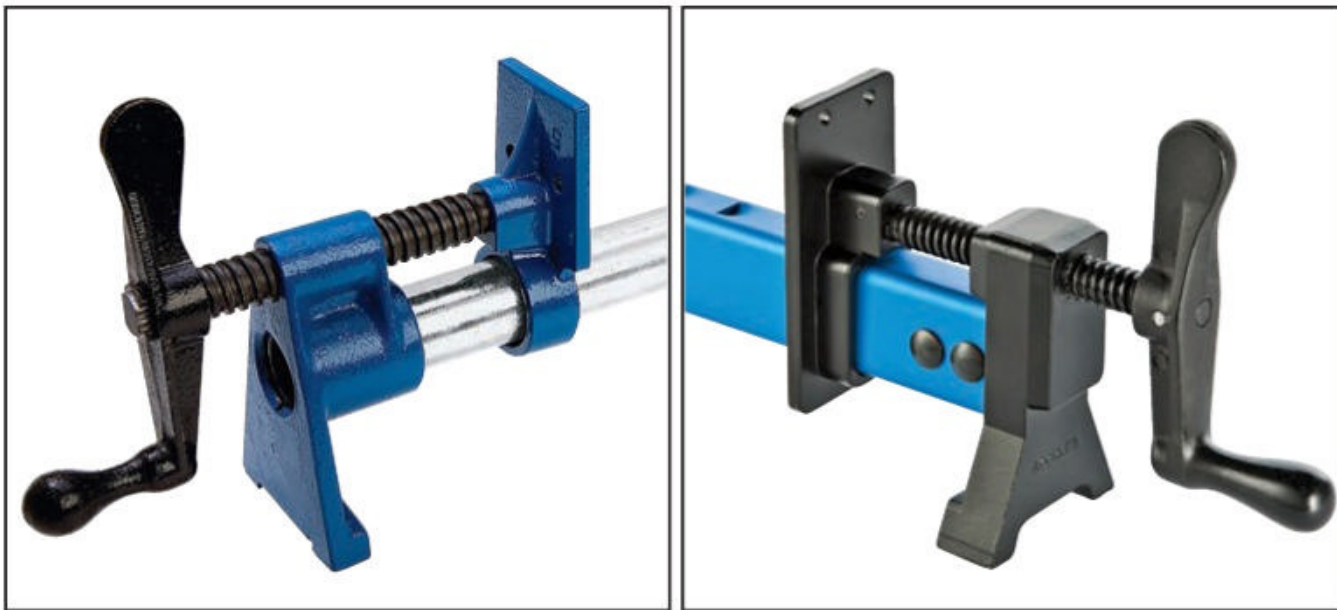
Clamps have a lot of interchangeable terminology. If there's a long straight part, it's often called a bar clamp no matter what specific type it really is. Generally, clamp nomenclature describes its

shape or basic characteristics. For instance, F-style clamps are shaped like, well, the letter "F," while parallel clamps have parallel jaws.

Clamp Types

There are dozens of kinds of clamps, and some are pretty specialized. With that in mind, let's take a look at the most commonly used woodworking clamps, along with some typical specs. We'll start with some oldies but goodies.

C-clamps have been around for ages. These all-metal clamps provide lots of pressure, but the jaw pads



Pipe and bar clamps share a number of similarities, and sometimes they even look and function the same. Footed versions like these are able to stand on their own, which is helpful for panel glue-ups.

are small, meaning they don't distribute pressure well and often mar wood surfaces. Metalworking shops love them, but their use is more limited for woodworking.

They shine, however, as hold-downs for jigs and fixtures. While the fixed jaw is rigid, the pad on the movable jaw pivots, so they handle uneven surfaces like the drill press table shown on page 53. C-clamps typically have 3/4" to 14" openings and a throat depth of 1/2" to 7".

Pipe/Bar clamps are similar, in that they have a fixed but adjustable jaw at one end and a sliding jaw on the other. On a pipe clamp, the sliding jaws secure to the pipe with a multi-plate mechanism; on a bar clamp, the sliding jaw adjusts on notches or holes in the bar. For both, a rough opening is set first by locating the sliding jaw, then the crank on the fixed end tightens the integral jaw. These clamps can be any conceivable length

just by swapping out the pipe or bar or by adding extensions. Their throat depth is typically about 2".

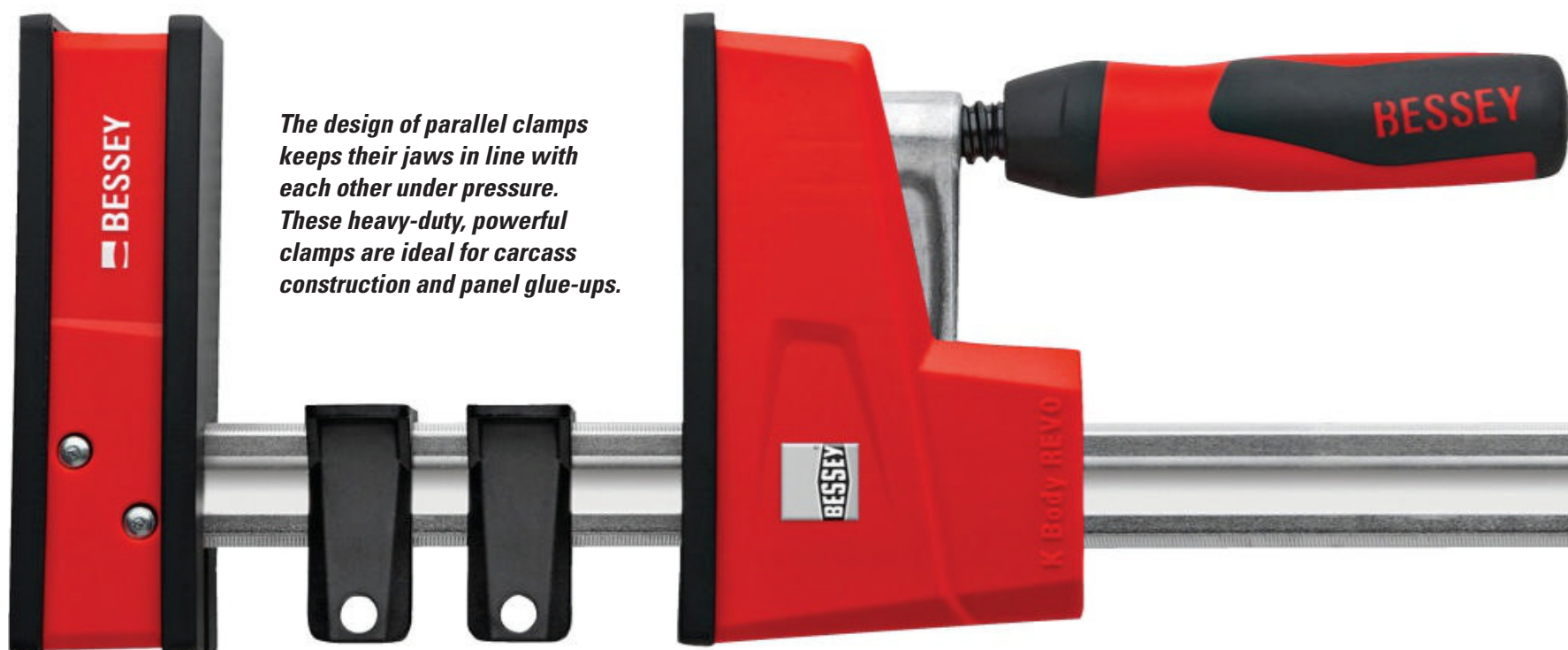
F-style clamps, just one variation on bar clamps (and often called that), are among the most common and practical woodshop clamps. Although some have openings up to 60", the most useful sizes are 6", 12", 18", 24" and 36". Much longer than that and the bars tend to flex under high pressure. A throat opening of 2½" to 4" is typical for this style.

Hand screws have been around for a very long time, and they consist of two opposing wooden jaws connected by a pair of cantilevered screws with handles. Because the screws operate independently, the jaw opening adjusts through a range of angles from obtuse to acute, making them useful for clamping non-parallel surfaces. Like C-clamps, they excel at hold-down chores for jigs and fixtures as well as clamping odd shapes. Jaw openings are 2" to 10"; their throats are typically 2" to 7".

Quick-action clamps (also called ratcheting or trigger clamps) are yet another variation on bar clamps. They have a ratcheting movable



A wooden hand screw (flat on table) not only clamps things together but also can function as a use-anywhere vise. Here it's being held in place by a Rockler quick-action clamp that tightens by pumping a single handle.



The design of parallel clamps keeps their jaws in line with each other under pressure. These heavy-duty, powerful clamps are ideal for carcass construction and panel glue-ups.

jaw operated by pumping a handle. A quick release instantly kills the pressure. They're great for both gluing and hold-down chores, as shown in the bottom photo, opposite page. They have openings up to 24" and throats of 4" or less.

Parallel clamps (shown above) feature jaws that are always aligned, making them a go-to choice for cabinet and carcass construction. The most useful of these tend to come in large sizes. A square-back design of the jaws allows them to rest upright on a worktable for horizontal panel glue-ups. They'll have up to 72" openings and typically a 4" throat.

Spring clamps (top photo, next page) are clothespins on steroids. Their squeeze-to-operate nature makes them one-handed tools, and spring operation allows them to be placed quickly. Clamping pressure is usually a factor of the internal spring, but higher-end versions allow pressure adjustment through a short range. Rockler's Bandy Clamp™ edge clamps have a flexible band that applies pressure 90 degrees to the direction of the jaws, ideal for installing edging. Their versatility makes

spring clamps handy outside the shop too. You'll find jaw openings from 1" to 5".

Band/strap clamps feature a long woven strap at-

tached to a ratcheting spindle inside a cranking mechanism. A cam-lock holds the other end of the strap to create a loop that, when placed

No-clamp Clamping

Sometimes you just don't have the right clamp for a specific task. Here are three of my favorite clamping workarounds.

Pin Nailer: In lieu of edge clamps, tiny pin nails can come in handy. Just apply glue to the edging, hold it in place and bang in a line of these slender fasteners the entire length. For other tasks, if it isn't seen you can also use a brad or finish nailer ... or, of course, screws.

Strong cord: Any heavy cord or even medical tubing can become a clamp. Tie a double loop, slip it over whatever you're clamping, insert a short piece of scrap or dowel between the cords and twist. It's perfect for odd shapes and angles that might cause clamps to slip.

Tape: If you don't have a strap clamp for securing a mitered box when gluing it together, lay out the mitered sections in a line and stretch tape across the backs of the joints. Flip the assembly over and dab glue onto the open joints, then just fold the box closed to pull the corners tight. Add tape to the last corner and pull it taut. You may be surprised by how well this simple clamping option works!





Rockler's Bandy Clamps have a stretchy inner band that applies pressure at a right angle to the clamping force.

around multi-sided items, applies inward pressure. Uses include mitered boxes and frames, chairs, coopered barrels and chest lids, and so forth. Their openings are limited only by strap length.

Ratchet-action strap clamps apply even pressure around the entire circumference of projects with multiple glue joints, like this small mitered box.

A Few Clamping Tips

A complete how-to on clamping could fill a book, but here are a few usage tips and

tricks to keep in mind.

For common panel construction, always space clamps evenly. Whenever possible, clamp on a flat surface to avoid panel twisting — the larger the panel, the greater the twist threat. Keep in mind that edge pressure across panels can also cause bowing. To avoid this, alternate clamps on op-

posite sides to help equalize clamping pressure, or install smaller clamps at the joint locations, as shown in the top photo, next page.

Glue tends to go everywhere when clamping. Keep a rag or paper towel handy to wipe up spills and drips, especially on the clamps themselves. A protective covering on your work surface limits messes and makes cleanup easier when you're done.

Clamps can apply hundreds of pounds of pressure — some up to half a ton! But do you need all that? No, at least not for most woodworking. For doing bent laminations or pulling hard-to-set rough framing to a mark, high pressure is your friend. But for typical glue-ups on woodworking joints, a hundred pounds or so is plenty of force. Almost all clamps except spring clamps are capable of this pressure.

Speaking of pressure, overdoing it creates two drawbacks. First, extreme pressure can warp parts, and when the glue dries they may stay that way, ruining a project. Excessive pressure can also squeeze more glue out of a joint, potentially starving it. While the joint will look nice and tight, there may not be enough glue inside to bond it over the long term.

Keep a close eye when applying pressure, as



Pipe clamps have been a mainstay of woodshops for ages, and they often are the go-to clamp for panel glue-ups due to their strength and jaw opening capability.

components can shift or slip. Minimize this by clamping slowly, one clamp at a time. Sometimes a small secondary clamp applied first to align parts, followed by the main clamping action, does the trick. Also, sprinkling a few grains of very fine sand into a wet glue joint can help “lock” the parts. It only takes a little sand to do the trick.

On the subject of shifting joints, there’s a special concern for right angles and keeping them that way. Uneven pressure or skewed clamps can pull perfect corners out of 90 degrees. Assembly squares not only can keep corners at right angles, they also speed up carcass construction in general.

Be sure to scrape dried glue off clamp pipes/bars to keep them from scratching wood. Ditto for jaw pads.

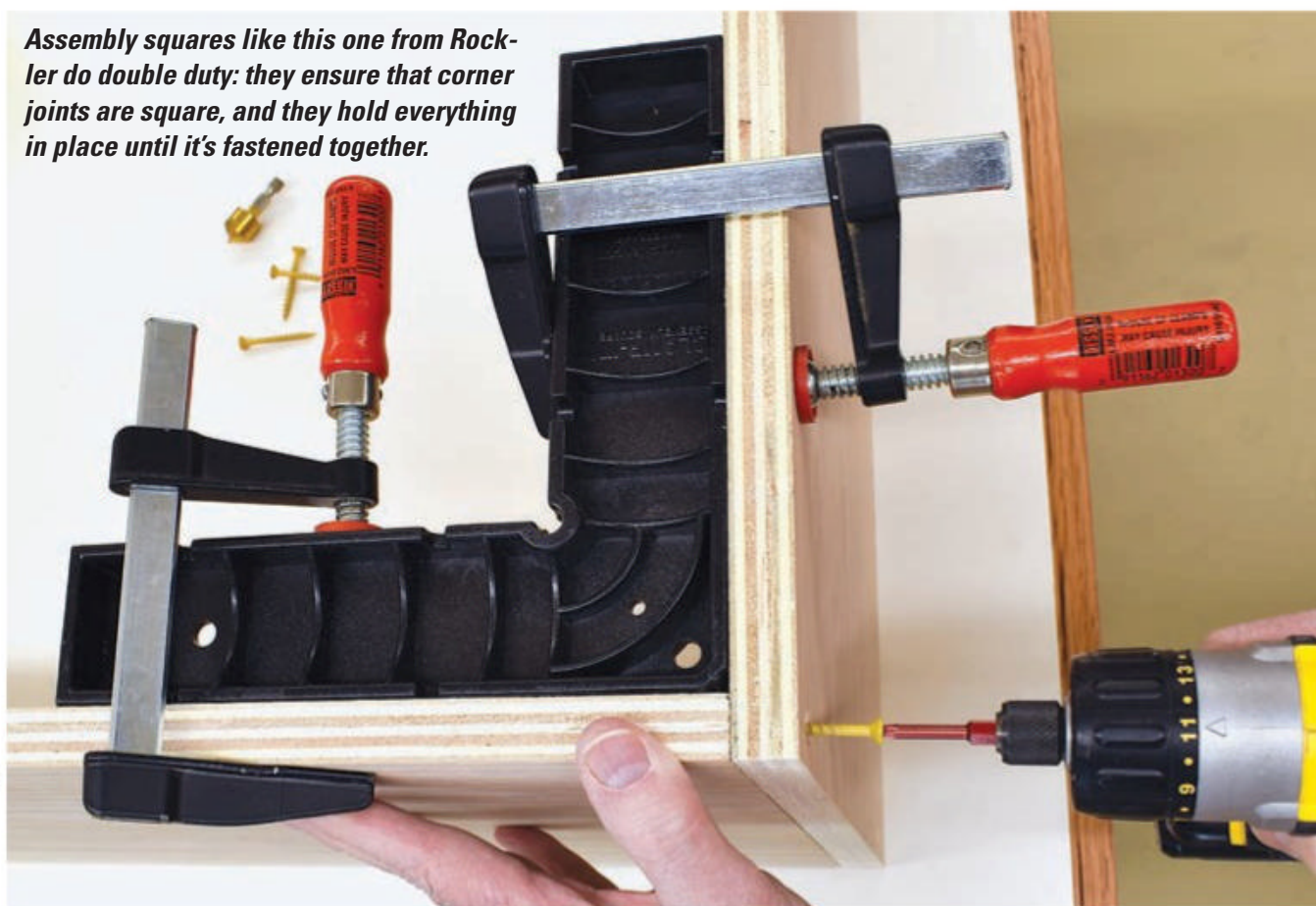
Finally, always remember that a hundred (or more) pounds of pressure concentrated on two opposing spots per clamp can damage wood permanently. If your clamps have jaw pads, use them; if you lose them, replace them.

And whenever practical, insert pieces of scrap beneath clamp pressure points, not only to protect the project wood, but also to help distribute clamping pressure.

A.J. Hamler writes frequently for Woodworker’s Journal.



When clamping up a wet glue joint, a lack of any squeeze-out (top) can mean you haven’t applied enough glue, which is one common way of starving a joint. The other is over-tightening the clamps. A little squeeze-out along the seam (center) is just right. When the squeeze-out drips and runs (bottom), you’ve overdone it with glue.



Assembly squares like this one from Rockler do double duty: they ensure that corner joints are square, and they hold everything in place until it’s fastened together.

Six Smart Picks for Woodworking

Whether you need to make a worktop, templates or a cabinet divider panel, here are six goods options.



Six worthy sheet goods for woodworking include, from bottom to top: Baltic birch, veneered plywood, MDF, melamine board, lauan plywood and tempered hardboard.



Core compositions of sheet goods will vary. From left to right, they might consist of thin solid lumber laminations, even thinner veneer layers, wood pulp or coarser wood particles.

Sheet goods, which include a range of plywoods and other composite materials, are essential to woodworking. If you're just getting into the craft, here are six good options to keep in mind for your various shop or project needs.

Usual Suspects

While the fir plywood you find at a home center might be ideal for sub-flooring or a roof deck, it's really not a good choice for woodworking. But between home centers, lumberyards and specialty woodworking stores, you can find these better options.

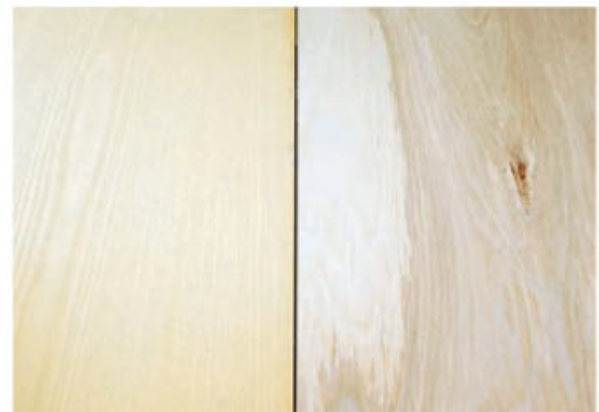
Baltic birch: Blonde and nearly void-free, Baltic birch plywood is flat, stable and looks great, even on its edges. It's not common to home centers, but specialty yards often stock it in 1/4", 3/8", 1/2" and 3/4" thicknesses. The great news for woodworkers is that Rockler has a huge selection of Baltic birch plywood in a variety of manageable sizes.

Veneered plywood: Plywood with thin hardwood face veneer will suit many project applications, and a specialty yard or woodworking store will stock it in more varieties than you might imagine. Most common North American lumber species, including ash, birch,

cherry, hickory, maple, red and white oak and walnut are easy to find in 4 x 8 sheets of plywood. This way, you can match the sheet stock to the hardwood in your project for a first-rate appearance.

MDF: Made of compressed wood pulp and resins, medium-density fiberboard (MDF) is a workaday standby for making jigs or templates as well as substrates for countertops or veneering. It's smooth, dead-flat and easy to machine, but be careful to keep it dry or it can swell. MDF's high density makes it very heavy. It holds fasteners adequately and is easy to glue or paint.

Melamine: Chipboard covered with a plastic-like coating is often referred to as melamine board. Reserve it



Veneered plywood will typically have a premium "A" grade "show" face on one side (left) and a lower-grade "B" face on the other (right).

for shelving or work surfaces where easy cleanup and a smooth surface is important. Melamine's particulate core is difficult to fasten to and can crumble along its edges.

Lauan plywood: Sold in 1/4" thickness, common lauan plywood is a great choice for drawer bottoms, dust panels and cabinet backs.

Tempered hardboard: Dark brown and sometimes coated with a dry-erase or chalkboard surface, tempered hardboard is another alternative to lauan plywood for low-cost drawer bottoms and back panels. It makes sturdy templates, too.



Specialty yards will stock 1/4", 1/2" and 3/4"-thick veneered plywood in many species. Among this stack of African mahogany plywood is a stunning example with ribbon-stripe veneer on one face.

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TOOL PREVIEW

Beadlock Pro Jig Kit

By WJ Staff

Loose tenon joinery is a great way to create strong end grain to edge grain joints when building tables and chairs. It is a classic furniture joint. Create strong loose-tenon joints simply and effectively with just this updated jig and a drill.

With Rockler's new Beadlock Pro Jig Kit, you can add mortise-and-tenon joinery to a wide variety of projects (including the Cloud Lift Chair on page 24) using only a drill/driver. The image below shows the entire scope of the Beadlock options, which are sold separately.



Longtime Rockler customers probably already know that its patented Beadlock® joinery, which uses mortises of multiple overlapping holes to house special loose-tenon Beadlock stock, has been around for many years. Originally, the design was conceived by an enterprising woodworker who was looking for an easier way to make mortises with a drill. Now, the company has redesigned the original jig into a Pro version that uses the same principle for mortising but with a jig that's even more versatile to use.

Made of reinforced plastic, the new Beadlock Pro Jig has large clamping surfaces on its front and top faces, making it easier to clamp to workpiece faces or edges than

the jig's previous style. A hardened-steel drilling guide block fits inside the jig and is held in place with two knobs on 1"-long, threaded posts. To drill a Beadlock mortise, the jig is marked with "A" and "B" positions for sliding the drilling guide. Once all of the available holes are drilled through the guide at position A, sliding and locking it to position B and drilling the remaining holes completes the mortise's unique overlapping-hole shape.

The updated jig also makes it virtually foolproof to align both mortises for a joint accurately. Just scribe a line across mating workpieces at the center of the joint, and use the jig's clear viewing window with hairline cursor to locate and clamp the jig in the correct position.



The unique fluted edges of Beadlock tenons increase their surface area for glue, strengthening the joint. Their shape and snug fit in the drilled mortises also helps to prevent joints from racking.

On the jig's inside back face, several depth scales help to quickly set the drilling depth for Rockler's 1/4", 3/8" and 1/2" pre-cut Beadlock tenons or other mortise depths.

The new Beadlock Pro Jig Kit (item 54318, \$79.99) comes with a 3/8" drilling guide, 3/8" split-point drill bit, stop collar, hex wrench and a molded plastic case. Beadlock tenon stock is sold separately.

While the 3/8" sizing is intended for 3/4"-thick stock and thicker, Rockler also offers accessory kits for making 1/4" and 1/2" Beadlock joints in thinner or thicker stock using the same Pro Jig. The 1/4" Drill Guide Kit (item 54637; \$34.99) includes a steel drilling guide, 1/4" drill bit with stop collar and several spacers. A 1/2" Drill Guide Kit (item 57429; \$49.99) is similarly outfitted.

Easy Offset Potential

Mortises aren't always centered on stock thicknesses, so Rockler offers an optional Spacer Kit (item 50917; \$19.99) to offset the Pro Jig's drilling guides as needed. Five plastic spacers in 1/16",

1/8", 1/4", 1/2" and 3/4" thicknesses can be mounted in any combination behind the drilling guide to locate mortises where you need them. They work with all three guide block sizes. Longer threaded posts in the kit enable all of the spacers to be used together, if required, for centering mortises on stock up to 4 1/8" thick.

Stock Options for Tenons

Rockler's untreated, domestic birch Beadlock tenons are available in several variations. If you'd prefer to cut your own custom tenon lengths, Rockler offers three-packs of 12"-long tenon stock in 1/4", 3/8" and 1/2" sizes for \$8.99 per pack. Or you can buy packs of pre-cut lengths in each size for \$9.99. The 1/4" tenons are 1 1/2" long and come in 25-packs. Twenty 3/8" tenons in 2" lengths come in a pack, and the 1/2" tenons are 2 1/2" long, 15 to a pack.

It's also possible to make your own 3/8" tenons from any stock you choose if you use Rockler's 1/2"-shank Beadlock Tenon Router Bit (item 31318; \$59.99).



To help place mortises exactly, five thicknesses of plastic spacers — 1/16", 1/8", 1/4", 1/2" and 3/4", sold as a kit — can be installed behind the steel drilling guide. Longer threaded knobs accommodate the spacers.



Depth scales molded into the Pro Jig's inside face (left) make it easy to set the included drill bit's stop collar accurately for drilling any mortise depth you need to make (above).

Three sizes of Beadlock joints are possible — 1/4", 3/8" and 1/2"— depending on the hardened drilling guide you use in the jig. The kit includes the 3/8" guide block size (center in photo).



WHAT'S IN STORE

Bit-friendly Clamps, New Cordless Tools

Contact Information

Dremel
800-437-3635
us.dremel.com

Milwaukee Tool
800-729-3878
milwaukeetool.com

Rockler
800-279-4441
rockler.com

WORX
855-279-0505
worx.com

MORE ON THE WEB

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

While most of us do our best to prevent it, encounters between router bits or blades and hold-down clamps is always possible, especially when running programs on a CNC machine. **Rockler's Bit-Saver Hold Down Clamps** can help minimize the damage to blades and bits, should an accident like that occur. The glass-filled ABS clamp arms have aluminum threads inside, and this combination of materials makes them less likely to damage carbide cutters. The clamps come with 5/16"-18 x 3" T-bolts that are also made of aluminum rather than steel, in case a cutter should happen to make contact with them, too. Easy-to-grip 1" knobs with aluminum inserts lock these 3 1/4"-long clamps securely to standard T-tracks. The clamps can reach material up to 2 1/2" thick. Sold in pairs, these Bit-Saver Hold Down Clamps (item 59799) are priced at \$14.99.



Rockler Bit-Saver Hold Down Clamps

The **WORX® 20V Power Share 4 1/2" WORXSAW® Brushless Compact**

Circular Saw delivers up to 50 percent more run time and up to 80 percent more power than a comparable saw with a brushed motor. At 4.8 lbs with battery, its slim profile and small size also make the tool easier to use

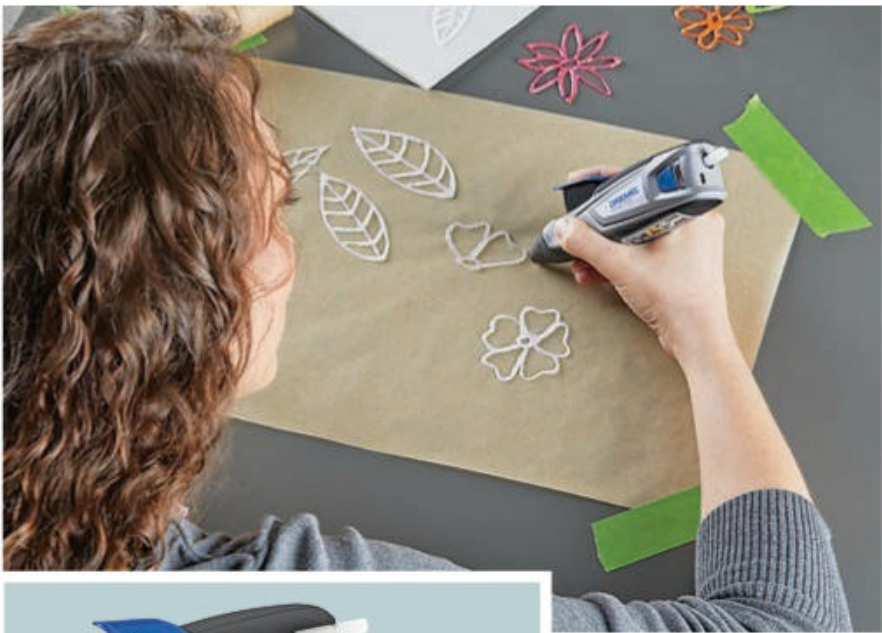


than 7 1/4" saws. A thin-kerf, 24-tooth blade enables this left-blade saw to cut through materials up to 1 1/2" when the base is set to 90 degrees or 1/8"-thick stock with the blade tilted to 45 degrees. An LED light, dust extraction port with vacuum adapter and electric brake are other helpful features. In kit form with a 2.0 Ah Max Lithium battery, charger and edge guide (WX531L), this 20-volt WORXSAW sells for \$159.99. Or buy it as a bare tool without battery or charger (WX531L.9) for \$99.99.

Hot glue is a useful adhesive for DIYers, crafters and woodworkers alike, and it will be quicker and easier to



WORX 20V Power Share 4 1/2" WORXSAW Brushless Compact Circular Saw



Dremel Home Solutions Rechargeable Glue Pen

dispense with the *Home Solutions™ Rechargeable Glue Pen* by **Dremel®**. This innovative tool has an internal 4V MAX rechargeable lithium-ion battery with a USB charging port. Unlike typical corded glue guns that can take five minutes to heat up, this Glue Pen melts the glue in just 15 seconds. Its 6⁵/₈" length is comfortable to hold, and a precision nozzle helps reduce drips. Dremel's Home Solutions Rechargeable Glue Pen (\$39.97) comes with a power adapter, USB cable and four glue stick refills.

Three *Doweling Jig Kits* from **Rockler** simplify the process of making dowel joints. The glass-filled nylon jigs with hardened-steel bushings have a generous clamping surface with a scale molded into them for setting drilling depths. Two stops on either side of the jig can be slid into place to index off of part ends or edges, and a window with reference lines make these jigs easy to align to layout marks. The 1/4" jig (item 59060) centers holes

on 1/2"-thick stock. The 3/8" jig (item 54854) centers holes on 3/4" stock, and a 1/2" jig (item 55072) accommodates 1"-thick material. Each of these kit options has a drill bit, stop collar and hex wrench and sell for \$17.99.

Milwaukee's M12™ 23 Gauge Pin Nailer uses a nitrogen air spring mechanism to sink pin nails ranging from 1/2" to 1³/₈" long into hardwoods or softwoods consistently without a compressor or gas cartridge. It will drive up to 750 nails on a single charge when equipped with an M12 REDLITHIUM™ CP 1.5Ah Battery. The gun's double-action trigger fires nails sequentially, while a dry-fire lockout and soft tip prevent marred workpieces. Weighing 3.3 lbs without battery, the nailer is light-

Milwaukee M12 23 Gauge Pin Nailer



Rockler 1/4", 3/8" and 1/2" Doweling Jig Kits

weight and compact. An LED work light brightens the nail zone, and a magazine reload indicator helps you keep tabs on when to replenish the nail supply. It also has a battery fuel gauge, tool-free depth adjustment and a reversible belt clip. Milwaukee offers this nailer in a kit (2540-21; \$249), which includes the above-mentioned battery, charger and a contractor bag. In bare form without battery or charger (2540-20) it sells for \$199.



FINISHING CORNER

How Can I Make New Pine Look Old?

By Tim Inman and WJ Staff

Aging pine to a yellow-orange color is a two-step process: start with dye and follow with shellac.



Once cured, lacquer, shellac or varnish finishes can be wet sanded with fine abrasives and a lubricant to remove dust nibs or imperfections and flatten the surface.



Tim Inman is a professional woodworker and finishing expert and the author of *The Art of Classical Furniture Finishing*.

Q How can I make my new, very white pine match the rich, amber-orange color of our old pine walls?

A Both the wood and finish tend to color with age. I'd apply a very diluted wash coat of a yellow aniline dye to match the aged effect of the wood itself, then I'd go for a little orange shellac to match the vintage finish color.

— Tim Inman

Q I have heard about “wet sanding” in the finishing process. Can you please describe what this is, when to use it and on what wood?

A A lot of terminology gets tossed around among different hobbies and specialties. I believe “wet sanding” is a cross-over term from automotive finishing. It involves using

a lubricant such as soapy water or mineral spirits, in conjunction with very fine silicon-carbide paper, to smooth and flatten each coat of finish before applying the next. The lubricant helps to wash away grit particles and the little bits of finish that are abraded as well as keep the dust down. You can do the same thing on your woodworking projects between coats of thoroughly cured film finishes such as shellac, lacquer or varnish. The wood type makes no difference. Some wood finishers call this process “rubbing out” rather than wet sanding. It will help smooth away little dust

when done carefully, makes a big difference in the surface quality of your finishes.

— Chris Marshall

Sometimes “wet sanding” also means raising the grain with water during the sanding process. If that’s what you’re wondering, here’s what I do: sand the entire project to 220-grit, then take a wet cloth and wipe the whole piece of furniture. It removes the dust and lightly dampens the wood. Once damp, the wood fibers swell and then dry. (This lifts very small dings and closes ultra-small cracks and creases in the wood surface.)



To give blonde pine an aged appearance, first apply diluted yellow dye (center section of above sample) to color the wood. Then topcoat with amber shellac thinned with denatured alcohol (left section of above sample).

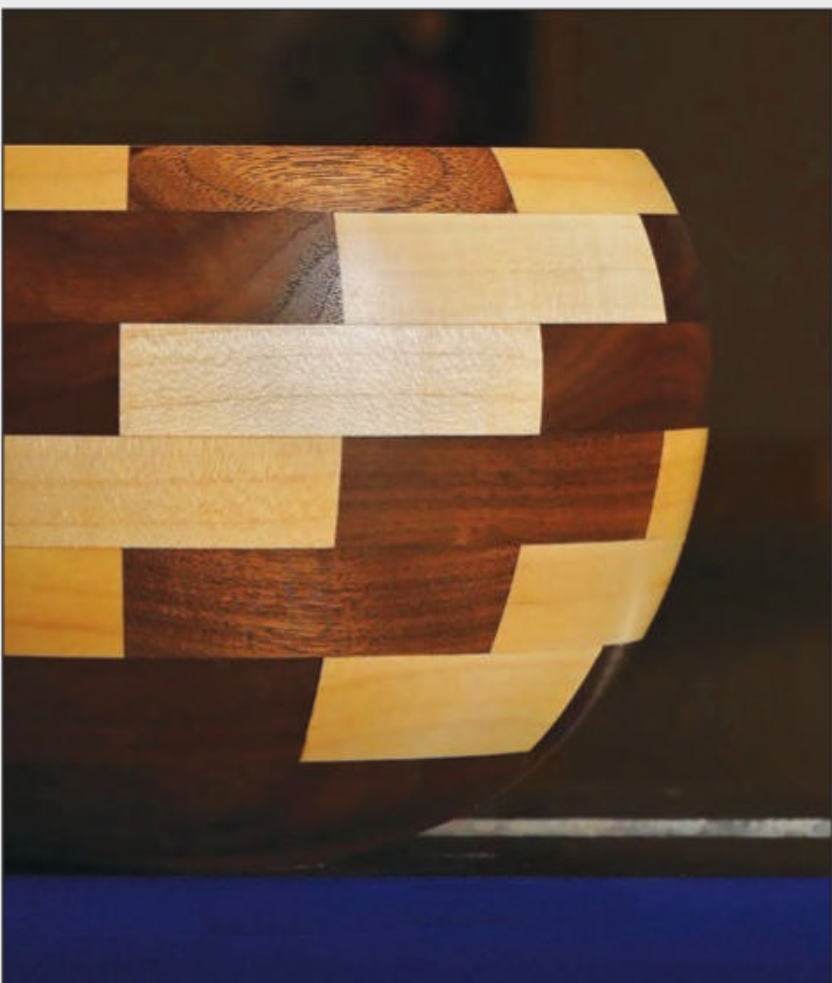
nibs, brushstrokes or other tiny imperfections so the finish feels smoother. A good book on wood finishing will explain the process in better detail to help get you started — it’s not difficult to do and,

Sanding very lightly one more time with 220-grit, and then finer paper if desired, produces a super smooth surface for applying finish.

— Rob Johnstone

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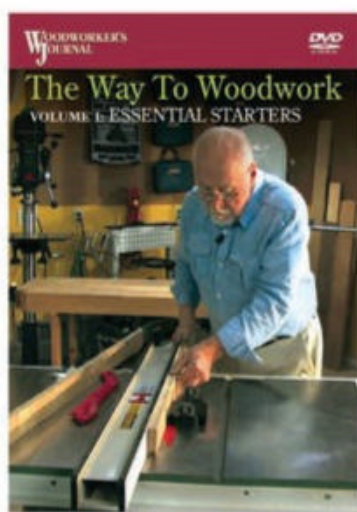
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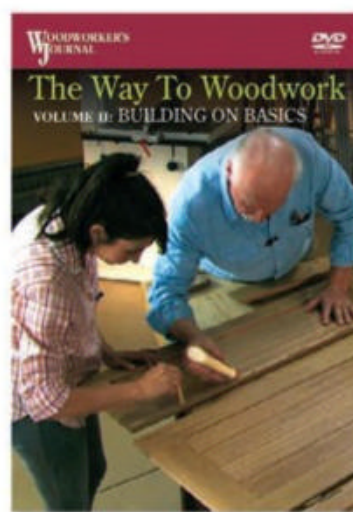
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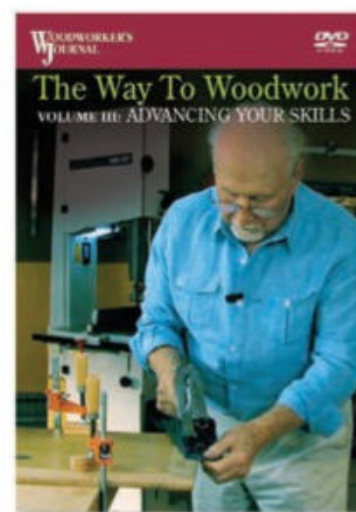
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HARDWORKING WOODS

Mesquite: *Prosopis glandulosa*

By Rob Johnstone

Grill fuel can be beautiful lumber, too!

I have to admit that, previous to building the chest project shown here — it graced our pages back in 2008 — my most intimate experience with mesquite was pulling its nasty little spikes out of various and sundry sections of my anatomy while bird hunting in Texas. Beyond that, it was most familiar to me as a complement to the barbecue briquettes over which I prepared the fruits of my outdoor labor.

But mesquite, as I was to learn, can be quite impressive lumber!

When finished with a clear topcoat, it has a warm brown-orange and red hue with amber flecking. The figure can be downright stunning, too.

Mesquite commonly has many black knot and limb-wood incursions. To some degree, these incur-

sion flaws and waney edges are impossible to avoid in this special lumber. But they should be considered beauty marks that add to this rugged wood's distinctiveness.

The lumber is strong, hard, straight-grained and warp-resistant. It has a very



low volumetric shrinkage from when it's freshly cut to dry (just 4 to 5 percent).

Honey Mesquite

The most widespread of some 35 species of mesquite in North America is honey mesquite. It occurs from Kansas down through west Oklahoma, most of Texas and into northern Mexico. A variety is found as far west as southern California.

Native Americans used honey mesquite for fuel wood. They commonly used the bean-like fruit, ground into flour, for making a type of bread that was the main staple of their diet. The pods were also used to make drinks. These bean pods are an important food source for numerous species of birds, mammals and livestock.

Mesquite is more widespread now than it was in the 19th century. The introduction of European cattle to the Southwest led to overgrazing of the rangeland, which eliminated the range fires that

held mesquite in check. The cattle also widely distributed undigested seed. Interestingly, its range into Oklahoma and Kansas, as well as east into Shreveport, Louisiana, is generally along the trails used for the last 19th century cattle drives out of Texas. It soon took over rangelands under these conditions, eliminating native grass stands.

Lumber Tree Location

While often limited to gnarly, small bushes in extremely dry areas, under ideal conditions, honey mesquite can grow up to 40 feet tall. Straight-stemmed trees, found mostly along damp drainages, are the form most often used for lumber.

The current rate of use of straight-stemmed mesquite for lumber cannot be maintained without good land management practices. Fortunately, land owners in some parts of Texas are now managing stands of mesquite for lumber production.

Shop Scorecard

Uses: Fence posts and columns, flooring, rustic or fine furniture, millwork, turnings, cabinetry

Hardness: Mesquite ranks higher on the Janka hardness scale than hickory or hard maple. It's similar in density to red oak but heavier.

Area of Origin: Southwestern U.S. into Mexico

Workability: Planes, cuts, routs and drills moderately easily with power tools. Also can be chiseled and carved with sharp hand tools.

Finishing: Readily accepts common topcoats without special finishing considerations

Cost: Expensive, given limited availability relative to other more plentiful native hardwoods

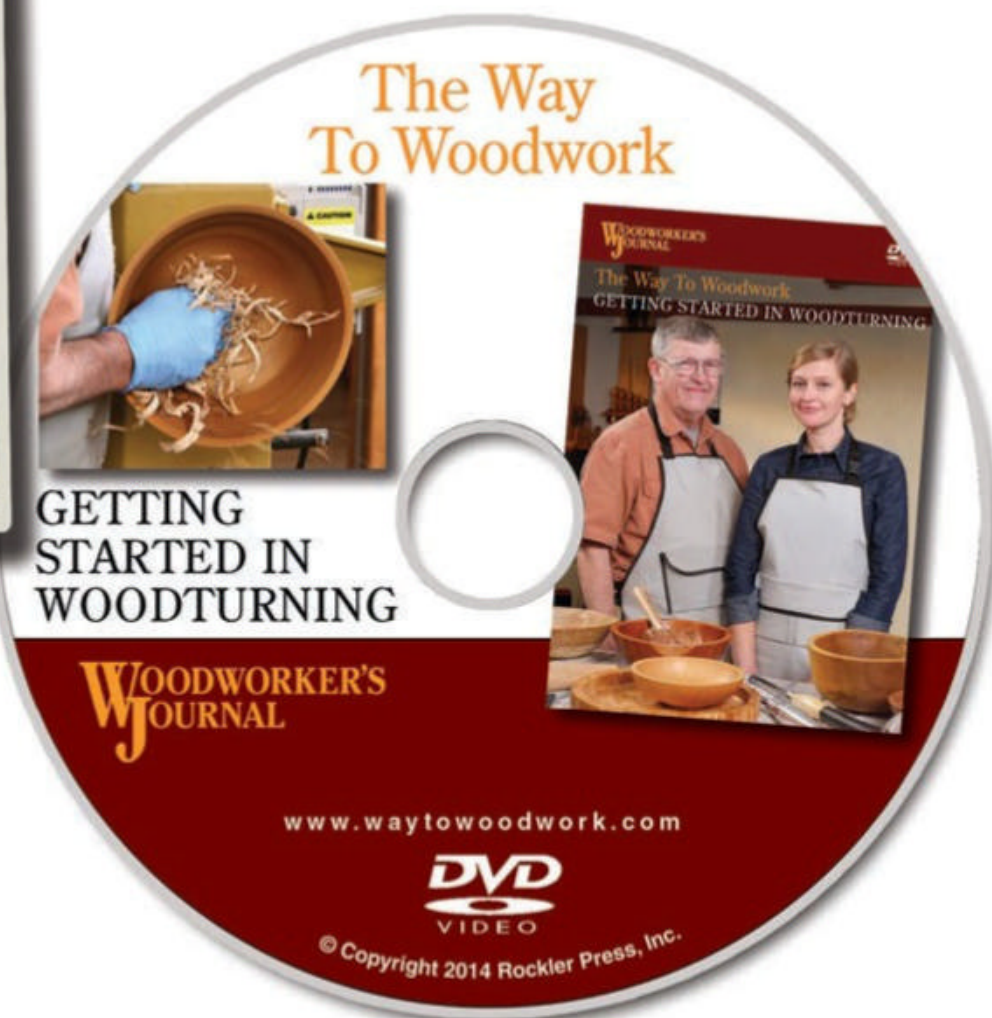
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The Way To Woodwork: Getting Started in Woodturning

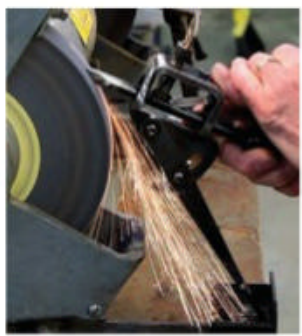


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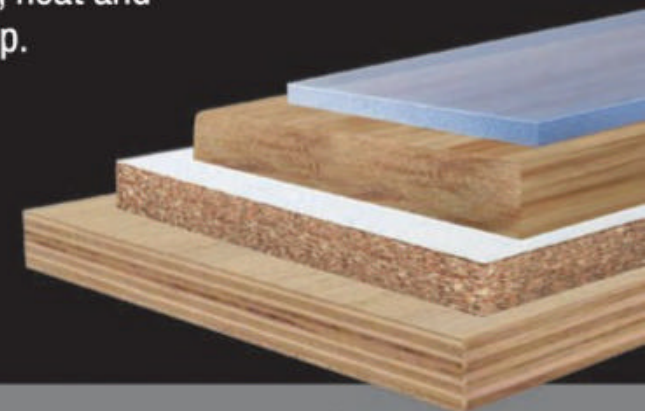


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