

DRILL SHOOTOUT: 12v Drill Comparison



Popular Woodworking

AUGUST 2022 | #266



BUILD A

SPLAY-LEG TABLE



BENT LAMINATION

Building an Arched-Top
Tea Cabinet

LOW-COST LUMBER

Mill Your Own Lumber
with a Chainsaw Mill

BESPOKE TOOLS

A Talk with Jared Greene from
File & Hammer Saw Works



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12" VARIABLE-SPEED BENCHTOP DRILL PRESS WITH LASER

- Motor: 1/3 HP, 120V, single-phase, 5.1A
- Swing: 12"
- Spindle taper: MT#2
- Spindle travel: 3 1/2"
- Spindle speeds: Variable, 400 - 2700 RPM
- Drill chuck: 1/32" - 5/8", JT3, keyless
- Drilling capacity: 5/8" mild steel
- Max. distance from spindle to table: 13 1/4"
- Table dimensions: 9 5/8" x 9 5/8"
- Table tilt: 45° left/right
- Table swivel around column: 360°
- T-slots: (x4) 1/2", X pattern
- Overall dimensions: 13" W x 22" D x 36" H
- Approx. shipping weight: 93 lbs.

MADE IN AN ISO 9001 FACTORY



WARNING! †¹
T31739 ONLY \$545⁰⁰

\$75
SHIPPING

18" 1 1/2 HP OPEN-END DRUM SANDER WITH VARIABLE SPEED FEED

- Motor: 1 1/2 HP, 120V, single-phase, 13A
- Drum surface speed: 2600 FPM and 3400 FPM
- Conveyor feed rate: variable, 0-12 FPM
- Maximum stock dimensions: 36" W x 4 1/2" H
- Minimum board length: 6"
- Minimum board thickness: 1/8"
- Sanding drum size: 4"
- Dust collection port: 4"
- Overall size: 35 1/2" W x 22 1/2" D x 50" H
- Approx. shipping weight: 235 lbs.



ETL
Intertek

WARNING! †¹
G0458Z ONLY \$1104⁰⁰

\$229
SHIPPING

10 1/2" HP BANDSAW

- Motor: 1/2 HP, 120V, single-phase, 3.5A
- Max. cutting width left of blade: 9 3/4"
- Max. cutting height (resaw capacity): 6 1/8"
- Blade speeds: 2, 1520 and 2620 FPM
- Blade size: 71 1/2" - 72 1/2" (1/8" - 1/2" wide)
- Table size: 14 3/16" x 12 5/8"
- Table tilt: 0-45°
- Footprint: 24 1/2" x 20 1/2"
- Overall dimensions: 28" W x 21 1/2" D x 58 1/2" H
- Approx. shipping weight: 75 lbs.

MADE IN AN ISO 9001 FACTORY



WARNING! †¹
G0948 ONLY \$390⁰⁰

\$25
SHIPPING

14" HEAVY-DUTY FLOOR DRILL PRESS

- Motor: 3/4 HP, 120V, single-phase, 7.5A
- Swing: 14"
- Spindle taper: MT#2
- Spindle travel: 3 1/4"
- Number of speeds: 12, 140-3050 RPM
- Drilling capacity: 3/4" steel
- Drill chuck: 3/64" - 5/8"
- Table tilts: 90° left and right
- Table swing: 360°
- Table size: 11 3/8" x 11 3/8"
- Footprint: 18" x 11"
- Overall height: 64"
- Approx. shipping weight: 156 lbs.

MADE IN AN ISO 9001 FACTORY

SP
C 184841 US



WARNING! †¹
G7944 ONLY \$615⁰⁰

\$179
SHIPPING

12" 1 1/2 HP BABY DRUM SANDER

- Sanding motor: 1 1/2 HP, 115V, single-phase, 13A
- Conveyor motor: 1/8 HP, 0.3A
- Sanding drum size: 4"
- Drum surface speed: 2127 FPM
- Maximum stock dimensions: 12" W x 3 1/2" T
- Minimum stock dimensions: 8" L x 1/8" T
- Conveyor feed rate: variable, 2.5-17.3 FPM
- Conveyor belt dimensions: 12 1/2" W x 49 3/4" L
- Sanding belt size: 3" x 70" hook and loop
- Dust port size: 2 1/2"
- Overall dimensions: 27" W x 24" D x 27" H
- Approx. shipping weight: 166 lbs.

SP
C 177335 US



WARNING! †¹
G0459 ONLY \$1195⁰⁰

\$179
SHIPPING

14" 1 HP DELUXE BANDSAW

- Motor: 1 HP, 110V/220V (prewired 110V), single-phase, 11A/5.5A
- Max. cutting width left of blade: 13 1/2"
- Max. cutting height (resaw capacity): 6"
- Table size: 14" x 14"
- Table tilt: 10° left, 45° right
- Floor-to-table height: 43"
- Blade size: 93 1/2" (1/8" - 3/4" wide)
- Blade speed: 1800 and 3100 FPM
- Overall dimensions: 27" W x 30" D x 67 1/2" H
- Approx. shipping weight: 246 lbs.

SP
C 177335 US

MADE IN TAIWAN



WARNING! †¹
G0555LX ONLY \$995⁰⁰

\$179
SHIPPING

13 1/4" OSCILLATING DRILL PRESS

- Motor: 3/4 HP, 110V, single-phase, 9A
- Swing: 13 1/4"
- Drill chuck: 1-16mm
- Drilling capacity: 5/8" mild steel
- Spindle taper: JT-33
- Spindle travel: 3 1/8"
- Oscillating stroke length: 3/4"
- Number of speeds: 12 (250-3050 RPM)
- Column diameter: 2.79"
- Table: Round, 12 3/8" Dia.
- Table swing: 360 degrees
- Table tilts: 90 degrees in both directions
- Footprint: 11" W x 17 1/2" L
- Overall dimensions: 15" W x 24" L x 38" H
- Approx. shipping weight: 123 lbs.

MADE IN AN ISO 9001 FACTORY

2-Year Warranty!



WARNING! †¹
W1668 ONLY \$859⁹⁹

\$69
SHIPPING

6" X 48" BELT/12" DISC COMBO SANDER

- Motor: 1-1/2 HP, 110V, single-phase, 10.5A
- Sanding belt size: 6" x 48"
- Sanding belt speed: 1066 FPM
- Sanding belt tilt: 0-90°
- Platen size: 6 x 14-1/2"
- Sanding disc diameter: 12"
- Sanding disc speed: 1725 RPM
- Sanding disc type: PSA
- Sanding disc table size: 10" W x 17-5/8" L
- Sanding disc table tilt: 0°-45°
- Number of dust ports: 2
- Dust port sizes: 2" and 2-1/2"
- Footprint: 14" x 17"
- Overall size: 35" W x 19" D x 55" H
- Approx. shipping weight: 179 lbs.

SP
C 175381 US



WARNING! †¹
W1712 ONLY \$1249⁹⁹

\$179
SHIPPING

17" 2 HP EXTREME-SERIES[®] BANDSAW

- Motor: 2 HP, 220V, single-phase, 8.7A
- Cutting capacity/throat: 16 1/4" left of blade
- Max. cutting height (resaw capacity): 12"
- Table size: 23 5/8" x 17 1/4" x 1 1/2" thick
- Table tilt: 5° left, 45° right
- Floor to table height: 37 1/2"
- Blade size: 131 1/2" long
- Blade sizes available: 1/8"-1" wide
- Blade speed: 1700 and 3500 FPM
- Footprint: 27" L x 17 3/4" W
- Overall size: 32" W x 32" D x 73" H
- Approx. shipping weight: 460 lbs.

MADE IN TAIWAN ISO 9001 FACTORY

SP
C 181721 US



WARNING! †¹
G0513X2BF ONLY \$2215⁰⁰

\$229
SHIPPING

*To maintain machine warranty, 440V operation requires additional conversion time and a \$250 fee. Please contact technical service for complete information before ordering.

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10" 2 HP BENCHTOP TABLE SAW

- Motor: 2 HP, 120V, single-phase, 15A
- Table size: 26³/₈" W x 32¹/₄" D
- Arbor speed: variable, 2000-4000 RPM
- Blade tilt: Left, 45°
- Max. depth of cut: 3¹/₈" @ 90°, 2¹/₄" @ 45°
- Rip capacity: 28" right
- Dado capacity: 1³/₁₆"
- Dust port: 2¹/₂"
- Overall size: 28" W x 37¹/₂" D x 20¹/₂" H (G0869); 41¹/₂" W x 37¹/₂" D x 41" H (G0870)
- Approx. shipping weight: 72 lbs. (G0869) 106 lbs. (G0870)



MADE IN TAIWAN ISO 9001 FACTORY

⚠ WARNING! †¹

G0869 ONLY \$535⁰⁰

WITH ROLLER STAND

G0870 ONLY \$705⁰⁰

\$55 SHIPPING

\$75 SHIPPING

13" 2 HP BENCHTOP PLANER WITH HELICAL CUTTERHEAD

- Motor: 2 HP, 120V, single-phase, 15A
- Max. cut width: 13"
- Min. stock length: 6"
- Min. stock thickness: 1/8"
- Max. stock thickness: 6"
- Max. cut depth full width: 1/32"
- Max. cut depth 6" wide: 3/32"
- Cutterhead type: 2" helical with 2-row spirals, 30 inserts
- Insert size and type: 15mm x 15mm x 2.5mm indexable carbide inserts
- Cutterhead speed: 8500 RPM
- Feed rate: 25 FPM
- Table size with extensions: 13" x 28"
- Dust port size: 2" with 4" adaptor
- Overall dimensions: 25¹/₂" W x 28" D x 19" H
- Approx. shipping weight: 82 lbs.



MADE IN AN ISO 9001 FACTORY

⚠ WARNING! †¹

G0940 ONLY \$925⁰⁰

\$75 SHIPPING

6" BENCHTOP JOINTER WITH SPIRAL-TYPE CUTTERHEAD

- Motor: 1¹/₂ HP, 120V, single-phase, 10A
- Max. width of cut: 6"
- Max. depth of cut: 1/8"
- Min. workpiece length: 10"
- Number of cuts per minute: 72,000
- Cutterhead type: 6-Row spiral-type
- Cutterhead diameter: 2"
- Cutterhead speed: 12,000 RPM
- Cutter insert type: Indexable HSS
- Cutter insert size: 14mm x 14mm x 2mm
- Number of inserts: 12
- Table size: 6¹/₄" x 30"
- Fence size: 19³/₄" L x 4⁵/₁₆" H
- Dust port size: 2¹/₂"
- Footprint: 9¹/₂" x 19¹/₂"
- Overall dimensions: 30" W x 17¹/₂" D x 13¹/₂" H
- Approx. shipping weight: 44 lbs.



⚠ WARNING! †¹

G0946 ONLY \$415⁰⁰

MADE IN TAIWAN ISO 9001 FACTORY

10" 2 HP 120V HYBRID TABLE SAW

- Motor: 2 HP, 120V/240V (prewired for 120V), single-phase, 15A/7.5A
- Rip capacity: 31" right, 16³/₄" left of blade
- Max. depth of cut @ 90°: 3¹/₈"
- Max. depth of cut @ 45°: 2¹/₄"
- Table size with extension wings: 40¹/₂" W x 27" D
- Distance from front of table to center of blade: 15¹/₂"
- Floor-to-table height: 35³/₈"
- Arbor diameter: 5/8"
- Arbor speed: 3450 RPM
- Max. width of dado: 1³/₁₆"
- Dust port size: 4"
- Footprint: 21" L x 19¹/₂" W x 40¹/₂" D x 36" H
- Approx. shipping weight: 330 lbs.



MADE IN TAIWAN ISO 9001 FACTORY

⚠ WARNING! †¹

G0771Z ONLY \$1595⁰⁰

\$229 SHIPPING

13" PLANER/MOULDER

- Motor: 1¹/₂ HP, 110V/220V (prewired 110V), single-phase, 15/7.5A
- Maximum stock width: 13"
- Maximum stock thickness: 6"
- Maximum planing cutting depth: 1/8"
- Maximum moulding profile depth: 3/4"
- Maximum moulding width: 4⁹/₁₆"
- Feed rate planing: 24 FPM
- Feed rate moulding: 12 FPM
- Knife size and type: 13" x 5/8" x 1/8", HSS
- Cutterhead speed: 5000 RPM
- Footprint: 22¹/₄" x 21¹/₄"
- Overall dimensions: 23¹/₂" W x 23" D x 44¹/₂" H
- Approx. shipping weight: 236 lbs.



MADE IN TAIWAN ISO 9001 FACTORY

⚠ WARNING! †¹

G1037Z ONLY \$1335⁰⁰

\$179 SHIPPING

8" X 76" PARALLELOGRAM JOINTER WITH HELICAL CUTTERHEAD & MOBILE BASE

- Motor: 3 HP, 230V, single-phase, 12A
- Max. width of cut: 8"
- Max. depth of cut: 1/8"
- Max. rabbeting depth: 1/2"
- Cutterhead diameter: 3¹/₁₆"
- Cutterhead type: 4-row helical with 36 inserts
- Insert size, type: 15 x 15 x 2.5mm, indexable carbide
- Cutterhead speed: 5500 RPM
- Table size: 8" x 76"
- Fence size: 38" x 4¹/₂"
- Min. stock length: 10"
- Dust port size: 4"
- Overall dimensions: 76" W x 25" D x 41¹/₂" H
- Approx. shipping weight: 487 lbs.



MADE IN TAIWAN ISO 9001 FACTORY

⚠ WARNING! †¹

G0858 ONLY \$2575⁰⁰

\$275 SHIPPING

10" 3 HP 240V CABINET TABLE SAW

- Motor: 3 HP, 240V, single-phase, 14A
- Rip capacity: 32" right, 14" left of blade
- Max. depth of cut @ 90°: 3"
- Max. depth of cut @ 45°: 2¹/₈"
- Assembled table size: 40" W x 27" D
- Distance from front of table to center of blade: 17"
- Floor-to-table height: 34"
- Arbor diameter: 5/8"
- Arbor speed: 4200 RPM
- Max. width of dado: 1³/₁₆"
- Overall dimensions: 66" W x 47" D x 39³/₄" H
- Footprint: 20¹/₂" x 20¹/₂"
- Approx. shipping weight: 508 lbs.



MADE IN TAIWAN



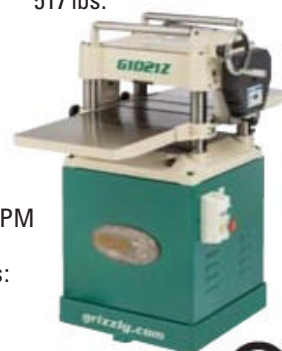
⚠ WARNING! †¹

G1023RL ONLY \$2325⁰⁰

\$229 SHIPPING

15" 3 HP PLANER WITH CABINET STAND

- Motor: 3 HP, 230V, single-phase, 12A
- Max. stock width: 15"
- Max. stock thickness: 6"
- Min. stock thickness: 3/16"
- Min. stock length: 6"
- Max. cutting depth: 1/8"
- Cutterhead diameter: 3"
- Cutterhead type: 3-knife
- Knife size & type: 15" x 1" x 1/8", HSS
- Cutterhead speed: 5000 RPM
- Feed rate: 16 & 28 FPM
- Table size with extensions: 15" x 50"
- Dust port size: 4"
- Footprint: 21¹/₂" x 21"
- Overall dimensions: 32" W x 50" D x 44" H
- Approx. shipping weight: 517 lbs.



MADE IN TAIWAN ISO 9001 FACTORY



⚠ WARNING! †¹

G1021Z ONLY \$2570⁰⁰

\$275 SHIPPING

8" PARALLELOGRAM JOINTER WITH HELICAL CUTTERHEAD

- Motor: 3 HP, 230V, single-phase, 12A
- Max. width of cut: 8"
- Max. depth of cut: 1/8"
- Max. rabbeting depth: 1/2"
- Cutterhead diameter: 3¹/₁₆"
- Cutterhead type: 4-row helical with 36 inserts
- Insert size & type: 15 x 15 x 2.5mm, indexable carbide
- Cutterhead speed: 7000 RPM
- Table size: 8" x 83"
- Fence size: 38" L x 4⁵/₈" H
- Min. stock length: 10"
- Dust port size: 4"
- Footprint: 18" x 46"
- Overall dimensions: 83" W x 26" D x 46" H
- Approx. shipping weight: 730 lbs.



2-Year Warranty!



⚠ WARNING! †¹

SB1091 ONLY \$3810⁰⁰

\$350 SHIPPING

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FROM THE EDITOR

The Woodworking Community

By Logan Wittmer

Of all the reasons I feel blessed in this world, one of the tops is the fact that I get to interact with members of the woodworking community every single day. That could be tool manufacturers that support our magazine, readers, or other members of the community. I've found, in general, that people within the community are some of the best people around.

On page 44, you'll find an article on chainsaw milling. That article was photographed at a local sawmill, Reynolds Sawmill (Swan, Iowa). The owner, Bob Reynolds (pictured to the right), has become a good friend of mine over the last few years. Bobby is the epitome of the stereotypical person in the woodworking community. When you stop at his sawmill



to buy lumber or drop off wood for kiln drying (like I do), you'll be welcomed with open arms, a warm smile, and personal service. With this in mind, I ask you to help support our fellow woodworkers that offer services. Local sawmills, boutique tool shops, and even local guilds. Not only will you find some of the best people around, but you'll probably walk away with a new friend or two. Cheers.

Logan Wittmer

ABOUT THE AUTHORS



WILLIE SANDRY: *Whiteside Blade* –pg. 10

Hailing from the Pacific Northwest, Willie Sandry is a long time 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 part-way, 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 finish. YouTube: The Thoughtful Woodworker



COLLIN KNOFF: *Drill Review* –pg. 14

Collin has been fascinated with building things as long as he can remember — from LEGO sets to taking apart things around the house just so he could see how they went back together (sorry Mom!). It wasn't until he took wood shop in high school, however, that he found the best way to channel that energy, and has been a maker ever since. Collin joined the *Popular Woodworking* team as the Digital Editor in 2019, and is excited to be part of the bright future ahead for the next 40 years.



DILLON BAKER: *Tea Cabinet* –pg. 36

Dillon Baker attended Iowa State University and majored in Studio Arts. For the past five years, Dillon has been a Project Designer and Design Editor for *Woodsmith Magazine*. Recently, he's been contributing to *Popular Woodworking Magazine* as the Project Editor. Dillon's favorite furniture style to design and build is a toss up between Art Nouveau and Postmodern. Outside of the shop, Dillon's often found with a book in his hand or cycling around town.

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LETTERS FROM OUR READERS

Fully Automatic Lawn Darts

In regards to the April 2022 “Lawn Darts” article. I can’t believe your staff would publish plans to produce a toy that has been banned by the Consumer Product Safety Council in 1988 due to the high number of injuries and deaths caused by lawn darts. Your staff may be too young to remember but someone should have done some research. You need to inform your readers immediately of the dangers these “toys” present. I am forwarding the article to the CPSC.

— A Dozen or So Readers,
with comments along the same lines.

Of the many emails I received in regards to the lawn darts (I fully expected these types of emails), it was quite clear that most didn’t read the article. I clearly stated that these were banned for a reason and that there needs to be caution used when playing darts. Almost all of the injuries reported from lawn darts were in children under 15 years old. My perception is that our readers can recall these injuries and know that these are not intended for children. This article targets you, the woodworker, and shows the techniques needed to make them. Not a mass-produced product available on department store shelves, being picked up by parents for the kid’s potluck this weekend. I hope that, even if someone doesn’t want to build a set of the lawn darts, they might pick out a technique from the article— change the scale and shape, and you’ve just made a beautiful awl (for example). To be clear, I was contacted by the Consumer Product Safety Council, and the nice lady there confirmed that it was only illegal to sell lawn darts, not make them or show how to produce them. And I did ask ... she said she enjoyed the article.

— Logan Wittmer

A Letter from Last Summer

Hey Logan,

Wanted to drop you a quick note with a few thoughts. I subscribe to a few woodworking mags, and I had planned to drop PopWood from the mix when it ran out in Oct. despite subscribing for many years. The biggest reasons were the lack of editing—bad spelling and grammar, and project articles where the text and photos didn’t jive. Also, and maybe more importantly, Popwood did not inspire. I didn’t look forward to reading it and I could leaf through the entire issue and barely pause before recycling it. It just wasn’t worth my money.

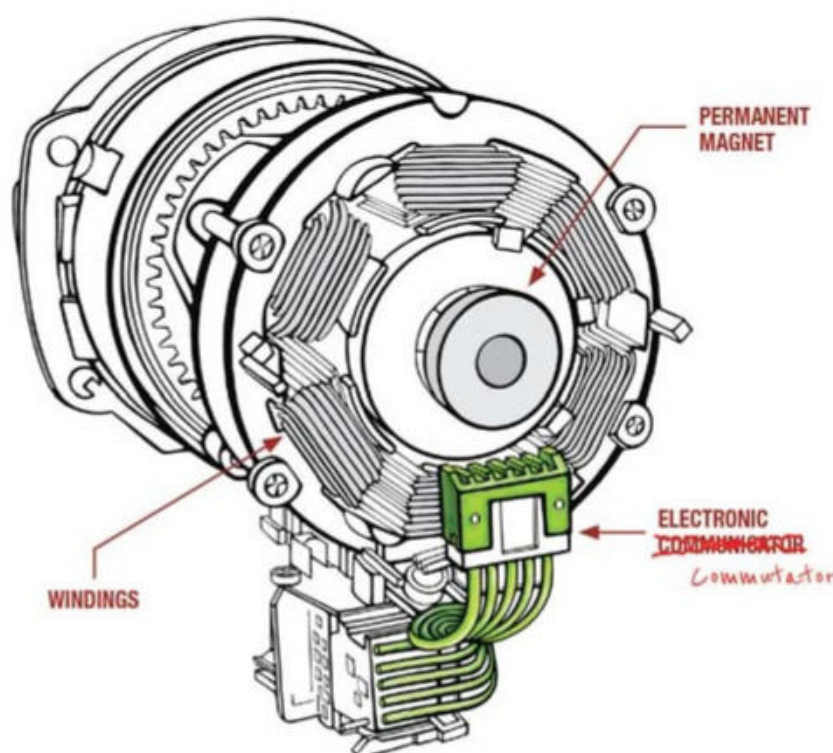
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Send your thoughts to lwittmer@aimmedia.com. I try and respond to each and every email that comes through.

Miss Commutator-cation

In your most recent issue this engineer spotted a mistake in the article on cordless tools. Specifically one part of the motor was referred to as the “communicator.” The correct term is “commutator.” Otherwise an excellent article. — Gregory Brown



With the Aug 2021 issue, however, after reading your editorial and reading (yes, reading) it cover to cover, I’ve decided to re-up my subscription for another year. If it remains at least at the level of the Aug issue, you’ll have retained a long-term customer.

— David Peters

David — Thanks for the note. Your letter was the first I received as Editor, and I have held onto it. I hope we’re going in a direction that you and others enjoy. I will note that I’m a woodworker first and foremost; editor and writer doesn’t even make the list. You’ll probably catch me with some grammatical errors and typos. You’re welcome to rough me up about it, but be gentle! — Logan Wittmer

■ WORKSHOP TIPS

A Great Glue Bottle Tip



I like the narrow tip on refillable glue bottles. What I don't like is the tiny little cap, which is very easy to lose.

The other day I was pawing through shavings on the floor looking for my lost cap when the pencil in my apron pocket decided to join the bottle cap on the floor. That did nothing for my mood until I saw the solution to my lost-cap problem on the end of my pencil. It was the replacement eraser. It slipped right over the glue bottle like they were made for each other. Eureka! I was back on my feet and working at my bench instead of the floor. — *Dave Munkittrick*



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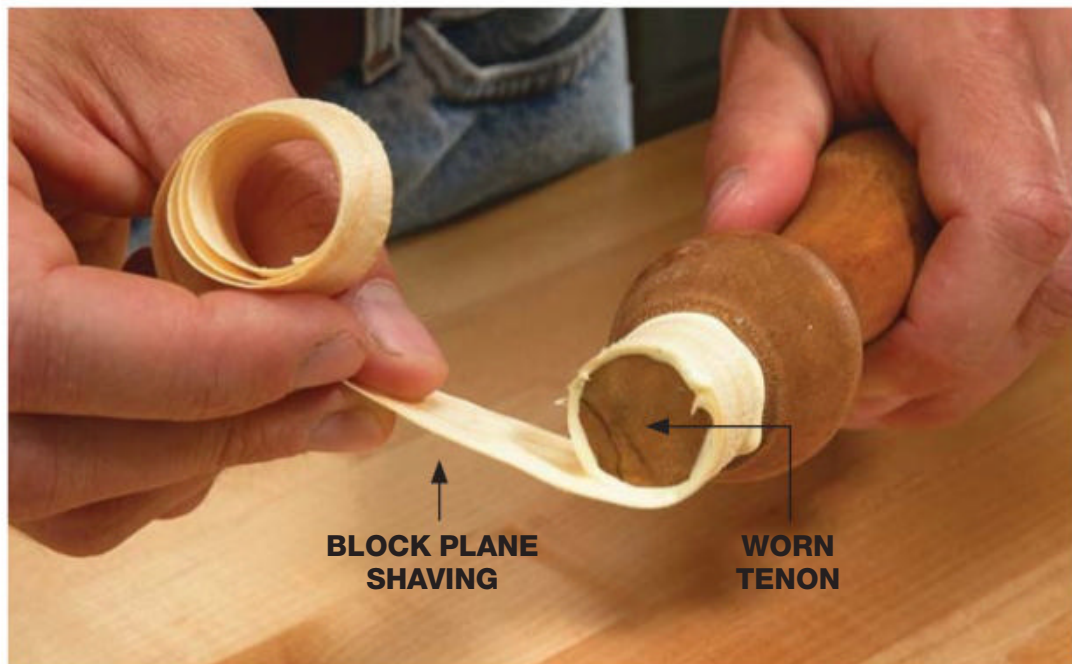
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WORKSHOP TIPS

Wrap Up a Worn Down Tenon

When a joint loosens and begins to wobble, the tenon and socket wear each other down. To enlarge the tenon and restore a tight fit, wrap it with a shaving from your plane. Keep in mind that wear and shrinkage turn round sockets and tenons into ovals. This means you'll have to do some careful sanding to shape the tenon just right.



Mop Pad Jaws

Frustrated with my vise's inability to hold odd-shaped pieces, I tried many solutions: v-notched faceplates, cork, bubble wrap, leather, etc., but to no avail. One day I pulled an old mop out of the trash. I peeled off its bottom pad, cut it in half, and fastened both pieces to the faces of my vise with double-faced tape. It works great with all sorts of odd shaped parts, providing a sure grip for sanding, drilling, filing, chiseling, and more. — *Bill Monahan*



Scrollwork Finishing Bath

For all you scrollsawers out there, here's a slick finishing tip. You know how tough it can be to brush or spray finish into all those tiny sawed-out areas? Well, give your handiwork a bath instead! The finish will get into all those little areas and seal the wood nicely. Wipe off drips and excess finish with a clean shop cloth and set your project aside to dry. Then, brush or spray the final coats on the faces and sides only. Trying to build up the finish on the inside areas is unnecessary. — *Luke Callahan*

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NEW TOOLS

Whiteside Plus by Dimar

I had the opportunity to spin the newest blades from *Whiteside Plus* by Dimar. I thoroughly tested the *Whiteside Plus* dado blade in cabinet-grade plywood, both with and against the grain. The dado blade didn't falter in sheet goods, but I don't consider that much of a challenge for a high-end dado set. No, the real judge of a dado stack, in my eye, is how well it tackles hardwood joinery.

So, I put the blade to work on a 3 h.p. cabinet saw and a 1.75 h.p. hybrid saw to test the functional power requirements of this 8" dado set. Both saws managed deep grooves and joinery cuts without a hiccup. I spend a lot of time evaluating dado blades, and one of the key things that I look for is a flat bottom groove. It may seem like a simple thing, but a lot of accurate machining needs to happen to make this possible. I was pleased to see the test dados and grooves were dead flat within a single $\frac{3}{4}$ " pass. Likewise, tenon shoulders and half-lap cheeks were true and splinter-free.

I worked up some sample joints in maple and walnut and noticed this dado set produces remarkable clean tenons, particularly if the final pass is a light one. *Whiteside* called for an incredibly high tooth count on the outer blade, 44 teeth per blade in fact, which is impressive on 8" blades. Hook angle is negative 6° , and the teeth are ground with an alternating bevel interspersed with

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flat ground teeth for the cleanest possible cut.

The outer blades are paired with more traditional two-wing chippers with a positive hook angle. Despite the overall tooth count of 96 teeth on a full $\frac{3}{4}$ " stack, the feed rate didn't seem to suffer any. The kit includes four $\frac{1}{8}$ " chippers, one $\frac{1}{16}$ " chipper, and a comprehensive set of plastic laminate shims for nearly any possible groove width. I'm impressed with the machining and overall quality of this blade set, and my list of grievances is short. I wish a blow-molded case and a $\frac{3}{32}$ " chipper was included for quicker setup of undersized grooves. Overall, I can recommend this set, and it stands with the best dado blades on the market today. Look for video reviews of the *Whiteside Plus Dado Blade* and 40 tooth general purpose and crosscut blade on my YouTube channel, *The Thoughtful Woodworker*. — Willie Sandry

Microjig BladeClean

Sharp bits and blades are the keys to getting clean cuts and crisp routed profiles. More often than not, what appears to be a dull blade can simply be a dirty blade. The new *BladeClean* from Microjig helps take care of all your blade cleaning needs in one compact unit.

The *BladeClean* kit comes with a brush, *ScotchBrite* type wheels (with rotary tool arbor), and a magnetic blade handle. The *BladeClean* has two tool wells — one in the small green lid for router bits and a larger, lower well for soaking blades up to 12" in diameter. The wells get loaded with your solvent of choice (*SimpleGreen* for me), and you can soak the blades. The magnetic blade handle lets you hold the blade as you scrub it. Now, there's no more excuse for a dirty blade. — Logan Wittmer



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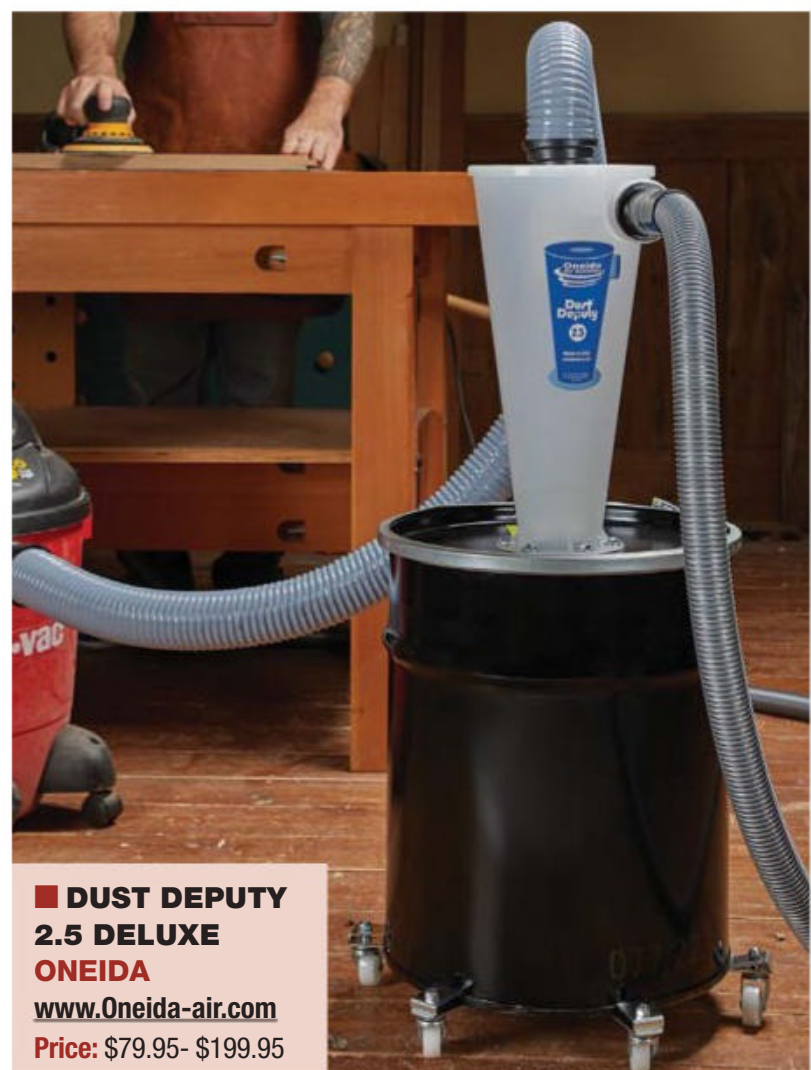
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Oneida Dust Deputy 2.5 Deluxe

In the shop, most of us use a variety of dust collection methods. For larger, stationary power tools, a dedicated dust collector is the best bet. The high CFM and static pressure can handle the large amounts of dust that these tools can generate. However, for smaller operations, such as sanding, hand routing, and general shop cleanup, I find that a portable dust extractor or shop vacuum handles everything I need. Unfortunately, most vacuums will quickly fill up with dust and shavings, rendering them choked and blocked up. Luckily, Oneida has just announced the release of their new, upgraded *Dust Deputy*, the 2.5 Deluxe.

Building on their insanely popular *Dust Deputy* platform, the 2.5 Deluxe kit is designed for higher CFM shop vacs that take a 2.5" hose. The cyclone mounted to the top of the canister deposits dust and chips into the steel bin, leaving your shop vacuum clear of dust and debris. This means longer use, and less frequent filter changes. The *Dust Deputy* 2.5 is available in the *Deluxe* version (shown here) with the canister, the *Plus* (with hose and lid), or as a stand-alone cyclone. After adding the 2.5 to my shop, I've been extremely impressed with its efficiency, and I think the cost savings in filters make it a no-brainer. — Logan Wittmer



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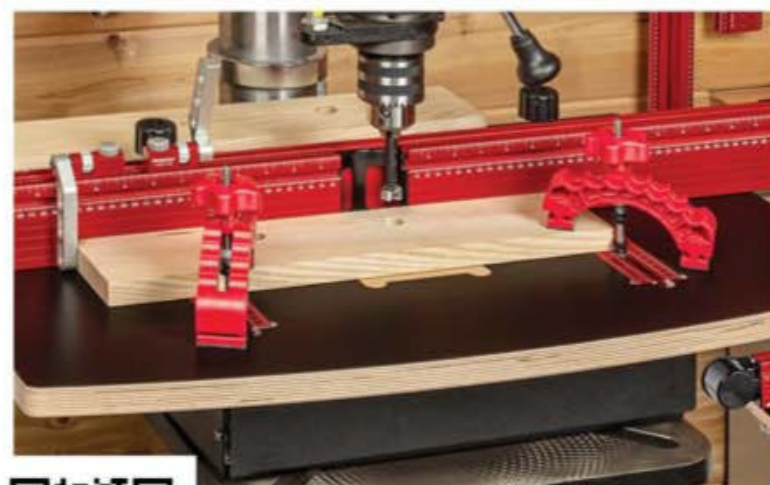
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■ Tools 101

12V DRILL SHOWDOWN

By Collin Knoff

We take a look at six drills to see what sort of progress these tools have made in the past decade.



There was a point in time when drill comparisons were ubiquitous in the pages of this magazine. There was an almost comforting familiarity in seeing the latest and greatest put to the test every 18 months or so. And then, for whatever reason, we stopped doing them in 2009. Maybe it was the lack of perceived technological advancement, or maybe interest just dried up, but it's been 13 long years.

Clearly, it was time to get the band back together and see what was new. We decided to look at 12v drills, which are still the underdogs of the power tool world. Twelve volts is all most people need, and the smaller, lighter package means they're easier to work with as well.

We reached out to all of the usual players (and some new ones) and ended up with five 12v drills and one compact 18v. Supply chain issues meant a few would-be competitors had to miss out, and we decided to throw in a wildcard with a bigger drill. We weren't looking to see if the 12v drills would match the more powerful tool but instead to see if a compact 18-volt drill could match the ease and comfort of the smaller drills. Our goal was to try and find out if there was a new Goldilocks zone in the drill market.

Testing the Drills:

The Lag Bolt Test

We decided not to reinvent the wheel with the testing regiment. To test battery life, we would see how many 1/4" by 1 1/2"-long lag bolts each drill would drive into poplar on the lowest speed, and highest clutch setting. Then to stress test the motor and battery, we would see how many 1" holes could be drilled into 1 3/4" poplar at the highest speed.

The results were impressive, to say the least. Every drill (except one, more on that in a moment) drove more lag screws than any of the 12v drills we tested in 2009. They even beat the average number of screws driven in an 18v comparison from 2008. We had a bag of 60 lag screws for each drill. All of the testers drove those 60 screws, unscrewed them, then drove them an additional time for 120+ lags driven for each drill. The combination of



1 Like the energizer bunny, the drills kept going and going and going and...

2 The *Bosch* lacked the torque to drill the lag screws all the way into the wood.

3 Drilling 1" holes in poplar stresses every part of the drill. There were no meltdowns though.



12v Drill Showdown

half-full battery meters and sore arms made us cut off testing at that point. Even the sole brushed tool in our test, the *Hercules*, just kept going and going.

The *Bosch* came up with a big ole zero in this test. The highest clutch setting didn't have enough torque to drive a single lag screw. Since no other drill suffered this issue, we let the results stand as is.

Drill-A-Thon

The second part of the test, drilling 1" holes with a spade bit, ran into a bit of a snag from the start. The self-feeding spade bits we picked up were pulling too quickly for the high-speed setting on every drill, causing them to stall. Instead, we ran them at low speed with the clutch set to drill mode.

Here again, the current crop of drills completely outperformed their fore-bearers. Half of the drills we tested drained their battery entirely, and the other half were stopped by heat cutoff sensors in the drill. Those three, the *Hercules*, *Hoto*, and *Milwaukee*, were perfectly fine after cooling down for a short time. The results reflect how many holes they drilled prior to the safety measures being engaged. It might be easy to criticize those drills for their lower numbers, but there's nothing wrong with technology to prevent damage and extend the life of the tool.

Ergonomics

We also looked at the ergonomics of each drill. When you drive 120 bolts back-to-back, you quickly recognize the importance of comfort. The ranking is purely subjective, as everyone's hands are different, but there was a lot of back-and-forth and nitpicking little things like the location of the directional switch.

Assorted Observations

Here are a few things we noticed that caught our attention.



4



5



6

4 The grip sizes varied wildly from tool to tool. The *Hercules* (left) is almost too narrow at times while the fatter *Milwaukee* (right) is better for someone with larger hands.

5 The drills were evenly split between flat and tube style packs.

6 The *Hoto* charges via a USB cord, which took a long time to charge.

7 Chucks that close completely tight (left) can hold the extra-small bits that are nice for drilling pilot holes. Some can only grip bits down to 1/16" (right).

8 Most drills in the test have a 3/8" chuck, but the *Ryobi* and *Milwaukee* were both 1/2".



7



8



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12v DRILL STATS

	Bosch GSR12V-300B22	DeWalt DCD701F2	Hercules HD91B	Hoto (no model #)	Milwaukee 2503-22	Ryobi PSBDD01K
COST	\$129	\$149	\$39.96	\$149.99	\$169.99	\$129
WEIGHT**	31.5 oz	38.3 oz	40.3 oz	31.04 oz	43.5 oz	48.11 oz
LENGTH	6"	5 15/16"	7 1/2"	8"	6 5/8"	6 3/8"
HEIGHT	7"	8 1/2"	8"	7 1/16"	7 3/4"	8 11/16"
CHUCK SIZE	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"
TORQUE (IN LBS)	265	N/A***	213	265	350	400
HOLES DRILLED	17.5	17.5	11.5 *	15 *	14 *	36.5
BOLTS DRIVEN	DNF	120+	120+	120+	120+	120+
ERGONOMIC RANKING	4	2	3	5	6	1
INCLUDED IN KIT:	2 x 2 ah batteries, charger, tool bag	2 x 2 ah batteries, charger, tool bag	Only sold as bare tool for \$39.99. Total cost with charger and two batteries = \$119.96	Internal 2 ah battery, charging cable, 8 drill bits, and 10 screwdriver bits	1 x 2 ah and 1 x 4 ah battery, charger, hard case	2 x 1.5 ah batteries, charger, tool bag

Red = best in comparison, *stopped due to overheating, **with 2ah battery, ***DeWalt does not list torque specs



9 The clutch on the *Hoto* (they call it a torque selector) is a very different concept than we’ve seen before, but it worked quite well.

- We almost gave full credit to the improved performance on brushless motors until we realized the *Hercules* didn’t have one. The fact that it performed near the same level speaks to how well it’s made.
- The three most comfortable tools all used a more traditional battery location at the bottom of the tool instead of in the handle. The *Bosch* was the most comfortable of the tube-style packs.

- The electric “clutch” on the *Hoto* worked very well, even if it wasn’t as easy to use as a standard one. It also has a pulse mode to help newbies avoid stripping out screws, but it didn’t seem to do much at all.
- The chargers for the *DeWalt* and *Hercules* works for their 12v and 20v platforms, which is a big convenience.
- The *Ryobi* suffered from an issue we’ve seen on a few other *Ryobi* drills — it comes to a stop so fast the chuck occasionally loosens from the inertia.
- Every drill besides the *Hoto* had a spot for a belt hook, though the *Hercules* did not include one. In addition to the belt hook, the *Bosch* also had a bit holder attachment that can be mounted in the same location.
- *DeWalt* uses plastic disguised as metal for the chuck and collar. It’s not particularly convincing.

Final Thoughts

So what did we learn after all of our testing? First off, there’s not a bad tool in the entire test. Even

the unique-styled *Hoto*, which got a few chuckles when it was unboxed, outperformed our expectations and then some. Every drill here would work well for nearly any task a woodworker would throw at it.

Our thoughts on compact 18v tools as a replacement for 12v were mixed. The *Ryobi* was the most powerful tool here and the most comfortable... but also the heaviest with the bulkiest battery. If you’re committed to an 18v platform, then go for it. I still personally grab for my 12v first for most household tasks. Of the drills tested, the *DeWalt* seemed to stand out the most as far as ergonomics, balanced with power and battery life. It’s a well-built tool, but then again, the rest are as well.

Finally, we learned that the tools of today are better than the ones of yesteryear in every way. They’re more powerful, reliable, weigh less, and when factoring in inflation: cheaper. So while it might have been 13 years since we last ran a test like this, don’t expect us to wait for another 13 to do it again. Though we are going to give our arms a bit of a rest first. **PW** — *Collin Knoff*



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RYOBI: *The Ringer*

Bringing an 18-volt drill to a 12-volt competition is a bit like bringing a machete to a knife fight. It's bigger, but is it any better? In short, yes.

It shouldn't be a surprise that the 18v *Ryobi* drill outperformed the other drills here, as that's exactly what we expected it to do. We were curious if the size tradeoffs were worth the performance increase. Turns out the *Ryobi* isn't actually that much bigger, though. It's the tallest by $\frac{3}{16}$ ", heaviest by 4.5oz, and actually midpack in length. It was even tied for second-cheapest! It was also the most comfortable to hold, which is partially attributed to the battery pack nicely balancing the weight of the drill. The battery pack is also where the on-paper measurements fall a bit short. It's quite wide and long, making it a tight fit in places the other drills will happily go. It might be the "best" drill in the test, but it's not the best 12v drill here.



DEWALT: *Editor's Choice*

From the get-go, the *DeWalt* sort of flew below the radar. Yes, it was comfortable, lightweight, and performed well, but didn't seem to stick out in any particular way. It did perform well during the hole drilling portion, finishing with the same number of holes as the *Bosch*, but it also felt stronger throughout. It also was just barely edged out of the top spot in ergonomics.

It wasn't until we started discussing our favorites after the testing that the *DeWalt* kept coming up. After all, it was comfortable, lightweight, and performed well, what more did we want? It did everything with little drama and no real negative attributes. Exactly what you want in a drill.



HERCULES: *Bargain Champ*

The *Hercules* was the only brushed (as opposed to brushless) tool in the test and the only one that didn't come in kit form. Neither of those facts significantly held it back, though. Even after purchasing a charger and two batteries, the *Hercules* was the least expensive drill in the test. If you shop in-store at *Harbor Freight*, you can even save an additional \$25 to drop the cost below \$100. During our testing, the *Hercules* kept up during the driving portion and only scored a lower number in the hole portion due to a temperature cutoff. After letting the drill rest a minute, it was ready to go again.

The ergonomics were neck-and-neck with the *DeWalt*, and the moving parts and plastic exterior were well made. That being said, this was the only tool to off-gas, with a noticeable smell during use.

BOSCH: *The Balance Master*

The *Bosch* wasn't the outright winner in any particular area and was the only drill to struggle with the lag screws, but we kept coming back around to how much we enjoyed it. The big reason was balance. It was effectively the smallest and lightest drill here, and as a result, we experienced no fatigue in our testing. It almost felt like a smaller class of a drill; a Yaris in a world of Corollas.

The biggest thing holding the *Bosch* back was a seeming lack of torque. On paper, it was solidly competitive, but in practice, something was missing. On the highest clutch setting, there wasn't enough torque to drive a single lag all the way into the wood. If the clutch was disengaged it had no issue, but that's not a recommended practice for installing fasteners. With that in mind, if one chose to do so, we have very little doubt the *Bosch* would have put up similar numbers.



MILWAUKEE: *Best Built*

Right out of the box, the *Milwaukee* felt in a different league than everyone else. It was substantial — the only tool here with a metal chuck and cast collar. It felt like you could drop it off a roof, and the drill wouldn't even notice.

There was also a heft to it, a heft that portrayed quality while also just making it too dang heavy. The weight plus a handle that's very wide at the bottom bumped it to the bottom of the ergonomic rankings. It was not so much that it was uncomfortable as it was fatiguing.

The different "league" also applied to the equipment the *Milwaukee* came with. It was the only drill in the test to include a 4 ah battery and a hard carrying case. While the *Hoto* felt like it was designed for a casual user, the *Milwaukee* felt like it was built for business.

HOTO: *The Underdog*

It might be a bit unreasonable to call the second most expensive tool in the test an underdog, but that's definitely how we all felt about it. *Hoto* is a virtually unknown company out of China making a drill that looks like a blow drier, charges via USB, and uses a digital clutch.

We cynically figured it would be entertaining to watch it struggle through for a bit before finally melting down. Instead, it was an absolute tank, tackling each task with the same gusto as the big brands and even beating them in some. It wasn't all sunshine, though. The futuristic look was ergonomically challenged, and though the internal battery was long-lasting, it takes forever to charge via USB. The hours-long charge time bumps this from a would-be shop drill to something that's better suited for the occasional DIYer or homeowner.



TURNING

Bowl-Turning Accessories

By Logan Wittmer

These top-notch bowl-turning accessories will make your time at the lathe more enjoyable.

In my free time, I'm either out running my sawmill or standing waist deep in lathe shavings. To me, there's nothing better than roughing out a wet bowl and having ribbons of shavings flying over your shoulder or making that perfect finish cut on the inside of a bowl. And while in the purest form, the only tools necessary are a sharp gouge and a lathe, I've found a few well-thought-out accessories and tools make your time at the lathe just a little bit sweeter. So, here are a few of my must-have bowl-turning accessories, in no particular order.



SPIKE PLATE

My time at the lathe is valuable. I generally try to make the most of it. This involves roughing out a boat-load of blanks at once if I can. I've found one of the most efficient ways to do this is to take bowl blanks to the band saw and cut them round. After that, I'll head to the lathe to start roughing. In the past, this meant taking the time and screwing on a face plate, or using a screw chuck to mount them. However, with the *Spike Plate* from Ames Grigg, this step has become much easier.

As you can see to the right, the *Spike Plate* is essentially a faceplate, but instead of screw holes, it has sharpened steel spikes. The center post registers on the blank, and I actually swapped my bandsaw circle jig post to match the spike plate post, so the hole does double-duty. Mounting a blank is as simple as slipping it over the center post and tightening the tailstock allowing the spikes to bite in. When batching out a large number of bowl blanks in one sitting, the *Spike Plate* is an invaluable asset to have.



AMES GRIGG
AmesGrigg.com
Price: \$150



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Comes with (2) 4" adapters



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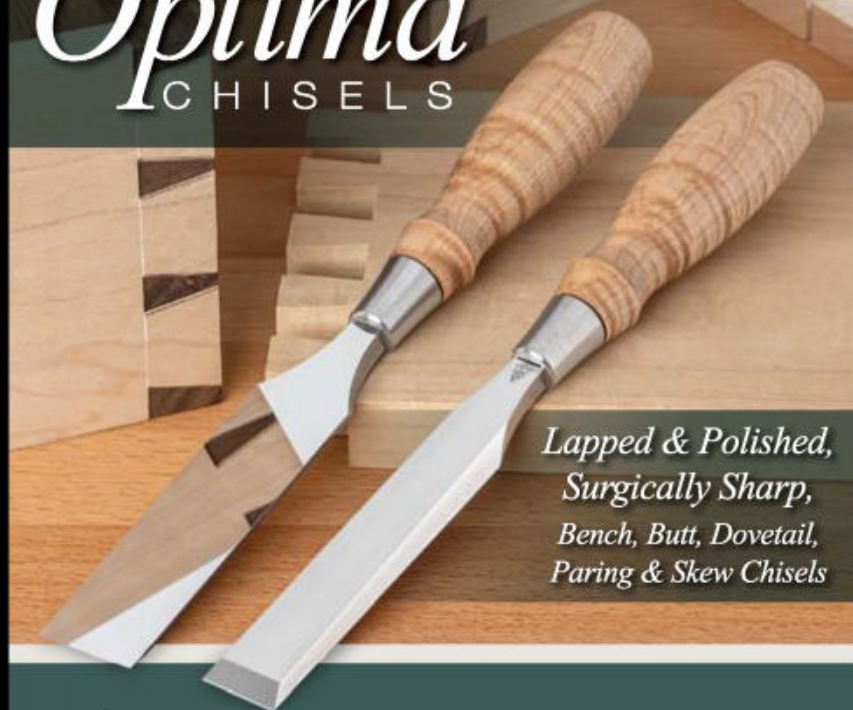
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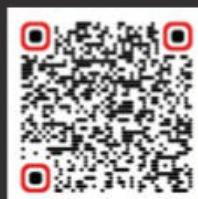
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CALAVERA TOOL WORKS
CalaveraToolWorks.com
 Price: \$325-670
 *varies by size and options

■ SILVA TURNER'S APRON

As a turner with access to a lot of green wood, I'm generally twice turning bowls. The long, wet ribbons off a freshly cut blank are wonderful. But you know what isn't wonderful? Those same shavings finding their way down the front of my shirt. It leads to a long day of doing the wiggles like I have a bad case of fleas. Over the years, I've tried every smock, jacket, and turning coat I could find. While they all worked, nothing worked the way I wanted it to; affording protection, and plain rugged utility.

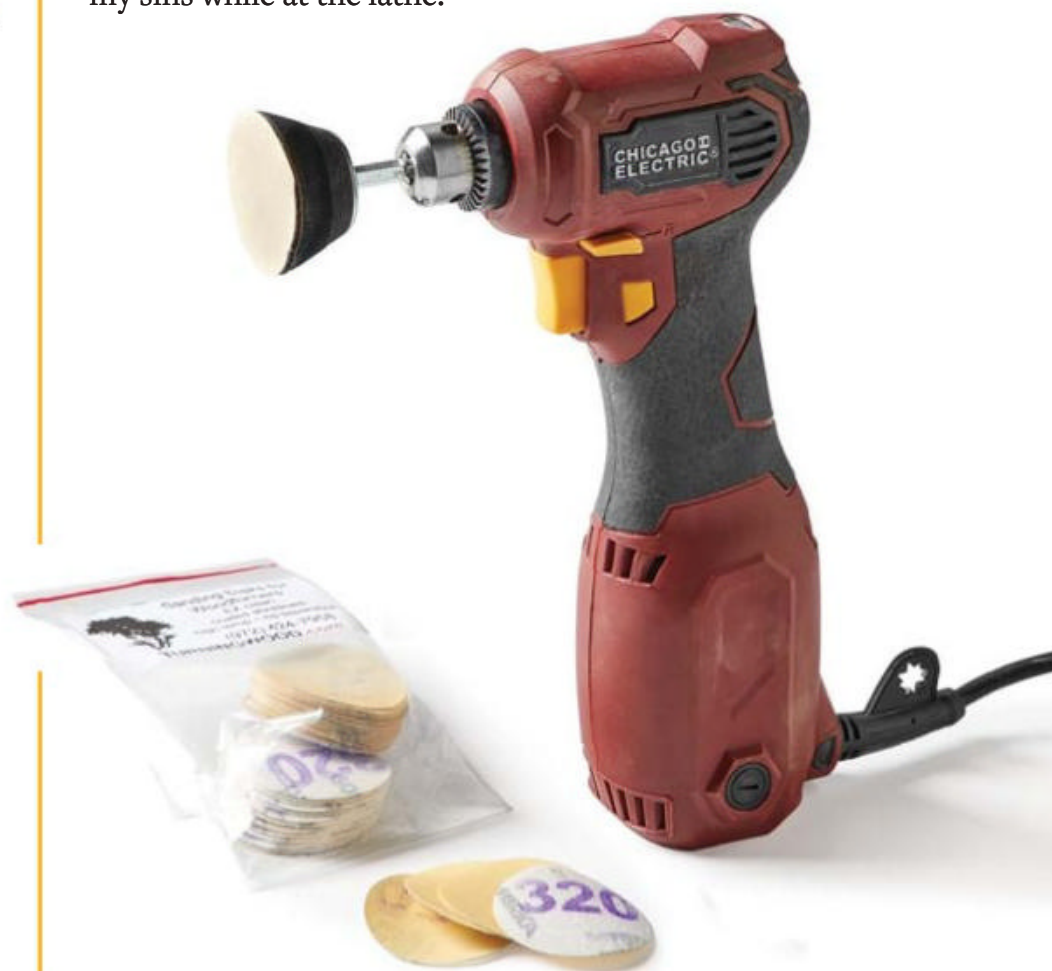
When I caught wind that *Calavera*, the maker of my beloved shop apron, was working with Tom Silva to produce a turner's apron, I knew that this would be the answer. Like all *Calavera* aprons, they're made to order and can be customized. The turner's edition has a neck guard to block shavings and a well-placed tool holder on the front — the perfect spot for a chuck key, dividers, and a pencil. The large angled pockets on the front do a great job of not getting filled up with shavings. None of that is to mention that it's a dang sexy looking apron.

■ SKILTON SANDING PAD

I feel like there should be a mantra in turning: "Sanding erases all sins of the lathe." Now, don't get me wrong. A good tool finish will let you start at 180-grit. However, for those of us that don't always get that perfect cut, we sometimes need to spend a little more time sanding than others. The best way I've found to sand the inside and outside of bowls is using a soft sanding pad. In my opinion, none beats the *Skilton* sanding pad available from *TurningWood.com*. The pad is designed to be chucked in a drill and is soft enough to contour to the surface yet firm enough to allow directed sanding pressure where it's needed.

Of course, any sander is only as good as the sandpaper you attach to it, and the *Skilton* pad is no different. Luckily, Steve at *TurningWood.com* offers 1", 2", and 3" *Mirka Gold* sanding discs to compliment the *Skilton* pad. These high-quality discs are stamped on the back with the corresponding grit. This is a great feature, as I don't know how many times I pull off a pad and put it on top of the lathe, only to reach for it in a little bit. Before I found these pads, it was a guessing game trying to remember what order I put the discs down in. With a decent right-angle drill, a *Skilton* pad, and a handful of *Mirka Gold* discs, I can erase a lot of my sins while at the lathe.

SKILTON PAD & MIRKA GOLD
TurningWood.com
 Price: \$5 & UP



JIMMY CLEWES SIGNATURE TOOLS



**JIMMY CLEWES
WOODTURNING**

JimmyClewes.com

Price: \$40-165

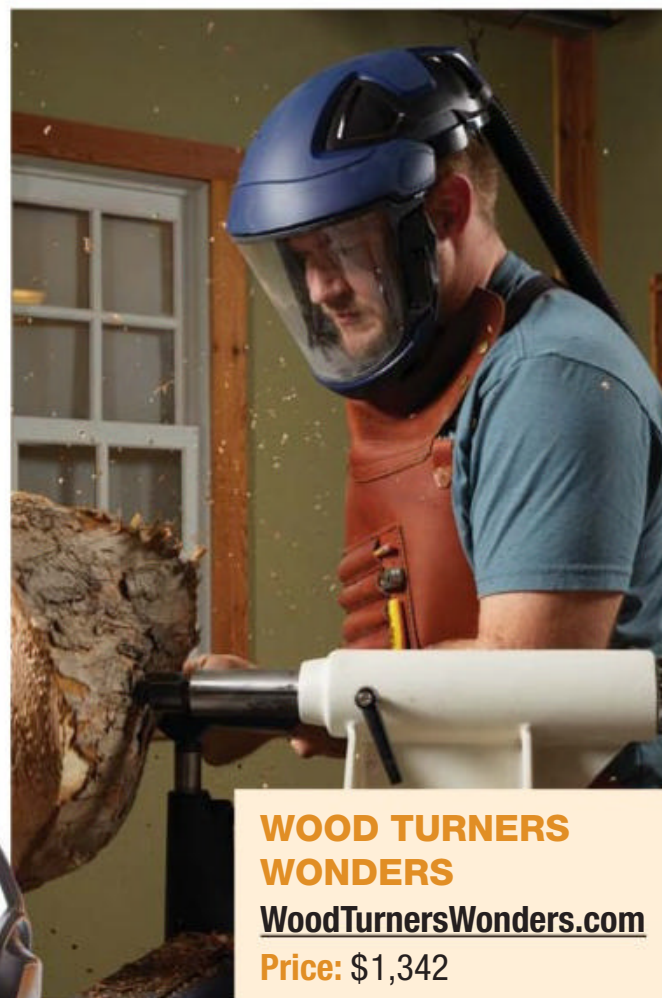
If there's one opinion that's asked for more than "which lathe is the best," it's "who makes good tools and which tools should I buy first?" The answer to the second half of that question is "depends on what you turn", but the answer to the first half of that question is always "My favorites are the *Jimmy Clewes Signature Tools*."

Jimmy's tools are made for him by Doug Thompson to Jimmy's specification, but the real crown jewel of the set is the quick release collet, as you see to the left. A quick quarter-turn of the cam-lock collet will lock or release the tool. This makes it extremely convenient to keep a handful of tools lying on the lathe bed as you turn (as I have a tendency to do), but not worry about knocking full-length tools with handles onto the ground (as I also have a tendency to do). Jimmy's bushings come in a few sizes, but the $\frac{5}{8}$ " size is my favorite. If I have a tool from a different manufacturer that I want to load into the handle, I knock the original handle off and use one of the adapter bushings to fit into the quick release unit. So now, instead of a wall full of tools with handles, I have one drawer with dozens of handle-less tools in it.

SR 500/570 POWERED AIR-PURIFYING RESPIRATOR

I'll admit it. I'm not a face shield type of guy. I do not like them, Sam-I-am. However, I know that many turners do like to wear them, and rightfully so. They protect against flying debris and are a major piece of safety equipment, so I suggest wearing one. Now that I've tried the *Sundstrom SR500/570* face-shield, I think I'm ruined for life. This face shield has single-handedly changed my view of face shields.

The *Sundstrom shield* is a powered respirator. The belt pack includes a pair of filters and a battery pack. The fan blow air through a hose into the face shield. This keeps a steady flow of clean air flowing over your face and keeps the shield fog-free. One of the greatest features is the different filters available —both particle and chemical filters. The SR is an industrial unit, and the price reflects that, but it's an investment that's well worth it, and is much cheaper than a trip to the ER for not wearing a face shield.



**WOOD TURNERS
WONDERS**

WoodTurnersWonders.com

Price: \$1,342

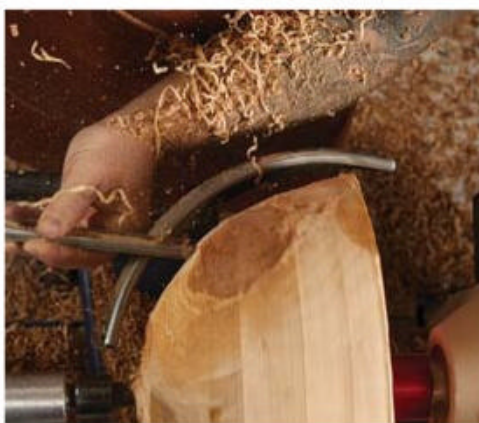
■ 12" INTERIOR / EXTERIOR CURVED TOOL RESTS

ROBUST
TurnRobust.com
 Price: \$49 & up

One of the most overlooked parts of any lathe is the tool rest. And I always thought that was an odd sentiment until I really learned tool control and how a tool should float on the tool rest. So, it's unfortunate that many high-end manufacturers overlook this critical aspect of the entire turning picture. Luckily, *Robust Tools*, headed by Brent English, offers various tool rests for different applications. My two favorites are shown below.

These curved tool rests are designed to hug the outside shape of a bowl and the inside shape. This

gives great support just where you need it (no more forcing a straight tool-rest into a curved bowl interior). When you go to order one just make sure to pay attention to your lathe swing (head height), and the tool-rest post diameter. There are a lot of different combinations available. After you've ordered and used ones of the curved one, you're likely to turn back around and order a straight one as well. They're just flat out better than any other tool rest available that I've tried.



■ PRO SHARPENING SYSTEM

Sharpening traditional turning tools can be daunting. There's a variety of grinds, tool shapes, and sharpening systems available. However, nothing (in my opinion) beats a good old fashion grinder. Having started my turning career with cheaper, hand-me-down grinders, one of the best favors I did for myself was to upgrade to a larger, 1 HP *Rikon* grinder and CBN wheels. My old grinder would take thirty seconds or so to get to speed before I could sharpen. The *Rikon* starts up so fast that, after flipping the switch, it's up to full speed by the time I've moved the tool to the rest.

Anyone that's been around the turning world will recognize similarities between the *Rikon* jig and others available. Two tool holders are mounted below the wheels. Each holder accepts either a V-rest (for use with the gouge grinding jig), or the adjustable platform. You can swap the two from side to side, depending on which grit stone you want to use. However, from my experience with all the others, I like this version better. The *Rikon* has a better fit and finish and overall build quality. I also like the fact that the locking handles are shorter, especially on my... crowded... bench.

When you pair this grinder and jig with a set of CBN grinding wheels, you've covered everything you need to get your turning tools razor sharp. For wheels, I prefer a CBN wheel in the 220-grit range, along with an 80-grit wheel. This covers my main sharpening needs, along with a coarse wheel for profiling or heavy grinding needs.



RIKON
RikonTools.com
 Price: \$149



NEXTLED
[Amazon.com](https://www.amazon.com)
 Price: \$21

MAGNETIC LIGHT

In the woodshop, lighting is critical. Being able to see your work and your layout lines is as important as the tools you use. And at the lathe, lighting holds even more importance. Being able to highlight a turning's profile, making sure it's smooth, and fluid, and being able to see tool marks are critical. Once you get to the inside of a vessel, standard shop lighting can cause terrible shadows that make it hard to see anything. That's where an auxiliary light like this little guy is invaluable.

The light I use on my lathe is a cheap one that I got off Amazon. A few of the features that I really appreciate are the magnetic base, flexible neck, and focus ring around the lens. This means that I can stick it where I need to (usually on the bed of the lathe or the tool rest), bend the light where I need it, and even tighten up the light area to really see what I'm working on. Don't get me wrong—there are nicer, more powerful lights on the market, but for under thirty bucks, it's hard to beat.

MAGNETIC TOOL HOLDERS

Finally, what would a must-have accessory list be without some dirt-cheap, stupid simple item that just makes sense? Well, these magnetic tool holders are just that. At my lathe, I keep a handful of auxiliary tools floating around. Stuff like lead screws (for my scroll chuck), hex wrenches, and dividers. You know, the stuff that gets knocked to the floor and is quickly covered in shavings. However, utilizing these cheap magnetic tool holders (which are available at most big-box stores and discount stores like *Harbor Freight*), I can keep my tools close at hand, but out of the way. Now, they aren't powerful enough to keep heavy items in place if your lathe starts bouncing. But, if you're turning something that has the lathe rocking, you should probably slow the speed down anyways.

I also have found it's super handy to have the magnetic trays attached to the top of the headstock. These are perfect for throwing used but not destroyed sanding discs in for the next time you need them. **PW** — *Logan Wittmer*



HARBOR FREIGHT
[HarborFreight.com](https://www.harborfreight.com)
 Price: \$5-15





PHOTOS BY LOGAN WITTMER / JACK COYIER

PROJECT #2215

Skill Level:

Intermediate

Time: 2 Days

Cost: \$100

Splay-Leg Table

This small table is the perfect, elegant addition to any room and can easily be built in a weekend. **By Logan Wittmer**

There's something I love about a clean, simple design. I think that's why I've fallen in love with the Shaker style, and why my house is filling up with Shaker furniture. When contemplating what design elements I wanted to incorporate into this table, I knew I wanted to use basic, traditional joinery. But when sketching out a simple Shaker table, I wanted something... *more*. The Shaker design isn't really what demanded more. In fact, the Shaker soul is the opposite of that mentality; less is more. Instead, I wanted more simply from a woodworking standpoint. My *more* ended up coming in at 2°. A 2° splay to the legs to be precise. It's enough that it drastically changes the look of the table, and it adds just enough complexity that you'll have to pay attention, so you don't cut a part wrong (ask me how I know that). Of course, I needed to make a pile of plane shaving during this build, but don't let my processes here bind you.

Creating the Top

I'm going to admit something before we get started. And it's a little embarrassing. I've run out of air-dried walnut. There, it's out in the open. I never thought that day would come. Luckily, I just had a big load of 'nut come out of the kiln. However, I will tell you that kiln-dried just simply does not work as easily as air-dried. If you're planning on tackling this build (or any others for that matter) with hand tools, do yourself a favor and get air-dried stock. The kiln crystallizes the lignin within the wood fibers, and the result is slightly more... crunchy... material.

The top for this side table clocks in at a nice and thick 7/8". Starting with thicker, 8/4 stock, I took it to the bandsaw and resawed it down to about 1 1/4"-thick. Getting a good tight glue joint is probably more important on the top of a project than anywhere else. So here, I spent several minutes using my jack plane to joint the mating edges of the stock I was using for the top.

As I'm doing this, I constantly check the edges with a square to confirm that I'm not accidentally creating an edge out of square. After jointing the edges, I like to check the fit by mating the parts together and holding them up to a light. If I see a little light in the center of the joint, that's okay. A small, 1/32" gap will squeeze out with a clamp and is technically called a "spring joint." Theoretically, you can apply one clamp across the center of the joint and that's it—

no need for other clamps near the ends of the boards. I, however, have trust issues, so I almost always over clamp.

Once I'm happy with the fit, I glue the panels together. Here, I'm gluing two panels up. However, I ended up gluing one more panel that was a little wider—I decided at the end of the build that the top needed to be a little larger for aesthetics. Once the glue has skimmed over, I come back with a scraper and remove any squeeze-out.



1 With shorter workpieces, you can get away with a "jointer" plane that is a little shorter. Here, my low-angle jack plane is the perfect size to joint the edges of the top pieces.

2 Two clamps give an even line of glue squeeze out.

Spindly Chicken Legs

I always prefer Shaker legs that have a really delicate look to them ... a long taper so the table almost looks spindly. However, before any thoughts are given to shaping (in this project or others), it's best to knock out as much of the joinery as possible while the legs are square. So after cutting the stock to size and planing it to thickness, it's time to cut some joinery.

The joints between the legs and aprons will be mortise and tenons. Instead of fussing about with a standard mortise (either chopping, routing, or using the mortising machine), I figured why not just rout through the top of the leg. This simplifies the entire mortising process, so why the heck not?

At the router table, I use a spiral up-cut bit to rout the mortise. You can gauge the length of the mortise by making a couple of pencil marks on the fence as stop and start points. After routing one mortise, from right to left (Photo 3), you can make the second mortise by dropping the leg over the running bit and routing out the top of the leg (Photo 4). The result is a leg with perpendicular mortises, as seen in the inset photo.

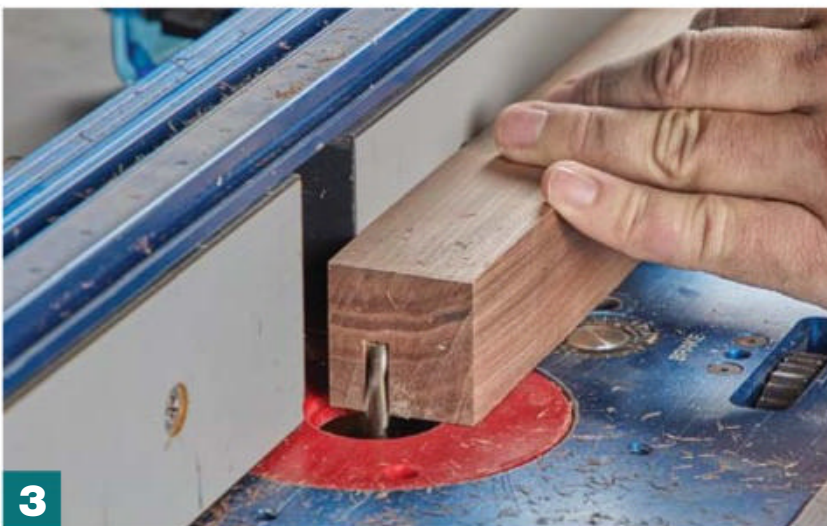
To form the taper on the legs, you have a few options. You could simply make a line, blast some Stevie Nicks, and plane until you hit your line. Otherwise, you could use a taper sled at the bandsaw or table saw to cut the taper in. Here, I marked out the line with a pencil

(a white pencil is easier to see on a dark wood like this walnut), and I rough cut it at the bandsaw. Just leave a little bit of the pencil line as you're cutting. You can do some final smoothing on the taper with either the jointer (joint from the big end to the small end for proper grain direction) or you can clean it up with a plane (Photo 5).

Because these legs will be splayed, I decided to cut the bevel on the bottom of the legs — simply register the still square outside of the leg against the miter saw fence, angle the blade 2° and also tilt the blade 2°. This will put you in the ballpark of the final leg splay, at least close enough you can sand or plane the bottom of the feet flat.

3 Form the first mortise by routing from right to left. Rout until the leg reaches your stop mark that you drew on the fence.

4 To create the second mortise, simply drop the leg over the running bit and rout through the top of the leg. Here again, start the end of the leg on a start mark drawn on the fence.



5 Cut or plane the taper into the leg. If you cut the taper into the leg, you can smooth it out with a hand plane.



Aprons Set the Angle

With the legs cut, shaped, and joinery complete, you can set them aside. Now, let's concentrate on the aprons. The aprons set the splay of the legs. This means, whatever angle you cut the end of the aprons at will be the final splay of the legs. Here, that's 2°.

Most stock miter gauges aren't terribly accurate, at least with the pre-marked angles (technically, the angles just need to be consistent, not exact). To accurately set the miter gauge to 2°, I use a *Miter-Set* gauge. With the gauge set, I installed an auxiliary fence and cut the aprons to length. A stop block attached to the fence dials in the final length and keeps it consistent across all four aprons. Now, we can form the tenons to fit into our mortises. This is easily done by loading up a dado blade in the table saw and making a pass along each face.

The key while cutting these tenons is to make sure to angle the miter gauge so that the end of the apron is riding flat against the fence. This keeps the shoulders of the apron even and will give a good, tight joint. A note while doing this, you will have to flip the miter gauge for cutting the different angles.

When cutting tenons, I always leave them just a hair fat. I find it much easier to fine-tune the fit of the tenon into the mortise back at the bench. A few swipes of a rabbet plane (either a block or shoulder plane) will help you bring the tenon down to the proper size. It will also pointlessly get rid of those annoying little ridges left by the dado blade, and it makes me feel good when they're good!

At the bench, you'll need to notch the bottom of the tenon on the apron. This will allow clearance for the angle of the leg (which causes the mortise to be angled in relation to the tenon), and it also allows us to ignore the fact we're putting a squared-off tenon in a rounded mortise (left from the router bit). It's a win-win. Just zip it with a hand saw.



6

6 A *MiterSet* gauge allows you to set the miter gauge in 0.5° increments. Originally designed for segmented turners, I've found they're invaluable when cutting angles at the table saw.

7 Trim the aprons to length using a stop block to define the length of the parts.

8 A dado blade is used to form the tenon on the aprons. The rip fence sets the length of the tenon, while the height of the blade sets the tenon's thickness.

9 Use a hand saw to nip away the lower corner of the tenon. Cut the shoulder first, aligning it with the inside and outside shoulders. Then, cut away the waste.



7



8



9

The Drawbore Joint

Here's something that puts a smile on my face every time I use it. That's a drawbore joint. The drawbore joint is simple a mortise and tenon, like we've created, but with a couple of pegs driven through the joint. The trick here, though, is that the peg hole that's drilled in the tenon is slightly offset. This causes the peg to pull the mortises and tenon extra tight and holds while the glue cures without clamps. It's a wonderful technique of yesteryears.

The first step of the drawbore is to drill the peg holes. Start by laying out the peg locations on each leg and drill the holes. You'll want to go deep enough that you go through the leg and about $\frac{1}{2}$ " into the opposite face of the mortise. You can see this in Photo 10 (it doesn't work better if you use a brace and bit, but you gain style points). Drill all of the peg locations this way.

Next, we assemble our pieces. The goal here is to hold the pieces as tight together as you can and use the drill bit to poke through and mark the center point of the peg hole on the tenon (Photo 11). This works best with a drill bit that has a sharp lead screw. Brad points work very well here. Mark each and every peg location, and make sure to also mark which tenon goes into which mortise. If you're sighting off on any of the holes, you want to make sure the matching tenon-hole is also off.

Now comes the magic. Disassemble the joint and use an awl to move the center location toward the shoulder of the tenon. You only want to move it about $\frac{1}{16}$ " at the most. The goal is to offset this hole just enough that, when you drive



10



11

10 Start by drilling the pin holes through the mortise.

11 Next, assemble the joint and mark the hole location using a drill bit. Press hard enough to mark the center point.



12



13

12 Use an awl to slightly offset the center point you just made.

13 After cutting the pegs, taper one end with a knife.

14 Assemble the joint and drive the pegs home.



14

a peg into the hole, it has to bend to get into the tenon hole and back into the mortise hole. This spring pressure will hold the joint together with extra force.

After you're transferred the holes, you can drill the holes in the tenon using the same drill bit that you used in the legs.

Now, grab the dowel material of your choice and lop off a bunch of pegs. I've found that I really like the subtle contrast of cherry pegs with walnut, but as always, it's your choice.

Quickly sharpen one end of each peg. I do this with my *Sloyd* knife, but a chisel works as well. Heck, if your pegs are long enough, you could probably use a pencil sharper as well. Just try and not go into a sharp point—the long taper and point might stop the peg from fully seating into the hole. Instead, simply try to chamfer the leading end so that it will slip past the offset holes.

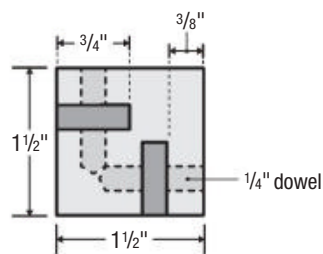
Now it's time to assemble the table base. Make sure that you've finished the aprons to whatever final finish

you want (I just smoothed them with my number 4). The offset surfaces of the legs and aprons will be tough to touch up later. Here, it's business as usual. Spread glue on the tenons and slip the apron into the mortise. Now comes the satisfying part. Start each peg in their holes and start tapping them in. You'll feel resistance, but it will eventually go through the tenon and you'll see the joint just suck together. It's satisfying. Some people are fans of putting a dab of glue on the pegs, but I've never bothered and haven't had one fall out.

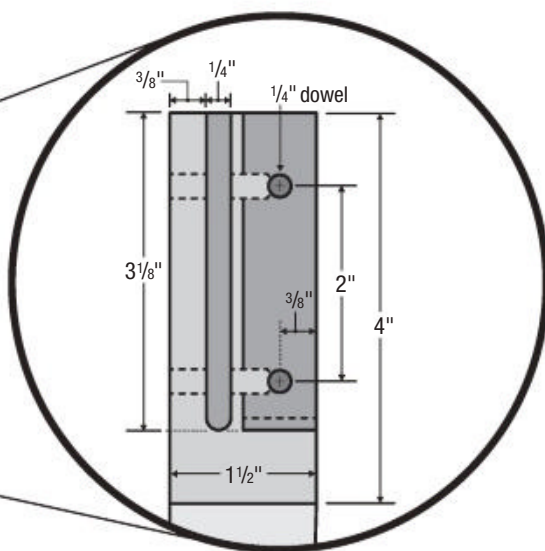
At this point, go ahead and put together two assemblies, consisting of an apron and a pair of legs. Before adding the final two aprons, drill a pair of pocket screw holes for attaching the top. I know—settle down. Pocket holes are a completely traditional way of attaching the top. Simple, and no fuss. A pair of screws in opposing aprons will be plenty for what we're doing here.

Once you've given the glue time to tack up, trim the pegs down. Most people will probably cut them flush. However, I like to trim them proud and sand them to slightly dome them over. This makes the pegs appear as though they're old pegs starting to pop.

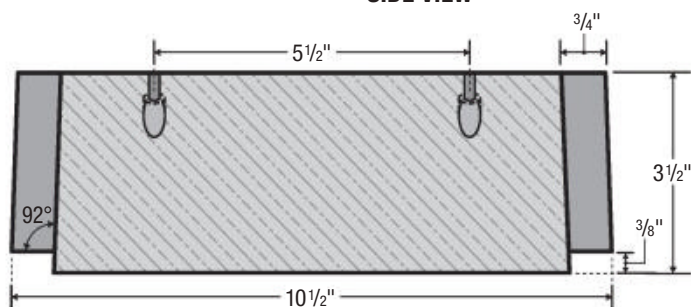
Splay-Leg Table



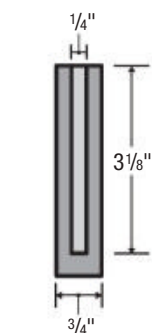
TOP VIEW
SPLAY-LEG



SIDE VIEW

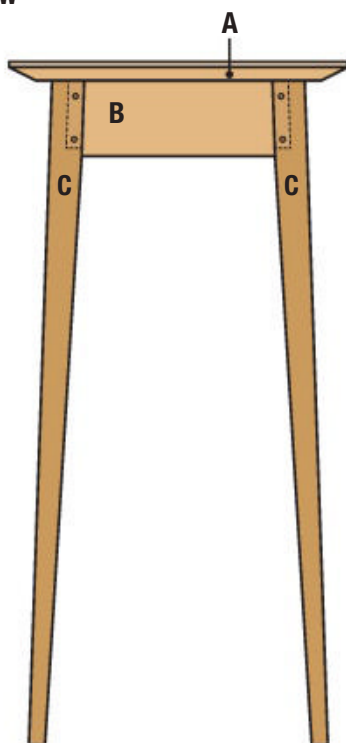


APRON
BACK VIEW



APRON
SIDE VIEW

NOTE: Top bevel is 5/8" deep by 1 1/4" long.



15



16



17

15 A sanding disc is a perfect spacer for slightly proud pins.

16 Pocket screws will mount the top to the base.

17 A marking gauge line gives you a target while cutting your bevels.

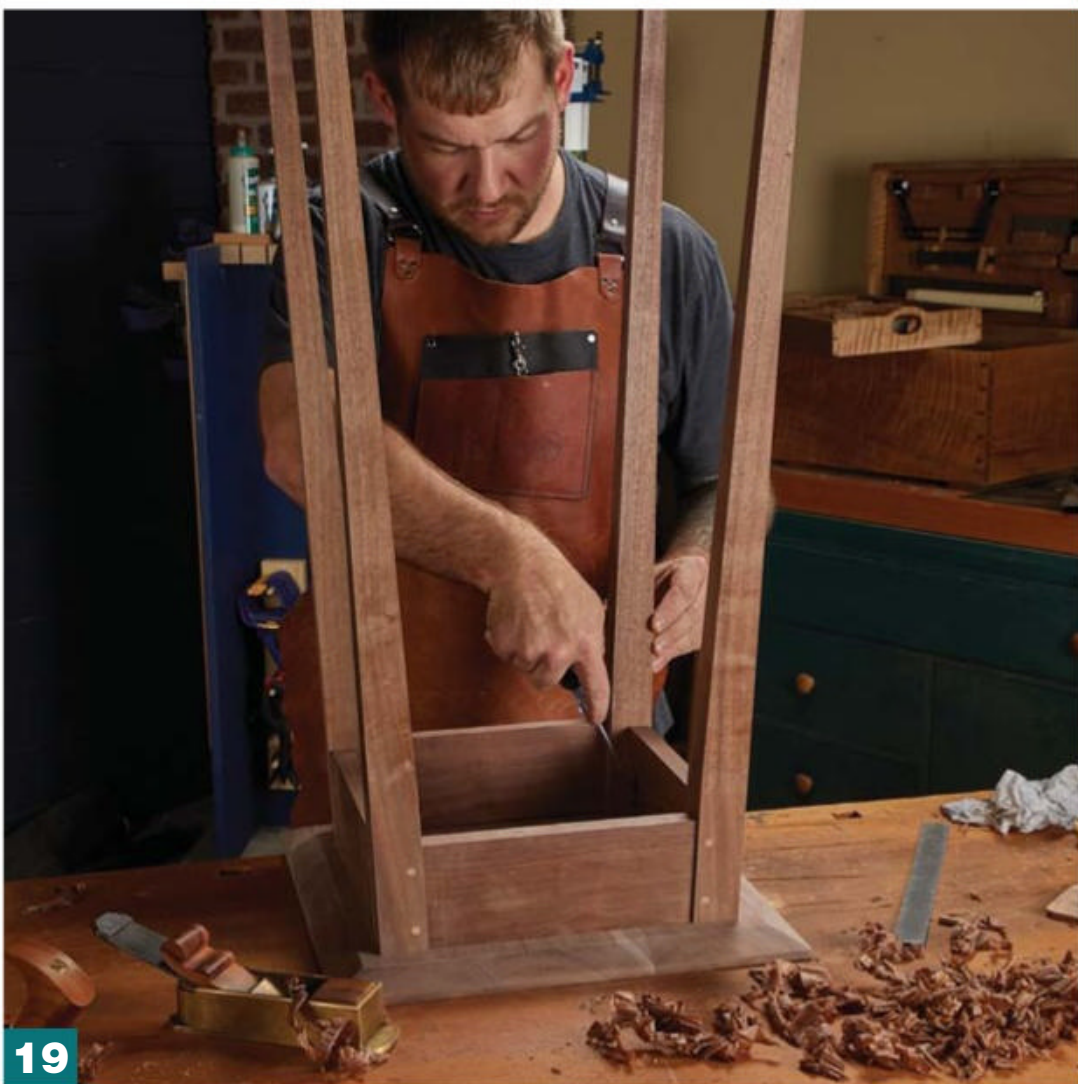
Cut List

No.	Items	Dimensions (in)		
		T	W	L
1	A Top	7/8	15 3/4	15 3/4
4	B Apron	3/4	3 1/2	10 1/2
4	C Legs	1 1/2	1 1/2	30

Also needed are eight 1/4" x 1 1/4" dowels for table construction.



18



19

18 It's not fast, but a hand plane is a therapeutic way to form bevels on table tops.

19 After making sure the base is centered on the top, you can install the top with screws. The screws and holes will allow just enough room for wood movement as the seasons change and the wood moves with humidity.

Top & Finish

At this point, let's wrap this little table up. The top can be planed down to the final thickness and cut to its final size. The dainty look of this table doesn't play well with a thick, heavy top. So, we're going to add a wide bevel around the lower edge of the top. To do this, I make a mark around the entire perimeter of the top. This gives me two gauge lines to shoot for—one for the bevel width and one for the bevel height.

I love cutting bevels with my hand plane. The important thing here is to start with the end grain bevels first and skew the plane. The shearing cut makes it remove material more efficiently and cleanly. And, by starting with the end grain cuts, any tear-out on the long grain will be removed when you cut those bevels. Just keep an eye on your two target lines and make adjustments as you go. It's kind of like an airplane landing—lots of little movements as you're getting closer to those two lines, making sure you hit them both at the same time. It's a lot of planing, but you can just as easily cut the bevels at the table saw.

After positioning the base on the top, you can install it with screws through the pocket holes. Take a look at the feet and if any adjustments are necessary, make those with a block plane or sanding block.

For a piece like his table, I always try and do a traditional type of finish. I've talked in the past about how Danish oil is one of my favorites, however, on walnut Shaker-inspired furniture, I rarely do anything but a hot linseed oil bath. Simply dump boiled linseed oil into a jar in a double boiler, and let it get smoking hot. Then, liberally apply it. The hot oil soaks in nicely and can be wiped off after half an hour. Once the linseed oil is cured, I usually come back with paste wax for a little, teeny tiny bit of water protection. Now, that's what I call a great project to knock out in a weekend. **PW**—Logan Wittmer



PROJECT #2216

Skill Level:

Advanced

Time: 3 Days

Cost: \$150

PHOTOS BY LOGAN WITTMER & CHRIS HENNESSEY

Tea Cabinet

The elegant arched case of this tea cabinet is a great way to practice bent lamination and showcase some unique wood. **By Dillon Baker**

If you're like me, it's difficult to imagine beginning the day without a piping hot cup of a caffeinated beverage. For some, this beverage may be coffee, but for the rest of us it's more than likely tea. Consumed only second to water, tea possesses a past that's as long as it is complex. Dating back as far as the Han Dynasty (second century B.C.), lore has it that Emperor Shen Nung — while passing through the countryside — experienced a gust of wind that caused a leaf to split from a branch and land conveniently into his boiling cup of water. Regardless of whether you believe this legend to be true or not is irrelevant because what's undeniable is tea's omnipresence and global popularity. So, what better way to celebrate the ritual of waking up than by constructing a shrine to house your favorite beverage? Follow along step-by-step as I take you through the process of building a tea cabinet that's as timeless as the tea itself.

Creating the Form

Start by creating the bending form for the main carcass. I used $\frac{3}{4}$ " Baltic birch plywood, though any plywood can be used for this application. The radius of the form should match that of the interior of the finished cabinet. I chose to oversize the depth (i.e., thickness) of the form to account for refinement once the lamination has cured.

Once you have the bending form constructed, go ahead and drill a series of holes ($1\frac{1}{2}$ " in diameter) around the perimeter. There is no perfect formula; just create enough holes to provide sufficient clamping pressure around the lamination.

Resawing Veneers

The veneers for this project are $\frac{1}{8}$ " x $5\frac{1}{2}$ " x 72". You will notice that the width is oversized by $\frac{1}{2}$ ". This was done to help minimize the chance of gaps or voids caused by removing the raw or unfinished edges after the glue-up. Now, when it comes to bent laminations, I always recom-

mend using air-dried stock. The reason for this is that when using kiln-dried wood, the lignin tends to have dried out and decreases its natural malleability. If you only have access to kiln-dried lumber (commercial availability is usually air/kiln dried), all is not lost. However, you may need to soak the boards in warm, distilled water for a few hours. For this procedure, a makeshift trough was built out of plywood and then lined with high-density painter's plastic — no need to get fancy.

Gluing Up the Main Case

Like any glue-up, start by doing a mock run to solidify your strategy. Any number of aids can be used to persuade the laminations around the form. I like to make curvilinear cauls that match the radius of the form along with some rectangular scrap pieces to help distribute the pressure. If your pieces are proving to be uncooperative, a ratchet strap wrapped around a fixed point (see photo) can help take some of the pressure off the task. Since this is



1 Locate or fashion a vessel that's large enough to soak the veneers. You'll want to soak the veneers for several hours in hot water until they're pliable.

2 Bend the veneers around the form without glue. Clamp them in place, and as they dry, they'll start to retain the shape.



3



4

3 Apply a layer of epoxy to each face of veneer. A knap roller works best here, as foam rollers seem to degrade after a few minutes of rolling the epoxy.

4 Apply clamps around the entire bending form. Additional cauls and ratchet straps help pull everything tight for good, clean glue lines.

5 Use a shop-made t-jig to guide the router as you rout the stopped dados for the shelves.

6 Clean up the bottom of the dados using a router plane.

7 To form a groove for the back, use a wing cutter at the router table.

a one-man operation, I like to use an adhesive with a longer open time. West Systems 105 resin with either the 205 or 206 hardener will more than suffice. Using a two-part system takes the stress out of the procedure while minimizing spring-back and ensuring a rock-solid bond. If you end up soaking your boards, allow laminations to fully dry on the form before gluing. Any remaining moisture may compromise the adhesion, ending in potential catastrophe — don't ask me how I know.

Refining the Case

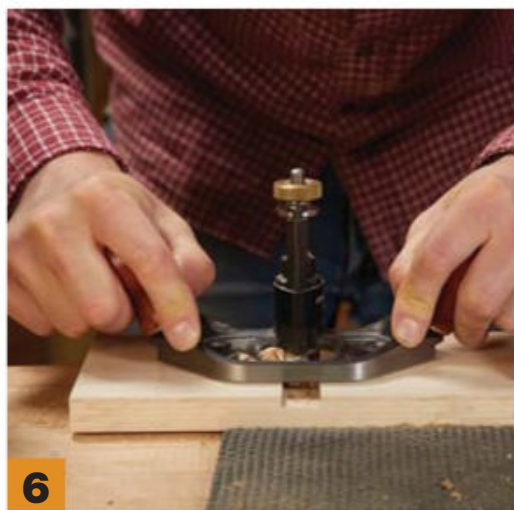
Once the form has cured, it will need a little love. Start by refining — preferably the front side — using a jack plane or a sanding block. With one side smooth, send the opposing side through the power planer until you have reached the desired depth. Now, this may go against the laws of grain direction, however, if you remove small amounts of material ($\frac{1}{32}$ " or less) this can be done successfully without tear-out. Even so, this is being done on the backside of the cabinet where all blemishes and boo-boos will be conveniently concealed.

Take A Router to the Piece

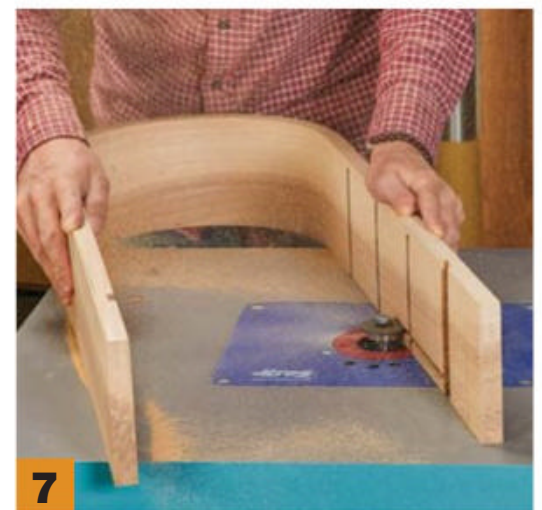
The joinery for the cabinet was created using a handheld router and a template. To help with alignment, I made a series of registration marks on both the case as well as the template. Start by clamping the case on the end to the workbench. Using the registration lines, align the template



5



6



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to each stopped groove and make your way down the side. Since the template is set up to create $\frac{1}{4}$ " grooves, the bottom through dado will be created in a few passes.

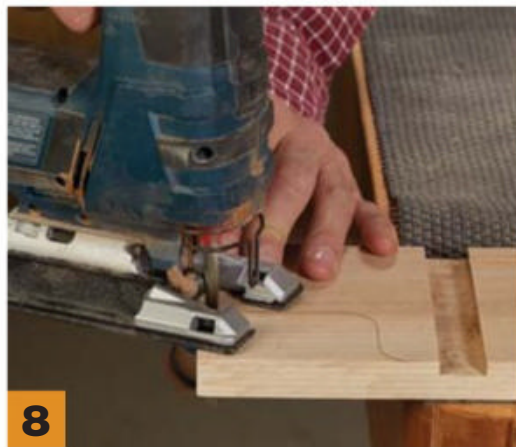
Flip the case and repeat the same procedure until you have created all of the stopped grooves for the shelves and dados for the bottom. The last course of action to complete the case joinery is to create the groove for the back panel. This was done over at the router table with a $\frac{1}{4}$ " three-wing slot cutter. The depth of the groove is also $\frac{1}{4}$ ", so use the corresponding bearing to achieve the desired depth.

To cut the cabinet to length, use a crosscut sled at the table saw and then create the profile on both ends of the case. Using a template, trace the profile onto the piece and rough cut the shape with a Sabre saw. If you are a stickler for duplication, you can use the same template in conjunction with a pattern bit at the router to get a perfect pair of profiles.

Shelves, Apron, Bottom and Back

All three shelves are identical. Begin by cutting the blanks to their final dimensions. Then, create the tenons on both sides of each shelf using a flat-kerf table saw blade. The three recesses on the shelves are made using a template and $\frac{1}{2}$ " pattern bit (bearing towards the shank). The recesses are about a $\frac{1}{4}$ " deep, so make them in a couple of passes to relieve the stress on the bit. Once this is complete, continue by creating the bottom along with the apron. The bottom has a $\frac{1}{4}$ " groove on the top to accept the back panel as well as one on the bottom to receive the apron. Lastly, create the tongue on the top side of the apron.

It's time to create a back to finish off the main case. This can be done using a $\frac{1}{4}$ " piece of plywood of your choosing. Cut the panel to size and create the radiused top using either a bandsaw or Sabre saw. Test-fit your results and prepare for the glue-up.



8 Rough shape the bottom of the case with a jigsaw.



9 Make the ends symmetrical by using a template to flush-trim the rough cut surface.

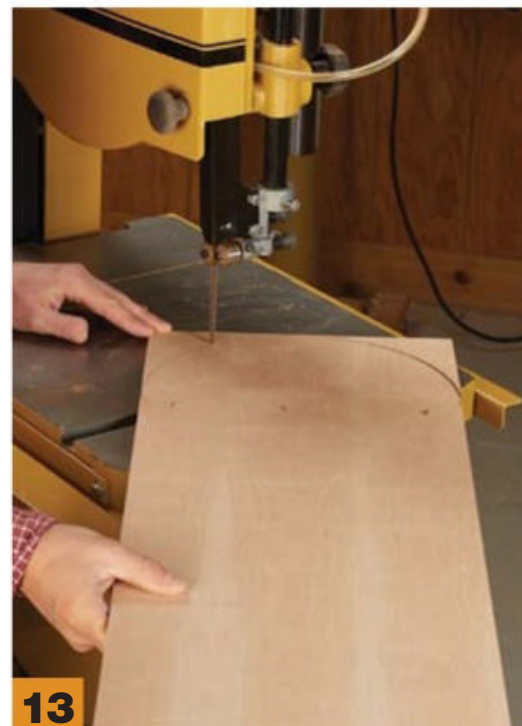


10 Use a template and rout the recesses for the containers.

11 At the table saw, form the tongues on the ends of the shelves.

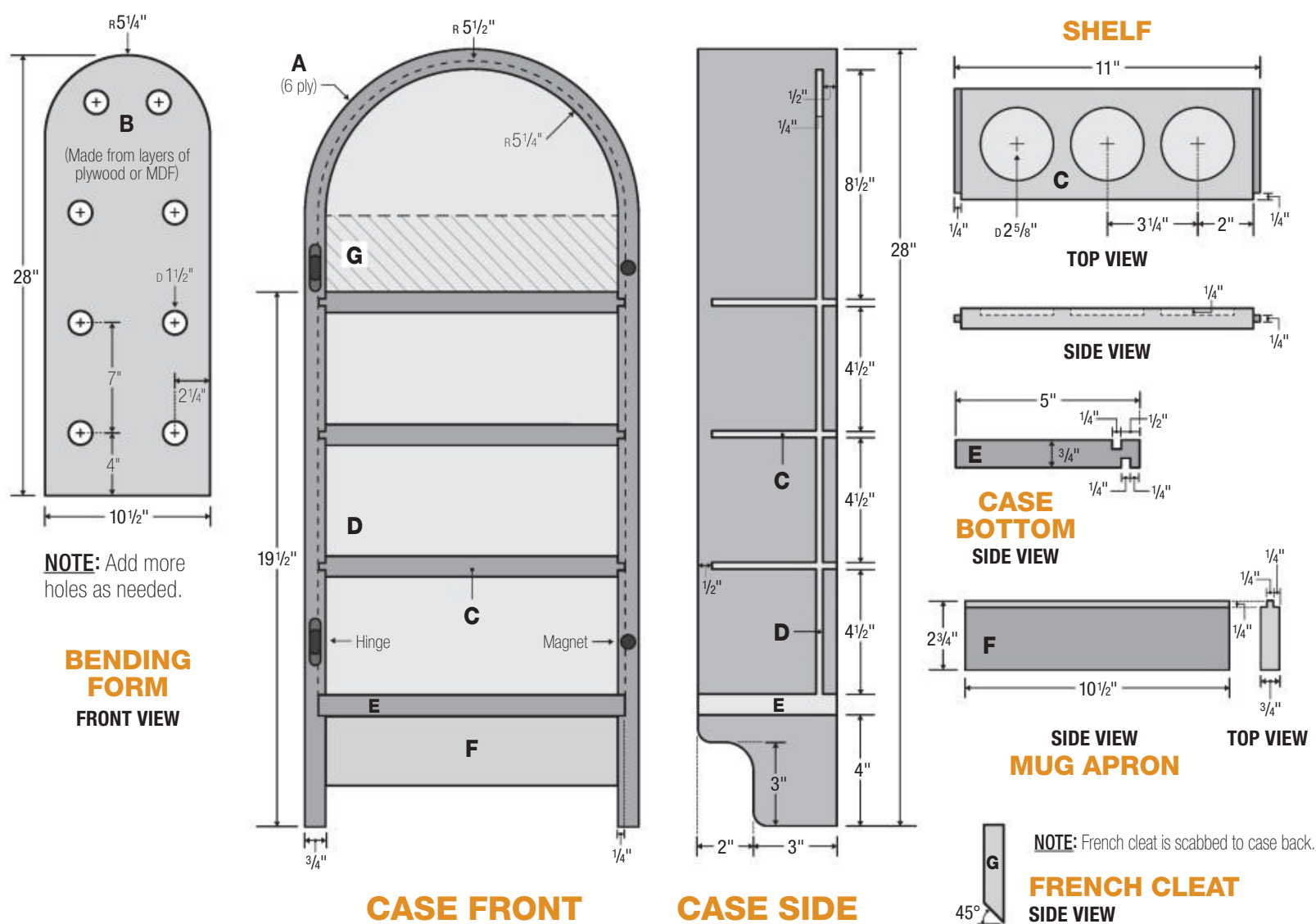


12 After forming the tongue on the ends of the shelves, stand them on edge and notch the front of the tongue.



13 Cut the curve of the back at the bandsaw.

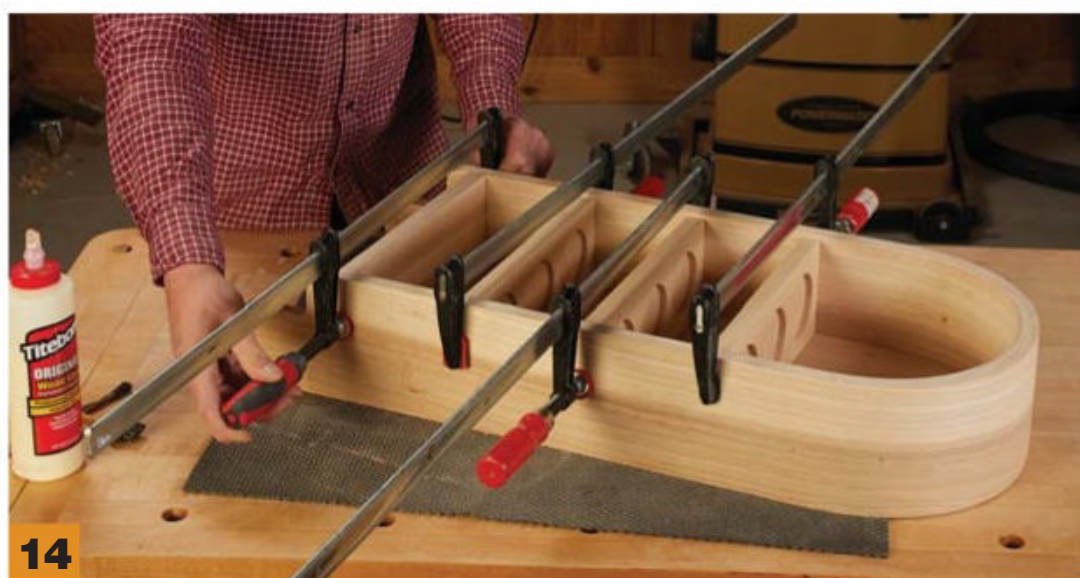
Tea Cabinet



Glue up the main case by installing the three shelves first. Next, push the back panel into its corresponding groove from the bottom. Once the back is in place, slide the case bottom into the dado. Check your shelf recess spacing and ensure the bottom is flush with the case sides. With all the pieces in place, go ahead and apply clamps. Polish off your assembly by installing the apron into the case bottom.

Door and More

Don't let the contour of the door discourage you. Its frame is constructed of four pieces and joined using dowels. Start by cutting the stiles and rails. Drill the joinery using a Dowel-It® jig with a 1/4" brad-point bit. Use 1 1/4" dowels to give each mortise a 5/8" depth. Dry fit your assembly and check its dimensions

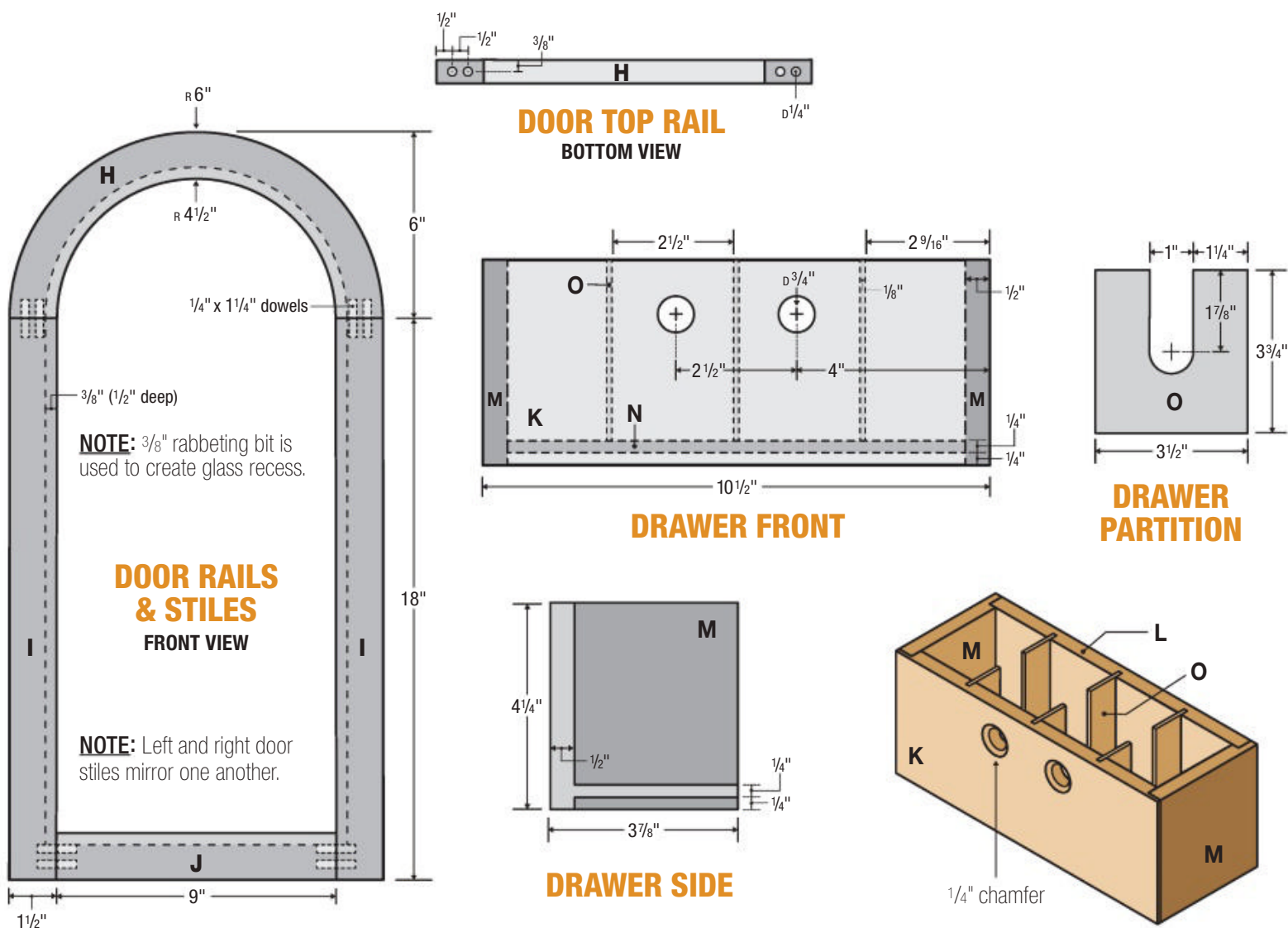


14

14 After inserting the back, slip the shelves and divider into place with glue and apply even clamping pressure.

15 The door parts are held together with twin dowels. Drill these with a self-centering doweling jig.

16 The top of the door starts as a wide piece and will be cut to shape.



Cut List

No.	Items	Dimensions (in)		
		T	W	L
6	A Veneers for bending	1/8	5 1/2	72
1	B Bending form	5 1/2	10 1/2	28
3	C Shelves	3/4	4	11
1	D Case back	3/4	11	23
1	E Case bottom	3/4	5	11
1	F Mug apron	3/4	2 3/4	10 1/2
1	G French cleat	1/2	2 1/2	10 1/2
1	H Door top rail	3/4	6	12
2	I Door stiles	3/4	1 1/2	18
1	J Door bottom rail	3/4	1 1/2	9
1	K Drawer front	1/2	4 1/2	10 1/2
1	L Drawer back	1/2	4 1/4	10
2	M Drawer sides	1/2	3 7/8	4 1/2
1	N Drawer bottom	1/2	3 1/2	10
3	O Drawer partitions	1/8	3 1/2	3 3/4

Also needed are eight 1/4" x 1 1/4" dowels for door frame construction.

Supplies

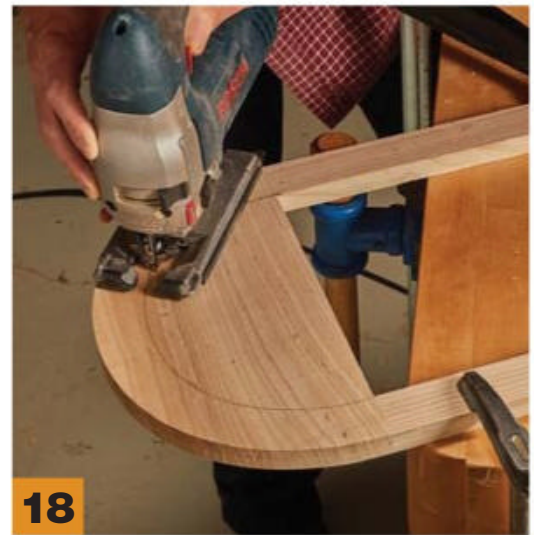
- **35mm acro knob**
Lee Valley #00A7923
- **2 Pair of Adhesive-backed magnets**
1/2" dia. *Lee Valley #99K3465*
- **2 Soss #101 concealed hinges**,
3/8" x 1 11/16", black finish
Rockler #30664
- **2 Single robe hooks**,
flat black, *Rockler #31710*
- **9 Straight-sided glass jars (6oz)**,
black plastic lid, *Uline #S15847PBL*
- **1 Clear, scratch and UV resistant Acrylic**, *McCaster Carr #8560K257*

against the main case. Go ahead and glue up the door frame and begin to lay out the arch for the interior. To match the radius of the case, lay the door facedown onto the bench and trace the profile of the case onto the door. Cut both arched profiles using a Sabre saw. Then, clean up any blade marks using a spindle sander.

With the frame refined, head over to the router table and create the rabbet you see on the backside using a $\frac{3}{8}$ " rabbeting bit.



17



18

17 Shape the outside of the door first.

18 With a jigsaw and a new blade, cut the inside curve of the door.

19 A rabbet bit forms the rabbet for a custom-cut piece of acrylic.

20 Square up the rounded corners left by the rabbet bit.



19



20



21



22

Hinges and Hardware

The next step is to secure the door to the cabinet using SOSS® concealed hinges. Admittedly, these can be a bit finicky to install, but spending a little extra time on a good template makes for quick, accurate mortises. A $\frac{1}{4}$ " piece of plywood for the routing plate with a $\frac{3}{4}$ "-thick plywood strip scabbed on as a spacing/reference guide will suffice. When creating the mortising template, make sure

to account for the distance from the outside of the guide bushing to the cutting edge of the router bit. A trial run on a scrap piece will help prevent any extraneous emotional distress.

Once the mortises are complete, install the hinges and make sure the edges of the door are flush with the cabinet. Proceed by creating the recesses for the rare-earth magnets over at the drill press. Depending on the hardware of

21 A plywood template guides the bit to form the mortises for the Soss hinges.

22 Use a Forstner bit to recess magnets in the door and case.

choice, you may find that you need to counterbore a hole to accept the attachment screw for the door pull. This step can be achieved while still at the drill press.



23

23 The dados in the drawer dividers are formed at the table saw with a single kerf.

24 Define the bottom of the finger slots using a forstner bit.

25 At the bandsaw, finishing creating the finger slot.



24



25



26

26 Glue up the drawer with the dividers in place. A pair of cauls on each joint apply even clamping pressure.

27 For a low-profile pull, simply drill a pair of holes in the front of the drawer, making sure to avoid the dividers.



27

You will notice that there are two hooks attached to the apron. Lay-out their position (contingent on teacup size) and mark the attachment locations with an awl. With a functioning door and hardware locations established, it's time to create the drawer.

Creating Drawers

The recesses we created on the shelves in the beginning are to accommodate a variety of your favorite loose-leaf teas. However, there are some of us that still enjoy the convenience of pre-packaged tea—this is where the drawer earns its keep. Start by cutting the sides, front and back to their final dimensions. The rabbet joinery you see can all be created at the table saw using the same methodology applied to the shelves. Next, create the divider grooves across the grain with the same blade.

Glue up the drawer, then size and fit the tea packet dividers. As you can see in the photos, the two holes that make up the pull for the drawer were drilled after the assembly. Normally this would be done prior. However, I had reservations about what appropriate hardware (if any) would be used, so this was done after the fact. Avoid my indecision-induced blunder and do as I say, not as I do. When the drawer is complete, check the fit and make any necessary alterations to ensure a smooth fit.

Finish and Installation

The ash used in this project was too handsome to alter or disguise, so I chose a clear lacquer finish to protect as well as accentuate some of its curly qualities. Once the finish has cured, reattach all of the hardware and begin to place all of your favorite loose-leaf blends in their respective containers. With your cabinet complete, all that's left to do is heat up some water, pour a cup, and steep in your own success.

PW—Dillon Baker

When it comes to milling lumber, chainsaw mills offer a low cost of entry, with some big capacities.

By Logan Wittmer

■ Milling Lumber with a Chainsaw Mill

PHOTOS BY CHRIS HENNESSEY

The more and more I get wrapped up in the milling, logging, and lumber industry, the more and more questions I seem to get about chainsaw mills. What are my thoughts on them? Are they worth the cost? Will they produce good, usable material? So, out with the chainsaw, fuel cans, and some long johns to answer these questions.

Chainsaw Mill Basics

A chainsaw mill, obviously, utilizes a chainsaw powerhead and bar to rip logs into usable pieces. One of the most common setups, designed and sold by *Granberg*, is shown below. Commonly referred to as an “Alaskan mill” (which is a trademark name owned by *Granberg*), it’s a fixture that captures the chainsaw bar under a pair of guide rails. The guide rails can be adjusted to make different sized cuts when milling a log.

One of the most common questions when it comes to chainsaw mills is “will my current saw work?”. And the answer is... maybe. For chainsaw milling operations, you need a saw with a minimum of about 70cc. At 70cc, you’re starting to get into the professional saw category, and that’s a good thing, as professional saws are generally built better than “homeowner” saws. And, I want to be clear: milling can be hard on saws. In fact, most saw manufacturers don’t recommend milling with their saws. But, when it comes to milling, the bigger the powerhead, the better. Here, we’re using a *Stihl MS880*, which is the biggest saw they currently make. If more power is needed, then you start to get into the realm of double-headed bars (yes, two saw heads on a bar is a thing). However, that only makes sense if you’re cutting logs over 60"-wide.

The second half of the chainsaw question has to do with the bar. Standard chainsaw bars are made from aluminum or steel. They work well for most operations and probably milling as well, as long as you’re sticking under 36" or so. Once you start to get to long bars (such as the 68"-long bar you see here), the bars will start to sag. To fix that, companies like *Granberg* produce titanium bars that are stiffer than other types of bars. This leads to minimal sag for flat lumber.

Finally, you need to look at the chain. Standard chainsaw chains will cut. But it will be painful. Instead, a specially designed ripping chain helps more efficiently remove the waste as you make these long, wide cuts. If you’re planning on doing any milling, it’s worth investing in a handful of loops of ripping chain.

Now, before firing up a saw, I’m going to dive into my safety speech real quick. Safety glasses are a must,



1 A chainsaw milling setup consists of the mill frame, a special bar and chain, a power-head, and something to get the first cut started off flat.

2 Before gassing up the saw, some work is done on the log, such as blocking it to keep it from rolling and installing a winch bracket for the winch on the *Granberg* mill.

but a full-face shield is better. In my opinion, chainsaw chaps aren't as critical when running a chainsaw mill, but they're still important. The bar is held in a fixture, and the bar is buried in the log. Plus, you're not cutting with the tip, which is where most kickback occurs. My buddy Bojan is wearing a set of high-end *Dyneema* reinforced climbing pants. If you don't have a super fancy set of professional arborist pants, I would highly suggest wearing chainsaw chaps when operating any chainsaw.

Getting Started

The cool thing, in my opinion, about any chainsaw mill is that there isn't much to them. The guide rail references off the last cut to produce

the desired thickness of lumber. To get the first cut flat, however, you need some form of a jig. Simple 2x4's screwed the log works, as does an aluminum extension ladder. However, *Granberg* sells a guide rail specifically for this first cut. It rests on the top of the log and is held in place by a couple of hooks that are driven into the log (Photo 3, below). A series of leveling screws along the length of the rail allows you to adjust the rails, so it's perfectly flat along the length of the log, without any twists, dips, or humps. In my experience, it's best if your rails extend past the end of the logs by several inches, especially if you're milling by yourself. However, if the rails are a little shorter than the log,

you'll just need a helping hand as you're starting and ending the cut.

With this big pin oak, the rails were a little short on both ends. So, this is what I consider a two-person starter. One person is on the powerhead, holding the throttle. The second person is supporting the mill on the opposite end of the log, helping get the mill riding on the rails. After the saw is in the log and the mill is fully riding on the rails, you can connect up the winch for one-person operation. You can see this in the top two Photos on the next page.

During the cut, once the winch is hooked up, it's a simple matter of keeping the sawhead running full-throttle and feeding the saw with the winch. If you crank too



3

3 The Granberg system includes a set of guide rails for making the first cut. Hooks hammered into the log hold it in place. .

4 Two leveling screws on each cross member allow you to level the rail and compensate for any twist in the log.



4



5

hard on the winch, the saw will bog down, and the RPMs will fall out of the ideal range. You want to cut slow enough that the saw doesn't bog down and has enough time to clear out the chips from the kerf. This pin oak is about 44" in diameter. The wider the cut, the more time the chain needs to clear the kerf of chips (and the slower the cut). Because the bar on a large mill like this is so long, it needs a little additional lubrication at the tip of the bar. As you can see in the lower right photo, we do this with a simple water bottle with a hole poked in the top. Every few seconds, a squirt

of bar oil on the sprocket adds a little extra lubrication. *Granberg*, offers an auxiliary oiler for the mill that would take care of this step.

One of the most obvious differences with a chainsaw mill is the much wider kerf that's created as you're cutting. Unlike my bandsaw mill, the weight of the workpiece will cause the bar and chain to become pinched. So, as you're making a cut, it's important to add wedges every couple of feet to keep the kerf open as you cut. This is where a second person is very handy—they can be adding lubrication and wedges as the operator is cutting.



6

5 After starting the cut, you can pull the winch cable to the winch bracket.

6 The cable runs through an eyelet on the bracket and runs back to the opposite end of the chainsaw mill fixture for an even pulling force.

7 With the saw engaged, it's a simple matter of keeping on the throttle and slowly cranking the feed winch.

8 A set of helping hands adds extra lubrication the sprocket end of the bar, however it's up for debate on whether dripping oil on the chain is providing additional lubrication (versus the oiler which internally oils the sprocket and chain groove).



7



8

As you reach the end of the first cut, I usually try and slow down, especially if my rails are a little short. I'll have my helper (or I will, if I'm the helper) step back in, get a hold of the end of the mill, and help guide it out of the log. Then, the saw is set off to the side to be refueled, reoiled, and cooled down. (Yes, it takes almost an entire tank of gas in an 880 to make this cut).

This, in my opinion, is the most exciting part of milling... pulling off the first slab and seeing what this log will yield. After this point, the guide rail isn't needed, so it can be removed and put back in the truck. Depending on how you're planning on stacking this log will depend on if you want to keep this first bark cap or not. In this instance, this cap went into the firewood pile. If it won't make lumber, it will make heat at least.

As much as this is the most exciting part for me, it's also one of the hardest. That's because you need to use your head as you move these big pieces of wood. It's very easy to decide that you want to try and muscle a large piece of wood with one or two guys when in reality, they may weigh several hundred pounds each. Get some helpers, and if there's a skid loader or tractor handy, all the better.



9



10

9 As the cut is made, a helper should be applying wedges every few feet to keep the kerf open.

10 After the first cut, the guide rail is no longer necessary, and it can be removed.

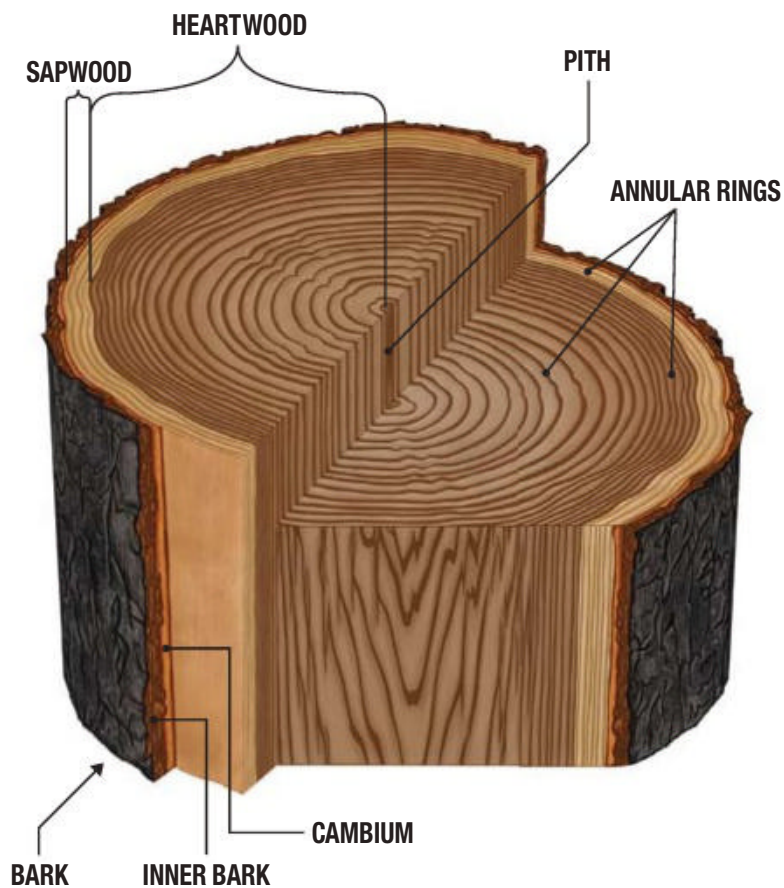
11 The first cut produces a large slab of waste. Depending on the shape and taper of a log, it may be thicker on one end versus the other. This first cut determines how each successive cut is laid out, so measure carefully. Ideally, the pith (center) of the tree will end up within one piece of wood, as it will likely split.



11

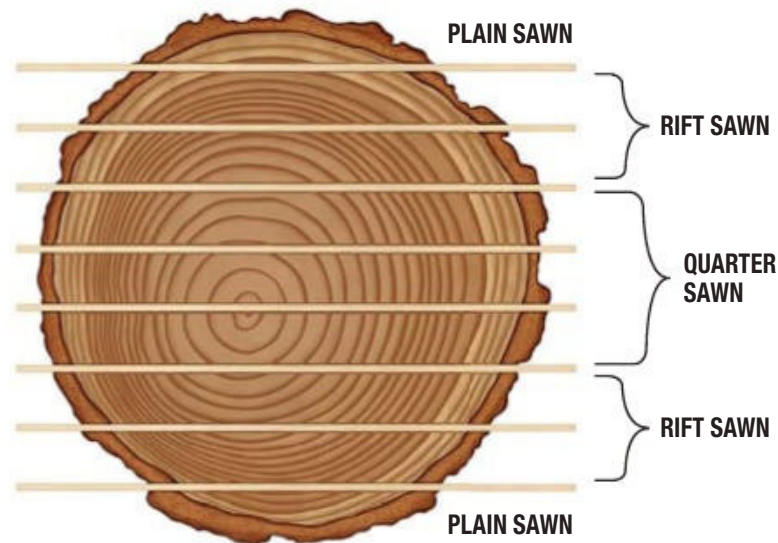
LOG ANATOMY 101

Tree Anatomy



In woodworking, we're generally concerned about the sapwood, heartwood, and annular rings (which is what we see as "grain pattern"). The slower a tree grew, the tighter the annular rings will be. If a tree grew quickly, it will have large growth rings and a large amount of sapwood. Trees that grew on hills, or under stress will have an off-center pith.

Stickered Log



When "slabbing" a log, you're left with a variety of different grain patterns. The top and bottom pieces will be "plain" or "flat" sawn. Next, will be the rift sawn material, where the growth rings are 45 - 60° to the face of the board. Finally, the center cuts will be quarter sawn, and the growth rings will be at 60 - 90° to the face of the board.

Log Orientation



CROTCH CUT

When a log has a crotch section, such as the one shown above, laying it flat and cutting through the crotch will reveal compression figure, or "feathering."



BULL'S EYE CUT

When a limb comes off the top of the log, and cuts are made through it, the resulting grain pattern will be a bull's eye, or knot in the middle of the stock.



12

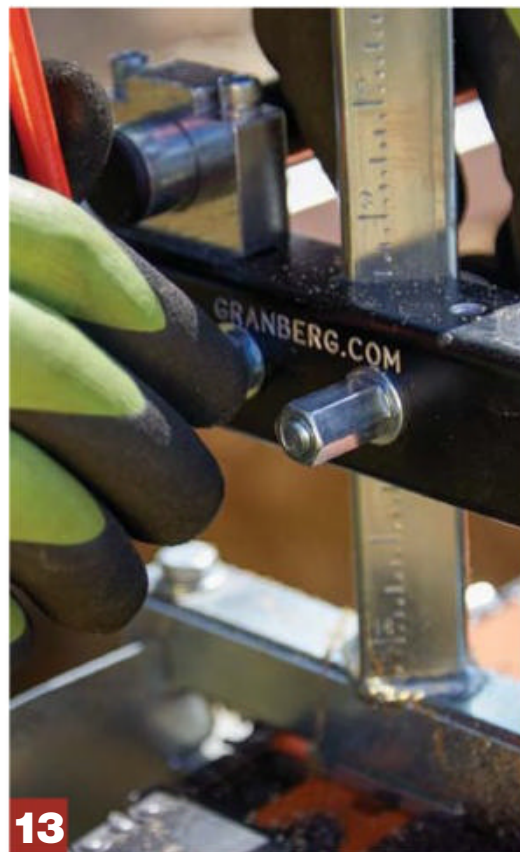
12 After establishing a flat reference surface, it's a simple matter of rinsing and repeating. Continue to work down the log, adjusting the winch arm lower and lower until the entire winch bracket can be removed. At that point, it's best to bring in a helping hand to help guide the mill without the winch.

13 As you're milling, you can change thickness by adjusting the mill with the build-in gauge. We cut these 2 1/2" thick.

Rinse and Repeat

Once the top back cap is removed, it's time to start making lumber. First, as you can see in the photo at right, you need to decide how thick you want to cut the pieces. For most things chainsaw mill-sized, I cut at 2 1/2"-thick. This allows enough thickness to surface it after it's dry and still end up with a 2"-thick tabletop. The *Granberg* mill has a built-in scale, so you can simply align the top of the member with the thickness you want. Now, it's on to business. The process is exactly the same as before, except without the guide rail. The mill now will ride on the top side of the just-cut log, which is why it's imperative that the first cut be flat and true.

As you mill down the log, the winch clip can be slid down the bracket, keeping the winch pulling perfectly flat, not up or down. At a certain point, you'll need to unscrew the winch bracket (and hope you used good screws that don't break off in the log). Once you do this, it becomes a two-person job to push the mill through the remaining few slabs that are left. Technically, you could probably do it yourself, but you'll probably have extra helping hands there already, so you might as well use them. As you saw down the log, you'll notice the look of the boards change. This is because you're producing different grain patterns based on where you're at in the log. The closer to the center you are, the more quarter-sawn your



13

boards will be. The nearer the top or the bottom, and they'll be more plain-sawn or flat-sawn. The box on page 49 gives you a little more information on the type of grain patterns your cuts will yield and a little bit on log anatomy.

Now the Hard Part

If you thought that picking up a log, moving it around, and even milling it was hard, you're in for a treat. The hardest part comes after you mill the log. And that's drying it. Each end every tree species out there dries at a different rate, and each one is fairly easy to screw up. So, let me give you my best advice when it comes to drying.

First thing's first, is you have to understand how wood holds moisture. There are two types of moisture in the wood fibers. The first is unbound (free) water. This is the water that sits between the wood cells. This is the moisture that will quickly come out of the wood,

but it's also the moisture that will cause mold and mildew if it's not allowed to evaporate. The second type of moisture is bound moisture. This is water that is locked inside the cells of the wood. This is the stuff that takes years to get out (or needs to be forced out with a kiln). The goal of drying the wood is to reduce the moisture content to a point that the wood will no longer lose enough moisture to adversely affect the project. For air-dried stock, here in Iowa, that's about 12-14% for air dried lumber. If something is kiln-dried, that's usually around 7%. Can you build projects out of air-dried lumber? Certainly—it's been done for hundreds of years. Even today, in the age of central air, those air-dried projects are still going strong.

So, how do we manage to get the moisture out of the wood at an appropriate rate without causing any issues? To start, before you even think about cutting a log, you should give some consideration as to where

you'll stack it. You want it to be away from buildings and brush so it gets good airflow. But you don't want it out in the middle of a field baking, either. The ideal location would be somewhere that's fairly shaded but gets good cross-ventilation. No, your basement with fans is not a good idea. There is such a thing as drying wood too fast. With certain species, such as oaks, low and slow is the key. I will cover my piles of oak lumber with sun tarps—tarps that allow air to flow through while blocking out the sun's UV rays. This will keep surface checking down and reduce the chance they'll case-harden (the outside drying too fast and locking moisture inside the wood).

14 A quick splash of water will show you what you've been working for. As you remove pieces from the log, make sure you have a drying site prepared to stack them for final drying.



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15 Stacking lumber to dry, regardless of how it's sawn, can make or break it. Start with a good location with a nice cross-breeze and solid base. Then, stack it with stickers (spacers) between each layer and either band, weight, or strap it down. Then, sit back and let it rest for several years until its ready to use.

Next is an even, level base. As this wood dries, it's essentially steam bending. If the base is twisted or uneven, you'll end up with lumber that reflects that. I've found either big 6-by material works well, or my favorite is to use cinder blocks (they're cheap and easy to level).

With an even base and a good, breezy location, you need to make sure each layer of lumber gets good airflow. This means spacing each layer out with a series of spacers called stickers. I use stickers that are about 1" square and ideally wider than my log or lumber stack. I always place stickers as close to the end of the stack as possible and spread them out every 18". And, as you add each additional layer, make sure to keep the stickers placed in rows—the next layer of stickers goes directly over where the pre-

vious layers of stickers are. Doing this keeps the weight of the stack in line and directly over your base. This is all in an effort to keep the stack as flat as possible during the drying process. Some species, such as elm and sycamore, are notorious for twisting as they dry. In these cases, I will ratchet strap or band the bundles together, and even stack other logs on top of them. This extra weight works like a linen press to keep them flat. Now, it's a waiting game. The thicker your material, the longer you'll need to wait. The rule of thumb is one year per inch of thickness. This is a good ballpark, but a quality moisture meter will let you know when you're there. Of course, your other option is to let it air dry for a year or so (let that free moisture come out) and then to have it kiln-dried. Kiln drying costs

vary based on where you're located and what type of kiln it is but expect to pay somewhere in the 50¢ - \$1.00 per board foot for kiln drying.

So, What's the Verdict?

Is chainsaw milling worth the effort? I think it can absolutely be, depending on what your end goal is. First off, chainsaw milling has a lower cost of entry than a portable sawmill. A powerhead (chainsaw) will set you back between \$1,000-\$2,000, depending on what you get. You can actually get one much cheaper if you buy an imported "clone" saw (a knock-off of brand-name saws). I don't know how the quality is on them, so I won't offer an opinion other than they're out there. The mill and a bar from *Granberg* will run another \$500-\$1,100. So, all-in you can be operating

between \$1,500 and \$3,200. That's a pretty good deal if you ask me. Especially when you start considering the crazy amount that live-edge "slabs" sell for in some areas. It will quickly pay for itself if you're in an area with large trees and are willing to put in a little work. And no, don't ask me how much you can sell your slabs for. I don't know what your market's like. But, for some context, these pieces above are about 75 board feet each. Once dried and flattened, it wouldn't surprise me to see them sell for over \$10/board foot.

Another benefit of chainsaw mills is their capacity. The price per inch of capacity (I just made that standard up), is much lower than a bandsaw mill. You can get an 84" bar and mill for a chainsaw. You'd be hard-pressed to find many bandsaw mills that size, especially commercially available. (Yes, I see you over there Mr. Cremona). And, let's not ignore the portability factor. If a

giant log falls in the woods, as they tend to do, it's easy to carry a chainsaw mill into the timber. However, getting a mill or heavy equipment back there might not be as easy.

Like everything, chainsaw mills come with some drawbacks, so I want to make sure that I paint a fair and accurate picture. Chainsaw mills are not fast. With my *Norwood*, I can make an entire cut in under a minute. I haven't timed the chainsaw mill, but most cuts are over 10 minutes. The smaller the log and the fresher the chain, the faster. But, they're not fast.

Chainsaw mills do really well at making live-edge slabs. Personally, I don't care for the look of most live-edge projects. Instead, I prefer to saw my logs into boards, which is what I do on my HD36. However, there are size limits on my HD36, and the chainsaw mill is a great compliment to the bandsaw mill. If I don't want to produce live-edge

slabs, I can always use the chainsaw mill for whittling down oversized logs until they fit on the mill. It's a win-win.

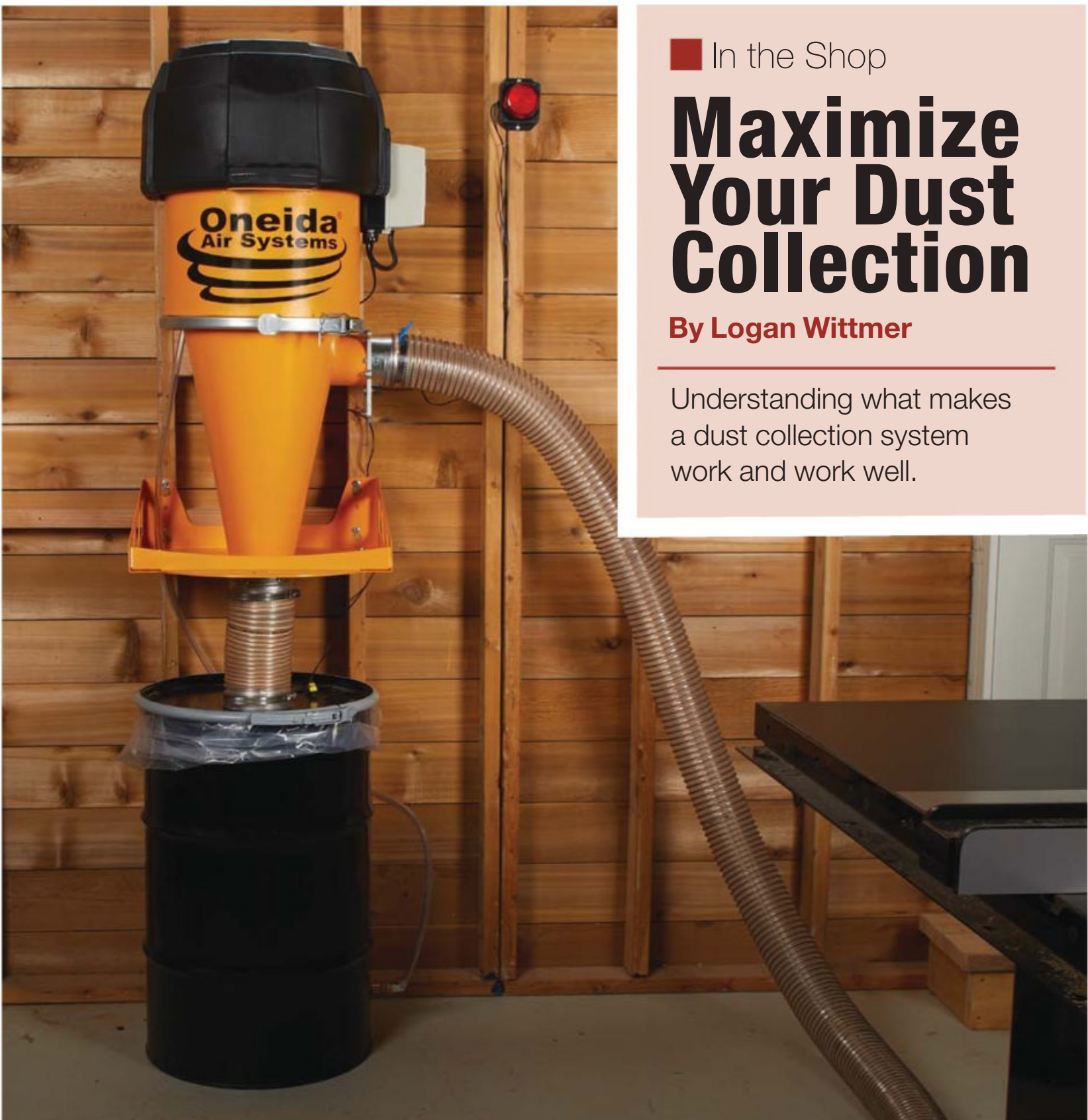
Because a chainsaw mill uses a saw chain instead of a blade, there is a much larger kerf on the chainsaw mill than the bandsaw mill. When you're talking about a log this size, I don't think that matters a whole lot. But the chainsaw kerf is a whole lot thicker than my little bitty bandsaw mill blade. About four times the kerf, actually. You need to be able to effectively sharpen the chain, or have it sharpened. Likewise, if you hit metal, it's a bigger deal with the chainsaw mill than if I ruin a \$25 blade on my band saw. The largest chainsaw mill chains can be over \$100 each.

And finally, I think to really, truly be efficient with the chainsaw mill, you need at least two, if not three, people working at the same time. Now, this isn't bad at all. In fact, I have a blast when we get a group of people together to saw logs. Especially when everyone has the same enthusiasm about sawing lumber that I do. **PW** —Logan Wittmer

16 For final air drying, I like to use the European method of drying. This involves re-assembling the log with stickers in between. This way, the log's bark and shape protect it from rain and snow as it sits outside to dry.



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■ In the Shop

Maximize Your Dust Collection

By Logan Wittmer

Understanding what makes a dust collection system work and work well.

Dust collection tends to be a tricky subject when it comes to woodworking. There's a lot of misconception about dust collection and what exactly is necessary and important when it comes to wrangling dust in your shop. However, I understand some of that ambiguity, as everyone's dust collection needs are different. In my shop, where I use mainly hand tools, I stick with mostly a *Dust Deputy* (now the 2.5, as you see on page 11) and my shop vacuum. This handles dust from sanding and the occasional routing task that I do.

In the larger *Popular Woodworking* shop, however, our dust collection needs are different. We have various tools set up in permanent spots, and with a handful of projects going on, dust piles up in a hurry. In shops like this, dust collection is more important and is a necessary thing to consider.

In deciding what dust collection system made sense, I decided to reach out to Robert Witter, the founder of *Oneida Air Systems*. *Oneida* is the largest name in dust collection, and I wanted to pick the brains of the experts on what's really important when it comes to dust collection.

Oneida Air Systems

Before we dive into it, I wanted to give a little background on Robert and *Oneida*. Robert, a mechanical engineer by trade, founded *Oneida Air* in '93. He was an engineer at a dust collection company that concentrated on industrial dust collection. When he continued to get calls from small 1 or 2-man cabinet shops, he decided to start building smaller-scale dust collection pieces and sell them out of his garage. Now, nearly 30 years later, *Oneida* is the leader in dust collection systems and continues to make innovations in the space.

PHOTOS BY COLLIN KNOFF & LOGAN WITTMER

Before we start diving into what makes a good dust collection system, you'll notice the photos on the next several pages show the installation steps for the dust collection we settled on — the *Oneida Supercell*. I'll give an overview of the installation and my thoughts at the end of the article.

Dust Collection Basics

On its surface, dust collection seems like a pretty straightforward task—collect dust as it's generated. However, there are a few basic principles that apply to the entire dust collection “ecosystem”.

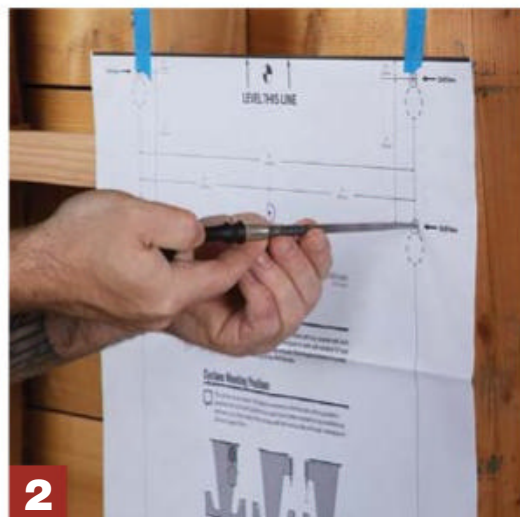
The first principle is that the most effective dust collection is done at the source. This means you position the dust collection suction as close as possible to the location where dust is being created. For example, on a router table, the dust collection is generally in the fence, and the fence should be positioned as close to the bit as possible. If dust is not

collected here, then there will be loose ambient dust that escapes the collection. Sure, you might get the big chips and debris, but those aren't really the ones that matter. It's the small stuff that escapes into the air and floats around for ages until it finally settles on everything in the shop (and your lungs). That's the dust that will cause you health issues long-term.

Now that the collection point is positioned as close as possible, we have to offer sufficient air movement to effectively gather the dust. If there isn't enough volume of air flowing into the collection point, dust and debris will escape. The amount of air movement required at each tool is dependent on the tool. And, it's important to note that the air movement needs to be measured *at the tool*. Each tool will require a different airflow, but here's a starting point. Band saws, table saws, router tables, and lathes all require in the 350 CFM range. Smaller (13") planers,

jointers, and smaller sanders will require in the 400-500 CFM range. Larger industrial machines, such as planers, drum sanders, and belt sanders, will require between 600 to 800 CFM. Each tool's design will shift these numbers a bit, but this is a good starting point. And, as I mentioned, this is the amount of air movement needed at the tool. The CFM measured at the tool will differ from what the dust collector states (more on why that is in a bit).

The next principle is that there needs to be some form of chip separation before the collected air passes through a filter. What I mean by that, is that the air needs to be “pre-filtered” before it actually gets filtered. This is most commonly done with a “cyclone” type separator. The moving air is pulled through an inverted cone, and the shape of the cyclone allows the vast majority of the chips and dust to actually be collected long before it touches a filter. After talking to Robert, it made so much sense.



1 The Supercell mounts on the wall, and the first step is to level the mounting location with a level.

2 The supplied template provides mounting hole locations.

3 A support bracket is installed above the main bracket, and may require additional blocking.

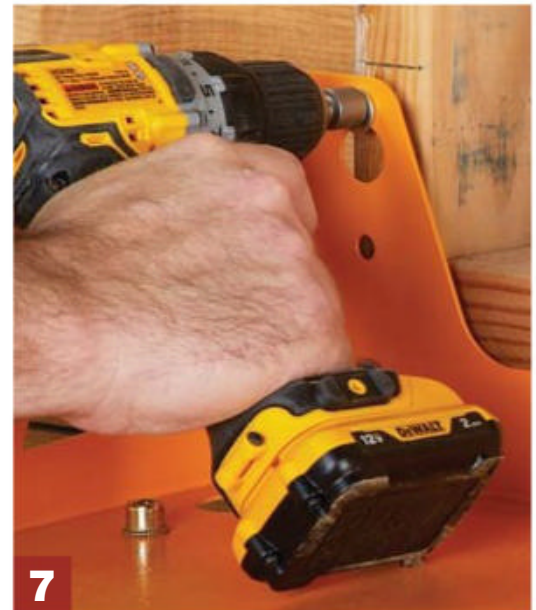
4 Drive stout lags into the pre-marked locations.

5 Install the support bracket.



6 The key-hole slots, along with the template, make hanging the bracket a straight-forward task.

7 After the bracket has been mounted to the lag screws, you can come back and tighten them down, permanently securing the bracket to the mounting location.



I don't know how many times I've fired up a dust collector that had the "bag type" filters on it, to only watch a giant plume of dust erupt into the air as soon as the pressure builds and inflates the bags. Most of these (generally) inexpensive dust collectors rely on the dust being dropped into a collection bag via gravity when in reality, the majority of the fine (dangerous) dust is pushed into (and through) the filter. Not only does this reduce the amount of air that the collector can move by a significant amount, but as I mentioned, it still allows a large amount of dust to escape every time you fire up the collector.

Finally, this brings us to the final principle of dust collection. You're going through the effort to collect the dust, so you might as well actually *filter* it. This means getting a quality, rated filter for your dust collector. Now, many people will talk about "HEPA" filters. HEPA, or high-efficiency particulate air is a misleading term.

Back in the 1950's, the term HEPA was commercialized and has been used as a generic term. What you're looking for is a filter that is

rated down to 0.03 microns. Anything larger will allow dangerous dust to pass through it. Think of it this way — according to the EPA, particles 2.5 microns and smaller are the most dangerous. Most of these, when inhaled, are able to be absorbed into the bloodstream. It gives a new and creepy meaning to my favorite saying, "Sawdust in your blood."

Static Pressure & CFM

As I mentioned before, dust collection systems are generally sold with a cubic feet per minute rating. However, there's a second piece of information that's often ignored altogether, and that's static pressure. While cubic feet per minute is the volume of air that's moved, static pressure is, in short, the amount of resistance that's within the dust collection system. While we don't think about it in our day-to-day, air has weight. Clean air, dust-laden air, all air. As air is moved through a tool, it goes into the dust collection port and through the ductwork. When it reaches the dust collector itself, it goes through a cyclone and finally through a filter. At every point during this journey, it's generating friction.

The amount of resistance that the air is encountering is often referred to as static pressure (w.c. or inches of water column pressure).

Without going super deep in the weeds on it and at the risk of over-simplifying it, static pressure is how strong of suction the dust collector can generate. As you increase the drag within the system, the lower the static pressure and the lower the CFM rating will be.

So, if you are looking at dust collectors and see a high CFM, why should you care about static pressure? As soon as you introduce any reduction in your ducting, say going from a 6" diameter trunk line down to a 2" diameter port (which is a common size these days) for a smaller power tool, you could run the risk of the sawdust stalling out in the line. What I mean is that you may have enough airflow to capture the dust at the source, but as soon as the sawdust enters the main trunk line (or a vertical run), there may not be enough volume



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(pressure) to keep the dust airborne all the way to the cyclone. This will, over time, lead to blockages in your dust collection lines.

Think about it this way. Your furnace blower in your house moves a massive amount of air. A 100,000 BTU furnace moves *about* 2,000 CFM. However, we've all probably seen the commercials about getting your ducts cleaned and the amount of lint and dust that collects in your ductwork. That's because even though a furnace moves a lot of air, it does it without much static pressure. So imagine if that lint within the duct was sawdust in your dust collector.

Keeping Traffic Moving

So, we know now that we need both CFM and pressure to have effective dust collection (of course, we need the other principles as well). So what things, other than the design of the collector, can affect CFM and pressure? The most common is the layout and the type of ductwork used in your dust collection system.

I'm sure that you are aware of most of the types of ductwork used in most systems. The best dust collection hoses are going to be ones

that have smooth interior walls. Any ducting with ribs on the inside will increase friction and reduce static pressure. PVC is generally a good option for rigid lines and straight runs. I know that it might seem like a good idea to use residential ductwork for the runs in your shop, however, furnaces work in the opposite direction; the air is blown through them instead of pulled through like a dust collector. The orientation of a lot of the HVAC fittings will actually force air through the joint instead of flowing over it.

Speaking of joints and junctions, when a new branch is necessary (say, running off a trunk line to a tool), use a wye joint off of the main trunk line. This will help maintain velocity within your system. If you must use 90° joints, such as corners, use long radius joints. The long radius helps to maintain air velocity within the lines—the tighter the radius, the more friction is produced. Try to avoid multiple 90° joints in one line, as they'll quickly compound and reduce the line's velocity.

The duct diameter that you use also will play a role in how effective your system is. As a rule, the larger

8 The cyclone is set on the wall bracket and is sealed with a gasket.

9 The bottom flange matches up with the cyclone and another gasket.

10 The HEPA filter sits on top of the cyclone.

11 A retainer ring locks the filter in place.

12 A rubber gasket creates a tight seal between the motor and the cyclone.



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13 The Supercell motor is lifted over top of the HEPA filter and sits on top of the cyclone. A retainer ring locks the motor to the cyclone.

14 To collect the dust and chips, you have a few options. You can use the supplied bags and the negative pressure hose. This makes it easy to just gather up the bag and lift it out of the bin. Otherwise, you can forgo the bag and let the collector empty straight into the bin.



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the ductwork is, the more CFM it will accommodate. In addition, larger ductwork leads to less friction generated, therefore maintains higher pressure. For example, a blower with a rating of 1,200 CFM will produce about 450 CFM with 4" pipe. Bumping up to a 6" pipe will allow for 785 CFM, but unless the blower is oversized (3HP), the pressure and air velocity will not be high enough to keep dust suspended throughout the entire run.

Now I know that a lot of this can sound a little overwhelming. In my mind, there's a reason that companies like *Oneida* exist—they have the smart folk in place to figure this stuff out and help you decide what suits you and your work style the best. So, with that being said, let me explain why we settled on the system we did in the *Supercell*.

30 Gallon Supercell

One of the things that I appreciate about the *Supercell* is that *Oneida* provides very clear-cut specifications on it, whereas other products will give you numbers (such as CFM

and port sizes). *Oneida* states that the *Supercell* will provide effective dust collection for tools from 1" through 5"-dia ports for up to 100 feet of 4"-diameter flex hose. The *Supercell* is available in 14, 30, and 55 gallon configurations. The 30 and 55 sizes deposit dust into a steel drum that sits underneath the cyclone separator. The 14 gallon has a smaller, injection-molded roll-out bin. The *Supercell* is able to be wall-mounted, which is a necessity in our shop where floor space is at a premium. However, for someone that converts their shop from a garage and back, the *Supercell* 14 gallon is available as a mobile unit.

The *Supercell* itself is a high-pressure, high-volume dust collector... one of the first of its kind. What makes the *Supercell* different is the amount of pressure it creates. Where other "traditional style" bag type dust collectors produce between 8" and 11" of pressure (wc), the *Supercell* blows (or sucks?) those out of the water. This baby pulls a massive 97.8" of pressure. This leads to a ridiculously strong

dust collector. In fact, it's so strong that it needs special ductwork, as standard ductwork won't withstand the suction. Don't worry—the kit comes with 25' of flex hose for direct connection to tools in your shop, and *Oneida* sells a full line of *Quick Clamp* ductwork so you can plumb your entire shop into one *Supercell* unit.

Now, the first several pages of this article outline the specifics of what makes a good quality dust collector. As products like these do, the *Supercell* ignores and breaks a lot of those rules. For example, *Oneida* suggests that you run a straight 4" trunk line with 90° tees off it for dust ports... which would be a cardinal sin with other dust collectors. In fact, the suction on the *Supercell* is so great that it is able to keep up with three 2.5" dust ports being in use at one time. This intense suction and massive airflow not only make the *Supercell* the perfect fit for at-home shops in the medium to large size range, but it makes it a great option for the semi-pro to pro shops with multiple machines running at one time.

Installation

By now, I'm sure you've followed the photos in this article. But, I figured I would at least give you a high-level overview of the installation process.

The *Supercell* can be mounted to a wall using the wall bracket. A supplied template is spaced out to not only hit wall studs but also to accurately space out the mounting hardware. After attaching the template to the wall, you'll mark the holes and measure the proper distance for the rear support brace (this is not a load-bearing part, so it can be mounted on blocking or with a drywall anchor, which you supply).

The wall bracket hangs on the lag bolts, and a gasket is placed between the cyclone, bracket, and bottom flange. The entire unit gets bolted together like you see in Photo 9 earlier. The HEPA filter is installed on top of the cyclone and is held in place with a retainer ring and nuts (Photo 11). After applying the gasket onto the

bottom lip of the motor housing, it can be flipped upside down and sat on top of the filter and the cyclone (Photo 13 on the previous page).

The drum gets a few pieces of hardware installed on it. The first is a quick-connect coupler. This will attach to a vinyl hose from the motor housing (part of a negative pressure system to help hold the bag fully open as the system is operating). A bag can then be installed inside the drum, or you can opt to run without the bag. If you choose this route, you'll need to plug the quick-connect hole with a supplied plug.

One of the many nice things about this kit is that Oneida supplied a proximity sensor for the barrel. This sensor (Photo 15) will read the level of dust in the drum. Once it gets close to the top, it illuminates a LED light that you mount in a highly visible spot in your shop (Photo 16). To wrap up this quick, one hour install, the drum gets connected to

the bottom of the cyclone, and the low-pressure hose is connected to the drum.

Finally, you can connect the flex hose to the inlet on the cyclone and give the *Supercell* a go. A supplied remote control allows you to hang it from your shop apron and turn it on at will. The first time I flipped the *Supercell* on, the pressure within the system was so great that it actually lifted the 30-gallon drum off the floor an inch. Once a little sawdust gets into the bottom of the bin, it doesn't lift, but that just goes to show the power of this system.

Overall, dust collection is something that you should really think about in your shop. Maybe it's just taking a fresh look at your setup and deciding if you can optimize what you already have. Or, maybe it's taking a look at a new system to really wrangle the dust. Whatever the case may be, your lungs will thank you.

PW—Logan Wittmer



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15 An optical sensor reads the level of sawdust currently in the bin.

16 At a predetermined level, the optical sensor will trigger this flashing light.

17 A short section of hose connects the cyclone to the bin.

18 The negative pressure hose spreads the bag out while it's in use.

19 The supplied 4" flex hose is ideal for moving between tools.

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BESPOKE TOOLMAKER

Jared Greene's File & Hammer Saw Works

By Logan Wittmer



Jared Greene has been making a name for himself in the hand tool world with his handmade back saws.

If you spend any amount of time lurking woodworking forums or social media groups, you're bound to notice a name when it keeps coming up. Recently, one of those I continued to notice was that of Jared Greene ... but more importantly, I kept noticing the beautiful saws that he was producing. After reaching out to Jared and getting a hold of one of his saws, I can tell you that he's the real deal. Jared's saw outperforms every saw I have, and the fit and finish are beautiful. Made to order, I have a feeling Jared's wait-list will only grow as the word about his saws spreads.

The Saw Making Journey

Based out of South Carolina, Jared Greene spent most of his adult life in the military, first in the Marines, followed by the Army. After leaving the service, Jared has used wood-

working and saw making as an outlet to channel his focus and energy. When talking with Jared, I asked him how he got into saw making. His response: "I didn't go into this thinking that saw-making would take off for me. It started off as a fun challenge, and I had made the assumption that it would be easy to make a saw. I figured that it only consisted of a few core parts, so how hard could it be? Long story short, my first attempts failed, but I've been absolutely hooked ever since."

Looking at Jared's saws today, I have a hard time believing that he ever actually failed at it. Each and every saw is handmade and flawless. One of my favorite details (aside from how they perform) is that each saw is adorned with a traditional etch on the saw plates (silly, I know, but I'm nostalgic for classic details).



1

1 Every saw handle is hand cut, shaped, and sanded. When a saw leaves Jared's shop, it's had hours of individual attention.

2 Jared's shop, which is actually a spare bedroom in their house, is setup for full-time saw making.

3 Saw handles are available in open or closed style.



2

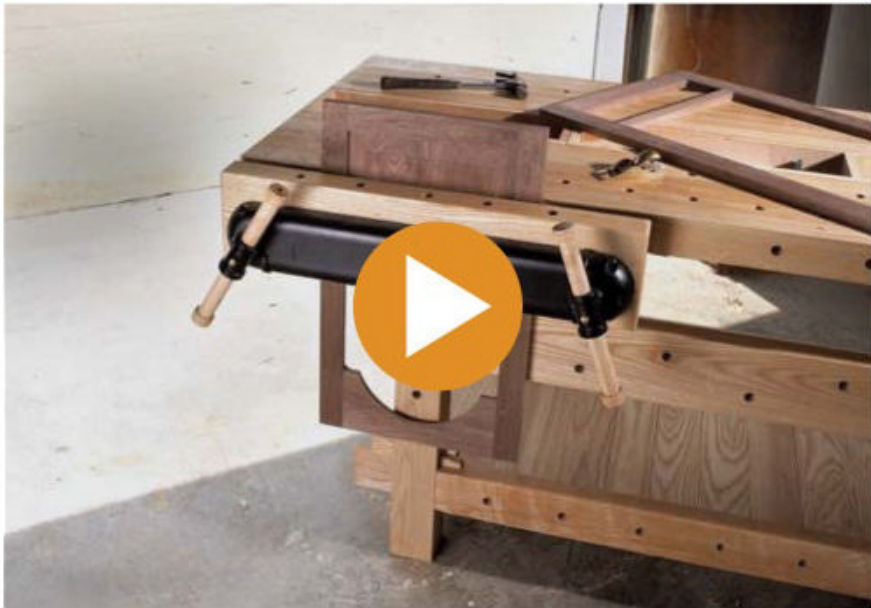


3

PHOTOS PROVIDED BY JARED GREENE

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Oak (Red)	4/4	Select	2.80	\$105.00
Oak (White)	4/4	QS	2.90	\$105.00
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“Saws absolutely fascinate me!

They are so much more than just a piece of jagged steel with a handle; there is an art and beauty to saws that cannot be found elsewhere.” - Jared Greene

4 Jared’s progressive pitch makes the saw easy to start, but cut quickly.

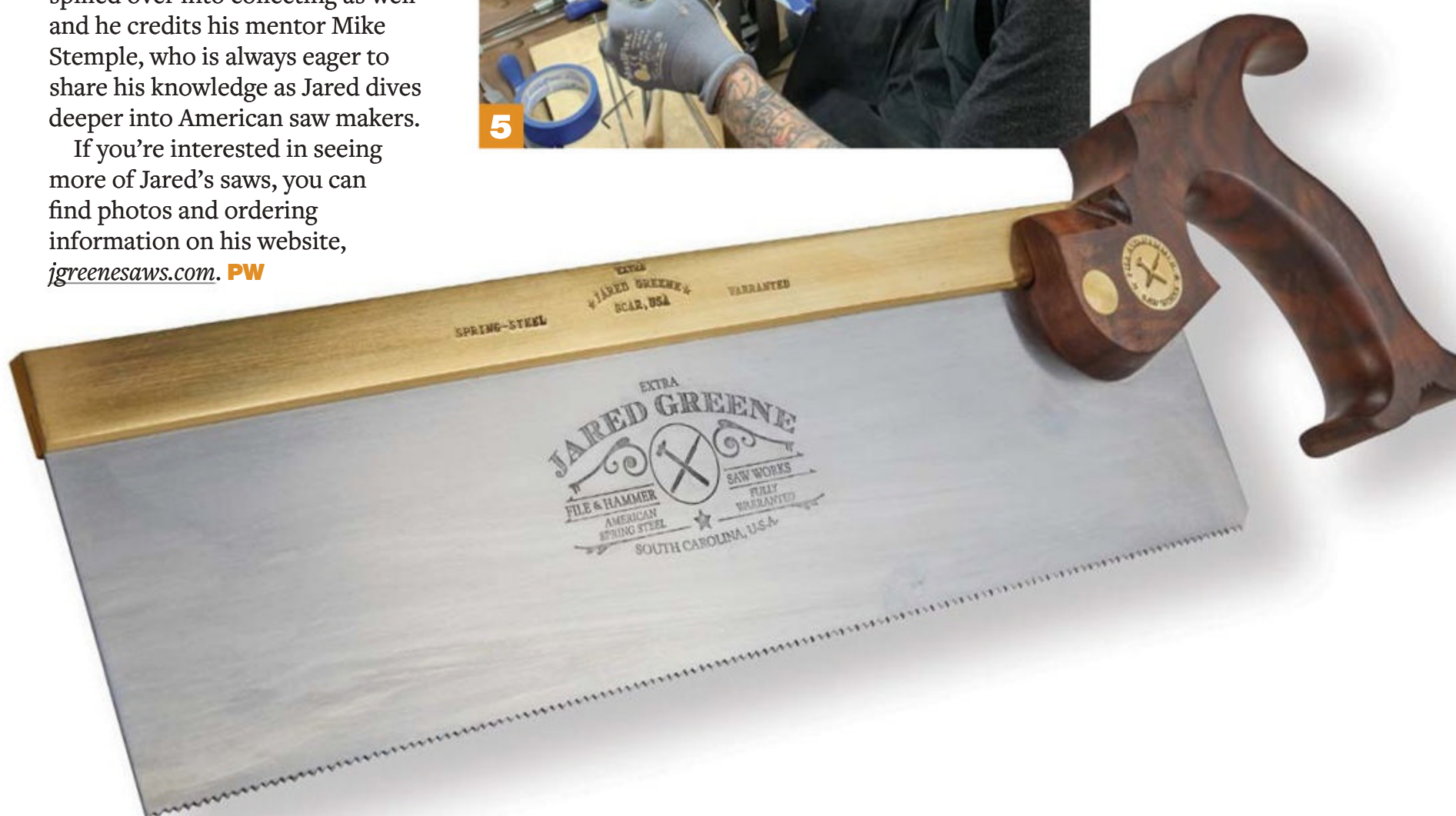
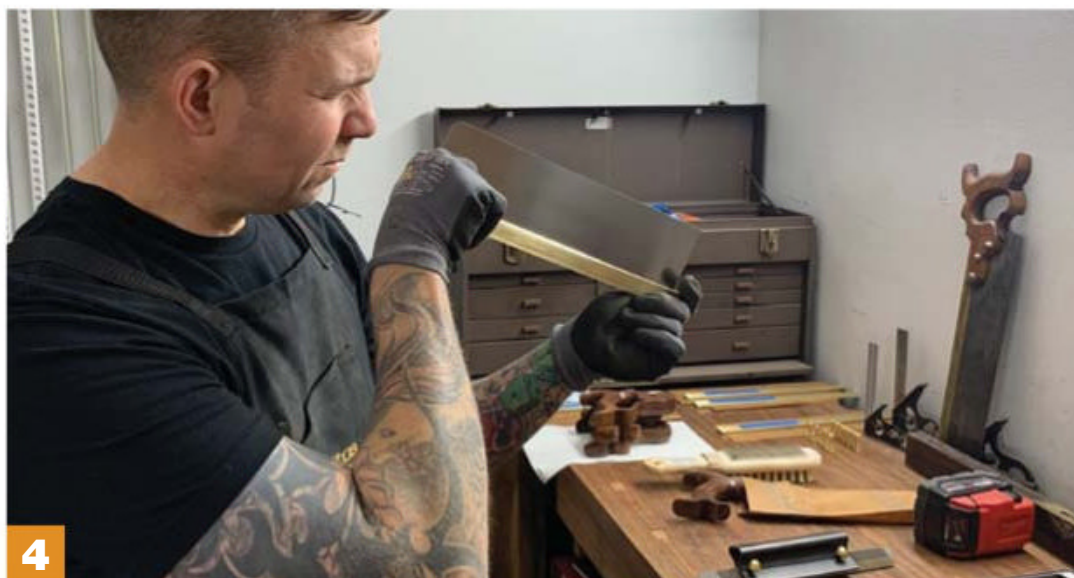
5 If you buy one of Jared’s saws, he’ll always hand sharpen it for just the cost of shipping.

Currently, Jared is making dovetail, carcass, sash, and tenon saws. His goal is to produce a premium yet affordable saw that can be tailor suited to each individual woodworker. Occasionally, Jared builds limited runs of saws that are based on the designs of early American saw makers.

Jared, as talented as he is, is also modest. He gives a majority of the credit to his wife, as she has been helping him since the beginning — both from a support standpoint, as well as a helping hand in the shop and administratively. Apart from building saws, Jared’s passion has spilled over into collecting as well and he credits his mentor Mike Stemple, who is always eager to share his knowledge as Jared dives deeper into American saw makers.

If you’re interested in seeing more of Jared’s saws, you can find photos and ordering information on his website,

jgreenesaws.com. **PW**





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