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Number 256, December 2020, Popular Woodworking Magazine (ISSN 0884-8823, USPS 752-250) is published 6 times a year, February, April, June, August, November, and December, which may include an occasional special, combined, or expanded issue that may count as two issues, by Active Interest Media, 5720 Flatiron Parkway, Boulder, CO 80301. Editorial and advertising offices are located at 2200 Grand Ave, Des Moines, IA 50312. Unsolicited manuscripts, photographs and artwork should include ample postage on a self-addressed, stamped envelope (SASE); otherwise they will not be returned. Subscription rates: A year's subscription (6 issues) is \$24.95; Outside of the U.S. add \$7/year. Canadian Publications Mail Agreement No. 40025316. Canadian return address: 2835 Kew Drive, Windsor, ON N8T 3B7. Copyright 2020 by Cruz Bay Publishing. Periodicals postage paid at Boulder, CO, and at additional mailing offices. Postmaster: Send address changes to Popular Woodworking, P.O. Box 37274 Boone, IA 50037-0274.



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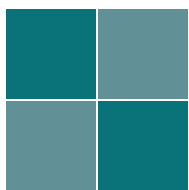
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Popular Woodworking Magazine and its sponsors will award one prize each day from November 25 through December 31. The prize pictured on each day in the calendar above is the prize offered for that day. To register for a chance to win each prize, you must enter on the day the prize is offered. You may enter as many of the daily contests as you like, but are limited to one entry per day.

Registration starts midnight EST, November 25, 2020 and ends 11:59 PM EST, December 31, 2020.

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Connect

■ FROM THE EDITOR

Seeking Comfort

By Andrew Zoellner

This year hasn't been easy.

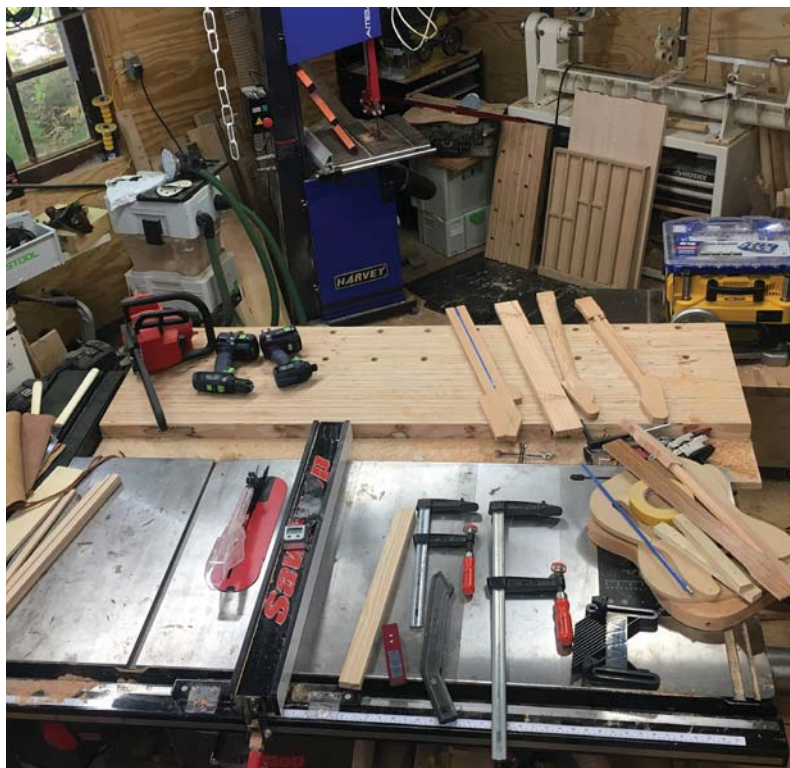
There have been times I've really identified with Bill Murray's character in *Groundhog's Day*, doing the same things over and over again, with no real end in sight. Wake up. Check the news. Make coffee. Sit at my computer. Eat dinner. Sleep. Repeat. Hope for change.

As the year draws to a close and I'm still not leaving the house, except for a walk or bike ride, or a trip to the grocery store or home center, I wonder how long this will last.

I do feel lucky that I snuck in under the wire buying my first home only a couple years ago. Instead of being confined to a 800 sqft. apartment without much outdoor or garage space, we have about twice that much space now, plus a modest yard and a garage-turned shop.

Now that I'm spending much less time around people (other than my better half), the shop is really how I connect to the rest of the world. When I talk with friends and family, what I'm working on in the shop is the first thing out of my mouth. I've made a few items for friends that can't find (or afford) a pro to help. And offered advice and encouragement to start making stuff to help pass the time at home.

I'm still hopeful that things will get better and we'll return to freely traveling to see friends and family, going on vacations and smiling at strangers without masks. But I also know things won't ever go back to



The state of my shop on a brisk fall morning. A few projects in the works for me, the magazine and friends, plus plenty of cleaning and rearranging that needs to happen.

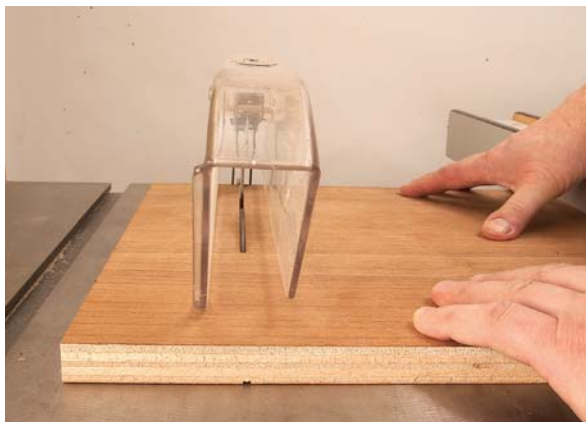
the way things used to be. Much of the country has been working/running businesses remotely. People have been forced to innovate, to find new balances between work and life. Advances in technology are still driving us into the future, and the way people think about cities is evolving.

While I'm stuck at home, I'm grateful to have woodworking to keep me grounded and to take my mind off the state of the world. It feels like technology is advancing so quickly and things are changing, but I'm also using my free time to

build a project in ways that haven't really changed all that much.

Making a few shavings, struggling to get a door to hang right, building a bench for a little garden or a gift for a loved one –those things will never go away. My only hope is more and more people find just how comforting working with your hands can be, and how through woodworking, you can provide comfort to others.

WORKSHOP TIPS



Shallow Cut Eliminates Tearout

When I crosscut hardwood plywood, I use an old technique to minimize tearout on the bottom face. I simply make two passes with my general-purpose blade. After setting the rip fence, I cut a shallow groove, no more than 1/32 in. deep. Then I raise the blade and cut all the way through. Cutting plywood this way takes longer, but I'm not in a hurry and the tear-out-free results are worth the extra effort.—*Eric Swanson*



Hook Your Cordless Drills

While building this little station to organize my cordless drill paraphernalia, I discovered that bicycle hooks make great drill holders. Mounting the station on the wall saves valuable bench-top space. Now I never have to hunt for my drills, chargers and bits.—*Hans Wendt*

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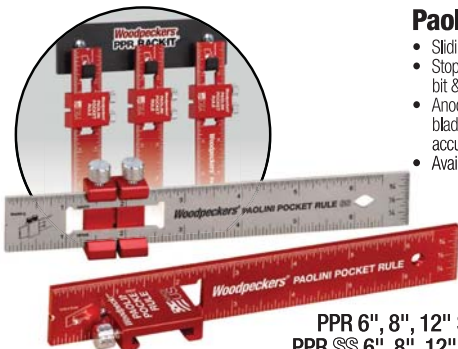
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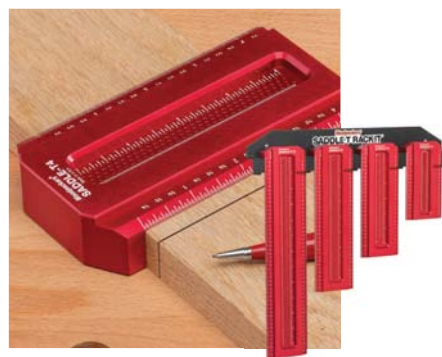


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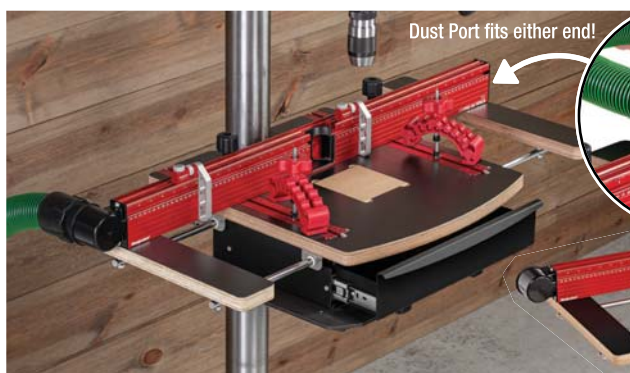
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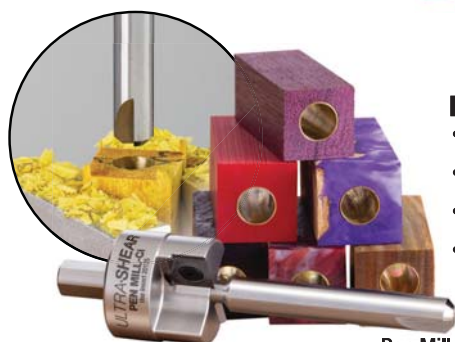
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NEW TOOL

WORKSHOP TIPS

Jointing with a Planer

I found some wonderful oak boards for a small table I wanted to build. The problem was the boards were too wide for my jointer, and I didn't want to rip them any narrower. I solved my dilemma with this planer sled that allows me to use my planer as jointer. The trick is to keep the board from rocking during planing. A wood shim under the high corner is all it takes. I add hot-melt glue to the shim and all four corners to keep them from shifting on the sled during planing. Once I have one side planed flat, I take the board off the sled, flip it over and plane the other side. The boards for my table were only 4' long, and the sled was about 6" longer. This technique works equally well for longer boards, although you will need a longer sled (and you may need additional shims along the sides).—*Mike Hofer*



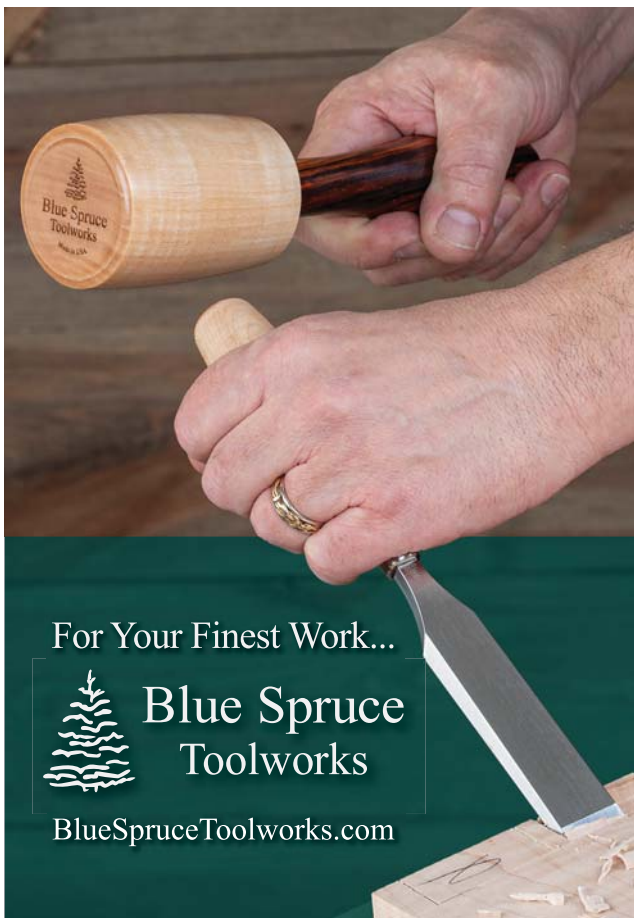
Better Winding Sticks

Winding sticks are very useful for gauging twist in a board, but they're difficult to read. My improved version of these time-tested helpers makes the twist stand out.

I start with a pair of straight, flat 2"-wide sticks made from $\frac{3}{4}$ "-thick light-colored wood. Then I stain both of them dark—the darker, the better. When the stain is dry, I cut shallow rabbets in both faces at the top of both sticks. This exposes a ribbon of light-colored wood above the stained surface on each face. To cut the rabbets, set the blade's height to $\frac{1}{2}$ " and the rip fence $\frac{1}{32}$ " narrower than the stick. Rip all four rabbets from this setting.

Joint the top edge of one board to remove the stain. Then rip this board narrower by the width of the rabbet on the other board. That's all there is to it.

During use, the narrow stick goes in front. Any twist in the board shows as a dark-colored wedge between the top of the rabbet on the near stick and the bottom of the rabbet on the far stick.—*Stephen Youngerman*



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NEW TOOLS

Premium Impact Driver and Drill

Like all power tool companies, Festool is continuing to improve its battery technology and how it pairs with the tools these batteries are powering. You can see (and feel) the fruits of this innovation in their new TID 18 impact driver and T18+3-E drill/driver, both powered by redesigned brushless EC TEC motors and 4AH batteries.

The TID 18 impact driver includes three speeds plus a special mode designed for driving self-tapping screws into wood-backed metal (think flashing a house). This mode starts with a high speed to penetrate the metal, then switches to a lower speed automatically (sensing the change in material) so you don't strip out the screw.

The T18+3-E drill/driver has two speeds and an electronically-controlled clutch. The standard chuck is also user-swappable for a quick-release collet, an eccentric attachment and right-angle chuck.

Overall, with both tools paired with surprisingly compact 4 AH batteries, they performed admirably. (I put the impact driver and drill through a lot of abuse outside the shop, including fastening Tapcons into concrete and drilling through galvanized steel.) There's plenty of



■ TID 18 IMPACT DRIVER & T 18+3 DRILL COMBO PACK

Festool
festoolusa.com
Price: \$549

runtime (the impact driver is rated to drive 800 2 3/4" screws on a charge), the tools are relatively lightweight and well-balanced and do everything you ask of them. They also come with three-year full-service

warranties and third-generation Systainers. Festool offers these as individual tools and as part of bigger bundles geared for different trades.

Benchtop Dust Collection

Dust really is the bane of the power tool woodworker. It's also hazardous, especially if you spend much of your time woodworking. Dust collection on stationary tools and portable tools (hooked to a dust extractor) is getting better and better, but there are still times when you aren't able to effectively collect dust at the source. That's where Oneida's new benchtop dust collector comes in.

The Benchtop DC Personal Dust Collector is powered by six fan motors, generating 535 CFM. Its compact, portable design means you can fit it on a bench (or near wherever you're working). That means you can capture even fine dust before it finds its way into the air. This solves the dust collection issue with all those tools that are just hard or very inconvenient to use with proper dust collection: rotary tools, hand-sanding, scrollsaw work, etc. Plus it comes with a supplemental 110-volt outlet to power tools and accessories.



■ Benchtop DC Personal Dust Collector

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NEW TOOLS



Hand Tool Starter Kit

For a long time, there were really only a couple options to get started using planes and other hand tools: shell out big bucks for new, premium-quality tools that are ready to cut out of the box or learn how to restore old tools before you ever take blade to wood. But more recently, there are a few overseas plane manufacturers that offer a better compromise of price and usability out of the box. For its 45th anniversary, Garrett Wade has put together a three tool package that hits the sweet spot in price and quality for new hand tools.

That's important for those new to the hand tool world, who can't invest a lot of money up front or don't have the time to spend restoring tools. This kit includes a No. 4-sized smoothing plane, a low-angle block plane and a flat-bottom spokeshave.

Out of the box, all three tools are machined well where it counts and only took about 20 minutes from unpacking and removing oil to making shavings. I then spent a little bit more time sharpening the blades, and these tools produced shavings and surfaces that match any of the premium tools I have in my shop. The block plane is my favorite of the bunch, because it's easy to dial in the adjustable mouth. My only grip with the No. 4 is that its mouth is a bit on the large side, so getting those super tight, silky shavings takes some playing around. For about \$250, you'd be hard pressed to find a set of vintage tools that you can get up and running with as little effort.

■ **45th Anniversary Set of Three Woodworking Tools**
Garrett Wade
garrettwade.com
Price: \$253

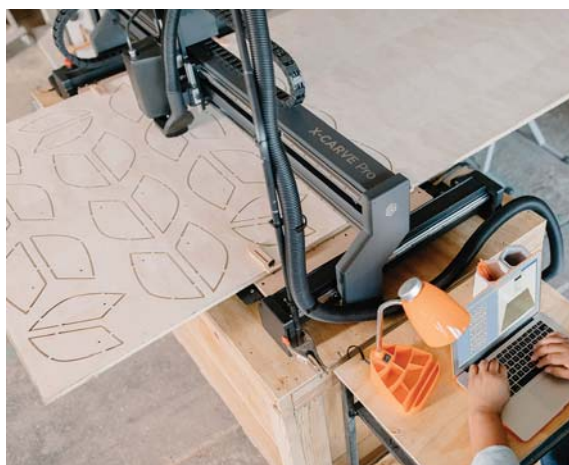
Compact CNC with Pro Features

Inventables made a big splash with their affordable X-Carve and Easel software a few years back, putting CNC routing into the reach of many home/hobby woodworkers. But their newest machine is aimed firmly at professional-level users. The X-Carve Pro was designed from the ground up to satisfy the needs of makers who need industrial CNC machine features but still want ease of use and a space-saving footprint.

The X-Carve Pro is available in 4' x 2' and 4' x 4' configurations. One of the key points Inventables discovered in their design research process was that nearly all users want the ability to work with 4' x 8' sheet material, but often only machine a small section of that sheet at a time. So, both sizes of the machine have a full, 4' working area under the gantry, which means with some outfeed support, you can work on full-size sheet goods without breaking them down first. Easel Pro's tiling feature lets you design as big as you want, and the X-Carve Pro will machine the design in smaller sections.

Beyond the size, both models share the same gantry, brushless, air-cooled spindle and materials. The machine is sold as a complete package, with hardware and software configured to work right out of the box (getting up and running takes just a couple hours). It offers machining accuracy down to .001". The machine is spec'd to cut up to 25 times faster than the original X-Carve. There's US-based professional support available to minimize any downtime, and the whole system is designed to support the most demanding business users. It's the perfect machine for a new CNC user or someone that wants to scale a business.

■ **X-Carve Pro**
Inventables
xcarvepro.com
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Oak (White)	4/4	QS	2.90		\$105.00
Poplar	4/4	Select	1.80		\$ 85.00
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Mill Brass & Aluminum with a CNC Router

Add a new dimension to your woodworking skills.

By Chris Fitch

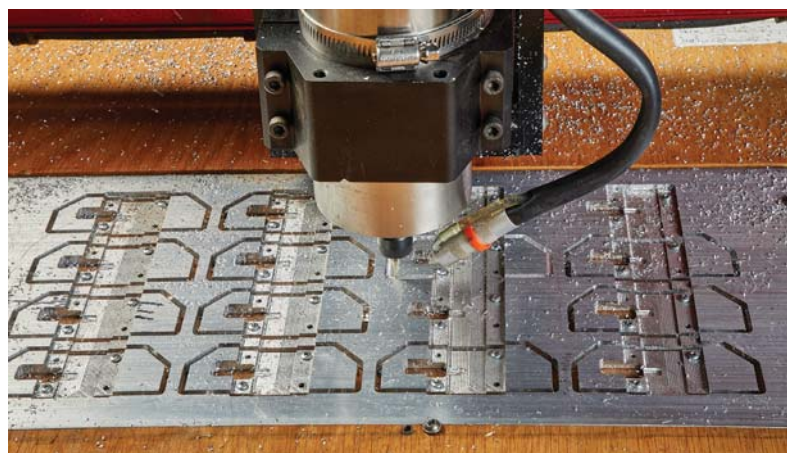
With the right techniques and tooling your CNC router can mill brass and aluminum with dependability, accuracy and consistency. Milling these materials on a home shop CNC router isn't difficult, but milling metal requires a different and a disciplined approach. Here is a basic formula to get you started:

1. Stick with easily machinable alloys.
2. Choose the bit that is correct for brass or aluminum.
3. Mill at an RPM and feed rate that is right for your machine.
4. Use a light depth of cut.
5. Lubricate the bit.
6. Clear the chips.

The Alloys

We want to choose an alloy that machines easily, is commonly available and is affordable. Aluminum alloy 6061 is a great choice to work with. Manganese and silicon are the major alloying elements. Alloy 6061 is strong, corrosion resistant, inexpensive and widely available and can be easily machined on a CNC router.

Ultra-machinable 360 brass consists of copper and zinc, and as you might guess from the name, it is made to be easily machined with the addition of lead. This attractive



alloy stands up to high speed milling with minimal wear on tooling while generating chips that clear easily from the cut.

The Right Bit

The bit we're looking for doesn't deflect, minimizes lateral forces on your router and clears the chips quickly to give you a quality cut and long bit life. The bit that accomplishes this for both aluminum and brass is a 1/8" diameter, 1/4" shank spiral upcut and with a length of cut that is about 1/8" more than your max. depth of cut, but not much more. The small diameter reduces lateral strain on your machine which increases accu-

racy. The 1/4" shank and short length of cut reduces chatter and deflection while the spiral shape clears waste chips efficiently, but how many flutes? This is where brass and aluminum part ways.

Aluminum is a "gummy" metal that can cling to the cutting edge of a bit. Once that occurs, breakage is only moments away. What's needed is a single-flute, highly polished bit that both clears chips quickly and

1 360 brass alloy material is excellent for CNC routing.

2 A two-flute bit (left) for brass and single flute bit for aluminum.



prevents them from sticking.

360 brass is alloyed specifically to cut cleanly so a two-flute bit can be used. Two flutes offer the advantage of additional stability and more cutting efficiency.

RPM and Feed Rate

Speed and feed rate calculations give you an ideal set of numbers to cut metal. However, home shop machines suffer from a lack of rigidity. To compensate, we need to slow down the feed. I have found that a feed rate of 50 fpm at a speed of 19,500 rpm is a combination that will work well in most situations. Don't go below this trying to baby the machine. Feed rates slower than 50 fpm cause the bit to rub needlessly increasing heat, wear and reducing its' life.

Depth of Cut

Bit deflection, backlash, and frame rigidity are enemies of a clean cut. To counter these, we need to choose an optimum depth of cut. For aluminum 6061 I have found .03" to work well and for 360 brass .05". It might not seem like much, but you will find your CNC router can clear a lot of metal in an hour's time.

3 Just like drilling metal with a drill press, proper lubrication is key. Find something that's inexpensive. I use "plumber's lard."

4 Chip removal helps prolong cutter life. With a big compressor, you can deliver a continuous stream of air.

Lubrication

No doubt you have had the experience of scorching some wood while routing. The dense structure of metal creates even more heat as the bit balances between cutting and rubbing, so lubrication is critical to keeping the bit cool. A cool bit means a longer bit life and a better cut. To lubricate a cut there several options: wax, spray can oil or an oil mister.

If you're cutting thin sheet stock in one pass, a wax stick makes sense. Wax sticks are less messy than oils and have the advantage of being applied once and letting you walk away. No babysitting.

For cuts requiring multiple passes, the simplest approach is to use oil from a spray can at frequent and even intervals. Avoid using sprays that are designed for stopping squeaks and breaking frozen bolts. Choose a dedicated machining oil or an oil with some cling (such as chain lube).

The best approach that guarantees constant lubrication for the bit and no babysitting of the machine is to use an oil mister. It's an add on and uses compressed air to suction oil from a reservoir and delivers it directly to where it's needed: the router bit. There are many specially formulated oils for machining, but in our situation the oil is not recoverable. Once it is sprayed it's gone, so price matters. An inexpensive cutting oil that can be bought in gallon jugs goes by the name "Plumbers Lard" (not a glamorous name but it works). I

also keep a spray bottle of this oil in my shop for metal drilling or CNC work when I don't want to use the mister.

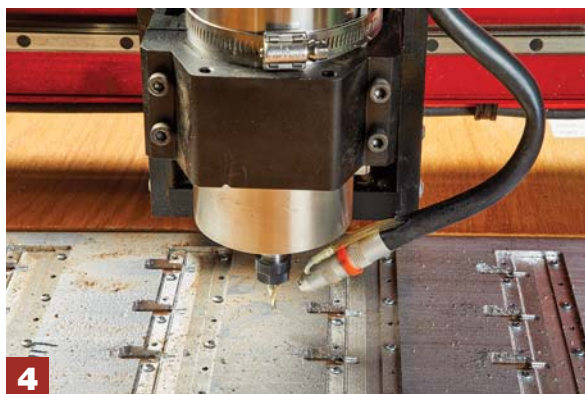
Clear the Chips

You know that milling wood produces a blizzard of chips. Milling metal can do the same. Chip buildup results in re-cutting the chips, increasing heat and stress. It's the number one cause of broken bits when milling metal.

So how do we deal with the chips? They can be blown out of the cut with an air wand or, if you have a larger compressor, set up a continuous air stream using a flexible nozzle attached to your router. (Take care to be very careful when using compressed air on metal chips, as the chips can end up in electronics, in-progress wood projects, or worse, in your eye.) A dust collector can help keep the workpiece clean, but metal chips are heavier than wood. You may need to fit a custom boot to increase air flow around the cut.

Cutting aluminum and brass with a home shop CNC router is an exciting process. By addressing the issues unique to milling aluminum and brass, you can mill with confidence. So, pick up some cutting oil and the right bits, and open the door to a new world of possibilities for your shop. **PW**

Chris Fitch is Popular Woodworking's resident CNC expert and uses technology to make his woodworking life easier.





■ Milling Your Own Lumber

Whether a hobby or a small business, it's a woodworker's dream job. **By Logan Wittmer**

As a craftsman, I've always enjoyed building stuff. But the pivotal point that led me into woodworking happened long before I stood at a table saw or picked up a hand plane. And that point is clearly ingrained in my memory. I was 12 years old and my grandpa and I harvested a pecan tree from his yard. Instead of cutting the trunk into firewood, grandpa hired a sawmill to come out and turn it into lumber.

It was at that point that I, at 12 years old, had an earth-shattering realization that wood literally grew from trees. I know, I was a 12-year old genius. It was that day that triggered my fascination with the material we use for our woodworking. And I've noticed in the past few of years, the number of people that are starting to share this interest with me are growing. The number

of people becoming interested in harvesting and milling their own lumber has increased. And if it's piqued your interest at all, the good news is that it's not as complicated as you might fear.

There are a number of reasons why I would argue that someone should consider milling their own lumber instead of hitting up a lumber yard.

First, and maybe the most obvious, is the cost. Milling your own lumber can produce quality material for a fraction of the price of a lumber dealer. In fact, if you purchase your own mill, like I have, you can actually make a profit off of it by selling lumber to other woodworkers and by offering to mill other people's logs.

The second reason I enjoy milling my own lumber, and you will as well, is that you have control of the material through the entire process. This

means you select how you want the lumber cut and are in control as it's drying. In my experience you'll end up with stock that is much higher quality than you can readily buy.

Finally, I take great satisfaction in turning urban trees into lumber that can be used for a project instead of going to the dump or fire pit. On this same note, you'll also have access to some unusual species that are almost impossible to buy commercially.

All of this is not to say that you have to go out and buy a sawmill to mill your own lumber. A quick internet search will usually yield a number of local sawyers that will come out and mill your logs on site. However, if you do take the dive into purchasing a sawmill, you'll wonder why you waited this long to buy one. Now of course, this all starts by getting your hands on some logs.



1 Milling your own lumber can open up a world of materials that you may not have access to at the lumberyard, like this 24-inch wide cherry log.

2 Don't think that a sawing log needs to be arrow-straight. Small, odd pieces such as this walnut crotch can yield some beautiful, specialty pieces.

Finding and Picking Logs

When it comes to picking up logs (or hoarding them, as my wife says), I've found a few different sources that work well for me. As a rule of thumb, there are always free logs available, and I don't pay for them.

The first, is harvesting the trees myself. This works well if you own property or have access to property with millable trees. Plus, you have the ability to selectively harvest and manage the timber stand. This allows the trees to reach their full potential before harvesting.

Probably my most consistent source of logs are a handful of arborists that I work with. If they get to a job site and have a nice log, they'll usually give me a call. The crews I work with take trees down year-round, and it's often less work

(therefore cheaper) for them to have me come take a log, rather than dispose of it.

Another source for free logs comes from land clearing companies. These guys are usually spending a week at a site clearing land for large commercial spaces or residential developments. This method can be rather hectic, but fruitful. What I mean by that, is you'll often have a number of good sawing logs in one spot, but there will be a narrow window to get in, get the logs you want off of a log pile before it gets dosed in diesel fuel and burned.

Finally, don't overlook online classified ads. Often times a homeowner will list a freshly felled (or fallen) tree for free if you want to come and cut a section of it. (Stay away from the "free if you take it down" ads). I

always make sure to ask if it's okay if I take just the trunk, and if there's access for me to get the mill up to it. Even if the homeowner is trying to sell the log, I'll touch base and leave them my contact info. Most of the time they don't get a buyer and they get to a point they just want it out of the yard.

Now, while I never turn down free logs, there are a few things I look for. First, I make sure it fits on my mill. My Norwood HD36 has a 36"-diameter capacity. So, I'm focusing on logs in the 16-36" range. As far as length goes, I shoot for the 4'-13' range. And don't think that a tree has to be arrow straight either. While I stay away from limb wood, trunks with crotches, splits, and other so-called "defects" can make some beautiful lumber.



3 Pulling logs out of a burn pile can be a great way to score some valuable logs. A handful of log chains, a truck, and a winch have served me well.

4 A log cant (or log peavy) is invaluable in safely moving and rolling logs. Utilizing leverage, you can move a several thousand pound log with minimal effort.





5

5 Fresh off the mill, you flood the lumber surface with water. This will wash away a majority of the sawdust, and also show you the grain of the wood.

6 Some of the most beautiful lumber I saw, such as this cherry crotch, would grade fairly low at a commercial mill, but any woodworker can see the value in this character.



6

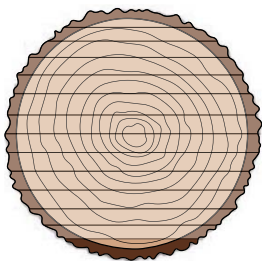
However, if you are looking to pick up the logs I would suggest renting a trailer and a skid loader and loading up a handful of logs in an afternoon. Sometimes, arborists will have one on site, as will clearing companies. A small handmade gift is a good way to thank them for loading the logs for you. Otherwise, if you have a trailer you can use ramps and a winch to roll the logs over the side using a process called parbuckling. For a more dedicated log loading rig, take a look at some log arch videos on YouTube (Matt Cremona has a great one on his channel).

When it comes to what species to look for, that really depends on where you are in. Here in the Midwest, I get mainly ash (a lot, thanks to the current ash-borer situation), red and white oak, hickory, elm, maple, walnut and the occasional cherry. But don't discount a wood just because you've never seen it in a big-box store. Some of my fa-

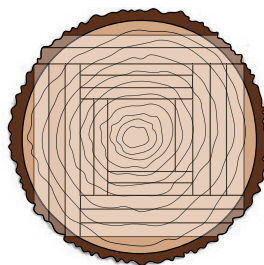
vorites to mill are sycamore, linden (basswood), and apple.

Once you've identified some logs that you're planning on milling, now comes the first party trick—picking them up. Now, I admit. I cheat. My mill is portable, so I can cut them on site and throw the boards in my truck. You can hire a portable mill to do this as well.

■ CUTS OF WOOD



Live sawing is making cuts straight through the log, leaving the bark on both sides. For this, the log needs to be smaller than the guides on the mill (28" in my case). Usually, the lower bark is discarded and the top one covers the stack.



Plain sawing removes four sides of bark to turn the log into a cant. Then, the cant will be sawn down into boards, and I usually leave the center of the log (with the pith) as beams for workbench parts or fireplace mantles.

Prepping Logs for Milling

After getting your newly stashed logs back home, there's probably going to be a little bit of work to do. Occasionally, logs will get dropped off at my place from an arborist. The first thing I do is inspect the logs and run through a mental checklist. Are there any nubby bits that are going to get caught while I'm trying to roll it? Are the ends clean, or are they chewed up from a chain saw (or already cracked from drying)? How is the log size? Is it too long, or do any crotch sections need trimmed to fit on the mill?

If any of these things need to be addressed with a chain saw, I take care of it at this point before sealing all of the end grain (and trust me, it's easier to seal the end of the log instead of the individual ends of boards). Sealing the end grain reduces cracking as the lumber is drying. I use Anchor seal 2 as a sealer, however a few coats of old glue or latex paint will work as well. If the ends have started to already crack (if the log's been sitting in a trailer), I'll trim the ends to remove the cracking prior to sealing.

A portable mill, like my Norwood, will come with some form of log loading attachment. Some may be hydraulic, others manual. You can see my setup here. It consists of a pair of ramps that attach to the side



7 Trimming the end of a log when it first arrives gives me a clean, check-free end.

8 Quickly after trimming, I seal the endgrain with a wood sealer to help the wood dry more evenly and limit additional checking.

9 My Norwood HD36 uses ramps and a winch to roll logs up onto the bunks.

10 The toe boards are used to level the log on the mill.

11 The first bark cut gives you a reference surface for measuring out your cuts.



of the mill. Then, an attached winch is used to roll the log up the ramps. Remember earlier when I talked about parbuckling? This is essentially a parbuckling setup. The winch cable goes over the log and then under it. The hook on the end attaches back to the frame of the mill. Now, it's time to crank the log up. The thing about a setup like this is that even some of the heaviest logs can easily be cranked up the ramps. I've loaded ash and oak logs that are over 4,000 lbs. without any worry.

As well as the loading ramps work, however, if I'm milling at home, I find it a little easier to use a tractor or skid loader to load logs. If you choose this rout, however, be careful not to drop the logs down or bump the mill in any way, as that can cause unnecessary stress on the mill.

Once the log is onto the mill deck, this is where you're going to start making some decisions that

affect what type of lumber you'll get out of the log.

First, the log needs to be positioned in relation to the cutting head and mill bunks (bed). Almost every log will taper, some more than others. To get the best yield and grain pattern out of a log, you'll need to raise up the small end of the log. This can be done with jacks, or toe boards, like you see here. The goal is to raise the small end of the log so that the heart of the tree (the pith) is level with the bunks. This will leave the heart in one board when you're done cutting.

The second decision to make is the orientation that the log is going to be cut in. In my mind, the two main ways to saw a log are for graded lumber or the best character. Because I don't sell commercially, I rarely saw for grade. Part of the appeal of wood to me is each tree's uniqueness and story. So, I saw for

character in almost all instances. This means that making sure any character marks (such as crotch sections) are horizontal so every board will have some form of character. Sawing for grade and how the grading system works is an entirely other article.

There are some instances where I may rotate the log and forgo the "best" character cut to avoid some actual defects like cracks or rot, but those are extreme cases. Once the log is positioned where you want it, it can be clamped down. The key here is to make sure the log is tight against the log rests and held tightly in the log clamps/dogs. Even though a large hardwood log can be several thousand pounds, a twelve-foot band saw blade exerts a tremendous amount of force. Vibration and the blade can cause logs to want to roll, so make sure it's clamped down tight.

■ COST TO MILL

I often get asked "how much does getting a mill setup run?". The largest expense, obviously, is the mill itself. Mills, depending on the size, can cost between \$2,000 for a small mill, up to \$75,000 for a fully hydraulic mill. My Norwood HD36, starts at about \$8,500 and can handle a log up to 36". There's a few other accessories that you'll want to have.

■ CHAINSAW

Price: \$200 - \$1500

This is necessary for cutting logs to length, trimming them on the mill, etc.



■ CANT HOOK

Price: \$115

This item is an invaluable tool when it comes to moving logs around. The metal hook bites into logs and allows you to easily roll a log using leverage. I use a Logrite 60" that will grip logs up to 36"-diameter.



■ PALLET BANDING KIT

Price: \$100

Finally, in order to keep boards flat as they dry, I suggest getting ahold of a pallet banding kit. I purchased a setup off Amazon and use poly strapping with wire buckles. You'll need strapping, buckles and a tensioner.

Putting the equipment costs aside, it's fairly easy to breakdown the milling into a cost-per-log. A new blade runs about \$25, and lasts about 4 hardwood logs (give or take, depending on the species, size and if there's metal in it). Taking fuel and blade lubrication into account, it costs about \$8 to mill a log. On average, to hire a portable mill to cut a log, it will run about \$75 per hour.

Making the Cuts

The final decision to make before you fire up the mill (or have the sawyer do it) is to decide what cut of lumber you want out of your log. That is, what grain pattern do you want to see on your boards? There are three common types of grain patterns in a board: plain, rift, and quarter sawn. Depending on what you're planning on doing with the lumber will help you decide how to cut it.

When I'm sawing for my personal lumber yard, I mainly "live saw".

This means I cut the log into slices, leaving the bark on both sides. Then, as I pull the lumber off the mill, I can "rebuild" the log so that it can dry (more on that later). There are three reasons I like this sawing method. First, it's fast. There's no need to turn the log into a cant and alternate between sawing and flipping the cant. It's a load it up and cut process (I do flip the log once, generally).

Second, I hardly ever have a plan for a log when I cut it. By live sawing a log, I am left with stock that is (roughly) 1/3 quarter sawn, 1/3

12 After the first cut, board thickness can be set.

13 After setting board thickness, you can make cuts down until you've reached the pith (middle) of the tree.

14 With half to one-third the log left, I'll flip the log over, lower the toe boards, and allow the log to rest flat on the bunks.

15 The final cuts of the log will, hopefully, yield the pith of the tree in one board. The pith of the tree will nearly always crack (see the bottom board, here).



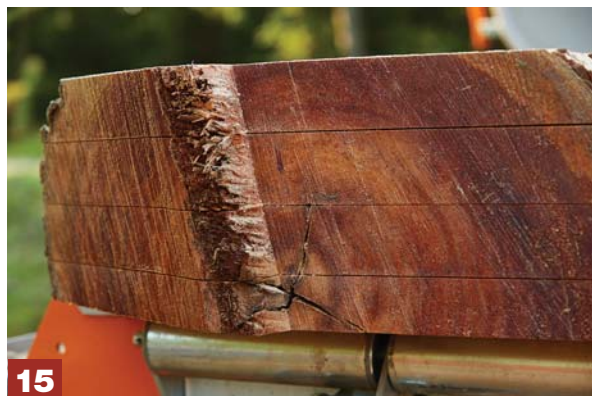
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rift sawn and 1/3 plain sawn. This means that when I use the lumber down the road, I have different grain pattern options to choose from. I eluded to the final reason that I like this pattern earlier—I find it easier to dry.

Making the cuts into the log is where all of the hard work (at least, up until this point; there's more to come!) pays off. The first cut is to remove the top cap of bark (called the slab) from the log. With this cut, I usually aim to get into the sapwood of the tree (just below the bark) and get at least 6"-8" of flat, clean wood. If you're live-sawing and going to re-stack the log, save the bark cap. If not, it can be discarded. On my Norwood, I have a scale I can zero out based on this first cut. Then, I can lower the head (using the scale as a gauge) to make the next cut. Here again is where I hedge my bets. Without having a plan for the lumber, I always cut 8/4 (2"-thick) boards. That way, if a project calls for thinner stock, I can

always resaw the material. It's easy to make it thinner. Not so easy to make it thicker. Just note that the thicker boards will be heavier—it's always beneficial to have an extra set of hands available to help unload boards off the mill.

As you're making cuts and flitches are coming off (a flitch is a board with live edge on two sides, sorry, it's not called a "slab"), make sure to be aware of how the log and the saw are handling. A sharp blade should be almost effortless to push through a cut. If you're getting excess vibration, wavy cuts, or the engine is bogging down, then the odds are it's time to put a new blade on.

In addition, pay attention to how the flitch or board is acting as it's being cut. Often, stresses in the tree will reveal themselves at this point. The board or flitch will start curling up, or even left or right. This is the stress being released from the log. After noting a stress indicator like this, the best bet is to rotate the log

and try to keep the pith as centered as possible in the material that is left. This will help "ease" the tension out of the log and distribute it across the boards.

As you make cuts down towards the pith, I like to stop just shy of that "middle" cut. Then, I'll flip the log 180° so the flat side is facing down (lower the toe board) and finish out the cuts. If you've done everything correctly, and leveled the log, you'll end up with one final board on the sawmill bed that has the pith down the center of it. The pith of the tree will always crack, so you can either let it crack, or saw it out. The material on both sides of the pith will be perfectly quarter sawn and make great leg blanks.

16-17 Having a helper available to help unload the sawmill will make the work go much faster. Unload the slabs onto a staging area where you can place stickers between the layers.



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Now We Wait

Congratulations. You just milled your first log. Now you have the task of not screwing it up. And I know that seems like an odd statement, because the hard part is over, right? Not quite. There have been thousands of board feet of beautiful lum-

ber that have been flat out ruined by improper drying.

Before I get into what I do to dry my lumber, let's lay out some facts. Fresh cut lumber, even if it's in a tree that was felled a year ago, will be wet. If it's stacked without airflow, it will mold. And finally,

different species of wood dry differently. Do your research on the species you're cutting.

The three keys to drying lumber successfully are: good airflow, a level base, and protection from the elements. Let's start from the ground up.

When you've finished cutting your lumber, you need somewhere to stack it. Imagine drying lumber as a low-temperature version of steam bending. The lumber will dry to the shape of what it's stacked on. That means it's best to have a flat and level base. As you can see in the photos below, I like to build a good foundation with cinder



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18 For final air drying, prepare an area with good airflow and set up a level base (I use cinder blocks).

19 Make sure stickers are placed in line each above the previous layer, and make sure they're the same thickness.

20 When stacking the boards, I'll reassemble the log in the same order it came off the mill, into log form.



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blocks. Then, I can run a level or an extension ladder across the blocks to verify they're flat and coplanar. Some blocks will be shimmed or dug out to keep everything level.

Next up is airflow. This is the easiest one in my opinion. The key here is to stack the lumber where it will receive a good breeze, and ideally be out of the sun. Good airflow actually starts on the mill. As I'm removing flitches off the mill, I scrape or brush off all excess sawdust that can hold moisture. Then, when I go to stack them on the cinder blocks, I will make sure that there is a kiln-dried sticker (a 1x1 spacer) between each layer, directly over the cinder blocks. This allows air to flow through the stack. Some sawyers will saw wet stickers from lumber as they're milling. However, this has the potential to trap moisture between the wet sticker and the wet slab, causing mold stains. Best bet: use kiln dried wood as stickers.

21 During drying, I band the bundles and label the boards with tags that list the species and when it was milled. The story behind a log can often be a powerful selling point.

22 For edged lumber, I will stack wider bundles and make sure the base has plenty of support to avoid warping.



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Finally, the third key is to keep the stack out of the elements (sun and rain). When live sawing a log and restacking it back into log form, the bark that was left on the log (and bark cap) become the rain protection. This can be seen here and is called the "European drying" method. The shape of the log will shed water naturally. When sawing edged lumber, however, it's best to cover the stack with a tarp, a sheet of plywood, or some corrugated metal.

As a side note, I do two other things to my stacks of lumber as they're drying. First, is I use a pallet bander to strap the entire log, or stack of lumber, together. Not only does this make it easier to move it with my tractor, but it also helps add some pressure to hold the lumber flat. I also nail on (using aluminum nails to avoid iron stains) a small plastic tag with an ID number on the end of each flitch. Then, I inventory each of those numbers in a spread sheet, so I know the size of each piece, along with where the tree grew and when I harvested it. I've found many buyers love hearing the story and history of the tree and how it came to be in my, and ultimately their, hands.

Are you ready for the hardest part? You wait. Depending on the species of tree, you'll wait a while.

The rule of thumb is about 1 year per inch of thickness. However, after about 12-16 months of air drying, I will start pulling these flitches into the basement to finish drying. Usually, in Iowa, we can count on about 13% moisture content for air dried stock. You could get lower if you go into a kiln, but personally, I will almost always opt for a air-dried stock over kiln dried. It works better by hand (in my opinion), and I've never ran into an instance where (correctly) air dried stock has caused any issues.

With all of this being said, milling your own lumber isn't for everyone. It takes a bit of work and some space. If you are seriously considering a mill, you'll also want a healthy serving of "bring it on" attitude. However, I think you'll quickly realize that there's the opportunity to make a little extra money, and most people ask themselves why they didn't get one sooner. Plus, when you pull that first piece of lumber off the mill and recognize the endless possibilities... well, that's what we call "saw dust in the blood". And once you have sawdust in your blood, I don't think you'll ever look back. **PW**

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Logan Wittmer is Woodsmith's assistant editor and an aspiring sawyer.



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PROJECT #2016

Skill Level:
Intermediate
Time: 3 days
Cost: \$400



Vintage Pharmacy Cabinet

An Homage to the Past by Embracing the Present. By Dillon Baker

PHOTOS BY CHRIS HENNESSEY

Over the years it has become apparent that all projects are not created equal. Although, they all seem to come with their equal share of challenges and complexities. It never fails, no matter how much preplanning is implemented, there always seems to be an issue that materializes past the point of no return.

For years, my remedy to this was to destroy and discard any signs of what I deemed a failure of personal effort. Allowing such a blunder to become public was inconceivable. It wasn't until later in my woodworking design career that I realized that these "mistakes" were paramount to the process of learning and development. Not only is it important to confront these miscalculations, it's the resolve from these faux pas that generates the "ah-ha" moment(s) within the discipline of design. This project, being no exception to the rest, happens to be a model example of this realization.

Initially inspired by 20th century medical equipment, this pharmacy-styled cabinet evolved from an acute case of modern nostalgia and an impulse to reverse engineer. The self-imposed objective then became focused on incorporating modern building materials and techniques to achieve a look of the past while making sure a woodworker could build it. The original cabinets were made from metal. This one's primary medium is Baltic birch plywood.

Stretchers and Legs

Begin by cutting the eight pieces that comprise the four legs of the cabinet. Since all of the leg blanks and stretchers are the same 2" width, take the time to cut all of the stretchers to their final dimensions. Once this is complete, move over to the router table. Using a 1 3/4" chamfer bit with a bearing, double-stick tape two of the leg blanks together. By doing this you are creating a surface for



1 Much of the joinery and shaping for this cabinet is cut with a router and these five bits: a rabbeting bit, a chamfer bit, a roundover bit, a pattern bit and a straight bit.

2 Attach two leg pieces back to back with double sided tape, then cut the 45° edge on both, using a bearing-guided chamfer bit.

3 Then, rout the stopped grooves for the panels with a 1/4" straight bit.

the bearing to accurately ride on while simultaneously streamlining the chamfering process. Run one side through, then rotate the two conjoined pieces 180° and make another pass. Repeat this process for all four legs.

While still at the router table, switch out the chamfer bit for a 1/4" straight bit. It's time to start routing the stopped grooves that accommodate the panels. Begin by marking a line 1 1/2" up from the

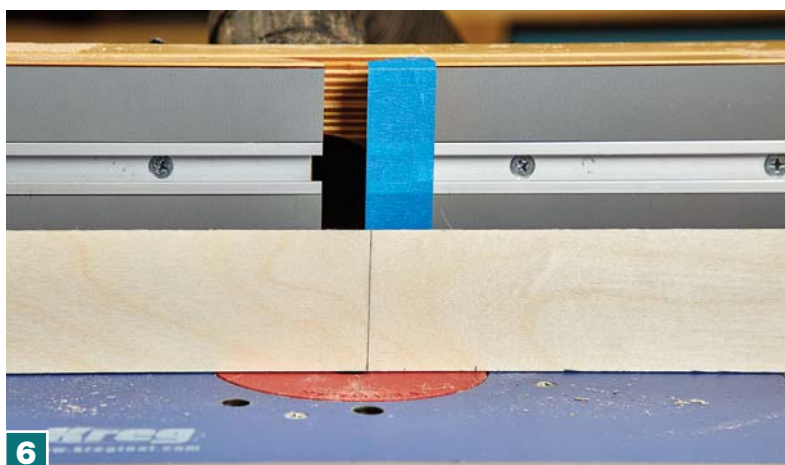
bottom of six of the eight pieces that comprise the four legs. This line will serve as a registration point as to where to make the stop. Now make another mark on the router fence directly above the router bit to correspond with indication line on the legs. Rout the groove on six of the eight pieces and set the legs aside. With the 1/4" straight bit still set up, rout the grooves on all of the stretchers that accommodate the panels.



4 Pocket hole joinery is used for nearly all the joinery, including attaching rails and stiles for frame and panel construction for the body of the cabinet.

5 Pay attention to the position of the pocket holes in relation to the grooves cut at the router table.

6 To cut stopped grooves, I mark the fence of the router table with a piece of tape, measure the offset from the router bit, and mark my pieces accordingly.



7 The glass doors and side panels are the trickiest part of the build, but they follow the same construction, starting with a piece of $\frac{3}{4}$ " plywood. Spend the time to get this part right. Begin with the layout, using a compass to draw the inside radius in each corner of the opening.

8-9 Drill a starting hole, then use a jig saw to cut out the opening. With the first pass, I cut close to the line, staying inside the cut. Clean up the curves at the spindle sander.

Dressing the Panels

Take this time to cut all of the panels for the casework to their final dimensions (including both upper as well as lower doors). While still at the table saw (using a flat kerf blade) start by cutting a $\frac{3}{8}$ " wide by $\frac{1}{2}$ " deep rabbet around the edges of all six frame panels. Once completed, take the two $\frac{3}{4}$ " thick (upper left and right case panels) and make a $\frac{1}{2}$ " x $\frac{1}{2}$ " rabbet cut on opposite side on all four edges. Before moving on, check the fit of rabbets in their respected grooves.

A Pattern, of a Pattern, of a Pattern

To create the openings for the two side panels as well as the two doors, start by laying out the area that will be removed. Using a combination square, draw a line $1\frac{1}{2}$ " in from the outside edge on all four sides. Then, create a 2" radius layout line on the four corners using a compass. Proceed to do this for all four panels.

Once complete, drill a hole large enough for a jig saw blade to pass through. Following the layout lines, cut shy (approximately $\frac{1}{16}$ - $\frac{1}{8}$ ")



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10-11 I attach a straight piece of plywood with double-sided tape to use as a reference for a bearing-guided pattern bit. This gives perfectly straight lines.

12-13 With the openings finished, install a $\frac{1}{2}$ " rabbeting bit on the router table and rout a recess for the glass and retainer. Rout in two or three passes until the rabbet is $\frac{1}{2}$ " deep.



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14 The glass will have square corners, so I make a quick 90° corner jig to rout the bulk of the waste with a pattern bit.

15 With the jig still attached, I use a chisel to square up the corners.

16-17 The glass retainer is solid wood. The stiles are cut to their final dimension before glue up, but the rails are left wide to accommodate the inside radius.

18 Set the retainer in the rabbeted back of the door. Trace the opening onto the retainer.



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19 Rough cut the retainer with a jig saw, staying inside the line.

20 Use a pattern bit to flush trim the retainer, using the door as the pattern.

21-22 The retainer fits the back of the door. It will hold the glass in place against the rabbeted edge of the door.

from the referenced border. Clean up the radiused corners over at the spindle sander. From here, attach a square scrap piece of wood to the work piece along the designated layout line. This square piece will act as guide to flush trim the irregularities left by the jig saw on the straightaways. Repeat this step on all four sides of each of the four panels.

Using a $\frac{1}{2}$ " rabbeting bit, follow the interior contour of the cutouts you just created. The final depth of cut is $\frac{1}{2}$ " deep, so making a few



passes (even though its Baltic Birch) will help ensure accuracy as well as prevent potential splintering. Since the glass retainers are rectangular, the radiused corners will need to be squared up. Switch out the rabbeting bit for a flush trim bit.

Diameter is mildly arbitrary here, just so long as the bit length accommodates the cut. The technique used here mimics that of the one used to trim up the straightaways on the initial cutouts. Attach a couple of scrap pieces of birch to the work piece to use a template to clean up the corners. A small radius will inevitably remain, so square up the corners using a bench chisel.

Now that this is complete, it's time to start gluing up the frames that compromise the glass retainers. As shown (see photo 17) the two rails are cut to their final dimensions, while the stiles are oversized to accommodate the 2" radiused corners.

Once these are glued up, place them within the recess and trace the profile of the cutout onto the stile. Remove the excess waste (while the retainer is still within the panel) using a jig saw. Flush trim any remaining waste using the panel as a template. Repeat this step for all four panels.

The final step is to create the faux gaskets that will be applied to the outside of the glass openings. Start by cutting $\frac{1}{2}$ " Birch plywood panels that are 1" longer as well as wider than the openings cut for each panel. Using a compass, mark a $2\frac{1}{2}$ " radius on all four corners of the gasket panels. Once drawn, attach the gasket panels to the outside of the two doors as well as two side panels equally space from all four sides. Flip the panels over and drill a hole large enough for the jig saw blade to pass through. Rough cut the interior waste and proceed to flush trim the remaining over at the router table.



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Pull the gaskets away from their respected panels and cut the outside $2\frac{1}{2}$ " radius with the jig saw (or bandsaw). Clean up any chatter left by the blade with either a spindle or belt sander. With the faux gaskets in hand, give the two outside edges a $\frac{1}{4}$ " round over.

Pocket Hole Construction

With a bulk of the labor behind, it's time to start drilling the pocket holes that make-up a majority of the cabinet's construction. Begin by marking about $\frac{5}{8}$ " in from either side. This should allow enough room to accommodate the stretchers that possess grooves. Set the appropriate depth stop on both the pocket hole jig as well as on the bit collet and begin drilling. Repeat this step on all horizontal stretchers along with the two front vertical stretchers that divide the doors.

Drilling for Shelf Pins

Since the intended purpose of this cabinet is at the discretion of the builder, so is the location as well as the quantity of shelves. If you desire to follow the project to a "T", the layout in the plans provides plenty of room for adjustment. Whether using a Shelf Pin Jig by Kreg or Rockler, or creating them with something shop-made, it's much more accessible to do prior to assembly.

Panel Assembly

The assembly is pretty straight forward. Begin by constructing the two sides. Ensure that the $\frac{1}{8}$ " reveal



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23 The non-glass panels are just plywood. The top of the case is a $\frac{3}{4}$ " piece of plywood, rabbeted to fit snugly in the opening. The rabbet is $\frac{3}{4}$ " wide and $\frac{1}{2}$ " deep (to fit the $\frac{3}{4}$ " plywood rails and stiles). Getting this piece dialed in is key to the structure of the cabinet and makes final assembly go quickly.

24 The inset solid panels are $\frac{1}{2}$ " plywood, rabbeted to leave a $\frac{1}{4}$ " x $\frac{1}{4}$ " tongue that fits in the grooves of the rails and stiles.

25 The glass side panels are also get this rabbeted joinery detail. They are fit similar to the solid panels.

26 The rails will have $\frac{1}{4}$ " x $\frac{1}{4}$ " openings at their tops/bottoms. Glue in some scrap here. Paint will hide any defects.



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on the inside of the panel visually consistent around all of the edges of both panels and proceed to screw the stretchers to the legs. Follow a similar procedure for the back as well as the front assemblies.

Once this is complete, you humbly may need to exercise your ability to ask for a helping hand during assembly. Run glue on all of the faces with a mitered edge. With the help of your willing assistant, bring the four sides together using a series of band clamps. With the



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clock of the open time running, check alignment of all the miters and ensure the interior of your case is square.

Unruly and stubborn by nature, miters can often times use some alternative persuasion. If need be, do not hesitate to clamp some square blanks in the corners of the case using spring clamps or Quick Grips. The alternative, (or rather the peace of mind) is to fill any small voids with wood-putty or latex caulking during the finishing process.



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Top, Middle, and Bottom Application

This is where having a square case becomes our friend. Much of this cabinet derives its core rigidity from the top, middle, and bottom sections. Start by scabbing on the cleats that hold the case middle as well as the bottom in place. Once these are in place, continue by screwing these panels in place using a series of #8 screws.

The top is attached in a similar, yet slightly different manner.

Starting with a $\frac{3}{4}$ " piece of plywood, cut it down to its final dimensions. While still at the table saw, reset the blade height and cut a $\frac{3}{4}$ " wide by $\frac{3}{8}$ " deep rabbet around all for sides. Since a snug fit is desired, sneaking up on the measurements is always encouraged. Once installed, proceed to screw the top to the case.

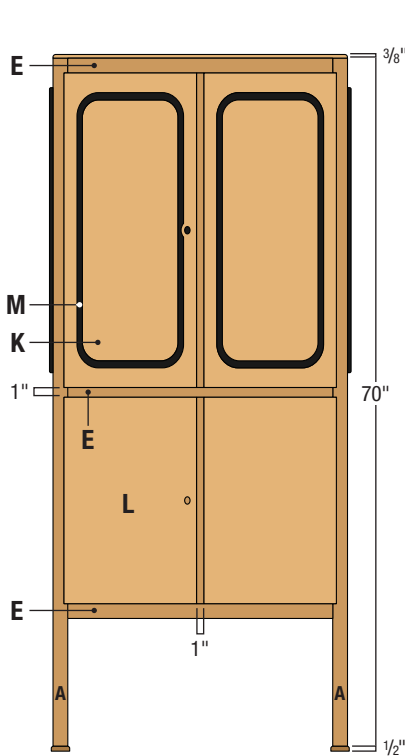
Don't Forget the Feet

Employ the help of the assembly liaison for one last favor and tip the cabinet on its back upon the closest

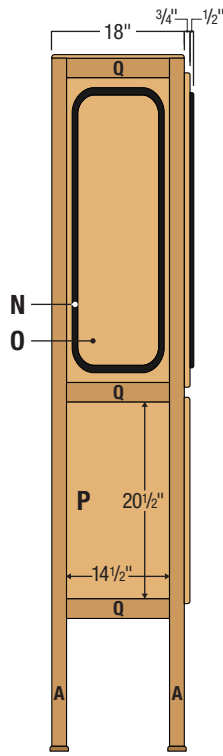
27 Begin assembly by starting with the cabinet sides. I attach the stiles to one rail, then slide in the panels.

28-29 Then, I start at the top and connect the other rail, keeping things flush and square as I got. Sometimes pocket holes have a tendency to misalign as you're drilling, so a clamp helps keep the surfaces flush.

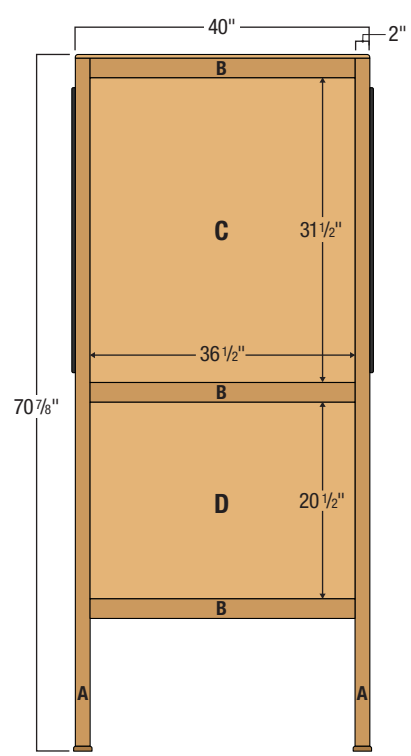
Vintage Pharmacy Cabinet



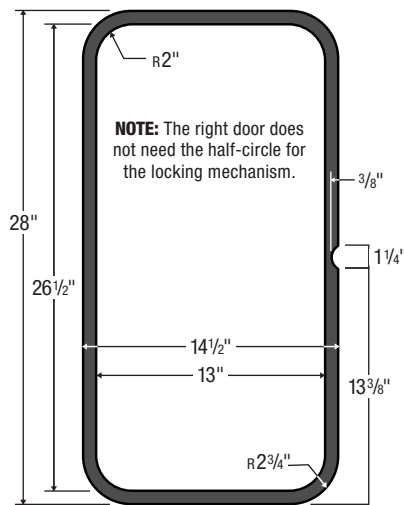
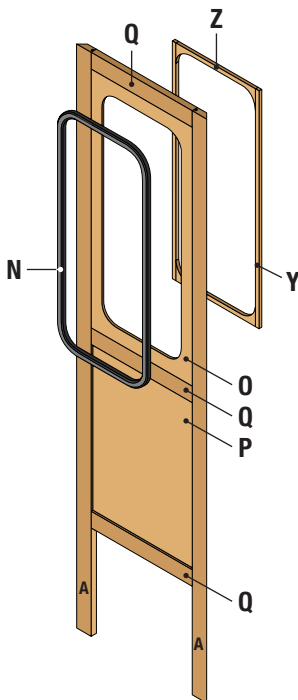
FRONT ELEVATION



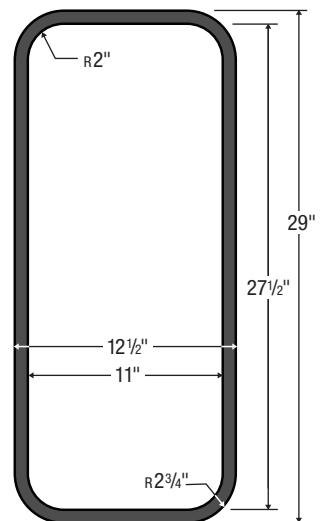
SIDE ELEVATION



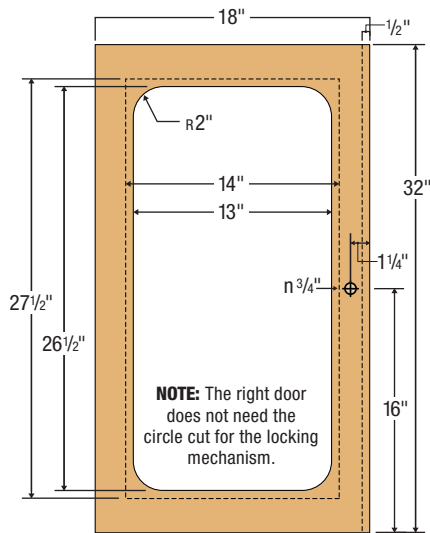
BACK ELEVATION



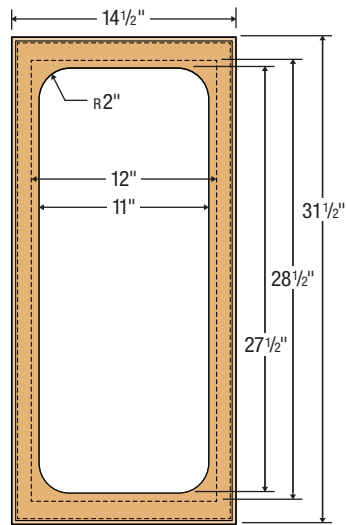
FAUX GASKET
(Doors)



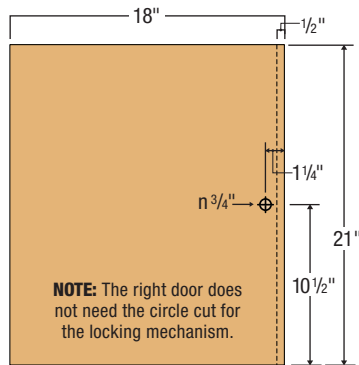
FAUX GASKET
(Side Panels)



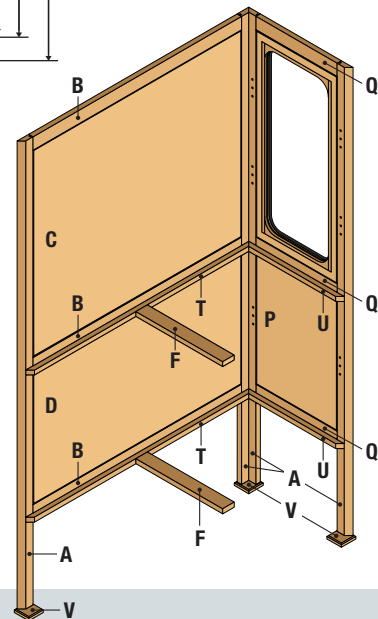
TOP DOOR



TOP SIDE PANEL



BOTTOM DOOR



Cut List

No.	Item	Dimensions (inches)		
		T	W	L
8	A Legs	3/4	2	70
3	B Back stretchers	3/4	2	36
1	C Back top panel	1/2	35 1/2	36 1/2
1	D Back bottom panel	1/2	20 1/2	36 1/2
3	E Front horizontal stretchers	3/4	2	36
2	F Center stretchers	3/4	2	15
1	G Front vertical stretcher (<i>long</i>)	3/4	2	31
1	H Front vertical stretcher (<i>short</i>)	3/4	2	20
1	I Lock strip (<i>long</i>)	1/4	2	32
1	J Lock strip (<i>short</i>)	1/4	2	21
2	K Top doors	3/4	18	32
2	L Bottom doors	3/4	18	21
2	M Faux gaskets (<i>doors</i>)	1/2	14 1/2	28
2	N Faux gaskets (<i>side panels</i>)	1/2	12 1/2	29

No.	Item	Dimensions (inches)		
		T	W	L
2	O Side panels (<i>top</i>)	3/4	14 1/2	31 1/2
2	P Side panels (<i>bottom</i>)	1/2	14 1/2	20 1/2
3	Q Side panel stretchers	3/4	2	14
1	R Case top	3/4	18	40
2	S Case bottom/middle divider	3/4	16 1/2	38 1/2
4	T Shelf cleats (<i>long</i>)	3/4	3/4	38 1/2
4	U Shelf cleats (<i>short</i>)	3/4	3/4	16 1/2
4	V Case feet	1/2	2 1/2	2 1/2
4	W Glass retainer stiles (<i>doors</i>)	3/8	1/2	27 1/2
4	X Glass retainer rails (<i>doors</i>)	3/8	2 1/2	13
4	Y Glass retainer stiles (<i>side panels</i>)	3/8	1/2	28 1/2
4	Z Glass retainer rails (<i>side panels</i>)	3/8	2 1/2	11
1	AA Bottom shelf	3/4	16 1/4	38 1/4
1	BB Bottom shelf trims	1/2	1 1/8	38 1/4



30

30 Flip the side over and you will see the seamless look—no exposed joinery.

31 The faux gasket just attaches to the outside of the opening. It will be affixed with glue after painting. Make sure to mask off the mating surfaces so the glue will adhere correctly.



31

available work surface. Constructed from $\frac{1}{2}$ " plywood, cut four square pieces to $2\frac{1}{2}$ " x $2\frac{1}{2}$ ". Predrill two countersunk holes on each foot and proceed to attach one to the bottom of each leg using #8 screws.

Lock & Hinge Installation

With the cabinet construction complete, it's time to start fitting the hardware. Even though the doors are an overlay, face frame self-closing hinges were used. With plywood not always being the nominal thickness (usually about $\frac{1}{32}$ " thinner) choosing face frame

Supplies List

No.	Item
2	1 1/8" Cabinet and drawer utility cam locks (chrome)
2	4 7/8" light duty door pulls (black)
8	Surface mount self-closing overlay hinges (black)
48	1/4" Shelf pin sleeves (black)
48	1/4" Shelf pins (black)
2	Tempered glass shelves 1/4" T x 16"W x 38"D
2	Annealed glass for side panels 1/8" T x 11 7/8"W x 28 3/8"D
2	Annealed glass for doors 1/8" T x 13 7/8"W x 25 7/8"D

32-33 The lock hardware was tricky to fit within the confines of the skinny door rail and center rail of the cabinet, but a little careful cutting yielded a solution I could live with. It almost looks intentional.

hinges as opposed to half overlay hinges provided more flexibility with placement.

To create the recess for the hinges, construct a jig to be used in conjunction with a hinge mortising router bit. And although face frame hinges are not required to be mortised, this process was implemented to correspond with the locking mechanism that will be installed.

Now that the hinge locations are placed, our attention moves towards the locking mechanism. This system (functioning in two parts) uses a traditional cam lock in tandem with a corresponding rabbet joint. The first step is to locate the center on each door and drill a 3/4" hole to accommodate the barrel of the cam lock. Second, take the four doors and cut a 1/2" wide by 1/4" deep rabbet on the sides that face one another. Cut two strips of 1/4" plywood to the lengths of each door by 2" wide. These two strips will now be glued into the rabbet that was created on each of the two right doors.



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Working Through Mistakes

There always seems to be at least one unaccounted for misstep (typically with hardware). In this case, the layout for the Cam Lock impeded with its ability to properly engage. A simple cure was to cut a concaved profile on both center stretchers where the cam engages on the backside. Since everything is held together with pocket screws, the two center stretchers were able to be removed and altered.

Metallic Finish

To achieve the desired finish, a couple preparatory measures were taken before paint was applied. Take this time to fill any small gaps or cracks using wood filler. Once this has cured (two to six hours) proceed to apply a coat of sanding sealer. Sand this coat smooth (with #220 grit) after it has fully dried. This sealer coat provides a smooth, non-porous substrate for the paint to be applied. Continue by painting the cabinet, glass retainers, as well as the faux gaskets. To further mimic the metallic appearance, a latex-based satin enamel was applied.



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Attaching Hardware, Glass and Gaskets

Now that the paint is fully cured, begin by applying the faux gaskets to the four panels. This was done using PVA glue with a series of spring clamps. On the inside of the panels, place the 1/8" glass (remember to undersize glass dimensions by 1/8" on each side) and pin nail the retainers in place. Since the shelves have the potential of holding objects of mass, opt for 1/4" Tempered glass. Finish by installing the shelf pin sleeves, shelf pins, locks, handles, as well as door hinges.

With your new cabinet complete, ready to be admired, the only thing left to do is to establish its rightful place and purpose within your home. Whatever you choose to put inside it, remember that your "ah-ha" moment, when it arrives, may not come easy—but that the lessons it contains will serve you for a lifetime. **PW**

Dillon Baker is Popular Woodworking's projects editor and a furniture designer-builder in Iowa.



PHOTOS BY THE AUTHOR

■ Mobile Assembly Table

Storage and utility in just the right size.

By Willie Sandry





PROJECT #2017

Skill Level:
Intermediate
Time: 2 days
Cost: \$350



It's often said that a shop layout is never truly complete.

While that may be true, I have discovered a valuable asset in my shop that can move and adapt to changing layouts. I've been testing a mobile shop cart over the last several years to make sure it holds up to the rigors of woodworking. The key is middle dividers that act like the webbing of an "I-Beam." With this tested construction technique, the entire cart forms a rigid base to support the top. The work surface is a double-layer of thick MDF, forming a flat top that can handle daily use and abuse in a shop environment. Special features include pass-through doors, slide-proof adjustable shelves, and a built in clamp rack for even greater utility.

Construct the Base

Cut plywood parts to size, and complete the basic joinery shown in the detail rendering. Start with the bottom panel, which has a dado to receive the middle divider. Cut 6" wide x $\frac{3}{4}$ " notches at the top corners of the middle divider. These notches will eventually receive long cleat strips, which function to lock the dividers square. Install the end panels, which are rabbeted to fit over the bottom panel.

As you install the first end panel, you'll capture the "clamp rack wall" in vertical grooves. Add a bead of glue to the bottom of the clamp rack wall component and reinforce this butt joint with screws from the bottom. Now add the other end panel, and glue and nail it in place with 18-gauge brad nails. Finally, add the cleat strips to lock everything in place. The cleats are screwed into the middle divider from the top and attached to each end panel with pocket hole screws.

Wheels and Clamp Rack

Before the cart gets too heavy, turn it upside down and add 4" locking casters at each corner. Finish the carcass by adding maple edge band-

ing to any exposed edges. I used iron-on edgebanding and trimmed it flush once it cooled down. Take a moment to sand any sharp edges, and add the last fixed part to the base, a hardwood clamp rack. Use a $\frac{1}{2}$ " wide dado stack to cut evenly spaced notches in a $29\frac{3}{4}$ "-long x $5\frac{1}{2}$ "-wide board.

The clamp rack is installed in a $\frac{1}{4}$ " deep dado in the clamp wall panel. Three small brackets offer additional support to the clamp rack. I sized mine for small parallel clamps, however it could be adapted for various clamps in your shop. It's a handy spot to always have a clamp at the ready when assembling projects.

Making Drawers

I knew the drawers on this cart would carry a heavy load, and wanted them to last a lifetime, so I built them with solid hardwood lumber. The drawer boxes feature maple sides and walnut front and rear panels. The drawer bottoms are plywood panels. I used $\frac{1}{4}$ " aromatic cedar plywood for the small top drawer, and more substantial $\frac{1}{2}$ " maple plywood for the lower two drawers. The corners are joined with through dovetail joinery, and were cut with a variable spacing dovetail jig.

Once the drawer boxes are built, install the full-extension drawer slides in the cabinet. Hang the drawers and test them for proper operation. The finishing touch is the maple applied drawer fronts with curved cutouts. Mark the semicircular shapes for the drawer pulls, and joinery-exposing curves on each side. Rough cut the shapes at the bandsaw, and finish the job with a router and template setup. I made a two-sided template from a scrap of $\frac{1}{4}$ " MDF to handle both shapes. Attach the template to the drawer with double-sided carpet tape, and chuck a bearing guided flush-trimming bit in your router. Once the final trimming is done, ease the edges with a $\frac{1}{8}$ " radius roundover bit.

Assembly Table

1 The end panels are rabbeted to fit over the bottom panel, and the middle divider sits in a shallow dado. The clamp rack wall is also housed in grooves on both sides. Glue the main case together, and add the cleat strips to lock it square.

2 Secure these long strips flush to the end panels with three pocket hole screws. Add glue to reinforce this butt joint.



3 The clamp rack wall is like webbing of an I-beam. The clamp rack wall is key to the carts design, and functions to prevent both racking and sagging. Reinforce the connection to the cleat strip with glue and 1 1/2" long #8 screws.

4 Cover any exposed edges with maple edgebanding. I use the iron-on variety, and align one edge to the plywood veneer as I go. The opposite edge overhangs the plywood, and will be trimmed off later.





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5 Plane a board to fit the dado, and cut a series of notches with a $\frac{1}{2}$ " wide dado stack. Crosscut the clamp rack to fit, and glue it in the shallow dado.

6 Attach three small triangular supports with glue and fasteners. Now your clamp rack is complete and ready for years of service.

7 A variable spaced dovetail jig and router make quick work of the standard through dovetail corners. A dovetail bit handles the tails, while a straight bit cuts the pins.

8-9 One template handles both drawer front cutout shapes. Adhere the template to your workpiece with double-sided carpet tape, and clamp them to a workbench, before trimming to final shape.



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Pass-Through Doors

One limitation with typical shop cabinets is lack of space for long and bulky items. I wanted space to store my dovetail jigs and dowel stock, so I designed the cart with a pass-through cavity. It features long shelves that are accessible by a door on either side of the assembly table.

Build the doors with simple mortise and tenon construction, but make the tenons extra long for improved strength. The door is a solid maple panel, rabbeted to a 1/4" tongue. If you're running low on hardwoods, 1/2" maple plywood is a reasonable substitute. Attach each door to the cart with a pair of overlay cup hinges. Cut two long shelves to fit, and install them on six shelf pins each.



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10 With a sanding block or shoulder plane, shave the door rail tenons until they nestle into their mortises. Take light cuts and check the fit frequently for best results.

11-12 The 1" long x 1/4" deep tenons are haunched to fit the door stiles. The extra tenon length adds strength to the joint.

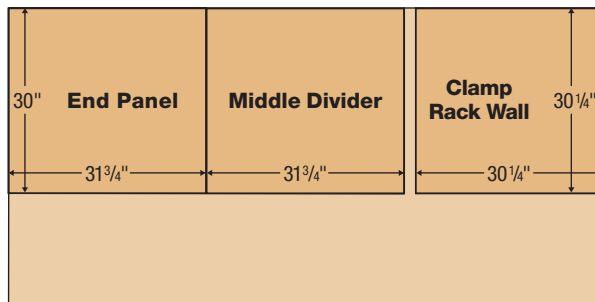
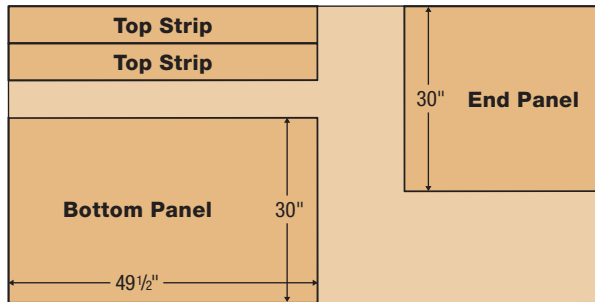
Cut List

No.	Item	Dimensions (inches)		
		T	W	L
1	A Worktop	1	36 1/2	56 1/2
2	B Worktop edge boards: <i>long</i>	3/4	2	58
2	C Worktop edge boards: <i>short</i>	3/4	2	38
1	D Bottom panel	3/4	30	49 1/2
2	E End panels	3/4	30	31 3/4
1	F Middle divider	3/4	30	31 1/4
2	G Top strips	3/4	6	48 1/2
1	H Clamp rack wall	3/4	30 1/4	30 1/4
1	I Clamp rack component	3/4	5 1/2	29 3/4
3	J Clamp rack brackets	3/4	3	3
2	K Door panels	1/2	16 1/4	28 3/8
4	L Door stiles	3/4	1 3/4	31 3/8
2	M Upper door rails	3/4	1 3/4	17 1/4
2	N Lower door rails	3/4	2 1/4	17 1/4

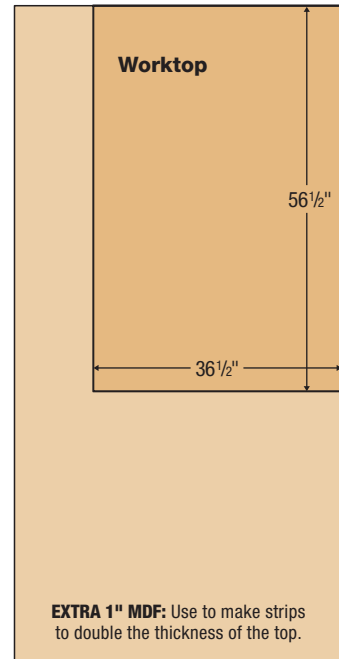
No.	Item	Dimensions (inches)		
		T	W	L
2	O Pass-through shelves	3/4	18	30
1	P Top drawer front	3/4	6 7/16	30 5/8
2	Q Top drawer boxes: <i>front/rear</i>	3/4	5	28 3/4
2	R Top drawer boxes: <i>left/right</i>	3/4	5	23 1/2
1	S Top drawer bottom	1/4	22 3/4	28
1	T Middle drawer front	3/4	12	30 5/8
1	U Bottom drawer front	3/4	13	30 5/8
4	V Lower drawer boxes: <i>front/rear</i>	3/4	11	28 3/4
4	W Lower drawer boxes: <i>left/right</i>	3/4	11	23 1/2
2	X Lower drawer bottoms	1/2	22 3/4	28

This project requires two 4x8 sheets of 3/4" maple plywood, one sheet of 1" thick MDF (worktop piece), a piece of laminate for the top, plus smaller amounts of 1/4" thick and 1/2" thick miscellaneous plywood for the drawers and doors. It's a great excuse to use all your scraps.

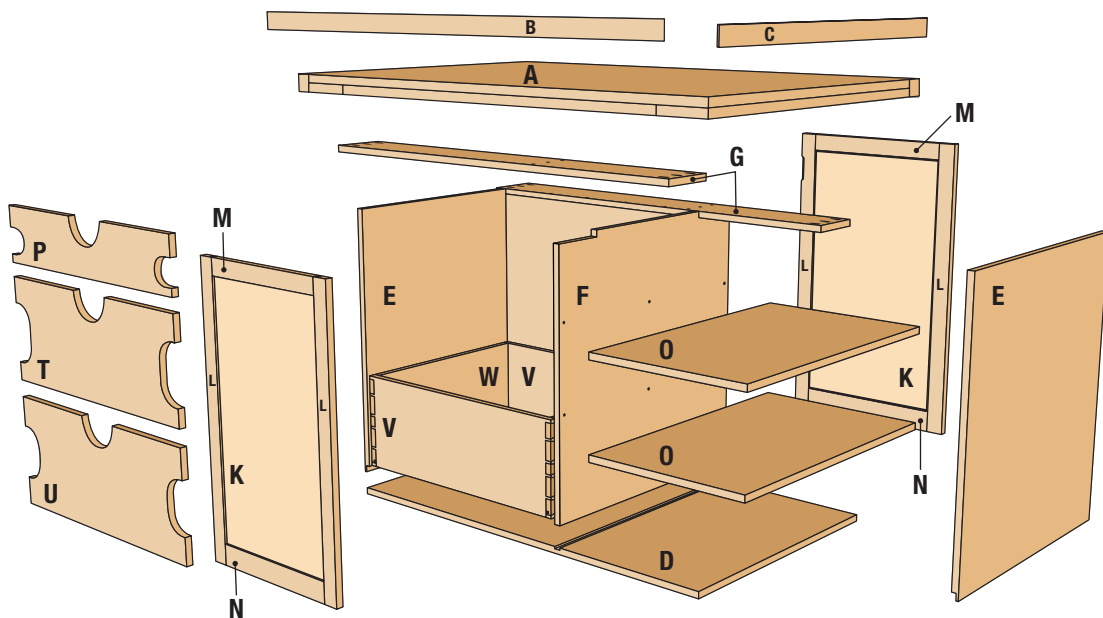
Mobile Assembly Table



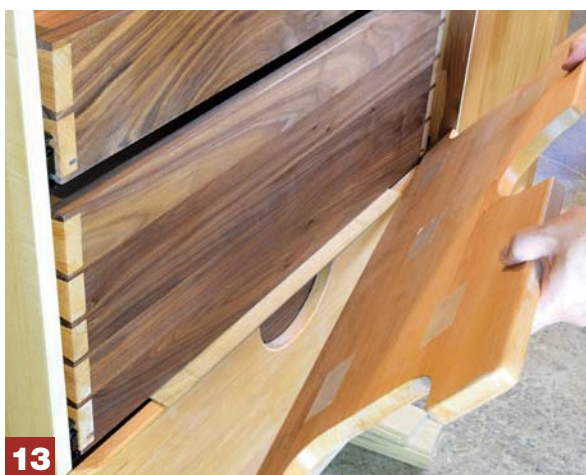
PLYWOOD CUTTING LAYOUT



MDF CUTTING LAYOUT



EXPLODED VIEW



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13 Use a spacer stick to set the $\frac{1}{16}$ " gap between drawers, and attach the drawer fronts with carpet tape. Permanently secure the drawer front with five screws driven from inside the drawer box.

14 No metal knobs here, which could interfere with clamps when the cart is in use. Instead, a cove cut that aligns with the top drawer cutout making a convenient finger pull to open the door.



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15 Attach a durable laminate surface to the thick MDF top with contact cement. Once the contact cement tacks over, press the laminate firmly in place with a J-roller or workpiece support roller.

16 Install a laminate trimming bit in a compact router, and trim the surface flush.

17-18 Install 6 shelf pins per shelf, and trace the location of each one. Then cut shallow recesses with a router, before dropping the shelf in place.



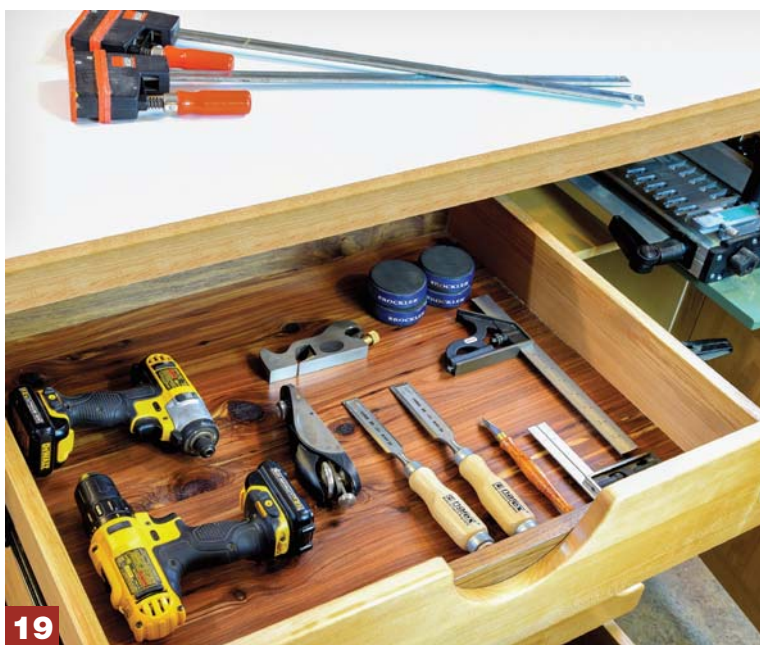
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Materials List

- **Maple edgeband:** 7/8" W x approx. 50' L
- **Pocket hole screws:** #8 x 1 1/4" and 1 1/2" L
- 3 pairs of full extension **drawer slides**
- 2 pairs of 35mm **cup hinges**
- **Plastic laminate** (white): 37" W x 57" L
- **Maple trim** for worktop: 3/4" T x 2" W x 16'
- **Misc. 3/4" MDF** for template
- Four **Total locking swivel casters:** 4" wheel diameter, 5" overall height

19 Load the drawers with your most frequently used tools, and they'll be within reach on your next project.

20 Even bulky routers stored upright will disappear into the oversized drawers. Just like the cabinet doors, skip metal drawer pulls for unfettered access when clamping workpieces to your table.



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Extra Thick Top

The top work surface is built-up from two layers of 1" thick MDF. Cut a piece of thick MDF 56 1/2" x 36 1/2", and use the rest of the sheet to make 8" and 12" wide strips. Attach the strips around the perimeter of the worktop, as well as over the carcass dividers. This stiffens the counter-top, as well as achieves adequate bearing on the cabinet framework. Instead of trying to align the edges perfectly, let the strips overhang the top panel slightly. Attach the strips with glue and screws, and flush trim the edges once the glue dries.

Now add plastic laminate, for a work surface that's durable and easy to clean. Apply contact cement to both surfaces with a low-nap paint roller and allow it to tack over until it feels dry to the touch. The paint rollers for smooth walls with a 1/8" or 1/4" nap seem to work best. Apply the laminate, allowing it to overhang the top in all directions.

With a trim router and laminate trimming bit, flush up the plastic laminate around the edges. Use a J-roller, or top half of a shop workpiece support roller, to press the laminate firmly to the substrate. The final step to complete the top is to add hardwood trim around the edges. I dressed the top out with 2" wide x 3/4" thick maple boards, mitered to fit. The maple edging is attached with biscuits and glue and clamped in place.

Applying finish is optional, but I like to add a few coats of something for a bit of protection—usually whatever I have on hand. This assembly table is finished with clear shellac, which I've used on a lot of my shop furniture. It's simple to apply and makes things easy to clean up. All that's left to do is load it up and start working. **PW**

Willie Sandry makes all kinds of furniture in Washington. He's a frequent contributor to Popular Woodworking.

An Unusual Retirement

In Conversation with
Plane Maker Karl Holtey

By Kieran Binnie



In 2015, acclaimed hand plane maker Karl Holtey announced his impending retirement and was working on the 984 panel plane: what he intended to be his final production run of hand planes and the last word in a career that resulted in a reputation for an unwavering focus on perfection and the development of several technical innovations that had an impact far outside the boutique world of high-end hand planes. Karl and I spent several days

that autumn in his workshop in rural Scotland talking about plane making and his journey to becoming widely recognized as one of the greatest plane makers in the world, an interview that can be found in the April 2016 issue of *Popular Woodworking*.

Now it is 2020, much of the world is several months into lockdown as a consequence of the Covid-19 pandemic, and Karl recently announced his latest design—the 985 smoothing plane. Wait a minute: surely he

retired in 2015? Apparently not, and in late December 2019, Karl quietly appeared on Instagram under the handle @karlholtey, offering an insight into his manufacturing process. Word soon slipped out that Karl Holtey was still making planes.

An Unusual Retirement

In the five years since we last spoke, Karl concluded his run of 984 panel planes, and then produced a second run of the 983 block plane. His moti-

PHOTOS 1, 9, 10, 12-17 COURTESY OF THE MAKER / ALL OTHERS BY THE AUTHOR

The 985 is one of my best. I like it very much. Karl Holtey

vation in revisiting the 983 was that he had sold the final plane from the initial run and did not have one for himself. Instead of making a one-off, he decided to do a full production run, a decision that he would not repeat. “I forgot how much work was involved in a production run,” he explains, “I prefer to do smaller batches now that I’ve retired.” Despite the birthing pains of that second batch of 983 planes, all but one plane has now sold.

In fact, Karl’s retirement has been marked with an enviable rate of productivity, and he shows no sign of slowing down. Instead, retirement seems to represent a change in how Karl approaches his plane making rather than in ceasing work. “It has allowed me to do things and explore designs that I didn’t have time for before,” he explains, with the focus on smaller batched work “taking some of the pressure off.”

This change in outlook has not dulled Karl’s creative drive or pursuit of the perfect hand plane. So, what keeps him in the workshop making planes during retirement? “Vanity. I’m a naturally competitive person, and I love being the best at what I do,” he says. “I can’t explain, it has always been there. If I have an idea about making something, I can be very driven to make it.” The interest in hand planes he attributes to his apprenticeship as a furniture maker when he became frustrated with the tools he was using. And at 71, he still finds himself thinking through new designs and approaches constantly: “I’m fabricating planes in my head constantly,” he tells me, “when I’m walking the dogs, driving, just living.”

Following that second batch of the 983 block plane, Karl made a run of six of the 984 smoothing plane, revising the design as he did so. Dubbed the 984s, this batch was initially to use up a collection

The 7⁷/₈" long smoothing plane features a 1¹⁵/₁₆" wide blade bedded at 54°, with no chip breaker or adjuster, and comes in either stainless steel sole with brass sides or stainless steel throughout.

of spare handles and components, but Karl could not help but revise the design to create a new twist on his celebrated bevel-up panel plane. Originally a 13⁵/₈" long plane, the 984s features a shorter 12¹/₂" long body and omits the striking chamfering of the original. Says Holtey, “I just love it like that. I don’t want to put the original No 984 down but leaving the chamfering off makes it look very much more serious and business-like. I am changing my ideas about some of the decorative side of the work.”

In terms of new designs, he has plans to make new types of planes but nothing that he is yet ready to share with the outside world. As a plane maker that started out building replicas of celebrated Norris infill planes, much of Karl’s career has been spent trying to mitigate the effects of wood movement within metal plane bodies, a design problem he is returning to with

his new planes. As he explains, “I am trying to think of new designs where I can incorporate more wood without compromising the stability. Wood sells all by itself and people don’t get excited by metal work or engineering. I have been experimenting on my Instagram postings to see where I get the most likes.”

985 Smoother

The 985 represents the first brand new design of Holtey’s retirement. When asked about the origin of the plane, Karl explains that it started as “a tiny little idea in the back of my mind. I borrowed the basic shape from a Spears plane. I drew it out several years ago and was blowing hot and cold about the design. I wanted the plane to be as short as possible—a smoother doesn’t need to be long. A lot of historic smoothers are 7¹/₂" long, but that was compromising too much on the handle and bun area. The whole design process was about seeing how small and short I could make the plane. I couldn’t have an adjuster and keep the length down, nor was there

1 Plastic prototype for the 985 smoothing plane.





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2 The 985 is an exercise in simplicity with no chipbreaker or adjuster. The tote is angled forward for increased comfort.

3 Depth of cut and blade orientation is adjusted by the setting post.

4 The rear tote is fixed in place through the underside of the sole.

5 The setting post allows the blade to be adjusted in any direction.

6 The disassembled 985.



6

enough room to fit a traditional sneck to the iron.”

Designing within those parameters led to one of the most striking features of the plane—a setting post set into the face of the blade. “I was getting the idea that some people expected a Holtey plane to have an adjuster,” he says, “so as an afterthought, I decided to put in a setting post on the blade to be tapped with a setting hammer. I am more excited by this plane than any others that I have made. For example, the No 983 was an innovation and the No 985 is just a simple plane I just love to bits.”

The setting post can almost be taken as a microcosm of Karl’s work—at first glance it is an incredibly simple feature, but behind that simplicity lies a great deal of work and problem solving. The fitting for the post is cut only once the blade is hardened to 62 Rockwell, which requires special tooling. To ensure that the post



7 The 985 echoes the art deco stylings of previous Holtey planes including the 984 smoother.

8 The 985 at work smoothing a piece of maple.



remains fixed, the mounting is countersunk and peened into the blade.

The plane also features some other subtle but significant design details. Firstly, the bed of the plane prevents blade from protruding more than 1mm, preventing the blade from dropping out of the plane. Secondly, the rear tote has a subtle forward tilt compared to many planes, which results in a more comfortable grip and less flex in the user's write. The rear tote is secured in place by a substantial steel spine which is 10mm at its thickest, meaning that the handle is, according to Holtey, "bomb proof."

Design Process

Karl's career has been marked by a strong aesthetic element to his designs, which is heavily influenced by art deco design, and by pioneering revolutionary designs which have filtered down to production planes. Notably, it was Karl's 985 smoother, which rescued bevel-up planes from a nearly forgotten evolutionary cul-de-sac and proved their functionality, resulting in the widespread use of bevel-up planes by many woodworkers.

So how does Karl approach designing a new plane? "I like simplicity," he says; "it has to be functional, and I want to create the effect of precision at a glance." Alongside functionality, "the look of a plane is incredibly important—it has to have a 'wow' factor." How Karl approaches the "wow factor" is the use of exotic timbers or striking synthetic polymers for totes and knobs. "When I go to design a new plane, I'm looking for ways to introduce more wood to it," he comments, as particularly on Instagram, "people respond to pictures of pretty wood, not to explanations of the technical processes and engineering that go into making a plane."

On the technical aspects of design, he is very matter of fact, explaining that plane design "is not really rocket science. I look at things in more detail than what has gone before," and taking a new approach to problem solving and design: "I think I like to go to places where people haven't quite been. I'm reinventing the wheel, but in a way that other people haven't done."

So once Karl has decided the type of plane, and what the "wow factor" will be, he then decides what type of adjuster he will use, before drawing on aspects of old planes that he likes. The design process usually involves many hours spent at the drawing board; he says that he

cannot afford to make iterations of prototypes and so he focuses on getting the design perfect on paper before moving to the workshop. What does perfect mean to Karl Holtey, a maker who is renowned for a relentless focus on technical perfection? "When I find it, I'll let you know," he chuckles, "I don't think it's achievable. All you can do is try to be more perfect than anyone else." In terms of his strong aesthetic style, Karl says, "Design is an interesting thing because everyone has different taste. And it's hard to find an equilibrium to please everyone. I love to look at interior design. All of my inspiration comes from the past. Talent has been around for a long, long time, and I am just a newcomer."

Advice for the Next Generation

Karl Holtey offers a unique vantage point from which to discuss professional plane making. When he first started making reproductions of Norris infill planes, the only other British plane maker was Bill Carter. Since then, he has seen (and in many ways inspired) the growth of the boutique plane market. So what advice does he have? "You don't have to be mad to do this, but it helps a little," he laughs. "It's not an easy life, but if you set your mind to where you want to go, there's probably no stopping you."



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9 Holtey milling synthetic polymer for plane totes. It's a messy part of his process.

10-11 Peining the dovetail joints locks the sides to the sole of the plane.

12-13 Cutting the integral rivets on his milling machine.



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14 Some components of the 985 smoother with plastic prototypes and milling tools.

15 Boxwood and rosewood totes and the substantial stems which fix them to the sole.

16 Final shaping the totes is done by hand.

17 Tapping the thread in boxwood for the front knob.

18 Rosewood knobs in their preliminary milled shape, and one in its final form.



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19-20 Devising work holding is where much of Karl's time is spent. This fixture holds a plane body for peening the dovetails.

21 A finished version of Holtey's Norris-style A28 Chariot plane.

Myth Busting

After a long career pushing the technical limits of plane making Karl unsurprisingly has some strong views on what he terms the “handed down wisdom” passed between woodworkers on the internet. When asked what popular plane-making myths he would like to dispel, he rattles off several examples without a moment's hesitation, all based on his years of plane making and deep understanding of the engineering involved:

Flattening Metal Bodies Planes Using Abrasive Paper on a Flat Surface

“Any form of work holding will introduce some pressure, which is very often unwanted and will cause the plane to distort. Moving the plane body over an abrasive sheet by hand introduces this sort of pressure, and you simply can't get a true surface through this method. The best finish you can hope to achieve is on a surface grinder, which will be perfect until you release the plane from the vise and then

it springs back out of true! I use a very fine roller to apply bluing ink to a reference surface. Moving the plane over the inked surface identifies the high spots and then I abrade those in isolation until the plane is flat.”

Chip Breakers

“I don't see the need for them. The angle of the blade will force the chip to bend, so a chip breaker is not necessary if the blade is presented properly. If you're producing a shaving of one thou thickness or a little more, the deflection angle is already very high.”

Tight Plane Mouths Prevent Tear Out

“Wafer thin plane mouths are not necessary to prevent tearout. The moment the shaving is parted from the wood is already deflected. If you can get the deflection as quickly as possible and get a high angle, then you won't get tear out. It is all about the presentation of the blade—getting the correct angle of the blade and correct depth of

cut. Cutting at higher angles will encourage the shaving to break. People get hung up on the idea of tight mouths, but that sort of arrangement would be time consuming to set up and would need constant maintenance—the plane would clog up and the sole would wear away around the mouth. So it would not be a practical set up. I can cut very difficult wood without tear out using a wide plane mouth. An aperture of $\frac{1}{8}$ " in front of the blade would not result in greater tear out but would be impractical for other reasons. A mouth width of twelve thou of an inch to 24 thou in front of the blade is respectable to my mind.”

Historic Infill Planes

“...are primitive. They can be beautiful objects to look at, but technically quite inferior compared to even a modern production plane. Wood movement can compromise the function of the plane, and old Norris planes were built to very poor standards.”



22



23

In terms of the right temperament for a plane maker, he says, “In my early days as a furniture making apprentice, I was more interested in learning and my work than I was in earning money. And that counts for a lot. You have to be that kind of person. You have to be dedicated.” As for appropriate skillset, Karl considers that to be a plane maker, “You need an engineering bias, a good knowledge of engineering and wood-working machines, and you need to be good with your hands. It is not all machine work.” But the “most important thing of all is you need lots of insanity. Then there is the cost of acquiring the equipment and reasonable working space. As well as all this, you need to be able and find the time for sales and marketing along with the personality to do this.”

Those not familiar with metal work might be surprised to find that actually working on a plane body is not where the majority of Karl’s time and effort is spent. “The main skill and most of the work involved is making fixtures to make

and hold the work,” he says. “Work-holding solutions, and problem solving, take a lot of my time.” And while he has incorporated CNC and other machine tools in his manufacturing process, Karl still considers his planes to be handmade. “People think that the CNC is the proverbial Heath Robinson gadget,” he tells me. “They think you press a button and a block plane drops out.” But that is far from reality. The benefit of incorporating CNC tooling, Karl has found, is repeatability—spare parts in his stock will fit any plane of the model he built it for. But despite the use of CNC, a great deal of his time is still spent doing handwork on the fine details of his planes, such as polishing the swooping body chamfers on the 984 panel plane (which he says can only be done by hand). Shaping plane totes is also largely done by hand, and the result is a supremely comfortable tote that supports the hand through extended use. “It’s all the little details,” he says. “It just goes on and on.”

22 Karl’s component store contains parts for many of his planes. The benefit of CNC machining he tells me is that parts are guaranteed to fit any plane of the correct model.

23 Karl with his T21 panel plane.

What’s Next

Despite retiring, Karl seems to show no sign of slowing down. “I want to be making planes for at least another 10 years and am looking at different approaches and designs.” At some point, he also hopes to find some time to build furniture. “I miss my days working with wood. I’d like to do some Chinese dynasty style furniture, and a Barnsley Hayrake table—that is a piece I’ve wanted to build for a long time.” One thing is for sure, however he spends his retirement: Karl Holtey is going to be busy. **PW**

See more at holteyplanes.com.

Kieran Binnie is a furniture maker and woodworking writer. You can read more from him at overthewireless.com.

Turn a Classic Wooden Bat

Learn how to beat the chatter.

By Alan Lacer



Almost every common wood has been used for bats at one time or another. However, a few species dominate the history of the sport. Traditionally northern ash has been the wood of choice, but currently—at least in the pros—it is a neck-and-neck race with hard maple. A few bats are still made of hickory and beech. For this project, I suggest buying a blank of ash or maple that has been graded for bats. The reason is not only superior performance, but also safety. A bat made from a graded bat blank is less likely to break in use.

Bat blanks are graded differently from regular furniture grade lumber. First, only straight-grained wood from slow-growing trees of moderate size make the grade. The blank must have tight, evenly spaced growth rings and be free of flaws like knots. The best blanks are often split from the log rather than sawn in order to follow the grain perfectly. Extra care is taken in the drying of bat blanks to create an even distribution of moisture throughout the entire thickness.

Tools and Supplies

To make a full-size baseball bat you will need a lathe that can handle lengths up to 36" between centers. For Little League bats, a lathe with shorter capacity will work just fine. It is best to have a live center at the tailstock end, and drive with either a spur or cup drive. If you are duplicating a bat, you will need to fabricate a simple V-block system to hold the master bat (the one being duplicated) directly behind your blank.

The bat can be turned with three tools: a spindle-roughing gouge (1 1/4" to 1 3/4"), a parting tool (1/4" wide) and a spindle/detail gouge (3/8" or 1/2"). If you are comfortable using a skew, a large one (1" to

1 1/2") can be added as an option for smoothing the shape and rounding the end of the barrel.

Complete your supplies with a pair of locking outside calipers. Make sure the caliper's points are fully rounded smooth. Sharp points can catch when used to size your bat. Round the points with a file and smooth with sandpaper. A pair of dividers is helpful—although optional—for sizing the knob's width. A plastic center finder is helpful in locating centers on round bat blanks.

Prepare the Blank

Determine the type of the bat you intend to turn: Major League, softball or Little League. This can be based on an old favorite you'd like to duplicate or from scratch using a drawing based on regulations dimension (see diagram). The blank should be 1 to 2

inches longer than the finished bat to allow for waste at both ends.

Mark the centers on the blank and mount it on the lathe. I place the barrel end of the bat at the tailstock. Then I true the cylinder to the axis of the lathe.

Shape the Barrel

Shape the widest part of the bat, called the barrel, first. You want to preserve the thick diameter on the blank as long as possible to avoid chatter from vibration. Start by making guide diameters on the first third of the blank with calipers and a parting tool. Set the calipers about 1/8" wider than the desired diameter to allow for final shaping and sanding. If you're duplicating

■ REGULATION BAT DIMENSIONS

MAJOR LEAGUE BAT



ADULT SOFTBALL BAT



LITTLE LEAGUE BAT



*1 1/16" minimum handle diameter for Little League bats 30" and longer, 1" minimum handle diameter for bats under 30".

These numbers are only guidelines. Because of the ever changing and sometimes localized nature of bat regulations, it's best to check with your local league officials for specific bat dimension limits.



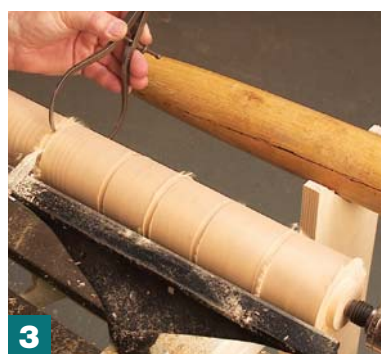
1

1 If you're starting with a purchased round blank, mark the center on both ends with a plastic center finder. On a square blank use a ruler across the diagonals to find the centers.



2

2 True the cylinder's entire length with a spindle-roughing gouge. This step is necessary because the blank may be warped or center marks are not perfect. Take light cuts. You do not want to remove too much stock.



3

3 Size the bat with calipers and a parting tool. Transfer diameters from a drawing or an existing bat (called a master) onto the blank. Lightly push the calipers into the work as you reduce the diameter with the parting tool until the calipers just slip over the cut.



4

4 Use a spindle-roughing gouge to "connect the dots". The goal is to join and blend the different guide diameters to create a smooth cylinder that tapers towards the handle.



5

5 Take light cuts and create level transitions as you approach the final shape of the barrel. Work from the large diameter to the small to minimize tearout.



6

6 Roll over the end of the barrel with a detail/spindle gouge. Shoot for a smooth, gradual curve like the master has. Leave about a 1/2" by 2" diameter waste area near your live center for now.



7

7 Spiraling or chatter is a big challenge for the bat maker. Spiraling results from the wood flexing, or the tool bouncing or a combination of both. As the bat gets thinner, the problem becomes more pronounced.

a bat, place the master directly behind the mounted blank.

Next is a process of connecting the guide diameters with the spindle-roughing gouge. Shoot for smooth transitions between the guide diameters. Go ahead and roll over the end of the barrel at this time.

Shape the Handle

Mark and shape the middle third of the bat in the same way you shaped the barrel. When you reach the last third of the bat, remove some of the waste material towards the knob end first to give you some working room. Spindle work is best done from larger to smaller diameters because it produces the least amount of tearout. As you reduce the diameter of the

bat, you will experience chatter. This usually shows up as spiral marks on the surface of the wood.

To reduce chatter, use a sharp tool and keep it firmly planted on the tool rest. Take light cuts. Avoid pushing hard or you're bound to get chatter from the flexing blank. Even with all these tactics, you will need added support as the handle narrows. The traditional method is to support the narrow area with your hand. Another option is to employ a steady rest. I use a steady rest when I get to about the middle of the blank.

Continue the process of cutting and connecting the guide diameters working from the large diameters on either end towards the narrowest point on the handle.

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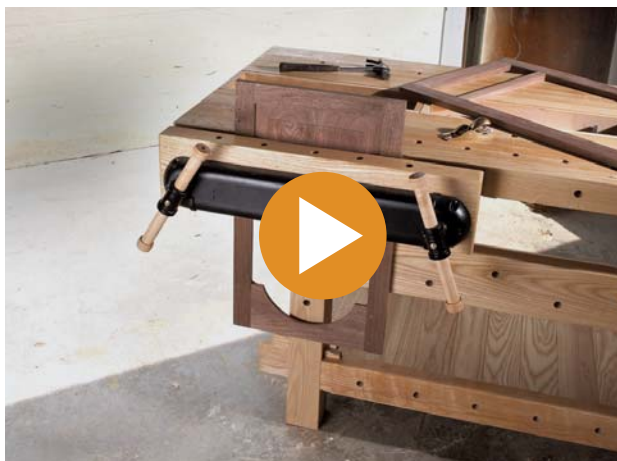
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8 Support the work with your hand to reduce spiraling. This is a safe and common practice. Make sure there is little gap between the tool rest and the wood. Keep your hand pressure on the back of the blank.

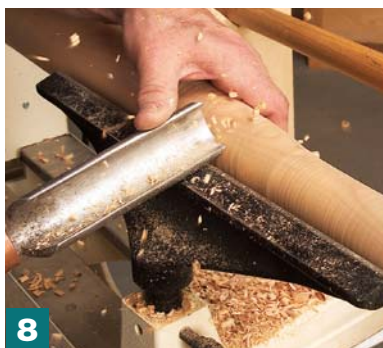
9 A steady rest is an alternative to the hand-support method. It virtually eliminates chatter and spiraling because the work is supported on three sides at once. A steady rest requires a smooth area for the wheels to run upon.

10 Work the area to the right of the knob. Cut from the large diameter towards the small diameter (also known as cutting downhill). This produces the smoothest cut with the least tearout.

11 Establish the width of the knob with a pair of dividers. Keep the wood on either side of the knob as fat as possible until the handle area is almost complete. This helps reduce spiraling from a flexing blank.

12 Roll the knob using the spindle/detail gouge. Start at the widest portion of the knob and ride the bevel of the gouge down to the handle or waste block. The open or U-shaped portion of the gouge faces the direction of the cut.

13 Sand your bat with the tool rest, steady rest, and master bat removed. Start with 100 grit followed by 120, 150 and 180 grit paper.



Shape the Knob

As you approach the end of the bat, go ahead and lay out the knob area. Establish the knob's width and diameter. Then reduce the diameter on the knob's right side, blending into the handle. Leave a 1/2" to 1" length of waste material past the end of the knob. After the handle area is completed, finish off the knob by rolling away the corners with the spindle/detail gouge.

Finishing Touches

Sand the entire piece, working through the different grits up to 180. Turn the waste material on both ends down to slightly larger than

your lathe centers. Remove the bat, cut the waste off with a handsaw (such as a small Japanese saw), and finish sanding the ends of your bat by hand or a disc on the lathe.

Most bats have brands to indicate how the bat should be held. Always swing the bat with the label up to reduce the chances of breakage. The goal is to hit the ball on the radial grain, or what some woodworkers call the edge grain—rather than the tangential or face grain. So, put your brand on the grain that looks like chevrons rather than the edges of plywood. Use a woodburning tool to put whatever name or symbol you wish to use as your brand.

I recommend finishing your bat. A finish gives the bat a nicer look as it brings out the grain. Plus, it offers some protection from moisture. All types of finishes have been used for bats, including shellac, lacquer, varnish (water-based or oilbased). For this bat I am using a wipe-on poly; three coats is sufficient. Some players prefer the handle area to be free of finish—for better gripping and applying pine tar. Now, it's time to hit the field! **PW**

Alan Lacer is a woodturner living and playing ball in western Wisconsin. See more articles, videos, tools and his teaching schedule at alanlacer.com.

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Woodworking Accountant

An interview with furniture maker Peter Griffin

By Collin Knoff



How did you get started woodworking?

Woodworking for me was born out of a desire to do something different. I am an accountant by profession. Although it is a profitable business, when you close a deal in accounting, there's nothing physical you can point to and say: Here is the result of our labor. Everything is digital. Just numbers on a computer screen. So when I wanted to expand my entrepreneurship, I looked for something that satisfied my desire to get out of an office and make something with my hands. That journey led me to woodworking.

Who were your mentors?

Had you asked me two and a half years ago what was a plane, I would have had no context outside of the ones that fly in the air. No one in

my immediate or extended family worked in the trades. My father was a preacher. My granddad worked for the power company. My brothers, uncles, and cousins all have professional degrees, save my youngest brother who is a chef. YouTube was my first and greatest mentor. From there I realized I needed more in-depth teaching so I searched out books. My first was *The Illustrated Professional Woodworker*. When I had specific questions I'd ask one of my tax clients, Randy LaValley. He started a full-time woodworking business two years before I did. He was great. Then I started reaching out to guys at the local Guild. But there's no one I'd really call a mentor. Just more of a community.

What kind of work do you do the most?

I was walking through a high-end furniture store and saw a live-edge dining table that cost about \$12,000. It caught my eye something significant. I didn't want to own it. I knew I could make it. That started my love affair with woodworking and ultimately tabletops. I love tables and I love cabinets. My best piece so

far is the living room set I finished last week. I do have two legendary table builds I'm working on now. They will be my greatest work. Every piece gets better.

What's your best hands-on tip or woodworking technique?

Just because an edge sander doesn't have a blade, don't underestimate its ability to ruin your day.

Who inspires you?

Right now, I'm really feeling Mark Jupiter out of Brooklyn. His eye for design, his flare for largish appeals to me. There's also a designer out of Santa Fe named Sequoia P. Madan. I've yet to see anyone pour pewter into a live edge table as successfully as he does. This guy is somewhat of a recluse, but his work can be seen on his showroom floor at sequoiasantafe.com. He peddles in rustic/exotic/ wood art and does so as well as anybody in the States.

.....
Learn more about Peter Griffin and his work on Instagram @pgriffinandcompany. Collin Knoff is Popular Woodworking's digital editor.



“Listen to your heart

when it comes to your identity as a woodworker...
But if you want to pursue woodworking as a profession,

listen to your voice

that causes you to gravitate towards a style,
a method, a niche. People pay for specialization...
Focus on the jobs that make you better at becoming
you and success will follow.” - Peter Griffin

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Dear Customer,

In this, the first letter I've written since early spring, it would be hard not to acknowledge the "elephant in the room" – the pandemic that has disrupted all our lives. Most of us have been staying close to home, focused on protecting our health and that of our communities.

For many of us, it has meant a lot more time in the shop or garden, or engaged in whatever pastimes keep us sane. Personally, it has meant that projects I have started have also been finished in a reasonable time – both indoors and out, undisturbed by travel or external commitments.

It has also meant that there has been time to winnow the duplicate or unused tools from the shop, as well as organize and assess what additions are really needed. That's why one of the first products I'll be buying from this book will be the metal waste can shown on page 3.

Much of my finishing is done using natural oil-based products. When done, I often store the rags in water or hang them to dry (usually on one of the handles of the drill press). But even when they are fully dried, there's always a nagging worry at throwing them in the trash bin. And a lot of projects mean a lot of worry.

This can is well made and well priced (go ahead and check!). There is little margin in the product for us, but it's something we feel strongly should be in every shop.

Then, too, there's always the chance a concern over spontaneous combustion might lead to a spontaneous order...

Cheers,

Robin C. Lee
President

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Quantities shown over our prices, e.g., 1+ and 10+, indicate a quantity discount – the price is reduced when 10 or more of the same item are purchased. The discount does not apply to mixed sizes and types that may total 10 or more.

Special Symbols



Product is made in USA.



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A. Metal Can for Flammable Waste USA

Even in the absence of sparks or open flame, rags or cloths soaked with flammable oils, finishes and stains can spontaneously combust if handled improperly, presenting a serious and sometimes unexpected fire hazard. Having this all-metal waste can in the workshop or on a job site helps prevent such risk. Operated hands-free with a sturdy foot pedal, its self-closing cover restricts oxygen needed for combustion yet permits limited air circulation through the base to disperse heat build-up. The 6 gallon (23 litre) container is 16" high by 12" in diameter, and has a durable powder-coat finish and a carrying handle. It is marked "empty every night" in compliance with safety regulations for certain work areas. Check your local hazardous-waste collection site for information on rag disposal. CSA listed. Made in USA.

22R74.01 Metal Waste Can

\$89.00



B. Lee Valley

Panel Gauge Canada

When you need to scribe a parallel line for squaring up wide panels, a standard marking gauge won't do. Large workpieces call for a panel gauge. Our gauge has a 25" long beam, capable of marking to the middle of 4x8 sheet goods. Its design was modelled on the Stanley No. 84 slitting gauge, which has a roller and tote on the blade end. We made ours out of beech for stiffness (which, in turn, improves accuracy), and replaced the tote with a horn for greater force and control of the cutting depth, especially when used at full extension. The horn can be flipped the other way to suit your handedness or your preferences when pulling or pushing the gauge. The hard-wearing Delrin roller ensures smooth travel over work surfaces without marring boards.

The 1" rabbeted step on the 9" wide by 2 3/4" tall fence provides good registration on the edge of a board. On the opposite end of the beam, there's a non-rotating wheel cutter with a single bevel that leaves a crisp, clean line that you will be thankful for when ripping your stock with a handsaw. Used with two hands, this panel gauge can make a deep cut, capable of going completely through thin materials, such as veneer, with only a few passes. It is an indispensable tool when dimensioning or jointing multiple large panels to a consistent width without the use of power tools.

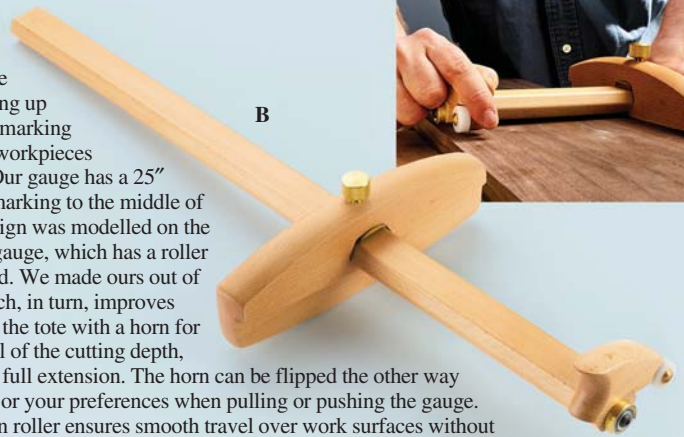
Beam, fence and horn are made of beech. The high-carbon steel wheel cutter is hardened to Rc50-52. Brass locking knob. Made in Canada.

15N06.01 Lee Valley Panel Gauge

15N06.02 Repl. Wheel Cutter

\$83.50

\$ 7.30



Veritas PM-V11 Carver's Drawknife Canada

An ordinary drawknife is too large for fine carving. Ours is designed for ease of use with maximum control. The walnut handles are shaped to nestle comfortably in your palms and are canted at 45° to the blade to provide an ideal grip angle. Made from PM-V11 steel hardened to Rc61-63 for superior edge retention, the 4"x3 1/4"x1/8" thick blade is honed to a 20° primary bevel. A blade guard is included. Available on its own or with a leather case that is also sold separately. Made in Canada.

C. 17U06.50 Carver's Drawknife

\$79.00

D. 17U06.18 4" Leather Case

\$13.50

17U06.51 Carver's Drawknife & Case

\$89.00



E. Halder Simplex Replaceable-Face Mallet

Sometimes, a bigger hammer IS the best solution to a problem. This one has two faces of different hardnesses – a white face of ultra-dense polymer ("superplastic") with high-impact resistance best suited for use on harder materials, and a blue face of softer, non-marring TPE plastic that's more forgiving on softwoods and materials that call for a gentler touch. The soft face compresses slightly on impact, remaining in contact for a fraction of a second, delivering a smoother transmission of force at the expense of a slightly "bouncy" feel. Each 30mm diameter face is highly durable, but spare replacement faces are offered should you damage or wear one out. The faces mount on a cast-iron head attached to a lacquered acacia handle. The mallet measures 11 1/2" and weighs just under 3/4 lb. Made in Germany.

69K50.30 Halder Simplex Mallet

\$32.50

69K50.31 Repl. TPE Face Insert

\$ 7.95

69K50.32 Repl. Superplastic Face Insert

\$ 8.95





Razertip Wood Burning Systems

Well made and built to last, the two models are the same quality and have the same features except for the number of handpiece plug-ins. Model SK accepts one handpiece; Model SS-D10 accepts two handpieces, for quick switching between the two (extra cord needed).

Both models feature a solid-state power supply (10 amp, 45 watts) with variable heat control (340°F to 1400°F), a vented, fixed-tip handpiece and a 39" cord. The handpiece is light, control-

lable and has excellent recovery. It has a large tip (#1L), which is standard for most wood burning. Heating time of the tip is only about 8 seconds. A selection of other handpieces is offered on our website.

Three-year warranty on the power supply. The CSA certification is recognized across North America.

A. 38N20.03	Razertip Model SK	\$135.00
B. 38N20.01	Razertip Model SS-D10	\$169.00
38N20.02	Extra Cord, 39"	\$ 14.90

Basswood Blanks

A light-colored, medium-density wood often favored for carving and pyrography, basswood is easy to work, with a fine, even texture that takes detail well. These pieces are select-grade North American basswood, kiln dried, then milled to nominal dimensions and sanded to a smooth finish.

Small Basswood Blank Sets

Supplied ready to use, with surfaces that are square to each other, these blanks come packaged in sets of sizes suitable for smaller carvings. The three-piece set includes 1 3/4"×1 3/4" blanks of various lengths. The 10-piece set includes two 3/4"×1"×2", two 3/4"×1"×4", three 3/4"×1 1/2"×2", and three 3/4"×1 1/2"×4" blanks. (All dimensions are approximate.)

C. 38N12.20	3-pc. Basswood Blank Set	\$5.95
D. 38N12.21	10-pc. Basswood Blank Set	\$5.95

Basswood Plaques

These plaques require minimal prep work for typical applications. The oval and rectangular plaques come as live-edge pieces (which include the natural bark) cut from a single block of wood, or as laminated panels with profiled edges. Sizes listed are width by height (of course, there is more size variation with the live-edge plaques, so measurements for those are approximate). Thicknesses are a nominal 11/16" except where indicated in brackets. The 2 1/4"×3 1/2" live-edge plaque has a through-hole and a string for hanging.

E. Live-Edge Plaques

	1+	3+
38N12.50	7"×11" Rect., ea.	\$ 9.95 \$ 8.95
38N12.51	10"×13" Rect., ea.	\$11.95 \$10.80
38N12.52	11"×16" Rect., ea.	\$13.95 \$12.60
38N12.60	2 1/4"×3 1/2" (1/2") Oval, ea.	\$ 3.95 \$ 3.55
38N12.62	8"×10" Oval, ea.	\$ 8.95 \$ 8.05
38N12.63	10"×13" Oval, ea.	\$10.95 \$ 9.85

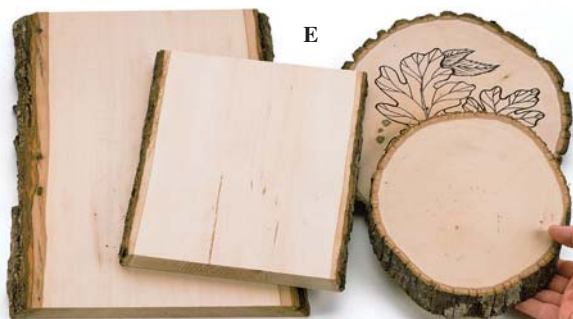
F. Profiled-Edge Plaques

	1+	3+
38N12.31	8"×10" Rect., ea.	\$ 8.95 \$ 8.05
38N12.32	9"×12" Rect., ea.	\$ 9.95 \$ 8.95
38N12.40	5"×7" (3/8") Oval, ea.	\$ 3.95 \$ 3.55
38N12.42	8"×10" Oval, ea.	\$ 8.95 \$ 8.05
38N12.43	11"×14" Oval, ea.	\$11.95 \$10.80



C

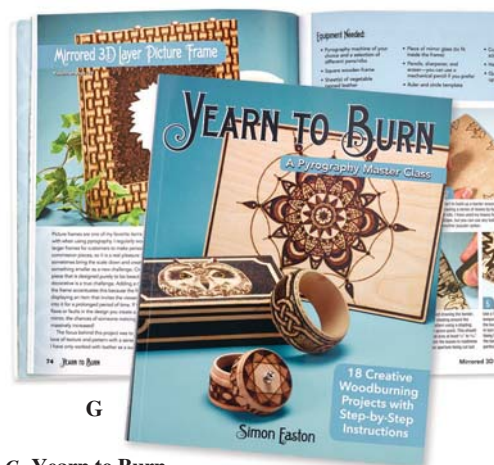
D



E



F



G

G. Yearn to Burn

by Simon Easton

Building on the lessons of *Learn to Burn*, this book teaches the next level of pyrography skills while still welcoming those who are new to the craft. The first chapter walks you through the basics, providing a clear summary of the tools, general techniques and terminology used; more advanced techniques and detailed explanations are provided as needed for the individual projects. The 18 projects progress in skill level, ranging from applying a texture pattern to a key fob to burning a leather border of elaborately layered leaves for a mirror frame. All the patterns needed to reproduce the projects are included. More than just a collection of projects, this book shows how to take simple repeated elements and combine them into complex patterns, guiding even woodworkers of limited artistic ability to create beautiful designs. Softcover, 8"×10", 168 pages, 2019.

49L51.34 Yearn to Burn \$16.95



A. 50-Piece Magnet Sampler

If you have never used rare-earth magnets before, you cannot appreciate their strength. Great for many different applications, from holding keys or wrenches on machines to making fridge magnets. We've assembled a sampler of 26 rod magnets and 24 circular magnets to let you try a variety of sizes. The magnets are nickel plated with slightly rounded edges, with lift strengths from 2 1/2 lb to about 9 lb (on our circular magnets). They can be glued in place with almost any glue, epoxy being the most secure.

Sampler includes:

- 15 of 1/8" dia. x 1/8" thick rod magnet
- 8 of 1/4" dia. x 1/4" thick rod magnet
- 2 of 1/4" dia. x 1/2" thick rod magnet
- 1 of 1/4" dia. x 1" thick rod magnet
- 8 of 1/4" dia. x 1/10" thick circular magnet
- 8 of 3/8" dia. x 1/10" thick circular magnet
- 8 of 1/2" dia. x 1/8" thick circular magnet

The sampler is priced at about 35% off the price of the individual magnets.

50-Piece Magnet Sampler
99K33.50

\$26.00



WARNING

Keep all magnets out of reach of children. Swallowing magnets can be dangerous for a child of any age, especially those under the age of 3. Seek immediate medical attention if a magnet is swallowed or inhaled. Not to be used on toys.

Rare-Earth Magnets

Until you have actually used rare-earth magnets, you cannot appreciate their strength. For example, the 1/4" dia. by 1/10" thick magnet will lift a 2 1/2 lb block of steel. It all has to do with the electron array in the neodymium, the rare earth they are made from. There are hundreds of uses for these magnets – from holding keys or wrenches on machines to making fridge magnets. Nickel plated with slightly rounded edges, they can be glued in place with almost any glue (epoxy is the most secure).

The 3/4" and 1" dia. magnets are so powerful that only people with very strong hands can separate them without using an aid of some kind. This presents a handling problem for us, so we sell them only in bundles of five, with instructions for simple separation methods. The odd one may have a minor chip in it since collisions can happen easily at these power levels.

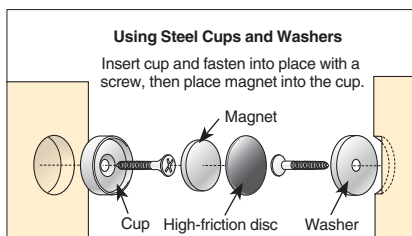
	O.D. x Thickness	1+	25+	100+	250+
B. 99K31.01	1/4" x 1/10" ea.	\$.50	\$.37	\$.32	\$.30
C. 99K32.03	3/8" x 1/10" ea.	\$.75	\$.56	\$.48	\$.45
D. 99K31.03	1/2" x 1/8" ea.	\$1.35	\$1.01	\$.87	\$.81
E. 99K32.11	3/4" x 1/8", pkg. of 5			1+ \$10.80	5+ \$8.60
F. 99K32.13	1" x 1/8", pkg. of 5			\$16.00	\$12.80



Rare-Earth Magnet, Cup & Washer Sets

We offer matching sets (magnets, cups and washers) at a 25% discount off the individual prices. An excellent way to make closures in cabinet doors or box lids. The three smaller sets include four magnets each, 1/4", 3/8" or 1/2" in diameter, and four matching cups and washers. The three larger sizes come in sets of two magnets, 5/8", 3/4" or 1" in diameter, with two matching cups and washers.

G. 99K33.10	1/4" Magnet Set, 12 pcs.	④ \$ 5.10
H. 99K33.15	3/8" Magnet Set, 12 pcs.	④ \$ 5.80
J. 99K33.20	1/2" Magnet Set, 12 pcs.	④ \$ 9.95
99K33.53	5/8" Magnet Set, 6 pcs.	④ \$ 8.20
K. 99K33.25	3/4" Magnet Set, 6 pcs.	⑩ \$ 8.10
L. 99K33.30	1" Magnet Set, 6 pcs.	⑩ \$10.80



M. Standoff Magnetic Tool Holder

This magnet keeps a chuck key or wrench right where it is needed. Its zinc-plated 5/8" tall steel body gives enough clearance to grip the tool easily for removal. A 3/8" rare-earth magnet in one end holds the tool (up to 1 lb) firmly, but the stronger 1/2" magnet at the other end keeps the tool holder stuck to the machine body, not to the tool.

50K18.01 Magnetic Tool Holder, ea. **\$5.60**

N. Magnet-Based Pen & Pencil Holders

Although these coil-spring holders with rare-earth magnet bases are wonderful fridge magnets for holding a pen or pencil plus a grocery list, they are equally useful in the shop for similar purposes, and to hold small LED flashlights, Sharpies, screwdrivers, chuck keys, etc. Sold in sets of three in a snap-lid style tin – press the center to open, press the edge to close.

88K78.97 Magnet-Based Holders (3) **\$12.90**



Shown actual size.



Veritas Journeyman's Brass Mallets

With a solid brass head, a walnut handle and a simple, refined profile, this is an elegant and effective mallet. Designed for work that requires more finesse than power, it can be held by the handle or used with the head cradled in your palm, allowing you to more precisely control the force of blows. The head is attached to the handle with a blind threaded connection rather than a through-hole, which leaves it with a flat top you can use as a striking surface with the same feel and force as the sides. The small mallet, with a 12 oz, 1 1/4" diameter head, allows a more delicate touch for fine details. The large mallet, with an 18 oz, 1 5/8" diameter head, is ideal for sculpting and carving. Each is just under 6" long overall. Made in Canada.



- A. **05K15.01** Small Mallet \$29.50
 B. **05K15.03** Large Mallet \$34.50
05K15.05 Set of 2 Mallets \$58.00

D. Japanese Spear-Point Marking Knife

This is an exceptional marking tool. Known as *kensaki shirabiki*, meaning "sword-tip marking knife," it is used for incising layout lines, producing a much finer line than a pencil. It differs from a Western marking knife in that it has no handle, so it can be registered flat against a workpiece for reaching into tight spots. It can also work much like a skew chisel for tasks such as cleaning the bottom of a dovetail socket. The spear-point design permits left- or right-hand use for marking out joinery, letting you score either side of a reference surface when scribing one workpiece to another. The 15mm wide blade has a white steel #2 core hardened to Rc62-63 for good edge retention, and is laminated to a layer of softer carbon steel. This construction, combined with a hollow-ground back and wide bevel, makes it relatively easy to sharpen. Measures nearly 7" long overall and has a blackened finish. Made in Japan. A simple, effective workshop staple.



60N07.04 Spear-Point Marking Knife \$21.00

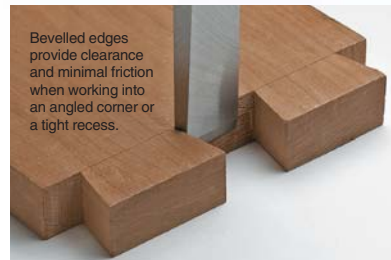


Veritas PM-V11 Bench Chisels

Precision made in our own machine shop, these chisels are milled from PM-V11 steel (Rc61-63). This metal can withstand heavy chopping cuts without chipping or deforming as readily as other tool steels, even at bevel angles as low as 20°. The edge typically lasts at least twice as long in use as an A2 blade, yet it's easy to sharpen. The blades taper from shoulder to tip for strength and rigidity, and have parallel sides and true bevel edges for clearance and minimal friction when working into an angled corner or a tight recess. To ensure that the face of each blade is both smooth and true, the chisels are lapped flat. The blade and handle are connected with a tang and a socket-like stainless-steel ferrule that seats directly onto the shoulder of the blade. The hard maple handle has been torrefied to stabilize it against swelling and shrinkage. Contoured to fit the hand nicely, it has a domed end that resists chipping from glancing mallet blows. Blades range from 3 3/8" to 5 1/8" long. The 3/8" and smaller chisels have 30° primary bevels; the others are 25°. All have 2° micro-bevels and require only final honing before use. Offered individually or as a set of five (1/4", 3/8", 1/2", 3/4" and 1") or a set of seven (all sizes).

- 05S21.02** PM-V11 Bench Chisel, 1/8" \$ 82.00
05S21.03 PM-V11 Bench Chisel, 3/16" \$ 82.00
05S21.04 PM-V11 Bench Chisel, 1/4"* \$ 88.00
05S21.06 PM-V11 Bench Chisel, 3/8"* \$ 88.00
05S21.08 PM-V11 Bench Chisel, 1/2"* \$ 92.00
05S21.12 PM-V11 Bench Chisel, 3/4"* \$100.00
05S21.16 PM-V11 Bench Chisel, 1"* \$104.00
 C. **05S21.50** Set of 5 Chisels, PM-V11* \$429.00
05S21.70 Set of 7 Chisels, PM-V11 \$565.00

Bevelled edges provide clearance and minimal friction when working into an angled corner or a tight recess.

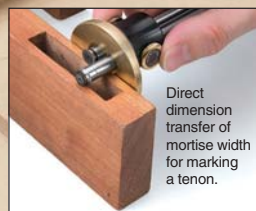


Veritas Dual Marking Gauge

With two independently adjustable rods, this gauge lets you set two measurements at once, so you can quickly alternate between them when transferring or marking repetitive dimensions. Projection up to 5 3/4" is easy to set, since an internal O-ring keeps light but constant friction on each rod. The hardened steel wheel cutters scribe perfectly at any point of their circumference. The opposing bevels ensure that you can always set the bevel in the waste side of a cut. One rod has its cutting edge at the extreme end of the rod, making it useful for transferring dimensions such as tenon shoulder and mortise depth. Each cutter can be retracted into the brass face. 7 1/4" overall. Patented.

The optional shaft clamp fits onto the gauge's guide rods to let you lock the relative position of the cutters while still being able to freely adjust the fence for offset. This allows you to preserve identical mortise or tenon sizing when joining parts of different thicknesses or when adding a reveal, since it prevents the cutter settings from shifting while the fence is being repositioned. Machined to precise tolerances to prevent binding on the rods, the 1/2" long collar is made from extruded aluminum, with a turned brass thumbscrew that tightens onto the marking gauge's steel guide rods.

- E. **05N70.01** Dual Marking Gauge \$55.00
 F. **05N70.05** Shaft Clamp \$10.50
05N70.10 Gauge & Clamp Set \$62.50



Direct dimension transfer of mortise width for marking a tenon.



Veritas Dovetail Saddle Markers 🍁

For quick, accurate marking of dovetails, a dovetail marker is the best tool available. Our dovetail saddle markers are precision machined at 1:6 and 1:8 angles, the traditional angles for softwood and hardwood dovetails respectively. The 14° marker is designed to approximate a 1:4 ratio, for those who prefer this angle when working in thinner stock, as it not only provides stronger material interlock than traditional ratio angles but produces a slightly exaggerated dovetail joint that many find attractive. The long legs ensure accurate registration. Made from anodized aluminum, these markers are light and durable, and will never mark your work. The 1:6 and 1:8 markers are available individually or as a pair.

- A. **05N61.04** 1:6 Dovetail Saddle Marker **\$14.90**
- B. **05N61.05** 1:8 Dovetail Saddle Marker **\$14.90**
- 05N61.06** 1:6 & 1:8 Markers, pr. **\$25.50**
- C. **05N61.08** 14° Dovetail Saddle Marker **\$14.90**

D. Set of 3 Veritas Joinery Saws 🍁

These high-utility saws are all you'll need for most joinery applications.

The 14 tpi **standard dovetail saw** has a 9 1/4" long blade for fast, clean cuts with the grain. It is 14 1/4" long overall, weighs 13 oz and cuts to a depth of about 1 9/16". The 14 tpi **crosscut carcass saw** has an 11" long blade, useful for both tenon and shoulder work. About 16 1/4" long overall, it weighs just over 13 oz and cuts to a depth of about 2 3/8". The 9 tpi **rip tenon saw** has a 16" long blade for quick, efficient cutting. The 21 1/2" long saw weighs just under 1 1/2 lb with a cut depth of about 3 7/8".

Made in Canada, each saw is well balanced with a spine molded from a mixture of stainless-steel powder for weight, glass fiber for stiffness and a polymer resin binder. The blade and handle-mounting bolt are molded into the spine. The blades are 0.020" thick high-carbon steel. Hardwood handles. An outstanding set of complementary saws at a saving of \$42; the three saws if purchased separately would be \$307.

- 05T05.14** Set of 3 Joinery Saws **\$265.00**
- 05T05.01** Standard Dovetail Saw **\$ 79.00**
- 05T07.01** Crosscut Carcass Saw **\$ 89.00**
- 05T14.01** Rip Tenon Saw **\$139.00**



Veritas Wheel Marking Gauges 🍁

With its cutting edge at the extreme end of the rod, this gauge is useful for transferring dimensions such as tenon shoulder and mortise depth. The wheel's single-sided bevel pulls the gauge face against the stock, maintaining accuracy.

We offer a standard marking gauge and a micro-adjust model that has an adjustment mechanism built into the stainless-steel rod; after setting the approximate projection, you can fine-tune the position of the cutter within a range of 1/4". A fine-pitch internal thread allows slow, careful adjustment.

We also offer the micro-adjust rod separately from the gauge body to let you upgrade a Veritas standard wheel marking gauge you own with the adjustment mechanism.

- E. **05N33.21** Standard Wheel Gauge **\$36.50**
- F. **05N36.31** Micro-Adjust Gauge **\$54.90**
- G. **05N36.41** Micro-Adjust Rod only **\$29.50**

H. Veritas Medium Shoulder Plane 🍁

This multi-purpose tool can be used for trimming end grain, paring cross grain or planing along the grain. It is 7" long by 1 1/16" wide and weighs 2 lb. The unique lever cap with a pivoting knob lets you adjust the plane to fit your hand and preferred holding style. The concave knob rests in the web of your hand, giving you a secure grip without the need of a vise-like pressure. The lapped 1/8" thick blade is made of PM-V11 tool steel. Patented. One of our most popular planes.

- Med. Shoulder Plane, PM-V11 **\$219.00**
- 05P41.71**





A. Veritas Apron Plane

Our small, low-angle block plane is ideal for trim carpentry. At 14 oz, it is half the weight of a standard block plane, a big plus if you carry it in an apron all day. The 5 1/2" x 1 3/4" ductile cast iron body takes knocks in stride. Unique side wings provide a comfortable, firm grip and stability for shooting. A combined feed and lateral adjustment mechanism makes setting easy and accurate. 12° bed angle. The 1 1/4" wide, lapped blade has a 25° bevel and is made of PM-V11 tool steel. Patented.

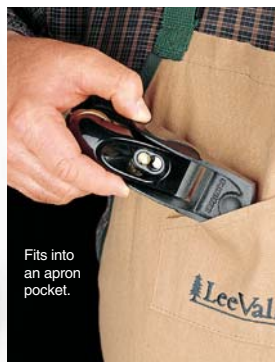
To keep your apron plane close at hand and protect it from damage, a split-leather holster with brass fittings is sold separately.

05P27.71 Apron Plane, PM-V11

\$105.00

B. 67K73.16 Leather Plane Holster

\$ 29.50



Fits into an apron pocket.

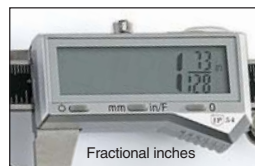


B



D & E

Decimal inches



Fractional inches



Millimetres



Inside measurement

C. Veritas #4 Smooth Plane

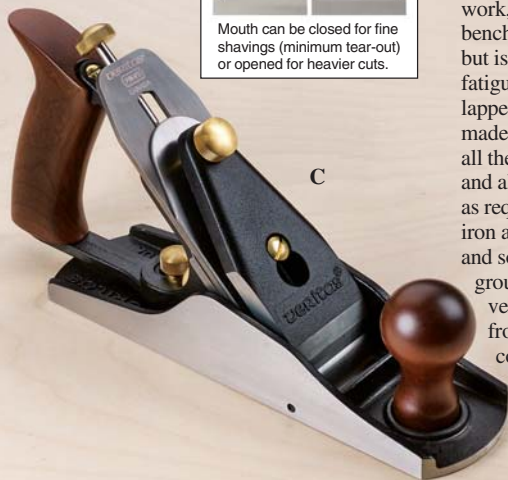
The #4 smooth plane is the most commonly used bench plane because of its versatility. It is the perfect size for general smoothing, finish work, trimming parts and other odd jobs at the bench. It has the mass required to cut smoothly but is also light enough (4 lb 6 oz) to avoid fatigue in use. The sole is 9 1/2" long, and the lapped blade is 2" wide, a full 1/8" thick and made of PM-V11 tool steel. The frog extends all the way to the sole to eliminate blade chatter and allow the user to quickly adjust the mouth as required. The body and frog are ductile cast iron and are fully stress relieved. The wings and sole are accurately machined and surface ground. The extra-large side wings make for very stable shooting. Both the hardwood front knob and tote are generous in size for a comfortable grip with good control. The combined feed and lateral adjust lever make blade setting easy and accurate. Patented.

05P26.71 #4 Plane, PM-V11 **\$239.00**



Mouth can be closed for fine shavings (minimum tear-out) or opened for heavier cuts.

C



Blindman's Fractional Electronic Caliper

Displaying 1/2" high numerals on an LCD screen, this caliper is easy to read. With all the usual caliper functions (including depth measurement), it also converts back and forth among decimal inches, fractional inches and millimetres at the touch of a button. It can be locked for measurement transfer using the integral thumbscrew and zeroes at any point for differential measuring. Available in a compact 4" length that slips easily into an apron pocket, or in a 6" length for general use. Each version is graduated in 0.0005", 0.01mm, or 1/128" increments; accurate to 0.001" or 0.03mm. Automatically displays reduced fractions, eliminating the need for mental arithmetic. Has an on/off button but automatically shuts off after five minutes to conserve battery power. Hardened stainless steel. Comes with a plastic storage case, instructions and a spare battery.

D. 88N90.44 4" Blindman's Caliper

\$33.50

E. 88N90.46 6" Blindman's Caliper

\$34.90

Veritas Spokeshaves

Designed for smooth, effective shaping, these beautiful spokeshaves are easy to use. The 1/8" thick PM-V11 steel blade, machined lever cap, and blade bed make chatterfree cuts in virtually any wood. The ductile cast iron body has hardwood handles, and the toe serves as a thumb rest, so you can choke up on the body for exceptional control on fine work. Twin adjustment wheels quickly and accurately control cut depth and skew, and shims let you adjust the mouth opening as needed. The concave spokeshave, with a 45° bed angle and a sole radius of 1 5/16", is popular with chair and paddle makers. The flat and round spokeshaves are suited to most kinds of woodworking. The round shave has a 1 3/4" radius. 10 1/2" long, each weighs about 12 oz.

The spokeshaves are sold individually or as a set of all three that includes our heavy polyester spokeshave roll. The roll has elastic straps that hold six tools up to 12" long, two inside pockets for extra blades, a pouch for shims and an external zippered pocket. Can be rolled up or wall mounted.

F. 05P33.76 Concave Spokeshave

\$132.00

G. 05P33.74 Round Spokeshave

\$129.00

H. 05P33.73 Flat Spokeshave

\$129.00

J. 05P33.17 Spokeshaves Set with Roll

\$345.00

50K60.01 Spokeshave Roll only

\$ 24.50



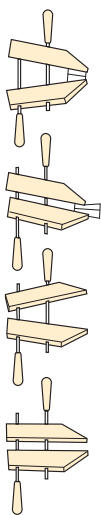
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F

G

H



A. Dubuque Wooden Handscrews USA

Traditional cabinetmaker's clamps, these are the most versatile available. The long, rectangular jaws provide even clamping pressure over a wide area, preventing marring of work. The ability to adjust them to a variety of closing angles permits clamping in unusual positions; it also permits bearing ledges when installing shelves, or in carcass construction. They have hard maple jaws and handles. Made in USA.

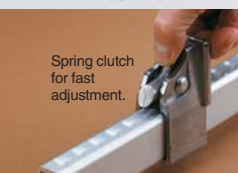
Length	Jaw Depth	Throat Opening	Max. 1+	4+
03F07.04	4"	2"	2 1/4"	\$18.50 \$17.00
03F07.06	6"	3"	3"	\$20.90 \$19.20
03F07.08	8"	4"	5"	\$23.90 \$21.95
03F07.10	10"	5"	7"	\$27.50 \$25.30
03F07.12	12"	6"	9 1/4"	\$31.50 \$28.95
03F07.14	14"	7"	10 1/4"	\$38.50 \$35.40

Dubuque Aluminum Bar Clamps USA

Made in the USA by the Dubuque Clamp Company, these aluminum bar clamps are lightweight, extremely rigid and easy to adjust. The strong extruded bars measure 1 3/8" x 7/8" and have side walls nearly 1/8" thick for excellent resistance to bowing and twisting. The bar remains reliably straight under clamping force, so you can clamp work against it to prevent misalignment. The moveable head has a spring clutch for fast adjustment on the notched bar, and the fixed head has a 1/2" diameter Acme-threaded screw for final tightening, with a large, easy-to-turn wing knob. 1000 lb load rating. Maximum opening capacity listed.

- B. 24" Bar Clamp, ea.**
03F06.24 **\$33.50** **\$30.80**
- C. 36" Bar Clamp, ea.**
03F06.36 **\$37.00** **\$34.00**
- D. * 48" Bar Clamp, ea.**
03F06.48 **\$39.50** **\$36.30**

* In addition to our regular shipping charges, a length surcharge of \$10 applies per order.



Veritas Platform Saddles Canada

These innovative saddles have dozens of practical applications in the workshop or on a job site. Used to hold standard dressed lumber (either 1" or 2" on edge, they make for a fast, flexible method of creating a sacrificial work stand-off for drilling, cutting or finishing. The removable posts have sprung wings for a snug fit in 3/4" and 20mm dog holes for bench use. With the posts removed, the saddles can be surface mounted anywhere. They are molded from resilient polypropylene that won't damage tool edges. They can be creatively used (and reused) to configure a stable work surface using materials at hand, whenever needed. A smart, straightforward system.

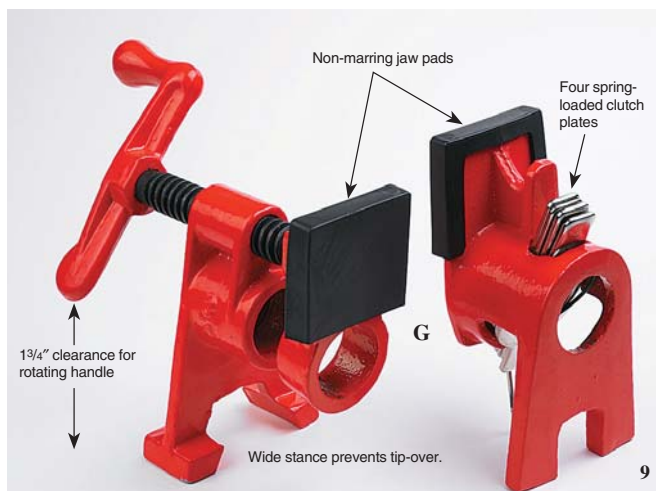
- E. 05H41.01** 1x3 Platform Saddles, set of 4 **\$12.95**
- F. 05H41.03** 2x4 Platform Saddles, set of 4 **\$14.95**

Our panel platform kit includes 12 saddles and a 4' nylon bag for storing and transporting your disassembled cutting platform. Visit leevalley.com

G. Bessey "H" Pipe Clamp

This clamp has elevated feet with a wide stance to prevent tip-over and give clearance when rotating the handle. It has a durable Acme-threaded hardened-steel screw, well-finished cast parts and non-marring jaw pads. The tailpiece comes with four spring-loaded clutch plates for quick and positive adjustment. Attach to any length of 3/4" black gas pipe (not included) that is threaded at one end. Load ratings are 2800 lb on standard pipe, 3800 lb on extra-heavy pipe. An excellent design.

- 17F06.15** 3/4" "H" Pipe Clamp, ea. **\$18.70** **\$17.75**

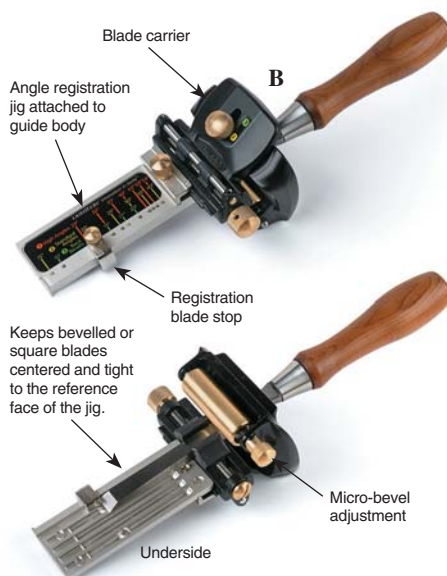
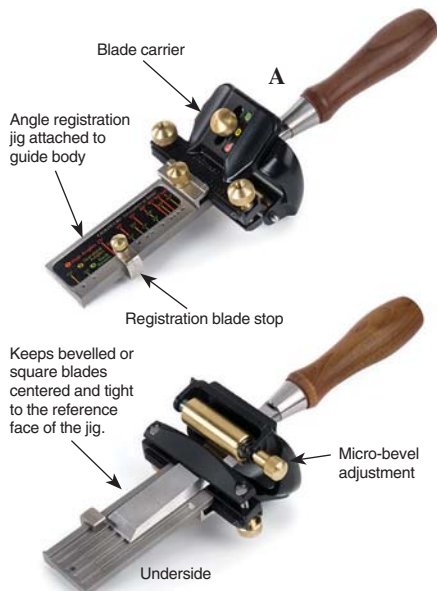




Stone and blade not included.



Stone and chisel not included.



A. Veritas Mk.II Honing Guide

The key to consistent and fast honing is repeatability – and this guide delivers it in spades. It will set bevel angles from 15° to 54° and a range of back bevels from 10° to 20°. It can easily accommodate chisels as narrow as 1/2" and blades as wide as 27/8" and up to 15/32" thick. The blade-registration jig slides onto the guide body, centering and squaring the blade with an integral fence. The blade stop has discrete positions for preset bevel angles. Features a three-position eccentric roller, allowing you to hone micro-bevels quickly and accurately with only a turn of a knob. Manufactured from die-cast zinc alloy, with precision-machined brass and steel parts. For the user, this means quick, accurate sharpening and perfectly repeatable results, reducing unnecessary stone and blade wear. Patented.

05M09.01 Mk.II Honing Guide \$70.95

B. Veritas Mk.II Narrow-Blade Honing Guide

For those who predominantly sharpen narrow blades, we offer a narrow-blade honing guide consisting of the narrow-blade clamping head, the straight roller base and the angle registration jig. It clamps blades from 1/8" to 1 1/2" wide using parallel jaws to ensure blades stay square to the jig. Whether they have bevelled or square edges, blades are kept centered and tight to the reference face of the jig by the canted jaws. It accepts bevel-edged chisels up to 15/32" thick and square-edged chisels up to 11/32" thick, and hones bevel angles from 15° to 40° and back bevels from 10° to 20°. Patented.

Mk.II Narrow-Blade Honing Guide \$91.50

Lee Valley
presents
Sharpen-Net
A Woodworker's Resource
leevalley.com/discover

C. 3M Aluminum Oxide Films for Sharpening

The aluminum oxide abrasive used in these films has very good fracture resistance, is precisely graded for size, and is densely applied in a closed coat, resulting in a medium that is quick cutting and long lasting, producing a highly regular scratch pattern. In our testing, they were comparable in speed to silicon carbide in O1 steel but about 40% faster in A2, maintaining their cutting speed appreciably longer in both. The 3-mil polyester sheet resists tearing and is PSA-backed for attaching to flat or contoured surfaces to create specialized hones that are much more portable than full-size stones. The films can be used with water, but we have found a light oil is best for carrying away the swarf.

Because the abrasive doesn't break down into smaller particles and leaves a consistent scratch pattern, it's important to work through a progression of grits. The 100 micron is for significant material removal, e.g., lapping or removing nicks; the 30 micron (equivalent to a 400x water stone) and 9 micron (approx. 1200x) are for working the primary bevel; the 3 micron (about 4000x) creates a micro-bevel; the 1 micron (slightly finer than 8000x) and 0.3 micron films polish to a finished edge.

Available individually. Made in USA.

	1+	5+
54K96.50 100µ Film, 8 1/2"×11"	\$4.60	\$4.15
54K96.54 30µ Film, 8 1/2"×11"	\$4.60	\$4.15
54K96.56 9µ Film, 8 1/2"×11"	\$4.60	\$4.15
54K96.57 3µ Film, 8 1/2"×11"	\$4.60	\$4.15
54K96.58 1µ Film, 8 1/2"×11"	\$4.60	\$4.15
54K96.59 0.3µ Film, 8 1/2"×11"	\$4.90	\$4.40



A. Hardwood Dowel Pins

These are well-made birch dowel pins. Manufactured to close tolerances, they have chamfered ends for easy entry, and well-formed flutes for a strong mechanical lock and good glue adhesion. Sizes listed are diameter by length.

	1+	5+
41K60.05 1/4"×1" Pins, pkg. of 100	\$3.50	\$3.15
41K60.06 1/4"×1 1/2" Pins, pkg. of 100	\$4.00	\$3.60
41K63.05 5/16"×1" Pins, pkg. of 100	\$4.40	\$3.95
41K63.06 5/16"×1 1/2" Pins, pkg. of 100	\$4.90	\$4.40
41K63.07 5/16"×2" Pins, pkg. of 100	\$5.30	\$4.75
41K61.10 3/8"×1" Pins, pkg. of 100	\$3.50	\$3.15
41K61.11 3/8"×1 1/2" Pins, pkg. of 100	\$4.00	\$3.60
41K61.12 3/8"×2" Pins, pkg. of 100	\$5.50	\$4.95
41K62.10 1/2"×1 1/2" Pins, pkg. of 100	\$6.90	\$6.20
41K62.11 1/2"×2" Pins, pkg. of 100	\$7.90	\$7.10

B. Making & Mastering Wood Planes

by David Finck

Originally published in 2000, this highly regarded guide has been reprinted in 2019 in a high-quality hardcover edition. This is more than an instruction manual on plane making; it is a book on refining woodworking skills. David Finck, who learned the craft from James Krenov, leads you through the construction of a laminated cross-pin wooden plane (with optional throat insert and sole), while teaching the fine points of woodworking. He covers tuning up, sharpening, and proper use of the tools for the project. He then teaches how to square an edge, flatten surfaces, and square end grain with your newly made plane. Included are instructions for shop-made shooting boards. Sure to be a staple in your woodworking library. 8"×10", 192 pages, revised 2016.

... Mastering Wood Planes
31L17.39 \$27.50



HSS Lipped Brad-Point Drills



Sharpened on a state-of-the-art Swiss CNC grinder, these high-speed steel bits are not subject to burning, and stay sharp much longer than carbon steel bits. The polished flutes give superior chip clearance, and the slight negative rake angle on the lip tips produce a clean entry and smooth sidewalls. The diameters of these bits conform to exacting standards of accuracy.

Bits from 5/64" to 3/8" are shanked to size. Bits from 25/64" to 1/2" have a 3/8" dia. shank. All are jobber length bits, with overall lengths varying from 2" with 1" of fluting for the 5/64" bit to 6" with 3 3/4" of fluting for the 1/2" bit.

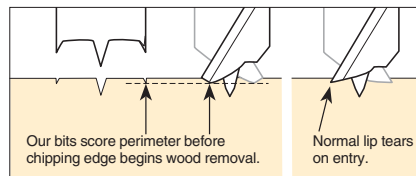
The set of seven includes 1/8", 3/16", 1/4", 5/16", 3/8", 7/16" and 1/2" sizes; the set of 12 is in 64th increments, and covers all clearance and tap holes for screw sizes #2 to #16.

C. **07J01.07** Set of 7 (1/8" to 1/2")

\$68.90

D. **07J01.12** Set of 12 (5/64" to 1/4")

\$54.50



Hock Krenov-Style Plane Blades with Chip Breakers

Shorter than traditional blade assemblies, these are specially designed for the low-slung wooden planes popularized by James Krenov. Made of high-carbon (0.95%) steel hardened to Rc62, the blades take a keen edge (final honing required) and are a hefty 3/16" thick to greatly reduce chatter. The 1/8" thick chip breakers provide additional mass and stiffness and are shaped to allow shavings to pass over them smoothly. The three widths of straight blade let you make a full range of bench planes, and the curved blade (approx. 4 1/2" radius) is ideal for making a hollowing or scrub plane.

E. **19P20.10** 1 1/2" Str. Blade/Chip Breaker

\$48.00

F. **19P20.11** 1 3/4" Str. Blade/Chip Breaker

\$52.00

G. **19P20.12** 2" Str. Blade/Chip Breaker

\$55.00

H. **19P20.13** 1 1/2" Crvd. Blade/Chip Breaker

\$53.00





A

A. Picard Veneer Hammer

Specifically designed for applying veneer with hot hide glue, this is the only veneering hammer that we know of that's still in production. And it happens to be a good one. Drawn across the work with firm downward pressure to push out bubbles and ensure good adhesion, the 3 $\frac{3}{4}$ " wide face has a smoothly rounded edge to avoid snags and scratches. The opposing square face has a bellied profile for work on small pieces and for driving veneer nails. The steel head retains heat well, so it can be warmed prior to use to avoid drawing heat out of the glue and making it set prematurely. Measures 12 $\frac{3}{4}$ " overall with a contoured ash handle. Made in Germany.

69K12.20 Picard Veneer Hammer \$59.50



B. Pax Curved Inlay Saw

This fine inlay saw has a thin curved blade and a brass back for rigidity. The 3" blade has 15 tpi (teeth per inch) and cuts a kerf of just 0.011". Measures about 7 $\frac{1}{2}$ " long overall with a hardwood handle and brass ferrule. Made in Sheffield.

33T08.20 Curved Inlay Saw



B

C. The Craft of Veneering

by Craig Thibodeau

Written by a renowned furniture maker, this meticulous, comprehensive guide to veneering offers helpful advice for both beginners and seasoned experts. Through photos and text, Thibodeau explains the industrial processes used to produce natural wood veneer and then explores all aspects of applying veneer, from tools and equipment to step-by-step methods for cutting, taping, gluing, pressing and sanding. The author demonstrates techniques for creating four-way and book matches for panels, and the more complex radial matches often used in designs for tabletops. He also discusses marquetry and parquetry for creating detailed images in veneer, as well as methods for veneering curves, creating bent laminated parts, applying edging and corner inlay, and more. A dozen photo gallery pages display stunning historical examples of veneered furnishings as well as contemporary pieces by the author and other notable makers. Richly illustrated throughout, the book also includes photos and descriptions of 37 wood species used for veneer, a glossary and a list of other resources. Softcover, 8"×11", 240 pages. 2018.

73L03.84 The Craft of Veneering \$23.90



C



D

E

Antique Restorer's Veneer Hide Glue USA

Hide glue is available in various strengths, but as the strength of the glue increases, the amount of time you have to work with it shortens. Our granular hide glue is a very strong one (rated 260g± Bloom strength) with a correspondingly short open time; it is good for uncomplicated assemblies where strength is of paramount importance. Pearl hide glue, used the same way as granular, is not quite as strong (rated 150g± Bloom strength) but takes longer to gel. With the longer working time, it is better for applications like veneering where you need time to fit, but where high strength is not required.

		1+	5+
D. 56K50.01	Gran. Hide Glue, 1 lb	\$16.90	\$15.20
E. 56K50.05	Pearl Hide Glue, 1 lb	\$15.90	\$14.30

F. 3M Binding Tape 🍁

Used by guitar makers for holding the edge-banding strips that surround the top and back of an instrument while the glue sets, this tape is convenient for a much wider range of tasks. It is similar to conventional masking tape, but has slightly greater strength and stretchiness, and a natural rubber adhesive with better holding power. These properties make it a practical alternative when gluing small, delicate projects, or shapes that are tricky to clamp. You can pull a joint tight, applying considerable tension before tacking the tape down; it holds the tension well, staying stuck tenaciously until you are ready to remove it. The tape peels off neatly without lifting finishes or leaving sticky residue behind. Comes in a 19mm×55m (3/4"×180') roll. Great stuff, made in Canada.

25U03.30 Binding Tape, 55m (180') \$9.80



F



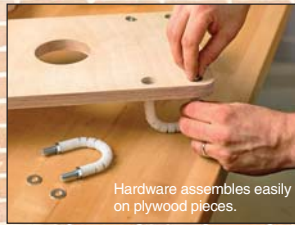
Applying edging to plywood.

A. Router Sled Hardware Kit 🍁

This innovative kit provides the necessary hardware to build an inexpensive large-capacity router sled for flattening slabs. The assembled sled lets you pass your router back and forth in an XY-plane to consistently flatten an entire slab. Combined with materials you supply, the kit offers an excellent option for milling live-edge tabletop slabs that are too large for a conventional thickness planer and jointer, or for projects using wood with difficult grain such as crotch wood, burls or knots. It includes a CNC-routed Baltic birch router carrier and a pair of trunnions, as well as U-bolts, hex nuts, washers and nylon wheels. The wheels strung onto U-bolts form the glide mechanisms that allow the router carrier to travel along the rails.

To build the router sled, you'll need nominal 1½" electrical metallic tubing (EMT), tools and a router with a suitable flattening bit. If you don't already have a proper surface to support the jig, the instructions include an easy-to-follow plan for building a supporting frame with risers that can be adjusted to accommodate workpieces of varying thickness. A video, instructions and a plan can be viewed on our website. An affordable way to flatten slabs without buying a costly flattening mill.

15K07.01 Router Sled Hardware Kit \$69.00



Hardware assembles easily on plywood pieces.



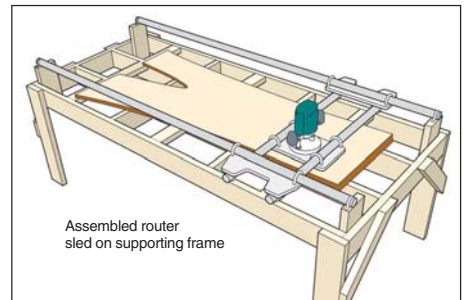
B. Steel Hairpin Legs

Suitable for slab or live-edge tables as well as other furniture styles calling for simple, sturdy supports, these are well-made hairpin legs at a reasonable price. Each is made from solid ½" diameter steel rod welded to a ⅛" thick steel plate with five mounting holes, so you can select between screw locations (or use all five for maximum shear strength). The matte-black powder-coat finish is evenly applied, providing a smooth, durable and paintable surface. The 16" leg is standard coffee table height, and the 28" leg is standard dining table height. Sold individually. Screws (#8 pan head) not included.

00S81.80 *16" Hairpin Leg \$11.50

00S81.81 *28" Hairpin Leg \$15.50

** In addition to our regular shipping charges, a length surcharge of \$10 applies per order.*



Assembled router sled on supporting frame

▶ VIDEO

Want to know more?

Visit leevalley.com to view a video and instructions that include a plan for building a supporting frame.

C. Flattening Router Bits

For flattening a workbench, live-edge table or other wood slab too large to pass through a jointer or thickness planer, these bits are an effective, economical alternative. Used with a router and router sled, they also work well for flattening end-grain cutting boards or wood with difficult grain patterns such as crotch wood. The bits have tungsten carbide tips that retain their hardness at high temperatures, so the bits keep their precision-ground edges for a clean cut. The bodies have a non-stick coating for easy resin removal. Each bit includes a friction-fit holder made of an advanced polymer, which can be mounted horizontally or upright. The 1" diameter bit has a cutting depth of 19/32" and an 8mm diameter shank that is 28mm long; the 1½" diameter bit cuts up to 11/16" deep and is available with an 8mm diameter shank (34mm long) or a 1½" diameter shank (111/32" long).

18J25.16 1" Bit, 8mm Shank \$34.90

18J25.24 1½" Bit, 8mm Shank \$49.90

16J25.74 1½" Bit, 1½" Shank \$49.90





Premium Leathercraft Kits

Easy and quick to complete, these kits provide everything needed to create an attractive, functional piece of leathercraft. Supplied by renowned Italian tanneries, the vegetable-tanned and dyed leather is durable yet supple and easy to work with. Each kit includes pre-cut leather pieces with punched stitch holes, two needles, waxed thread, all other components such as elastics and string closures, and detailed instructions.

A. Notebook Cover Kit

With this kit, you can create your own 5"×8¼" traveller's-style notebook. The sturdy two-tone protective leather sleeve holds a paper-bound notebook, secured with an elastic spine band so it's easy to remove and replace the notebook when it's filled. One 64-page notebook is included; replacements are available separately (or you can use any 4¼"×8¼" notebook). Difficulty rating: 4/5. Approximate completion time for a beginner: 3 hours.

09A10.60 Notebook Cover Kit **\$31.50**

09A10.61 Repl. Notebook **\$ 4.20**

B. Pen Holder Kit

This kit is used to make a sheath-style holder for pens up to about 6¼" long. About 17/8" wide by 6¾" long when closed, the completed project helps prevent ink from leaking or smudging the inside of a pocket or briefcase, and makes a nice complement when giving a pen as a gift.

Difficulty rating: 2/5. Approximate completion time for a beginner: 1 hour.

09A10.67 Pen Holder Kit **\$14.70**

C. Passport Case Kit

This kit makes a slim sleeve sized to fit most types of international passports, with additional pockets inside for holding cash, ID or travel documents. The completed case measures about 4"×6" when closed. Difficulty rating: 3/5. Approximate completion time for a beginner: 2 hours.

09A10.63 Passport Case Kit **\$54.50**

D. Multi-Purpose Case Kit

As the name suggests, this kit lets you make a practical, versatile holder for carrying anything from glasses to art supplies. The completed case measures about 7½"×3¼"×2" thick, and has a 17" leather cord used to bind the case closed. Difficulty rating: 3/5. Approximate completion time for a beginner: 1 hour.

09A10.65 Multi-Purpose Case Kit **\$20.95**



Leather Belt Kits

These kits supply all the leather needed for making your own belt. Each includes a 38mm wide by 3.6mm thick (about 1½"×1/8") strap of Italian vegetable-tanned leather at least 120cm (about 47") long, as well as two pieces of slightly thinner leather for the retaining loop and the buckle mount. No stitching or skiving is required; you need only punch holes for the rivets and belt adjustment, set the rivets (five 9mm/medium required), and cut the belt end to the desired length and shape. You can also add embossing, leatherburning or other decoration if you wish. Available in natural (undyed) and black.

E. 97K09.40 Natural Leather Belt Kit **\$36.50**

F. 97K09.41 Black Leather Belt Kit **\$36.50**



Belt Buckles

Designed for standard 38mm (just less than 1½") wide belts, these buckles are cast from a strong zinc alloy with a durable nickel plating polished to a mirror finish. Each is about 41mm wide by 44mm high and has a steel prong that fits a 5mm hole. We offer a classic square stirrup style and a more contemporary rounded design with cleaner lines and slightly flared corners.

G. 91Z51.46 Square Buckle, ea. **\$4.10 \$3.70**

H. 91Z51.47 Rounded Buckle, ea. **\$5.80 \$5.20**



Still searching for the right tools for your project? You're sure to find what you need at leevalley.com





A. German Chip Carving Knives

This range of knives was specifically developed for chip carving. Primarily intended for softwood carving (but usable for hardwood), the variety of blade styles allows you to make the various cuts necessary to this decorative carving form. The most popular is the general-purpose #8 knife. About 6" long overall with white beech handles.

06D04.02 Chip Knife #2	\$14.20
06D04.03 Chip Knife #3	\$14.20
06D04.04 Chip Knife #4	\$19.50
06D04.07 Chip Knife #7	\$14.20
06D04.08 Chip Knife #8	\$15.30
06D04.12 Set of 5 Chip Knives	\$72.50

B. The Art of Kumiko

by Matt Kenney

Traditionally used in Japanese sliding doors, *kumiko* is a delicate art created by assembling small wooden pieces into geometric patterns. This book provides step-by-step instructions for creating 10 *kumiko* lattices. The detailed instructions help you through every part of the process, from choosing tools and creating cutting guides and jigs to final assembly, using modern woodworking machines together with hand tools to create precise, beautiful work. Kenney demonstrates how to present the finished lattices, as a stand-alone decoration or incorporated into a furniture design. Cutting diagrams for the lattices and several of the wall panels he uses are included. Softcover, 8"x10", 164 pages, 2020.

49L27.48 The Art of Kumiko	\$22.50
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C. Adjustable-Depth Dozuki

The adjustable back of this dozuki lets you limit the depth of a cut, providing an adjustable stop to help make consistent joints for work where depth is critical and a fine kerf is appreciated, such as box-making, modelmaking and crafting delicate *kumiko* lattices. Metric and Imperial scales printed on the blade let you set the depth precisely, with a range of 1/16" to 15/8" (2mm to 42mm) deep. The 25 tpi blade cuts a narrow 1/64" kerf quickly, even in dense woods – as little as 15 strokes to make a 1" deep cut in 3/4" thick red oak. 21 1/4" overall, with an 8 7/8" long blade. Made in Japan by the blacksmith Master Yoshiwaka.

60T03.17 Adjustable-Depth Dozuki	\$58.50
60T03.18 Repl. Blade	\$37.50



Weather Instruments

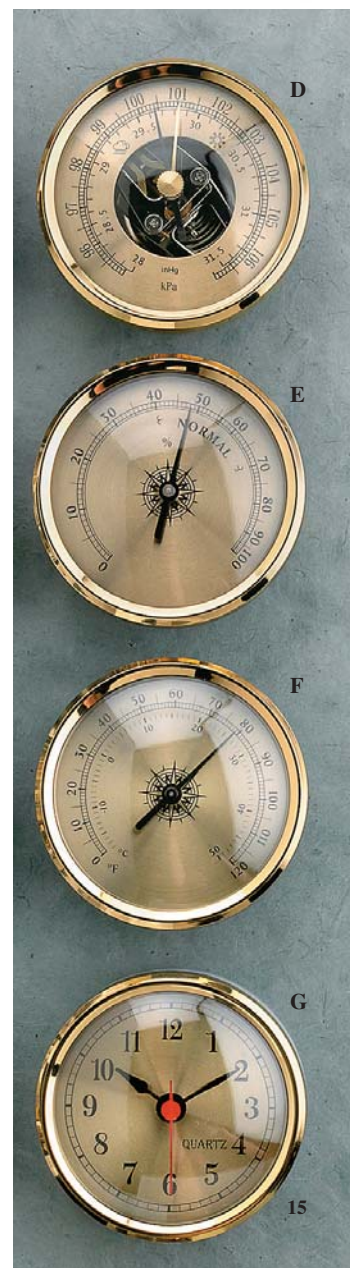
These weather instrument inserts are 72mm (just under 2 7/8") in diameter and mount in 2 1/2" holes. The included soft ring holds the instruments snugly in place. The barometer is graduated in kilopascals as well as inches of mercury. The thermometer measures in both Fahrenheit and Celsius. Humidity, fortunately, is the same in both systems. Each has a traditional polished brass bezel and satin brass dial. These are ideal to mount for personal use or as a gift.

D. 46K70.21 Barometer, ea.	1+ \$23.50	6+ \$21.20
E. 46K70.22 Hygrometer, ea.	\$13.95	\$12.60
F. 46K70.23 Thermometer, ea.	\$12.95	\$11.65
06J71.40 Saw Tooth Bit, 2 1/2"	\$39.50	—

G. 2 7/8" Clock Insert

This clock movement is the same size and style as our weather instruments. Though they are meant to complement each other in matched sets, it makes an attractive clock on its own. With Arabic numerals, it is 72mm (just under 2 7/8") in diameter, mounts in a 2 3/4" hole and comes with a mounting ring. The quartz movement uses one AAA battery (not included). Brass bezel.

46K70.25 Arabic Clock, ea.	1+ \$15.95	6+ \$14.40
H. 06J71.44 Saw Tooth Bit, 2 3/4"	\$45.50	—





Two- and Three-Jaw Chuck Braces

Though not inexpensive (there just aren't as many good brace manufacturers around as there used to be), these are good-quality braces and are exceptional for both round- and hex-shank bits. Manufactured in France, these 10" sweep braces are sturdy and well finished, and operate smoothly with a ball-bearing head. Our two-jaw chuck model is designed for use with bits that have square-taper tangs with short shanks (such as

spoon bits, reamers, socket adapters, etc.), but also works with regular auger bits and round shanks from $\frac{3}{16}$ " to $\frac{11}{32}$ ". The standard three-jaw chuck model accepts round shanks from $\frac{7}{64}$ " to $\frac{19}{32}$ " in diameter and all standard hex-shank bits. It also has the usual square-taper socket for conventional auger bits. Both braces have composite heads and grips.

A. **50J05.02** Two-Jaw Brace

\$79.50

B. **50J05.01** Three-Jaw Brace

\$87.50



Standard Taper Reamers

These simple, affordable one-piece taper reamers are ideal for many woodworking tasks. Rustic furniture makers use the small size ($\frac{3}{16}$ " to $\frac{3}{4}$ ") to back-taper holes for through-tenon wedging and for general tenon tapering. The large reamer ($\frac{3}{16}$ " to $\frac{13}{16}$ ") is an easy way for novice Windsor chairmakers to taper leg sockets. The bits are $\frac{33}{8}$ " and $\frac{51}{2}$ " overall with a $\frac{5}{16}$ " hex shank. The 12.8° body angle matches tenons made with our Veritas Tapered Tenon Cutters. Designed for use in an electric drill, they may also be used in a traditional brace with a brace adapter (see our website).

C. **05J62.05** Small Standard Reamer

\$18.95

D. **05J62.01** Large Standard Reamer

\$29.50

E. Wood Owl Bits

Precisely machined to strict standards, these Japanese-made bits not only yield smooth holes with minimal tear-out, but they do so with impressive speed. They have strong, sharply defined lead screws, and three spurs that score the perimeter of the hole accurately. They work best in dry or green softwoods as well as in green hardwoods, but can also produce excellent results in dry hardwood if used at reduced speed. Made of high-carbon steel with a low-friction PTFE coating, all are $7\frac{1}{2}$ " long, with triple flutes and $\frac{7}{16}$ " hex shanks.

60J01.06 Wood Owl Bit, $\frac{3}{8}$ "

\$ 18.50

60J01.08 Wood Owl Bit, $\frac{1}{2}$ "

\$ 19.50

60J01.10 Wood Owl Bit, $\frac{5}{8}$ "

\$ 19.50

60J01.12 Wood Owl Bit, $\frac{3}{4}$ "

\$ 20.50

60J01.14 Wood Owl Bit, $\frac{7}{8}$ "

\$ 23.50

60J01.16 Wood Owl Bit, 1"

\$ 24.90

60J01.45 Set of 6 Wood Owl Bits

\$109.00

We have more sizes of Wood Owl bits at
leevalley.com

F. Diamond-Head Forged Nails from Clouterie Rivierre

Used since ancient Roman times, square-shanked nails offer far greater holding power than modern wire nails. Driven into an undersized, pre-drilled hole, the tapered shank compresses surrounding wood, bending the fibers downward to yield a wedging action that helps prevent the nail from withdrawing. The well-defined shoulder seats flush to the work, allowing the broad head to spread the bearing surface over a large area; this draws the work together during assembly and prevents the head from pulling through under load. These nails should not be used to make anything you'll have to disassemble.

Made the same way since 1888, the nails are die-forged by Clouterie Rivierre in Creil, France. We offer them in traditional blued steel and black oxide finishes. We've put together two kits containing 30 each of the 23mm, 40mm and 50mm nails, plus 50 of the 35mm nails, a size frequently used to fasten $\frac{1}{2}$ " backboards and secure joints in $\frac{3}{4}$ " stock.

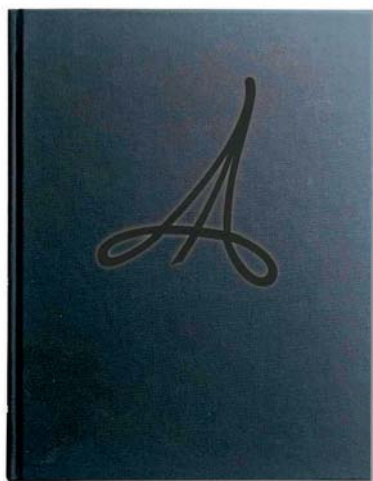
91Z50.30 140-pc. Assorted Kit, Blued

\$16.50

91Z50.70 140-pc. Assorted Kit, Black

\$19.50





A

A. The Anarchist's Design Book, Expanded Edition
by Christopher Schwarz

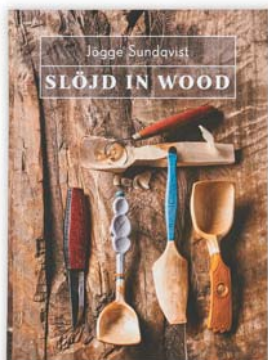
In this follow-up to *The Anarchist's Tool Chest*, Schwarz urges readers to build their own furniture as an antidote to the consumption of disposable, mass-produced goods. He outlines a straightforward approach to designing and making household items that are practical, durable and attractive, using only a few basic tools. All the projects are based on two simple methods, staked tenon construction and boarded construction. The selection includes a small sawbench, several chairs and stools, dining tables, a bed, a bookshelf and even a coffin. Filled with tips on every aspect of design and construction, the book includes chapters or appendices on the use of tapered iron nails, choosing tools, using hide glue, soap finish and milk paint, and other topics. This expanded edition adds almost 200 pages of new projects and essays to the original, with six new projects, including high and low staked stools, a mule chest with built-in drawers, and a sturdy armchair made using only board stock, as well as a method for cutting round tenons with hand tools. Hardcover, 8"×10", 634 pages, 2019.

20L03.65 The Anarchist's Design Book **\$47.00**

B. Slöjd in Wood
by Jörgge Sundqvist;
translated by

Ingmari Bergqvist & Jörgge Sundqvist
Slöjd refers to the Swedish folk-art tradition of making household objects from green wood using only a few basic hand tools. Translated from the original 2016 edition, this book gives advice on selecting trees, felling and riving them with an axe, and preparing the wood for carving. Sundqvist offers insight on visualizing a finished piece within the raw timber, following its form and grain for both beauty and strength. With photos and drawings throughout, the book details an array of techniques for carving, joinery, painting, sharpening and more – there is even an illustrated section showing how to grip the knife for various types of cuts. Beginning with a simple butter knife, it shows you how to make a range of useful objects such as spoons, ladles, bowls, boxes, cutting boards, coat hooks and stools. Hardcover, Smyth sewn, 7 1/2"×10 1/2", 116 pages, 2018.

20L03.49 Slöjd in Wood **\$35.00**



B



Frost Laminated Steel Knives

These Frost knives are made in the small Swedish town of Mora, which has been famous for its knives for three centuries. Each has a high-carbon steel core (Rc62) to hold a fine edge, clad with milder steel for shock absorption. For carving or shop use, or as a belt knife, each has a comfortable birch handle and comes in a plastic belt sheath. Excellent knives, and a pleasure to use.

- C. **02D01.01** Frost Knife, 2" Blade
D. **02D01.08** Frost Knife, 3 1/4" Blade

\$29.95

\$29.95



Pocketboy and Gomboy Folding Saws

These Silky saws from Japan are impressive for both pruning and general construction work. Each has an aggressive yet smooth-cutting 9 tpi taper-ground blade that is suitable for use with green or dry wood. The steel handles have textured rubber grips. All fold for compact storage and easy transport. The **Pocketboy 170M** has a 6 1/2" long blade and is under 15" long overall when open. At just over 8" long folded, it is a great size for backpackers (weighs just 7.2 oz) and comes with a plastic storage case that can clip to a belt. The **Gomboy 240M**, with a 9" long blade, is about 20" long overall when open and 10 1/2" long folded, and comes with a protective storage case. Weighs 9.6 oz. With a substantial 11 1/2" long blade, the **Gomboy 300M** is 24 1/2" long overall when open and about 13" long folded. Despite its length, it remains lightweight (11.6 oz), comfortable to use and easy to control. All have a lanyard hole at the end of the handle.



All saws fold for compact storage.



Pocketboy 170M comes with a storage case that clips to a belt.

- | | | |
|--------------------|--------------------------|----------------|
| E. 60T60.13 | Pocketboy 170M | \$40.00 |
| 60T60.14 | Repl. Blade, Pocketboy | \$30.00 |
| F. 60T60.34 | Gomboy 240M | \$50.00 |
| 60T60.35 | Repl. Blade, Gomboy 240M | \$35.00 |
| G. 60T60.53 | Gomboy 300M | \$65.00 |
| 60T60.54 | Repl. Blade, Gomboy 300M | \$35.00 |

H. Gränsfors

Hatchet

Most modern hatchets are crude little wedges of steel with a bit of wood for a handle. This hatchet is hand forged in Sweden and has a grace, heft, and balance that reflect good design and fine craftsmanship. The shape is classic with rounded lugs, sharply nipped shoulders, and a slim blade section. Full-grain leather case. It has a 3" face, 13" oiled hickory handle, and weighs 1 1/2 lb. Each hatchet is marked with the initials of the smith* who forged it. A wonderful item for anyone who likes well-made tools.

48U03.07 Hatchet

* Anders Magnusson, Anders Strömstedt, Daniel Gräntz, Kjell-Åke Sjölund, Lennart Pettersson, Mattias Blixt-Pettersson, Mattias Mattson, Mikael Sundberg, Paul James Alfberg, Rune Andersson, Tobias Thelin, Ulrik Nilsson, Tomas Andersson and Erik Blixt.

\$148.00



H



A

A. Osmo Polyx Hard Wax Oil

Osmo is a leading German company that has been producing wood finishes since 1964. Made with ecological responsibility and sustainability in mind, their high-quality finishes use natural and readily renewable vegetable oils and waxes.

An excellent choice for interior woodwork, this easy-to-apply finish is beautiful and durable. A blend of vegetable oils (sunflower, soybean and thistle) and waxes (carnauba and candelilla) combined with a small amount of low-odor solvent to improve workability, it has a low environmental impact. The finish provides protection comparable to varnish but is much more forgiving to apply – you can use a variety of methods (brush, roller, buffing pad or cloth) and a dust-free environment is not required. You don't need to sand between coats, which also makes future repairs straightforward.

Osmo Polyx is hard-wearing and has excellent resistance to water, alcohol and mild acids, making it suitable for a range of applications, from flooring and furniture to high-moisture environments such as kitchens or bathrooms. Non-toxic once cured, the finish is safe for food contact and complies with European standards for child safety (EN 71.3).

Three versions are available: matte, satin and satin pigmented, which has a small amount of white pigment to counter the amber tint of the finish on light-colored woods. Two coats recommended; dries in 8 to 10 hours. A high-yield finish, it provides an impressive coverage of 190 sq.ft. per 750ml (25.5 fl oz) can.

27K27.20	3031 Matte, 125ml (4.2 fl oz)	\$18.00
27K27.21	3031 Matte, 750ml (25.5 fl oz)	\$47.50
27K27.24	3043 Satin, 125ml (4.2 fl oz)	\$18.00
27K27.25	3043 Satin, 750ml (25.5 fl oz)	\$47.50
27K27.32	3051 Satin Pigmented, 125ml (4.2 fl oz)	\$18.00
27K27.33	3051 Satin Pigmented, 750ml (25.5 fl oz)	\$47.50



Shaker Oval Box Kits USA

Traditionally used to store tea, herbs and sewing sundries, these oval boxes typify Shaker design, graceful and functional with clean lines. These kits contain all the necessary materials – specially prepared cherry side band material, quarter-cut stock for the box tops and bottoms, plus wooden pegs and copper fasteners. Full-sized patterns allow easy construction of templates and bending forms, and thorough instructions provide clear guidance for shaping and bevelling the swallowtail fingers and bending the sides. Steaming or boiling of the wood is required for bending. The swing handle carrier kit makes one #4 handled carrier (approx. 6"×9"), while the oval box kit produces a nesting set of three boxes in sizes #1 to #3 (approx. 2 3/4"×4 3/4" to 4 5/8"×7 1/4").

B. 55K68.02 Swing Handle Carrier Kit \$27.50

C. 55K68.01 Shaker Oval Box Kit \$35.00



B

C



D

E

Beeswax Salad Bowl Finish & Polish Canada

Easy to use and safe for salad bowls, cutting boards, cheese boards, etc., the salad bowl finish is a blend of beeswax and mineral oil. After a thin coat is applied, the item can be used immediately or left overnight and buffed to a low sheen. Made from beeswax with a small amount of microcrystalline and carnauba wax, the polish is ideal for fine furniture or antiques. A light cream polish, it buffs to a soft sheen and has a mild beeswax scent.

D. 53Z32.01	Beeswax S.B. Finish, 1.75 oz	\$ 8.50
53Z32.02	Beeswax S.B. Finish, 7 oz	\$18.95
E. 53Z32.05	Beeswax Polish, 1.75 oz	\$ 8.50
53Z32.06	Beeswax Polish, 7 oz	\$18.95

F. Milk Paint USA

Milk paint is perfect for finishing country crafts, Shaker boxes, signs and cupboards, for stenciling walls and restoring antique furniture, and for use on reproduction Colonial or Shaker furniture. Made with casein (a type of milk protein), clay, lime and earth pigments or vegetable dyes, these milk paints yield deep, rich colors. The tough, non-fading paint penetrates and bonds to the wood fibers for a durable finish that can be removed only by sanding.

Supplied as a dry powder, it is mixed with water and applied with a brush, roller or spray gun. The second coat can be applied in an hour or so. For a top coat, apply a finishing oil, paste wax or water-based acrylic finish. Snow white is used as a reducer. Instructions supplied. Not recommended for exterior use. The 170g (6 oz) package will mix about 17 oz of paint. Coverage is approximately 30 to 40 sq.ft. for three solid coats.



F

Milk Paint \$16.50

Barn Red 53Z50.01	Slate 53Z50.02	Sea Green 53Z50.03	Pumpkin 53Z50.04
Buttermilk 53Z50.05	Lexington Green 53Z50.06	Mustard 53Z50.07	Pitch Black 53Z50.08
Soldier Blue 53Z50.09	Bayberry Green 53Z50.10	Federal Blue 53Z50.11	Oyster White 53Z50.12
Salem Red 53Z50.13	Tavern Green 53Z50.14	Snow White 53Z50.15	Marigold Yellow 53Z50.16



A. Veritas Cabinet Hinge Template

Simplifying hinge installation in cabinets and boxes, this template makes it easy to get an exact fit every time. Designed to work with a template guided router, it lets you quickly waste material from the hinge gain. The result is a clean, precisely sized mortise that requires no trimming other than to square the corners with a chisel. The template has a $4\frac{1}{2}'' \times 7\frac{1}{2}''$ acrylic plate that registers against one surface of the workpiece and a $9\frac{3}{4}''$ long pine fence that registers against the perpendicular surface to ensure accurate positioning. Accommodating hinge leaves from $\frac{1}{2}''$ to $2''$ long and from $\frac{1}{4}''$ to $1''$ wide, it has an adjustable opening that butts against the edges of each hinge, setting the dimensions by direct reference, so any size variations between individual pieces of hardware won't result in errors in your finished work. The template has a $\frac{1}{16}''$ offset, so it should be used with a template guide that has an outside diameter $\frac{1}{8}''$ larger than the bit (e.g., a $\frac{3}{8}''$ guide with a $\frac{1}{4}''$ bit). Made in Canada.

05H01.80 Cabinet Hinge Template **\$36.50**

C. Veritas Compact Router Base Plate

A simple upgrade to any compact router, this retrofit base plate mounts in place of the base plate supplied with your tool, improving its utility in several ways. When routing freehand, the $6''$ wide plate provides a broader platform to register against the surface of the work for better stability and control. Made of $\frac{1}{4}''$ thick clear acrylic, it doesn't obscure your view of the work, and has a flat edge for reliable registration against a fence or template. It's also the key to using the Veritas Table for Compact Routers, serving as an essential component that connects your tool to the table top.

It's available with predrilled mounting holes to match the base plates of common makes and models of compact routers. To make sure you select the correct version, you can find PDFs on our website showing the mounting-hole patterns that you can match to your router. If your tool is not one of those listed, we also offer a blank base plate, supplied with a centering guide and straightforward instructions on how to drill it to match the mounting-hole pattern of any other compact router. Each base plate accepts standard $\frac{13}{16}''$ template guides, inserts and inlay bushings, and has mounting holes for optional knobs (all sold separately). Made in Canada.

05J66.01 Base Plate for Bosch Colt PR20EVS **\$13.50**
05J66.02 Base Plate for DeWalt DWP611/Porter-Cable 450 **\$13.50**
05J66.03 Base Plate for Ridgid R2401 **\$13.50**
05J66.05 Base Plate for Makita RT0701C **\$13.50**
05J66.09 Base Plate, Blank **\$13.50**

B. Veritas Table for Compact Routers

Specifically designed for use with compact routers, this table is the ideal complement; it lets you make the most of the tool's small size and maneuverability for freehand use and adds the stability, safety and control of a router table that is compact, portable and easy to store. The table and fence combination brings repeatable accuracy to a wide range of common routing operations.

The sturdy $15\frac{1}{2}'' \times 11\frac{1}{2}''$ table top is milled from 18mm Baltic birch plywood and has a low-friction laminate surface. Designed to accept the Veritas Compact Router Base Plate (see below), it has five levelling screws built into the table to ensure you can fine-tune the base plate height so it sits dead flush with the table surface. Two of the levelling screws also serve as insert nuts, accepting the two mounting bolts used to attach the base plate to the table. One of those mounting screws can be replaced with the pivot post (provided) for routing curves without the fence. The $14''$ machined aluminum fence has a pair of laminate-clad sub-fences (each $7\frac{1}{2}''$ long) that can be adjusted to accommodate bit profiles for zero-clearance routing; integral top and face T-slot tracks can be used for mounting jigs and accessories, such as the included clear acrylic safety shield.

Changing bits is easy – either slide the barrel of your router out of the base (leaving it attached to the plate) for easy access to the collet nut, or remove the two mounting screws and pull the entire router through the table opening for bit changing (or freehand use). This is a sturdy, versatile table that will greatly extend the utility of your compact router. Highly recommended. Made in Canada.

05J67.10 Veritas Table for Compact Routers

\$136.50

D. Veritas Template Guides

Used for following the outline of a pattern, they are available in four sizes: $\frac{1}{4}''$ O.D. for use with a $\frac{1}{8}''$ bit, $\frac{3}{8}''$ O.D. for use with a $\frac{1}{4}''$ bit, $\frac{1}{2}''$ O.D. for use with a $\frac{3}{8}''$ bit, and $\frac{5}{8}''$ O.D. for use with a $\frac{1}{2}''$ bit.

05J66.20 $\frac{1}{4}''$ Template Guide **\$8.90**
05J66.24 $\frac{3}{8}''$ Template Guide **\$8.90**
05J66.26 $\frac{1}{2}''$ Template Guide **\$8.90**
05J66.28 $\frac{5}{8}''$ Template Guide **\$8.90**

E. Ring Nut for Veritas Template Guides, Inserts & Inlay Bushings

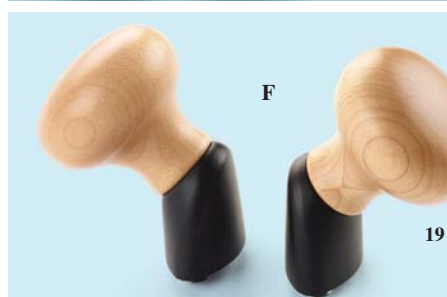
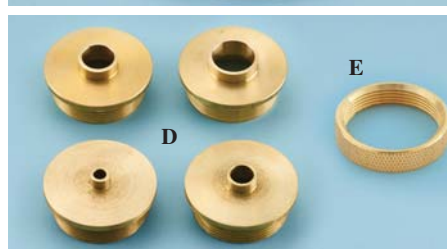
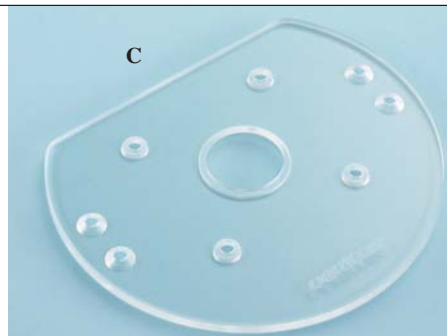
This $\frac{13}{16}''$ threaded brass ring fits the reduced height of our template guides, inserts and inlay bushings to attach them to the compact router base plate. Only one ring nut is necessary, regardless of the number of template guides or inserts you purchase. Made in Canada.

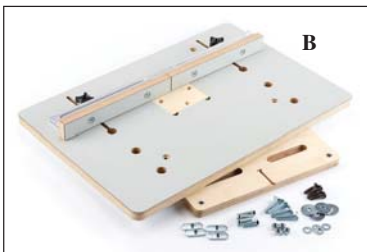
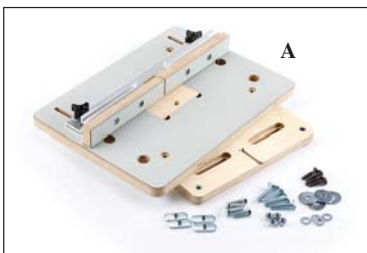
05J66.50 $\frac{13}{16}''$ Ring Nut **\$5.40**

F. Knobs for Veritas Compact Router Base Plate

It is essential to have a comfortable grip and good control when freehand routing with any router. This pair of wood knobs with stainless-steel posts is designed for use with the Veritas Compact Router Base Plate. The plate with knobs increases control and visibility, making your compact router feel like a full-size model in use. Mounting screws included.

50J50.12 Knobs for Base Plate, pr. **\$29.95**





Veritas Drill-Press Table & Fence

While drill-press tables are nothing new in metalworking shops, it's surprising they haven't been more widely adopted by woodworkers, as they bring improved accuracy, safety and convenience to a range of tasks. We designed ours to be compatible with most major brands of drill presses without modification.

Precisely milled from 18mm Baltic birch plywood with a low-friction laminate surface, the table top provides stable support for your work. It has two keyhole slots for mounting the included fence, as well as two standard 3/4" dog holes for clamps, dogs or other accessories. To support through-drilling, an opening in the middle accepts a 4" square sacrificial wooden insert (one supplied; replacements can be easily made from any 6mm (1/4") wooden sheet material). The 10 1/2" x 15 1/2" small table and fence set fits any drill press with a swing of 12" or greater (6" from bit to column); the 15 1/2" x 23" large table and fence set fits any drill press with a swing of 14" or greater (7" from bit to column). Both come supplied with all mounting hardware needed for installation in either through-slots or blind T-slots.

Each is equipped with a machined aluminum fence for accurate, repeatable stock positioning (14" long for the small fence and 20" for the large), and comes with hardware for mounting on the table (or in a pair of standard T-tracks or keyhole slots on other workshop fixtures). Both come with a pair of laminate-clad sub-fences (7 1/2" long with the small and 10 1/2" with the large) that can be opened to allow off-edge drilling, and a T-slot track on top for mounting jigs and accessories (such as the Veritas 1 1/2" flip stop).

Straightforward to mount and use, this is a practical, well-made upgrade to a woodworking drill press. Made in Canada.

- A. **05J68.10** Small Drill-Press Table & Fence **\$69.00**
 B. **05J68.20** Large Drill-Press Table & Fence **\$89.00**

C. Veritas Imperial Layout Block

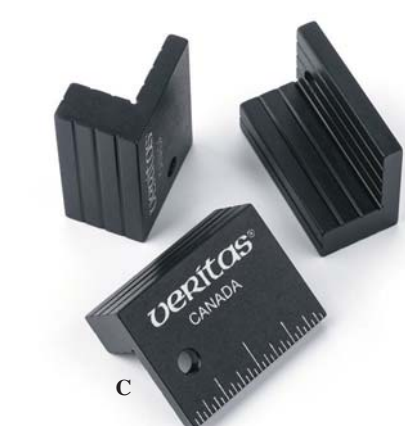
This L-shaped gauge block simplifies machine set-up or layout by providing a direct reference for five common Imperial measurements. Changing the block orientation makes it simple to position between a fence and a bit or blade, allowing rapid and accurate adjustment using the 1/8", 1/4", 1/2" or 3/4" sections or the 1" overall length. The precision aluminum extrusion is accurate enough to use with our set-up blocks (05N58.01). It has a hole for attachment to a key chain and an etched 1" rule with graduations in 32nds. Made in Canada.

- 05N58.21** Imperial Layout Block, ea. **\$ 8.50**
05N58.20 Imperial Layout Blocks, pkg. of 3 **\$19.50**

Veritas Metric Layout Block

Conveniently pocket sized, this L-shaped gauge block simplifies machine set-up or layout by providing a direct reference for five common metric measurements: 2mm, 4mm, 8mm, 16mm and 32mm. Changing the block orientation makes it simple to position between a fence and a bit or a blade, allowing rapid and accurate adjustment using any of the sections. The precision aluminum extrusion is also accurate enough to use with our metric set-up blocks. The total length of the metric block also simplifies 32mm spacing, especially when building European cabinetry. A hole on one side lets you attach it to a key chain, and an etched rule with graduations in millimetres allows measurements up to 32mm. Made in Canada.

- 05N58.31** Metric Layout Block, ea. **\$ 8.50**
05N58.30 Metric Layout Block, pkg. of 3 **\$19.50**



Japanese-Style Layout Squares

These compact layout squares are suitable for both joint layout and machine set-up, and have hardened stainless-steel blades that resist scoring. The combination square/miter comes in Imperial and metric versions (graduated in 16ths or millimetres) with clear etched and black-filled markings on both sides. About 6 3/4" long, it has a 3 3/4" wide blade. The double miter square is a traditional design, 4 1/2" along the base with a 2 1/4" wide blade. Both squares can be used for any joint incorporating a miter. The combination square/miter can also be used for any joint requiring a line at 90° to a surface, such as tenons, dovetails and half-laps. The 5/8" wide bases register solidly when setting table saw blades and jointer fences. Accurate to ±1/10°. Excellent quality.

- D. **60N03.10** Square/Miter, Imperial **\$23.50**
 E. **60N03.11** Square/Miter, Metric **\$23.50**
 F. **60N03.12** Double Miter Square **\$15.50**



Magswitch Magnetic Featherboards

These featherboards use two patented magnetic clamps to mount onto any ferrous table, allowing them to be used on machines without a miter slot, or with stock wider than a slot-mounted featherboard would allow. Switched on, the powerful rare-earth magnets instantly attach to the machine top; switched off, the magnets are easy to remove or reposition. A combined featherboard and hold-down, the 7" **universal featherboard** has opposing rows of flexible fingers that allow use on either side of a tablesaw blade. Its magnetic clamps (with a combined breakaway strength of about 190 lb) can also be mounted vertically to any ferrous fence to serve as a hold-down. About 8" square, the **single-sided featherboard** is for use only to the left of the saw blade. The combined breakaway strength of its two clamps is 210 lb. An optional **hold-down attachment** (compatible with the single-sided featherboard only) secures work up to 2 1/2" thick. It has up to 1 1/2" of lateral adjustment, and comes with four risers that let you make a tandem featherboard for use with thicker stock or materials fed along their end or edge. All are molded from durable ABS. Color may vary, depending on supply.

- A. **03J75.93** Universal Featherboard **\$48.50**
 B. **03J75.90** Single-Sided Featherboard **\$64.50**
 C. **03J75.91** Hold-Down Attachment w/4 Risers **\$19.50**
03J75.92 Featherboard w/Hold-Down **\$77.00**



Veritas Ruler Stop

The Veritas ruler stop slides onto any ruler 1" to 1 1/8" wide and up to 0.05" thick to provide a solid reference point. It is ideal for setting saw fences, repeat cuts, etc. With an anodized aluminum body and brass adjustment screw, it is 1" wide by about 2 1/4" long.

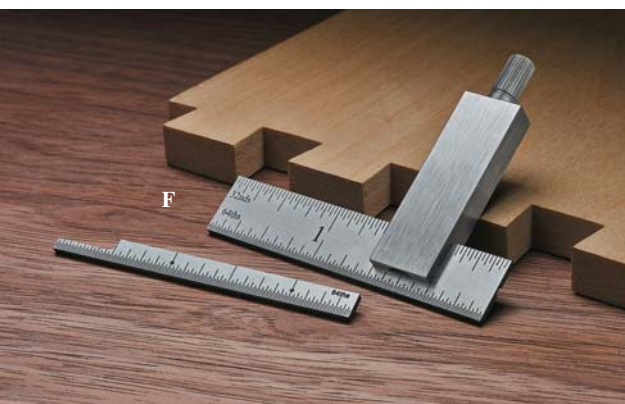
Available separately, the accurate, easy-to-read cabinetmaker's rule has machined edges and four different scales to suit a variety of requirements. Reading from both the left and right, the scale subdivisions are in 8ths, 16ths, 32nds and 64ths. At 1 1/8" wide by 12" long, it is guaranteed to be straight $\pm 0.010"$ over its length.

- D. **05N68.01** Veritas Ruler Stop **\$15.90**
 E. **60N20.06** 12" Cabinetmaker's Rule **\$15.95**

F. Lee Valley Small Double Square

This is an excellent tool for precise layout work and machinery set-up. Made entirely from stainless steel, the square includes two 2 1/2" long rules with etched and black-filled markings for legibility. The standard rule is graduated on one face in 32nds and 64ths. The narrow (0.2" thick) rule, with a 1/2" long probe on one end, is designed for access into confined spaces, such as when checking depth or square on hand-cut dovetail or finger-joint joinery. The knurled nut secures either rule at any position from full left to full right. All surfaces are ground and angular accuracy is to within 0.003" over the full length of the blades. Supplied in a French-fitted leatherette storage case. Made in Canada.

- 15N05.01** Small Double Square **\$49.50**



G. Dust Deputy Deluxe

Using this cyclone separator is an easy way to increase the capacity of your shop vacuum and extend the life of its dust filters. As much as 99% of shavings and dust are diverted into the container, ensuring very little reaches the vacuum itself, so filters load more slowly and suction loss is minimized. For use with any shop vacuum that has a 2 1/4" I.D. hose inlet, it collects dust inside a pair of nesting 5-gallon plastic pails; the outer one serves as a housing while debris accumulates in the inner pail, which is removable for easy disposal. Can be used freestanding or affixed to the vacuum and includes a translucent plastic cyclone separator with tapered ports, a lid, a 36" flex hose, two elbow fittings for vacuum connection, plus hardware (including casters) and installation instructions. An efficient and effective accessory for dust-collection systems. Made in USA.

- Dust Deputy Deluxe
03J02.20 **\$99.50**



Veritas Aluminum Straightedges

Our rustproof anodized aluminum straightedges are wide enough to stand on edge unsupported, so you have both hands free to make precise adjustments to your tools. Useful for setting up machines such as planers and jointers, they are 1 3/4" high and 7/16" thick. The reference edge is machined flat to within 0.003" over the entire length. They range from just under 1 lb to 2 1/2 lb.

- H. **05N63.00** Alum. Straightedge, 18" **\$26.50**
 J. **05N63.01** Alum. Straightedge, 24" **\$32.50**
 K. **05N63.03** Alum. Straightedge, 38" **\$42.50**
 L. **05N63.05** Alum. Straightedge, 50" **\$94.50**



A. JessEm Mite-R-Excel II Miter Gauge 🍁

A miter gauge is an essential table saw add-on, but it needs to be as easy to set up as it is to use, not to mention sturdy and accurate. JessEm has redesigned their Mite-R-Excel miter gauge to be all that. Made using CNC-machined aluminum components, stainless-steel parts and a rolled-steel guide bar, this miter gauge delivers repeatable precision angle and square cuts for improved table saw performance.

The nine pre-set detents are laser marked at 0°, 15°, 22.5°, 30° and 45° on the protractor. The spring-loaded indexing pin can quickly and precisely set and duplicate any other angle on both the left and right sides of 0°, and the lower Vernier scale makes it possible to fine-tune the setting to 1/10°. The 20" long extruded fence extends to 36", includes a right-to-left reading Imperial/metric scale and an adjustable flip stop for repetitive machining, and accepts a user-made sacrificial sub-fence up to 3/4" thick. Adjustable bar snugger screws in the guide bar provide low-friction travel and remove lateral play within a standard 3/4" wide by 3/8" deep miter slot.

Assembly required. Sub-fence mounting hardware, four hex keys and a hex key extension included. Made in Canada with high-quality, precision-machined materials for years of dependable service.

86N42.95 Mite-R-Excel II Miter Gauge

\$299.00



D

D. iVAC Automatic Vacuum Switch

This convenient, efficient device runs a shop vacuum only when it's needed – in unison with a power tool. Simply plug it into a regular 115-volt outlet and plug the tool and vacuum into their individual receptacles. When the circuitry senses the tool drawing power, it automatically turns the vacuum on.

The vacuum continues to operate for six seconds after the tool shuts off to ensure the hose is cleared. The vacuum can also run independently at the flick of a switch. The unit has a 17/8" thick by 45/8" square ABS housing with keyhole hangers for temporary wall mounting and two 115-volt, 12-amp input cords (one 6' long, the other 18" long). One cord is used when tool and vacuum draw less than 15 amps; use both cords in separate circuits for greater capacity (30 amps maximum). Each cord has a built-in circuit breaker. ETL listed for use in Canada and USA.



03J62.10 Automatic Vacuum Switch **\$49.95**



B

Lee Valley Canvas Aprons 🍁

Designed with cross-back shoulder straps to prevent neck strain, our aprons are made from tan-colored 100% cotton canvas, a washable material that is lightweight yet strong. Both have generously cut bibs for ample front and side coverage, plus adjustable shoulder and waist straps with easy-to-operate quick-release clips.

Compartments in the top pocket hold pencils, rules or small tools. The two bottom pockets can hold a variety of tools or just be a comfortable resting spot for hands. They have side ports for easy access and to help keep out dust and chips, and their rounded inside corners don't trap small objects. Our small apron measures about 26" long by 21" wide, with 9"x5 1/2" lower pockets, while the large measures about 34" long by 28" wide, with 14"x8" lower pockets. Made in Canada.

B. 67K10.06 Large Lee Valley Apron **\$42.50**

C. 67K10.08 Small Lee Valley Apron **\$35.50**

C



Cross-back shoulder straps

E. Tilt Box II Digital Inclinometer for Tool Setting

Ideal for setting angles on table saw blades, jointer fences, and bandsaw or drill press tables. You place it on the first surface, zero the display to calibrate it, and then move it to the second surface and set the desired angle. The display always reads left to right, even if inverted, and a "hold" button keeps the measurement for reference. It has a range of 90° left or right and a resolution of 0.05° (accurate to 0.2°). It can also be calibrated to read absolute angles to measure level and plumb. Rare-earth magnets on either side and on the bottom secure it to any ferrous surface. 9V battery included.

Tilt Box II
88N90.50 **\$42.50**

E





A. Veritas Quick-Release Wonder Dog 🍁

This version of our Wonder Dog has a fast-acting cam mechanism to speed adjustments. Two screw holes in the brass head allow a custom face to be attached for clamping curved and irregular shapes. The low-profile head and clamp body are $\frac{5}{8}$ " and $\frac{11}{16}$ " thick respectively, so you can plane stock as thin as $\frac{3}{4}$ ". The $\frac{3}{4}$ " diameter, $2\frac{3}{4}$ " long post lets you use it wherever you can drill a suitably sized hole, and is canted to keep the clamp head against the bench top under clamping force. The dog has just under 8" of travel. The rod, post and cam lever are made of steel. Made in Canada. Patented.

05G10.30 Quick-Release Wonder Dog **\$60.90**

B. Veritas Hold-Down 🍁

This hold-down can clamp workpieces to a bench or anywhere a $\frac{3}{4}$ " hole can be drilled. Exceptionally high clamping forces can be obtained because the arm is free to pivot independently, so all levered forces are exerted downward, with no losses due to horizontal slippage from the canting action of the hold-down post. The fine barb-shaped grooves on the post resist upward forces, yet still allow easy entry into a hole. The low-profile arm, made of forged steel, is unobstructed at the clamping end, allowing good access to work from all sides. The machined steel 10" hold-down post gives you 8" of clamping

capacity, matching the 8" throat capacity. Can be used vertically or horizontally. Clamping forces are infinitely variable by tightening the clamping knob (machined brass) to any degree.

For use in holes where through travel is limited, a retrofit shorter hold-down post is available separately. At just $5\frac{1}{2}$ " long, it provides about 4" of clamping capacity.

05G14.01 Veritas Hold-Down **\$99.50**

05G14.02 Optional $5\frac{1}{2}$ " Post **\$10.00**

Veritas Round Bench Dogs 🍁

Our round bench dogs are made from solid brass rod and can be installed in any bench by drilling a $\frac{3}{4}$ " hole. Brass dogs are non-corroding and kind to your tools. The combined crosshatching and 2° inward slope of the face hold wood securely. The side spring lets the dog slide smoothly, but holds it well at any desired projection. The bench dogs (at $4\frac{3}{8}$ ") are standard length. The Bench Pups (at $2\frac{3}{8}$ ") are fine for benches with tops up to 2" thick and ideal for bench sides; just drill holes in the skirt or the edge of the top. Both work well with Wonder Dog and Wonder Pup clamps.

C. **05G04.01** $4\frac{3}{8}$ " Bench Dog, ea. **\$16.50**

05G04.02 $4\frac{3}{8}$ " Bench Dogs, pr. **\$29.95**

D. **05G04.03** $2\frac{3}{8}$ " Bench Pup, ea. **\$13.90**

05G04.04 $2\frac{3}{8}$ " Bench Pups, pr. **\$25.90**

Veritas Planing Stops 🍁

These low-profile work stops present a broad bearing surface. Each $1\frac{1}{4}$ " wide anodized aluminum rail projects just 0.22" above the bench top, allowing materials as thin as $\frac{1}{4}$ " to be worked without obstruction. It also provides a reliable registration surface for materials too narrow to span two adjacent bench dogs. The two steel posts, sized to fit $\frac{3}{4}$ " diameter dog holes, slide along a T-track on the underside of the rail. The posts on the $9\frac{3}{4}$ " stop can be spaced up to 9" apart (center to center); the posts on the $17\frac{1}{2}$ " length can be spaced up to $16\frac{3}{4}$ " apart. The posts of the $25\frac{1}{4}$ " stop can be spaced up to $24\frac{1}{2}$ " apart; at over 2' long, it will span the depth of most bench tops, and can be cut shorter. For tasks that involve horizontal force in one direction, such as planing, a single stop can be used with no additional clamping. Stops can also be placed perpendicular to one another to capture two edges of the workpiece. A simple way to secure work without the constraints of typical clamping methods. Made in Canada.

G. **05G23.01** $9\frac{3}{4}$ " Planing Stop **\$24.90**

H. **05G23.05** $17\frac{1}{2}$ " Planing Stop **\$29.95**

J. **05G23.07** $25\frac{1}{4}$ " Planing Stop **\$35.50**



Veritas Wonder Dog & Wonder Pup 🍁

At $6\frac{1}{2}$ " long, the versatile Wonder Dog clamp can be used anywhere you can drill a $\frac{3}{4}$ " hole. It makes it easy to clamp curved work and irregular shapes. Since the dog head has two screw holes, any shape of tip can be cut with a scroll saw and quickly attached for specialized work, giving good control without marring work.

Using a Wonder Dog in combination with a standard round bench dog, you can make a clamp of any length by drilling $\frac{3}{4}$ " holes in a 2x4, 2x6, etc.

Two pieces of plywood with 2x4s between them for spacing can be drilled in a pattern to provide clamping for curved work and an infinite variety of other shapes.

At the lowest projection, only $\frac{5}{8}$ " of the dog head is above the bench. The swivel handle lets you apply ample clamping pressure in any position. The dog is drilled and tapped at a 3° angle to ensure that work is held tight to the bench.

The Wonder Pup is the same as the Wonder Dog in all respects, except that the post is shorter ($2\frac{3}{4}$ " instead of $6\frac{1}{2}$ ") and has no side spring. The side spring is replaced with an O-ring for slightly elevated clamping. For use in bench fronts, drill-press jigs, etc.

E. **05G10.01** Wonder Dog, ea. **\$40.50**

F. **05G10.02** Wonder Pup, ea. **\$37.50**



Lee Valley Electronic Gift Card

Lee Valley gift cards are available in any amount of \$10 or more and can include a personal message. We can send an electronic gift card by email or a physical gift card by mail.

Either version may be purchased and redeemed by phone, fax or mail order, or online.



Veritas Large Router Plane, Box & Blades Sets

These new sets are a complete system for cutting dados and grooves to a precise depth. We're offering the sets at a discount, which works out to a saving of 15% off the blades and accessories, compared to the cost of buying them individually. Included are the large router plane, a steel and aluminum fence, five narrow blades (1/16", 3/32", 1/8", 3/16" and 1/4" for the Imperial set; 2mm, 3mm, 4mm, 5mm and 6mm for the metric set), three wide blades (1/2" and 3/4" straight, and 1/2" spear-point), a sharpening jig for the wide blades, and our Baltic birch router plane box (assembly required) to keep everything organized, accessible and portable.

For more details on the large router plane and its accessories, visit leevalley.com.

Large Router Plane, Box & Imperial Blades Set
05P38.92

\$325.00

Large Router Plane, Box & Metric Blades Set
05P38.93

\$325.00

**Get free shipping on
orders of \$30 or more.**



Large router plane shown with the fence attached.