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August 2016

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**HAND TURNED
BARBEQUE SET**
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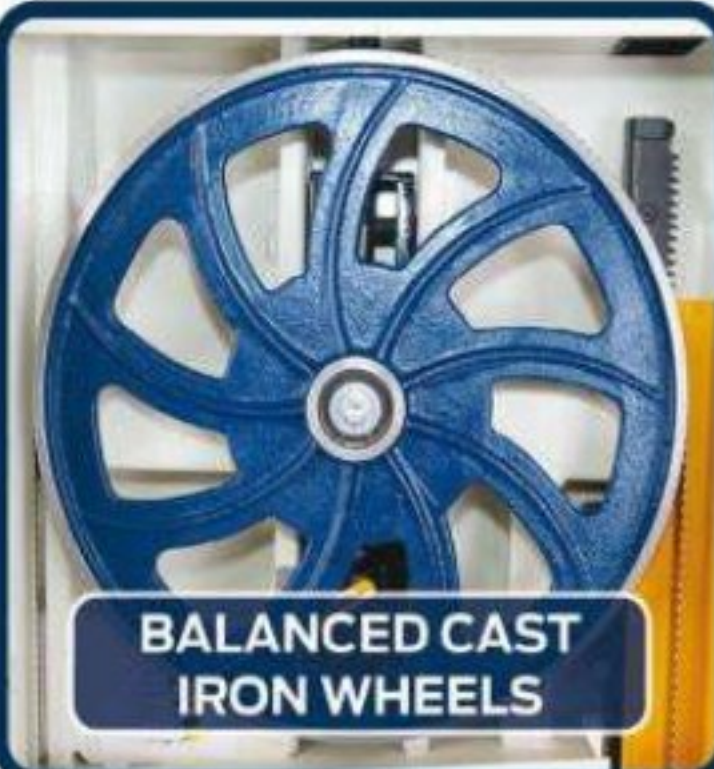
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Woodworker's Journal Contents

August 2016

Volume 40, Number 4

Projects



Page 56

Lighted Bookshelf

By Woodworker's Journal Staff

This shelf appears suspended in air, while dovetail slider bookends provide both practical and stylish support.



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Upholstered Ottoman Chest

By Sandor Nagyszalanczy

With a reversible lid and upholstery applied to the top and insides, this piece serves triple duty as storage, coffee table and extra seating.

Beehive

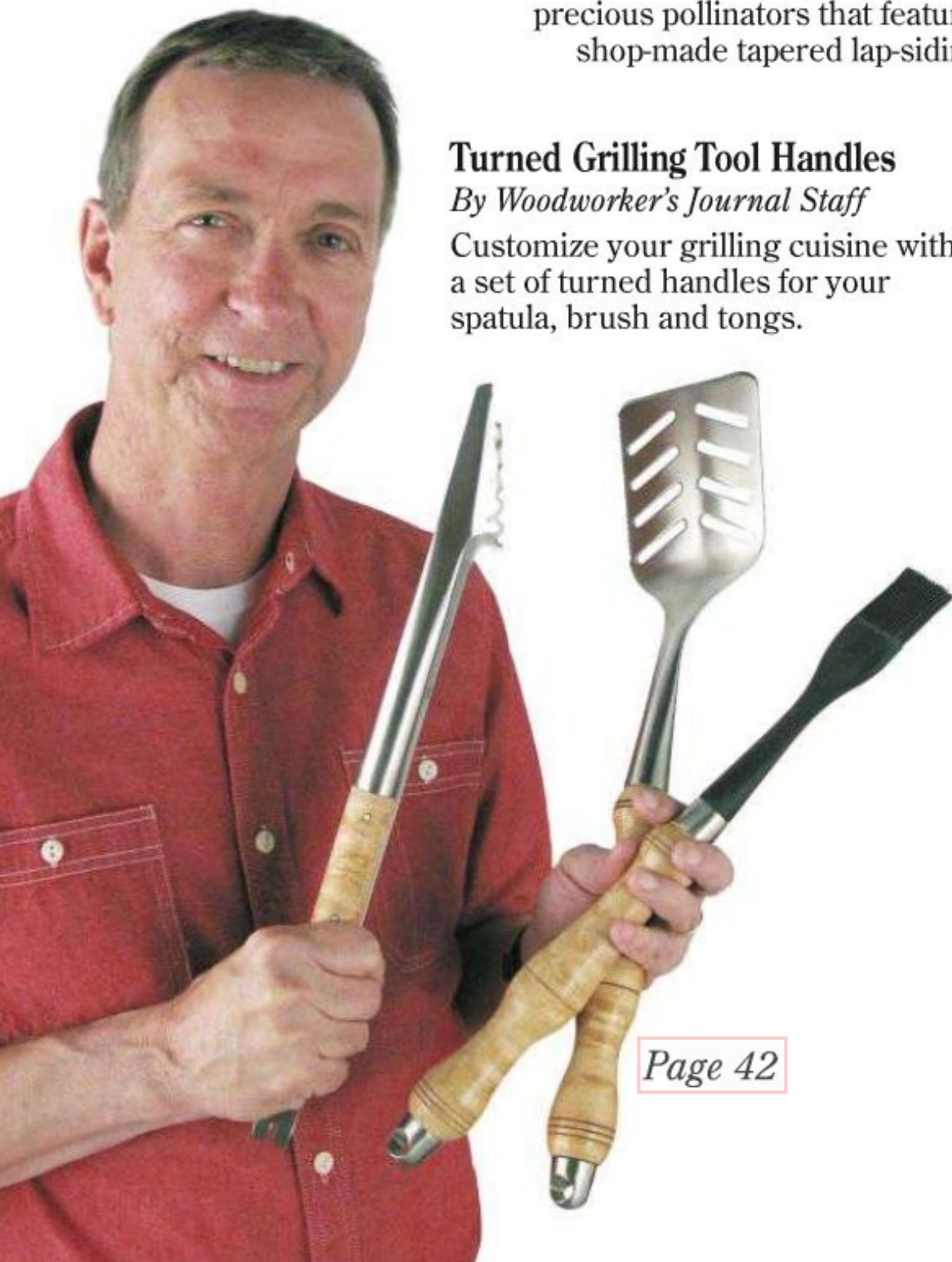
By Brad Holden

A fun-to-build backyard home for precious pollinators that features shop-made tapered lap-siding.

Turned Grilling Tool Handles

By Woodworker's Journal Staff

Customize your grilling cuisine with a set of turned handles for your spatula, brush and tongs.



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We Sweat the Small Stuff.

14
bx

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woodworkersjournal.com



I think you're holding out on us. Many of you have been sharing your favorite projects with us online, but I know there are far more that we haven't seen yet. Your work inspires both us and your fellow woodworkers, so we'd love to see more of it. We publish and share as many readers' projects as we can, whether in the Woodworker's Journal eZine or on our social media channels.

Here are the best ways to share the photos of your project:

1. Upload to Reader's Project Gallery at this link:
www.woodworkersjournal.com/readers-project-gallery
2. Post in the Visitor Posts section on our Facebook page by going here:
www.facebook.com/woodworkersjournal
3. Post on Instagram and tag us in the description by including our username, @woodworkersjournal

Can't wait to see what you build next!

On another note: this year's International Woodworking Fair takes place August 24-27. Keep an eye on woodworkersjournal.com and our social media channels for videos and updates during and following the Fair — we'll find the best new tools and products for your shop.

— Dan Cary



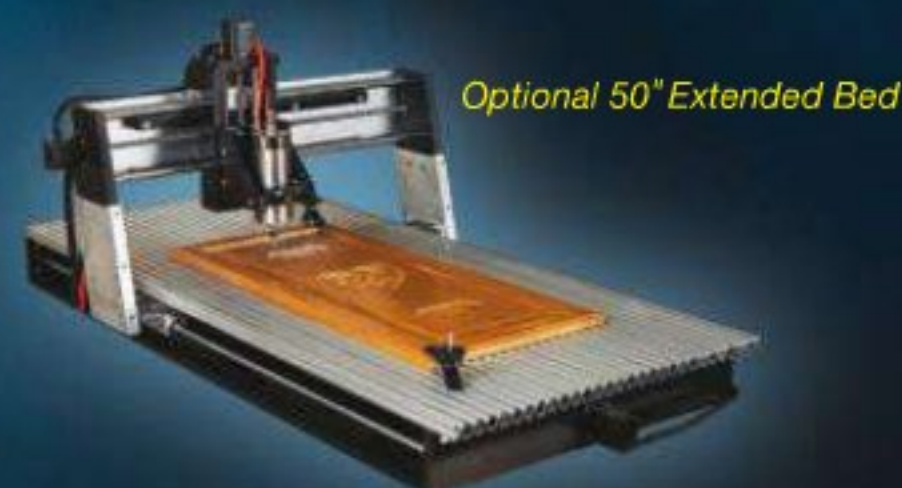


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Letters

Are You Feeling the Buzz?



WE'VE GOT A SWEET OUTDOOR PROJECT.

Over the years, we've published some really interesting outdoor-focused woodworking projects. A bat house, fishing net, birdhouses, an outdoor shower, fishing lures, canoe paddles ... you get the idea. It has long been my opinion that woodworkers don't stop woodworking in the summer — they just move outside. Last issue, we featured an Adirondack

chair, but this issue we're using woodworking skills to possibly sweeten up your life and maybe even help save the environment. Working with the folks from BackYard-Hive (backyardhive.com), we're publishing an easy-to-build and easy-to-use beehive — designed for backyards from urban centers to the suburbs and beyond.

Bees, and pollinators in general, have been having a rough time lately for a bunch of reasons. And when you think about it, it is in the interest of all of us to have a healthy posse of pollinators around, as all of us like to eat! When I saw what the folks at BackYardHive were doing, I thought this was a cool way that an everyday guy like me could be helpful to pollinators: have fun making an interesting project and maybe get some great-tasting honey in the bargain. After a phone call, Corwin Bell and Karen Sadenwater from BackYardHive were eager to help us in this effort to get the word out about supporting the bees and to get backyard hives spread all over the country. Check out the article on [page 28](#). I think you'll be as enthusiastic as I am.

— Rob Johnstone

"Real" Woodworking

This is in response to the letter from Tom Balph about CNC and laser machines not being real woodworking [*Letters*, April 2016]. Though these machines may not technically be woodworking, I think many people are missing the point and losing out on a resource to dress up and add to any projects you may be doing. I recently built a humidor and added nine carvings to the box with my CNC machine. I still think of myself as a woodworker but with the added benefit of carvings that would otherwise be unobtainable.

Dave Hebert
Johnstown, New York



Reader Dave Hebert made the carvings on this humidor with a CNC.

I find it interesting that some try to narrow down "woodworking" into little boxes like the "no power tool" box, or the "home construction isn't woodworking" box or the "there isn't a screw or nail in it" box. Most recently, the

Continues on [page 10](#)...



Digital image courtesy of Ale-ks/Bigstock.com

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Letters continued

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MORE ON THE WEB

Check online for more content covering the articles below:

Woodturning (page 20):

Turning a Greek Doric column to create a fern stand (video)

Beehive (page 28):

Using a specialized push block to safely cut top bars (video)

Storage Ottoman (page 36):

Upholstering process, step-by-step (video)

Turned Grill Set (page 42):

Split turning technique (video)

Technology & Woodworking (page 46):

Overview of Bosch REAXX Portable Jobsite Table Saw (video)

Tool Review (page 48):

See the 18-gauge cordless brad nailers in action (video)

Weekend Projects (page 56):

Notching dovetail sliders; installing shelf hardware (videos)

Finishing Thoughts (page 70):

Info on using pore filler; buffing a finish (video)

"laser or CNC isn't working with wood" box. Pshaw! If you work with wood, then wouldn't you be a "woodworker"?

These machines will never replace the craftsman's hands. You still have to put the engraved pieces together somehow.

Steven Reid
Coarsegold, California

Where the Vise Goes

I have to respond to "Where does the vise go?" in the April 2016 issue [Questions & Answers].

Having made and sold many of the cabinetmakers' benches of the past: you will note the front vise is on the left front with the tail vise on the right end. This was the standard for the cabinetmaker's benches made. At the time, there was never a question as to right- or left-handed.

We made and sold the benches to just about all



Helical cutterheads on 8" jointers can be a great boon to woodworkers.



the furniture manufacturers in the country. We stopped making the benches when the demand stopped, about 1970 or so. See what happens when us old guys are still around to remember "the good old days"?

Yes, I have one of the original benches and hand screws, which I use. Cut up and bruised, but still in working shape.

Paul F.C. Despres
Rockford, Michigan

went "helical" but bought a conversion kit and upgraded my straight-knife machine. I can say that my "new" jointer runs quieter, has less vibration and does a better job than my "old" machine. And besides saving money, I especially like that I didn't have to either junk my old machine or try to sell it.

Ken Horner
Morgan Hill, California

8" Jointers: Worth It?

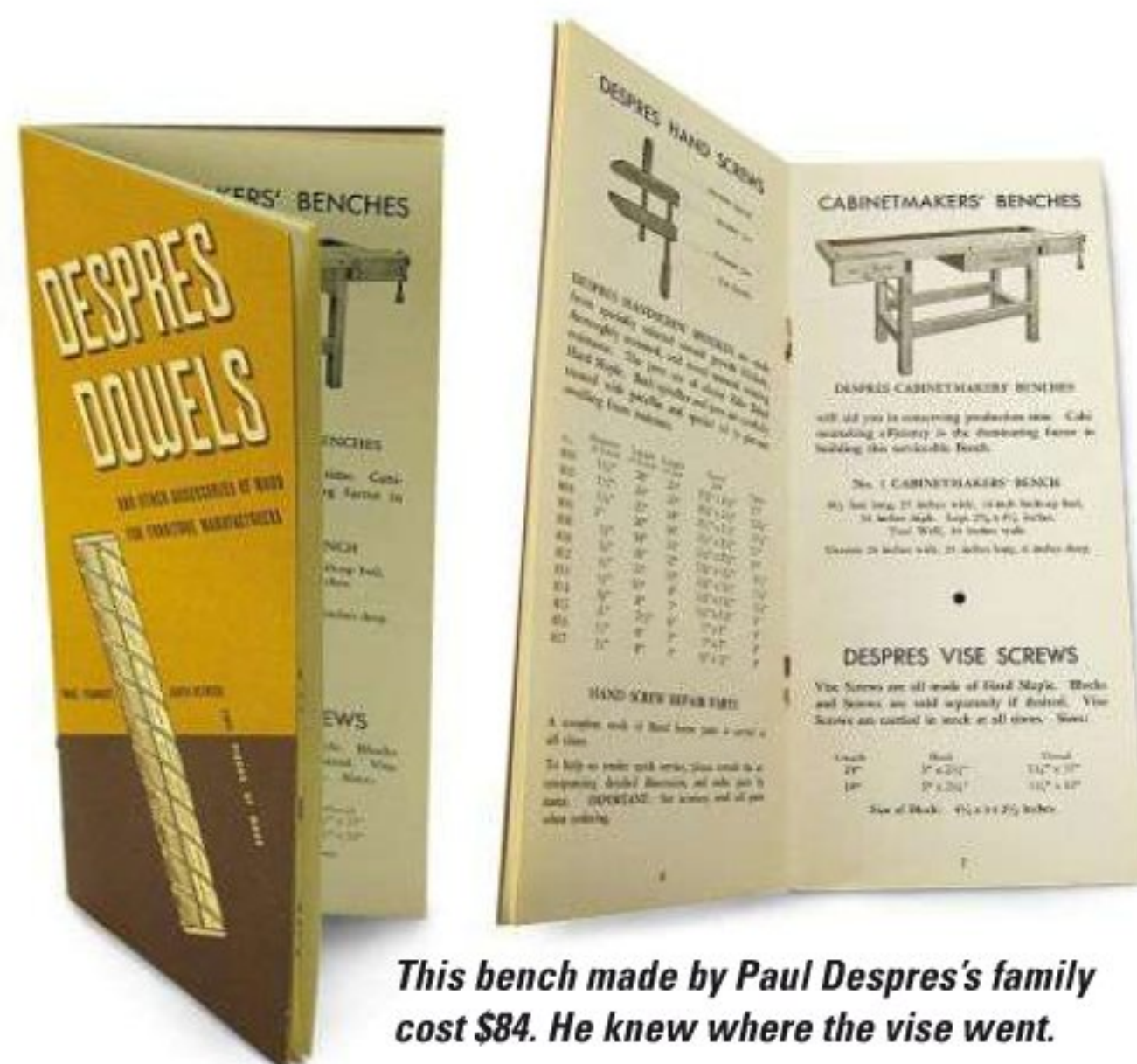
In the *Tool Review* article "8" Helical-head Jointers" [April 2016], Chris Marshall advocates junking our old straight-knife jointers and buying new helical-head models. Chris does mention that we might gasp at the price but thinks they are worth it considering the ease of fixing nicked edges (just rotate the affected carbide inserts), the clean cuts on gnarly wood, the lack of tearout and the absence of maintenance in getting all the knives cutting on the same plane.

I agree on all the reasons to change to a helical head — except for pushing my old JET 6" jointer out the door and buying a new machine. Some years ago, I

Why would any sawdust making artist want a \$3,000 big jointer for a hobby? I think that I can count the times in 40 years, on my fingers and toes (still have all of them) that I have used a jointer to flatten a board. Primary use was to true an edge prior to cutting to width.

A fairly new to woodworking person could take that same \$3,000 and buy a good quality table saw, 4" or 6" jointer, 13" planer and router. Probably with change left over. That behemoth in the article is for commercial use, and in a hobbyist's shop is nothing more than a "prestige tool."

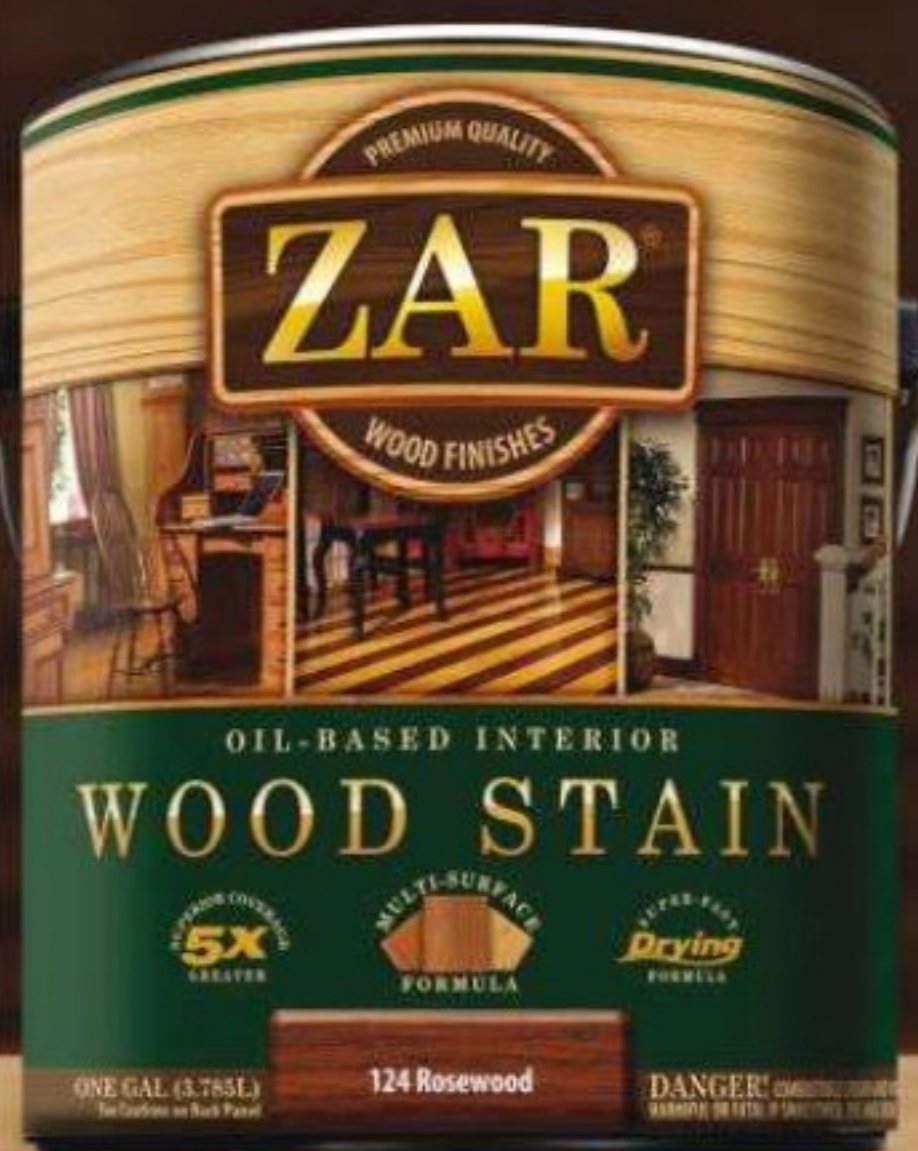
Jim Gier
Payson, Arizona



This bench made by Paul Despres's family cost \$84. He knew where the vise went.

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Tricks of the Trade

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Just What the Doctor Didn't Order

Recently my wife was cleaning out a closet and came across a box of tongue depressors she was going to throw away. Instead, I recycled them for shop use. I use them all the time now for mixing and spreading putties and epoxy, and they're perfect for stirring those little half-pint cans of stain for small projects.

Sterling Achee
Biloxi, Mississippi



Golf Ball File Handles

The best handles for files, by far, are old golf balls! Just drill a hole in the ball that's a little smaller in diameter than the file's tang, and pound the file into it. A golf ball fits perfectly into the palm of your hand and makes it easier to control how much pressure you're applying to the file.

Richard Turnzo
Pittsburgh, Pennsylvania



Coffee to Go, with Free Glue Applicators

Typical glue brushes are too soft for spreading glue onto the walls of mortises, and they can be hard to squeeze into tight spaces. Scrap wood applicators work better, and here's where you can get them for free. The next time you buy a hot beverage, save the wooden stir stick for glue-ups instead of immediately throwing it away. Wash it clean, and keep it with your glue supplies. It'll reach into corners where a brush won't.

Charles Mak
Calgary, Alberta

Coat Hanger Bits Align Screw Holes

Ever have trouble lining up the screw holes when reassembling project pieces? Here's a simple solution: cut some straight pieces from a metal coat hanger and insert them into the screw holes as guides for aligning the adjacent parts. Pull them out, one at a time, as you install the screws. Then be sure to save them for future projects.

Bill Mechanick
Plano, Texas



PICK OF THE TRICKS



Re-using Lacquer Thinner

I use lacquer for most of my project finishes. When cleaning my spray gun, I go through three rinses. It troubled me how much lacquer thinner I was wasting in the process. Well, here's how I now waste less. I save the rinse material in a can marked "Used Lacquer Thinner." It can be reused in two different applications — either to thin down more lacquer for spraying or as the first rinse when I clean the gun again.

Roger Mickelson
West Burlington, Iowa

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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Or send us an email:

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Questions & Answers

Compressor Care

THIS ISSUE'S EXPERTS

Ernie Conover is the *Woodworker's Journal* woodturning columnist. His Hand Plane video series is available in the Premium content section of our website at woodworkersjournal.com.

David Shumate is a product manager for Senco.

Q While cleaning my shop, I happened to look at the tag on my air compressor and its construction date was 1994. I've always drained it after use and there are no outward signs of rust, but I'm a little concerned about its age. Are there any rule of thumb type thoughts on when a compressor should be replaced?

Michele Miller
Paulsboro, New Jersey

A Always refer to the owner's manual for your air compressor to ensure proper and safe operation. You are off to a great start by draining the tank of any water that has built up inside it. This should be done after each use. The most important thing is that if the air tank develops a leak, replace the air tank immediately. Never repair, weld or make modifications to the air tank or its attachments.

You should inspect your air compressor for signs of obvious or concealed damage. Ensure all of the guards and coverings are in place and not damaged. You should also make sure all safety valves are working correctly. Do not use the air compressor if there are any signs of damaged, missing, or non-working parts.

There are a lot of factors that will contribute to the life of an air compressor. For

instance, periodic indoor use, versus daily jobsite to jobsite use by professional contractors, will greatly increase the years of service one can expect from their compressor.

In addition, never place objects against or on top of an air compressor. Operate an air compressor at least one foot away from any wall or obstruction that would restrict proper ventilation.

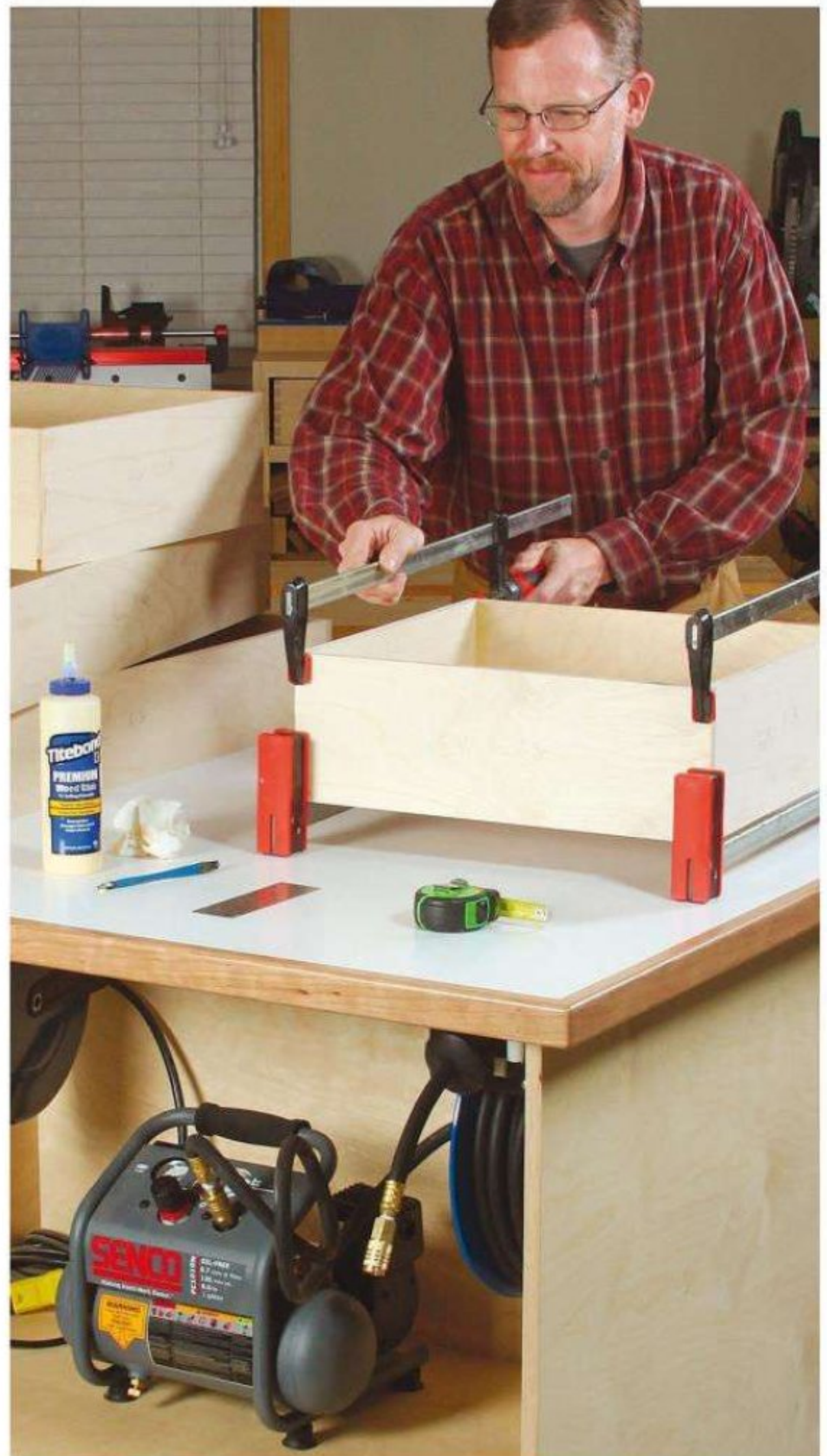
A properly maintained air

compressor should deliver years of service.

— David Shumate

Q What is the difference between a low-angle block and a standard block plane? What would be the advantage to having one or the other? I am getting into more traditional hand tools and I am wondering which one I should purchase first.

Matt Miller
Kerrville, Texas



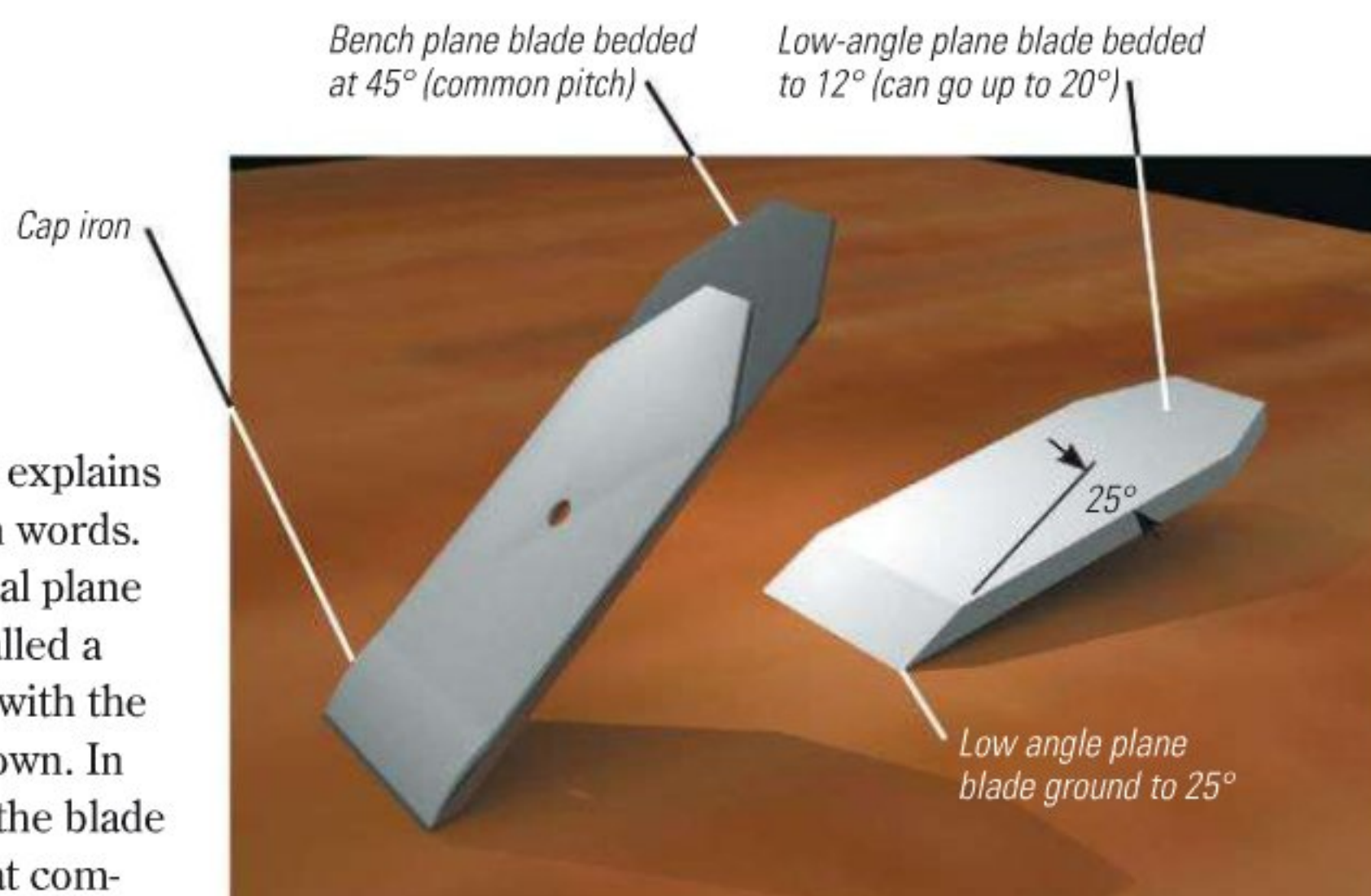
A My illustration explains this better than words. The blade of a normal plane at the left, what is called a bench plane, works with the bevel of the blade down. In most bench planes, the blade is bedded (angled) at common pitch (45°), but planes for difficult wood are bedded higher at York pitch (50°).

This blade also has a cap iron, which breaks the fibers of the chip immediately behind the cut. Without the cap iron, the cutter is more likely to become a wedge when working against the

grain and break bits of wood out ahead of the blade, a condition called tearout. You can see this phenomenon around a knot on a power surface-planed board.

A low-angle plane was originally intended for end grain work. It works with

the bevel up but is bedded to between 12° and 20°. With a 25° bevel, the angle of attack becomes 37° or 45°, depending on low or high bedding angle. This offers the opportunity for this plane blade to be more aggressive than a standard plane.



Winner!

For simply sending in his question about low-angle vs. standard block planes, Matt Miller of Kerrville, Texas, wins a **General International 7-piece Deluxe 8" Dado Blade Set** (item 55-185).

Each issue we toss new questions into a hat and draw a winner.

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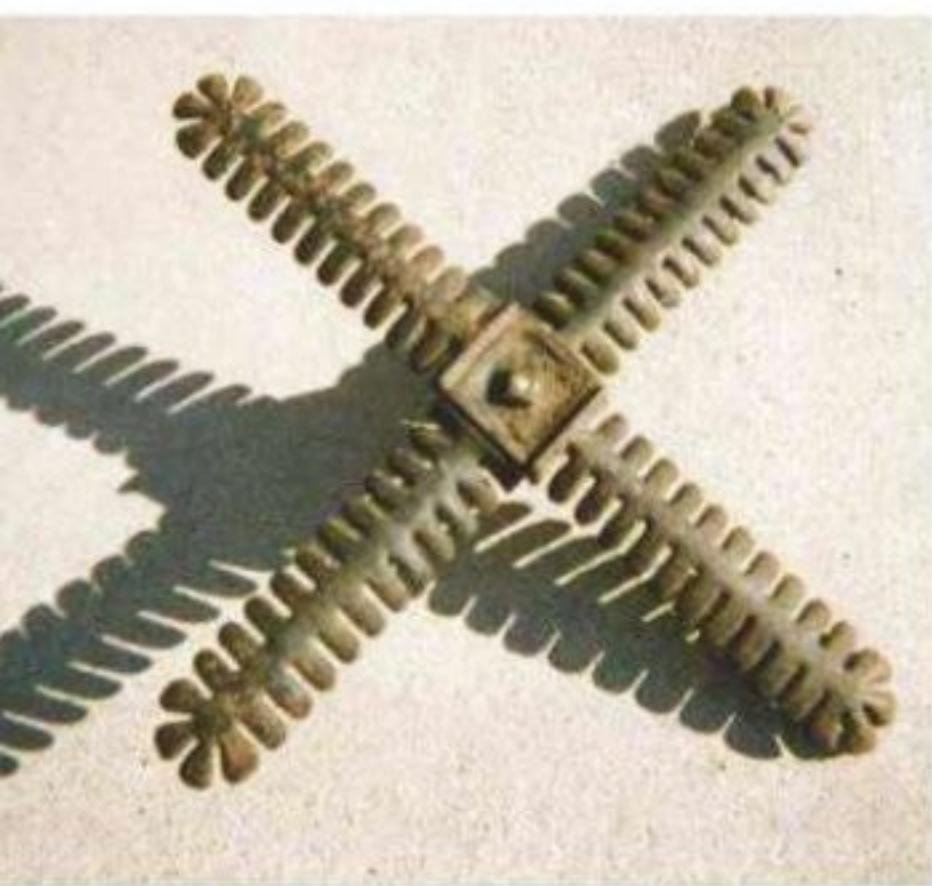
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Stumpers

Still a Mystery

Sadly, it seems there are no Sherlocks here.

"Is this a dagger which I see before me, the handle toward my hand?" Probably not ... but no other good IDs for the tool found in Scotland have come through.



What's This?

Ben Cowling of Roca, Nebraska, displays this tool in his living room, but that's not where it was used.

Do you know what it is?

Send your answer to stumpers@woodworkersjournal.com

or write to "Stumpers,"

Woodworker's Journal, 4365 Willow Drive, Medina, MN 55340 for a chance to win a prize!



Woodworker's Journal editor Joanna Werch Takes compiles each issue's Stumpers responses — and reads every one.

It seems *Stumpers* readers are really slowing down on your game! For the second time in a row, we do not have a positive ID on a mystery tool. Back in the April issue, **Bob Frederick** of Beverly Hills, Florida, showed us a tool he had found in a Scottish mansion. It remains a mystery ...

One of the most likely responses came from **Damon Maglietta** of Lakeport, California, who said the tool "is used to lift the trigger plates on old traps used for catching animals by the leg (ouch!). The trigger plate has a small loop in the center that the tool snaps onto to keep your fingers out of danger when setting the trap."

Unfortunately, we couldn't confirm that answer (and we even consulted with a British traps expert!). Sometimes, it's hard to take responses to *Stumpers* at their words. For instance, I'm sorry to tell **Wayne Thurman** of Hicksville, Ohio, that it is not a handle for old cast-iron clothes irons. I have one of those old irons and handles, and Bob's tool, not to mention not looking anything like the curved handle, frankly doesn't seem sturdy enough to prevent dropping one of

those cast-iron honkers on your toe (talk about ouch!).

Now, **Russell O'Neill** of Cape Town, South Africa, said the tool "looks very similar to the button clamps found on industrial sewing machines, and this tool could have been used to hold the button blank while drilling the holes." Again, possible, but no confirmation. You do realize the *Journal* staff has other jobs besides researching *Stumpers* mysteries, right? Maybe someone with a bit more time on their hands — like, for instance, some retired people — could put forth a little more effort.

And, a couple of people, like **Fil Fina, Jr.** of Saratoga Springs, New York, thought the tool was "for installing valve keepers in L head automobile engines." If so, it sure doesn't seem to work in any way like the valve keeper tools answered in the December 2006 and April 2007 issues.

Until next time ...



Winner! Jim Davis of Reston, Virginia, wins a RIDGID 18V Stealth Force Pulse Driver Kit (R86036K). We toss all the *Stumpers* letters into a hat to select a winner.

Questions & Answers

continued



The low-angle block plane is named after its common task of resurfacing butcher blocks.

By the way, the name "block" is connected with low-angle planes because butchers commonly used them to clean up their chopping blocks, which have end grain for the top surface. Between 1915 and 1923, Stanley offered a low-angle block plane bedded at 12° called the #64 Butchers Block Plane. Still, many more tradesmen have used a small block plane to clean up end grain and break edges. Many carpenters still carry one in their nail apron.

Good block planes have a mouth that adjusts by sliding a plate in the sole. Plane aficionados are honing the blades of their low-angle planes to as much as 38°, making their attack angle 50°. Many feel that this high angle, combined with the ability to close the mouth opening to as little as .003", makes them perform ahead of the pack.

Theory says a standard, bevel-down plane should do better, but I am a card-carrying member of the low-angle club. It is all about mouth opening. Buy the 12° low-angle block plane.

— Ernie Conover

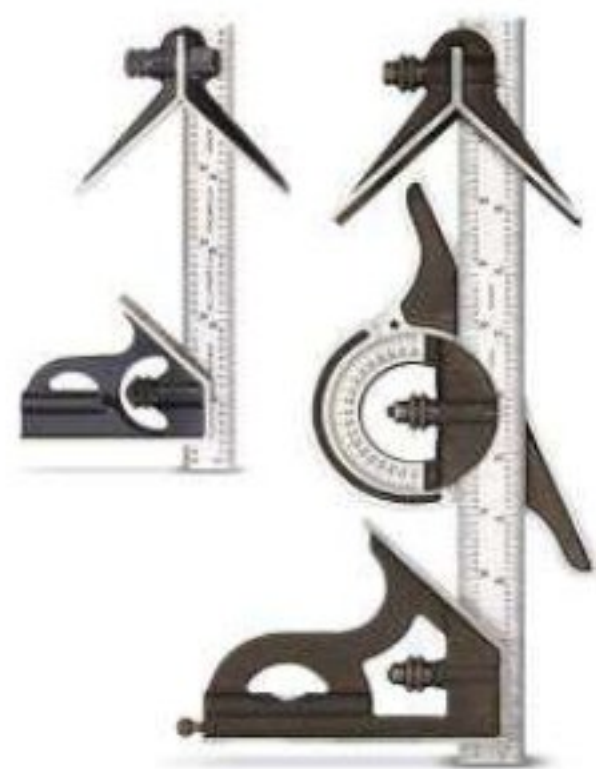
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The "Arts of War"

Side View



Rear View



This helmet from the North American Northwest Coast was carved from a single block of dense wood. It represents a killer whale and was fitted over a fur liner for comfort.

Wooden Weaponry Artifacts Put Craftsmanship on Display

Every woodworker knows that each project has its own requirements. Making a rough box for a barn is very different from making an altar for a grand church. Currently an excellent exhibit

at the Peabody Museum at Harvard University is exploring design decisions involved in fashioning weapons. There are over 150 objects, including spear throwers, shields, edged weapons, body armor, clubs and headgear in an exhibit called "Arts of War: Artistry in Weapons across Cultures." Many were designed to be used in battle, but some may have been designed to be ceremonial or threatening rather than for actual use.

The exhibit was curated by Dr. Steven A. LeBlanc, archaeologist and director of collections (retired) at the Peabody Museum. "People had been urging me to do an exhibit of the war implements in the museum's collection, but I was reluctant because it would just be an exhibit of weapons. Then, I had the realization of the amount of work put into weapons, but not their everyday tools, farming and cooking implements. This was true all over the world."

Describing his choices for the exhibit, LeBlanc said, "I

The binding on this painted shield from Papua New Guinea is made with cane. Shields from this region were used both ceremoniously and in war.



The painted wooden shield at left is from the coastal people of Papua New Guinea, who had a great variety of shield designs and shapes.

Images this page: © President and Fellows of Harvard College, Peabody Museum of Archaeology and Ethnology; helmet PM# 69-30-10/1590; shield at left PM# 33-32-70/130; shield at right PM# 91-6-70/50509



This club from the Nishga of northwest British Columbia is made of carved wood augmented with teeth.

Part of a bear mandible is attached to the sheath of this AINU knife from the Kuril Islands between Japan and Russia. The knife was collected in 1896.

Gift of Mrs. N. E. Baylies. © President and Fellows of Harvard College, Peabody Museum of Archaeology and Ethnology, PM# 96-3-60/47866.1.

would only use artifacts that were beautifully made, with beautiful shapes, but were also functional. The objects had to be chosen from all societies and multiple continents to show the universality of weapon decoration. The distinctive designs of these war implements had nothing to do with functionality. They would have been as effective as weapons without special designs or symbols.”

The objects in the exhibition cases are grouped by type, not by a culture or geographic location. “There is a mix of cultures in every exhibit case. I did not want it to appear that any group was more warlike than the other. We were able to use the vast collections stored at the Peabody Museum, but we did have a problem with condition. Wood doesn’t last forever, and these objects had actually been used and were beaten up. We chose the best for the exhibit,” said LeBlanc.

LeBlanc described the construction process, “Woodworkers would start with a tree trunk as one piece, using whatever amount of wood was needed for the weapon. They did not have

planes, but used adzes to reduce the wood. Their main tools were adzes. Big adzes started the initial heavy work of hewing out the trunks. Then they would switch to smaller adzes for the finer work. Chipped stone was a prime tool.”

They did not have reliable glues, so implements had to be made from whole pieces of tree trunks for strength. They did have drills and you can see the holes, for example, in connecting wooden armor panels. Trade with the wider world introduced metal. Iron objects became a monetary medium of exchange. They utilized metal wherever they could get it, taking to the new technology immediately. LeBlanc points out that “they kept their cultural design traditions even with the addition of metal items.”

The coming of metal allowed finer, more precise, woodworking and carving. They used side sharpened pieces of metal. Stone was not used for very fine work. Even heavy-duty glass

covers used on electrical and telegraph wires were put into service, but metal was the only tool better than stone. Northwest British Columbia groups and some other populations had access to meteor pieces to use in their weapons.

The exhibit offers speculation on human nature and its ability to combine beauty with the hard fact of war. Evident in the work is both craftsmanship and a demonstration of human ingenuity when new technologies are introduced.

For more information and to view the objects, visit <https://www.peabody.harvard.edu/node/971>. The exhibit is on display at the Peabody Museum of Archaeology and Ethnology at Harvard University, Cambridge, Massachusetts (phone 617-496-1027) until October 18, 2017.

— Helen Hannon

Northwest Coast peoples made the most intricately carved spear throwers. On this Tlingit example, dating prior to 1819, both sides are decorated.



Gift of the American Antiquarian Society. © President and Fellows of Harvard College, Peabody Museum of Archaeology and Ethnology, PM# 95-20-10/48390.

Woodturning

Grecian Columns: History and Turning

By Ernie Conover

Used in architecture for centuries, the column (in particular, the styles categorized by the ancient Greeks) remains a valuable component of furniture building, especially if you turn your own.



Hayden Hall at Western Reserve Academy in Hudson, Ohio, is a splendid example of Greek Revival architecture.

In architecture, a column used as a vertical support is as old as civilization. Columns, however, do not always bear load: architects often use them for purely decorative purposes or to delineate space — think about public buildings where columns are used in parallel rows to form pathways or in circles to form gathering spaces.

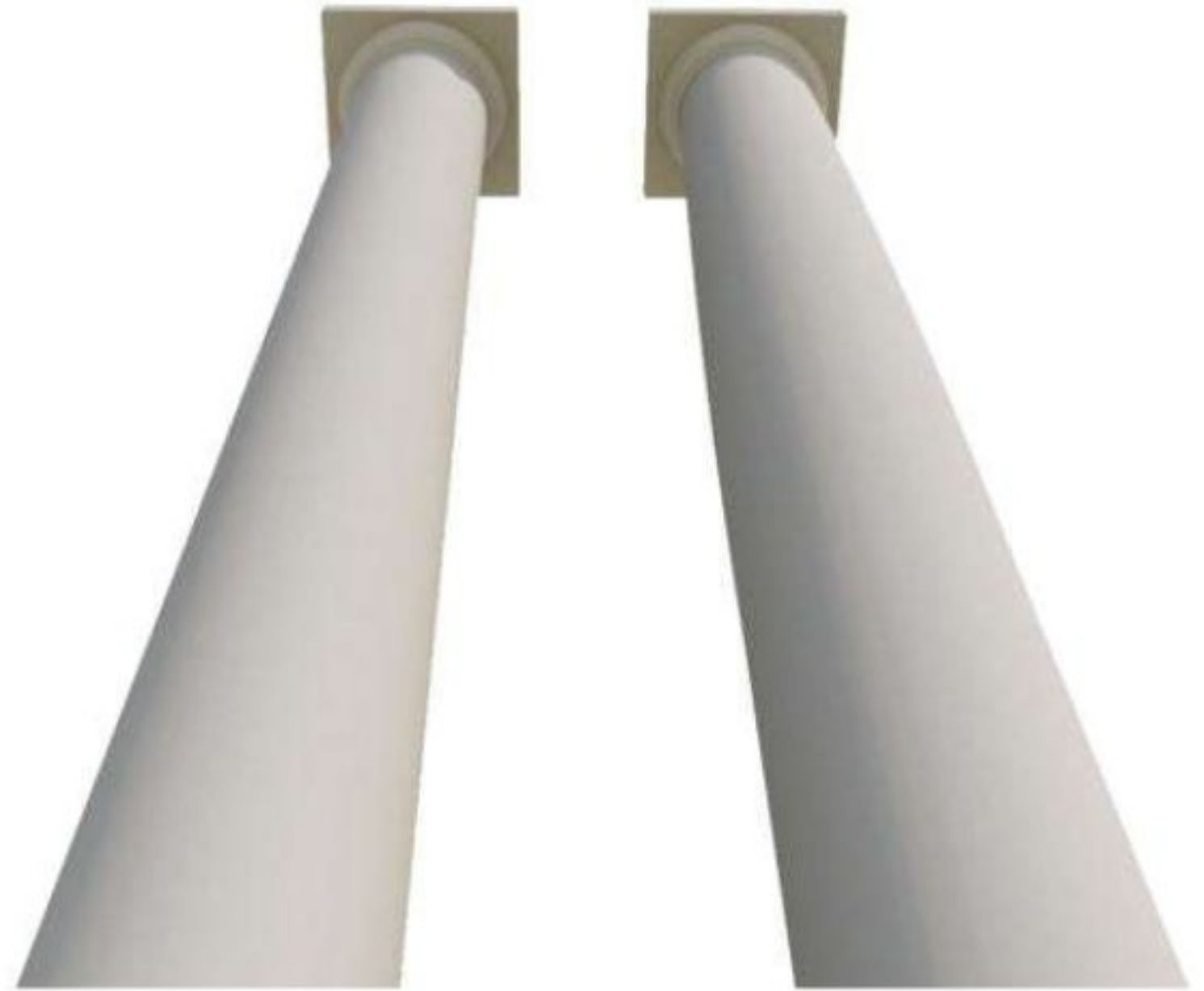
Columns are also used extensively in furniture, where they can support case pieces and frames, such as beds. They are used as a motif in things like music stands, fern stands and display tables. Engaged columns (half a column placed against a flat surface) are frequently applied to the face of chests of drawers and clock cases.

Later in this article, I'll tell you how to make a fern stand as an exercise in turning columns. First, however, it's time for a lesson in history.

Greek Origins

Technically, any vertical support, whether square or round, could be called a column. Most of us think of columns as round, however, because the ancient Greeks

Here, you see two 1'-diameter x 9'-tall Doric columns with architect Steve Oles for scale. The left column has a straight taper from the one-third point upward, while the right one has a gentle convex curve called an entasis. The entasis improves the look from afar.



Standing close, the straight taper on the left looks concave, while the entasis taper on the right looks correct. The entasis taper has corrected our visual perspective.

came up with classifications of round column styles we still use today. The Greeks' column styles not only beautified these essential building supports, they also developed a shape that corrected perspective, no matter where the viewer is standing. The Romans later adopted the Greek styles — and today's architects are still using them.

The Greeks created an entasis taper. At about one-third its height, a column's taper narrows inward to its capital (the decorative top). Sometimes the capital is placed directly on the column that's supporting it; sometimes a square plate, called an abacus, is interposed between the column and the capital to broaden the support.

The Romans sometimes also tapered the column downward toward the plinth, the square block that better distributes the load to the foundation. This convex entasis taper corrects the illusion of curving inward that a straight taper appears to have.

While scholars have tried to come up with mathematical formulas for the entasis taper, there is no evidence that the ancients crafted it in any way other than by eye. That's the way I have always made columns: get the ratio right, then just turn a slight bulging taper. See the illustration above.

Greek Revival

About the time of the founding of the U.S., Greek Revival architecture became the predominant style, especially in public buildings. It spoke to the egalitarian ideas of the new republic. Greek Revival looked back to the Greeks' temples for its inspiration, so the facades of Greek Revival



This photo of the author's home shows a fireplace wall in the Greek Revival style. The columns are purely ornamental but carry the Greek Revival theme.

Woodturning continued



As you see here, many Greek columns have a molding called an astragal just below the capital (the decorative top of the column), which here is a shouldered bead.

buildings are stylized temple fronts. Outside columns define the portico (from *porticus*, the same Latin root word that gives us “porch”) of a temple. Many churches and synagogues you can see today get their exterior look and feel from Greek Revival styling. The style was carried to the inside of buildings with things like fireplace surrounds also looking like temple ends.

So, what did Greek temple fronts look like? They, as well as Greek Revival buildings, often have massive columns

of large diameter towering multiple stories. This is because a wood or stone column will buckle (bend sidewise) when the length exceeds 11 column diameters. Therefore, a column necessarily has to get bigger in diameter as the height increases. A 6'-diameter column can go to 66 feet without buckling. Of course, Greek columns taper, but the taper is quite slight, and the diameter stays hefty toward the bottom, where it counts. The most slender columns are about a 10:1 ratio.

Flutes, Astragals

Most of the stone columns you see, whether classical Greek or modern, are fluted with about 20 flutes. In my observations of a lot of Greek Revival architecture, I have noticed that most wood columns are not fluted. However, if you want to flute a wood column, there are lots of router jigs that can be used in conjunction with your lathe to do the job handily. You simply use a core box bit of appropriate size.

If you plan to turn a wooden column, you will also want to consider that most Doric columns and some of the other styles have a molding, called an astragal, just below the capital. The astragal (photo above) molding is a raised band with a bead centered on it.

The author and his wife, Susan, felt Greek columns kept openness above their tub knee walls while defining space.

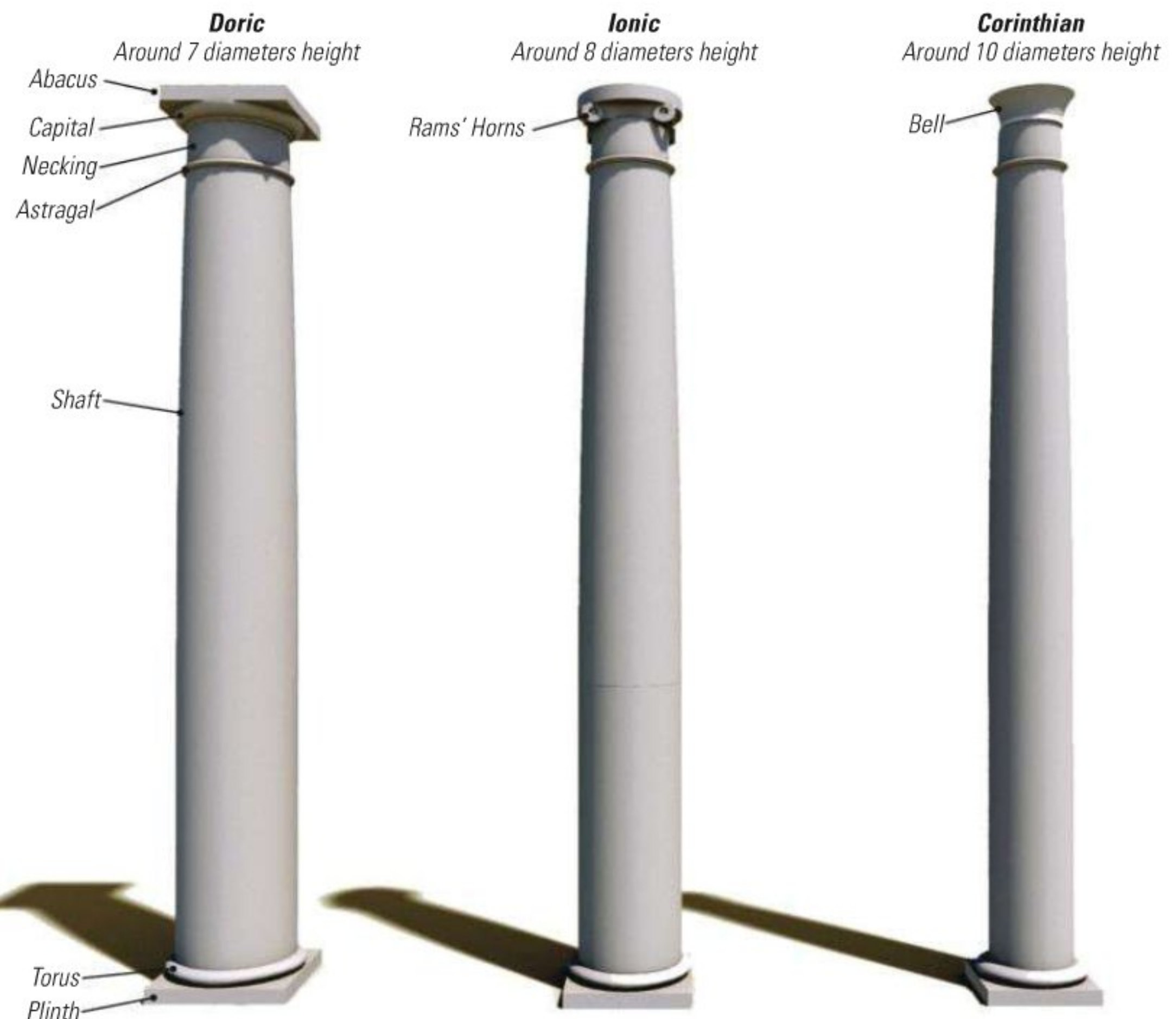


Grecian Column Orders

Each of these orders (classifications) is progressively more slender and graceful, but all are under 11 column diameters so they can bear loads up to the compressional limit of the material. The stubby proportions of the Doric column, at 7 diameters, lend themselves to furniture supports and the fern stand in this article. Ionic or Corinthian columns are better for engaged columns applied to furniture.

The diameter at the plinth and under the capital are also a ratio based on the height of the column. For columns up to 15' (all furniture columns), it is a top to bottom ratio of 5/6.

Most furniture columns are no more than three feet, so I am not afraid to adjust the ratio to make the taper look right. This is to say that 5/6 is a good starting point — but trust your eye and turn what looks good!



Doric Column Fern Stand

Speaking of turning wood, it's time to get back to that fern stand I promised. As an exercise in turning columns, I thought we would make a fern stand which is useful to elevate anything from plants to artwork. The support is a 31" Doric (it has a circular capital at the top) column with an astragal. The base is inspired by a temple portico with steps up to the column. The top is simply a square of wood, but you can scrape a pocket for the pot or artwork you want to elevate to make the elevated item less prone to gravity. You can often find a plastic tray at a garden store that you can scrape the recess to fit so that haphazard watering will not cause problems.

You will need to find an appropriately sized piece of wood: most functional Doric columns are at least 4" in diameter. I turned the column for this fern stand to 4½".

Starting at about a third of the way down the column, I used a sharp roughing-out gouge to turn the bottom third to a nice, smooth finish.

Use a beading and parting tool and a set of calipers to establish the diameter just under the capital of about 3¾". Make sure you plan for the astragal during your layout, because it is hard to put wood back if you turn to the final taper from the get-go.

You'll then remove the wood between the astragal and the capital; this area is called the necking.

If this is your first column, it may be useful to draw it full-size first to get the taper right. A piece of shelf paper is great for this task. Draw a centerline, followed by the base diameter of 4½" and the diameter under the capital of 3¾". Now carry the 4½" to the top. From one-third the height, draw a diagonal line to the capital. Draw the entasis

by flexing a thin strip of wood between the 10" height and the 3¾" line just under the capital. The entasis must always lie between the two straight lines. Find points to take caliper measurements in the *Drawing* on [page 24](#). Once you have more experience making columns, you can do this by eye.

Remove wood to create your desired taper, then move to skew work.

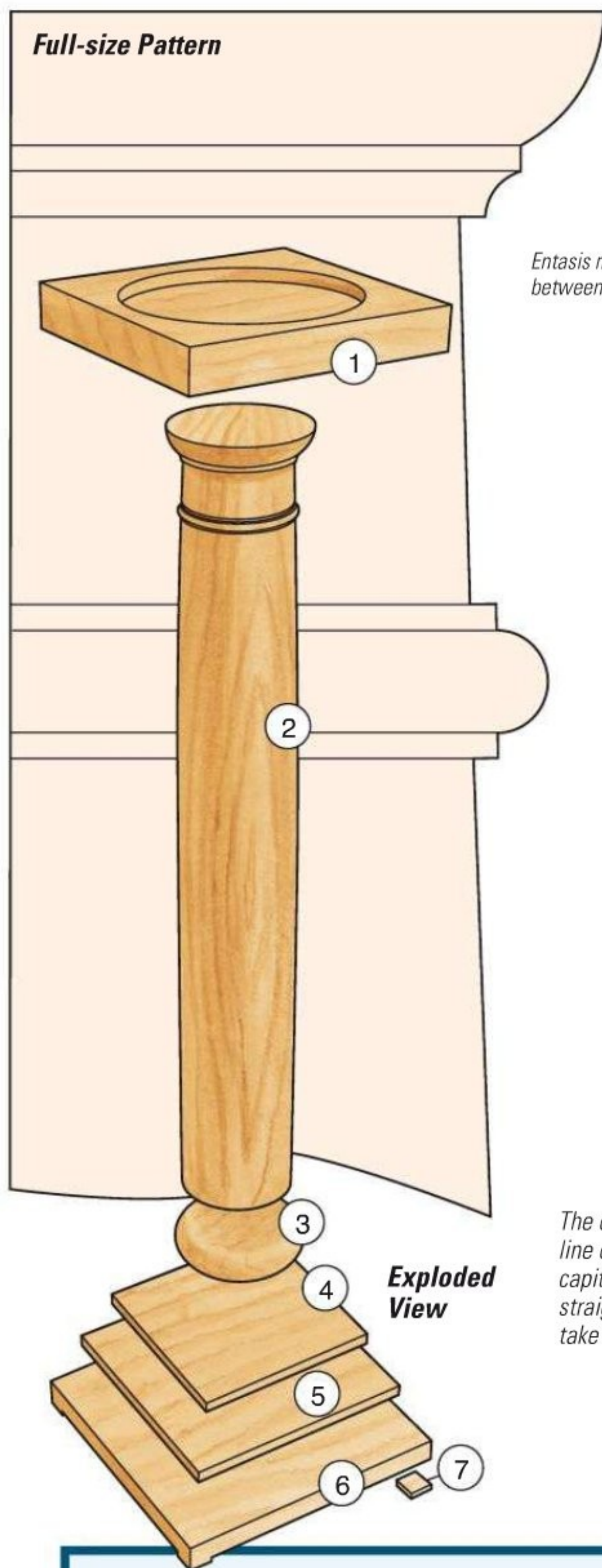
The astragal for this fern stand is a 1/2" bead with a shoulder on each side. Use

With experience, the author can make Doric column fern stands in a variety of heights and keep the proportions looking good.



Woodturning continued

Full-size Pattern

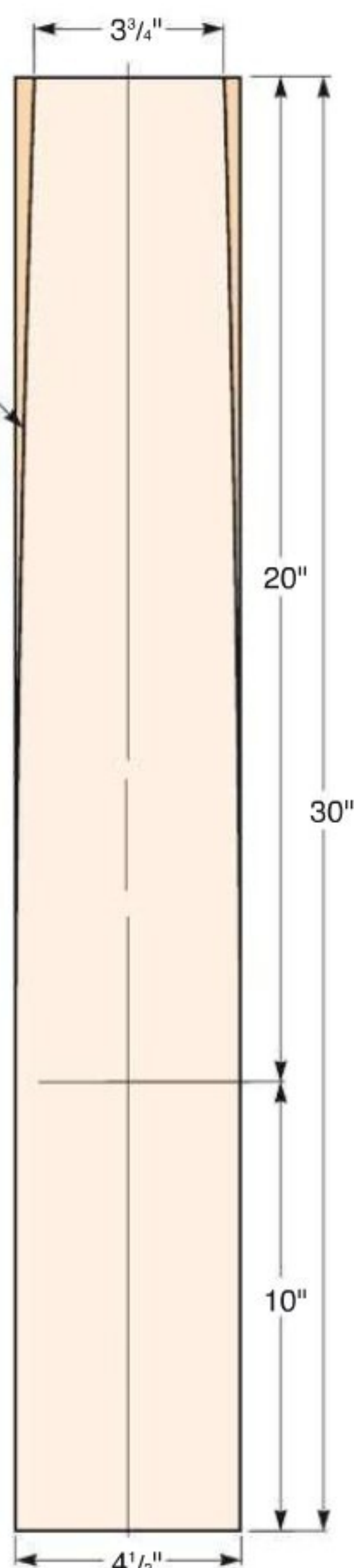


Exploded View

MATERIAL LIST

	T x W x L
1 Top (1)	1½" x 9¾" x 9¾"
2 Doric Column (1)	4½" x 32"
3 Torus (1)	1" x 5¼"
4 Third Step (1)	1/2" x 8" x 8"
5 Second Step (1)	1/2" x 10" x 10"
6 Base (1)	1" x 12" x 12"
7 Feet (4)	1/4" x 1" x 1"

Entasis must be between two lines



The drawing above shows a centerline and a diagonal line drawn from one-third the column height to the capital. The entasis taper must always lie between two straight lines — here, we give you reference points to take caliper measurements.



Elements of Greek architecture add the style to this simple fern stand project.

the beading and parting tool to bring the shoulder down to just proud of the column. Make sure your shoulders are the same height on both sides. Then turn the bead with a spindle gouge.

I also turned the capital with a molding at its bottom edge.

The torus is a disk of wood with a half-round bead faceplate turned on the edge.

To create the base, I glued pieces together to form the steps. I used four 1/4" x 1" x 1" blocks to create feet for underneath the base.

To assemble the base, the easiest way is to drill a center hole in each piece and use a dowel to center everything during glue-up.

The fern stand is best painted. Greek columns are all about form, and paint better carries that message. Have fun and trust your eyes while experimenting with the column, an ancient — but still relevant — form.

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

MORE ON THE WEB

For a video on turning a Doric column to create a fern stand, please visit our website at woodworkersjournal.com and click on "More on the Web" under the Magazine tab.



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Reader's Survey

Clamps

By Woodworker's Journal Staff

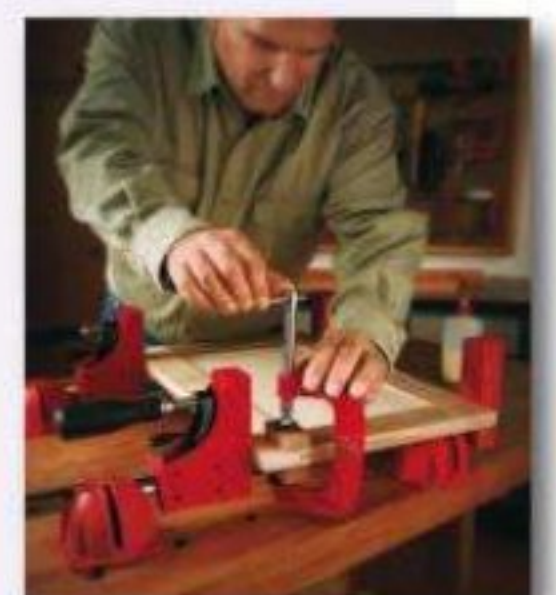
Woodworking is a wide and varied hobby. Regardless of what type of woodworking you happen to do, more than likely you use clamps — a lot of them!

There's room for more ... When we asked our survey group how many clamps, of any type, they had in their shop, the largest percentage **(23.6%) said 21 to 30**. You've got a long way to go to catch up with the **16% who have 61 or more ...**

When gluing up miters, woodworkers are about evenly split between who does and doesn't use a specialty miter clamp: **46% no, 45% yes**. (The rest just don't glue up miters.)

The most-owned brand of clamps is **IRWIN**, at **20%**. Next is **Adjustable (Jorgensen, Pony)** clamps at **17%**, **Bessey** at **15%** and **Rockler** at **12%**.

A clear majority **(80%)** of woodworkers use **clamping blocks** to accurately direct pressure during glue-up.





Most (39%) woodworkers use a variety of solutions to store their clamps. Among those solutions are shop-made clamp racks (38%), exposed beams or 2x4s (10%) and the ever-popular “in a pile” (2%).



The type of clamp most owned by woodworkers is the **C-clamp**, at **11%**. **Spring clamps**, **pipe clamps** and **quick-release style clamps** all came in at about **10%**.

Band clamps are definitely handy: **68%** of woodworkers use them when clamping irregularly shaped glue-ups.



A few odd uses for clamps, courtesy of our survey group:

A mallard duck stumbled into our backyard with half its upper beak ripped off. It couldn't pick up anything to eat. I fabricated an upper piece and, using a small band clamp, epoxy glued it to the remaining upper beak. A little file touchup, and two hours later the duck was eating fine.

Clamped a catfish as I cleaned it.

Clamped my belt sander to the bench to make a “stationary” sanding tool.

When my oldest son was two, he broke the childproof lock we had on the fridge. I used a pipe clamp across the top to keep it shut.

I overtightened three bolts on the transmission drain pan on my car and broke the heads off. When it started leaking, I used a tiny C-clamp to pinch the pan to the transmission housing until I could drive it to the mechanic to get the broken bolts removed.

I clamped my little brother to a post when we were kids.

Holding up my cane after surgery by clamping a C-clamp to a restaurant table.

Clamped a project to my bench, and then another board to the bench, and used wedges between the two (as I don't have a nine-foot clamp).

I had to clamp the head and shoulder on my granddaughter's doll.

A web strap around my stomach to ease the nerve pain from having shingles.

I have taken four K-body clamps and clamped one at each corner of a sheet of plywood to create a temporary table. The clamps serve as legs.

My broken finger. Two popsicle sticks, a small Bessey “F” style clamp and a trip to the emergency room (a long way away).

We have raccoons in our neighborhood. I keep a spring clamp on my

trash bin lid to prevent the raccoons from getting the lid open with their dang opposable thumbs!

The hose from my CPAP machine to our bedsheet. Use a little spring clamp, with a cable clamp screwed to one handle end. Does the job of hose control.

I used to use a C-clamp on the end of my barbecue's rotisserie shaft along with another clamped to the first C-clamp with counterweights to balance the shaft when barbecuing a turkey.

To hold a dolphin fin against the body — hard to keep the fin from leaning and finally coming apart.

Backyard Beehive

By Brad Holden

Help give honeybees a fighting chance, while honing your woodworking power tool skills.



Do your part to help the dwindling honeybee population, harvest honey in your own backyard and get some woodworking in to boot. While making this working beehive, you'll learn how to make your own tapered lap-siding and polish up your general angle-cutting skills. For detailed instructions on the setup and use of your hive, visit backyardhive.com.

Building the Box

Start the project by laying out and cutting the two hive ends (pieces 1) to shape (see *Drawings*, page 30). Then use one of these workpieces to set your table saw's blade tilt angle for trimming the top and bottom edges of the hive



Quite unlike other square beehive styles, this version features hanging crossbars to make the honeycombs easy to remove. A viewing window allows you to track the bees' progress and health, year-round.

sides (pieces 2), which also cuts them to width. Then cut the sides to final length. Now chuck a rabbeting bit in

Get Your Beekeeping Supplies

Once you've built your beehive and found a good location to place it, you are going to need some supplies — for example, some bees.

We recommend our partner in this project, *BackYardHive.com*, as a great place to get the stuff you need to put this project into production. They have informational online material that can get you started as well as a nicely produced DVD that walks you through the process. They have supplies for sale and even an online place to ask questions. Here is a short list of "must-haves" our partners recommend:

How-to DVD — demonstrates how to care for bees in your backyard

The Original Hive Tool — key to working the hive, loosening the combs for harvesting

Herding Tool — helps to gently move the bees off the comb without using smoke

Natural Beeswax — used to coat the bars; this encourages the bees to align their combs on the bars



Use one of the hive ends as a guide to set your table saw's blade angle (top) and then as a reference for marking the hive side pieces (right) before cutting them to final width.



your router and rout a 1/2" x 3/4" rabbet on each end.

This hive has a viewing window in one of the sides. You can make the window opening's long cuts on the table saw, carefully raising the blade through the stock at the starting point and then



ripping to the stopping point. Then make the short end cuts with a jigsaw. Or make all four cuts with a jigsaw, if you prefer. Finish it by routing a 1/8" x 3/8" rabbet around the inside edge for a glass recess.

With that done, trim 1/2" off of the bottom of one of the hive ends: this gap will be the bees' entrance. Go ahead and assemble the sides and ends with waterproof glue and stainless steel screws. Next, cut the bottom panel (piece 3)



Set the hive on the bottom panel, and trace the inside shape (top). Then determine the drilling angle you'll need for boring pilot holes for the screws (inset).

to size and set the hive assembly on it. Trace around the inside. Use this outline as a guide to pre-drill angled pilot holes for attaching the bottom

Rout a 1/8" x 3/8" rabbet around the inside edge of the window opening to serve as a recess for glass.

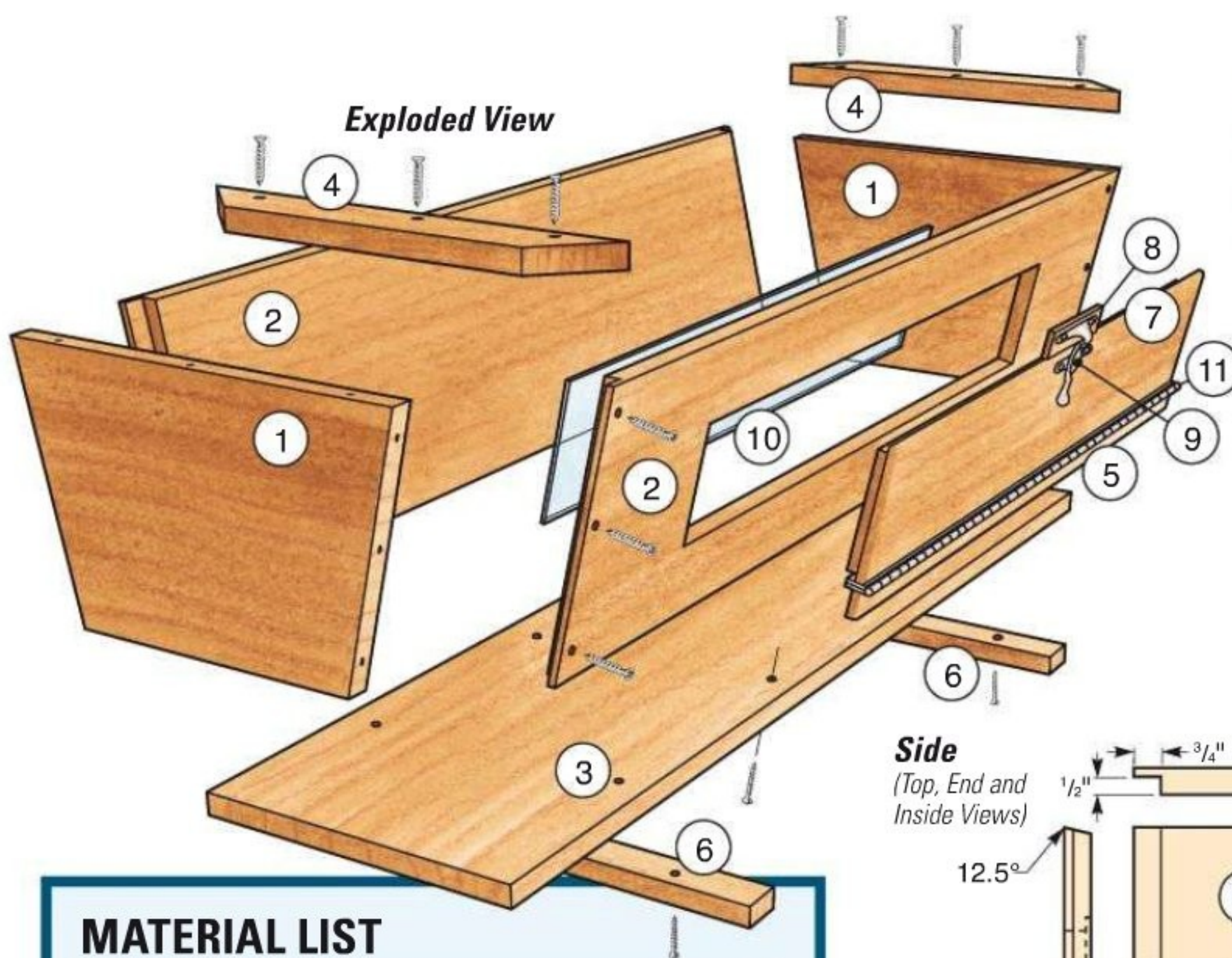
panel to the sides and ends. If you'd like to round over or chamfer any part of the hive up to this point, now is the time to do it, before attaching the bottom. Then go ahead and install it on the hive with glue and screws.

The end handles, window trim and feet (pieces 4 through 6) come next. Cut them to shape, mitering the ends of the handles, and fasten them all to the hive.

You can also rip and crosscut the window cover (piece 7). Round over and rabbet its ends and top edge, leaving the bottom edge flat for attaching the hinge.



A sliding bevel gauge makes a handy reference for guiding your drill as you bore countersunk pilot holes for the bottom panel screws.

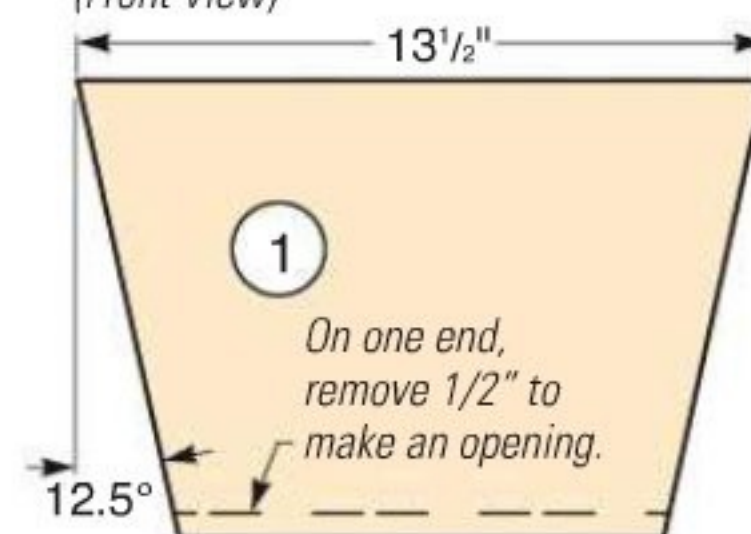


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MORE ON THE WEB

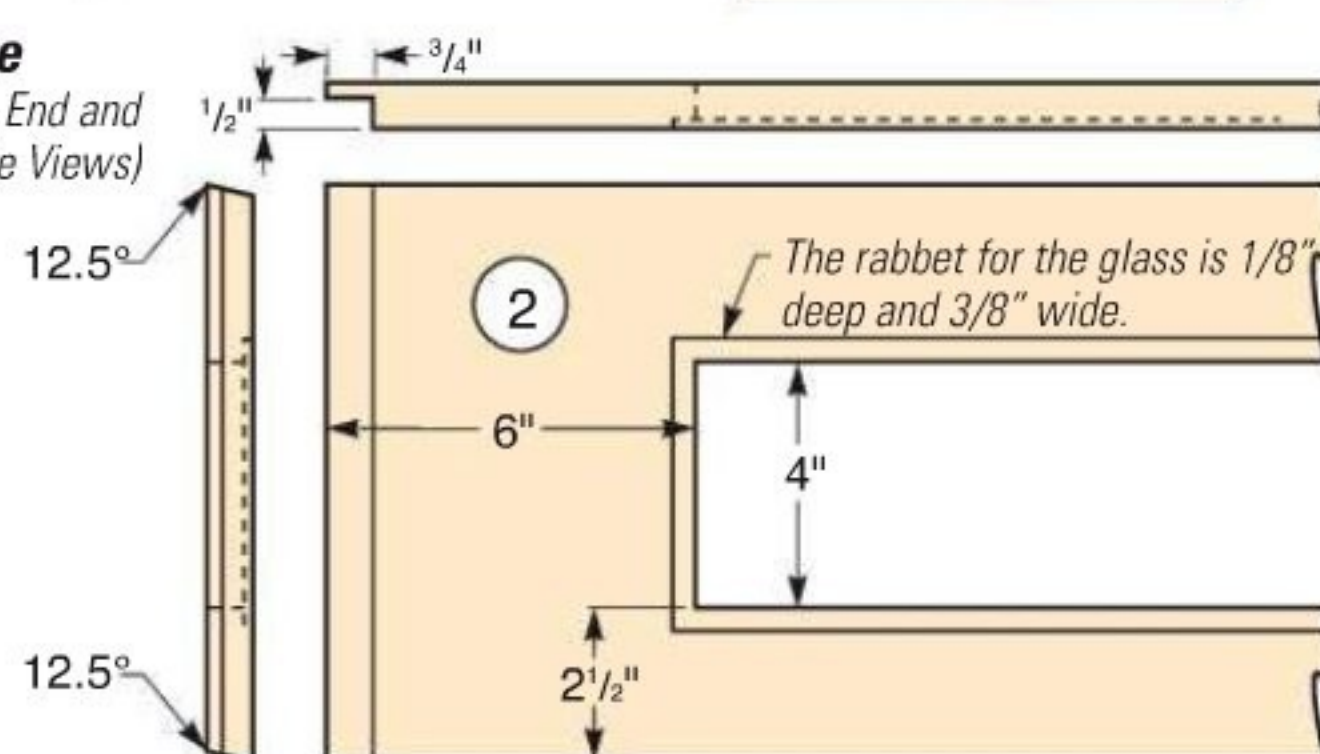


For a video on ripping a bevel on narrow stock with a job-specific push block, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

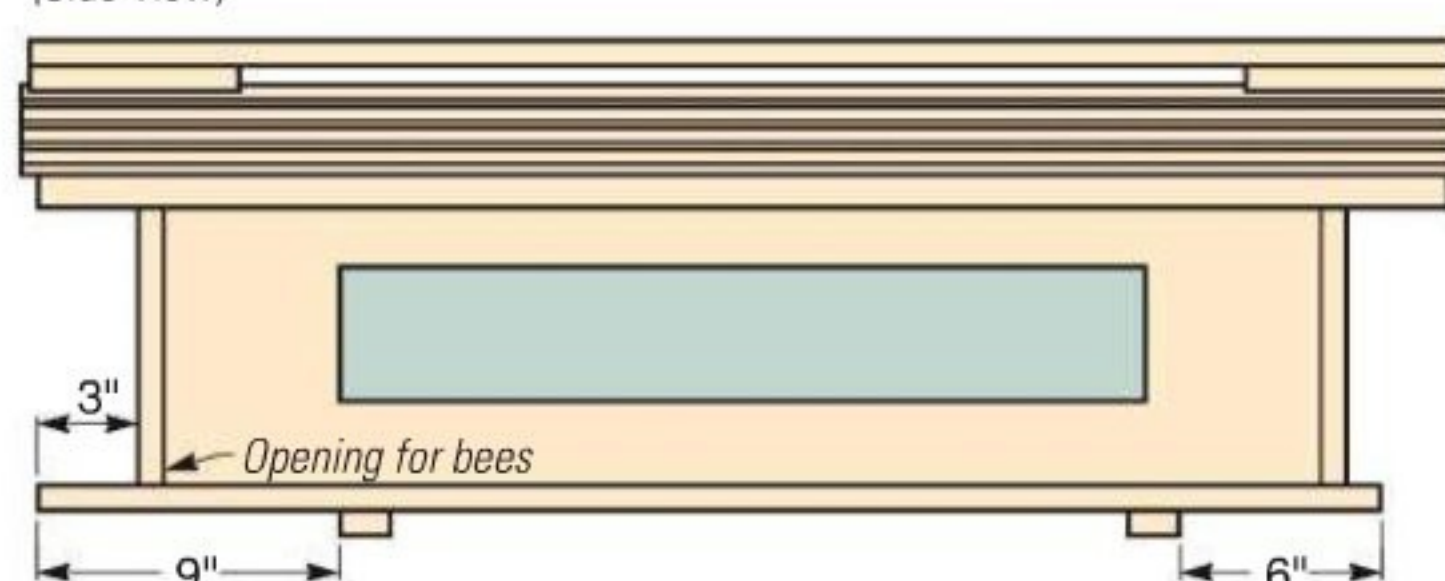
End
(Front View)



Side
(Top, End and Inside Views)



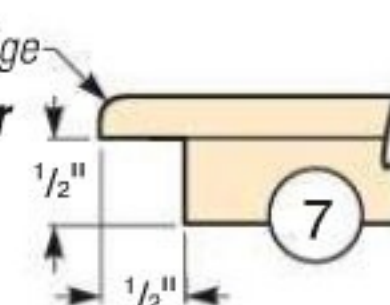
Beehive
(Side View)



Soften edge

Window Cover
(Side View)

Note: The bottom edge does not have a rabbet.



MATERIAL LIST

	T x W x L
1 Ends (2)	3/4" x 9" x 13 1/2"
2 Sides (2)	3/4" x 9 3/8" x 36"
3 Bottom (1)	3/4" x 11" x 40"
4 Handles (2)	3/4" x 2" x 14"
5 Window Trim (1)	3/8" x 7/8" x 24 3/4"
6 Feet (2)	3/4" x 1 1/2" x 16"
7 Window Cover (1)	3/4" x 4 1/4" x 24 3/4"
8 Latch Block (1)	3/16" x 7/8" x 4"
9 Sash Latch (1)	
10 Window Glass (1)	1/8" x 4 1/2" x 24 1/2"
11 Stainless Steel Piano Hinge (1)	1 1/16" x 36"

Stainless Steel Piano Hinge.....#32611.....\$20.99
Feed-N-Wax® Wood Polish and Conditioner#24545.....\$11.99
To purchase, visit rockler.com or call 800-279-4441.



Once you've glued and clamped the window trim in place (above), you'll have enough edge surface to cut and fasten the piano hinge (right) for hanging the window cover. Given the cramped workspace here, leave the window glass off until the cover is attached.



After you've cut the hinge (piece 11) to length, fasten it in the window opening, and attach the cover. Make and install the latch block (piece 8) above the window opening, and screw the latch (piece 9) to the window cover. Wrap up by setting the glass (piece 10) into its rabbet with a bead of silicone caulk.

Assembling the Hive's Lid

The lid comes next: it fits over the hive and rests on the handles to protect the inner compartment and combs. Cut the lid frame sides and ends (pieces 12 and 13) to size, and rabbet the ends of



Assemble the lid frame and corner blocks with glue, screws and clamps. These blocks fit around the hive handles so the lid rests flat.



Cut the lid panel to size, then glue it into the rabbets in the frame assembly. The author used pin nails as fasteners.



Seal any gaps around the lid frame and panel with a thick bead silicone caulk, for added insurance against leaks or insect pests.

the side pieces. Notice in the *Drawing* at right that the lid (piece 14) fits down into a top rabbet in the frame. Rout that 1/4" x 3/8" rabbet along the top edge of the four frame pieces, before assembling them with glue, screws and corner blocks (pieces 15). Now bed the lid panel into its rabbet with silicone caulk.

Making the Roof

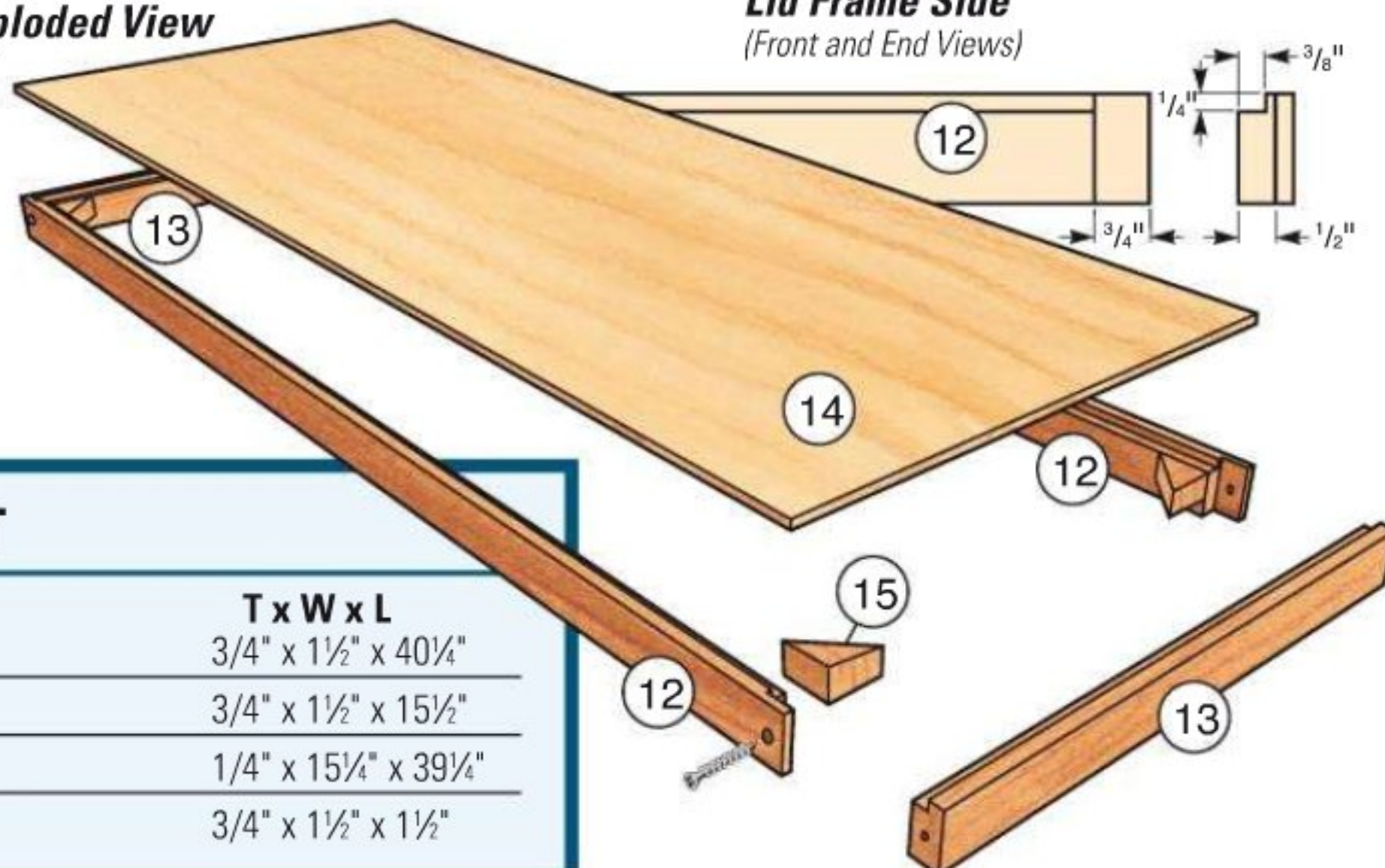
The hive's roof covers the lid and creates a seasonal thermal barrier, plus weatherproofing. I decided to style my roof with some resawn lap-siding (pieces 16) to add a "homey" touch. To make it, start with 3"-wide by 3/4"-thick stock. With your band saw's table tilted 5°, resaw the stock, making two almost equal halves. Doing this can be difficult, so set your fence to saw the offcut about 1/32" thicker. After cutting the first piece, run the offcut through, so it will end up exactly the same.

When the dust clears, you'll notice that because of the angle on the siding's bottom edge, the rough, resawn faces will be the outer faces. To change this angle rela-

MATERIAL LIST

	T x W x L
12 Lid Frame Sides (2)	3/4" x 1 1/2" x 40 1/4"
13 Lid Frame Ends (2)	3/4" x 1 1/2" x 15 1/2"
14 Lid Panel (1)	1/4" x 15 1/4" x 39 1/4"
15 Lid Corner Blocks (4)	3/4" x 1 1/2" x 1 1/2"

Exploded View



Lid Frame Side (Front and End Views)

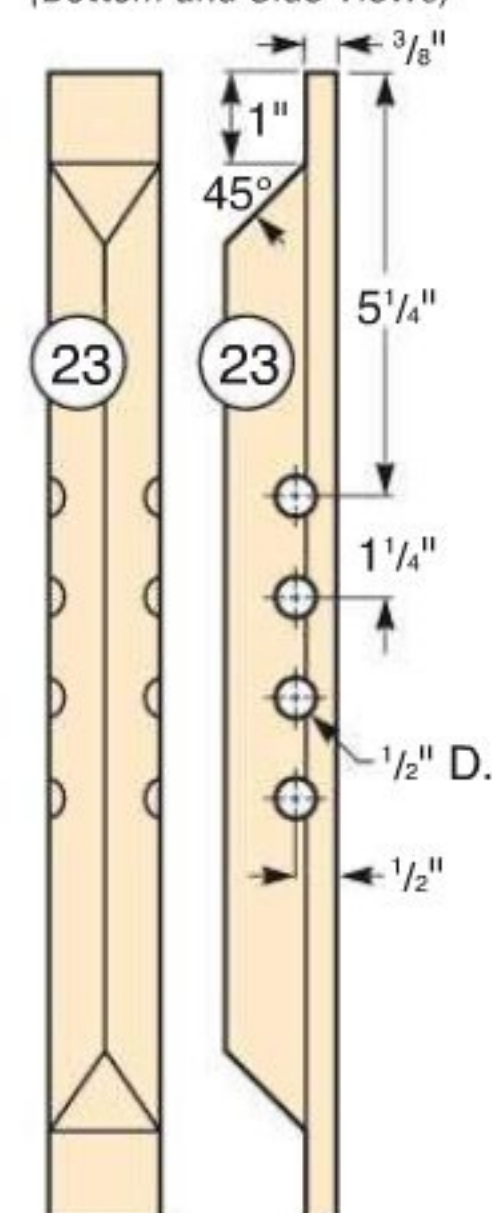


Start the roof lap-siding by making a tilted resaw cut at the band saw to form two siding pieces (left). Trim the bottom edges at the table saw to square them up again, then rabbet them to form lap joints with a dado blade tipped to 85°.



In two of the lap-siding pieces, rout a narrow groove along the thin, top edge. The author clamped an overly long fence to his router table fence to add bearing support for this operation (left). Then glue up two roof panels from four siding pieces each, and trim their top edges at 15° where they'll meet at the roof peak (top).

Top Bar
(Bottom and Side Views)



tionship, rip the bottom edge of each piece with the rough sides face-down and your table saw set at 90°. Cut off just enough to change the angle. Next, use a dado blade tilted to 85° to cut the rabbet into these bottom siding edges. Leave two pieces un-rabbeted; these will

be the bottom edges of the roof. Then cut the siding to finished length. One last step: use a straight bit in your router table to make the 1/4"-wide, 30 1/2"-long roof vent cutouts in only the top two pieces. Most router table fences aren't long enough for this, as the cutout is longer than the fence. Mine wasn't long enough, so I clamped a long auxiliary fence with a cutout for the router bit (see top left photo).

Glue the eight siding pieces into two

roof panels, using weights and clamps as necessary to keep the assemblies flat and square. When the glue dries, trim their top edges at 15°, so there's no gap where they meet at the roof peak.

Next, lay out the roof ends (pieces 17), and cut them to finished length. Cut their slopes on the band saw. Now, rip two roof sides (pieces 18), and bevel-rip their top edges to 15°. Cut them to final length. After you mill 1/2" x 3/4" rabbets on their ends, glue and screw the roof ends and sides into a frame. You're



Lay out the two roof end pieces to create its pitch, then cut these angles at the band saw, freehand. A tapering jig would also work.



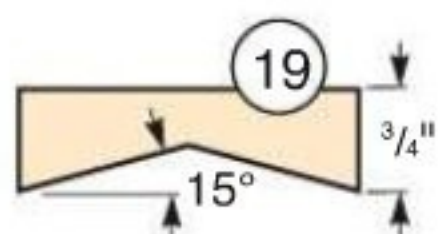
After you've bevel-ripped the top edges of the roof sides and rabbeted their ends, attach them to the roof ends to form a frame.



Arrange the roof panels for an even overhang on the roof frame. Mount them to the frame with glue and finish nails. Putty over the nail holes, if you like, to fill and hide them.

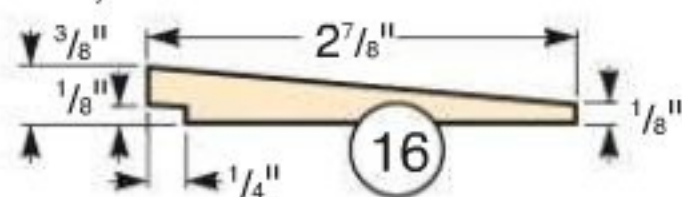
Roof End Block

(End View)



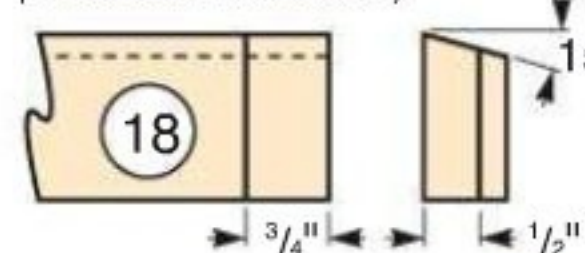
Roof Lap-siding

(End View)



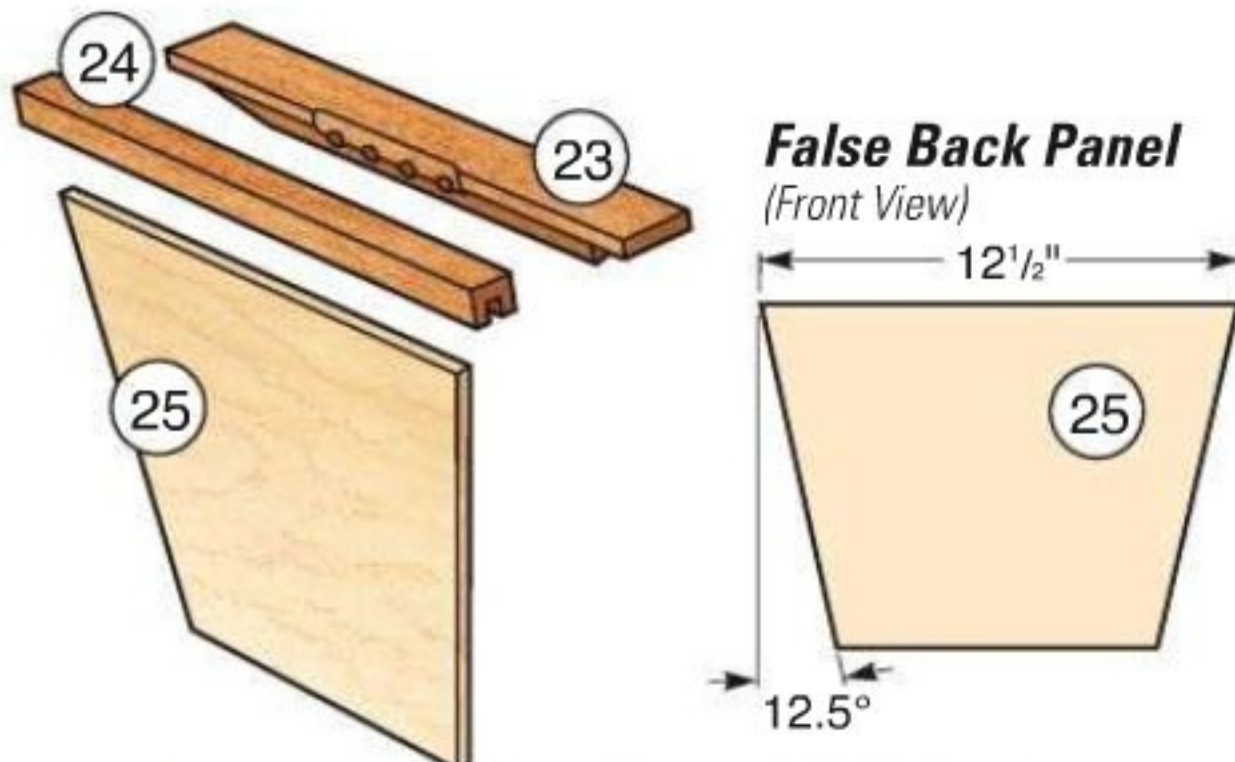
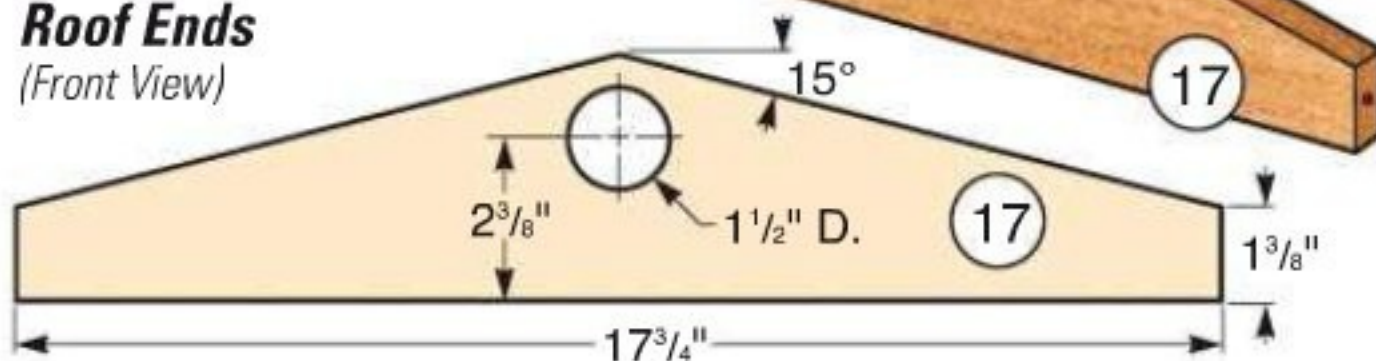
Roof Side

(Inside and End Views)



Roof Ends

(Front View)



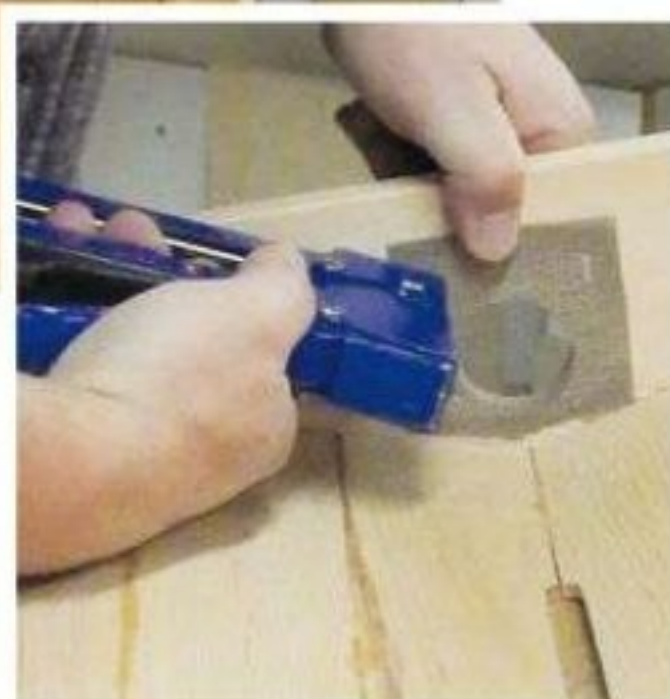
Exploded View

MATERIAL LIST

	T x W x L
16 Roof Lap-siding (8)	3/8" x 2 7/8" x 43"
17 Roof Ends (2)	3/4" x 3 5/8" x 17 3/4"
18 Roof Sides (2)	3/4" x 1 1/2" x 42"
19 Roof End Blocks (2)	3/4" x 2 1/2" x 6 1/4"
20 Ridge Cap (1)	3/4" x 2 1/2" x 42 1/2"
21 Screen Retainer Strips (2)	3/16" x 3/4" x 30"
22 Roof Screen (1)	cut to fit
23 Top Bars (24)	1 3/8" x 1 3/8" x 14 1/4"
24 False Back Top Bar (1)	3/4" x 3/4" x 14 1/4"
25 False Back Panel (1)	1/4" x 9" x 12 1/2"



Bore a 1 1/2"-dia. vent hole through each roof end. The author used a hole saw for this job (top). Staple window screen over these two holes from inside the roof to keep pests and birds out of the interior.



Help our Pollinators



Pollinators are in trouble — and that is not good news for those of us who like to eat! (Or for the environment or life on earth in general.) Recent studies and news stories report that honey-bee and Monarch butterfly populations are in steep decline. The list of challenges for these essential insects is long: not enough forage (they are starving), pesticides, pollution, mites and other parasites — it is no bed of roses, literally.

One bit of good news is that everyday folks are now starting to step up to try to reverse the trends that are hurting our pollinators. Below are just a few good websites (there are many more) for you to check out if you'd like to be a part of the solution.

<http://www.backyardhive.com/>

<http://www.fws.gov/pollinators/PollinatorPages/YourHelp.html>

<http://www.xerces.org/bringbackthepollinators/>

<http://baselandscape.com/portfolio/pollinator-boulevard/>



Cut the V-shaped angles into the roof ends at the table saw with the blade tilted to 75°. Make these two cuts incrementally, raising the blade until the inner waste piece falls free.

now ready to install the roof panels with glue and finish nails. Then bore a 1½"-dia. vent hole through each roof end, and staple window screen (pieces 22) over them to cover them from inside.

The roof has two end blocks (pieces 19). Make their V-shaped cutouts on the table saw. If you have a left-tilting table saw, move the fence to the left

side of the blade for this operation. Cut the angles a bit at a time, raising the blade incrementally after each cut. Be sure to cut from both edges before raising the blade. Crosscut the blocks to length, and glue and screw them to the roof.

Install screen (piece 22) over the ridge vent with screen retainer strips (pieces 21) and staples. Wrap up the roof by attaching the ridge cap to the roof ends with countersunk screws.



Glue the roof ends to the roof at its peak. Then reinforce these connections by driving screws up into the roof ends from inside the roof.



Fasten the ridge cap to the roof ends with pairs of countersunk screws only — no glue. That way, you can remove it if the ridge vent screen ever needs to be cleaned or replaced.

Machining the Top Bars

The 24 top bars (pieces 23) lie across the hive and form attachment points for the bees to make individual hanging combs. To build the bars, start with 1⅜"-square billets that are cut to the final length. Cut the non-through end angles at the table saw using a miter gauge equipped with a long fence and a stop block for accuracy. Trim off this waste at the band saw to form a lapped end (see top left photo, next page).

BackYardHive's Mission

We at the *Woodworker's Journal* are pleased and honored to be working with *BackYardHive*. We support their efforts to help better the bee and pollinator situation. Below, in their own words, is what they are all about (from their website):

"Our primary focus is on improving bee ecology and beekeeping methods that respect the honeybee. Our hope is that by introducing new hobby beekeepers to the rewards of beekeeping there will eventually be backyard beekeepers worldwide who will help bring back the feral bee population and improve the genetic diversity of the honeybees. This diversity is critically important to the survival of this most precious natural resource. Thank you for being a part of the solution and being a part of the growing community of backyard beekeepers we are helping to create at *BackYardHive.com*."





Cut the non-through end angles on the top bars at the table saw. Use your miter gauge and a stop block to control these cuts. Tilt the saw blade to 45°.



Trim the waste pieces free at the band saw to complete the "lapped" ends of the cross bars. It's a faster, safer method than using a tenoning jig at the table saw.



A stop block clamped to the drill press table, and three spacers, make it easy to drill the top bars' three through holes so they're evenly spaced.

Set up for drilling the bars' top holes by making three 1¼"-wide spacers. Clamp a stop on the drill press for the end hole. Drill the first hole and then slip a spacer between the stop and the bar's end for each successive hole.

Cutting the bars' long angled sides is tricky, but with the proper setup, it needn't be dangerous. You could easily make the first cut with the point facing down, but the second cut would be impossible. Instead, you'll need to cut the bars with the point facing up. Again, if you have a left-tilting saw, move the fence to the left side of the blade.

You'll need three essential items to make these cuts: a zero-clearance insert (with its slot cut through at the same angle that you're cutting), a featherboard



To create the long beveled edges on the top bars, the author used a special push block that fits around the top bar blanks and holds their lapped ends down against the saw table. It has a cutout area in the middle to accommodate the taller part of the upturned bars. Two cuts, with the saw blade tipped to 55½° and passing through a zero-clearance throatplate, did the job.

and a push block. The zero-clearance insert and push block are job-specific but worth the added measure of safety. Without the zero-clearance insert, the offcuts will slide down between the blade and the throatplate's opening, causing a dangerous binding situation. If your blade doesn't lower far enough to allow an uncut throatplate to seat completely, groove the throatplate's underside where it contacts the blade, allowing it to fully seat. Then raise the blade through the throatplate while it's pinned down by the rip fence.

The push block has two "feet" that hold down the thin lapped ends of the bars (see top center photo). Trim the feet to the same width as the bars, so that they don't interfere with the featherboard. The block's middle is cut out so that it bridges the taller part of the upturned bar. As you feed the stock, the blade becomes housed within the block.

Now that you've got all of your safety equipment ready, bevel-rip one side of



Each top bar receives a narrow vent, milled at the router table, along one edge. These vents provide air circulation between the combs but are thin enough to prevent the bees from crawling through.

each bar, then spin it end-for-end in the push block to trim the other side.

Next, make a slight roundover along both top edges of each bar. The roundover makes it easier to insert a tool that's used to separate the bars when they're in the hive and coated with wax. The final step for the bars is to rout a 3/32"-wide, 4¾"-long vent on one side of each bar. When you set the bars in place in the hive, it creates a gap that's too small for the bees to crawl through. The false back panel and top bar (pieces 24 and 25) are your last things to build. Rout a 1/4" groove along the top bar for the panel, and just glue them together.

Apply a finish if you like, to the exterior only. The best choice is a natural finish (see *Material List*, page 30), so it doesn't affect the bees or the honey. Now assemble the hive and order some bees!

Brad Holden is a Minneapolis-based woodworker, specializing in custom pieces for both residential and commercial applications.

Upholstered Ottoman Chest

By Sandor Nagyszalanczy

A multipurpose furniture piece that can serve as a leg rest, a storage chest, a coffee table and even a padded bench.



Recently, I wanted to build a long ottoman with an upholstered top to go in front of a low couch, so my wife and I can both put our feet up when we're reading or watching television. Some ottomans are built like chests, and it made sense to design one with a liftable lid, so the piece could also be used to stow away pillows, books, DVDs, etc. But I had yet another functional desire to fulfill: Sometimes, we eat dinner in front of the TV, so I also wanted my ottoman to provide a firm table surface on which to set plates and glasses. It seemed like a tall order, but

with a little trial and error and the help of a full-sized mock-up, I came up with the design shown in this article.

Most of the ottoman's construction is straightforward: the chest portion is built frame-and-panel style, with solid mahogany rails and stiles. Instead of installing the usual flat or raised panels in the frames, I decided instead to fit a series of evenly spaced slats, behind which are thin plywood panels covered in the same black vinyl fabric used to upholster the ottoman's lid. A simple plunger mechanism located in a corner of the carcass allows the lid to be lifted, to allow access for storage, or to flip the lid over and use its reverse side as a coffee table. With the upholstered side up, the ottoman can also function as a bench seat — an added bonus.





The author uses the Festool Domino system loose tenons to join the frame members of the ottoman.



Use a ruler to make sure that the spaces for open panels on the long sides of the ottoman are even.

Building the Framework

Construction begins with cutting all frame stiles and rails to size, following the *Material List* on [page 39](#). I built the front, back and side frames separately, then assembled these subassemblies together. All the stiles are joined to the rails with loose tenon joinery (I use the Festool Domino system, but you can also use the router mortising method, or even cut traditional mortise-and-tenon joints). I set the Domino's fence to center the mortises on the thickness of the stock, then I marked out the location of each mortise on the inside edges of the long and short rails. After plunge cutting these, I fitted the Domino with its trim stop accessory, which I set to center the mortises side-to-side on the ends of the stiles.

Now it's time to glue the frames together. For each frame, I slathered the loose tenons and mortises with yellow glue, then pressed the tenons into their lower rail mortises. I then put the stiles in place, tapping them onto the tenons. Next, I put loose tenons into the upper ends of the stiles and pressed the upper rail into place. I applied a few short bar clamps, then double-checked to make sure that the edges of the stiles were flush with the ends of the rails and the assembly was square and flat before setting it aside to dry. On the ottoman's long sides, also make sure that the open panel spaces are even.

Once all four of the ottoman's frame sides were dry, I scraped off the excess glue and gave the inner and outer frame

surfaces a rough sanding, so that all members were level with each other. Now, using a router fitted with a rabbet bit set for a 3/8"-deep, 3/8"-wide cut, I routed the inside edges of each frame opening. I then squared up the corners with a sharp chisel. At the table saw, I tilted the saw blade to 45° and beveled on the inside edge of each frame's end. To keep the long frames square during cutting, I guided them with a miter gauge.

Now I was ready to cut slots in these beveled ends for the #20 plate joinery biscuits that will join the four frames into the ottoman's carcass. After tilting the biscuit joiner's fence to 45°, I marked out the position of the three slots and plunge cut them on each frame end. Moving to the table saw,

To keep the long frames square while cutting bevels on the inside edge of each frame's end, the author guides them with a miter gauge.



Rout the inside edges of a frame opening with a piloted rabbet bit.

I mounted a dado set wide enough to cut a 7/16"-deep, 3/4"-wide rabbet along the bottom inside edge of all four frames' bottom rails. The rabbet serves to capture the ottoman's 3/4" plywood bottom. Next, I fit my plunge router with a 3/8" spiral fluted bit and routed a slot through the upper corner of one of





A biscuit joiner with the fence tilted to 45° cuts slots in the beveled ends of the frames for the #20 plate joinery biscuits that will join the sub-assembled frames together to form the ottoman's carcass.

the short frames. Positioned as shown in the detail *Drawing* on [page 39](#), this slot is for the lid lifting dowel. Finally, I sanded the four frames flat and smooth, sanding everywhere except around the yet-to-be-joined beveled corners.

Creating Slatted Panels

To give my ottoman a unique look, I decided to create panels from thin wood slats backed by 1/8"-thick plywood covered with the same vinyl fabric used to

upholster the lid. I cut the 48 slats that are needed from the same mahogany I used to build the frame. After jointing a straight edge on the stock, I crosscut it into 10 3/4" lengths, then ripped the blanks to all the necessary 1 3/8" and 1 3/4" widths (see the *Material List* on [page 39](#)). On the table saw, I cut each piece in half, thickness wise, using a narrow-kerf rip blade, then ran the stock through my planer to reduce each slat to its final 5/16" thickness. I finish-sanded both edges and one "good" face of each.

To make the spacer blocks that fit into the frame rabbets between the slats, I ripped

a few strips of 3/8" x 5/16" stock, then used my table saw's miter gauge to cut a bunch of blocks, each 3/8" long. To keep these small pieces from being hurled by the force of the saw blade, I clamped the nozzle of my shop vacuum (which I'd emptied of all sawdust) atop the saw table, directly opposite where the blocks are cut off. (See left photo, below.)

Before fitting the slats, I put the frames atop my bench, rabbeted side up, and sanded the edges of each panel opening smooth. Next I applied a narrow bead of glue around one of the rabbeted openings and set the slats in place, one by one, good side down, following the order shown in the *Drawing*. After inserting each slat, I set a pair of spacer blocks into the rabbet top and bottom, then put the next slat in and repeated the process. The blocks not only keep the slat spacing even, but also fill the gaps in the rabbeted frame, as you can see in the photo below. Once all the slats were in, I used a pneumatic pin nailer to secure the slats and blocks with 1/2"-long brads. This process is repeated on each of the panel openings in all the frame subassemblies.

After cutting out eight backing panels from 1/8" lauan "doorskin" plywood, I tried pressing them into their frame openings, trimming each one as necessary for a snug fit. I lettered each panel, so I could return them to the same openings later.



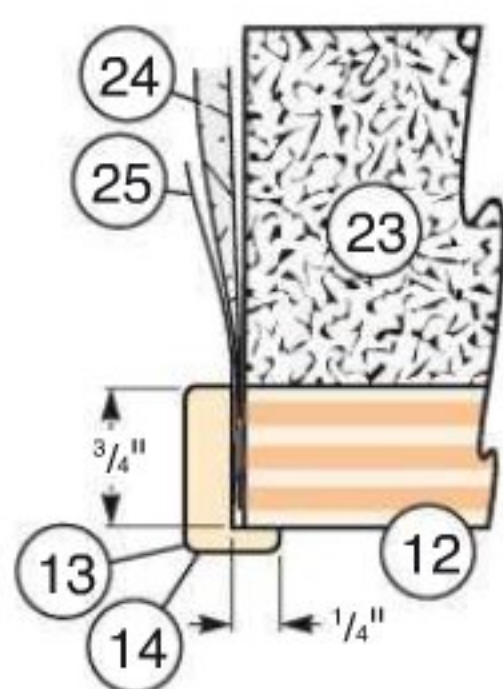
A shop vacuum hose nozzle, clamped atop the saw table, collects the small spacer blocks as they are cut, thus preventing them from being flung by the blade and lost.



Spacer blocks set into the top and bottom frame rabbets keep the slat spacing even, and also fill the gaps in the frame.

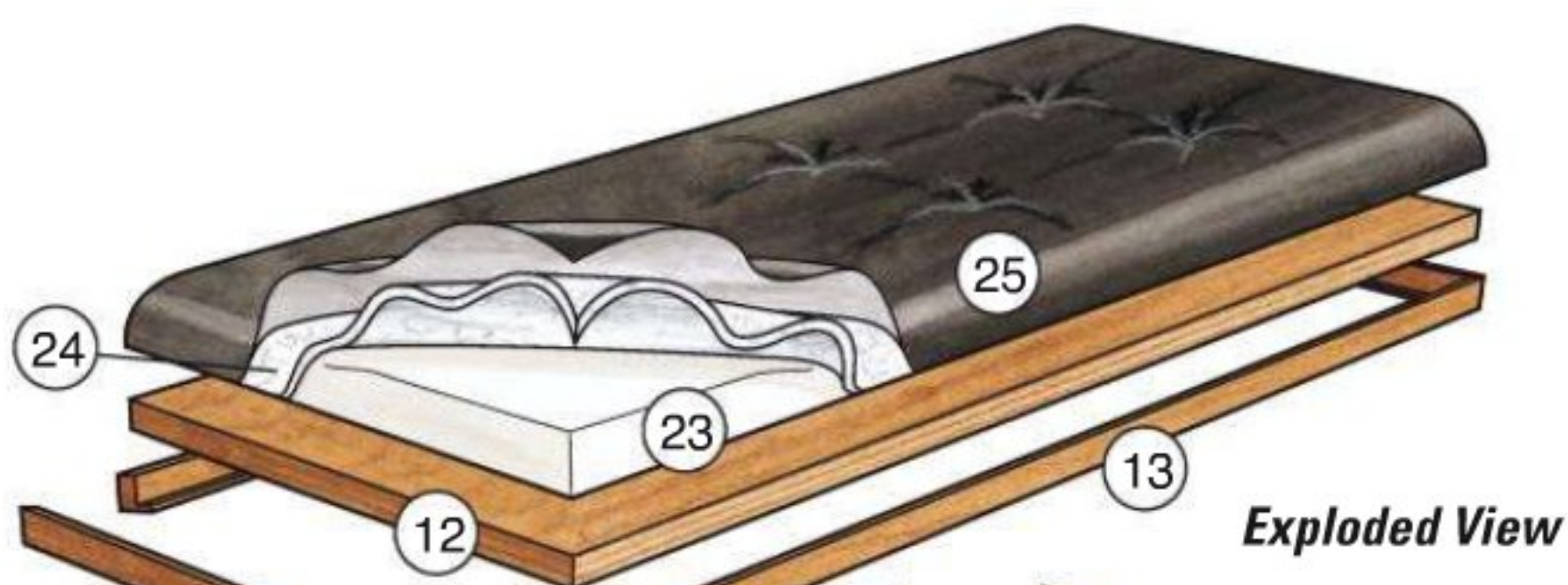
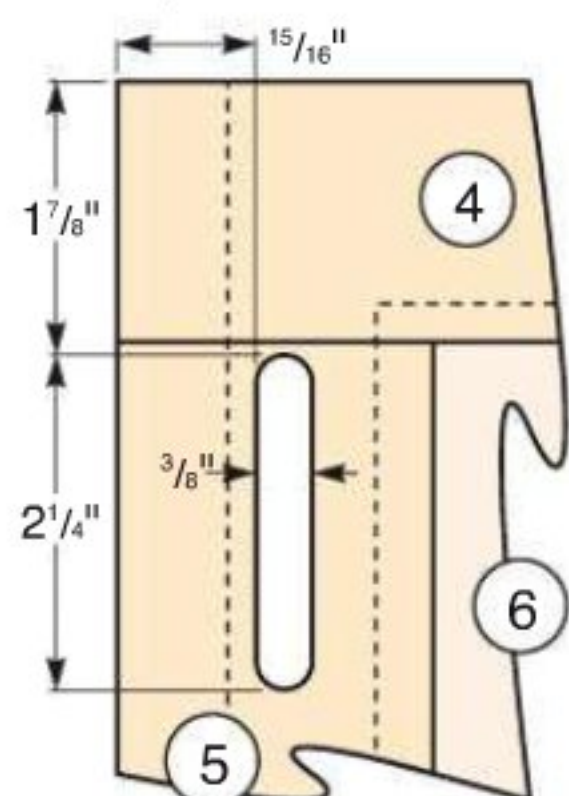
Lid Assembly

(Section View)

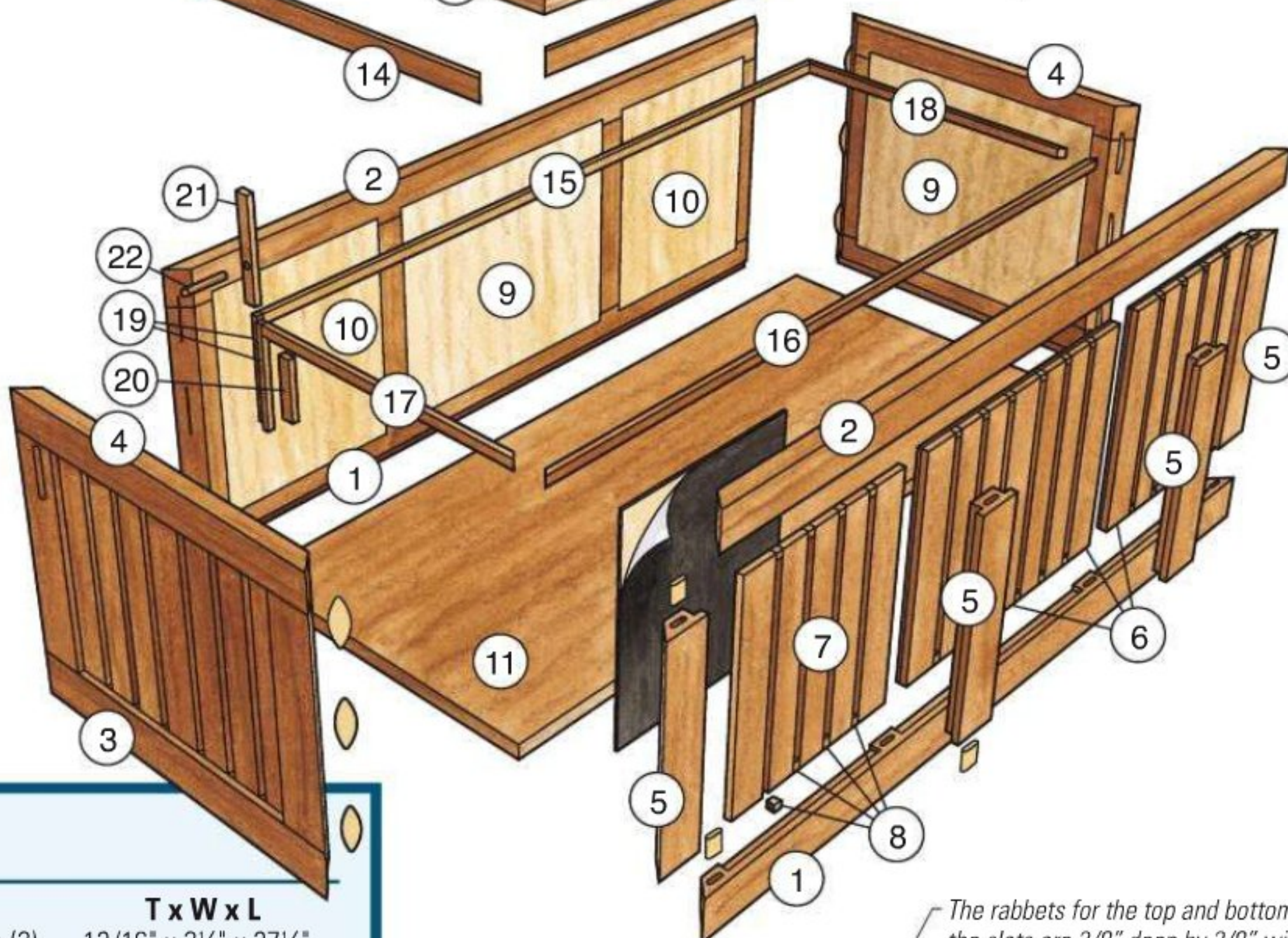


Lid Lifter Slot Location

(Front View)



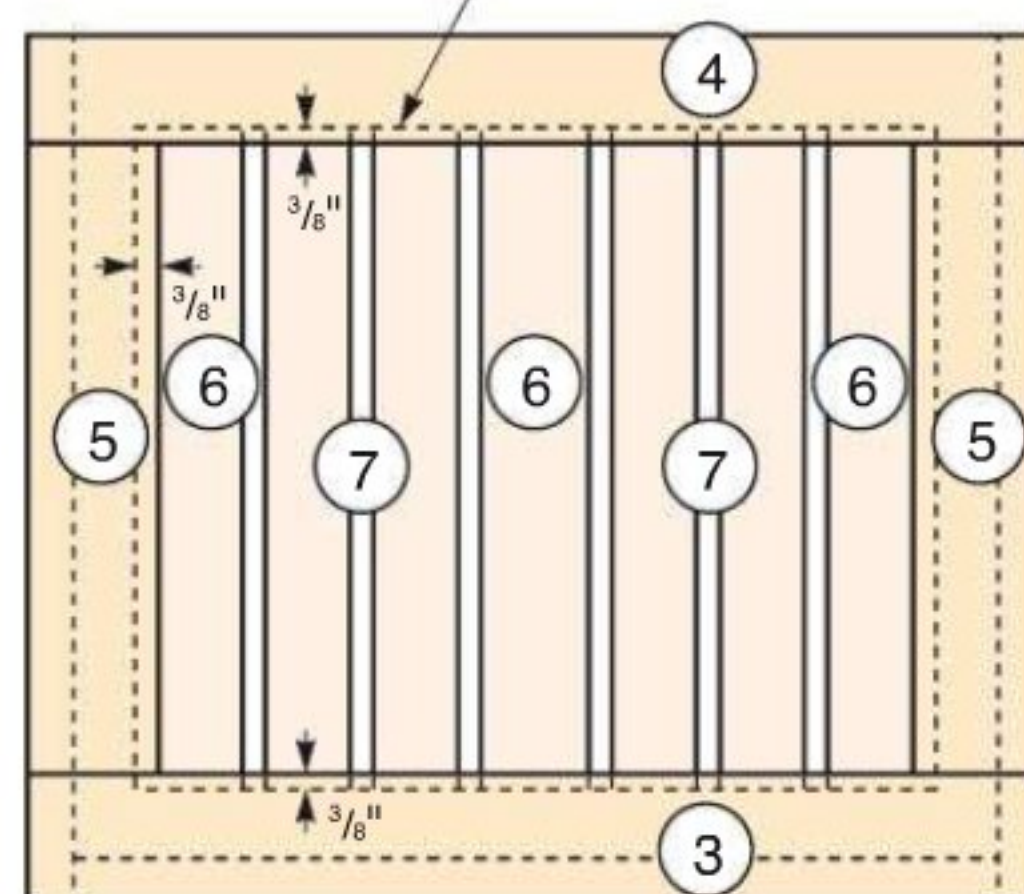
Exploded View



MATERIAL LIST

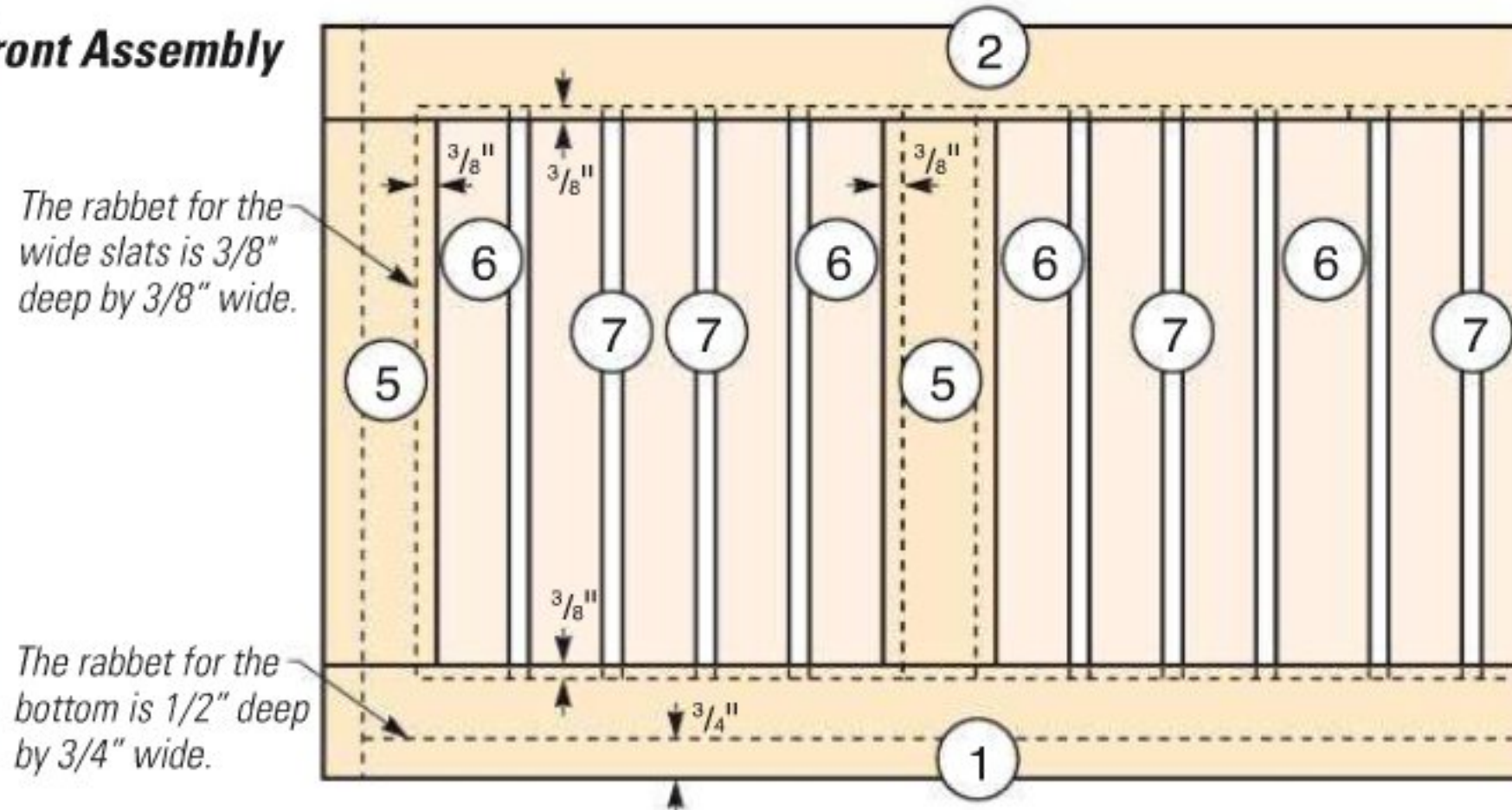
	T x W x L
1 Front and Back Lower Rails (2)	13/16" x 2 1/8" x 37 1/2"
2 Front and Back Upper Rails (2)	13/16" x 1 3/4" x 37 1/2"
3 Side Lower Rails (2)	13/16" x 2 1/8" x 16 1/2"
4 Side Upper Rails (2)	13/16" x 1 3/4" x 16 1/2"
5 Stiles (12)	13/16" x 2 1/8" x 10 1/4"
6 Wide Slats (20)	5/16" x 1 3/4" x 11"
7 Narrow Slats (28)	5/16" x 1 3/8" x 11"
8 Slat Spacer Blocks (80)	3/8" x 5/16" x 3/8"
9 Large Panels (4)	1/8" x 13" x 11"
10 Small Panels (4)	1/8" x 9 7/8" x 11"
11 Bottom (1)	3/4" x 15 7/8" x 36 7/8"
12 Lid (1)	3/4" x 14 3/16" x 35 1/4"
13 Long Lid Trim (2)	1/2" x 7/8" x 35 3/4"
14 Short Lid Trim (2)	1/2" x 7/8" x 14 1/16"
15 Back Support Ledge (1)	5/16" x 1/2" 35 1/4"
16 Front Support Ledge (1)	5/16" x 1/2" 35 7/8"
17 Left Support Ledge (1)	5/16" x 1/2" 13 15/16"
18 Right Support Ledge (1)	5/16" x 1/2" 14 7/8"
19 Tall Slide Guides (2)	5/16" x 5/16" x 5"
20 Short Slide Guide (1)	5/16" x 5/8" x 3"
21 Slide (1)	5/16" x 5/8" x 5"
22 Pin (1)	5/16" x 2" dowel
23 Foam Pad (1)	2" x 14 3/16" 35 1/4"
24 Poly Batting (1)	1/2" x 16 1/2" 37 1/2"
25 Vinyl Cover (1)	24" x 42"

End Assembly



The rabbets for the top and bottom of the slats are 3/8" deep by 3/8" wide.

Front Assembly



The rabbet for the wide slats is 3/8" deep by 3/8" wide.

The rabbet for the bottom is 1/2" deep by 3/4" wide.



The author uses a small hand plane to trim each 1/8" plywood backing panel for a snug fit in its frame opening. Each is labeled, so it can be returned to the correct frame opening later.



Band clamps hold the frame subassemblies together during glue-up.

Frame Assembly and Finishing

Before gluing up the frame subassemblies that form the ottoman's carcass, I did a dry fit to make sure that everything fit together properly. Working atop a true, flat surface (covered with construction paper to keep the assembly from sticking), I applied glue to all the

roundover bit, I rounded over the top outside edges of the carcass. Next, I cut the four ledge strips that serve to support the ottoman's lid. At the router table, I rounded over two edges of these strips (adjacent to their 1/2" width) using an 1/8" roundover bit. Positioning the strips with their rounded edges

slots and plate joinery biscuits. After setting everything in place, I used a pair of band clamps, one set at the top of the frame, the other at the bottom, to pull the corners tightly together. I slipped a third band clamp around the midsection of the carcass, tightened all clamps, and checked the squareness of the assembly before leaving it to dry.

The next day, I scraped away excess glue, then sanded the corners to round their beveled edges slightly. Using a router fitted with a 3/8"-radius

facing in and top edges exactly 7/8" below the top of the frame, I located the two strips with un-mitered ends at the front-right corner (where the routed slot through the frame is), then glued and nailed them in place using 5/8"-long brads. I also made and attached the three-piece lid lifter housing to the inside corner of the carcass over the slot in the frame. On the 5/8" x 5" lifter piece, I drilled a centered 5/16" hole, 3" from the top end, for the lifter's 2" dowel handle (which I stained jet black with a permanent marker pen).

I cut the ottoman's lid and bottom from 3/4" mahogany plywood, trimming them to final size and making sure their edges and corners were square. While at the table saw, I also ripped the lid's edge trim, leaving each piece a little long for now. I used a rabbet bit in the router table to create each trim strip's final L-shape profile, as seen in the *Drawing*.

To give the mahogany some color and depth, I decided to finish my ottoman with a tinted oil finish (medium walnut colored Watco® Danish Oil). After sanding all parts to final smoothness with 240-grit sandpaper, I applied two coats of the tinted oil to the carcass (inside and out), the 1/8" slat panels, both sides of the bottom and lid, the lid trim pieces and lifting mechanism. After a few days, I topcoated all parts with satin spray lacquer, to give the surfaces greater durability and a pleasant sheen.

Upholstering Lid and Slat Panels

To make my ottoman a comfortable leg rest, I upholstered one side of the lid with a textured black vinyl fabric, which looks great with the walnut-stained



The lid lifter housing is comprised of three pieces fit to the rear left corner of the carcass.

MORE ON THE WEB



For a video covering the upholstering process, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

Buttons secured with strings and U-shaped fencing staples create a tufted look for the upholstery.



mahogany. The fabric is laid over a piece of 2" thick firm foam, covered with thin poly batting, then stretched and stapled to the plywood lid. Instead of just leaving the padding flat, I tufted the surface using eight buttons covered in black vinyl. The buttons are secured with strings, threaded through U-shaped fencing staples and secured to the edges of the lid. The entire upholstery process is too extensive and complicated to describe in this article, so I made a step-by-step video, which you can view at the More on the Web section of woodworkersjournal.com.

Once the upholstery was done, I attached the lid trim to hide the staples and finish off the raw edges of the vinyl and plywood. Instead of measuring the lid itself for this trim, I first cut a 45° miter on one end of each trim piece, then clamped two pieces to the short edges of the lid. I laid the long trim pieces on these and marked their exact outside length. I repeated this process to mark the short trim pieces, then mitered all pieces to final length. After carefully fitting the trim around the lid, I applied a dab of glue to each mitered end, clamped all strips to the lid and used a pin nailer to secure the trim all the way around. Later, I sanded the miter tips and rounded them slightly, to remove any excess glue, and touched up the finish.



Textured black vinyl fabric stretched over firm foam adds comfort and style to the ottoman.

Only a few small tasks remained to complete the project: I applied black vinyl to the faces of the eight panels that back the slats. I sprayed one side of each with 3M "Super 77" spray adhesive, let the glue set for about 30 seconds, then pressed the fabric in place and trimmed any excess from the edges with a razor knife. I set the panels into their frame openings and secured them with 1/2" pins. Next, I slipped the lid lifter into its housing and glued its dowel handle in place. Finally, I set the ottoman's bottom into its rabbet and secured it with 1 1/4"-long, 18-gauge brads. Nylon furniture glides, one attached to each corner of the bottom, serve as feet.

All that remains is to flip the ottoman over, set its upholstered top in place and put my feet up and relax.

Sandor Nagyszalanczy is a furniture designer/craftsman, writer/photographer and contributing editor to Woodworker's Journal. His books are available at Amazon.com.



The author marks the outside length of the long trim pieces against the two pieces clamped to the short edges of the lid.



A pin nailer with 1/2" pins secured the backing panels into their frame openings. The "good" side of each panel is covered in black vinyl.

Turned Grilling Tool Handles

By Woodworker's Journal Staff

Do you spend your summers demonstrating your grilling prowess? Turn your own handles for your grill tools, and your friends will be just as impressed with what you produce in your shop.

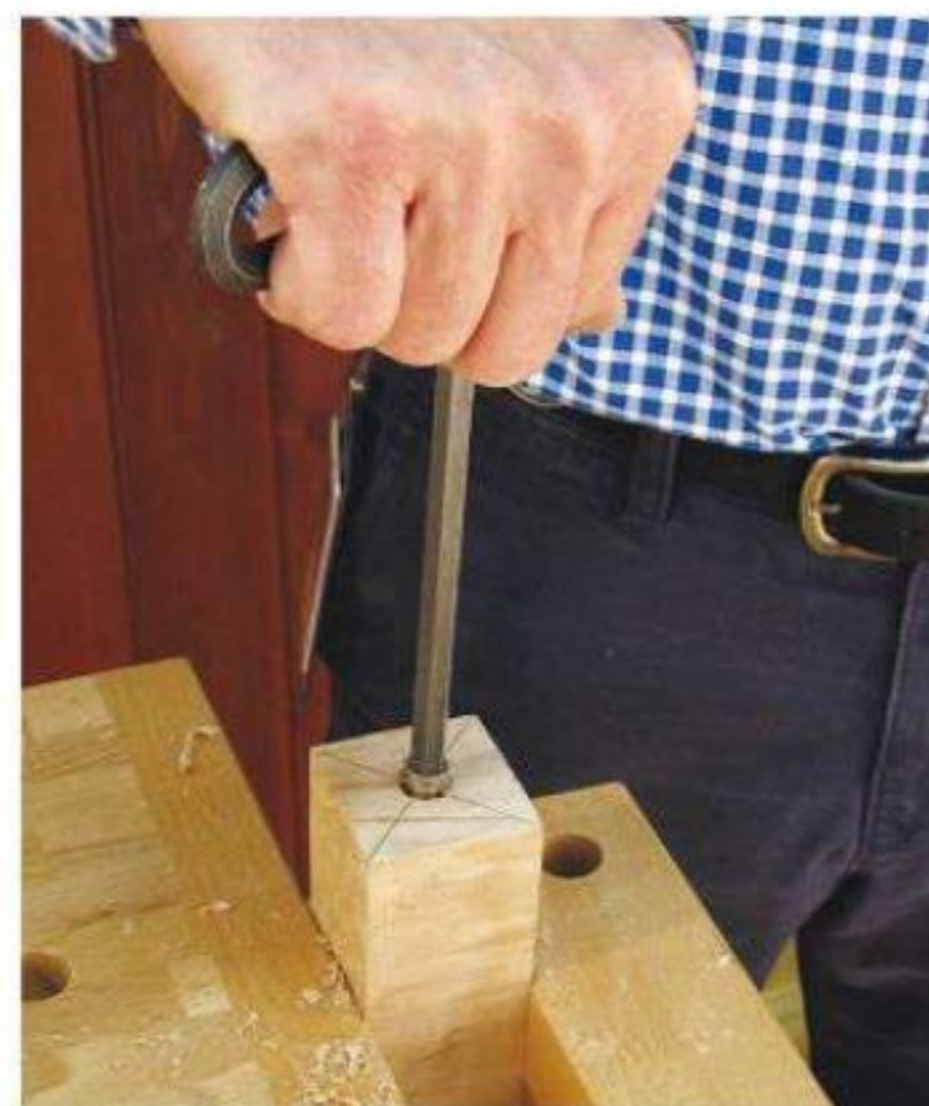




After squaring the ends of the blank to each other, mark the exact center of both ends. To do so, just draw an X from corner to corner.



When drilling the hole to accept the threaded insert, make sure you are drilling straight into the wood. A square beside your drill can help.



The threaded insert should fit snugly into the hole. If it is too loose, use some CA glue or epoxy to be certain it is secure.

Need a break from slaving over a hot grill this summer? Creating your own handles for your grilling tool set may be just what the doctor ordered.

Using a new set of grill tool hardware from Rockler, we decided to put the lathe to use and turn our handles from hard maple. With the set, you get the hardware to create a spatula, basting brush and a set of tongs.

We'll turn the spatula and basting brush first, then create a split turning for the tongs second — it's a slightly different process.

Preparing Blanks

You'll need blanks that measure $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x 6". Square up the ends, then mark them with diagonal lines to locate the center.

At that center, drill a $1\frac{1}{2}$ "-diameter hole to a depth of $1\frac{1}{2}$ " on one end of each blank. This is where you'll install the threaded insert hardware that will join the grilling tools to your handle.

Grab the insert and, using an Allen wrench, turn it into the hole until it is just below the surface of the wood, keeping it square to the blank. If it is loose in the hole, use some CA glue or epoxy to secure it firmly.

Turning Spatula and Brush Handles

To turn these two handles, you'll want to first mount a drill chuck in the lathe's headstock and install a 1" Shoulder Mandrel with $5/16$ "-18 threads in it. (See *Hard-to-Find Hardware*, page 45.) Thread the blank on the mandrel. With a live center in the tailstock, engage it to the center of the blank and tighten it.



Begin by roughing your blank into a cylinder, then turn it to the profile you want. Your only restriction? The diameter of the hardware: the 1" shoulder mandrel is sized to match that diameter. You'll also want to take note that the tail end of the handle has to be turned to 1" diameter, too, matching the decorative loop cap hardware.

After turning, sand your workpiece up through the grits, and apply the finish you want. I went with a clear wipe-on polyurethane.

Remove the blank from the mandrel and, using an $11/32$ " twist bit, carefully

drill a $1\frac{1}{4}$ " deep hole centered on the tail end of the handle. The dimple left by the tailstock will locate the hole.

You've got one of your tools' handles almost complete; thread your other blank onto the shoulder mandrel and repeat the process.

To assemble your spatula and brush, thread the tool hardware into the handle inserts. Attach the loop caps at the handles' tail ends using quick-set



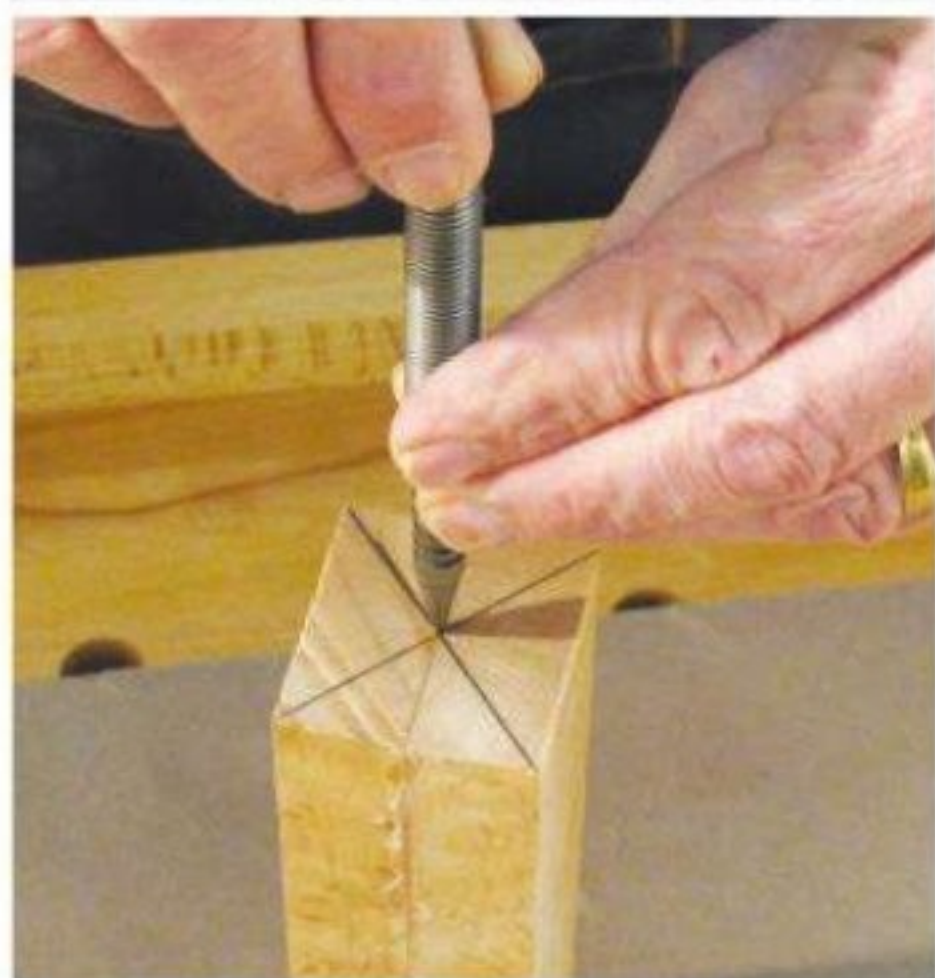
Once the blank has been threaded onto the lathe mandrel (inset), it is time to rough it round and then shape the handle to suit your needs and to please your eye. Let creativity be your guide.

www.woodworkersjournal.com
MORE ON THE WEB



For a video covering the split turning process, please visit

woodworkersjournal.com and click on "More on the Web" under the Magazine tab.



Gluing a piece of brown paper between the two halves of the tong handle creates a "break apart" joint. It is important that the two pieces align after glue-up and that the center of the blank is dead on the paper glue line. Turn the blank between centers — but don't apply too much pressure as it may split the joint. Wear a faceshield, just in case it does come apart during turning.



epoxy on the loop cap posts, inserting them in the handles. Make sure to immediately wipe away any glue squeeze-out. And, voilà! You've now got a hand turned spatula and basting brush for your grill.

Turning the Split-Handled Tongs

The tongs, because of the two-piece handle, are slightly more complicated.

Don't worry, you can handle it! (Get it?)

You'll be using the split turning method, and you'll need two pieces of wood measuring about $3/4"$ x $1\frac{1}{2}"$ x $6"$ each. Cut a strip from a brown paper grocery bag or just plain brown kraft paper that's a little bit longer and wider than your pieces of wood. Spread an even layer of wood glue on one face of each of your wooden blanks and sandwich the paper

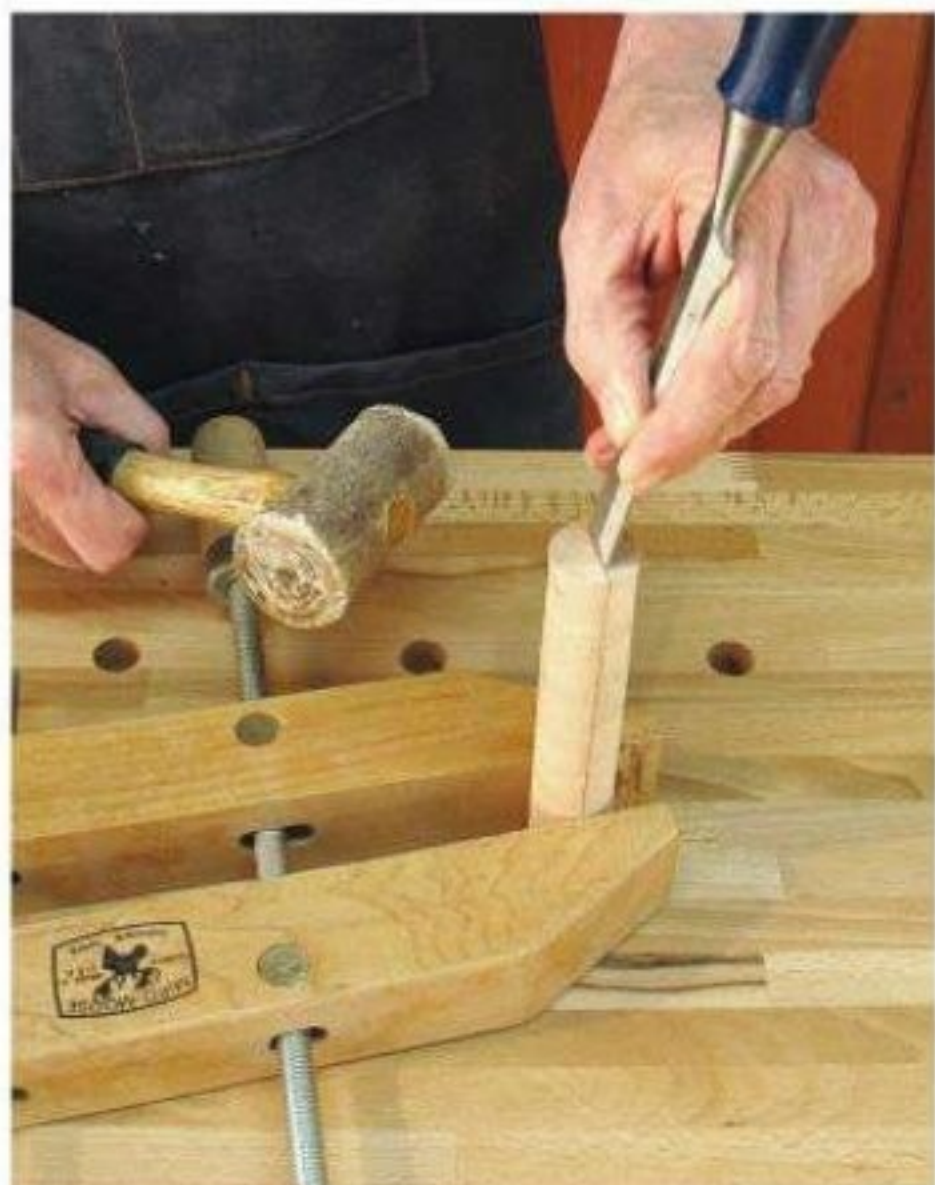
layer between them (see photos above). After you get this arranged, clamp them together and let the glue cure. (Could be a good time to get a refreshing beverage and set your steak out to thaw.)

When you come back to your tong turning project, first square the ends of the blank if you need to, then use the same process you did with the other handles to draw diagonal corner-to-corner lines to find the centerpoint. It's critical this center mark hits where your paper is layered between your two pieces of wood to produce matching halves of your tongs.

Mount your glued-up blank assembly between centers on your lathe — no mandrel this time. Make sure the points of the drive and live centers are on the center marks on the blanks' ends.

Carefully — you absolutely must wear a faceshield for this operation! — rough your blank into a cylinder, taking slightly lighter cuts than usual. Then turn the blank to your desired profile, making sure the ends have a 1" diameter.

Remove the blank from the lathe, then stand it on end on a solid work surface and carefully position the cutting edge of a sharp 1" chisel on the paper



Once the blank is turned to form the handles for the tongs, position it as shown in the photo at left. Then, with a chisel placed on the paper line, tap the chisel carefully until the parts separate.



Quick-setting epoxy is a good adhesive choice for bonding the wood to the tongs. Wipe the excess off before it cures.

line. Strike the chisel, using gradually increasing force, to split the blank along the paper layer.

Sand off the residual paper and glue from the flat sides of your blanks.

Assembling the Tongs

It's time to mount the handles to the tongs. Rough up the mating surfaces of the metal and wood with sandpaper. Apply quick-set epoxy to one of the handle blanks and press it onto one side of the tongs, aligning the blank to the edges and tight against the curved shoulder. Wipe away any squeeze-out and clamp the handle until the epoxy cures.

Next, squeeze the tong handles together and use clamps or tape to hold them in this position. Use the holes in the metal tong hardware as a guide to drill 1/8"-diameter holes perpendicularly through the wood handle for the pins (see top right photo).

Now glue the other handle in place as you did before. This time, drill the 1/8"-diameter holes in the second blank, using the holes in the first handle as a guide (see center right photo).

Now that you have all these holes in your handles, insert a pin into each of them. If they're loose, use (CA) glue or epoxy to secure the pins. Once they're tapped in place, file the pins close to the surface of the handles before you do your finish sanding.

Cover the metal on the surface of the tongs to protect it as you sand through the grits — it takes some care to avoid scratching the metal edges next to the wooden handle pieces.

After you've applied your finish and let it cure, you've got custom tongs to go with the rest of your grilling tools, and the set is complete. Time to celebrate! How about a nice porterhouse?



After the epoxy has cured, drill the pin holes through the handle using the predrilled holes in the tongs as a guide (keep it clamped as you do).



With the second handle glued in place, extend the pin holes from the first handle through it. Keep these holes perpendicular as you drill them.



Drive the pins into their holes and then file them flush to the wood surface. Now sand and apply finish, and the tongs are ready to go to work.

Turned Grilling Set Hard-to-Find Hardware

Rockler Grill Tools Hardware Kit #51066 \$69.99

Mandrel with 5/16"-18 threads #43469 \$10.49

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

Technology And Woodworking

REAXX Skin-sensing Saw Reaches Stores

By Woodworker's Journal Staff



Owing some of its pedigree and features to the award-winning 4100 table saw series, Bosch's new REAXX also has flesh-detecting circuitry and an injury mitigation system that doesn't damage the blade.

Despite ongoing SawStop litigation, Bosch's 10" REAXX Jobsite Table Saw was made available for consumer purchase, June 1.

Since 2004, only SawStop has offered skin-sensing table saws that help prevent blade injuries. That all changed in spring 2015 when Bosch unveiled its new GTS1041A REAXX™ Portable Jobsite Table Saw, which also has injury mitigation technology.

At that time, REAXX was slated to launch in fall 2015, but Bosch's plans were delayed by a U.S. patent infringement lawsuit filed by SawStop. The suit, which seeks to prevent Bosch from selling the saw to the U.S. market, claims that Bosch uses similar flesh-detecting injury mitigation technology

that SawStop patented 12 years ago. (As of press time, final ruling had not been made on the case.)

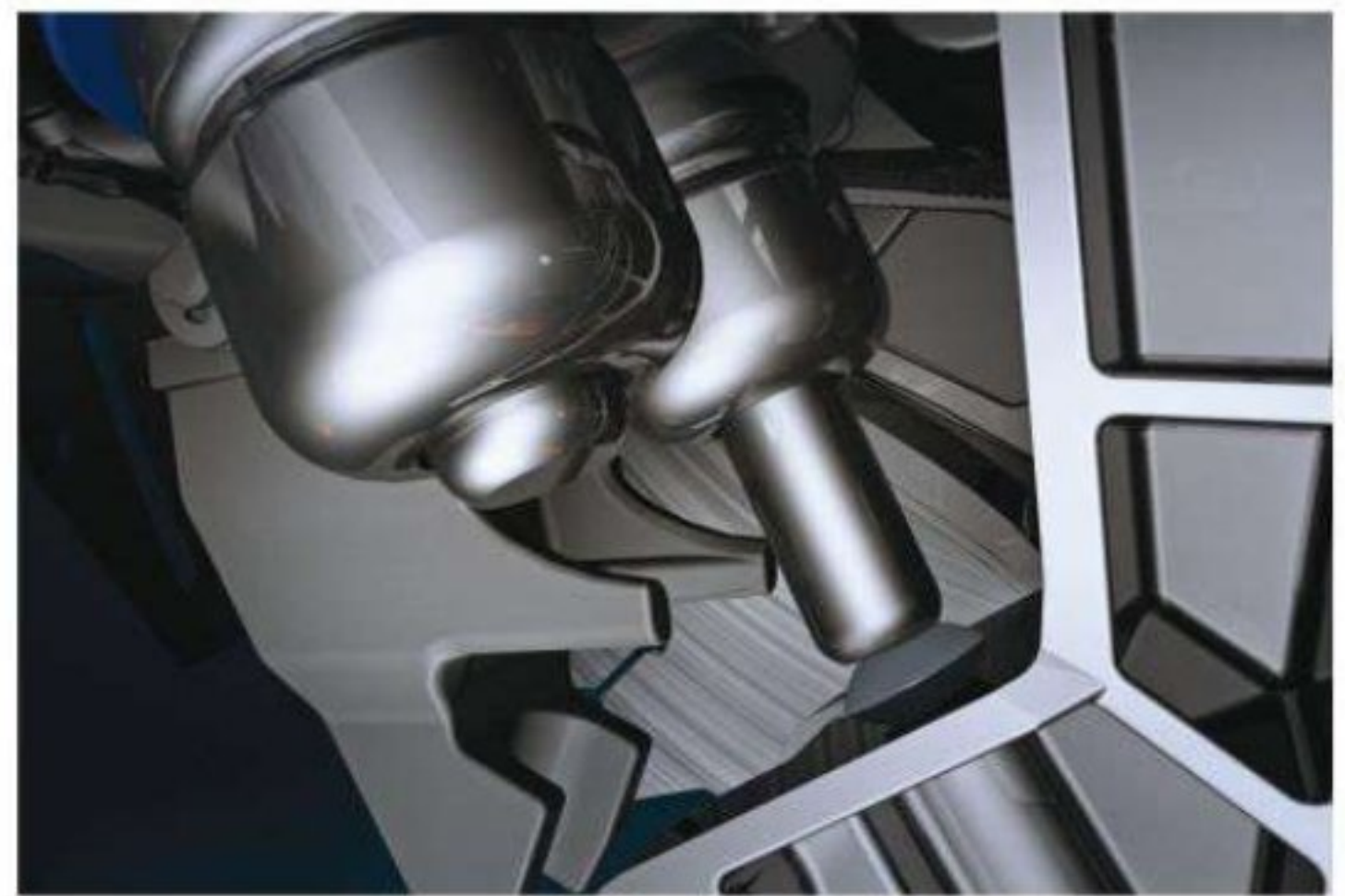
Still, Bosch issued a press release in April announcing that, as of June 1 of this year, REAXX would be available for purchase. "Bosch is committed to meeting the REAXX timelines we have shared with partners and end users," says Linda Beckmeyer, Bosch's manager of media and public relations. So conceivably, we now have two brand options from which to buy a truly safer, "skin smart" table saw.

"We've engineered the Bosch 10" REAXX Porta-





Bosch's easily removable, pressurized activation cartridge responds to two skin-sensing incidents before replacement is necessary.



When the saw's computer detects that the blade has contacted skin during use, the cartridge drives the arbor below the table at a high rate of speed.

ble Jobsite Table Saw to offer users the best injury mitigation system available in the power tool industry," says Craig Wilson, product manager for REAXX.

At the heart of REAXX is Bosch's Active Response Technology™. The saw's built-in computer uses a low-voltage, low-current electrical signal that's imparted into the saw blade. When human skin touches the blade, the electrical signal is altered in a way that creates a unique electrical "signature," which is detected by electronic sensors. Once the signature is received by the computer, it cuts power to the saw motor and initiates a pressurized activation cartridge. The dual-activation cartridge drives the blade arbor below the table at a high rate of speed, stopping an accident short.

While at first blush, this system may seem similar to SawStop's patented design, there are several significant points of departure worth understanding. For one, unlike SawStop's cartridges that embed an aluminum brake into the blade when an activation happens, Bosch's REAXX technology doesn't engage the blade.

"Once it's below the table, a latch engages with the drop mechanism, preventing the blade from rebounding above

the table surface," Wilson says. "The blade coasts to a stop. Due to the high speed that the blade drops, there is no need to incorporate a blade brake into the system."

Another difference involves the ability to reuse the cartridge. SawStop's brake cartridge must be replaced after every activation.

Bosch's cartridge, alternately, can activate twice before replacement. The saw takes about a minute to reset for use again.

REAXX two-activation cartridges sell for \$99. SawStop's single-use blade brake cartridges cost \$69 for a standard blade or \$89 for a dado blade set, plus the price of a replacement blade.

While Bosch's Active Response Technology is only available on REAXX table saws, Wilson says Bosch is willing to license the technology to other saw brands, too. "We would take any inquiries from third parties under consideration," he adds.

The REAXX table saw project has been in development for more than 10 years, Wilson says. It owes some of



its pedigree to the award-winning 4100 table saw series.

The new GTS1041A has a 4hp max-developed universal motor, featuring soft start, constant response electronics and overload protection. Its cast-aluminum table is sized to rip materials up to 25" wide, and it has a pull-out rear extension. REAXX accepts both standard 10" saw blades and 8" stacked dado sets that weigh under 8 lbs.

Bosch includes its Smart Guard blade guard, T-square style SquareLock™ Rip Fence and a Gravity-Rise Stand™ with 8" wheels. The saw, with stand, weighs 123 lbs. It retails for \$1,499.

Learn more about the new REAXX Jobsite Table Saw at boschtools.com/reaxx.

REAXX's design allows the blade to simply coast to a stop. After 25 activations of the safety feature, you need to have the saw serviced.

www.woodworkersjournal.com
MORE ON THE WEB

VIDEO For a video overview of the Bosch REAXX table saw from our staff at the 2015 AWFS show, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

Tool Review

Cordless Brad Nailers

By Chris Marshall



These seven cordless options prove that we don't need noisy air compressors or tangles of hose anymore to drive brads like a pro.

Cordless tool options continue to expand as batteries, motors and electronics become smarter and more energy-efficient. These seven cordless brad nailers are a good case in point. Nowadays, you don't have to attach an air hose or drag a heavy compressor around wherever you need to install 18-gauge brads. Just pop on a battery and you're all set — the nailers are completely self-contained.

I was skeptical of them at first, because I've used lighter weight and smaller pneumatic nailers all along. But after putting 1,000 brads through each of these test tools, I see the advantages. Cordless brad nailers are entirely game for driving brads into tough hardwood, delicate trim moldings and veneered plywood. There's no tangled air hose, no loud compressor kicking in, no burst of exhaust air to blow dust in your

DeWALT DC608K 18-volt

Street Price: \$279 (kit) / \$229 (bare tool)

Weight (with battery): 7.5 lbs. / Brad Lengths: 5/8"-2"

Features: Two firing modes, tool-free jam release, carry case

Battery (included): One 18V XRP™ NiCad and charger

Web/Phone: www.dewalt.com / 800-433-9258



Flipping a lever releases the nose cover on this DeWALT and several other nailers for clearing jams.



face, and plenty of battery run time to get most DIY or wood projects done long before the charge fizzles.

You can buy several of these guns “bare,” too, then use the batteries you already own from other tools to power them, saving money and foregoing another charger.

With five of these nailers, there’s a second or two of “ramp up” time after you squeeze the trigger before the nailer drives the brad. But, that brief delay really isn’t a big deal. You’ll get used to it quickly. I did.

Even if you’re a diehard pneumatics user, read on and imagine the possibility of going cordless, instead.

DeWALT DC608K

DeWALT powers this brad nailer with an included 18-volt NiCad — and that chemistry is a throwback, considering the domination of lithium-ion these days. But, there’s a reason for it: DeWALT remains loyal to contractors that are heavily invested in NiCad-powered

tools. And, this rugged nailer should be appealing to them.

With the battery freshly charged, the gun fired 100, 1¼" brads deftly into pine crown molding without leaving dents behind. Then I drove 525 more 2" brads into some 8/4 poplar test lumber before the battery finally petered out. Just because lithium-ion is sweeping the cordless world, 625 nails proves that NiCad power can still go quite a long distance.

Once the charge was replenished, I put the DC608K to work again, driving a total of 800 brads into poplar and 100 more 1¼" brads into a 3/4" maple plywood corner joint. The tool didn’t falter.

There’s just one oddity about this gun: when you depress the contact element on the nailer’s nose (a standard safety feature) against a workpiece, the tool’s motor starts running. It continues after you squeeze the trigger, too. It does that, in part, to spin up a flywheel, which engages a driver blade that punches the brad into the

wood. But, with other guns the motor starts and stops with the trigger squeeze. Some battery charge seems wasted here this way.

NiCad is typically a heavier battery than lithium-ion, but the weight didn’t impact the DC608K’s balance in hand — it’s very comfortable to hold and use, even overhead, and its 7 lb. weight is about average for the test group.

The nailer has both sequential and contact-actuation modes, which means you can fire a single brad with each trigger squeeze or a series of them by just bumping the contact element, repeatedly. However, it has no dry-fire lockout, so this nailer will continue to fire the driver blade even after the magazine is empty. That’s a useful feature this gun deserves but lacks.

For other extras, the DC608K has a pair of yellow lights for working in shadows and a tool-free jam release. It comes with safety glasses and a hard carry case. At \$279, I think it’s fairly priced.



A tiny toggle switch on the DC608K lets you choose between sequential or contact actuation modes.

MORE ON THE WEB

 For video showing each of these seven nailers in action, please visit woodworkersjournal.com and click on “More on the Web” under the Magazine tab.

Tool Review continued



Makita XNB01Z 18-volt LXT

Street Price: \$249 (bare tool)

Weight (with battery): 7.8 lbs. / Brad Lengths: 5/8" - 2"

Features: Two firing modes, dry-fire lockout, safety lock

Battery (provided for test): 4.0Ah LXT lithium-ion and charger

Web/Phone: www.makitatools.com / 800-462-5482



Makita's slim and tapered nailing tip makes it simple to place nails accurately, yet without denting.

Makita XNB01Z

If you're already invested in Makita, this XNB01Z is a "bare" option that will accept any LXT® lithium-ion 18-volt battery you own — Makita provided a 4.0Ah sample and charger for this test. And just one charge powered through 1,000 fasteners I sank into poplar, pine and plywood. This gun shot and set brads consistently and with gusto.

My favorite detail, among many standard features, is its sharply tapered nailing tip: you can place nails as accurately as a pin nailer with it. I had no trouble targeting pencil marks and crown molding shadow lines. On the grounds of nailing precision, this gun tops them all.

But, the Makita had a big drawback for me, which my wrist reported: it's noticeably imbalanced. The weight of this gun, with a battery installed, is mostly behind the grip and on the battery end. The nose end distributes very little of the weight forward. If you're only firing a few brads, you may not

feel it at first, but holding the gun horizontally in a normal nailing position causes your wrist to correct for the tail heaviness, and that became really fatiguing when driving 800 brads continuously into poplar. My wrist faded long before the test ended.

For features, this gun has dry-fire lockout, a safety lock near the trigger, both sequential and "bump fire" modes and a white LED that helps light the nailing area. Its internal motor hums quietly before each shot and ran cool throughout testing.

You'll need to remove three Torx screws to open the nosepiece if a nail jams, but the gun never misfired.

Milwaukee M18 FUEL 18-volt

Street Price: \$379 (2740-21CT kit) / \$329 (bare tool)

Weight (with battery): 7 lbs. / Brad Lengths: 5/8" - 2 1/8"

Features: Two firing modes, dry-fire lockout, brushless motor

Battery (included): One 2.0Ah M18 RedLithium and charger

Web/Phone: www.milwaukeetool.com / 800-729-3878



The M18 FUEL's slotted magazine has a numeric display to help you estimate how many brads remain.



PORTER-CABLE PCC790LA 20V MAX*

Street Price: \$199 (kit) / \$149 (bare tool)

Weight (with battery): 5.9 lbs. / Brad Lengths: 5/8"-2"

Features: Tool-free jam release, safety lock, LED task lights

Battery (included): One 20V MAX* lithium-ion and charger

Web/Phone: www.portercable.com / 888-848-5175



So, all in all, the \$249 XN-B01Z was a mixed blessing: it's accurate and powerful but ergonomically unforgiving in hand during sustained use.

Milwaukee M18 FUEL

Just this summer, Milwaukee unveiled its M18 FUEL™ Brad Nailer, which comes with an M18™ RedLithium™ 2.0Ah battery that powers many “red” tool options.

Squeeze the trigger, and this nailer grabs your attention fast: it fires instantly and with a brisk recoil. The absence of “ramp up” time is due to the fact that the M18 employs a unique drive system. The tool's motor and piston compresses pure nitrogen inside a sealed cylinder. That provides an immediate source of energy to propel the driver blade.

Milwaukee includes a brushless motor here. These state-of-the-art motors are compact, run cooler and use battery energy more efficiently than standard carbon-brush motors do.

In testing, the M18 dispatched 1,000 1¼" and 2" brads with only a few nails remaining less than fully set. The gun's contact element left some small dents on pine crown molding, due mostly, I think, to the tool's recoil at the tip. There were a few misfires too, but the M18's flip-lever nose release made

them easy to remove from the magazine.

That same big jam-release assembly makes it harder to sight nail positions if you're looking down over the front of the tool, but I found that my accuracy improved pretty quickly. In hand, this nailer balances comfortably.

It took around 800 nails to drain the RedLithium battery of charge (impressive!), and from clip to clip, the gun has a dry-fire lockout feature that stops the action within the last four or five fasteners. Milwaukee also has engineered thermal overload protection into the design: if the electronics get too warm, the gun shuts down until it cools off. Milwaukee says that feature will help extend the overall life of the tool.

You can switch between sequential or bump-fire modes using a push-button selector in back. And, a rear-positioned LED light provides a bit of aid beside the gun when nailing in a dark place.

At \$379, this M18 FUEL kit also includes a canvas bag.

PORTER-CABLE PCC790LA

Maybe brad nailing isn't a regular task, or your modest tool budget must be obeyed. Fair enough. PORTER-CABLE's PCC790LA may be just the kit for you. For \$199, its flywheel-based drive system and 1.5Ah battery were up to snuff for setting brads into all my test lumber neatly and effectively. The tool's quiet motor helped sink 400 nails before the battery needed recharging, and there was only one jam in 1,000, which cleared easily through the flip-open nose release.

There's no dry-fire lockout here, unfortunately, or bump-fire mode, but the magazine's viewing window will tell you when the clip is low. The gun has ample overmolding and pleasant balance. It weighs just 5.9 lbs — the lightest here. A plastic contact tip prevents marring workpieces, and twin LED lights help guide your way. Among some stiff pro-tool competition, P-C's value-priced brad nailer delivered a good showing.



Cordless brad nailers are heavier and larger than their pneumatic counterparts, but self-contained.



PORTER-CABLE's front-oriented nailing tip made it easy to sight and sink brads along a pencil line. The contact element is behind it.

Tool Review continued



RIDGID R09890B Hyperdrive 18-volt

Street Price: \$229 (bare tool)

Weight (with battery): 7.9 lbs. / Brad Lengths: 5/8" - 2 1/8"

Features: Two firing modes, dry-fire lockout, brushless motor

Battery (provided for test): 5.0Ah lithium-ion and charger

Web/Phone: www.ridgid.com / 800-474-3443

your hand wraps the grip. It's the best task lighting feature among this test group.

This gun's Hyperdrive™ energy system uses two pistons that move in opposite directions to form a vacuum inside a chamber. When you squeeze the trigger, the motor pulls one piston down to draw a vacuum, then a moment later, ambient air drives the top piston down to create the nailing force. You can dial the air pressure up or down with a slider switch on top.

It was plenty powerful for my nailing tests. Brads set and countersunk every time, and the gun operated quietly with almost no recoil. RIDGID provided a 5.0Ah battery for this bare tool; on the first

charge the battery still had gas in the tank after driving 1,000 nails continuously.

For \$229, this gun comes with a canvas bag and 500 1 1/4" brads. RIDGID backs it with free replacement of seals, pistons and driver blades for life. While not the least expensive bare unit here, the R09890B proved to be an exceptional tool.

RYOBI P320

If you have other RYOBI One+™ tools already, \$129 will add a brad nailer to your cordless options — and it's a dandy! In fact, given all

Continues on page 54 ...



RIDGID's Hyperdrive is powered by a brushless motor. They're small, energy-efficient and should outlast carbon-brush motors.

RIDGID R09890B

At 7.9 lbs., this orange and gray nailer has a hefty feel in hand, but RIDGID balances the weight well. It wasn't unwieldy, even when fastening crown molding overhead. Lavishly overmolded, the soft rubber lends a comfy grip.

RIDGID packs the R09890B with many desirable features: two firing modes, dry-fire lockout, a brushless motor and tool-free jam release. A slender button behind the trigger lights up a front LED, so you've got improved visibility as soon as

RYOBI P320 One+ AirStrike 18-volt

Street Price: \$129 (bare tool)

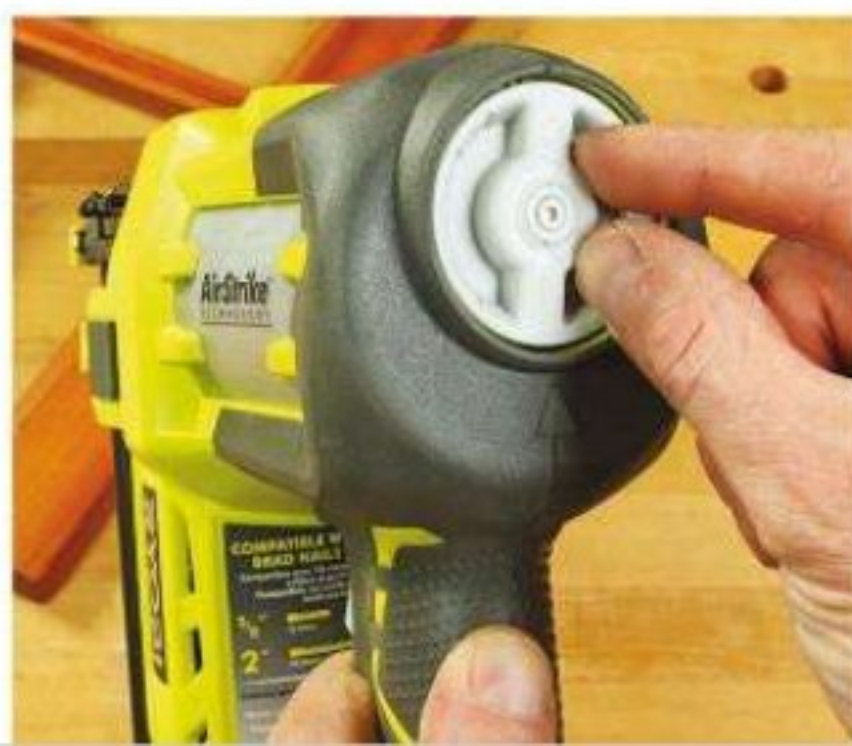
Weight (with battery): 6.9 lbs. / Brad Lengths: 5/8" - 2"

Features: Two firing modes, dry-fire lockout, grip LED

Battery (provided for test): 4.0Ah lithium-ion and charger

Web/Phone: www.ryobitools.com / 800-525-2579

A large dial atop the RYOBI P320 lets you adjust air pressure easily to suit the nailing situation.



Chicago Doctor Invents Affordable Hearing Aid

Outperforms Many Higher Priced Hearing Aids

Reported by J. Page

CHICAGO: A local board-certified Ear, Nose, and Throat (ENT) physician, Dr. S. Cherukuri, has shaken up the hearing aid industry with the invention of a medical-grade, affordable hearing aid. ***This revolutionary hearing aid is designed to help millions of people with hearing loss who cannot afford—or do not wish to pay—the much higher cost of traditional hearing aids.***

“Perhaps the best quality-to-price ratio in the hearing aid industry”

— Dr. Babu, Board-Certified ENT Physician

Dr. Cherukuri knew untreated hearing loss could lead to depression, social isolation, anxiety, and symptoms consistent with Alzheimer’s disease. **He didn’t know why hearing aids were so expensive when the prices on so many consumer electronics like TVs, DVD players, cell phones, and digital cameras had fallen.**

Since Medicare and most private insurance plans do not cover the costs of hearing aids, which can cost between \$2,000-\$6,000 for a pair, many of the doctor’s patients could not afford the expense. Dr. Cherukuri’s goal was to find a solution that would help with the most common types of hearing loss at an affordable price, similar to the **“one-size-fits-most” reading glasses** available at drug

- **Designed by a Board-Certified Ear, Nose, and Throat (ENT) Doctor**
- **Doctor-Recommended, Audiologist-Tested**
- **★★★★★ Top Rated Hearing Aid Online—Thousands of Satisfied Customers**
- **Save Up To 90%**
- **FDA-Registered**
- **Free Shipping Available**
- **Batteries Included! Comes Ready To Use**
- **100% Money Back Guarantee**



stores. He evaluated numerous hearing devices and sound amplifiers, including those seen on television. Without fail, those were found to amplify bass/low frequencies (below 1000 Hz) and were not effective amplifying the frequencies related to the human voice.

Inspiration from a Surprising Source

The doctor’s inspiration to defeat the powers-that-be that kept inexpensive hearing aids out of the hands of the public actually came from a cell phone he had just purchased. **“I felt that if someone could develop an affordable device like an iPhone® for about \$200 that could do all sorts of things, I could create a hearing aid at a similar price.”**

Affordable Hearing Aid-Superb Performance

The high cost of hearing aids is a result of layers of middlemen and expensive unnecessary features. Dr. Cherukuri concluded that it would be possible to develop a medical-grade hearing aid without sacrificing the quality of components. The result is the **MDHearingAid PRO®**, well under \$200 each when buying a pair. **It has been declared to be the best low-cost hearing aid that amplifies the range of sounds associated with the human voice without overly amplifying background noise.**

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*“I have a \$2,000 ReSound® Live hearing aid in my left ear and the MDHearingAid® PRO in my right ear. **I am not able to notice a significant difference in sound quality between the two hearing aids.**”*

—Dr. May, ENT physician

*“They work so great, my mother says she hasn’t heard this well in years, even with her \$2,000 digital! **It was so great to see the joy on her face. She is 90 years young again.**”* —Al P.

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Tool Review continued



SENCO F-18 Fusion 18-volt

Street Price: \$329 (kit)

Weight (with battery): 6 lbs. / Brad Lengths: 5/8"-2 1/8"

Features: Two firing modes, dry-fire lockout, tool-free jam release

Battery (included): One 1.5Ah lithium-ion and charger

Web/Phone: www.senco.com / 800-543-4596



Pure compressed nitrogen, stored in a front vessel, provides Fusion's firepower for driving brads.



All seven nailers offer LED task light, and SENCO's front mounting makes it even more useful.

the standard features that come with it, I'm surprised it's priced so economically. The nimbly balanced P320 includes both sequential and bump-fire modes, and it stops firing when you're down to five or so brads to protect the driver blade. It also shares RIDGID's grip-activated light styling, with two bright LEDs that shine down in front.

Here's how RYOBI's AirStrike™ system works: a single piston inside pressurizes ambient air with each trigger squeeze, and that's what drives the brad. The motor is quiet and the ramp-up time is brief. This nailer sinks even long brads into thick hardwood without unpleasant recoil — and mine didn't dent delicate pine trim or veneered plywood, either. You can fine-tune how deeply to countersink those nails with a large air pressure dial on top — it's unique to RYOBI. Plus, there's a second contact element adjuster wheel in front to set countersink depths. (The other guns are similarly appointed.)

If the nailer should happen to jam, you'll be able to clear the brad by popping open a tool-free release on the nose. My nailer didn't clog up once over 10 clips of 100 brads.

RYOBI includes 500, 1 1/4" brads with the tool. See the P320 at Home Depot stores.

SENCO Fusion F-18

SENCO was first to offer a nitrogen-based drive system in this "Fusion" line several years ago. It functions similarly to Milwaukee's M18 FUEL drive. And, like that gun, this nailer fires revolver-fast, with about the same amount of blunt recoil. But even with a powerful nailing force, the F-18 left behind tidy nail holes without dents.

SENCO says its sealed nitrogen "vessel" should last 100,000 nailing cycles before needing any service.

While quite tall, the Fusion is about a pound lighter than the M18 FUEL. It's slender and evenly weighted from front to back.

Pushing an illuminated switch allows you to choose between single-shot or contact actuation. I appreciated

how, unlike other nailers here, the Fusion will shoot every single nail in a clip before engaging the dry-fire lockout feature; you won't be left with a little stick of four or five fasteners to get hung up inside the magazine when you load the next clip. It also shuts off when the 1.5Ah lithium-ion battery needs recharging but before nailing performance suffers. Nice.

In testing, the battery lasted through 700 brads and then needed topping up. SENCO says the included charger will replenish it to 80 percent in just 15 minutes.

The Fusion's contact element is located ahead of the nailing tip, which makes it a little harder to visually position nails than when it's behind the tip. But, you'll get the hang of it. And, its well-placed front LED light helps you see your target better.

Priced at about \$50 under Milwaukee, SENCO's F-18 Fusion kit with canvas bag edged it out by a nose in features and performance.

Chris Marshall is senior editor of Woodworker's Journal.

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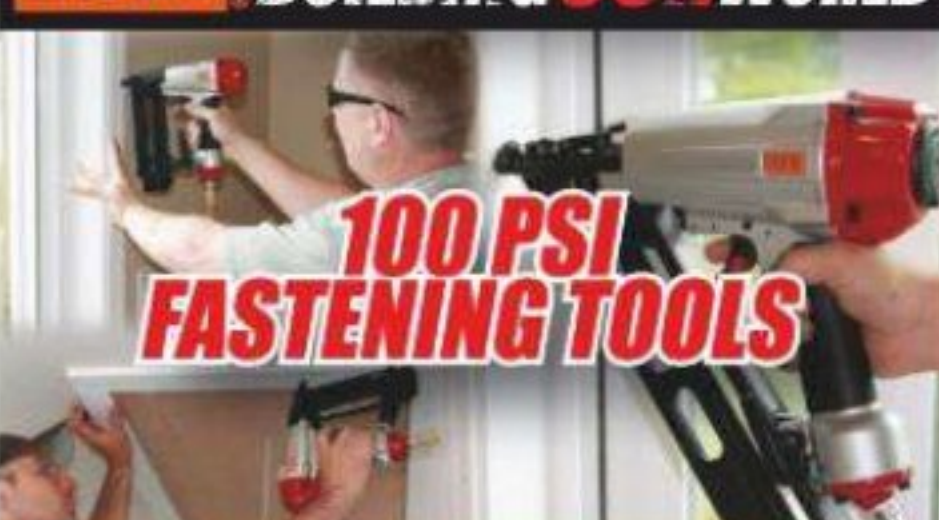


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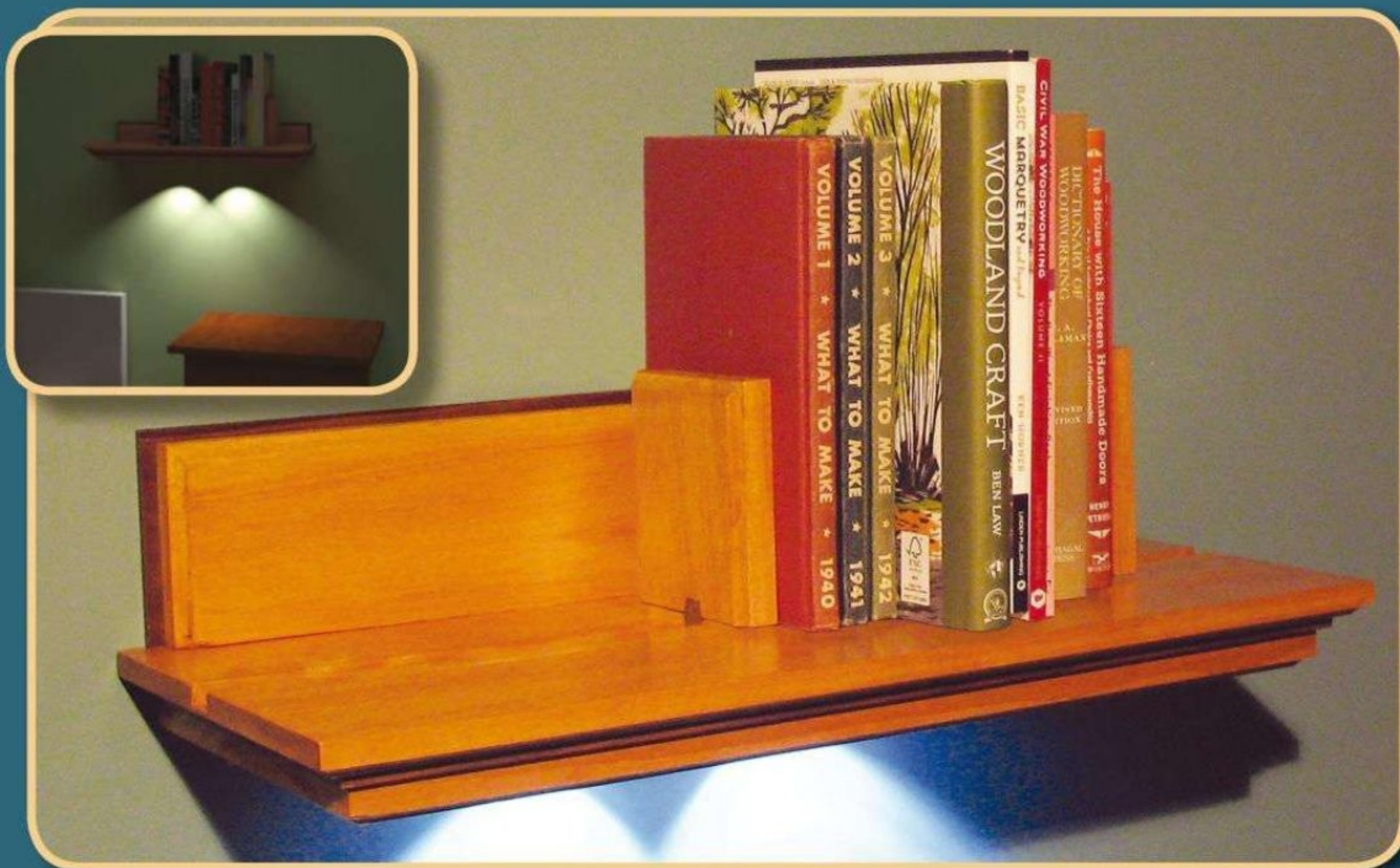
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Weekend Projects

Lighted Bookshelf

By Woodworker's Journal Staff



A good-looking bedside shelf that holds a small collection of special books and a memento or two can provide a really nice touch. And gentle, battery-powered LED lights will aid in nocturnal perambulation, especially if you share a bed with someone who is a light sleeper. This blind-mounted shelf will handle both of those tasks with ease. And you can build it in a weekend, no sweat.

Kicking it Off

We made this lighted bookshelf from Red Grandis® Eucalyptus, a plantation-grown variety that looks good and is easy to machine (see *sidebar*, page 62). We also added some local black walnut to our design as an attractive accent.

You will need some pretty wide boards for the main shelf components, so if your stock is narrower than about 10", you'll need to butt join enough 3/4" stock to make the main and bottom laminations (pieces 1 and 3). Chances

are you will need to do the same for your 1/4" stock to serve as the thin lamination (piece 2).

While those pieces are in clamps and the glue is curing, you can go ahead and make the front and rear trim pieces and the bookends (pieces 5, 6 and 7). Rip and cut them to length and set them aside for the moment. Then, when the glue has



Gluing up enough 10"-wide stock for the main shelf components is the first step in the process. You'll need three wide pieces.



Crosscut the stock to length on the table saw with a miter gauge. A circular saw or a sliding miter saw could also handle this task.



To add shape and shadows to the shelf, a 3/8" cove is routed into the edges and ends of the 3/4" stock. This works best on a router table but can also be done with a handheld router.

cured in your larger panels, scrape off the squeeze-out and cut the pieces to final size, according to the *Material List* on [page 58](#).

Start Shaping

Most of the 3/4"-thick pieces on this shelf have a 3/8" cove routed into their exposed edges and ends. It visually splits the thickness of the components in two. And, because each piece is smaller than the one above, when you assemble the stacked shelf components the edges form an attractive molded shape. The easiest way to form the cove is with a bearing-guided bit chucked into a router table. Rout the cove into the 3/4" stock where appropriate.

Dovetail Details

One really nice detail of this shelf is that the bookends are attached to the shelf with dovetail sliders. As you can see in the *Drawings* on [page 58](#), the sliders fit into a long dovetailed groove. This "locks" the bookends into the shelf and keeps them from falling off. The sliders are then glued and screwed to the bookends with countersunk screws.

The best way to make all those parts fit together is to begin by plowing the

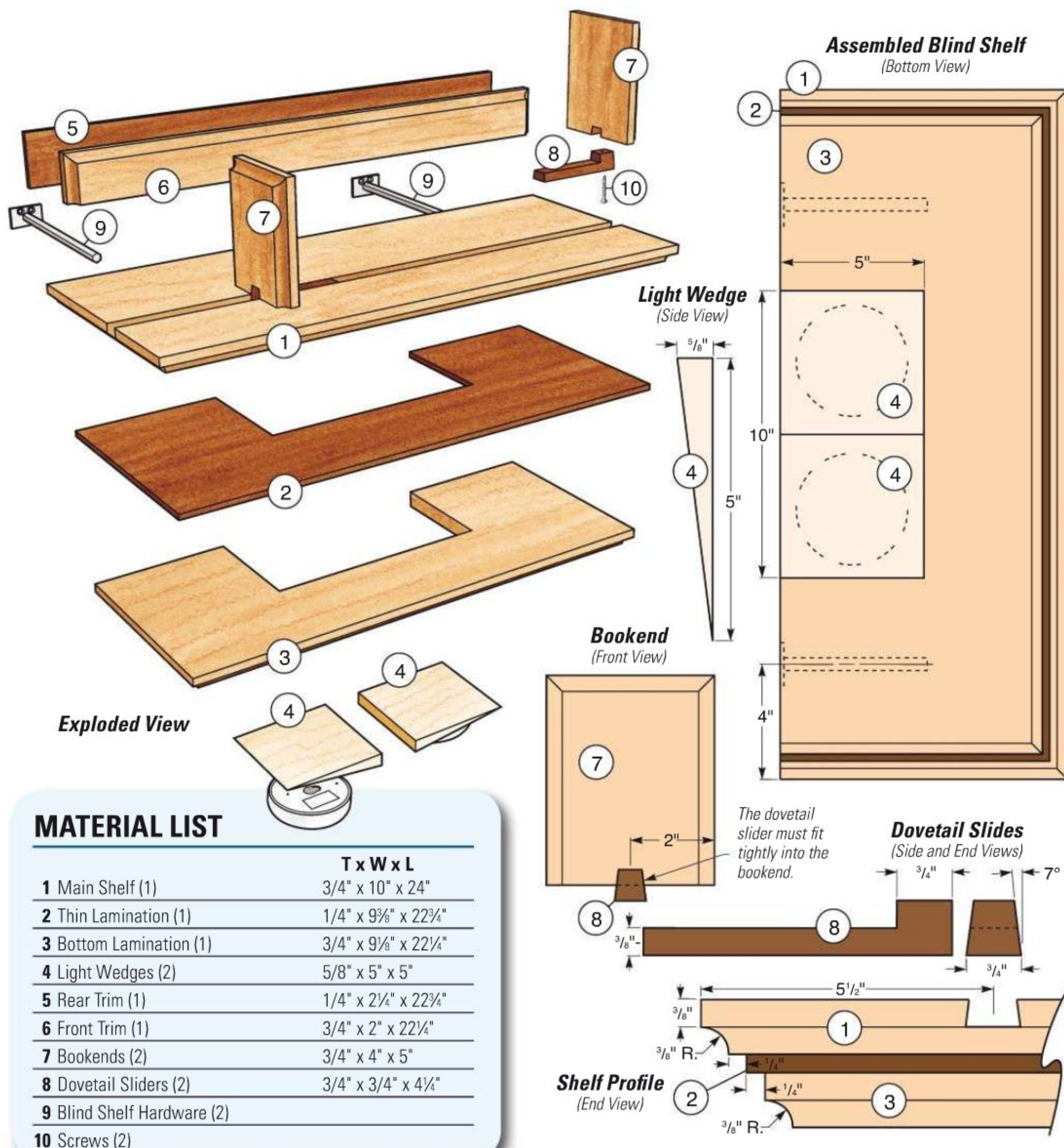
dovetail groove into the top of the main shelf. Because dovetails need to be routed at their full depth, it is a good idea to remove some of the stock in the groove before you use the dovetail bit. You can use a 5/8" straight bit in the router table, or even plow away some of the material on the table saw. Once you are ready to make the dovetail groove, mill it in one smooth operation, holding the board firmly against the fence and the surface of the router table. If you don't have a router table, use a router with an edge guide.

Now that you have the dovetail groove completed, it's time to make the sliders

Plowing a dovetail groove is best done with a two-step process. First, clear out most of the stock with a straight bit (upper inset), followed by the dovetail bit (lower inset).



Weekend Projects continued



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table saw will work in a pinch. Set the blade angle to match the dovetail bit ... in our case, it's 7°. Then rip an overly long piece of stock (a blank several inches longer than the two sliders added together), a small amount wider than the groove. Flip the piece around and form the matching angle. We used

Continues on page 60 ...

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MORE ON THE WEB

VIDEO For videos on the skills of notching the dovetail sliders and installing shelf hardware, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.



If you don't have a router table, you can cut the 7° sliders with a table saw. It will require a substantial push block, like this GRR-Ripper, for added safety.

a GRR-Ripper® 3D Push Block (see above) to hold the stock securely. Test the fit in the groove — it should be a smidge too wide — then estimate how much material you need to remove to have it fit and recut the piece. Remember, you can always cut more stock away, but putting it back onto the piece is much trickier. When the slider blank moves easily through the groove, you've got the fit you need. Then cut each slider to length. If you look at the *Drawings*, you'll see the sliders have

some additional material removed. It is explained in the *sidebar*, below.

Now for the penultimate step in this process: cutting matching notches in the bookends to fit the sliders. The easiest way to do that is to put a slider in the groove and trace the shape of the notch onto the bottom of each book-end. Now you can cut the angles of the notch with a handsaw. Next, you need to remove this waste. We did that by nibbling it away on the table saw using a sacrificial fence mounted to our miter



Two large rectangular sections are cut out of the lower two laminations of the shelf. Use a handheld jigsaw to remove the material.

gauge. You will need to adjust the fit on these notches — do that with a sharp chisel. When they all fit together well, drill countersunk holes up through the sliders and then glue and screw the sliders to the bookends.

Racing to the End

There are a few more machining steps to go on this shelf. The first is to remove a large rectangular section from the bottom two laminations (photo above) to make room for the light wedges. Lay out the shapes and cut the stock using a handheld jigsaw.

Now make the two light wedges (pieces 4) from 5"-wide stock. We used some pine we had on hand. We cut the wedges on a band saw, but you could form them using a handsaw if that works better for you.

That's it for "making pieces," but now you need to do the assembly. That means sanding the flat pieces individually before

Continues on page 62 ...

Notching the dovetail sliders



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The properly fit sliders have additional stock removed so that the material not joined to the bookends sits flush with the surface of the main shelf.

We used a Japanese hand saw to remove that stock. Insert the slider blank into the dovetail groove and mark it level with the top of the shelf. Step to a workbench and complete the layout of the notch (see the *Drawings*). Make the two cuts, then fit it back into the shelf groove. Use a random orbit sander to sand it even with the top of the main shelf.

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Weekend Projects continued

glue-up rather than later. We glued up the back trim subassembly first and set it aside for the time being. Then move to the shelf pieces. Even though it is a simple assembly, go ahead and test fit all the parts together. Remember, glue-up is not a step you can easily reverse. When everything fits as it should, glue and clamp all the laminations together. You can glue the light wedges in place simply by putting glue on both surfaces and “rubbing” the wedges in place until they grip. No clamps needed!

Preparing for Hardware

Before you glue the back trim subassembly in place, you need to drill a couple of holes and chop a couple of mortises for the blind shelf hardware (pieces 9). Start by laying out the hole locations at 16" apart. It should be stated that when you mount a “floating” shelf like this, you need to mount it to wall studs (usually 16" apart) or with substantial wall anchors. Your judgment in this task is critical to the shelf’s success. See the *sidebar* at right for more information.

Finalizing the Last Details

Take a couple of minutes and look carefully for glue squeeze-out. Get rid of it if you find some. Then give the shelf

Installing the blind shelf hardware



Mark two hole locations 16" apart on the shelf and grab a 1"-diameter Forstner bit to drill shallow 1/8"-deep holes. Now switch to the extra-long drill bit required by the hidden shelf hardware, drilling into the center of the shallow holes.

Guide the bit inside a doweling jig (top right photo), if you have one, to keep it drilling straight. Then place the assembled shelf hardware into the holes, square up the backplates, and trace around them.



Chisel these two mortises so the backplates will recess flush with the shelf edge.



parts a final sanding at 220-grit. Find the back trim subassembly you made earlier and glue it in place on the shelf, doing your best to avoid squeeze-out. When the glue has cured, you are ready to apply a finish. Here’s some good

news if you’re new to this wood species: The Red Grandis takes stains well, so if you have a stain color in mind, test it on some scrap pieces to be sure you like it. Then go ahead and apply the stain and an appropriate topcoat. We used a wash coat of amber shellac to add color to the Red Grandis and also as a sealer. We followed that up with several coats of lacquer from an aerosol can. For small projects, a spray can works great, and the lacquer dries super fast.

The last detail is to mount the LED lights to the wedges. This is just a peel-and-stick process. We also recommend putting a light coat of wax on the sliders to keep them moving smoothly in the groove. Then attach the shelf hardware to the wall studs with screws and push the shelf into place on them.

This good-looking, fun project can be completed in a weekend. The next time you need to get up at night, maybe for some cocoa, the LED lights will be just the ticket!

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Festool VAC SYS



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Continues on page 66...



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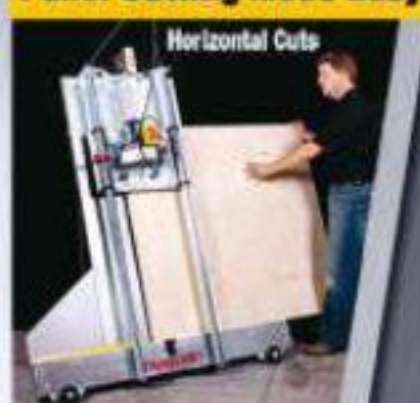
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What's In Store continued

system offers a handy lever and gear to unlock and set table angles in seconds. The 10-326 has a cutting capacity of 13" high and 13⁵/₈" wide and runs on a 1³/₄hp motor with blade speeds of 2,950 or 1,445 feet per minute. The cast-iron work table is sized at 21¹/₂" x 15³/₄". The saw also has a rear 115-volt power outlet and a 4" dust port in the lower wheel compartment. The 10-326 has a suggested price of \$999.

The new **Scribe-Master Cope Pro jig** speeds up the traditional coping process by using a router with a series



Scribe-Master Cope Pro jig

of stainless steel combs (each 0.2" thick) grouped in a block to form a profile copier. The router bit follows the contour of a negative copy of the molding profile to cut a perfect cope on the mating piece. Made in the UK of high-pressure laminate and stainless steel, the Cope Pro jig can cut both left- and right-hand copes and any shape of baseboard or chair rail. It comes with a 1/4" shank, twin flute spiral cutter, screws, workpiece clamp and comb alignment tool and is priced at \$399 on Amazon.

FEIN has released new oscillating power tools with their patented *Starlock tool-mount accessories*. Released in January 2016, the Starlock accessories can be changed in less

than three seconds. They have a recessed, three-dimensional mount that is very rigid, and they snap onto the power tool mount to lock in securely. The Starlock accessories line includes over 100 different items; some, such as a profile sanding set and a sanding finger, are patented and only available from FEIN, although the Starlock accessory class is compatible with most manufacturers' oscillating machines with 12-point mounts. FEIN's new oscillating tools include the *MultiTalent FMT 250 (Q) SL*, an entry-level cordless tool with 12-volt lithium-ion batteries that weighs 3.3



FEIN Starlock tool-mount accessories, MultiTalent oscillating tool

lbs., as well as a new *FEIN MultiMaster FMM 350 QSL*, available in three different sets with accessories, which runs on a 350-watt high performance motor with a tacho generator for continuous, fast work progress. Pricing for the MultiTalent will start at around \$149, and for the lowest-end MultiMaster kit at about \$199. Starlock accessory prices range from around \$8 to over \$100.

RIDGID's new *GEN5X Brushless 18-volt 7¹/₄" Circular Saw, Model R8653B*, uses brushless motor technology to deliver more run-time, more power and a longer motor life. A sight-line blower directs debris away from the cut line for increased visibility, while a micro-texture overmold enhances the user's grip. A grip light engages independently of the trigger to illuminate your work space. The R8653B has a no-load speed of 3,800 rpm and positive stops from 0° to 56°. Suggested price is \$139.



RIDGID GEN5X Brushless 18-volt 7¹/₄" Circular Saw R8653B



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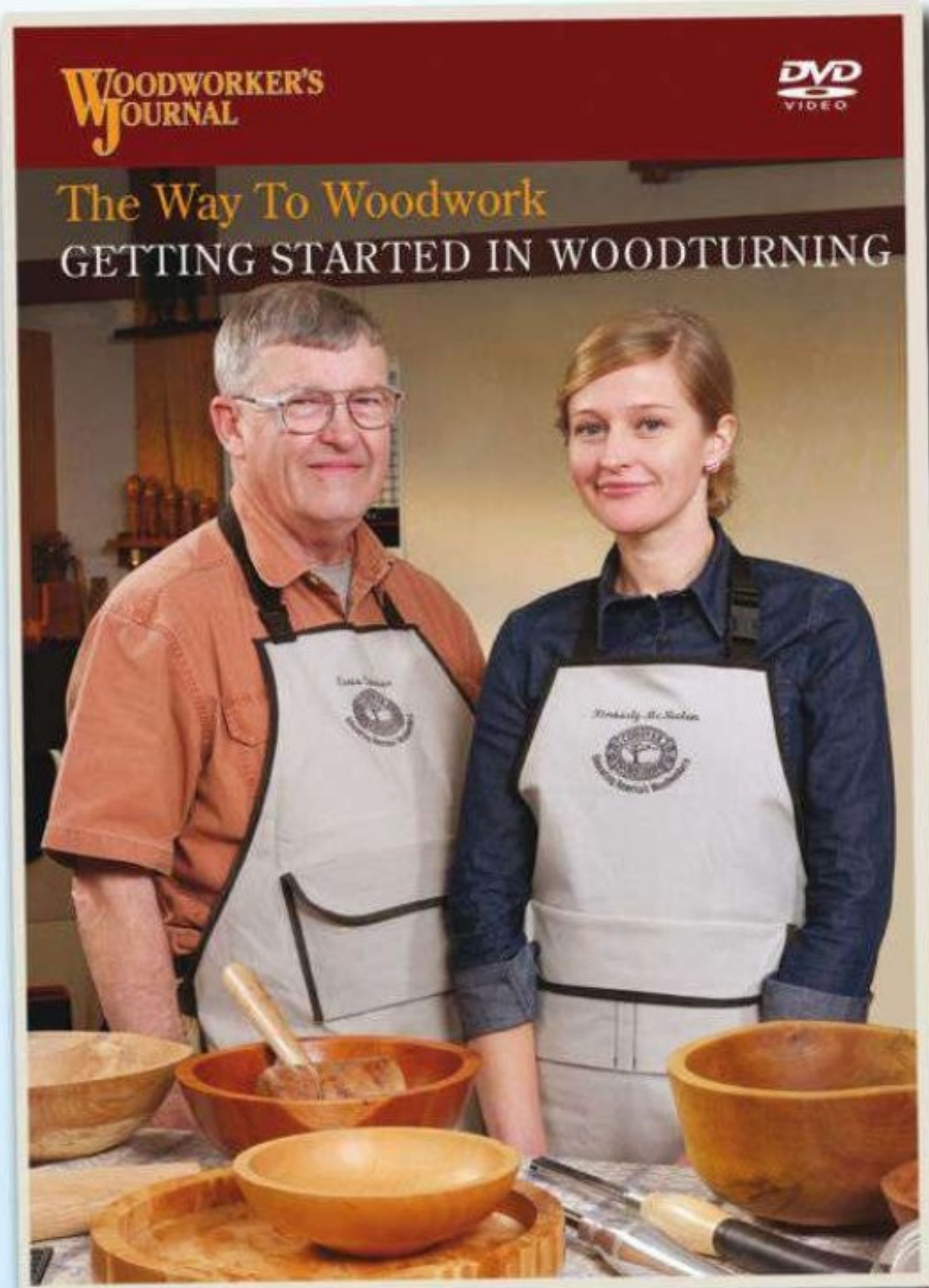
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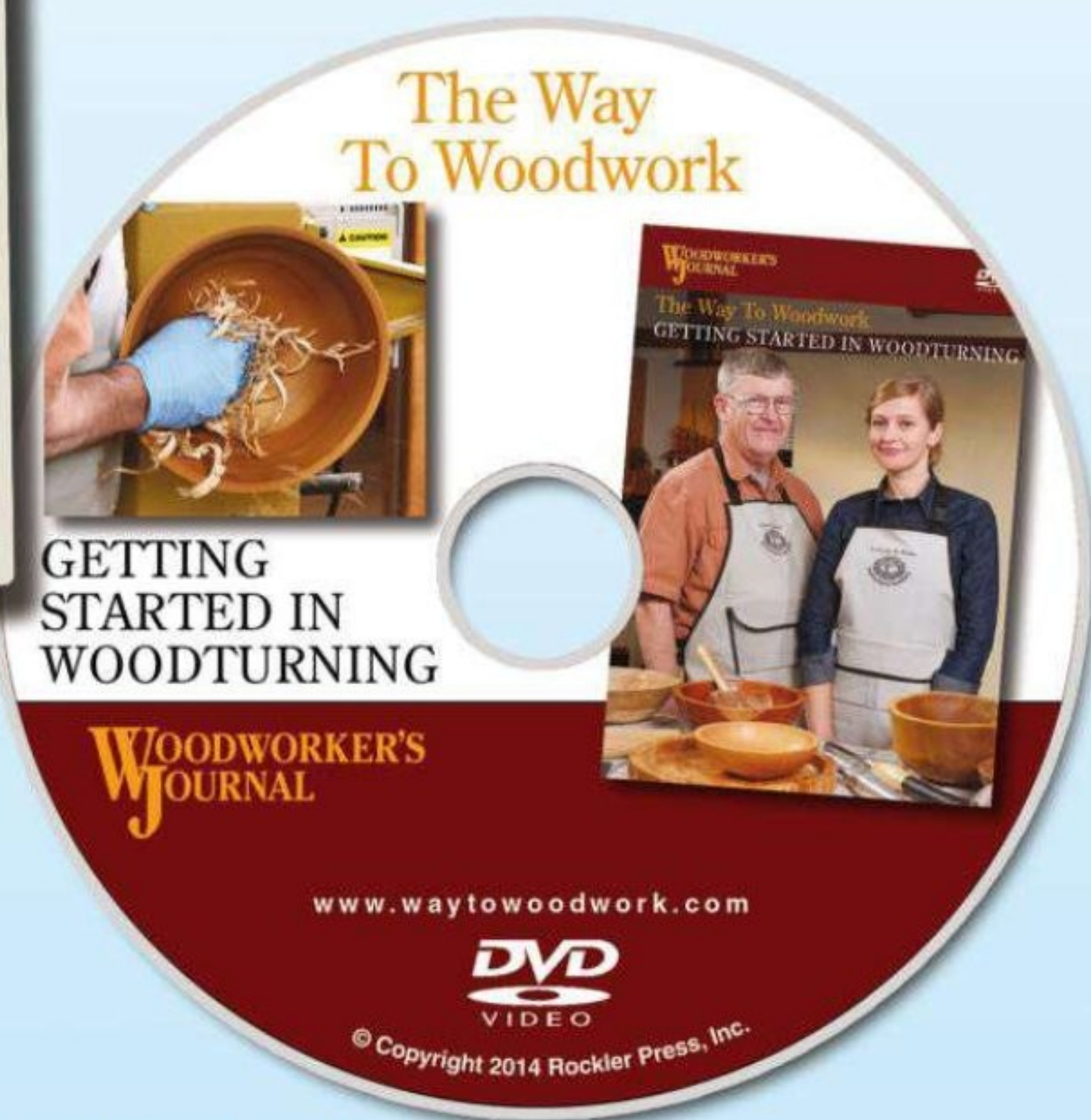
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The Way To Woodwork: Getting Started in Woodturning

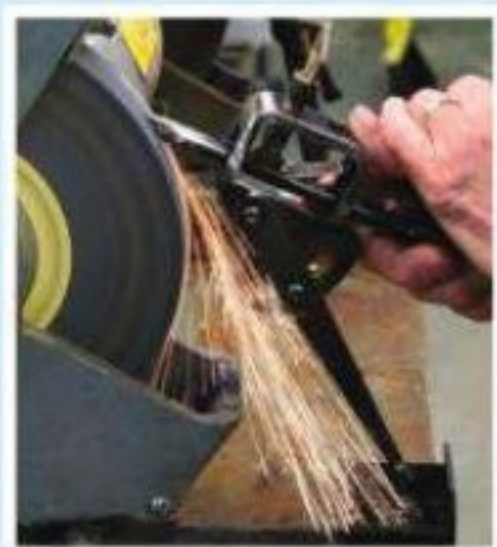


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Finishing Thoughts

Electrifying Electrics

By Michael Dresdner

Paint a solid body guitar to get a good look for your great sound.



Typically, they are easy to spray and dry quickly. If you've sprayed furniture lacquer, you'll have very little trouble spraying these automotive paints.

Prime

Every wood pore, divot, defect, or nib which would be easy to ignore in a clear wood finish will be glaringly obvious in a glossy solid color. Thus, preparation goes much further than usual.

Start by putting any defects and sanding the raw wood until it is smooth. If it is an open pore wood, fill the pores



Michael Dresdner

is a nationally known finishing expert. He shares his expertise on the DVD *The Way to Woodwork: Step-by-Step to a Perfect Finish*, available through the store at woodworkersjournal.com.

Building a solid body electric guitar is a challenge well within the abilities of most woodworkers, and a fun project to boot. While a guitar can be finished just like furniture, solid body guitars are traditionally done in rich dyes if the wood is figured, or in vibrant solid colors, metallics and pearls if it is not. This time around, we'll talk about solid colors, and leave the dyed and sunburst guitar finishes for another day.

What to Use

Most commercial guitars are finished with two-part chemically cured or UV cured coatings. These finishes are very durable, but difficult

to repair or remove, and more challenging to apply. However, there's no reason to resort to these "bullet-proof" coatings.

Single-part automotive plain and polyurethane buffed lacquers don't require mixing, and they will work just fine for our purposes. They are available at any auto paint store and come in a huge range of colors, including metallics and pearl.



You need pore filler for open pore wood or exposed end grain to prevent visible defects on your guitar.



Apply several coats of automotive primer. If you sand through to the wood, apply more primer.

with pore filler. That goes for any exposed end grain as well. For a refresher on that, see the pore filling section of the gloss finishing article from our February 2016 issue, online at this issue's More on the Web.

Apply several coats of automotive primer, which you can buy where you buy your paint, or use Zinsser BIN or 123. Primers can be any color since they'll be hidden. Even minor

defects will show themselves in a solid color. Putty again, sand, and recoat with primer until you have a perfectly smooth, defect-free primer surface. If you sand through to the wood, add more primer.

Color

Guitars are often finished in popular past and current automotive colors, so you've got a huge range to choose from. One customer, a rather famous musician, had me paint his favorite Fender Stratocaster to match his Seafoam Green '57 Chevy Bel Air.

Spray several coats of colored lacquer atop the perfectly smooth primer. If you get dust nibs or defects, sand them out with very



Auto colors, like 1950s Seafoam Green, are popular for guitars.

fine paper (600-grit or finer) and recoat. Continue until you get a perfectly smooth color coat.

Apply at least three coats, since you'll want enough material on there to buff without going through the color layer, but don't hesitate to add more if you need it. This is one time in finishing when thicker is better. As always,

leave plenty of drying time both between coats and after all the coats are on.

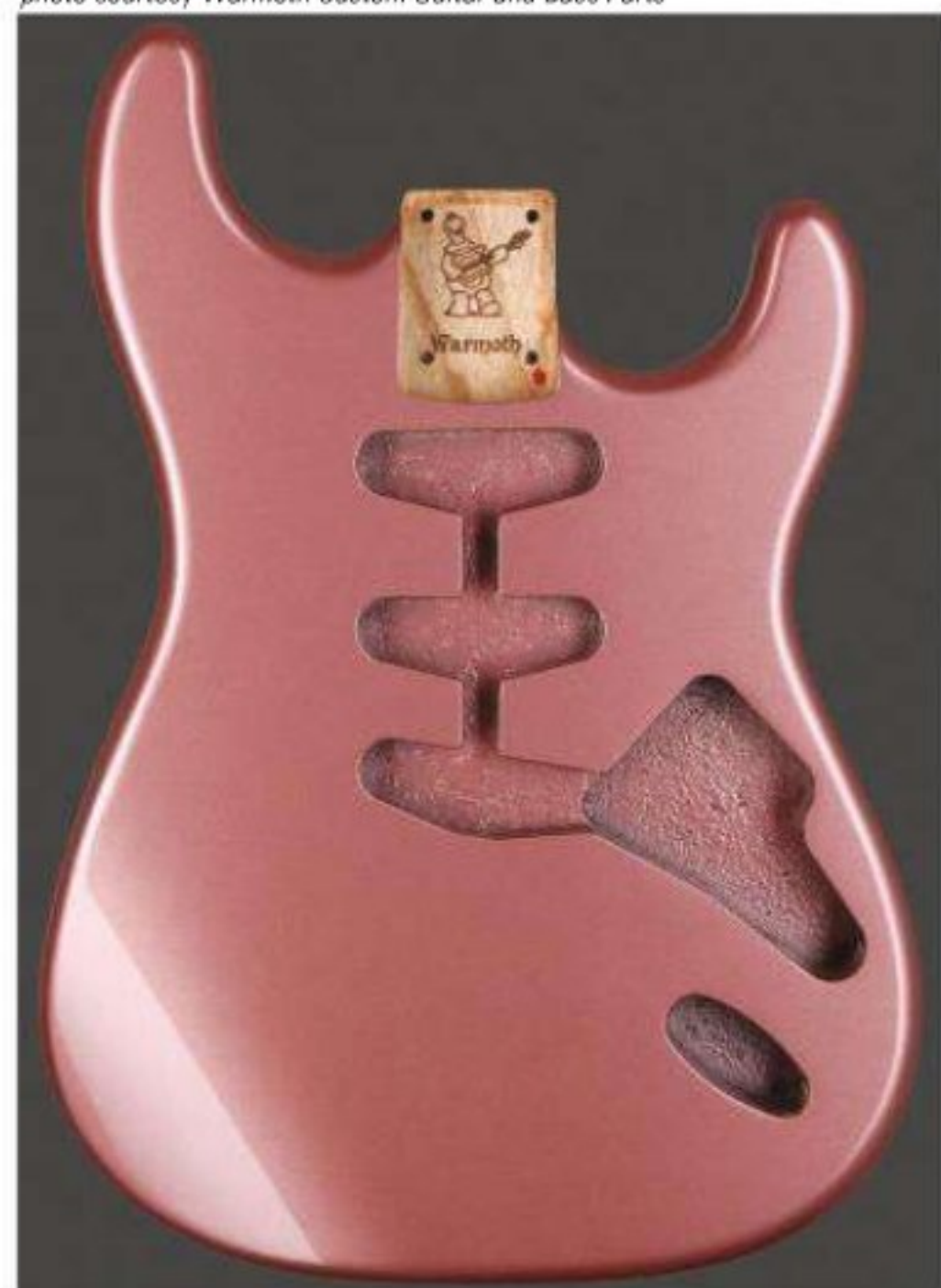
Metallics and Pearls

Colors with metallic flake mixed in can be a bit more tricky to spray, so practice on some scrap first. Smaller flakes are more user-friendly than large ones, which are called metal flake or just flake.

I often spray metallics in one direction, since metal flake sometimes lays down

Continues on page 72...

photo courtesy Warmoth Custom Guitar and Bass Parts



With metallics, the author prefers to spray in one direction to ensure reflective uniformity.

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Please include your address, phone number and email address (if you have one) with your thoughts or questions.

MORE ON THE WEB



For information on using pore filler and a video on buffing a finish, please visit woodworkersjournal.com and click on "More on the Web" under the Magazine tab.

directionally. When it does that, it will reflect light a bit differently when sprayed at right angles to another area, creating what looks like subtle shadows in the finish.

Pearl or pearlescent finishes are just as challenging. While some are mixed into one paint, others require you to spray a translucent pearl coat over a smooth solid color. In that case, spray evenly but sparingly, paying attention to the way the pearl layer alters the color below. It takes some skill to get the color even, with a uniform pearlescence.

With both metallic and pearl, I like to topcoat with several coats of water clear lacquer. That lets me buff and polish the clear coat without impinging on the pearl or metallic layers.

Candy Apple

The term candy apple refers to a two-stage coloring technique that gives a deep, gelid appearance not unlike the red candy apples you probably remember from childhood. First spray a coat

of silver or gold metallic paint over perfectly smooth primer, then follow that with several coats of clear

The first step in the candy apple two-step process is to spray a coat of silver or gold metallic paint over smooth primer.

gloss finish to which has been added translucent dye. Although it uses metallic finish, it has a very different appearance than paints with metal flake mixed in.

As before, prime and sand the wood until very smooth, since any wood pores or dust nibs will show up in the final finish.

Now spray a smooth, even coat of silver or gold metallic finish. Gold works only under red, orange and yellow. Silver works under all colors and won't distort blues, greens and purples, so it's my default background.

Once you get a perfect silver background, let it dry and start spraying coats of clear lacquer with a modest amount of compatible dye mixed in. Trans-Tint® concentrates work well with most clear lacquers.

Creep up on the final color, adding enough layers of tinted lacquer so the finish looks red or green or blue, but still reflects light off the silver below. It's that reflection of light going through the dye and bouncing off the metal flake that gives the finish its illusion of depth.

When the color is right, switch to clear for enough material to buff the surface to gloss without cutting through the color coats.

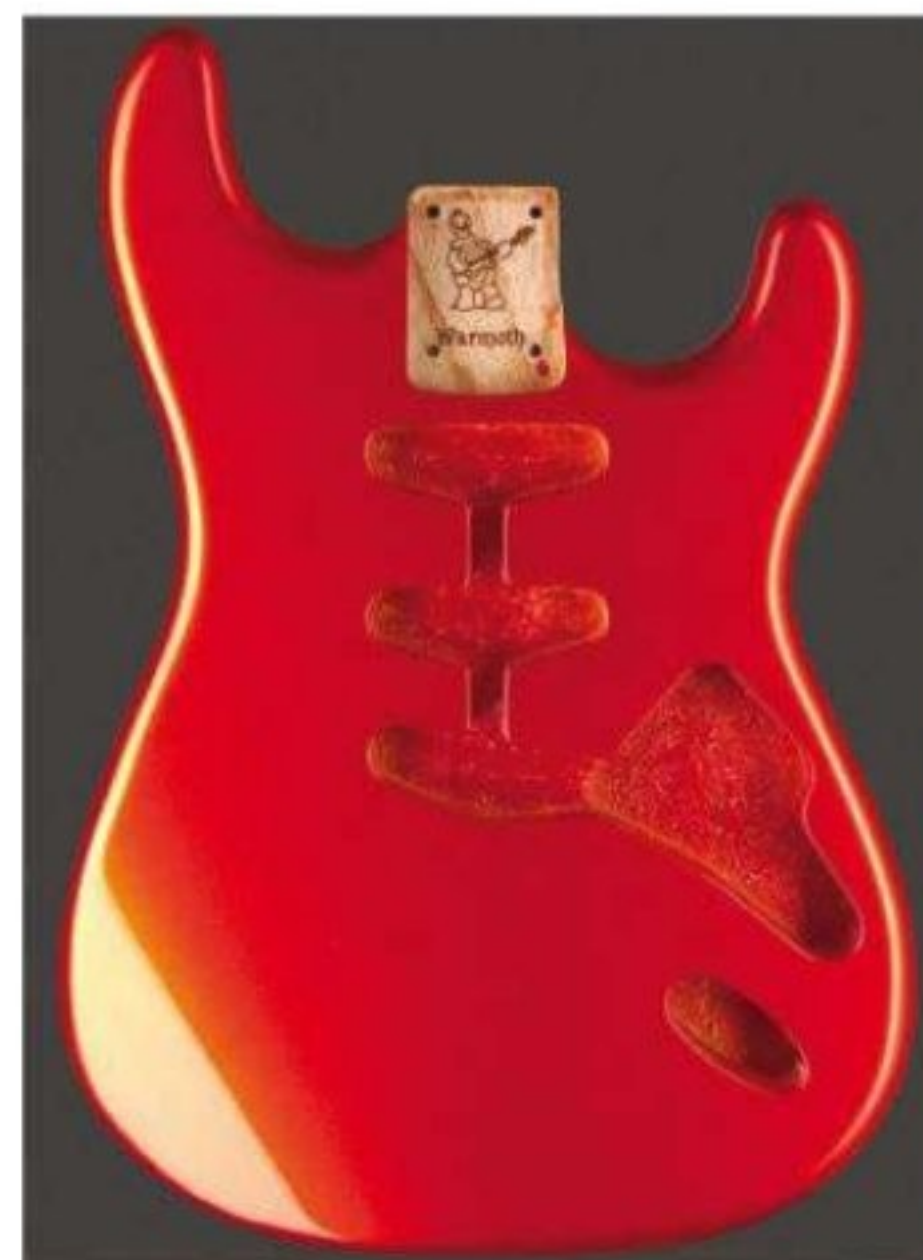


photo courtesy Mammoth Custom Guitar and Bass Parts

The reflection of light going through the dye and bouncing off the metal flake gives the finish the illusion of depth.

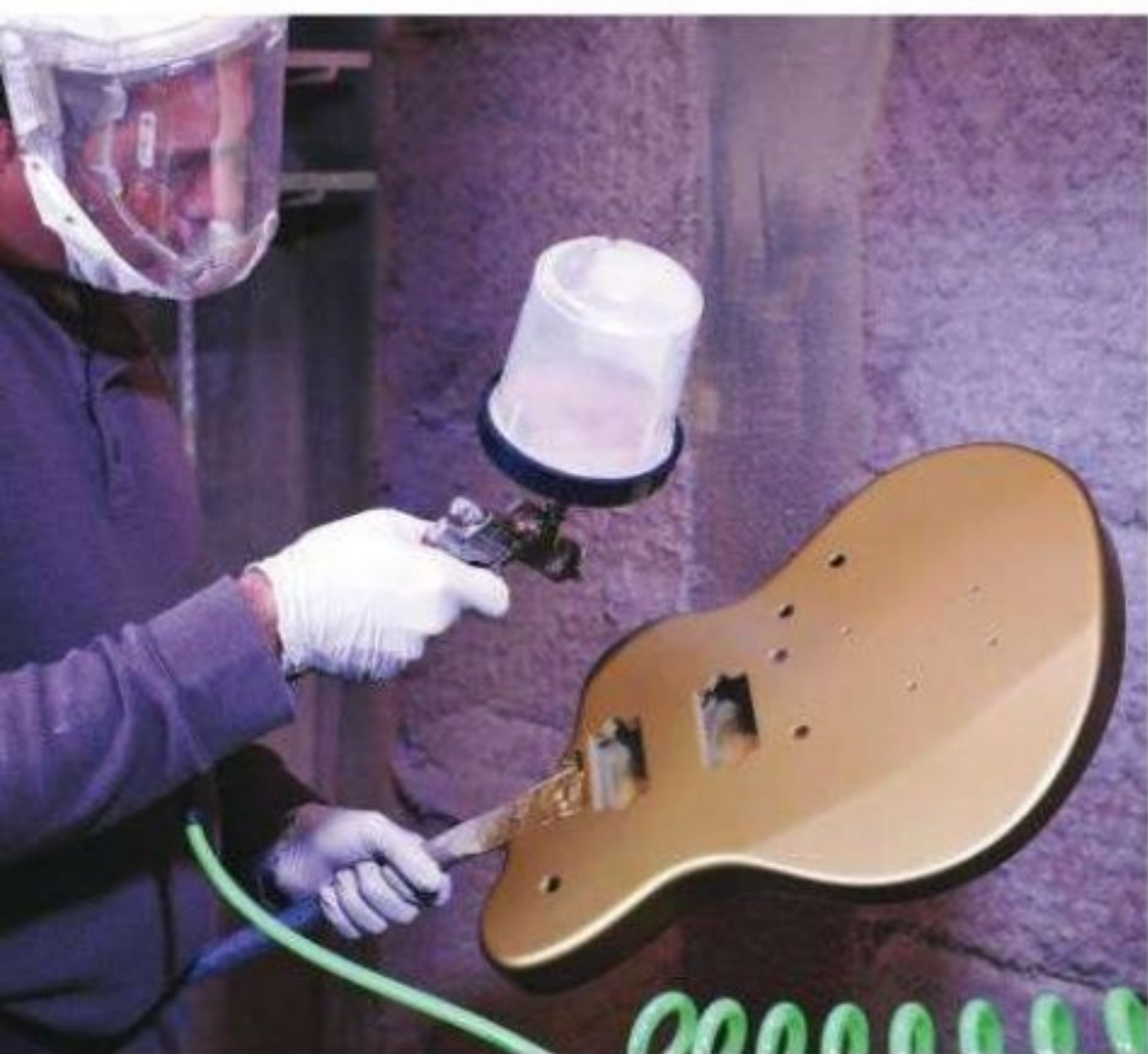


TransTint concentrates mixed with clear lacquer work well for the second step in candy apple finish.

Cure and Buff

The traditional sheen for all solid color guitars is gloss. Give the finish plenty of time to cure before sanding with ultra-fine paper, then bring up the gloss with rubbing and polishing compounds. (For a refresher course on buffing to gloss, visit the More on the Web section of our website for a video.)

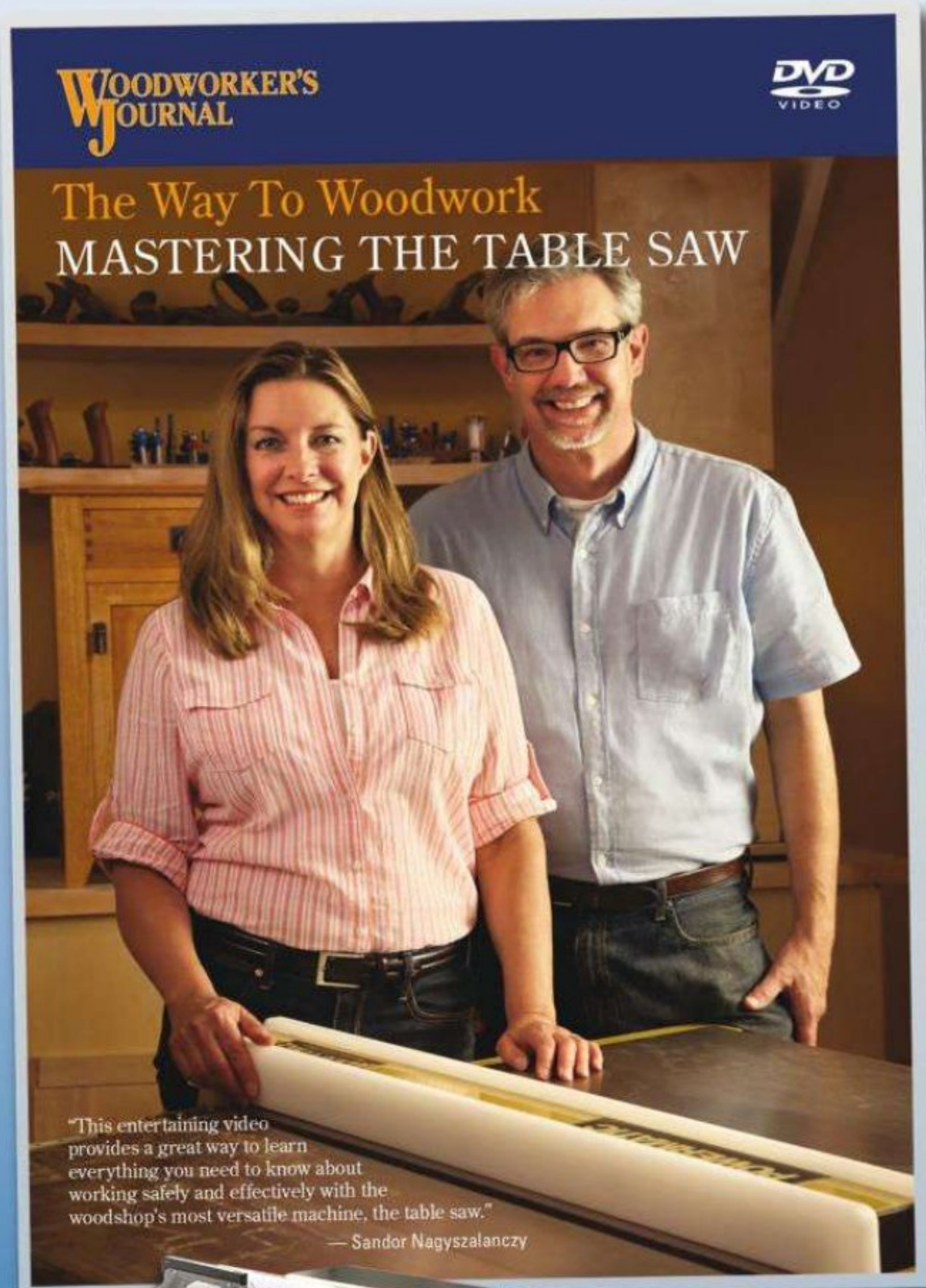
And then, start strumming away. Your instrument will look really cool — how it sounds is up to you.



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HEY Did You Know?

Woodworking trivia: layers of knowledge

Igneous vs. sedimentary: Traditional finishers use pumice for rubbing finishes, but finer rottenstone for polishing them to gloss. They're very different in nature. Pumice is ground-up porous igneous volcanic rock, formed when aerated lava cools quickly. Rottenstone is siliceous limestone powder, a sedimentary rock formed largely of layers of skeletal fragments of marine organisms.

What Does It All Mean?

A quick guide to terms from the world of woodworking.

Cutterhead: The spinning drum in which the knives (blades) of a powered wood surfacing tool such as a jointer or planer are mounted

Forstner bit: A drill bit used for making flat-bottomed holes, often in larger diameters than standard twist drills make

Miter joint: A joint created by joining two pieces of wood cut at complementary angles

Shim: Thin piece of wood or metal slipped into a gap to tighten it



Bark from a linden, i.e. basswood, tree can be made into a glue brush. Using a draw knife, cut off the outer bark and soak about 1½" of the end in water, then pound the soaked area with a hammer on a wooden block until soft bristles are formed.



Photo by R. Delahanty, courtesy of Evergreen Museum

The Spruce Goose, built by Howard Hughes, is the largest all-wood airplane ever built, but the plane is actually made almost entirely of birch, not spruce. It flew only once, quite successfully, on November 2, 1947, with Howard Hughes and David Grant at the controls.

Submit your own trivia ...

Send in a curious fact about your favorite topic and ours: woodworking. If it is selected for use, you will win an awesome prize!

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Your Trivia Test:

Q What is the formula for moisture content (which can account for half the weight of newly felled wood)?

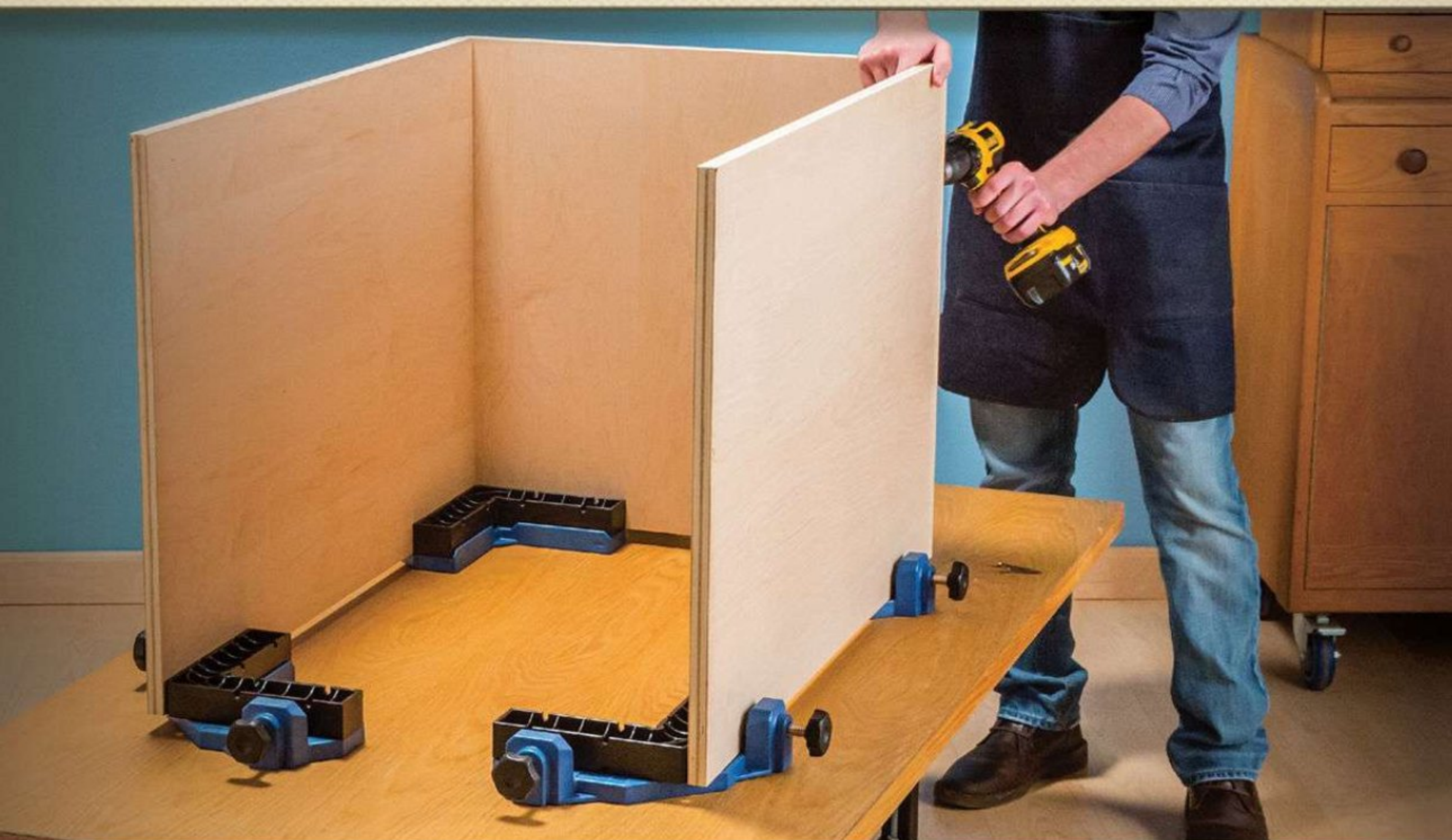
$$\text{MC} = \frac{\text{Weight of water} \times 100}{\text{Dry weight of wood}}$$

Answer



Ken Gile of Bennington, Vermont, will receive a Senco FinishPro 23SXP 23-ga. Headless Pinner, 1 Gallon Finish & Trim Air Compressor (model PC1010N) and pack of 23-ga. Pins (item A101009) for having his contribution selected for the Trivia page.

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