

Popular Woodworking

JUNE 2024 | #278

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G0771Z ONLY \$1195

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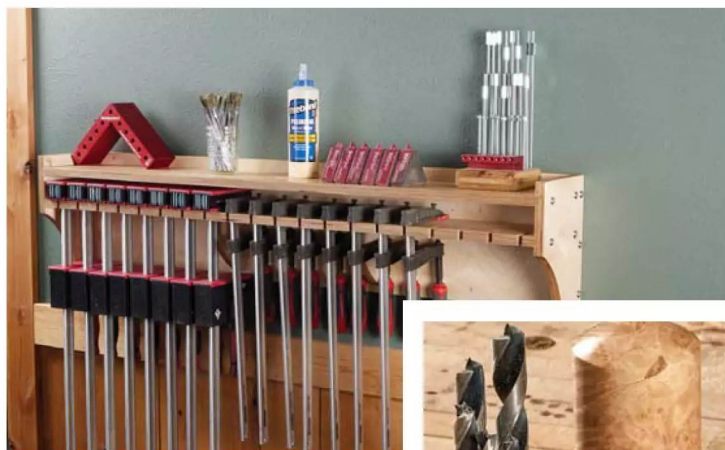
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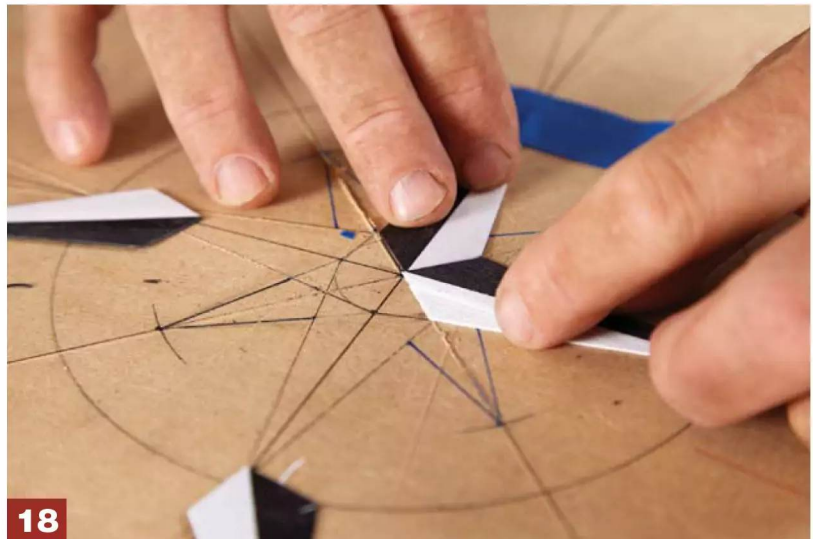
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FROM THE EDITOR

Find Joy in Stupid Stuff

By Logan Wittmer

For anyone that has met me, you'll probably know that I have a pretty happy-go-lucky personality. I enjoy helping others, sometimes to my own detriment. One thing that I'll always do is try and do things that I know will make me happy. A few weeks back, when I had some time scheduled with our video production team at our new shop, I was deciding on what I wanted to film. I knew something that would make me very happy would be getting the big Crescent bandsaw up and running.

So, that ended up being the marching orders of the day. Wiring a VFD, getting new tires installed, and spending a few hours fiddling with other adjustments. At the end of the day, long after the crew was sick of watching me tinker with the saw, we finally were able to turn it on. And, I have to tell you—I wore the childish grin on my face as a badge of honor. I don't know if the production crew was more scared of this giant saw running for the first time in 70 years, or the maniac



As expected, at 70 years old, there's some paint flaking off on this gal... but the original badge looks as good as ever.

look on my face.

At this point, I just received the rough edit of the video, so by the time you're reading this, you will be able to jump on YouTube and watch it. Hopefully, you find a fraction of the enjoyment in watching it that I got from firing it up for the first time. Maybe next time, I'll share the story of how I threw the tires off the saw. Onward. Forward. Cheers.

ABOUT THE AUTHORS



RALPH BAGNALL: *Kitchen Utensils*—pg. 32

Residing in Florida with his wife, Ralph is a long-time professional woodworker, author of several woodworking books, and frequently travels around the country giving presentations on various aspects of woodworking. His most recent book, "A Beginner's Guide to CNC Machining in Wood," is available from Fox Chapel Publishing and on Amazon. Apart from his professional career in woodworking, Ralph is also the founder of the website WoodAcademy.com. Its focus is to help woodworkers build their skills through instructional plans, articles, and video.



SCOTT GROVE: *Nautilus Star Inlay*—pg. 18

Scott Grove (Canandaigua, NY) blurs the line between artist and woodworker. He teaches worldwide, most notably at Marc Adams School of Woodworking and the Chippendale School in Scotland. Among his countless awards, Scott has received four Veneer Tech Craftsman Challenge awards, an unprecedented achievement in the field. You can see Scott's work at ImagineGrove.com.



WILLIE SANDRY: *Shaker Shop Cabinets*—pg. 48

Living in the Pacific Northwest, Willie Sandry is a longtime fan of Arts & Crafts furniture. He enjoys taking inspiration for his projects from antique furniture exhibitions as well as "old barn finds." Never one to do a job partway, Willie has developed a vast skill set to elevate his projects. From sawing lumber and kiln drying it to finishing a chair with top-notch upholstery, Willie sees a project through from the start until the finish. YouTube: *The Thoughtful Woodworker*.

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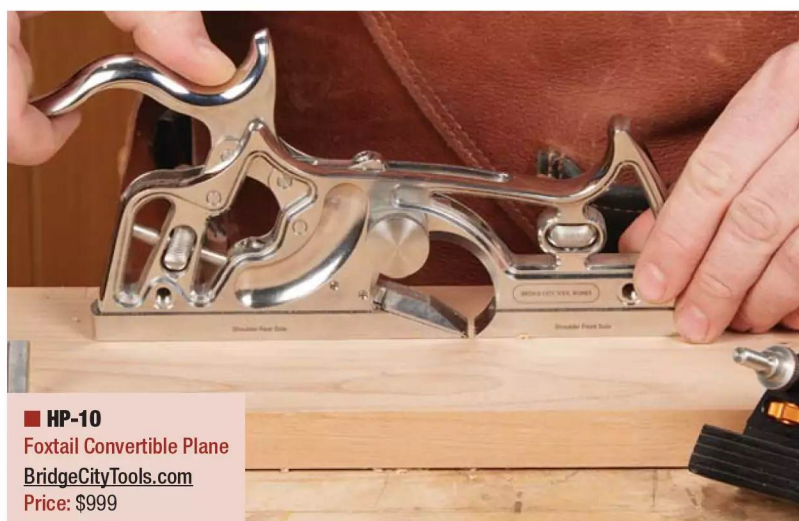
NEW TOOLS

Bridge City Foxtail Plane

Several years back, when it was announced that *Bridge City Toolworks* had been sold, I will admit that I was disappointed. I was worried that the beautiful quality tools that everyone loved would somehow change. Well, I'll be the first to admit that my fear was completely misplaced.

Bridge City's most recent plane, the Foxtail Convertible Plane (HP-10) is every ounce of what I expect from a *Bridge City* tool. The stainless steel is flawlessly milled. The finish is top-notch. And it works—oh lord, does it work.

As you can see in the lower photo, the blade is locked in with a cam-action lock. The blade is controlled with a beautifully designed depth adjuster and like *Bridge City's* other convertible planes, the Foxtail will accept different soles to cut various profiles. It comes with the rabbeting sole, but by swapping out the sole and blade, this little plane will do so much more. — *Logan Wittmer*



■ **HP-10**
Foxtail Convertible Plane
BridgeCityTools.com
Price: \$999

BORA Tempest Forstner Bits

The new Tempest Forstner bits from BORA are a set to be reckoned with. These forged bits are made by renowned bit maker *FISCH*. The precision ground edges are accurate and sharp—perfect for drilling by hand or with a drill press. Drilling in hardwood and softwood is easy with a quality bit like these. The bits are available individually, or in 4, 7, and 16 bit sets. — *Gregory Kopp*



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NEW TOOLS

Blue Spruce Mortise Chisels

Walloping on a chisel to chop a mortise is a big ask. It's no wonder that the "pig sticker" mortise chisels of old were meaty—modern variants have, in my opinion, fell short until now.

The new mortise chisels from *Blue Spruce* are the best mortise chisels I've ever used and I've owned many. The infused maple handles are a signature of *Blue Spruce* and the blades are everything I expect. They're ground to perfection and are razor-sharp out of the box. But that's not what makes them special.

A few weeks back, I was giving a weekend demonstration (shout out to the folks at the *St. Louis Woodworkers Guild*). After demon-

MORTISE CHISELS

Blue Spruce Toolworks

BlueSpruceToolworks.com

Price: \$109.99+



strating chopping a mortise, I got asked why that was so easy. Initially, I dismissed it to sharpness and good material. However, upon reflecting during my 5 hour drive home, I think it has to do with the design of these chisels.

The maple handle is capped on the end with a stainless steel cap. This cap threads onto the tang of

the blade—it extends through the handle to sort of "capture" the handle. Because of this, all your mallet blows are transferred directly to the blade. On a regular chisel, the wood handle acts like some form of shock absorber. Needless to say, I'm done buying any more mortise chisels. —*Logan Wittmer*

SawStop Scale Miter Gauge

One of the universal truths of life is that the miter gauge that comes with any saw is dang-near worthless. Oh sure, it's easy enough to square it up and make a 90° cut, but setting any angle outside of that is akin to piloting a cruise ship.

The new *SawStop* Scale Miter Gauge is here to cure your accuracy blues though. With 181 notches in 1° increments including one for 22.5° on each side, you know you'll be spot on with every cut. In addition, there's a built-in Vernier scale that gives you the ability to fine-tune in 1/10° increments. The 18"-miter bar is designed to fit a standard 3/8" x 3/4" slot and has six washers you can adjust to fit your saw just right. There's also a



SCALE MITER GAUGE

SawStop

SawStop.com

Price: \$249

high-quality aluminum fence with a telescoping extension and a flip stop with tooth and notch system that lets you position it in 1/32" increments. The extensive manual ensures you can get things set up for perfect cuts.

For all of its adjustability, there is a flaw that is hard to overlook—

the markings for the angles don't go all the way to the edge, so when you're trying to use the Vernier, there's a large gap, making it very difficult to hit the angle you're aiming for. For most users that's not going to be an issue, but it feels like something that should be avoidable. —*Collin Knoff*



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NEW TOOLS

Melbourne Tool Company Planes

Where is the money best spent on your hand plane—the body or the blade? Melbourne Tool Company, founded in 2022, is betting on the latter with their planes and I don't think I disagree.

Both the Low Angle Jack and Block Plane feature a 12° milled bed, adjustable mouths, and M2 High-Speed Steel (HSS) for the blades. Squint and you'll see more than a little resemblance to *Lie-Nielsen*. This is far from a bad thing—*Lie-Nielsen* based their designs on the classic Stanley tools and imitation is the more sincere form of flattery. One area of difference though is the aforementioned M2 HSS. Versus the more common for handplanes A2, M2 is

LOW ANGLE JACK AND BLOCK PLANE KIT

Melbourne Tool Company

MelbourneTool.com

Price: \$308.38



harder, usually seen in drill bits or turning tools. It's a long-wearing steel that will hold an edge for a longer period of time, with the trade-off being that it's harder to sharpen.

Speaking of sharp, the blades for both planes in this set were sharp and square right out of the box, with no adjustments needed. The block plane needed about 15 minutes of work to flatten the sole, mostly due to the adjustable

mouth, which is most likely machined separately. The jack plane was actually too large for my sharpening setup, so that's certainly a consideration for some. Adjustments were easy enough to make on both planes, though the mouth was a bit finicky to get just right. Once dialed in, both planes were very satisfying to use. I even ended up flattening my entire workbench top just for the heck of it. —Collin Knoff

Ultra-Shear Blades

Building upon the successful launch of Ultra-Shear router bits, *Woodpeckers* has released a new line of table saw blades sharing the same name. As with all *Woodpeckers* products, it's evident that the utmost care went into manufacturing these blades.

Woodpeckers manufactures these blades in-house, allowing them to offer the blades to an end user at a lower price than some other manufacturers. A minor, but appreciated, detail is that each blade comes with a spot for the sharpening service to make the date of last sharpening.

The carbide-tipped blades are available in a few configurations—a combination blade (for



ULTRA-SHEAR

Woodpeckers

Woodpeck.com

Price: \$129.99+

general use), a glue-line rip blade for smooth glue joints, as well as a flat-ground tooth blade for making flat-bottom grooves. The combo and glue-line rip blades are available in both full and thin-kerf sizes. The flat-bottom grooving blade is available in full-kerf only (and, I'm told is the most popular flavor to choose).

One could argue that there are enough saw blades available on the market. But, I would say that there aren't enough *good* saw blade manufacturers out there. *Woodpeckers* has ticked many boxes—American-made, quality blades at a good price. And, they're a heck of a blade to boot. —Logan Wittmer



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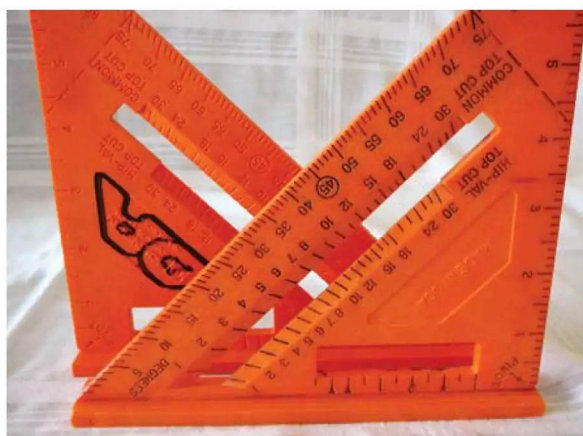
besseytools.com



WORKSHOP TIPS

Easy-Read Speed Square

I really like bright-colored speed squares because they're easy to locate on the job, but I find them difficult to read. To solve this problem, I spray-painted my speed squares black. After they were dry, I used a 3M Scotch-Brite pad to remove the paint. This left the marks and numbers black. Carpenter's squares, rules, and combination squares may also benefit from this treatment. —*Dewey Armstrong*



Accurate Folding Rules

I'm an old fan of folding rules. Unlike tape measures, they don't have a hook at one end that may require you to start at the one-inch mark for an accurate measure. Boy, have I made some embarrassing mistakes this way! There's a trick to using folding rules accurately, though. For precise marking, stand the rule on edge rather than laying it flat. This places the division lines right on the wood.

I really like this new-style rule, which is made from plastic. The joints are cleverly constructed so that every division line runs down to the wood, even at the joints. On old-style wooden rules, the metal fittings at each joint prevent many division lines from running to the rule's edge.



PHOTO BY VERN JOHNSON



The Mysterious Misfit

I was cutting a slot for a long edge fit the other day and everything was humming right along. But, when I put the boards together, they didn't line up worth a darn!

Turns out I made a very simple mistake. All along I thought my plate joiner's fence was sitting on top of the board (Photo 1). Nope. On some cuts, the bottom of the plate joiner must have been sitting on the bench instead. The board was a bit bowed, so I ended up making slots at different heights. That's why the boards weren't flush.

To fix this, I glued biscuits in the bad slots, cut off the excess, and started over. This time I made sure the board hung over the edge of the bench when I cut each and every slot (Photo 2).



PHOTOS BY BILL ZUEHLKE

1

2

1 Slots may not line up if your plate joiner sits on the benchtop. There may be a small gap under the fence.

2 Hang your boards over the edge of the bench to make consistent slots every time.

PHOTOS BY THE AUTHOR UNLESS OTHERWISE STATED



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WORKSHOP TIPS

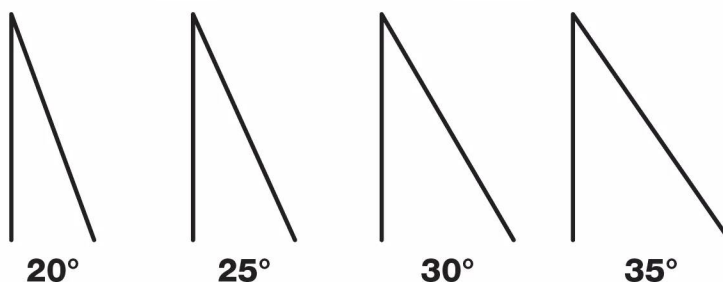
Chisel Angles

It's a great feeling when you can *make* a tool that's better than one you can buy. And it's a bonus when all you need is a plastic lid and a pair of scissors.

Every chisel must be reshaped on a grinder every so often. Setting the angle of a grinder's tool rest isn't a precise science. You give it your best shot, check the results, and readjust. This gauge is an easy way to check your progress.

Granted, it's not accurate to within a tenth of a degree, but that's no big deal. If you're within a full degree or two, you're okay, and that amount of accuracy is easy to achieve with this gauge.

Make a photocopy of these angles, tape the copy to a plastic lid and cut the lid with scissors.



Shop Plan Protector

I like to work from plans, but paper is hard to protect in a workshop. My plans often become so torn, crumpled, and soiled that they're impossible to read when I need them the most. Recently I discovered clear-view binders—notebooks with clear sleeves on the covers—for less than \$3 at the office supply store. Cutting out the three-ring center section creates a pair of sturdy protectors. Now I don't have to worry about wrecking my paper plans and I don't have to handle them with kid gloves, either. —Ron Morris



Satin Rules are Easier to Read

If you're thinking about buying a precision rule or square, check its luster first. Tools with a satin or matte finish are much easier to read under all light conditions, especially their teeny-tiny 1/64" divisions. Glare is a big problem with brightly-finished rules. The light must be just right to easily read them.

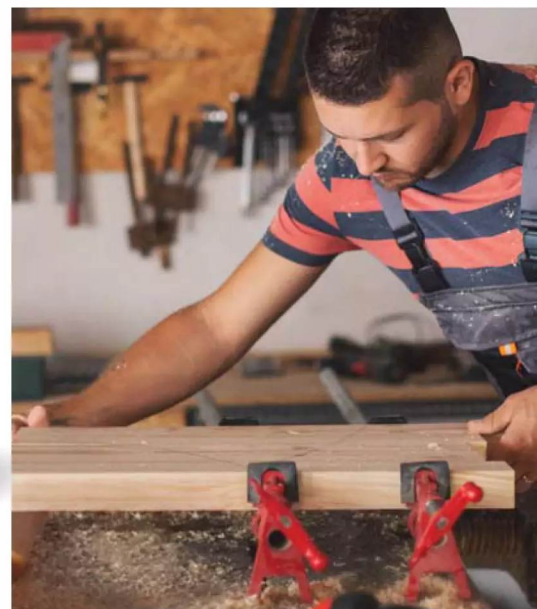


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WORKSHOP TIPS

Use When Clamping is Awkward

Epoxy forms a mechanical bond and needs only contact pressure to adhere. Use quick-setting epoxy, press the parts into place with your fingers and the job will be done in only a couple of minutes.

TIP: Wood is a porous material that absorbs epoxy. Applying it to both surfaces will ensure that enough is left unabsorbed to bond the two parts together. If you do use clamps, don't turn them too tight or you will squeeze out too much glue and starve the joint.



PHOTO BY PATRICK HUNTER

Plentiful Pencils

Buy a box of pencils, march up to the bandsaw and cut the box right in half. In one stroke you've doubled the number of pencils to scatter around your shop. Plus, they're shorter and more convenient to carry around in your pockets.

Buy More than Enough

It's a big mistake to buy the exact amount of wood your project requires. If you do, you're going to come up short, because rough lumber isn't perfect, not even top-grade boards.

A common rule of thumb is to buy 15 to 20% more than you need. Some species, like red oak, consistently contain few defects, so you don't have to over-buy as much. Other species, like black walnut, require more insurance than the average.

I usually don't bother with percentages; I just buy extra pieces. For example, if I'm going to build a table, I'll choose enough stock to make an extra leg. If the top requires 7 boards, I'll buy 8.



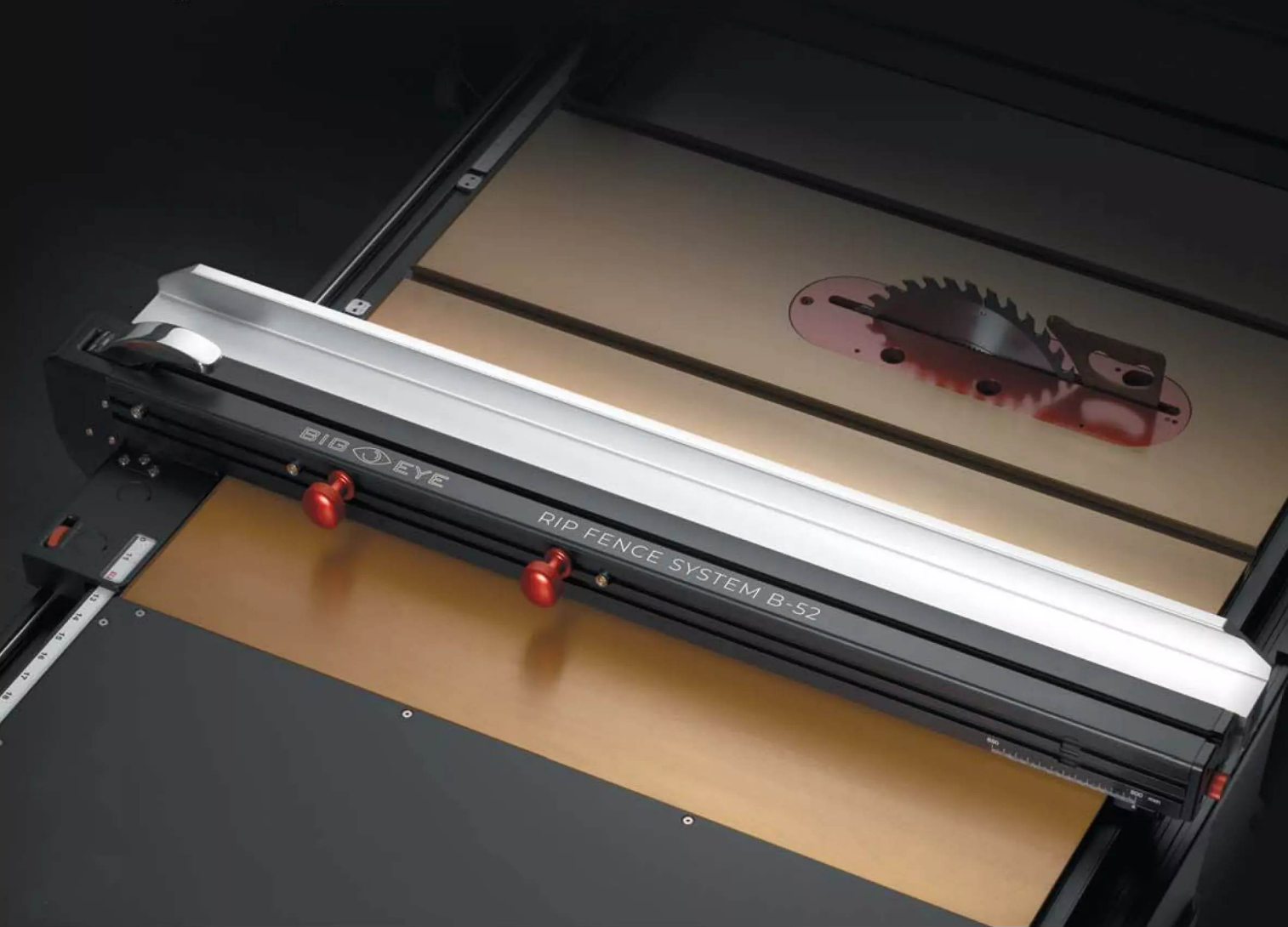
Garden Variety Wrap

Hook and loop tie wrap is nothing new, but you may not be aware that it comes in two different varieties. The two-piece kind sells for about a dollar per foot. One piece has hooks; the other has loops. The one-piece "garden variety" kind, which has hooks on one side and loops on the other side, really is made for gardeners, but I've found dozens of uses for it around the shop. I use it to bind cords, secure box lids, bundle wood scraps or dowels, etc.—*Peter N. Williams*

PHOTOS PROVIDED BY THE AUTHOR UNLESS OTHERWISE STATED

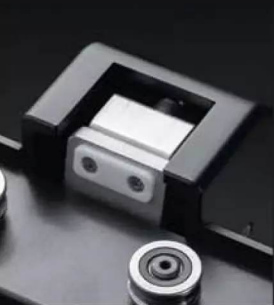


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■ From The Masters

Nautilus Star Veneer Inlay

Creating a Nautilus Star Inlay is a great way to add detail to your woodworking projects, big and small.

By Scott Grove

A **nautilus star**, also known as a compass rose, is a motif used in ancient as well as current cultures; it's seen on maps and fine furniture alike. It's a symbol of location, direction, accuracy, and a universal compass which many people recognize. Its design is derived from the magnetic compass that was refined in Italy circa 1200 AD.

Typically, the star has eight points: four major axes (cardinal directions) indicating at North (0°), South (180°), East (90°), and West (270°) respectively; and four minor points (ordinal directions) at 45° between the major axes. On maps, a fleur-de-lis is primarily on the top of the North axis.

I've tried a lot of techniques over the years, including a template and a square, but this method of inlaying a nautilus star is the most precise way I've found. It's easy to do with a few tools like a compass, an X-acto knife, and a straight-edge, and by following the steps in this article, you can create a very precise inlay for the touch of fine woodworking that everyone loves.

Creating the Major & Minor Center Lines (Axes)

To start this project, be sure to use a sharp pencil lead (I use a mechanical pencil). Use a compass to draw an 8" diameter circle on a roughly 12" x 12" piece of MDF. This circle represents the outermost tips of the major star points. Label the center A. Then, using a straight-edge, draw a vertical line through

the center point. Label the top intersection B and bottom C.

Note that ALL straight lines should extend past the circle at least one inch. Place your compass point precisely on any point or intersection and set the compass radius larger than your first circle. Place your compass point on B,

and draw an arc to the left and right of the circle. Then, place your compass point on C and draw arcs on the left and right again.

Place your straightedge on the arc intersections and draw the horizontal line. Label the horizontal intersection D and E.

For the 45° angles, put your



■ Make a Veneered Chessboard

Check out Issue No. 270, the April 2023 issue for the plans on to creating your own veneered chessboard!

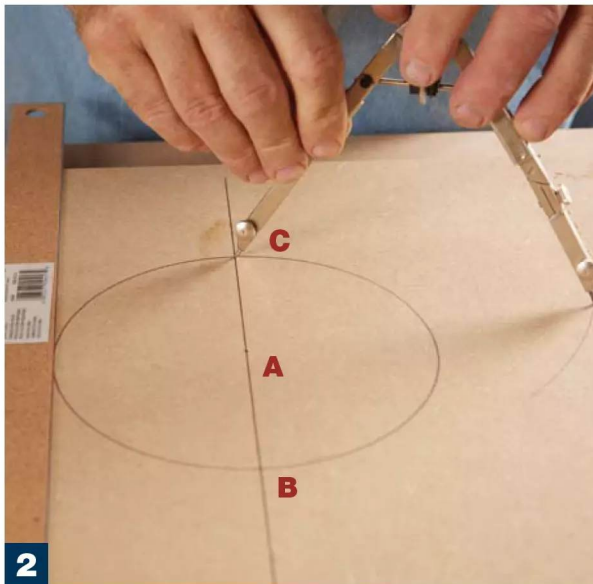
PHOTOS BY LOGAN WITTMER



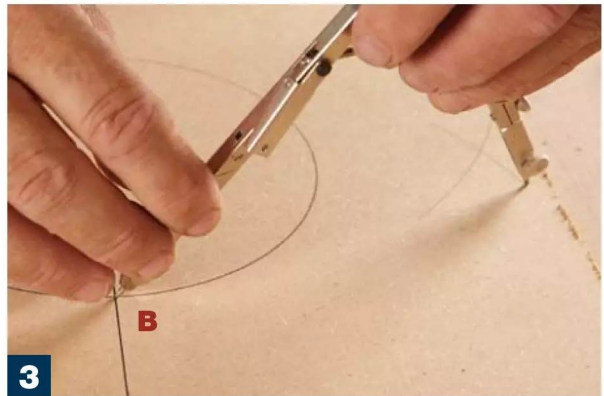
1

NOTE: See Diagram on Page 26

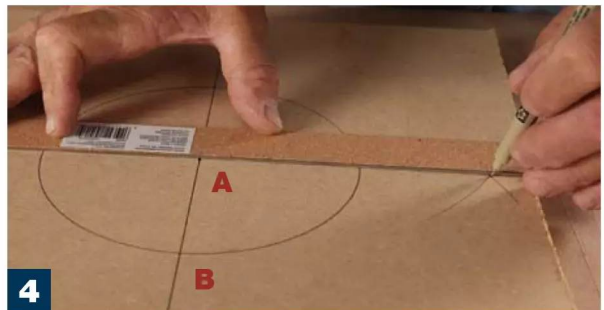
- 1 Draw a vertical line through center of the circle.
- 2 With the compass set to a radius larger than the circle, draw an arc roughly 90° to one side from the bottom point C.
- 3 Draw another arc from point B that intersects the previous arc.



2



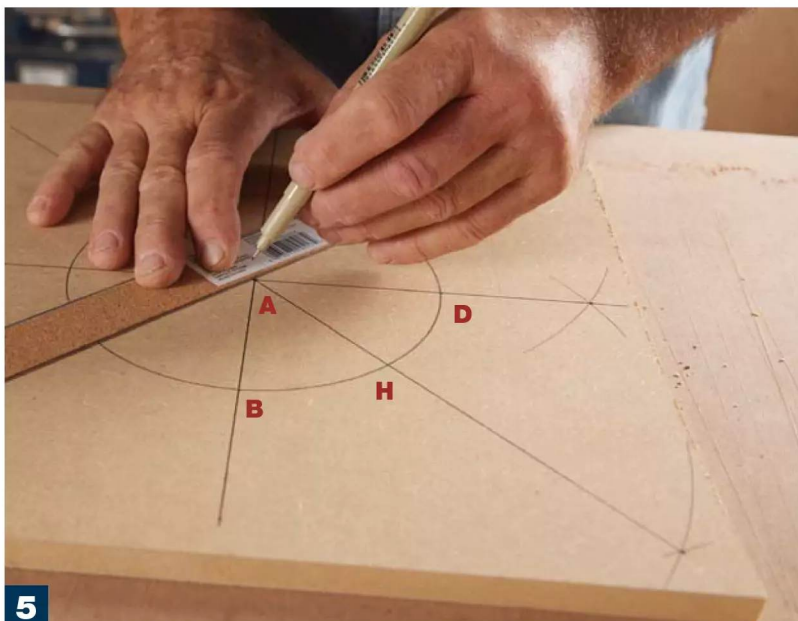
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4

- 4 Draw a horizontal line from the intersecting arc through the center. This is precisely 90° to the vertical BC line.

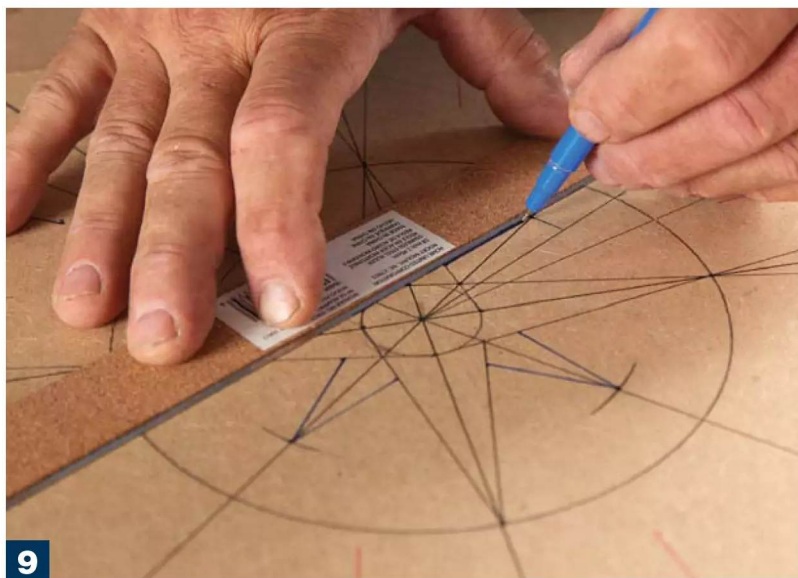
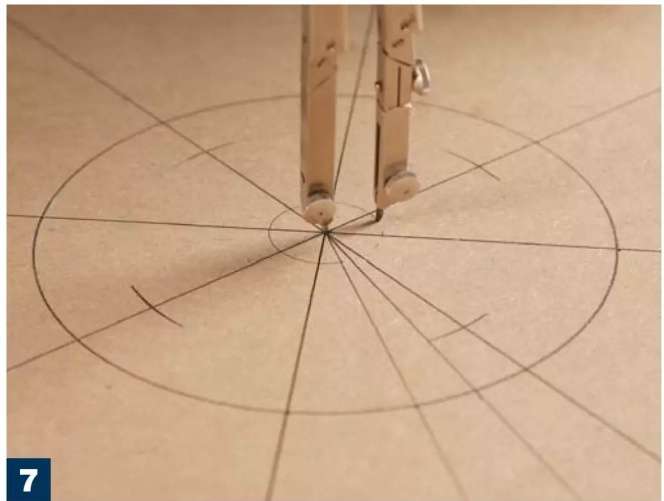
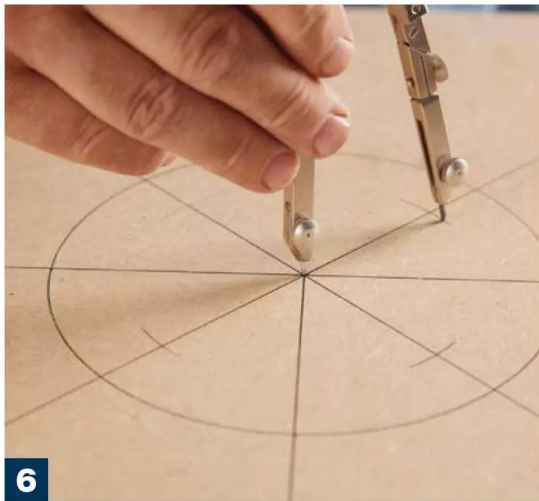
- 5 Repeat the angle bisection to create a 45° angle.



5

compass point on B and draw an arc to the right. Next, put the point on E and draw an arc to the top, crossing the previous arc. These arcs intersect at a 45° angle. Lay your straightedge on the intersection and the center of the circle A and draw a line through the circle. Label the upper right circle intersection F and the lower left G.

Start with your compass point on D and E, follow the same steps, and label the intersections H and I.



6 Mark the tips of the minor points with the compass.

7 Draw a minor circle for the base.

8 Create major points and extend lines past the tips by at least 1".

9 Draw the minor points from the major point axis to the tip drawn in Photo 6.

Creating Major Star Points

Place your compass point on A and draw a smaller circle (1" dia.) within the one you have already drawn. There is no rule of thumb to this dimension; use what feels right to you.

Label the intersections of your horizontal and vertical lines within the smaller circle as J, K and L, M. Take your straight edge and create a line from C to J (CJ), then draw CK. This is your first major star point. Continue drawing lines BJ, BK, DL, FL, FM. Remember to extend the lines past the large circle. Label each one of these extended lines X on each end.

Creating the Minor Star Points

Take your straightedge and create lines GL and GK. This is your first minor star point. Draw lines FJ, FM, HK, HM, IL, IJ. Label each one of these extended lines O on

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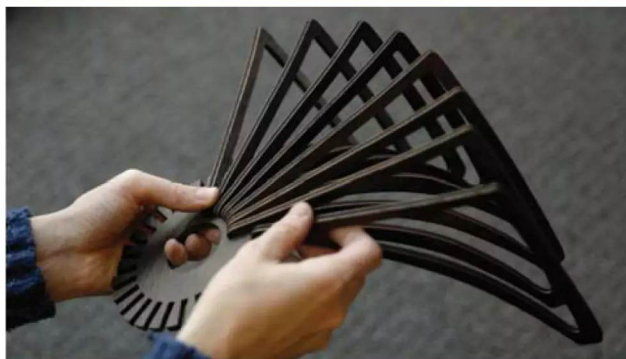
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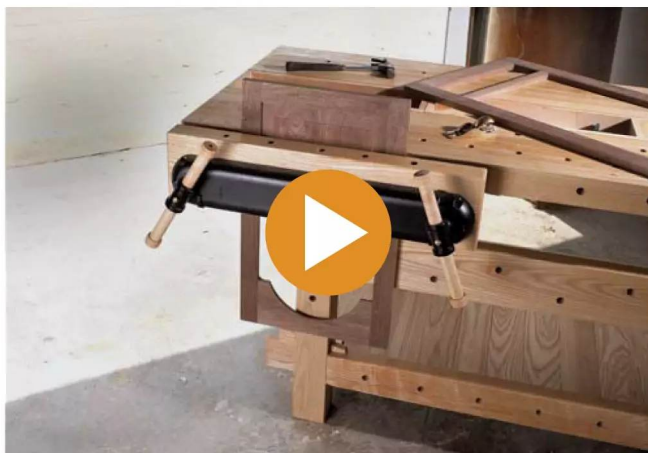
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10

each end. The X's and O's will help you identify which line is which when cutting the veneer in the next steps.

Creating the Veneer Star

First, select two contrasting veneers that also complement the surrounding veneer field. For this project I chose black-dyed boxwood and bleached maple veneer for their plain nondescript grain, flatness, and ease of cutting. It will also look great against the redwood burl background field (seen later in the article). See the chessboard article in *Popular Woodworking* Issue #270 for more about selecting and conditioning veneer.

Your material size depends on the dimensions of your overall star and width of the points. For this project, you'll need at least 5" wide by 3" long of each color of veneer.

Take your light and dark veneer and crosscut it to length; make the pieces about an inch longer than your star points. Cut them into vertical strips with a straightedge that is a little wider than the base of the star. You will need 8 strips of each color. Be sure to cut the long edge straight.

Now, tape one of the light and dark colors flat together with lite-tack painter's masking tape and keep the seams nice and tight.

10 Cut 8 strips each of contrasting colored veneers slightly wider and longer than your star points.

11 Tape two contrasting veneer strips together with light-tack masking tape.

12 Fold open veneer and apply white glue to the seam.

13-14 Flatten the piece down and scrape off excess glue. Apply weight to keep the veneer flat during drying.

First, fold the seam open and add a little strip of white glue to the seam. Then, close the pieces back flat and scrape off any excess glue with a putty knife. Repeat this for all remaining pairs. Set them under a board to dry flat for about 15 minutes. Lastly, remove the painter's tape.



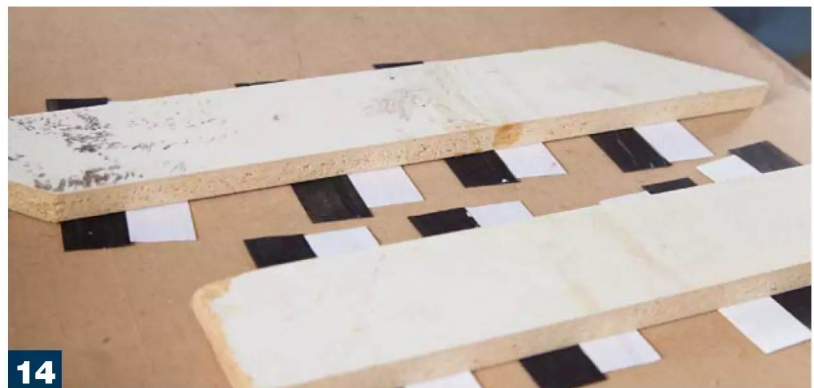
11



12



13



14

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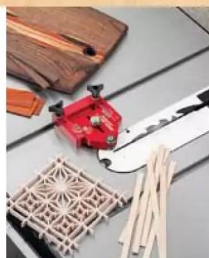


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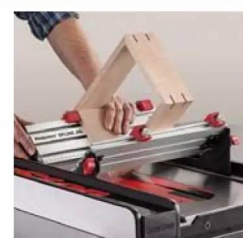


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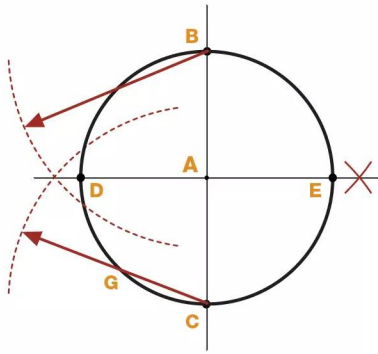
Popular Woodworking Magazine and its sponsors will award one prize each day from May 21 through June 16. The prize pictured on each day in the calendar above is the prize offered for that day. To register for a chance to win each prize, you must enter on the day the prize is offered, you may enter as many of the daily contests as you like but you are limited to one entry per day. All entries from the first 27 days will be eligible for the Grand Prize: JET 14" Bandsaw (JWBS-14SFX).

Registration starts 12:01 am, EDT on May 21 and ends 11:59 pm EDT on June 16, 2024.

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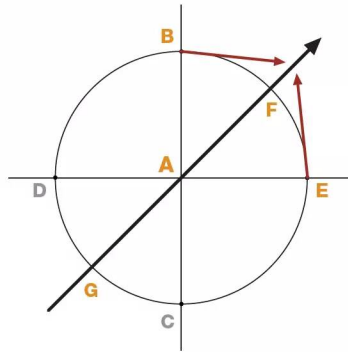
Popular Woodworking

Nautilus Star Veneer Inlay



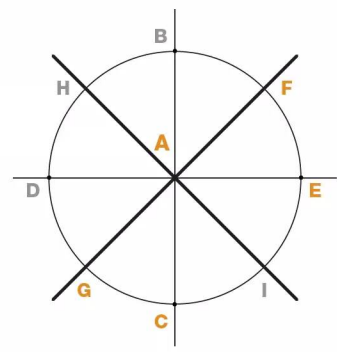
1 Create X & Y axes perfectly at 90°

- Draw a circle with vertical line BC through A. Extend all lines past large circle ~1".
- Draw arc greater than original circle radius from B & C creating intersection.
- Draw horizontal line from arc intersection through A, label D & E



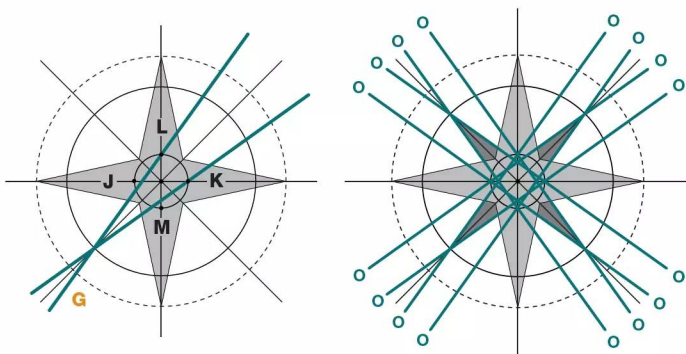
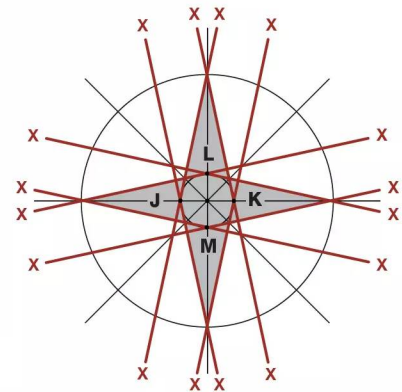
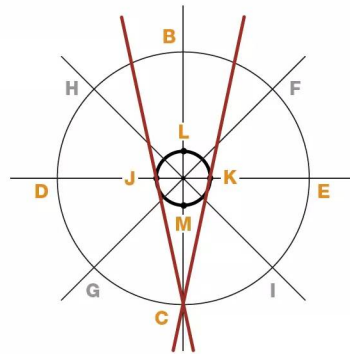
2 Bisecting Angle

- Draw arc from B & E intersecting top right.
- Draw line from intersection through A. Label F & G (45°)
- Repeat for second 45° line.
- Arc from D & B, creating line HI.



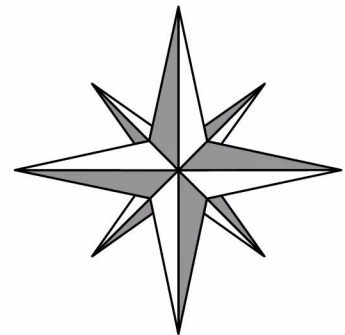
3 Major Star Points

- Draw small diameter circle for star base
- Label circle intersection with line DE, label J & K. Label line BC intersection and label L & M.
- Draw line C to J, and C to K, extend lines ~1" past the large circle
- Repeat for the 3 other major star points. Label extended lines X.



4 Minor Star Points

- Draw lines from G through intersection L & K.
- Repeat for 3 remaining minor star points. Label extended lines O.

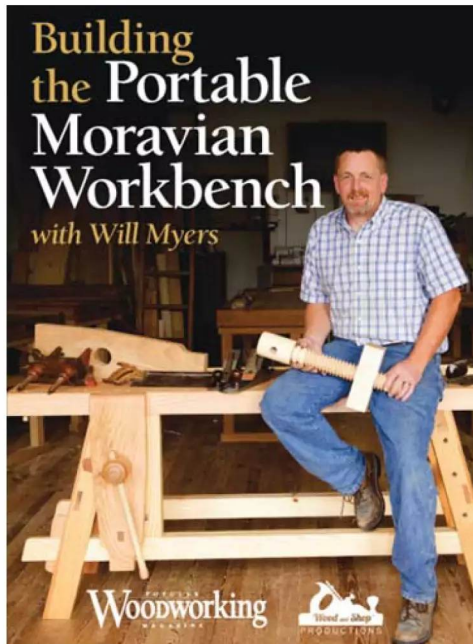


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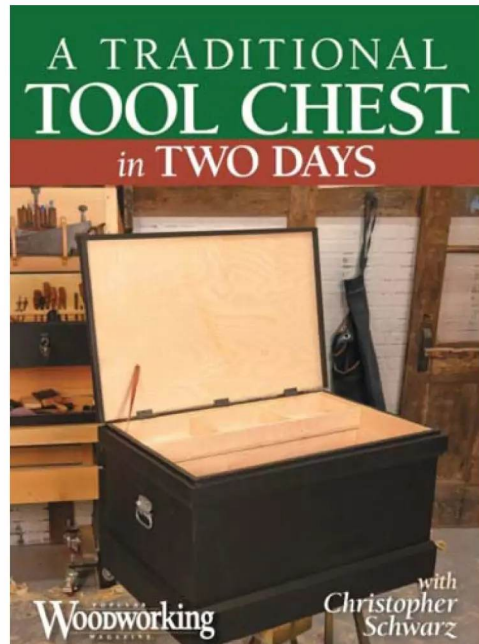
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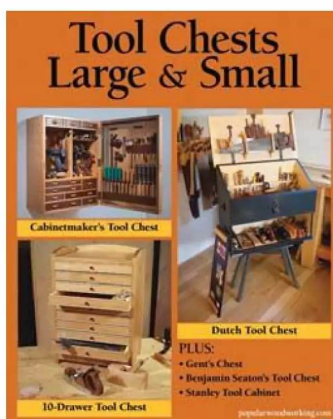


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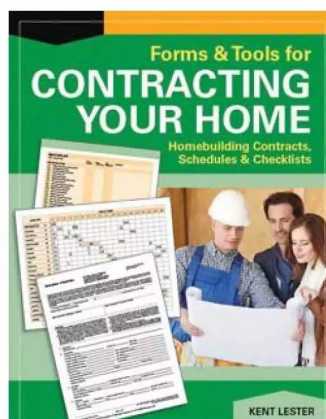


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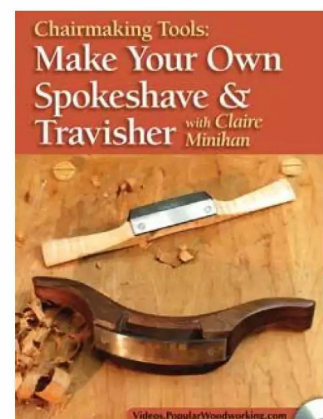
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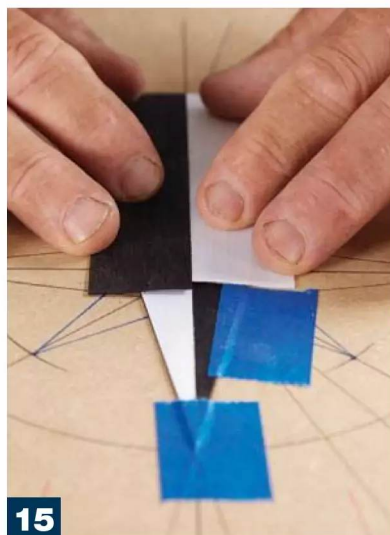
On the layout board, place one glued set over the first major axis. Align the seam with center axis and tape it in place. Next, align a straightedge with the extended angled lines and cut the two long side of the point. This is where the X and O marks can help you keep track of which line to use. Cut down-grain toward the point and be sure that the center seam lines up perfectly with the star tip.

Tape another set on the opposite side. Be sure to keep the light and dark orientation opposite and cut the long sides as above; it's okay if they overlap. Now align the straightedge to the minor 45° venter axis and cut the overlapped veneer. Do this on both axes.

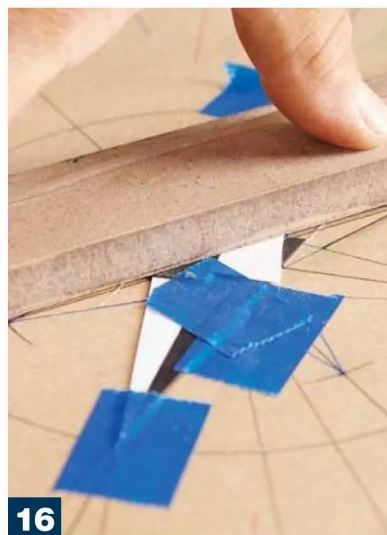
Repeat this process for the next two major star points and mark (register) them with a pencil to the corresponding location on the layout board. Tape the four major points together and set aside.

TIP: Register your pieces with a pencil mark to help with realignment when you're ready to inlay.

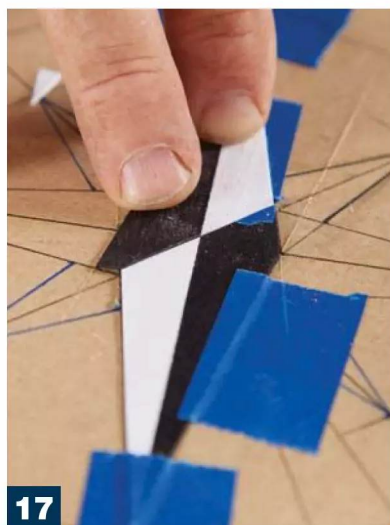
Repeat this cutting process for the minor point on the long sides only and set each pair aside as you go. Then re-tape the entire major star group back to the board and register the center seams to the X, Y axis.



15



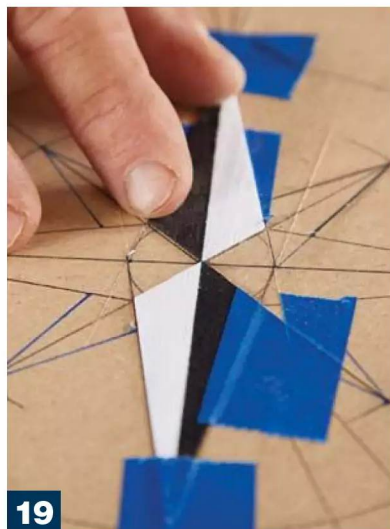
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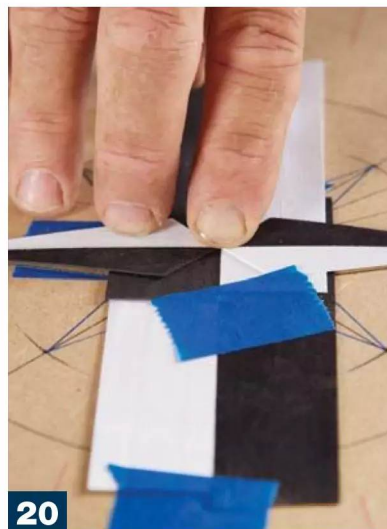
17



18



19



20

15 Lay your second veneer set and align it to the set below.

16 Cut the 45° seam with a straight edge, cutting through both layers of veneer.

17 Check 45° seam and check alignment of the center seam.

18 Cut the second 45° seam.

19 Align the cut pieces to the layout and tape in place at the tips.

20 Slide the second set under the first cut set, align and cut the 45° angles. Follow the cut veneer edges as a guide.

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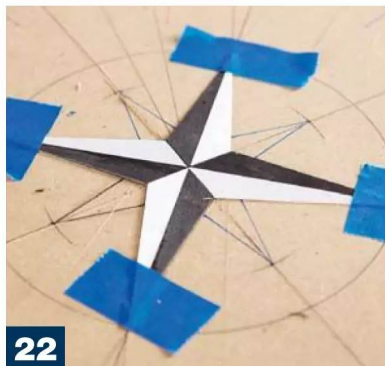
Fitting the Minor Tips

Next, slide and align the minor set under the major veneer set and cut the inside angle using the veneer as a guide. I often do this free hand or use a card scraper as a firm straightedge. Do this for the remaining minor points, taping them to the group as you go with masking tape. Flip the star over and tape all the pieces together with veneer tape. (See the chessboard article once again for more information.)

This cutting approach, working directly on a layout board, ensures all the points are perfectly aligned to the X, Y, and 45° axes.



21



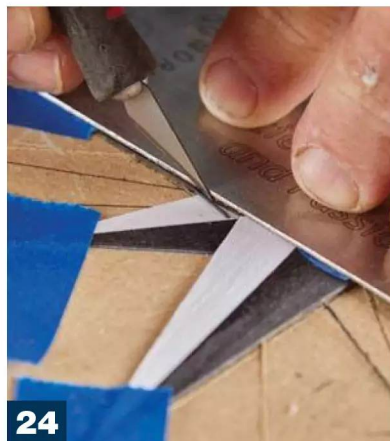
22

21 Test the fit and alignment of the center seams.

22 Tape all four major points in place at the tips.



23



24



25

Inlaying the Star

Inlay the star into the a field of veneer, tape it in place and add a registration mark on one point to help orient the star when it is ready to be inlaid.

Mark all the tips on the veneer field with a line perpendicular to the center seam with a pencil (you can see these white marks on photo 30). This mark shows where to stop your cut in the next step. Place a card scraper over the star and align it to the veneer edge. Cut through the bottom field veneer and stop at the marked top line.

Once all the edges are cut, remove the star and inspect the cuts. Typically, the inside and outside corners need attention, so make sure they are cut completely

23 Slide the minor point set under the major group, align the tip and center seams, and tape in place.

24 Cut the inside corners.

25 After all points are taped together with masking tape, inspect the opposite face.

26 Tape all seams together with veneer tape and set glue with iron.

through and remove the waste from the field. Place the star in the void using your registration mark for correct orientation, press it flush with a hard block or roller, and tape it in place with veneer tape. Flip the veneer over and inspect the bottom for the fit and aesthetic.



26

Completing the Project

Once your nautilus star is inlaid into your veneer, you're ready to place the field onto your core and into your press. I've found the best core to be MDF, because it is stable and won't move. Now it's time to go shoot for the stars! **PW**
– Scott Grove



27



28



29



30

27 Tape the star in place complete over field veneer.

28 Cut the star perimeter. Use a card scraper to guide the cuts and to not shave off any of the star veneer.

29 If any of the inside or outside corners are not cut all the way, now's the time to finish them.

30 Install the star. Be sure to reference your orientation so that it's the same way you cut it out.

31 Tape in place with veneer tape.

32 Flip the veneer over to check the back side for seam alignments.



31



32

Kitchen Utensils

Template routing and production techniques make this a fun project to make for friends and family. And, you might even get a meal out of the deal.

By Ralph Bagnall

PROJECT #2407

Skill Level:

Beginner

Time: 1 Day

Cost: \$10

PHOTOS BY RALPH BAGNALL & LOGAN WITTMER

Well-crafted utensils are always useful in your kitchen. They make great gifts and if your shop is a source of income, they sell very well on the craft circuit. And using templates, they are quick and easy to make. We will create simple templates for each style and even share a template sled design for production routing. Templates allow you to make a few utensils or a larger batch anytime you want, while ensuring that sets match and your kitchen tools are the same size.

Materials

Clear, tight-grained hardwoods make the best utensils. Fruit woods like apple or pear are excellent if you can find them. My favorites include olive, cherry, beech, and walnut.

Your stock can be any thickness between $\frac{1}{4}$ " (6mm) and $\frac{1}{2}$ " (13mm). I like $\frac{3}{8}$ " (9.5mm). Many lumber sources sell stock in these thicknesses if you can't resaw or plane your own.

You'll note that a couple of my examples here are bamboo. Inexpensive bamboo cutting boards are easy to find in useful thicknesses and work very well for utensils. Just be a bit careful with routing as bamboo can tear out.

Making Simple Templates

While it is possible to cut and shape utensils directly from the stock, flush trimming parts from templates greatly speeds the process if you are making more than one or two. And you can use the templates to make more utensils anytime you like.

Start by making a couple of 'simple' templates. These are made the same size and shape as the utensils and used to directly trim blanks to size. Templates can be made from many materials such as MDF, plywood, or plastics. Here I am using $\frac{1}{2}$ " (12mm) Baltic birch plywood.



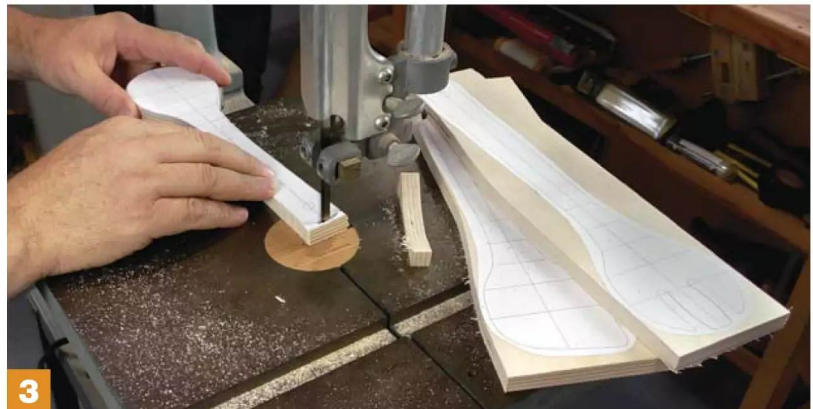
1

1 You can use a wide variety of wood species for your utensils, even pre-glued bamboo.

2 A drywall knife helps press the printed patterns flat onto your template stock as you glue them down.



2



3

3 When roughing out your template, cut smoothly and evenly around the lines to make the sanding easier.

4 Sand carefully around your template. Any bump or flaw will transfer onto every part you make with it.



4

Begin by printing out the patterns. The print includes a ruler to let you verify the size. Stick them to your template material by using a glue stick or spray adhesive.

Use a jigsaw or band saw to cut the stock to the template line. Cut as close to the line as you can without cutting into it. Sand around the edges right up to the printed border. Here I am using a sanding drum in the drill press. The faces do not matter, your flush trim bit will follow the edges and control the shaping of your parts.

I add pins to my templates to secure them on the stock for cutting. I am using *FastCap's* Blind Nails. These are pointed at both ends and are inserted with a special tool that looks like a nail set. Similar pins can be made in your shop by driving wire brads or finish nails into the template, then cutting the head to a sharp point.

To hide the pin holes in your utensils, I have located one pin where the hang hole is marked on the template. Place the second pin in the center of the working end. Later, when the hang hole is drilled and the paddle face is cut to shape, these pin holes will be removed.

Roughing Out Blanks

Position your template onto the stock and tap it into place engaging the blind nails. Adjust the template location as needed to select the best grain options and avoid any knots or flaws.

Get the most out of your materi-

al by tracing multiple parts nested tightly together. Leave about $\frac{1}{16}$ "– $\frac{1}{32}$ " (2–4mm) around the template for the flush trim step.

Saw the parts along the lines to rough cut them for trimming. The band saw is ideal for this work, but a jigsaw or coping saw can get the job done. Work as close to the lines as possible without cutting inside them.

Salad Tongs

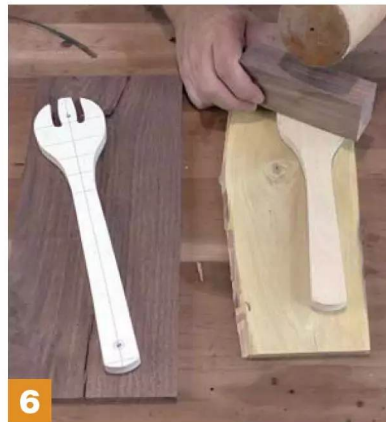
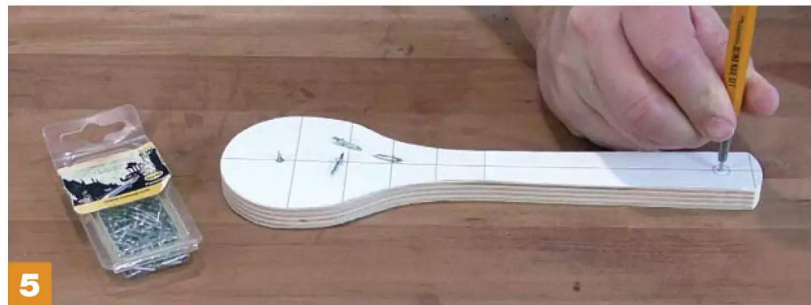
Cutting between the fingers on the salad tongs will require a $\frac{1}{4}$ " (6mm) flush trim bit. Set the tem-

plate on top of the stock and tap it to set the pins into the blank.

The parts here are narrow, so you may want to use a push block to hold the parts and keep your fingers out of the cut path. Keep the template tight against the bearing of the bit and be sure to move the template against the rotation of the bit (clockwise when looking down onto the table).

Rice Paddle

We are using a simple template for the rice paddle, the same as we did with the salad tongs. Since there



5-6 Pinning your templates to the parts lets you process parts quickly without the mess of double-sided tape.

7 Use a white colored pencil for better visibility when tracing your patterns on darker wood.

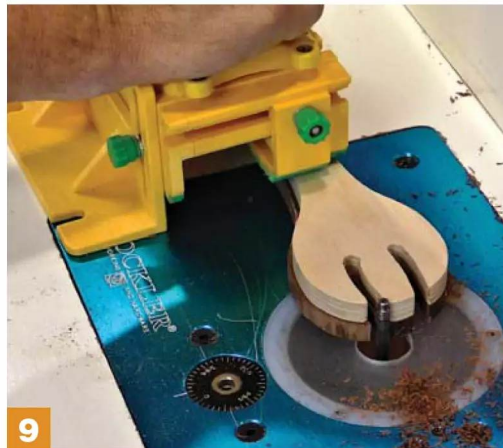
8 You can cut out as many or as few blanks as you want before moving to the router table for trimming.



are no narrow areas to cut, we can use a larger diameter flush trim bit, which cuts more easily than the 1/4" (6mm) bit we used before.

The grain of your utensils runs along the length of the handle, which means the flush trim bit is cutting against the grain as it moves from the handle to the wider paddle. A trick to prevent tear-out here is to trim the parts in two cuts. Start with a top-bearing bit and the template above the part. Begin the cut at the end of the padding working clockwise so the bit cuts from the wider section down into the narrower handle. Stop cutting when you reach the middle of the handle end.

To cut the other half, reset the router table with a pattern bit (bearing below the cutting edge) and finish the trim again starting at the end of the paddle and cutting down into the handle. Flipping the part means all cuts are made with the grain, preventing tear out.



9 Rough cutting the blank close to the template means less stress when flush trimming, which greatly reduces the risk of the tear out.

10 Light cuts and a sharp bit will allow you to make smooth, chip-out free parts.



11 Holding your part against a start pin (shown next to the bit) while pivoting into the bit to start the cut will help you control the cut and prevent the bit grabbing the part.

12 Some flush trim bits come with bearings at both ends so you don't need to swap bits between cuts, just reset the height.



Left & Right-Handed Spatulas

In addition to using simple templates for trimming parts, you can build a template sled. Sleds have the advantage of size and handles to keep hands out of the cutting zone. You will still need to make a simple template to draw and rough out the blanks.

The sled can be laid out using our drawings and your simple template, but it is the perfect reason to turn on the CNC if you have one. You can download the .DXF file on PopularWoodworking.com/online-extras and cut it out as needed.

Half of the spatula profile is cut into each side of the sled with about 1/8" (3mm) overlap on each side of the center line. Mount toggle clamps to hold the parts or cut grooves for clamps as included in the .DXF file. Mill these as "T" slots for hold downs or dovetail slots for *MicroJig's* MATCHFIT clamps as shown.

The "first cut" side of the sled locates the blank using a dowel through the hang hole, so drill these before moving on. A dowel stop pin is located behind the blank at the other end to accommodate the extra stock that will be trimmed off in the second cut. The "second cut" side also uses the hang hole for location, but the stop dowel is precisely set to locate the already trimmed edge of the blank (see sled drawing). So, it is useful to mark these two sides. Again, the CNC makes this easy to carve in.

The sled holds two parts that are milled in one setup. The spatulas are asymmetrical, so you cycle the sled, "cut 2" completes one spatula, the "cut 1" part is moved to the "cut 2" side, and a rough blank is loaded into the "cut 1" position. This system allows for the rapid processing of many parts with minimal time spent changing parts between individual cuts.



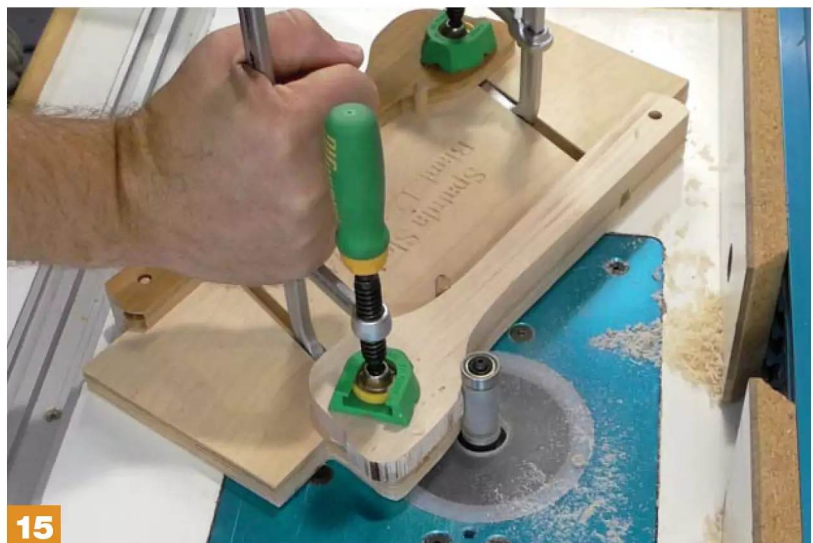
13

13-14 The template sled extends beyond the part, so the bearing engages with the template before the cutting starts.

15 The template sled allows for cutting different thickness parts without needing to change the set up at the router table.

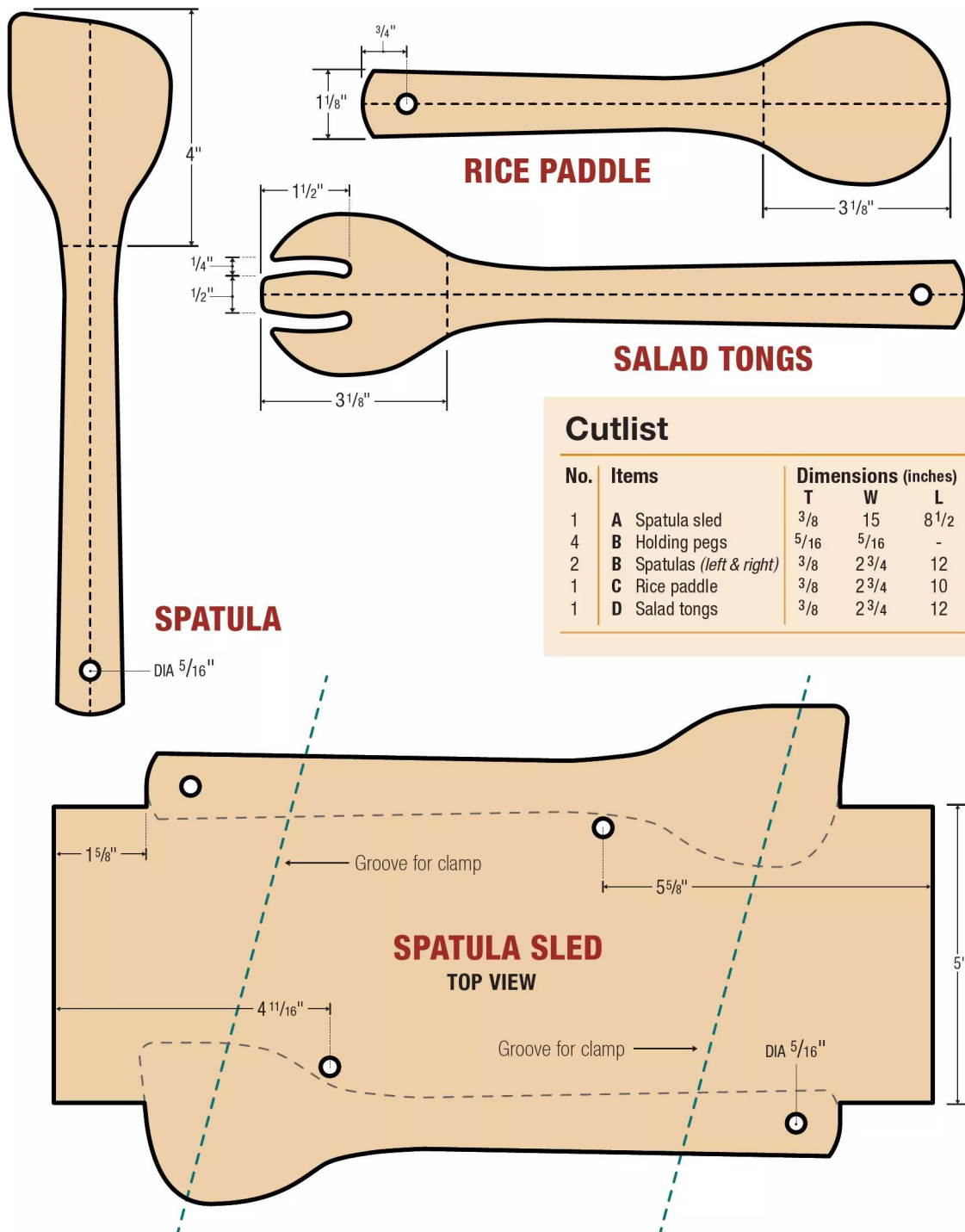


14



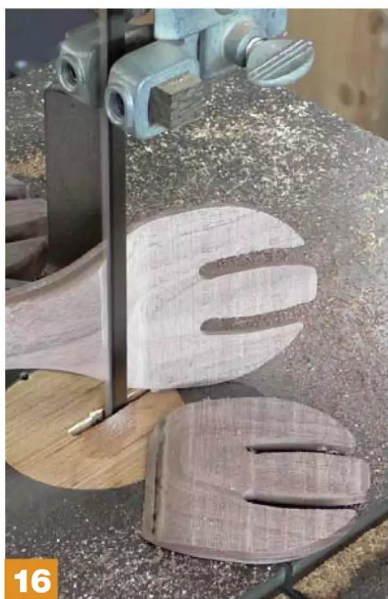
15

Kitchen Utensils



Want Full-Sized Templates?

Download at PopularWoodworking.com/OnlineExtras



16

Shaping the Utensils

Whichever template you use to cut out your utensils you need them once again to complete the shaping of them. Hang holes need to be drilled and all the edges eased using a $1/8$ " or $3/16$ " roundover bit. Be sure to ease the edges of the hang holes as well.

As these utensils need to be shaped at the wider “paddle” end. This is best done at the band saw. Resaw the paddle section along the center line, curving the cut back to full thickness just before the handle section. Just keep in mind that these spatulas become left or right-handed when you shape them so cut these pairs to be mirror images.

The final shaping and smoothing of the paddle sections can be done by hand or with a power sander. A spindle sander is ideal, just be sure to shape the matched pairs to be as similar as possible.

Finishing

For any kitchen products that will be used with food, I finish with oil. Oil repels water, resists staining, cannot chip off, and is easily renewed. There are many commercial oils available, but I still prefer

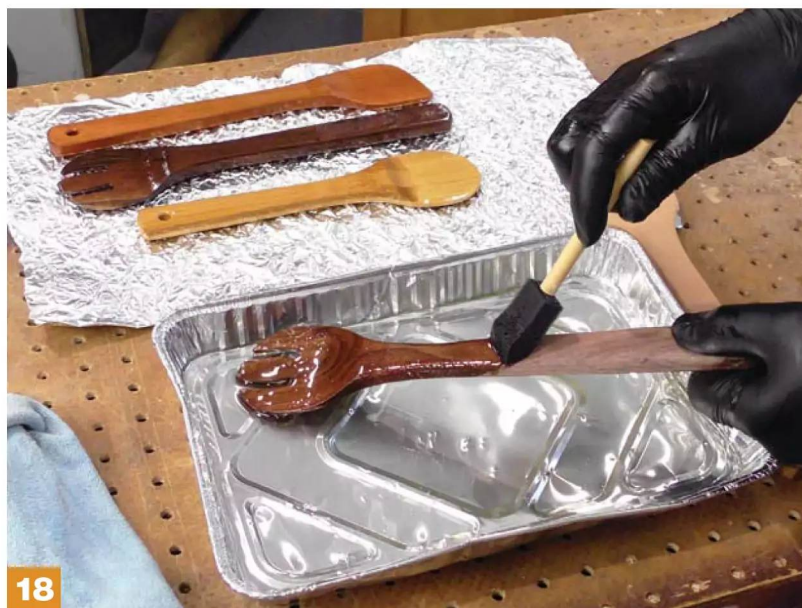


17

16 A magnetic square set next to the blade gives a visual reference to help hold the part vertical while cutting.

17 I do not have a spindle sander, so I tape a sanding roll around a dowel in my lathe. The drum shape lets me quickly smooth the scoop.

18 To help hold small parts for drying, gently crumple up some tin foil and flatten it out again. The wrinkles act as tiny standoffs to allow the parts to dry out of any excess finish.



18

mineral oil. It is inexpensive, can be bought in grocery stores, will not go rancid, and never gets sticky over time!

Apply a generous coat onto the wood, let it soak in for about 10 minutes, and wipe away any excess. These utensils can be

used right away but give the parts a couple of days to finish drying before wrapping them in paper or anything else that may absorb oil.

Used in your own kitchen or given as gifts, these utensils will be used and appreciated for years to come! **PW**—*Ralph Bagnall*

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Three Quick Shop Storage Solutions



PROJECT #2408

Skill Level:

Beginner

Time: 1 Day

Cost: \$10-40

These simple shop storage solutions are quick to build, but will make a big impact in your shop.

By Logan Wittmer

PHOTOS BY LOGAN WITTMER

Sometimes, it's the simplest things that can make your life better. That holds true in the shop as well. Often times, taking a bit of time to build a simple storage project or shop fixture exponentially increases the "quality of life" in the shop. When I was considering what projects I wanted to work on for this issue, I figured I would take the chance to show you

three of my favorite shop storage solutions that are easy to make. The first is the clamp rack you see above. It not only holds twenty of your clamps (which of course, you have many more clamps than that, right?) but also offers a bit of storage on top in the form of a shelf.

The next project is out of left field—a turned drill bit index. Using some fancy wood and the

lathe, you can create a great way to house a quality set of drill bits.

Finally, there is a basic utility shelf. If you have ever been in my shop, you will recognize these little shelves that are scattered all over. Some hold lathe accessories, others push pads, and one even holds my coffee cup at the bench. You will find uses all over for them.

CLAMP STORAGE

The first of these three projects is one that I'm sure you'll need to build multiple of—it's the clamp storage rack that you see on the previous page. This rack is designed to hold either F-style or parallel clamps. To be completely transparent—I usually load all of my parallel clamps on one and my F-styles on the other. I just combined them for the photo.

The things we need to contend with for a clamp rack are weight capacity and clamp accessibility. I think this design does both well. Slots hold the clamp bars allowing for easy retrieval, and plywood and stout joinery means that it will take as much weight as you can stack on it. Having a bit of

extra storage on top for the “miscellaneous clamps and accessories” is nice as well.

The approach to breaking down the plywood is a personal choice. For smaller pieces, I use the table saw. However, for full sheets, I will break out the track saw. Even though you can get finish-quality, accurate cuts with a track saw, I still cut stuff a little oversized before moving to the table saw for sizing parts.

The first parts to break down are the side panels. As you can see in the photo on the left page, and the illustration on the next, the sides have a set of dadoes and rabbet in them. The top dado will capture the shelf, while the bottom dado holds the clamp rack. The rabbet along the back edge will be for the back piece.

After breaking down the sheet, I trimmed the side panels to the final size at the table saw. Then, swapping out for a dado blade, I tackled the joinery. I took my time to make sure that the dado blade was set up the proper size for the Baltic birch plywood that I was using. Then, attaching an auxiliary fence on the rip fence (Photo 2), I cut the rabbet along the back edge.

After the rabbets are cut, remove the auxiliary fence, and cut the dadoes in the sides. I use the miter gauge to guide the workpiece through the blade here. After cutting the first dadoes on each side, don't change the setup. First, you'll want to use this same fence setting to cut a groove along the back panel (Photo 4, next page). Now, you can change the fence and finish out the final dado, as

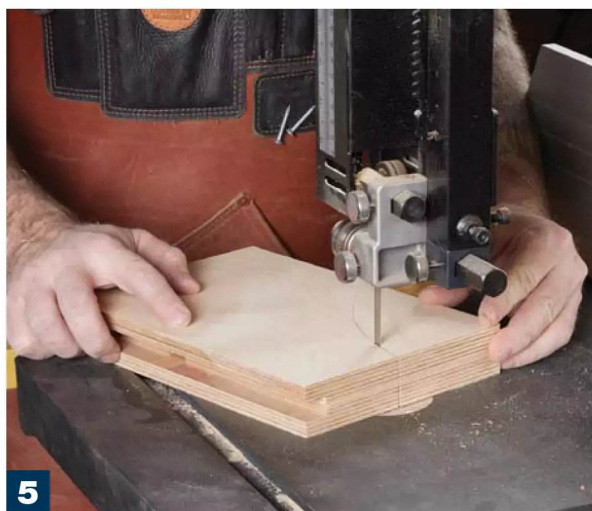


1 I use a track saw to break down the full-sized sheet of plywood. It allows me to make straight, accurate cuts, but not to worry too much about precise measurements.

2 A dado blade buried in an auxiliary rip fence makes forming the rabbet along the back edge of the sides easy.

3 Use the fence to position the part to form the dadoes. Guide the workpiece with the miter gauge.

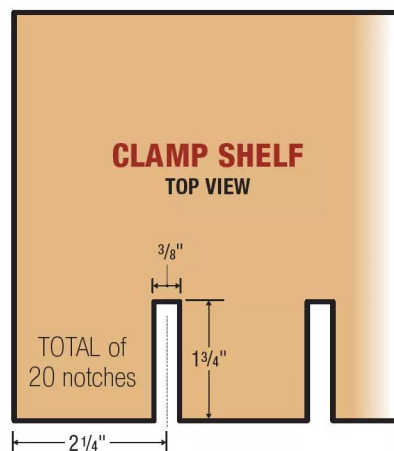
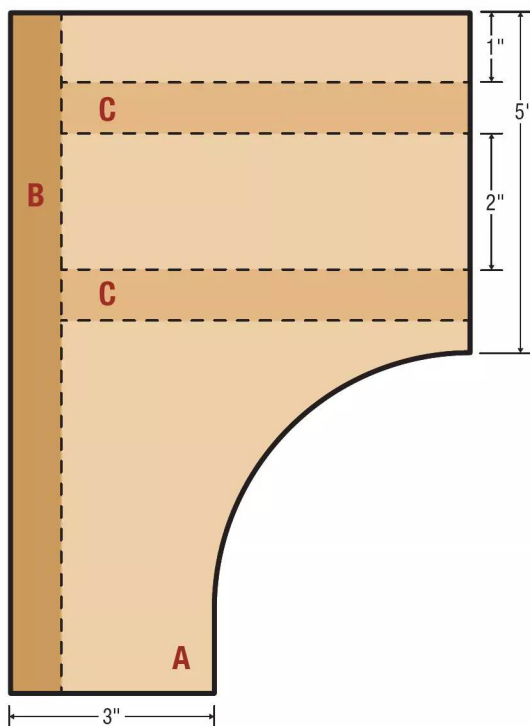




4 After cutting one dado in the side, cut the matching groove in the back before adjusting the fence settings.

5 Use double-sided tape to stick the sides together and gang cut them at the bandsaw.

Clamp Storage



Cutlist

No.	Items	Dimensions (in.)		
		T	W	L
2	A Sides	3/4	6 3/4	10
1	B Back	3/4	46	10
2	C Shelf/clamp shelf	3/4	46	6

well as the groove on the back. To add a little shape to the sides, I roughed in an arc with a pencil and cut it out at the bandsaw. As you can see in Photo 5, I taped both sides together before cutting these at once. Keep the off cuts, as you'll use these for braces in a bit.

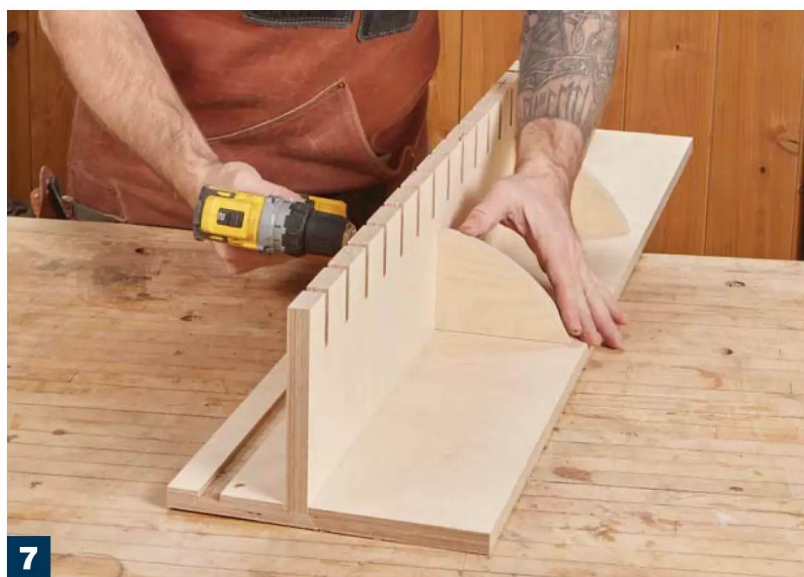
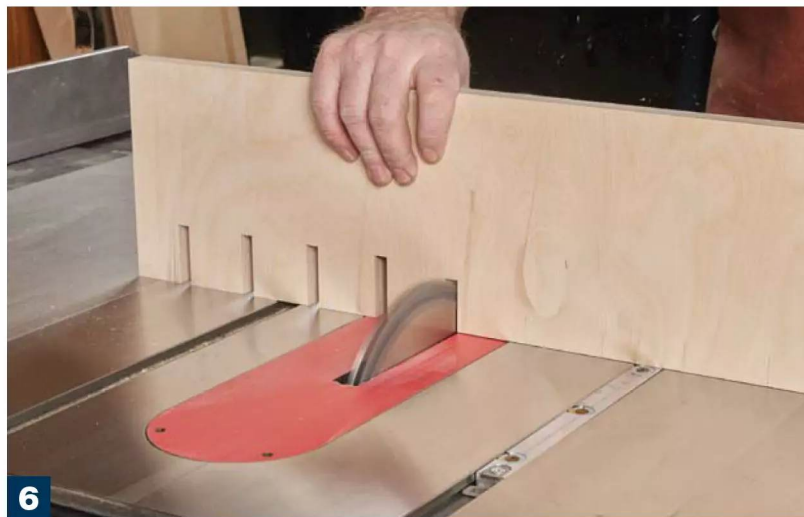
Before any assembly can happen, you need to take a moment to create the clamp holder. As you can see in Photo 6, I did this at the table saw. Setting up a dado blade to match my clamp bars ($\frac{3}{8}$ " in this case), I raised the blade as far as possible before making my cuts. I spaced out the clamp holder kerfs to give a little bit of room between the clamp heads. The spacing shown here works well for parallel or F-style clamps.

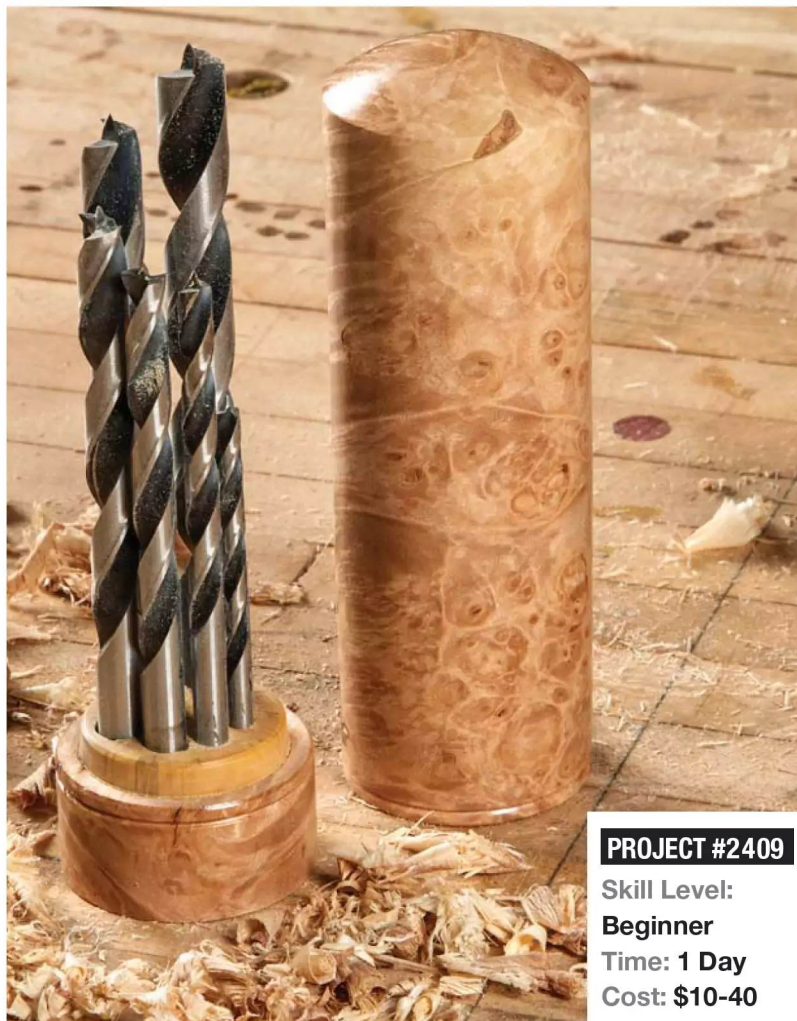
Now, the clamp rack can be assembled. Start by gluing in the clamp holder into the lower dado. Countersunk screws from the back will hold it in place. Remember the offcuts from the sides? Those get used as some support under the clamp holder, as you see in Photo 7. These get glued and screwed in place.

The top/shelf of the rack gets glued in next, as well as screwed in place. The sides get glued and popped into place. As you can see in the main photo and Photo 8, I decided to drive screws through the sides to hold everything together. Instead of countersinking these, I opted for some trim-washers on the screw heads. These are little metal rings that cradle the screw head and add a finished look. Now, the clamp can get sprayed with a couple of coats of lacquer before mounting it to studs in the wall.

6 Raise the dado blade as high as possible and cut the clamp notches.

7-8 The clamp rack gets glued together and held firmly with screws. Finish washers on the outside give a clean look.



**PROJECT #2409****Skill Level:****Beginner****Time: 1 Day****Cost: \$10-40****DRILL BIT INDEX**

I mentioned at the beginning of this article that this project was out of left field. But there's a back story—let me explain. I received a nice set of drill bits for Christmas. *Fisch* brand... by far the nicest I've had. However, they came in a disposable plastic package. So, I set out to buy a metal drill bit index. To my dismay, I couldn't find one to fit this 7-piece set. So, I took inspiration from some of the old wooden, shop-made indexes I've found in flea markets and turned this one.

This index starts with a blank—maple burl in this case. It's held between centers and turned round. A tenon is cut on each end to fit in the chuck and the base is parted off of the lid (see Photo 9). To hollow out the base and lid, I used a Forstner bit held in a Jacob's chuck in the tailstock. A bit extension will let you drill to the complete depth—no extra hollowing necessary.

The insert is what holds the drill bit shanks. I turned this from a separate piece of boxwood so that I could hide a magnet under it to "snap" the shanks in place. Turn it round, so that it fits into the base. You're looking for a friction fit. Make sure to leave a shoulder on the insert, as you see in Photo 14). This shoulder will get turned

**9****10**

9 A blank is held between centers. A spindle roughing gouge will work well for the heavy material removal. I switched over to a skew chisel to making planing cuts—this leaves a very smooth surface that can be sanded starting with 240-grit.

10 The easiest way to hollow a box like this is with a Forstner bit and a Jacob's chuck. The chuck turns the part, and the tailstock feeds in the drill bit.

and apply a coat of finish. I used shellac and Danish oil. After the finish has dried, put the top in place and wrap a couple of wraps of tape around the joint of the index. This acts like a jam chuck and will allow you to do some final shaping on the end of the index. As you see in Photo 15, I use my hand for a little extra support while making this cut. Once the tip is done, you can part the base away from the tenon. I slightly dish out the base with some hand sanding, allowing the index to sit flat on the workbench without tipping over.



15 Dome over the top of the lid. Blue painter's tape holds the two halves together as you make this cut.



PROJECT #2410

Skill Level:

Beginner

Time: 1 Day

Cost: \$10-40

UTILITY SHELVES

Finally, arguably the most useful little shop project are these little utility shelves. I use them all over my shop, and the basic design for each one is the same, but they all serve their own purpose.

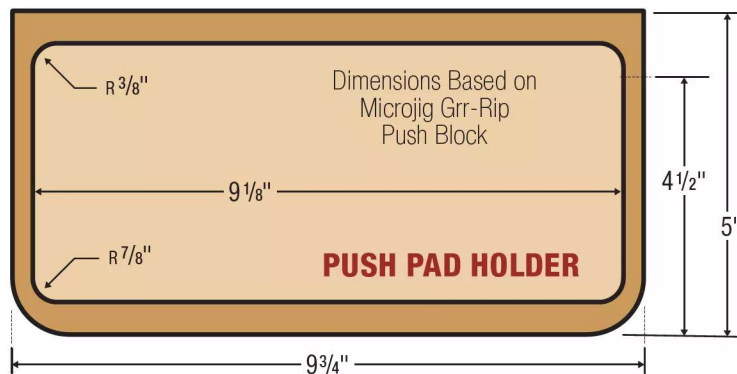
16 A shelf with a magnetic back can mount directly to a machine.

17 Scale the shelf to fit as many items on it as you'd like.

18 Simple dishes and pencil holders are a handy shop caddy near common workstations.

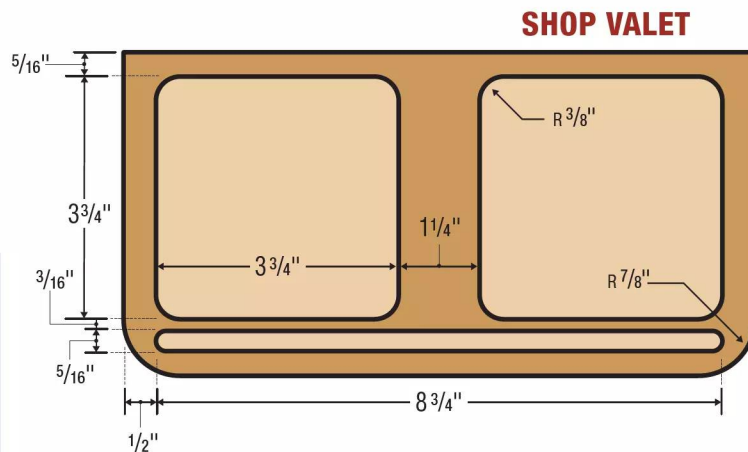


Utility Shelf Designs



Cutlist

No	Items	Dimensions (in.)		
		T	W	L
2	A Top cutout	1/4	5	9 3/4
1	B Top shelf	3/4	5	9 3/4
2	C Back	3/4	9 3/4	5



There's no fancy joinery here. The back support is attached to the platform with glue and screws—that's right, a simple butt joint. This is the foundation of these shelves—a place to rest things, and a way to mount it. Now, what treatment you add to the shelf will dictate how it's used.

Starting at Photo 16, you can see a push pad holder. With this shelf, I flipped it upside down. The platform is on the bottom, and the back support has a few embedded magnets on the back to mount it to a machine. This shelf is the home for one of my push blocks at my jointer. (To be fair, this is stuck on the side of

my planer, which is next to my jointer.) The platform here is two layers—I cut an opening in one to match the shape of the push pad, then glued it to the other layer. The push pad slips right in place and doesn't fall off.

The next shelf is my little "valet" (photo 17). It is next to my table saw. This orientation has the platform on top, with another two-layer construction. Cutouts create a pencil groove and two dishes—one usually has a tape measure and the other earplugs. Both are things I use at the table saw where this shelf is. You'll notice the inside edges of the trays are black—I cut this

out on the laser cutter, however you could do it by hand with a scroll saw. If you have several of these to make, you could also use a template, and rout out dishes with a bowl and tray bit and a handheld router.

Finally, Photo 18 shows my holder at the lathe. This shelf is a little bit longer and is adorned with 6 holes to hold various centers for turning. Drive spurs, cup centers, etc all live here. Now, the beauty of these are that you can make them any size you want, to hold whatever you want. You'll see my dimensions above, but just treat these as starting points—build them to fit your needs. **PW** – Logan Wittmer

Shaker-Style Shop

Every shop can use more storage. This set of cabinets looks as good in the shop as they would in the home.

By Willie Sandry

PROJECT #2411

Skill Level:

Intermediate

Time: 4 Days

Cost: \$1000



Cabinets



PHOTOS BY THE AUTHOR

Shopping for pre-made cabinets, you'll likely find woefully sub-par construction, often with $\frac{3}{8}$ " MDF side panels. Even the shelves are made of thin chipboard and can't support the gallons of paint and equipment that most shops need to store. Plus, common store-bought cabinets are 3 to 4 times the cost of sturdy shop-made cabinets. Another advantage of full custom cabinets is the ability to tailor them to suit your specific needs. And if you ever want to add another bank of upper cabinets in the future, you won't have any problems handling future shop expansions. So, skip the cabinet showrooms and make your own simplified cabinets for the shop. They're easy to build with just a few basic tools.

You'll need a way to break down full sheets of plywood, which can be a circular saw and straight-edge, or a tracksaw for splinter-free cuts. Another key accessory is a crosscut sled at the table saw for square crosscuts of each panel. Plus, I'll share some tips along the way for drilling extra-clean shelf pin holes and a way to build sturdy shelves without hardwood edging.

The base unit is made from two 36" wide base cabinets that are joined together before the face frame is applied. The base cabinets have an integral toe-kick and stand $34\frac{1}{2}$ " tall, which gives you a 36" high finished countertop. The upper cabinet is also made by joining two 36" uppers and applying a single face frame. Upper cabinets are commonly 30" or 36" tall and I opted for the taller version. If you'd also like the extra storage of a tall pantry cabinet, consider how it will relate to the uppers and lowers. By making the pantry slightly deeper than the lowers, you'll have a nice way to terminate the countertop. Standard spacing between the finished counter and uppers is 18", regardless of the upper cabinet height. So, a 90" tall pantry cabinet will come out at the right height to match the uppers in this case. If you build the $9\frac{1}{2}$ ' wall of cabinets featured here, just follow the provided cut list on pages 55-56. Or, if you need to modify the size to fit your space, it's pretty easy to generate a new cut list.

■ Total Sheet Goods and Hardwood

No.	Items
8	$\frac{3}{4}$ " Birch plywood sheets (full)
2	$\frac{1}{2}$ " Birch plywood sheets (full)
3	$\frac{1}{4}$ " Birch plywood sheets (full)
1	$\frac{3}{4}$ " MDF sheet for countertop
70 bd ft	$\frac{4}{4}$ Poplar (includes trim & waste)

Lower Cabinets

Start by cutting the side panels to final size and take care of the minimal joinery. Luckily there's just a single $\frac{3}{8}$ " deep dado in each of the side panels, starting $4\frac{13}{16}$ " from the bottom of the panel.

These modest-sized panels can be handled on a full-size table saw, so a dado blade set to match the thickness of your plywood works the best here.

Later when building the pantry, we'll look at an alternate dado technique using a hand-held router. Each lower cabinet side panel also needs a rabbet along the back edge to accept the $\frac{1}{4}$ " plywood back panel. Make these simple rabbets $\frac{3}{8}$ " wide and $\frac{1}{4}$ " deep. A toe kick is the final detail on the side panels, so take a moment to layout the 3" wide x $3\frac{1}{2}$ " tall cut-out. For best results, rough cut the toe kick with a jigsaw, staying well outside your lines. Then make the final trimming cut with a router and bearing-guided bit. This might seem like it's unnecessary, but

doing this two-step process will prevent the plywood veneer from chipping on the crosscut and give a nice finished appearance.

Now that you have the side panels complete, confirm the width of the fixed shelf, which should be 22" wide. Next glue the two side panels together with a fixed shelf, using loose cleats to support the open end of the assembly. Once the glue sets, you can quickly add cleats to the cabinet and create drawer openings. Add a pair of $3\frac{1}{2}$ " wide cleats at the top to hold the cabinet square. A 5" wide vertical cleat is installed next, which really starts to stiffen the cabinet box and provides a good surface to attach the back panel. Then use a $4\frac{1}{4}$ " spacer block to set the location of the drawer cleat and attach it from underneath with pocket hole screws. Finally, add a toe-kick cleat and rear lower cabinet cleat in the same way for a fixed shelf that won't sag, even once it's loaded with every gallon of paint you own.

1 Break down $\frac{3}{4}$ " plywood sheets with your best method. A track saw gives finish quality cuts and helps control dust, but a circular saw and straightedge will work too.

2 Cut a single dado in each side panel, sized to fit the plywood stock with your method of choice.

3 Each side panel also gets a rabbet to receive the $\frac{1}{4}$ " plywood back panel. Use a sacrificial fence and dado blade to cut the rabbet.

4 Mark the extent of the toe kick and rough cut it with a jig saw.

5 Trim to your line with a bearing-guided bit and scrap MDF used as a straightedge. Finish the inside corner with a hand saw.





6

6 Glue the two side panels together with the fixed shelf. Loose cleats support the top of the cabinet while the glue dries.

7 Cut all the cleats to length with a crosscut sled, such as my “X-Cut” sled designed to handle panels up to 24” wide.

8 Drill pocket holes in the cleats to prepare for assembly. You can use a small portable pocket hole jig, or speed things up with a pocket hole machine such as the Kreg Foreman.

9 Install cleats starting at the back of the cabinet. Clamp it flush with the rabbet before driving the screws.

10 Add 5 3/4” wide vertical cleats and join it to the top cleat.

11 Install the front cleat and use a spacer to locate the drawer cleat.



7



8



9



10



11

Upper Cabinets

By comparison, the uppers seem smaller and even more basic to construct. The parts are lighter and layout well on 48" wide sheet goods. Simply size your parts and cut a dado at the top and bottom of the side panels. These through dados start 1 1/8" from the ends and are identical top and bottom. Just like the lower cabinets, you'll need a rabbet in the side panels to receive the 1/4" back panels. Assemble the sides with two fixed shelves and add two cleats. The cleats add some rigidity to the upper cabinets and offer a good place to nail off the back panel. But the main purpose for the cleats is a secure mounting point once you hang them on the wall. The cleats are visible inside the cabinet, so take a minute to edge band the exposed plywood edge if appearance matters to you.



12



13

12 The basic core for the upper cabinets starts with just four parts. Glue the two fixed shelves between the side panels to form a 36" square box (cabinet shown on its side for glue-up).

13 Focus on keeping the parts flush at the front edge as you assemble.

14 For extra-crisp shelf pin holes, try using a plunge router. Follow a commercially available template or make your own using 1/4" plywood.

15 Screw together the two lower cabinets (shown here) as well as two upper ones.

16 The 90" long pantry side panels are too big for a table saw, so use a router and dado jig instead.



14



15



16



17

17 Glue together the pantry sides with three fixed shelves.

18 Measure from the cabinet to size the hardwood components. Note the outer vertical components run the full height, while inboard stiles are sized to fit between the rails.



18

Large Pantry Cabinet

If storage is important in your shop, you'll appreciate how much gear you can pack into this 90" x 42" cabinet. Plus, it's a little deeper than the lower cabinets to handle those odd-shaped or bulky items. The tall side panels are too tall to safely dado on a table saw, so I set up a router and dado jig. I used an exact-width dado jig from *Woodpeckers*, but you could build a wide version of my shop-made jig from the October 2022 *Popular Woodworking* article (issue #267). Just make the jig big enough to handle 23 3/4" wide panels. The bottom dado is spaced just like the lower cabinets (starts 4 13/16" from the bottom), while the middle dado starts 45" from the bottom of the cabinet. The top dado mirrors the upper cabinets and starts 1 1/8" from the top.

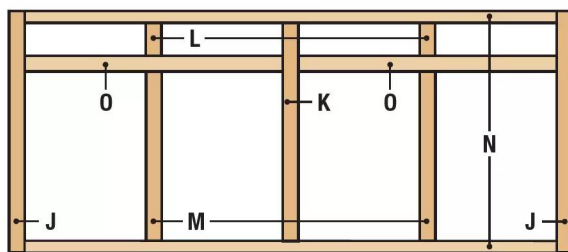
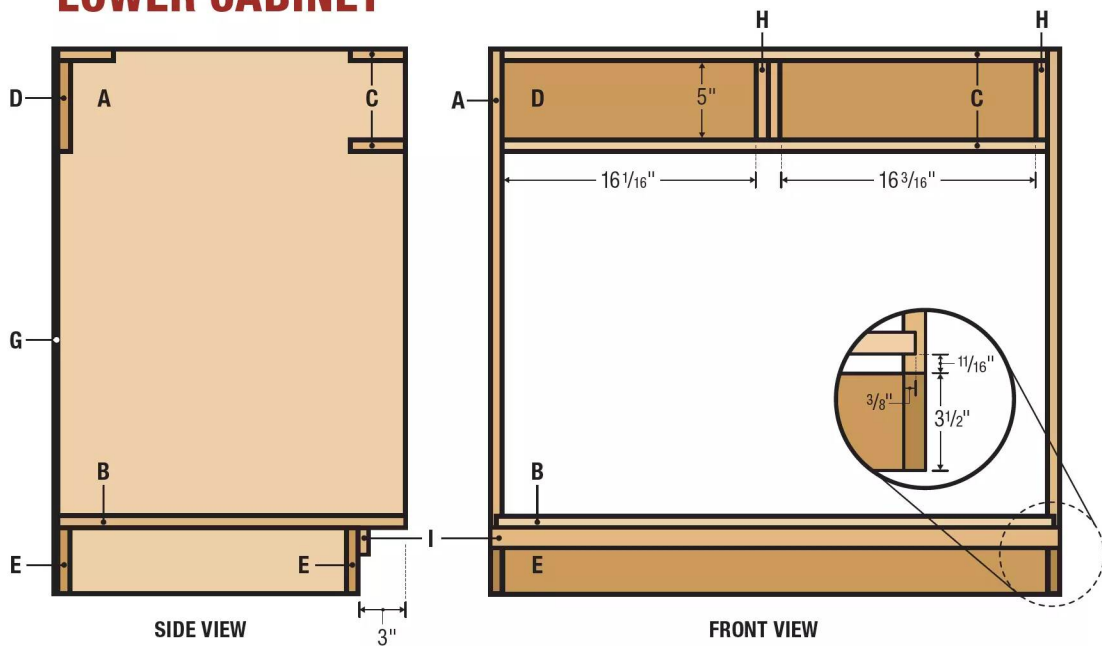
Next drill shelf pin holes for adjustable shelves in all the cabinets. I get cleaner results by using a compact plunge router equipped with a 1/4" spiral bit and 3/8" brass guide bushing. An upcut spiral bit will prevent burning and give the overall best results. Add cleats to the tall pantry—one beneath each shelf. Align each cleat flush with the rabbet at the back of the case and install them with pocket screws and glue.

Quick Face Frames

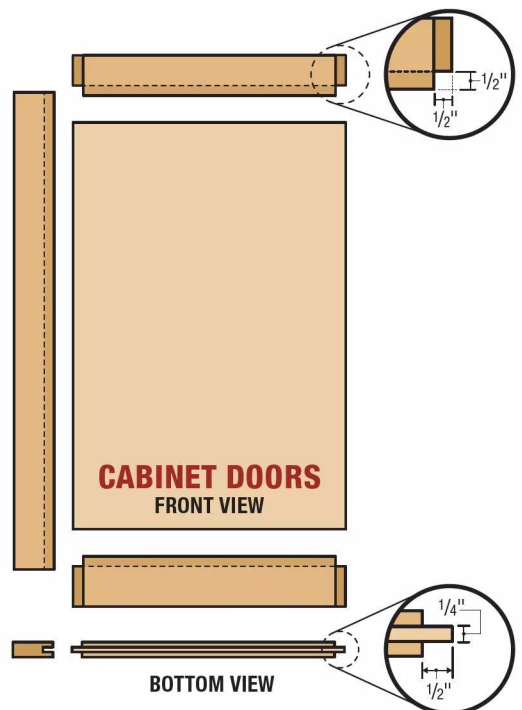
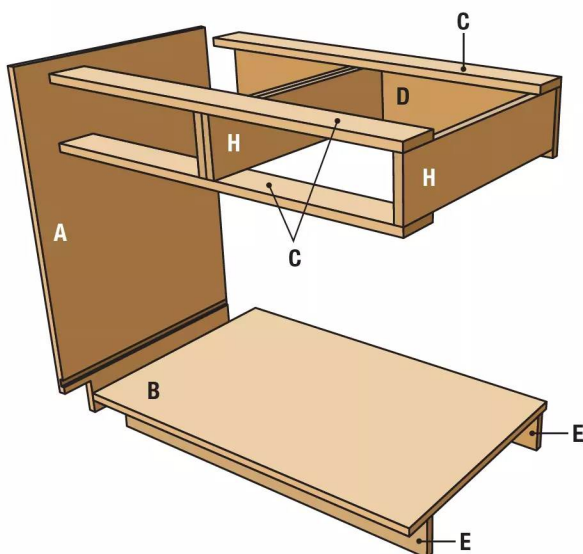
With all the cabinet boxes constructed, it's time to layout and build the face frames. I used poplar for these simple face frames, but maple is a nice paint-grade choice as well. Measure the cabinets to get the dimensions for the hardwood parts. The goal is to have the vertical parts extend 1/8" beyond the sides of the cabinet, to allow some fine-tuning as you assemble the cabinets. The horizontal parts should align nearly flush with the shelves. Typically, I shoot for the face frame rails to set 1/16" above the shelves, which

Lower & Upper Shop Cabinets

LOWER CABINET

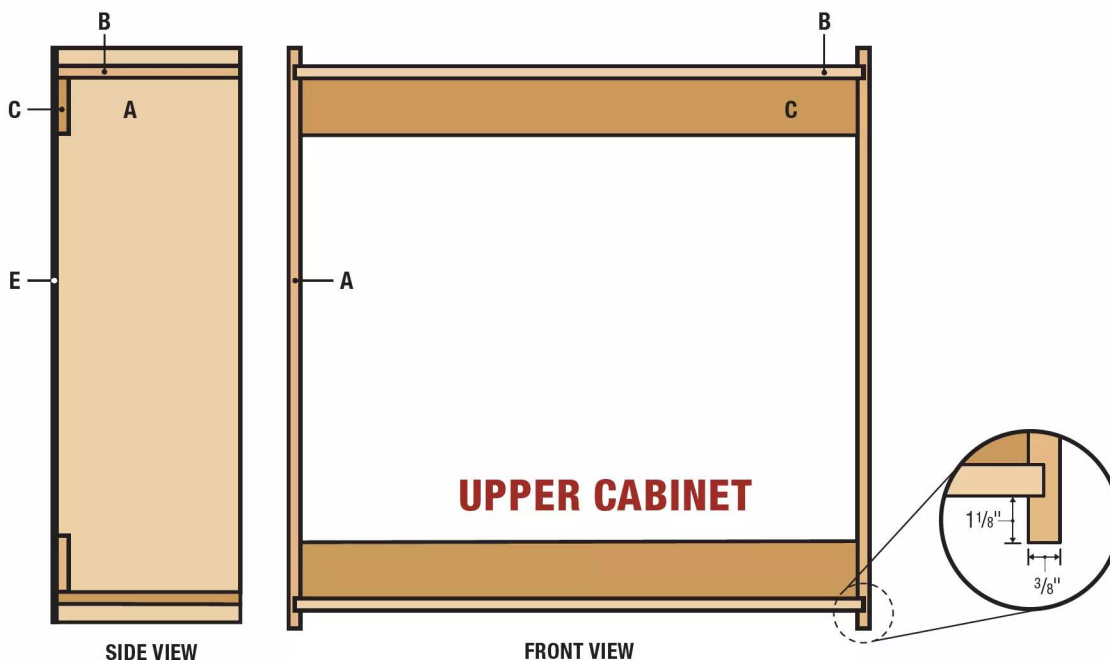


LOWER CABINET FACE FRAME



For more information

Visit popularwoodworking.com/onlineextras for more on the drawers and countertop.



Lower Cabinet Cutlist

No.	Items	Dimensions (inches)		
		T	W	L
4	A Sides	3/4	22 1/4	34 1/2
2	B Bottom panels	3/4	22	35 1/4
6	C Top/drawer cleats	3/4	3 1/2	34 1/2
2	D Rear vertical cleats	3/4	5 3/4	34 1/2
4	E Toe kick/rear lower cleats	3/4	4 13/16	34 1/2
2	F Adjustable shelves	3/4	22	34 1/2
2	G Back panels	1/4	35 1/4	34 1/2
6	H Drawer dividers *	3/4	5	21 1/4
1	I Toe kick trim (rip to fit)	1/2	4	72

FACE FRAME

2	J Left & right stiles	3/4	2	31
1	K Center stile	3/4	2	28
2	L Upper middle stiles	3/4	2	4 1/4
2	M Lower middle stiles	3/4	2	30 3/4
2	N Top & bottom rails	3/4	68 1/4	2
2	O Middle rails	3/4	33 1/8	2

DOOR PARTS

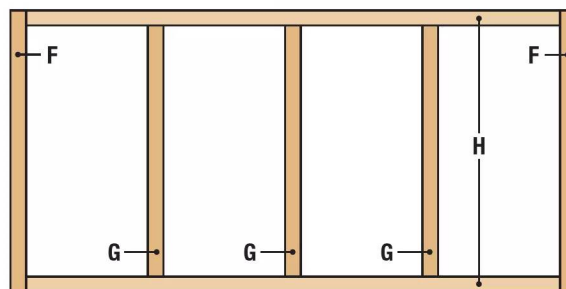
8	P Door stiles	3/4	2	23 3/4
4	Q Door upper rails	3/4	13 9/16	2 1/2
4	R Door lower rails	3/4	13 9/16	2
4	S Door panels	1/2	13 9/16	20 1/4

DRAWER PARTS

4	T Drawer fronts	3/4	5 1/4	16 9/16
8	U Drawer frame sides	5/8	21 3/16	3 3/4
8	V Drawer frame top/bottom	5/8	13 15/16	3 3/4
4	W Drawer bottoms	1/2	15 1/16	21 1/2

Face frame and door frame are poplar; all others are plywood.

* Plus hardwood spacers planed to fit



UPPER CABINET FACE FRAME
FRONT VIEW

Upper Cabinet Cutlist

No.	Items	Dimensions (inches)		
		T	W	L
4	A Sides	3/4	11 3/4	36
4	B Top/bottom panels	3/4	11 1/2	35 1/4
4	C Top/bottom cleats	3/4	3 1/2	34 1/2
4	D Adjustable shelves	3/4	11 1/2	34 1/2
2	E Back panels	1/4	35 1/4	36

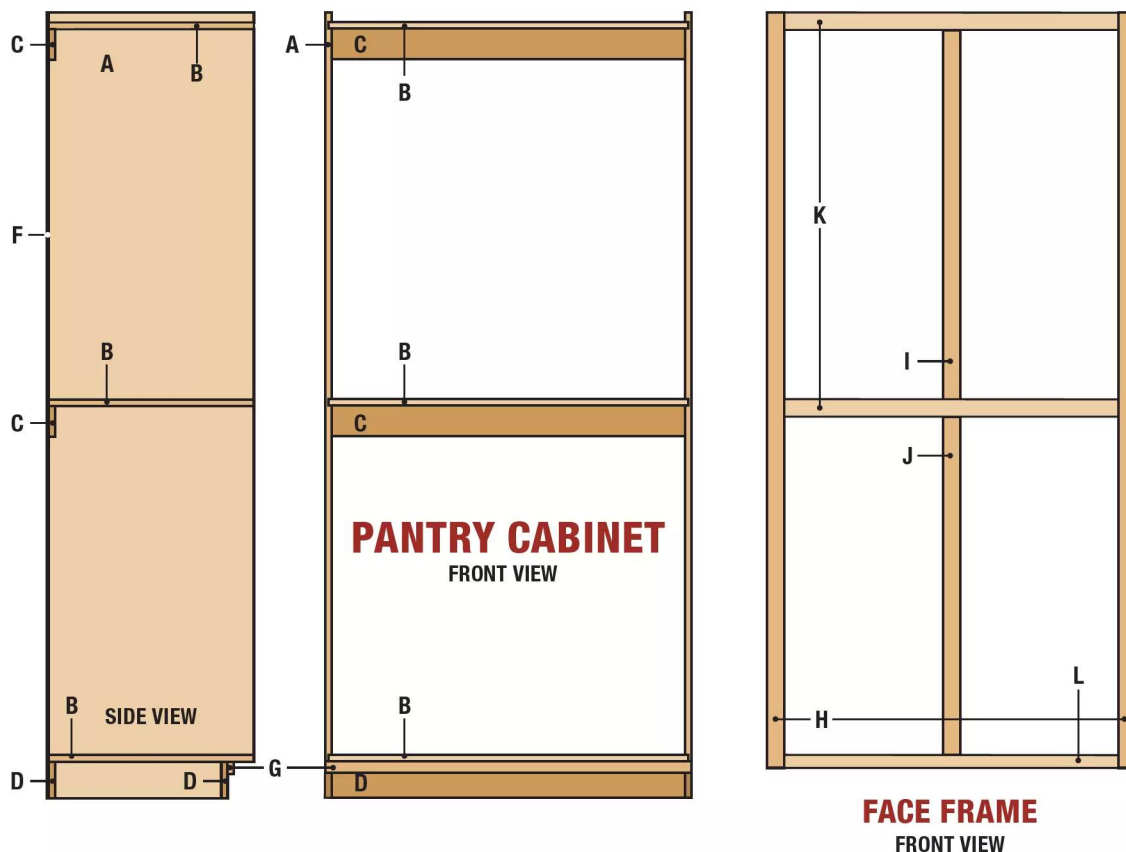
FACE FRAME

2	F Left & right stiles	3/4	2	36
3	G Middle stiles	3/4	2	32 1/8
2	H Top & bottom rails	3/4	68 1/4	1 15/16

DOOR PARTS

8	I Door stiles	3/4	2	34 9/16
8	J Door rails	3/4	2	13 9/16
4	K Door panels	1/2	13 9/16	31 9/16

Pantry Shop Cabinet



Pantry Cabinet Cutlist

No.	Items	Dimensions (inches)		
		T	W	L
2	A Sides	3/4	23 3/4	90
3	B Fixed shelves	3/4	23 1/2	41 1/4
2	C Top & middle cleats	3/4	3 1/2	40 1/2
2	D Toe kick cleats	3/4	4 13/16	40 1/2
6	E Adjustable shelves	3/4	23 1/2	40 1/2
1	F Back panel	1/4	41 1/4	90
1	G Toe kick trim (rip to fit)	1/2	4	42
FACE FRAME*				
2	H Long stiles	3/4	86 9/16	2
1	I Middle top stile	3/4	42 5/16	2
1	J Middle bottom stile	3/4	38 3/4	2
2	K Top & middle rails	3/4	2	38 1/4
1	L Bottom rail	3/4	1 1/2	38 1/4

No.	Items	Dimensions (inches)		
		T	W	L
UPPER DOOR PARTS				
4	M Stiles	3/4	2	43 5/16
4	N Rails	3/4	2	16 1/8
2	O Door panels	1/2	16 1/8	40 5/16
LOWER DOOR PARTS				
4	P Stiles	3/4	2	40 3/4
2	Q Upper rails	3/4	16 1/8	2
2	R Lower rails	3/4	16 1/8	2 1/2
2	S Door panels	1/2	16 1/8	37 1/4

Face frame and door frame are poplar; all others are plywood. *Total of 6 board feet needed for the face frames.



19 Assemble the frames with pocket hole screws and glue for a quick and sturdy butt joint. Be sure to clamp the parts down to a bench and tightly together to avoid joint creep.

20 Lower cabinets get additional small dividers to separate the drawer openings. 2" wide material can handle 2 screws per joint.



21 Glue the single face frame onto the cabinet with brad nails and a few clamps. This is the stage you'll start to appreciate the "monolithic" face frame because it's so easy to install.



gives a nice margin of error when building and installing the frames. Luckily, making face frames for ganged-up cabinets such as these is much easier than building individual frames. Just mill some hardwood stock $\frac{3}{4}$ " thick x 2" wide and cut the vertical parts to the full height of the cabinet (minus the toe kick on base cabinets). Then cut the horizontal parts to fit between the uprights and assemble the frames with pocket hole screws and glue. Finally, glue the face frame to the cabinet while checking for an even reveal beyond the sides and fixed shelves. The nice thing about paint-grade cabinets is you can use brad nails and a few clamps to secure the face frames. Then just fill the nail holes with a non-shrinking, paintable filler before applying primer.

Build the Doors

With the face frames built, you can now accurately size the doors for your project. There's some flexibility in determining how much of the face frame should be covered by the door, but let your hardware be your guide. I chose $\frac{1}{2}$ " overlay European-style hinges with a nice soft-closure feature. I like the bottom of the doors to nearly cover the face frame, so I sized my door parts with that in mind. Otherwise, the door dimensions list will yield a door that's 1" wider than the opening and provide 1" spacing between the doors in both directions.

The door joinery is about as simple as it gets—stub tenons at the table saw. Once the $\frac{1}{2}$ " thick door panel is glued in place, these sturdy doors should go out of style before they ever fail. Thinner plywood panels are an option, but I find the $\frac{1}{2}$ " panels make a sturdier, flatter door, and don't cost much more. Just rabbet the edge of the plywood panels to fit the groove in the door parts. Study the materials list and note the bottom rails on the lower doors are wider at $2\frac{1}{2}$ ".



22



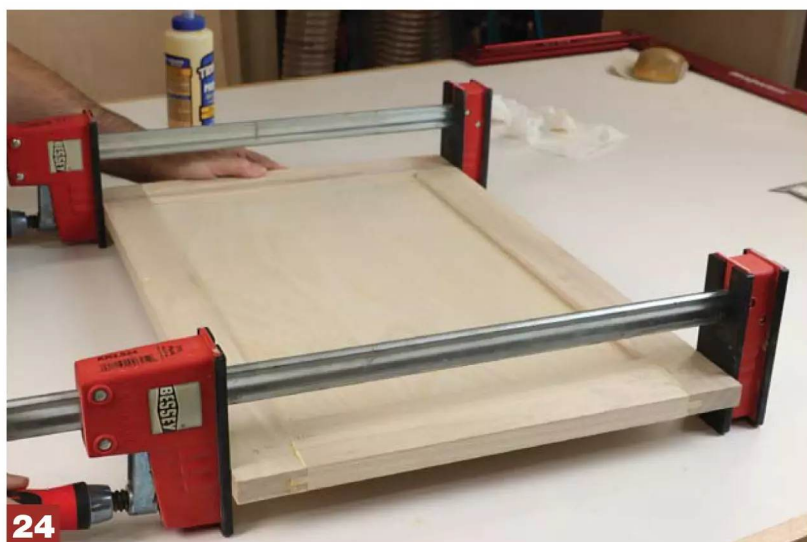
23

22 Complete the basic joinery at the table saw and rabbet the door panels to fit the groove.

23 Stub tenons are the easiest standard cabinet door construction method, so you can batch the doors out quickly.

24 Clamp the doors together, taking care to align the outer edges and check the assembly for flatness.

25 Add basic 1/2" overlay Euro hinges, mounted in 35mm holes. These have a built-in soft-close mechanism, without adding any extra bulk to the hardware.



24



25

Odds & Ends

Just a few details remain before you can add the finish of your choice. First, the face frames are intentionally left proud of the side panels and now it's time to decide if you'll trim the excess flush. Cabinets from the big box stores leave that edge proud, but one way to elevate your build quality for a "full custom" look is to trim it clean. My rule is to leave the overhang where two cabinets meet, but flush trim any exposed edges. Another detail I like to add is shelf pin holes drilled on the back of the face frame. A well-placed row of holes gives these 36" wide shelves extra strength and prevents them from sagging, all without the trouble of adding hardwood edging.



26

26 Flush trim the sides of the face frame as desired. If the cabinet joins another cabinet, it's okay to leave the overhang.



27



28

27 Working from inside the cabinet, drill an additional set of shelf pins in the central stile. This helps support heavy loads on the 3' long shelves.

28 Use “L-shaped” cleats to support the upper cabinet during installation. Make the temporary support cleats 19½" long for the proper cabinet height.

29 Clamp a scrap board under the face frame to support the cabinet doors during installation. Mount each hinge with a pair of screws and align as needed.



29

More Information

Because some cabinet designs make it almost impossible to install shelves after installing the back, play it safe, place the shelves in the cabinet before installing the pre-finished ¼" birch back panels with brad nails. The back panel is primarily for squaring the cabinet build, so make sure to mount the cabinets through the cleats. For more details on finishing your cabinets, see the cabinet details article on popularwoodworking.com. There you'll find a simple technique for locking rabbet drawers, as well as tips for building a laminate countertop and back-splash.

The cabinet boxes, doors, and drawer fronts were primed, then painted with urethane enamel cabinet and trim paint. Be sure to make up some toe kick and wall trim so you can spray everything in one go. Clear lacquer was chosen for the adjustable shelves and poplar drawer boxes, creating an interesting two-tone look. For additional details on painting cabinets with a HVLP sprayer, check out Willie's *YouTube* channel, *The Thoughtful Woodworker*.

PW – Willie Sandry

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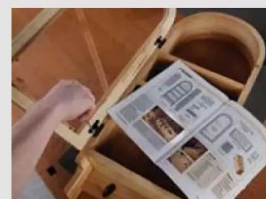
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Mahogany (African).....	4/4 Select	5.50	\$125.00
Maple (Hard).....	4/4 Select	5.00	\$125.00
Maple (Soft).....	4/4 Select	4.85	\$119.00
Oak (Red).....	4/4 Select	3.15	\$101.00
Oak (White).....	4/4 Select	7.00	\$150.00
White Oak (Quarter Sawn).....	4/4	8.95	\$180.00
Poplar.....	4/4 Select	2.85	\$95.00
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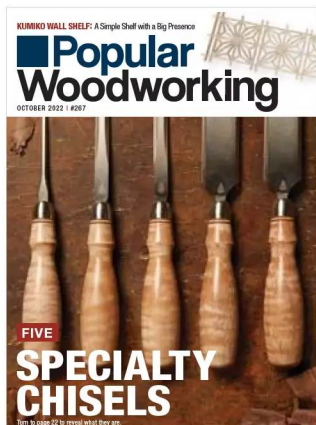
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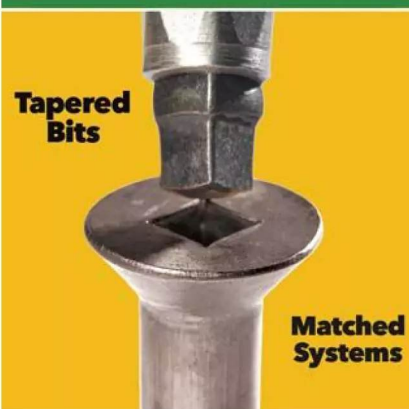


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Plane Wellness:

Woodworking & Mental Health

By Collin Knoff

Plane Wellness, a non-profit looking to improve mental wellbeing through woodworking, is headed by mental health professional, Jamie Harpster. We reached out to Jamie to hear his story.

Hobbies, like woodworking, have been shown to improve mental wellness by helping reduce negative emotions like stress, anxiety, depression, etc. They do this by giving your mind a break from whatever problems you may be facing and by grounding you in the basic need of staying active and having fun. Whether you woodwork to unwind after a long workday or just to keep your hands busy, there really is something

therapeutic about it. There's the sensory satisfaction: the sound of a plane taking a shaving or the feel of a joint locking together, but also the mental satisfaction. From planning a project to being able to say, "I built that." It brings peace, joy, and the feeling of accomplishment.

Hobbies are even more effective in helping mental wellness when you have friends who are also involved in the craft. Looking at woodworking specifically, we run into a few issues with this as the chosen hobby.

First, woodworking is complex and not always easy to learn on your own. Second, we are usually alone in our shops and don't have friends who are interested in the craft. That's why I've created Plane Wellness, a new 501 (c)(3) nonprofit aiming to change that by

offering affordable woodworking courses for all and free woodworking courses to individuals with a mental health diagnosis, physical disability, or who are a disabled veteran. We also want to bring fellow woodworkers together to form friendships and build a community.

Plane Wellness courses are currently being offered virtually; however, the goal is to build a retreat facility where individuals can stay on-site, woodwork during the day, enjoy meals together, and have campfires at night. We also hope to build an event center to host craft shows, tool swaps, and other activities to bring individuals together.

Our goal is to help spread the peace and joy that we find in woodworking with more people to ultimately improve their mental wellness. **PW** – Jamie Harpster



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How to Use a Hand Plane

TEACHER: Jamie Harpster
DATE: May 4, 2024

Hand planes are essential in hand tool woodworking, dare I say all woodworking? The only issue? There is a learning curve and many struggle with getting good results. Jamie will review different types, their parts, how they operate, and, of course, sharpening. Then practice and troubleshoot with Jamie!

PHOTOS PROVIDED BY JAMIE HARPSTER



Freehand Sharpening Basics

TEACHER: Jeff Warshaksky

DATE: May 11, 2024

For this course, you'll learn how to sharpen plane blades and chisels without using jigs and discover why this is a good approach. Plus you'll review what is sharp and what happens when a blade dulls. Next up are hands-on demos using various sharpening methods, discussions on hand and body positions, and a look at the edges of hand tools under magnification.



How to Use a Scraper

TEACHER: Jamie Harpster

DATE: July 6, 2024

Card scrapers and scraper planes are very handy tools to have in the shop, but I often hear that a lot of people can't get the results they want with them. In this course, Jamie will teach you how to prep and use scrapers. Then practice and trouble-shoot with Jamie!

Intro to Double-Bevel Marquetry

TEACHER: Albert Kleine

DATE: June 22-23, 2024

This course is an introduction to marquetry—the practice of inlaying wood veneers to create images. It'll be all about the traditional hand tool method. We'll start by discussing the theory and process, review the tools and materials, and learn the proper sawing technique. Then, we'll put these skills into action and make a simple leaf pattern. Last up are advanced techniques like layering pieces, optimizing grain orientation, sand-shading, and more.



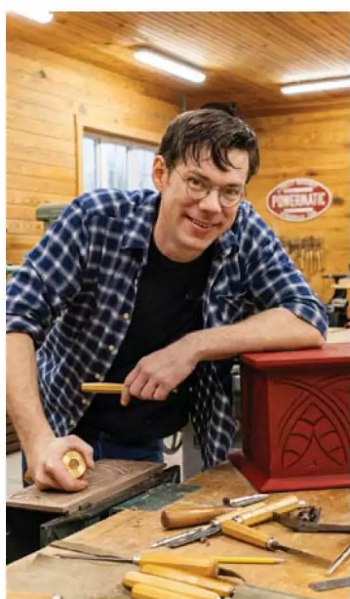
Carved Box Build

TEACHER: Shea Alexander

DATE: July 18-20, 2024

This course will be in person at the **Alexander Brothers Shop*** in Timbersville, VA. It'll be a special 3-day event of woodworking, food, and friends! Shea will walk you through building a box and carving it. Breakfast and lunch will be provided so we can enjoy more time together. At the end of the course, you get to keep your project! This course will be a mix of hand and power tools.

*The shop is run by the 3 brothers: a woodworker (Shea), a blacksmith (Drew), and a leatherworker (Josiah). They work together to produce 50+ pieces of furniture per year!



Build a Router Plane

TEACHER: Eric Meyers

DATE: June 29, 2024

A router plane is an awesome tool to have on hand. It is great for cleaning up and fine-tuning dados, grooves, joints, and more. In this course, Eric will teach how to build an "Old Woman's Tooth" router plane using minimal hand tools. By the end of the course, you will have a functioning router plane that you can use for years to come!

Woodpeckers®

Precision Woodworking Squares

- One-piece central core.
- Stainless model includes scribing guides.
- Lip keeps the square flat on your work.
- Guaranteed perpendicular to $\pm .0085^\circ$ for life.
- Available in inch or metric.



Precision Woodworking Square

Includes a Woodpeckers wall-mountable wooden case

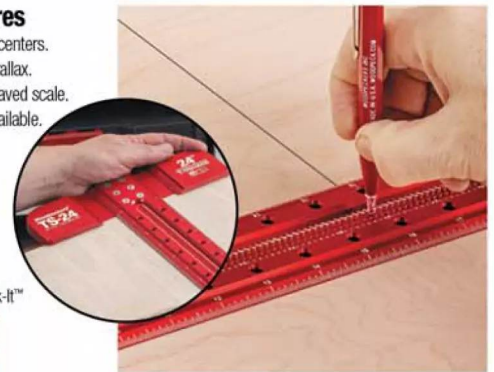
12"\$129.99

12" Stainless Steel....\$139.99

Other Sizes Available on Woodpeck.com

Precision T-Squares

- Scribing guides on 1/16" centers.
- Beveled edge reduces parallax.
- Tight tolerance laser-engraved scale.
- 600mm metric version available.



Precision T-Square

Includes a wall-mountable Rack-It™

TS-12 12"....\$129.99

TS-24 24"....\$149.99

TS-32 32"....\$179.99

in-DEXABLE

Combination & Double Squares

- Push-button index locks head at any full-inch.
- Laser-cut scribing guides for precision parallel lines.
- Retractable support keeps head aligned to your stock.



in-DEXABLE Squares

Includes a wall-mountable Rack-It™

Double 6"\$129.99

Center Finder 6"\$139.99

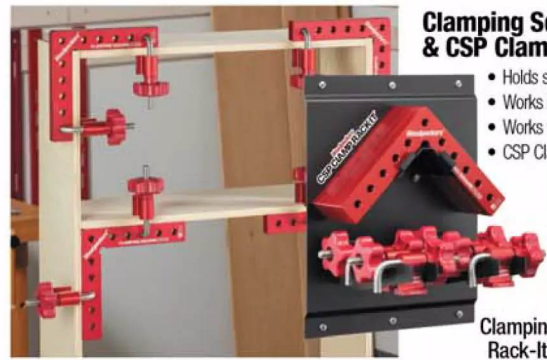
Combination 12"\$169.99

Protractor 18"\$239.99

Other Sizes Available on Woodpeck.com

Clamping Squares PLUS & CSP Clamps

- Holds stock at right angles.
- Works inside or outside.
- Works with any clamp.
- CSP Clamps speed the job.



Clamping Squares PLUS Rack-It™ Kit....\$269.99

CLAMPZILLA™

4-Way Panel Clamp

- Applies pressure both directions.
- Works with material from 5/8" to 4".
- Improved vertical pressure.
- Flatter panels faster.



ClampZILLA

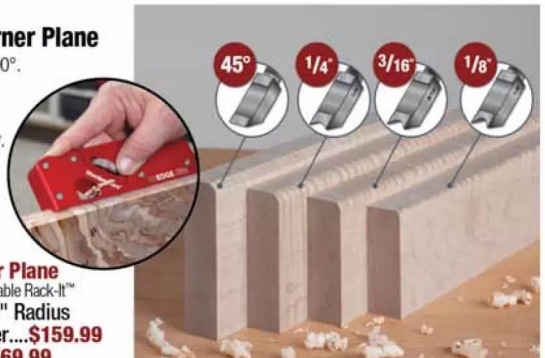
18" Capacity....\$139.99

38" Capacity....\$169.99

50" Capacity....\$199.99

EZ Edge Corner Plane

- Sole is a perfect 90°.
- 3 radius profiles.
- 45° chamfer.
- Resharpens easily.



EZ Edge Corner Plane

Includes a wall-mountable Rack-It™

1/8", 3/16", 1/4" Radius

-or- 45° Chamfer....\$159.99

Deluxe Set....\$569.99



Align-A-Saw System

- Plate delivers a flatter, longer reference for aligning table to arbor.
- Precision ground to a flatness tolerance of .002".
- Gives you 12" to check miter groove alignment.
- Gauge measures 90° and 45° accurately.

NEW TOOL

Align-A-Saw System

Includes a Woodpeckers wall-mountable wooden case

Plate & Gauge Set....\$229.99

Also Available Individually on Woodpeck.com

SANDSTAND™ Tilting Sander Base

- Turn your palm sander into a stationary sander.
- Works with most palm sanders.
- Angle adjusts from flat to 45°.
- Clamps or bolts to any work surface.



SandStand Tilting Sander Base....\$99.99

Sander not included.



AUTO-LINE™ DRILL GUIDE

- Perpendicular holes anywhere.
- Fence fits on all 4 sides.
- Works with most drills.
- Deluxe Kit includes extensions.



Auto-Line Drill Guide
Drill Guide....\$299.99
Deluxe Kit....\$399.99

Drill not included.



Table Saw not included.

THIN RIP GUIDE®

- Safe, accurate jig for repeat cutting of thin strips.
- Works with 3/8" x 3/4" T-slot table grooves.
- Easily calibrated scales in both inch & metric.
- Ball bearing contact for smooth feeding.

ThinRip Guide
Includes a wall-mountable Rack-It™
....\$169.99

MULTI-ROUTER

The Joinery Machine

- Heavy-duty, true 3-axis linear control.
- Machined aluminum templates for flawless joinery.
- Built-in dust collection.

Multi-Router The Joinery Machine

w/Dust Cabinet....\$2999.00

w/Mortise & Tenon

Package....\$4199.00

More Options Available
on Woodpeck.com



Table Saw not included.

Iron-Grip™ Small Parts Holder

- Rout small parts safely & accurately.
- Works with bearing guided bits or table-mounted fences.
- Quick-release jaw for fast change over.

Iron-Grip Small Parts Holder
....\$169.99
Extended Capacity
Fence....\$19.99

NEW
TOOL

Spline Jig

- Works with both table saw and router table.
- Spline grooves or dovetail keyways.
- Cut splines in projects up to 36" long.
- Stops included for repeat positioning.

Spline Jig....\$149.99



Hold-down clamps sold separately.

StealthStop™ Miter Gauge

- Fits all 3/8" x 3/4" miter gauge slots.
- Patented leaf springs ensure perfect fit.
- Rear fence extends from 21" to 29".
- Micro-adjustable flip stop.
- Positive stops for standard angles.
- Optional zero-clearance inserts.

StealthStop
w/Fence & Stealth Stop
Miter Gauge....\$119.99



Table Saw not included.

HexScale Rules

- Six rules in one!
- Inch & metric scales in 3 layouts.
- Right-to-left, left-to-right & centering.
- Stop simplifies repeat marking.
- 6", 12", 24" & 36" lengths.

HexScale Rule
Includes a wall-mountable Rack-It™
Set....\$159.99
Individual Sizes Available
on Woodpeck.com



THE DETAILS *MATTER*

You go the extra mile to make sure your projects turn out perfect. Your pinner should do the same. Senco®'s line of pinners with NEVERLUBE® oil free design never require lubrication, eliminating oil spatter and stains on finished surfaces.

NEVERLUBE®
OIL FREE TOOLS



21
GA
PIN

TN21L1
2" Headless Pinner



23
GA
PIN

TN11L1
2" Headless Pinner



23
GA
PIN

TN11G1
1 3/8" Headless Pinner

SENCO®