QUESTIONS & ANSWERS

the thread. And if you dip the screw about two pitches into some soft wax, it will drive more easily.

— Ian Kirby

Q I have several battery operated drills stored in my unheated garage. It gets below freezing occasionally in winter and over 110° in the summer. Is it OK to keep the batteries in the garage or should I store them in the house?

John White
Sugar Land, Texas

A Near-freezing temps aren't good for nickel-cadmium (NiCad) battery packs and can actually damage nickel metal hydride (NiMH) rechargeables.

However, it's exposure to higher temperatures — above 80 - 85 degrees — that can wreak havoc with cordless tool batteries. It tends to degrade the chemical gels and insulation materials inside the cells and significantly reduce their performance over time. Heat-damaged batteries appear to recharge as normal, but actually retain less of a charge. So cordless tool batteries should be kept in a cool spot during hot summer months. To prevent cold weather damage in the winter, move battery packs inside the house.

And, if you're not running your cordless tools for extended periods of time, there's something else you should do. Cordless tool expert Mike Sheriff of Ryobi America recommends recharging batteries every four to six weeks, since they'll lose a small amount of charge every day, and eventually drain completely. Leaving packs uncharged for long stretches reduces the amount of charge the battery will accept, thus reducing tool performance.

Fortunately, you can rejuvenate NiCad battery packs that have been sitting idle for a long time by putting them back into active use. Their capacity will be restored after a few discharge/recharge cycles.

— Sandor Nagyszalanczy

WINNER! *For simply sending in his question on battery storage, John White of Sugar Land, Texas wins a Hitachi DS14DMR 14.4-volt Driver Drill. Each issue we toss new questions into a hat and draw a winner.*

Turners featured in the Utah gathering's book include Kip Christensen, the turner of the "Lidded Jewelry Box-Antler Series" at left, and Curt Theobald, who turned "Dance of the Bison" at right.

25 Years of Turning

Artists Display Skills

This year marked the 25th anniversary of the Utah Woodturning Symposium, the longest running event of its kind in the world. In commemoration of the accompanying exhibit, the Brigham Young University Museum of Art is offering a book, *Beneath the Bark: Twenty-Five Years of Woodturning*.

Included in the book are the works of over 140 leading turners from 15 countries who have presented at the symposium over the years. Their works reflect technical skills such as spindle turning, faceplate work, off-center work, segmented work and ornamental turning. Works in the book also employ various surface decorations — marbling, metal foils, distressing, etc. — and turnings of materials other than wood, including stone, antler and bone.

You can order the book for $24.95 from the Brigham Young University Museum of Art by calling 877-266-5053.

Tigerstripe maple and Brazilian kingwood compose Bud Latven's "Fractured Tower" at left, while Dale Nish's "Rogard Vessel," below, is constructed of ash.

Stuart Mortimer's pink ivory and ebony "Twisted Hollow Form" (far left), Johannes Michelsen's madrone burl "Coach Hat" (left) and Cindy Drozda's jarrah burl "Vessel" (below) represent the turning skills found in the book.

Everybody's Got An Angle

Bowl gouges can be ground freehand, but a good jig will do a better job. On a fingernail grind, the angles at the tip and the shoulder vary as you swing the handle of the tool. Try for about 60° at the tip and 45° or less at the shoulder.

Skews, whether ground straight or convex, often have a larger bevel area to help control the planing cuts. Tormek's larger wheel makes this bevel easier to keep smooth and even when grinding. I use my skews with a combined angle of about 40° - 45°.

Scrapers: For better results, polish the wire edge off and burnish the solid metal edge. Grind to about 50°; hone off the debris the grinder leaves and run a hardened steel drill shank against the edge. ONE PASS ONLY. This will roll the sharp edge up to create a good cutting angle.

45° or so. This gives the edge a lot of support in heavy cuts. It doesn't have much bevel area, and doesn't leave a perfect surface behind, but it removes waste in a big hurry. It is the "hand grenade" of chisels. For bowl gouges most turners use a "fingernail" type grind, with the bevel ranging from about 60° at the tip to 45 - 50° (or less) at the shoulder. This allows smooth cutting with bevel contact on both the wall and bottom of a bowl's interior, and will work for exterior cuts as well. An experienced turner can perform nearly any reasonable cut with a good bowl gouge ground in this fashion. (If I could have only one gouge, it would be a 3/8" bowl gouge.)

Creating a bead wheel and mounting it on the outboard of your lathe keeps a quick honing option close at hand.

Skews: Skews fall into two grind profiles: straight or convex. The straight variety are a bit easier to sharpen. For those who like hollow-ground skews, simply run each bevel of the skew on the outside diameter of the wheel maintaining a combined angle of about 40 - 50°, or 20 - 25° on each bevel. The angle of the edge to the shank (toe to heel) is usually about 70°. I use the large wet wheel on the Tormek for skews, as it won't overheat the thin cutting edge. I then take a few passes on each face across a large DMT stone to remove the wire edge and create a flat micro-bevel at the cutting edge. You can do this quite a few times before having to regrind. A neat trick for those liking a flat grind on their skews is to use the flat side of the wheel to do their grinding. Some folks like this grind, but I find it a bit harder to hone.

Convex skews, which I find easier to drive on changing diameter profiles, are difficult to grind. Veritas makes an excellent jig for this application. You can grind them freehand, but I — ahem — "mumble" a lot when I do. It requires swinging the skew handle horizontally in a clean arc while maintaining an even bevel angle at the same time. This is akin to petting a rattlesnake while changing a lightbulb standing on a shaky ladder … you can do it, but why? The jig works well.

Scrapers: In the dim past we were all taught to simply grind up a wire edge on a scraper, use it "til it wore off," and then grind up another. But with the advent of good HSS scrapers, the best course for sharpening is to burnish up an edge as you would with a cabinet scraper. Grind the scraper bevel at about 40°, and then hone the top surface flat to remove the wire edge with a stone or hone. This leaves a fine sharp edge on the tool, but it's pointing in the wrong direction. To change the edge angle upward, simply pass the edge across a piece of hardened steel, like a drill shank, at 90° to the edge. One pass only. This will roll the edge up to an angle that will cut quite well, and the solid steel of this edge will last a long time. It takes a little practice to get it right, but it's worth learning. Done properly, a good burnished edge will produce shavings not unlike a cutting tool, and give better results than a wire edge scraper. Veritas makes a good jig for this as well.

The rule to remember is simple: don't use dull chisels. If you're working hard, the chisel isn't cutting correctly. And lathe chisel edges dull quickly, so don't spend hours getting "perfect" edges.

Steve Blenk is a professional woodturner who sharpens chisels (and fish hooks) in the Pacific Northwest. He is a contributing editor for Woodworker's Journal.

THE FRUIT OF FOUR TURNERS

By Steve Blenk

Woodworker's Journal sent four identical blocks of butternut, 6" x 4" x 12", to four turners of varying degrees of expertise. The charge: let the wood inspire you and send us the results.

Where do turners get their ideas? How do they put them into practice? Conversations about what inspires those whose woodworking focuses on woodturning tend to either begin or end with one of these questions. The answers never cease to surprise. The four turners (of varying degrees of expertise) whose work is shown on these pages were each supplied with a block of 12" x 4" x 6" butternut. Their task? Be creative and turn — something! One thing, or several.

No rules … well, just as long as it was made on the lathe, and mainly out of the wood we supplied. And then, tell us about why and how you arrived at the creations you produced. As the *Journal's* turning columnist, I got the call to be the one doing the asking. We got back a great primer on how to get the creative turning juices flowing!

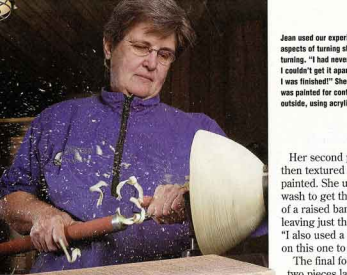
Our first step in this experiment was asking Mary Lacer, managing director of the American Association of Woodturners, for the names of our other participants (one of them, of course, was Mary herself). This article is our chance to share their turnings and creative insights with you.

Amelia Redig: Five years turning. Fresh creative perspective. Amelia has the advantage of sharing equipment and knowledge with her mother, Mary Lacer (below).

Jean LeGwin: six years turning — part-time. A very gifted amateur turner with a creative artistic approach.

Mary Lacer: 25 years turning experience. The AAW managing director turns vessels, spindles and small-scale work. Professional woodturner.

Linda VanGehuchten: 30 years turning. Craft items, furniture, vessels, industry demo's (with JET equipment). Professional woodturner.



Jean used our experiment as her own chance to explore aspects of turning she'd never tried before, including split turning. "I had never done a split turning before, and at first I couldn't get it apart! The joint didn't want to open up when I was finished!" She persevered and succeeded. The piece was painted for contrast, red in the recess and black outside, using acrylic paints.

Jean LeGwin

Turner: Jean LeGwin

Jean took our challenge to the limit, and also challenged herself as far as she could. As she produced her items, she used in each at least one technique she had never attempted before. She told us that she decided to make three separate turnings from our blank, and resawed it accordingly. Her first object was a hollow vessel with a basket-like carved surface. She admitted the butternut gave her some trouble, and she had a catch while turning the top. "I found out it carved better than it turned," she told me, "so I decided to carve the outer surface of the entire piece after turning." Jean then burned the surface for color and contrast.

Her second piece, a lidded box, was turned and then textured by woodburning before being painted. She used an undercoat and then a blue wash to get this effect. The handles were part of a raised band that was then carved away, leaving just the visible pieces remaining. "I also used a bit of maple for the top knob piece on this one to give a real contrast," Jean said.

The final form was done as a split turning … two pieces laminated with a paper joint, turned, and then opened and joined at the end.

Why three new techniques? I asked. "I wanted to try something completely new for this, to check the creative process for myself. The carved one was a nice surprise … finding out that butternut carved so well," Jean responded. *What usually determines your choice of forms?* "The piece of wood. You can have a form in mind, but the wood will be the big factor." *Where do you find your forms?* "I get ideas for shapes everywhere — natural forms, ceramic shapes, glass, metalwork ... A beginner could get ideas from all the above and by looking at the work of other turners and emulating them to build skill level; look at all the round objects in the world in all media and imagine how they could be turned." *Has your work been influenced by other turners?* "I have been particularly influenced by David Ellsworth and John Jordan because I have done workshops with them. David has an exquisite sense of elegant, minimalist shapes, while John is doing wonderful work with textural effects."

Turner: Linda VanGehuchten

Linda took a different tack with her piece of butternut. Her idea was to produce a deep endgrain vessel. To add a bit more of a challenge, she did it by mounting the blank on three separate axes, giving an ovoid effect to the piece. Her reasoning for this technique was to show as much grain as possible to best advantage. Then she went to the center axis and cut the lip using a skew, and did her hollowing. Finishing was done by burning with a propane torch, and then brushing the char. Linda immediately discovered that butternut was easy to burn, and easy to control where she wanted the wood to be lighter or darker. The charred effect gave depth and color to the wood, making the grain really stand out. For an additional accent on the rim, Linda applied a layered effect of Golden's acrylic copper and green interference paint with an airbrush.

I asked Linda, *What are some of the woods you really like to work?* "Western maple burl, cherry and Eastern hard maple. I make many items out of these, and they cut quite well." *What do you look at when you are deciding on a form?* "It's usually about the wood. You have to decide how to show what's there in the best way possible." *Why do you turn wood?* "Because it's fun. I enjoy turning even after 30 years of it. You never run out of new approaches to try." *Advice for other turners?* "Keep the chips flying. Try new things. Keep it fresh."

Turner: Mary Lacer

Mary told me she had considered this project for quite a while before actually getting the wood. She had thought about making an oval form, but was challenged immediately by the narrow 6" dimension of the blank. She solved the problem by resawing the blank and edge gluing it back together. This gave her approximately 12" x 12" x 2½" to work with. Lots of area, but not much thickness. Her next move was to mount the blank on a waste block, to retain as much of that 2½" depth as possible. "I didn't want to waste a bit of that blank. I wanted as much depth as I could get on the form.

Laminating it gave me the area, but I had just enough thickness," she said.

After turning, Mary decided to paint the rim black as a contrast to the center. "The idea was to give it an appearance of more depth." She used acrylic paint to get that effect, and put a number of grooves in it for a unique accent.

I asked Mary, *How did you get your start in woodturning?* "I took a class in woodworking, and my goal was to use every machine in the shop. The lathe kept my interest."

How do you decide on forms and shapes? "The grain of the wood usually indicates a direction you can go with a piece. You want to show grain and figure to the best advantage."

Linda VanGehuchten

Linda went with a three-axis approach to her piece, in part because she admires Stoney LaMar's work. "He's great. I like his forms and his techniques. Using that approach on this blank gave me a bigger vessel, more area to work with." In addition, she used a burned surface on the vessel "to try and bring out some character in what was a somewhat bland surface."

assic Canister Set

By Brad Becker

curacy is never in doubt if you make your canisters from
octagon. The author uses an accurate flip-stop miter jig
his canisters to length. All the other parts are uniform.

In the new culinary world order, flour, sugar and salt are "so twentieth century," but coffee and tea are definitely "in." And so a familiar kitchen staple — the canister set — is destined for a comeback, only it's holding trendy new ingredients for a new millennium.

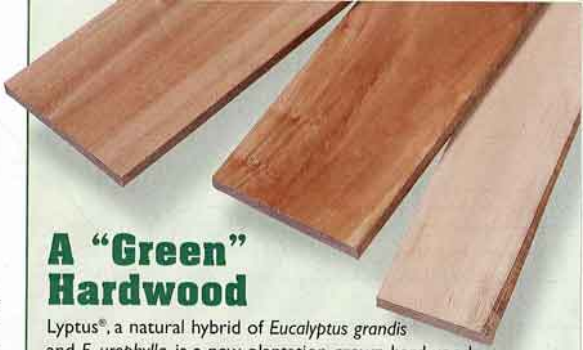
This project has been designed for customization. You can make one or six canisters, and you can make each as tall or short as your kitchen setup requires. You just can't make them fatter (at least not without major modifications to these plans). My production approach, as you can see in the photo at left, is to create one long glued-up octagon cylinder and then cut each canister to length.

Getting the Bevel Right Before Moving On

When you're making a segmented project like this, setup is all-important. If you set your bevels at 22¼° instead of 22½°, for instance, you'll get a quick lesson in the power of multiplication. A 1/4° times eight equals ... well, it equals a very leaky canister. So get some scrap wood out and set your fence and blade. (Use the *Material List* and the *Elevation Drawings* on pages 38 and 39 for all your construction details.) When you're sure you've got your setup right, cut eight test pieces to width and wrap them up with tape. Even a 1/32° alignment error will multiply up to a poor fit. So accuracy is your watchword.

Once you've tested your setup, go ahead and choose your stock. Remember, you're making a number of canisters from the same glue-up, so make sure you have nice uniformity in grain and color. Lyptus®, the wood we selected for our project, comes in a range of colors, as you can see from the three pieces shown at right. I picked a 1/2" thick board and jointed one edge dead straight before moving to the table saw. Decide the heights of your three canisters, throw in a few inches of waste for good measure, and crosscut your board to length. I drew some diagonal lines on each side with different colored chalk to keep things lined up and then proceeded to cut my sides (pieces 1).

Keep milling until you have enough sides to create a complete octagon. I recommend that you cut a few extra pieces, just for good measure. Now you're ready to create the "master cylinder." Get out the glue, some packing tape and a set of web clamps.



A "Green" Hardwood

Lyptus®, a natural hybrid of *Eucalyptus grandis* and *E. urophylla*, is a new, plantation-grown hardwood from Brazil. "Manufactured" by Aracruz Wood Products, it is distributed in North America through an exclusive agreement with Weyerhaeuser.

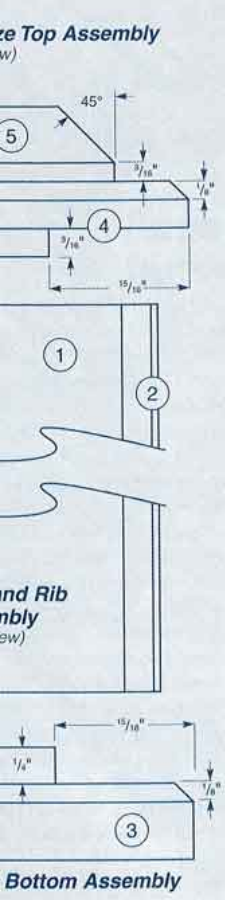
Chad Haas, sales & marketing manager with Weyerhaeuser, says Lyptus is being used for diverse applications where the beauty and appearance of mahogany or cherry is desired. "In its natural state," he notes, "the wood has a pleasant cherry color and variation between hardwood and sapwood boards. Left unstained, the natural figuration in Lyptus is similar to quartersawn oak. It oxidizes similarly to cherry and will turn a beautiful patina in a very short time."

Lyptus compares favorably to the density, strength and technical properties of oak and beech. It machines well (little tearout along or across the grain as it is sawn or shaped) and has the surfacing qualities of genuine mahogany. I found that very minimal after-shaping touchup sanding was required.

Weyerhaeuser, says Haas, believes Lyptus will become the most important hardwood species of our generation for two very important reasons:

1. Rapidly renewable — the growth rate is unprecedented. Four-year-old trees are already 45 feet tall. Lyptus is harvested in 15 years (as opposed to 50 to 120 years associated with other hardwoods). After Lyptus is harvested, it regrows from the stump without the need to replant or disturb the forest floor.
2. Lyptus is reversing the loss of native forest lands — 100% of Lyptus productivity comes from previously barren land that has been reconstituted through the reintroduction of native species indigenous to the region. Plantations of Lyptus are grown in a mosaic pattern interspersed with indigenous trees to preserve native ecosystems and create biodiversity.

***Lyptus is now available nationwide through* Rockler.com.**



...ze Top Assembly
...w)

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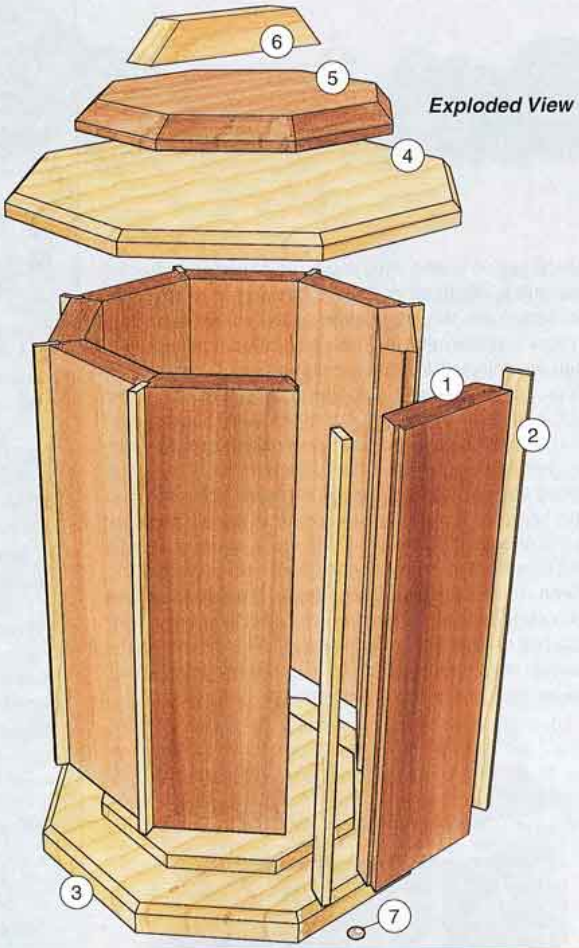
Bottom Assembly

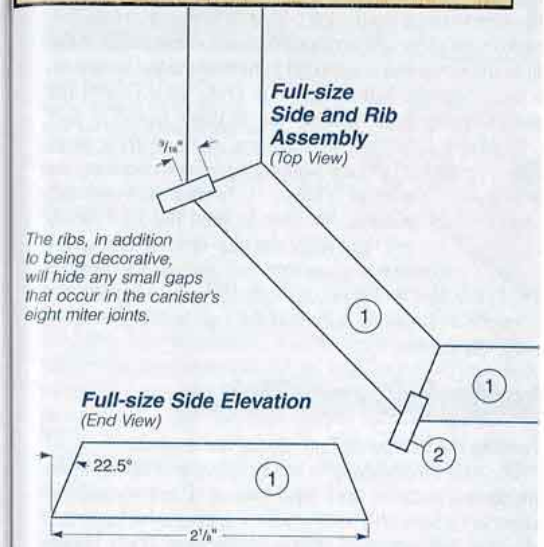


Exploded View

MATERIAL LIST

		T x W x L
1	Sides* (8)	1/2" x 2 1/8" x 25"
2	Ribs* (8)	1/8" x 3/8" x 25"
3	Bottoms (3)	3/4" x 6" x 6"
4	Tops (3)	1/2" x 6" x 6"
5	Top Accents (3)	1/2" x 4 3/4" x 4 3/4"
6	Handles (3)	1/2" x 1/2" x 2 1/8"
7	Base Buttons (12)	1/2" x 1/8" Silicon

*The sides and ribs for these canisters were cut to 5 1/2", 7" and 8 1/2" to create total heights of 7 1/4", 8 3/4" and 10 1/4" (including the bottoms and lids).



Full-size Side and Rib Assembly
(Top View)

The ribs, in addition to being decorative, will hide any small gaps that occur in the canister's eight miter joints.

Full-size Side Elevation
(End View)

The Master Cylinder

The next step is going to be a real breeze. It's going to be a real breeze because you used up lots of cheap scrap wood testing your bevel setup before you cut into your expensive hardwood. For that reason, everything is going to fit together perfectly and you're going to end up with a perfect "master cylinder." Remember, the origin of the famous woodworker's anthem "measure twice, cut once," can be traced to segmented projects.

As you can see from the photo sequence below, the first step is to lay out a few strips of packing tape on your work surface. Secure each end of this tape to the bench to ensure that things don't bunch up or move on you as you lay your pieces down, each touching the one next to it. Your chalk lines will help you with the sequencing. Just be sure to have a good look at the outside of each piece as you work through your layout process. If you spot a ding or a piece has warped or twisted, now is the time to grab one of those extras that you cut.

Once all the pieces are lined up, (and your web clamps are close at hand), use a foam brush to apply glue to the matching bevels (including the first and last ones). Because these canisters are going to end up in the kitchen, I recommend using a waterproof glue with adequate open time. I went with the new Titebond® III. It's waterproof, gives you plenty of open time (eight minutes) and cleans up easily with water. Move quickly to apply the glue and then, using the tape, slowly roll up your master cylinder. Bring on the web clamps, and you're ready to move on to the next step.

...g The Cylinder

...s the author, finds plenty of applications ...sually in the type of "pre-clamping" ...n here. Remember, when you're doing ...glue-up like this, always pay close ...r glue's open time.

The first step is to carefully lay all your mitered pieces on top of the packing tape with their ends squared up. Make sure the miters butt from one end to the other, and then quickly spread your glue in all the miters.

As soon as you've applied the glue, pick up the two ends of the packing tape and start rolling. The miters will come together easily, and the tape will temporarily "clamp" your cylinder together.

Bring on the muscle with a few web clamps, one at each end and one in the middle. Tighten the clamps securely, and then use a damp rag to wipe off as much excess glue from the inside of the cylinder as possible.

The simple jig shown at right will ensure that all your rib cuts will be perfectly located on the miter joints of each cylinder. As with many of the steps in this project, the author recommends testing your setup with the "drop" from the cylinder glue-up.

Creating the Ribs

After jointing one edge smooth, rip your ribs (pieces 2) to width on the table saw, as shown in the photo below. Be sure to use a push stick with this 1/8" thick stock and make sure there are no knots or cracks in sight. Test the fit in the scrap you used to set your blade depth: you want a nice, tight fit: half in, half out. Once your ribs fit the miters, rip enough material for all three canisters and, after a light sanding, crosscut them to their three lengths. I put my packing tape to work during the glue-up phase; it brings just enough pressure to bear to hold the ribs steady and tight while the glue dries. When all the ribs are in place and the glue is dry, remove the tape and sand through 180 grit, softening the edges and making sure that the tops and bottoms are perfectly flush.

Using A Spline Jig for Perfectly Placed Veins

Once the glue dries on your master cylinder, you're ready to crosscut them to their various lengths. The first photo on page 36 shows me doing just that. Use your miter fence and a good stop and move slowly ... this is no time to mess up all the work you've done already. I found that Lyptus mills pretty nicely, but I still sanded both ends smooth (using a block to prevent rounding), through 120 grit. I used maple ribs that ran the length of the eight miter joints. They not only create a design element that visually connects the maple top and bottom pieces, but if your miter joint has a small gap, no one will ever see it. You've got to like that.

To help accurately locate the rib veins, your next step is to make yourself a sled like the one shown above. Use a square scrap of plywood to create the base. Then attach two beveled pieces and two cross ties. The bevels (22½°) can be formed on the table saw. After cutting them to size, I placed the two pieces right up against each other on the base, screwed them in position and then screwed the two cross ties to them. Set your fence so the blade is directly in line with the point where the bevels meet and raise your blade high enough to cut through the base and the joined edges of the bevels, but be sure and stay below the cross ties: they'll be the only thing holding the jig together after the first cut is made. Adjust your blade height using a leftover segment of the master cylinder in the jig; you want the 1/8" blade to penetrate the canister miters to a depth of exactly 3/16". With all that in mind, go ahead and cut all the rib veins.

Forming the Octagonal Tops, Bases and Accents

With your three cylinders ready to go, it's time to move on to the bottoms and tops (pieces 3 and 4) and top accents (pieces 5). These pieces start out as squares and are cut into octagons on the miter saw. It's a simple process — just set your miter saw to 45° and either use tape as a marker or clamp a stop to your fence. Measure from the corner of the square piece in, as shown in the photo above (facing page). Once again, I strongly

Select clear 1/8" maple for the ribs and joint one edge before firing up the table saw. With thin stock like this, a push stick is especially important. Also, be sure your stock is completely free of defects.

Line up some tape on your miter saw's fence as a "stop" when you're ready to create the top, base and accent pieces. Use the illustration at right to lay out your cuts. Again, you can't go wrong using scrap to make a couple of test cuts.

recommend testing your setup with scrap. Work your way around each of the three tops and then do the same thing with the three accent pieces. Then, move over to the table saw and, using a 3/4" dado head, form the rabbets on the bottom of the lid and the top of the base piece (see the *Elevation Drawings*). Keep rotating the pieces while you nibble away the waste. Sand the saw marks from the rabbets.

The final step with these pieces is to form the chamfers along their top edges. I did this machining on my router table, using a chamfering bit. Work your way around each piece again and take a sanding pass to smooth everything out.

The handles are also formed on the miter saw, once again using tape on the fence to create a stop. After each cut, flip the stock over to form opposing miters.

Kitchen Finishing

Whether you find some liners for your canisters or store your coffee beans right in the "wooden boxes" as they did in the good old days is up to you. If you're going *au naturel*, be sure and use a food-safe finish on the inside, like General Finishes' Salad Bowl Finish.

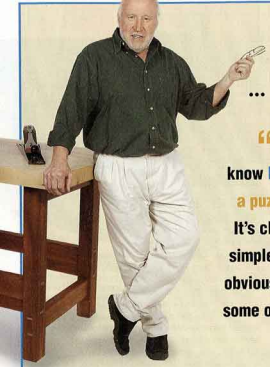
For the outside, I was more concerned with moisture hitting the surface on a regular basis, so I added silicon buttons around the bottoms and applied three coats of a wipe-on polyurethane gel finish on all of the exposed surfaces. The silicon buttons and finishes are available through Rockler Woodworking and Hardware, at 800-279-4441 or online at *www.rockler.com*.

Making the Handles and Gluing Everything Together

The final pieces to mill are the handles (pieces 6), which are also machined on the miter saw. Mill your stock to overall size and start with the blade set at 45°. Cut off one end, flip your piece over and slide it forward to your tape "stop" on the fence. The second cut creates the first handle. Keep cutting and flipping until you have all three handles. Sand these through the grits, softening their edges as you go.

Now you're ready to bring everything together. I glued the bases to the cylinders first (using epoxy) and then glued the handles to the top accents, pointing the handles in the direction of the grain. Once that subassembly dried, I glued it to the lid, keeping everything centered and making sure the grain on both pieces ran in the same direction. Test your fit and do any necessary final sanding at this time. Glue the silicon bumpers (pieces 7) to the bottoms of each canister and use a tack cloth to get ready for finishing. See the *sidebar* above for finishing recommendations. Then your canisters will be ready for those exotic teas and coffees you've been itching to try.

Brad Becker has been a woodworker in the Journal's *shop for a number of years now.*

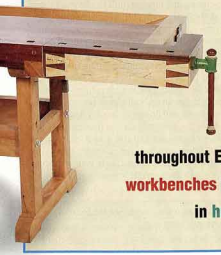


... Rightful Design

"Sometimes you see a tool and know how it is used, but often it remains a puzzle. So it is with the workbench. It's clearly a tool and at first glance its simple purpose as a work surface seems obvious, but in fact it has many purposes, some obscure and others inscrutable ..."

Two woodworkers. Two methods of work. Two completely different benches ...

Family Tradition ...



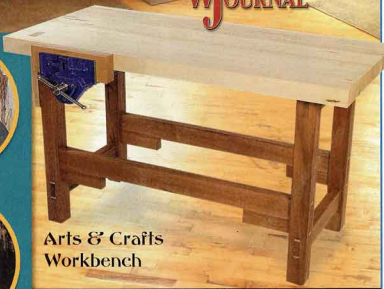
"In Hungary, where I grew up and learned the cabinetmaking traditions of my father and grandfather — and also throughout Eastern Europe — traditional workbenches haven't changed significantly in hundreds of years."

Classic Workbenches

Brought to you by Woodworker's Journal

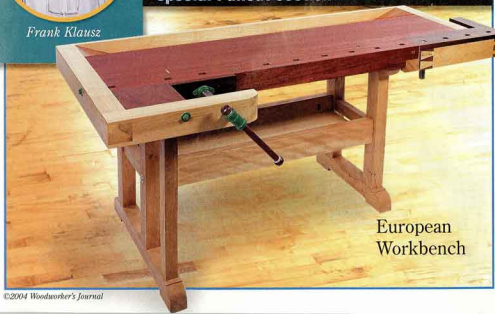
Ian Kirby

Frank Klausz



Arts & Crafts Workbench

Special Pullout Section



European Workbench

an airtight seal. How many strips you glue in one clamp-up depends on whether you work alone or with a helper. The real dividend of a helper is having someone at the other end of the board to lift and shift and at the other end of a clamp to attend to its positioning and other tasks. Working as two, you could begin with as many as six center strips. Working alone, begin with three center strips. Position five clamps equally spaced on the work surface. The remaining six clamps sit on top of the work, spaced between the bottom five. Using fast-acting clamps, align the surface of the laminates by keeping both heads of the clamp centered on the glue line. Also align the ends. After the first glue-up dries, add one strip to each side to allow ample time for precise alignments before the glue cures. By carefully managing the assembly this way, I needed to remove only 1/16" to flatten the top. It's possible to make three glue-ups a day: morning, noon, and evening.

"In the past, benchtops were made of two or three thick slabs of readily available quartersawn hardwood, maple in the U.S., beech in Europe."

Flattening the Top

Make the top flat by planing across the grain. This may seem counterintuitive, but it's the best way to remove the slight but inevitable unevenness in the laminations. As well, all woods plane well across the grain with minimal tearout. It's important to follow a planing pattern. Begin at one end and concentrate on a band 6" to 9" wide. Move to the next band as flattening occurs. After flattening the final band at the other end of the top, set the blade finer and start again. Use your straightedge from the very beginning and check every direction. Use a bench brush repeatedly to avoid planing over shavings. And keep the blade sharp. As the surface becomes more refined and the depth of cut is reduced, the shavings become like duck down and the planed surface is left very smooth. Don't sand the benchtop because the residual abrasive grit will dull your blade after only a few plane strokes when the occasional re-flattening is required.

The top must be flat in length, flat in width, and out of winding. Use a two-foot straightedge to check your flattening progress at close intervals across the top. I also used a six-foot extruded aluminum level to assess the flatness of the overall length. Use winding strips end to end, middle to end, and across the top to make sure there is no twist.

The maple bench stop is a sliding fit through a hole in the top and is anchored to a leg of the underframe by a coach bolt. A wingnut on the bolt allows for easy locking of the stop at the desired height. You will need to chop the hole in the top to accommodate this feature.

The Underframe

The bench underframe must be sturdy enough to support the mass of the top and any of the work that goes on the top, and to resist racking when it has to be moved or during bench operations such as planing. Almost any softwood or hardwood will fit the bill. The one shown here is made of mahogany and put together using through-wedged mortise and tenon joints and bridle joints. It calls for legs over 3" square with rails almost 2" thick.

The end frames are sized sufficiently inboard from the edges of the top so that fast-acting clamps can be used all around it. The deliberate absence of a long top rail allows long clamps to pass unimpeded under the top to hold assembled furniture parts firmly to the edge of the bench to be further worked on. The top itself provides the anti-racking benefits of a top rail when it's attached to the underframe.

Attaching the Top to the Underframe

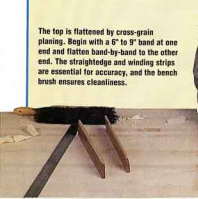
For many years I insisted that the top and the vise be attached by machine bolt and nut. It meant lots of work boring accurate holes and fitting 10 neat plugs to cover the bolt heads. Then, many benches ago, I began using lag screws, and my confidence in their lifelong holding power remains firm. The top has six lag screws, one in the center of the end top rail and one as far to each edge of the end top rail as is practical. I used 3/8" diameter lags that extend to within 1/2" of the benchtop surface. The center lags have a 3/8" clearance hole and the four outer ones have a 5/8" clearance hole to allow the top to move unhindered through its shrink and expand cycles.

Mortise and Tenon Underframe

This underframe uses through mortise and tenon joinery — a typical furniture maker's joint — but on a big enough scale to qualify as post-and-beam construction. Because of its large size, the joint is cut with a mixture of hand and machine tools rather than hand tools alone. There are many ways to achieve the end result and each depends on the machines you have available. For example, provided you get the geometry of the joint correct, you may cut the tenons on a band saw, whereas I used a table saw.

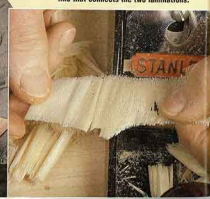
Making the Underframe

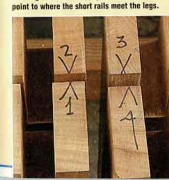
Start off by marking out each joint as though it were to be made by hand. I had to dodge some growth defects in the mahogany stock, so the first thing to do once the parts are milled is to decide on the layout (which parts go where) and mark each part clearly. I used numbers and arrows made large with a felt pen. The numbers and arrows tell you the inside faces, which is important to know when you cut the slopes on the ends of the mortises to accommodate the wedges. None of the marks are planed or sanded off after assembly, but they will be hidden. They were also recorded on paper as a backup.



The top is flattened by cross-grain planing. Begin with a 6" to 9" band at one end and flatten band-by-band to the other end. The straightedge and winding strips are essential for accuracy, and the bench brush ensures cleanliness.

Cross-grain planing produces these typical "fold-up" shavings, which are thick in the middle and thin at the edges due to the curve in the plane blade that prevents plane marks. Clearly evident is the glue line that connects the two laminations.





Locate the numbers so they are undisturbed when the joints are cut. The numbers read clockwise and are marked on the side where the long rails meet the legs. The arrows point to where the short rails meet the legs.

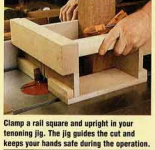
The rail numbers match the leg numbers. Top rails are marked on the top edge, bottom rails on the bottom edge.

Ian removed the waste in the leg's open mortise with a coping saw.

Glue the rail blocks to the long rails and clean up with a smoothing plane.

Simple but Strong Joinery

Mark out the joints with marking knife, try square and mortise gauge. The top joint doesn't have a unique name. It's a variation on a bridle joint which in the U.S. is often called an "open mortise and tenon." The top edge of the rail sits proud of the top end of the leg by 1/4" to avoid the following problem. If the leg and rail are made flush and shrinkage in the rail occurs after the top rail is attached, the ends of the legs would be proud of the rail. The shrunken rail would then pull the top into a cupped or curved state. The bottom edge of the joint has a 1/4" cosmetic shoulder. I coined the word "cosmetic" because its main purpose is to hide shrinkage and to cover any less-than-perfect edge you may have made on the bridle opening. Both parts of the joint can be cut on the table saw.



Clamp a rail square and upright in your tenoning jig. The jig guides the cut and keeps your hands safe during the operation.

Cutting the Leg and Rail Joints

Cut the leg mortises first in the tenoning jig shown in the *photos*. In each case, the rectangular peg and the rectangular hole are centered, so after you cut one side, turn the part around and cut the other side. This procedure can only produce cuts that are correct and alike if the parts have exactly the same thickness. That's why careful preparation of your stock is so important. Clean up the bottom of the joint with a chisel. Cut from each side shoulder line to leave a mound in the middle. Once you have established both shoulder lines, remove the mound by horizontal paring. The jig is guided by the fence and advanced by your hands, safely distant from the saw blade. The fence controls the setting. To effect a slight adjustment when setting up the cut, slacken the fence locking handle, then lightly tap the fence with a hammer. Because the saw is set at full height, it would cut deeply into the jig, so I glued on the thick bridge pieces front and back to stiffen its structure. Because the rail thickness differs from the leg thickness, you must change the settings. However, the tenon is centered on the rail, so this setting stays unchanged. Turn the workpiece around to make the second cut. The tenon should fit tight. Offer the uncut rail to the completed leg part of the joint and assess how close you need to be to the mortise gauge line. Set the blade only 1/2" high. Set the work in the tenoning jig so that the cut will err on the rich side. Saw both faces. Clamp the work in the miter gauge and set the blade to the correct height to remove the newly cut face. Now test the 1/2" stub tenon against the mortise. If the tenon is too rich, release the fence lock handle halfway, adjust the fence with hammer taps, and re-test.

Because the rail is too wide to fit inside the tenoning jig, it's mounted instead on the outside at the front. Although you can cut shoulder lines directly from the saw, getting consistent results on every piece is risky business. I take the slower but surer route: knife shoulder lines, saw within a 1/16", and clean up with a wide chisel.

A block clamped in place on the front of the jig positions the rail to cut the cosmetic shoulder and avoids sawing into the jig.

Slower is surer: knife the shoulder lines and clean up with a wide and sharp chisel.

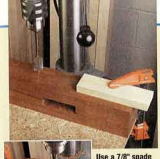
Making the Mortise and Tenon Joints

The normal order of cutting a mortise and tenon by hand or machine is to cut the mortise first because it's easier to adjust the tenon thickness to match the mortise width than vice versa.

Cutting the tenons on the bottom end rail employs the same jig and technique as cutting the tenon on the bridle joint, with the difference that there is a cosmetic shoulder on all edges and saw kerfs for the wedges.

Making the Mortises

Only the final walls of the mortise are cut with a router. Why? To avoid the excess dust that routers create. The answer is to remove as much waste as possible by drilling. Your first bit choice would likely be a Forstner.



Use a 7/8" spade bit on center to leave 1/16" of waste on each mortise wall.

Clean up the mortise with jig-guided router bits. The insert (left) lets you cut two sizes with the same jig.

However, not being good at removing its own waste, Forstners tend to choke and burn. I recommend a spade bit. It makes a very clean hole, even in very hard wood — but it does have its foibles. The trouble comes when you stop drilling to withdraw the bit. Being rarely concentric, the emerging bit can quickly make a mess of a clean hole, along with an alarming amount of vibration and noise. The solution is to clamp the work for each new hole, drill deep enough until the point just breaks through the bottom face, switch off the machine with the bit at the bottom of the hole, and then withdraw the bit when it stops. Result: a perfect hole. By clamping the workpiece, the hand that would normally hold it is free to safely hit the off switch while the hand on the drill press handle holds the bit at full depth.

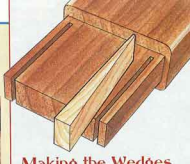
Put the leg in the vise on a support block and chop out the bulk of the waste using a mortise chisel (above left). Then complete the cut (above right) by pressing a sharp bench chisel tight against the face of the angled guide block.

The next step is to remove the fluted walls. Use a 1-inch chisel, being careful not to cut beyond the outer edges of the holes.

The remaining waste is removed by two router bits, a pattern bit (guide wheel on the shank) and a trim bit (guide wheel on the tip). The jig is an exact rectangle cut into 1/4" MDF. Clamp the jig in place and clean up the sides of the mortise with the 1" long pattern bit. Turn the leg over, clamp the jig from the same face, and rout again. Remove the jig, set the trim bit to depth, and clean out the waste remaining in the center.

Cutting the Ends of the Mortises

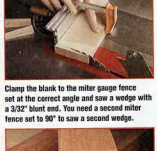
Knife the lines for the wedge openings on the outer faces of the legs. I decided to wedge out the longer rail joint 5/16" and the end rail joint 1/4". By drawing both joints full-size you can determine the gradient and make guide blocks (see *photos* above) to direct the chisels in cutting the slopes. Whenever paring or chopping a workpiece held in a vise, rest it on support blocks that sit on the vise guide bars. This frees you from tightening the vise to resist downward pressure from paring cuts and mallet blows, and the work is easily returned to level and height after checking.



Making the Wedges

Place a wide maple board, 4" long, on support blocks in the vise and plane across the grain to dimension.

The next step is to check the fit of the wedge blank in your mortise.



Clamp the blank to the miter gauge fence set at the correct angle and saw a wedge with a 3/32" blunt end. You need a second miter fence set to 90° to saw a second wedge.

When testing the wedge for fit, don't drive it home! You should be able to see that the length and slope will correctly fit the kerf and opening.

Through and half-blind dovetails join the face of the tail vise to the front and rear jaws. A simple router jig guides a template bushing to remove most of the material, and a sharp chisel finishes the job.

clamp both end caps at the time with two 8-foot bar or clamps and tighten the hex to pull both caps into tight ct with the ends of the top. final step of this main glue-up nstall and tighten the threaded ith washers and hex nuts at end. (See *photo,* page 63.) the glue dries, plane or belt- all the joints flush.

xt, mill and install a solid strip adwood behind the row of dog n This encloses the holes and eles a larger clamping surface the front lip of the bench, you are always clamping ieces. The backboard and ay are next on the list.

I like to use a special piece of wood for the backboard, since it is so prominent on the customer side of the bench. Cut the backboard to the correct width and length to span the end caps. Then, clamp it temporarily to the ends so you can lay out the dovetails. Cut the dovetails with a band saw and clean them up with a chisel.

Now, plow a 1/4" deep groove in the backboard for the tool tray, at a height equal to the thickness of your benchtop. Rip your plywood for the tray to a width that will underhang the benchtop by about an inch when fully seated in the groove in the backboard.

Glue the tray into the backboard, then install the assembled parts to the bench, gluing and screwing the tool tray to the underside of the bench. (See *photo,* page 64.)

To complete the top, install spacer blocks with screws and glue to the underside, where the top rails of the base will meet the top as shown in the *photo* on page 64.

Making the Tail Vise

Many woodworkers are nervous about making a tail vise, because it appears so complicated. In fact, it is only parts and pieces, like anything else you make.

Begin by building the tail vise frame, which consists of two jaws dovetailed to a face piece, and a back runner connecting the front and rear jaws. (See the *Exploded View* on page 59.) I use through dovetails at the rear jaw but half-blind dovetails at the front jaw, to provide an unbroken face-grain surface where it meets the other jaw. Here again, I use a simple router jig to hog out the dovetail sockets, then I clean them up with a chisel. The tails themselves are band sawn carefully and then pared to final fit with chisels. While the front vise jaw is still free, joint about 1/8" off the rearward part so you'll be able to resurface the clamping surface of the jaw a couple of times in the future, as necessary.

The dovetail joints that join the back rail to the jaws are also easily cut with a band saw. The top of this runner should be even with the bottom of the end cap when the vise is assembled to the bench. To make sure this happens, drill the clearance hole for the benchscrew in the rear jaw so that it is the same height up from the runner as the benchscrew nut is from the bottom of the end cap. Drill this hole slightly oversize so you have some room for adjustment when assembling the tail vise to the bench. (Refer to the *Drawings.*)

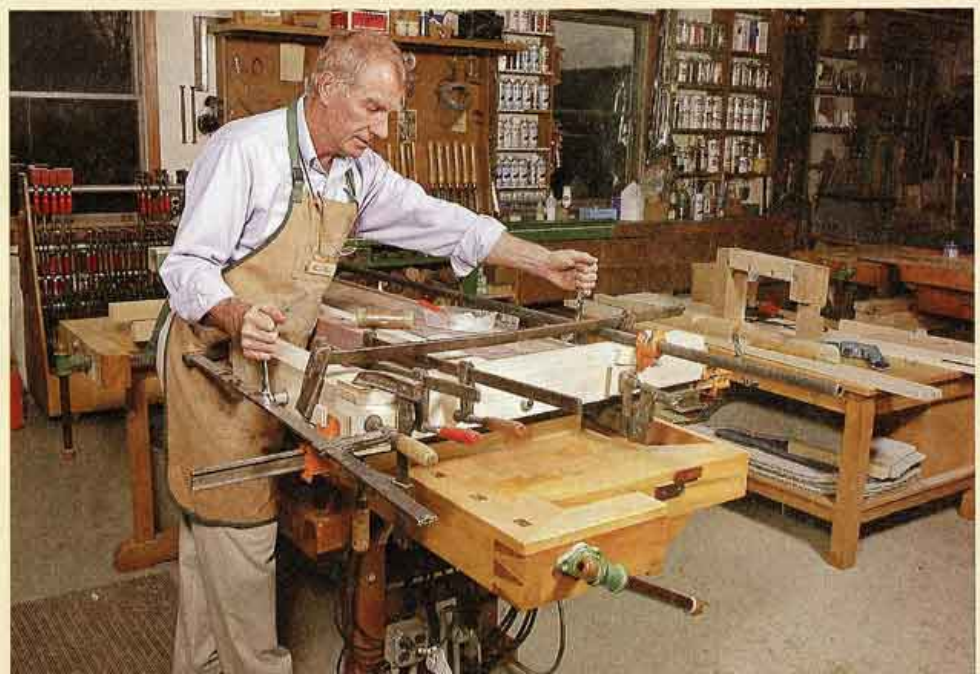
To complete the tail vise subassembly, you still need to glue a thin piece of plywood to the inside of the face piece to close off the bench dog slots and install the hardwood runner to support the front of the vise.

Careful, Practiced Assembly

Bar clamps and hex-head bolts with captive nuts connect the end caps to the benchtop. Note the installation of the benchscrew nut in the short end cap.

Installing the Tail Vise

In order to attach the tail vise, you'll need to make two guide blocks and one more runner. The outside guide block bolts to the underside of the end cap, and the inside block is bolted and glued to the underside of the top, where it forms the lower part of the vise jaw. (Again, look at the *Elevation Drawings* for these construction details.) The runner is bolted into a notch in the inner block and slides in the notch in the main jaw of the vise as shown in the *photo* on the next page.



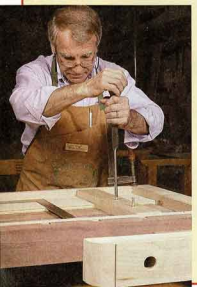
After clamping all the parts together and bolting the end caps, the final step in the glue-up is to install and tighten the threaded rod that reinforces the shoulder vise.

To assemble the tail vise, bolt the center guide rail to the fixed tail vise jaw and then bolt the outside guide block to the end cap. Finish up by installing the bench screw.

Final Details

For smooth operation of the tail vise, it is critical to make all the parts accurately and to be sure the runners are parallel to each other and to the benchtop. Before you install the benchscrew, move the tail vise through the full range of its motion by hand to check for binding and interference. Any misalignment or eventual sagging can be fixed by shimming the runners and rails as needed.

Once you have everything running smoothly, with as little slop as possible, you can install the benchscrew. Run it all the way in, center it in the clearance hole, and screw the flange to the rear jaw of the tail vise.



Attach spacer blocks to the underside of the benchtop where it meets the trestles. Then glue one maple "bullet" into each spacer block and drill mating holes in the tops of the trestles to locate the top perfectly each time you assemble the bench.

Making the Vise Caps

Next, make the vise caps. The two parts of the cap should be thicker and wider than necessary; you will trim them after installation. Miter the ends where they meet, then set the larger part of the cap onto the completed tail vise, with the inside of the miter aligned with the inside corner of the frame. Mark the bench dog hole locations from the underside, then drill and chop the corresponding holes in the top cap.

Finally, glue the two parts of the cap together at the miter, and assemble them to the frame with glue and clamps. When the glue dries you can plane them flush with the benchtop and with the outside surfaces of the tail vise.

Finishing Touches

At this point, you are almost finished with your bench. Just a few important details are left.

First, mount the top on the base. I use rock maple "bullets" to register the top to the base. Turn the bullets to 3/4" diameter as shown in the *Drawings*. Glue one into each of the two bearing strips on the underside of the benchtop. Drill mating holes in the top rails of the base so the bullets will register the top in the exact location each time you assemble the bench. After you install the bullets, drill through the top rails of the base for the 1/2" lag screws that secure the top.

Next, modify the benchscrew for the shoulder vise. The shoulder vise on this bench is designed to open to about 5½". When the vise is closed, you want the handle to come to rest about 1/2" from the arm of the shoulder vise. The stock benchscrew that I used for the shoulder vise was 2" too long, so I had to shorten it.

First, I punched out the roll pin that holds the screw into the handle casting. Then I used my reciprocating saw to cut off 2"

After gluing the backboard to the ends of the end caps, glue the plywood tool tray into the groove in the backboard and screw and glue it to the underside of the benchtop.

from the end of the screw. Now, I had to grind the end of the screw to fit back in the handle casting. So, I made a simple V-block jig to hold the screw at the proper height for grinding. (See *photo* at right.) I screwed the jig to my grinding bench with a single screw at the rear corner so I could pivot the jig toward the grinding wheel. When I reached the right diameter, I reinstalled the screw in the handle. This procedure worked very well and took very little time.

Building the Wooden Vise Jaw

Once you have bolted the top to the base and cut the benchscrew to length, you're ready to make the wooden vise jaw for your shoulder vise. I used a 1" thick piece of rosewood for mine, but any seasoned hardwood is OK. Make it a little wider than necessary so you can plane it flush with your bench after you install it.

The wooden vise jaw has an extension on the left end that fits between the shoulder block and the top rail of the base. It is connected to the benchscrew by a cast-iron foot that allows the jaw to pivot left or right to accommodate tapered or odd-shaped workpieces.

To locate the pivoting foot accurately, hold the wooden jaw in place and tighten the benchscrew against it (with the swiveling foot attached), making sure the open side of the foot faces to the right. Trace the outline of the foot onto your vise pad, then remove the pad and rout a 3/8" deep recess in it to receive the foot. This allows the jaw to open a bit wider, and it looks better, too.

Constructing a Wooden Stop

The wooden stop is another useful feature of this bench. It is simply a strip of tough hardwood — I used holly — that fits tightly into a rectangular mortise through the top (see the *Drawings*). A tap of

Shorten the shoulder vise screw 2" with a reciprocating saw, and then grind the end of the screw to fit in the handle casting. A V-block holds the screw for grinding, and a drywall screw in an adjacent piece of plywood acts as a stop.

a hammer or mallet from below raises it to working height for planing thin pieces of wood.

To make the mortise, I drilled a series of 1/4" holes with a brad point bit, and then removed the waste between them with a paring chisel. The mortise should slope about 2° from vertical, toward the right end of the bench. It's a good idea to make the mortise first, then make the stop to fit the mortise.

I like to finish my benches with Waterlox® wiping varnish. A few coats at the beginning and a little more from time to time keep the bench looking beautiful. Make sure to seal up the entire bench with the finish, including under the benchtop.

If you build my bench, you will have a friend forever. You will ask yourself, "How did I work until now without this bench?" Many years from now, your children will thank you, too.

Frank Klausz is a third generation Hungarian master cabinetmaker who runs a busy cabinet shop in New Jersey. Thanks to frequent contributor Ellis Walentine for his help with this article. Check Ellis' website at woodcentral.com.

Details Make the Difference

Small but important details elevate Frank's bench to the highest level of craftsmanship. The carved oil cup mounted to the underside of the tail vise, for instance, is a handy place to keep a little vegetable oil to lubricate anything that needs it, such as saws and plane soles.

Carved Oil Cup

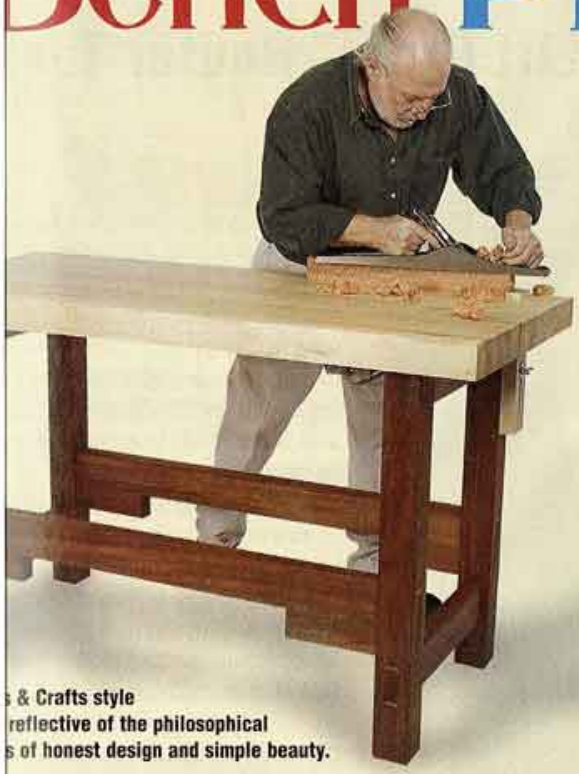
Leather vise liners are another delightful finishing touch featured on Frank's bench. The leather protects the jaws and the work. When it wears out or gets damaged, you can soak it off and replace it.

Leather Vise Liners

Ebony Crosscut Stop

And, of course, the fold-down crosscut stop at the end of Frank's bench is another detail that truly enhances the performance of his classic design.

Bench Philosophy



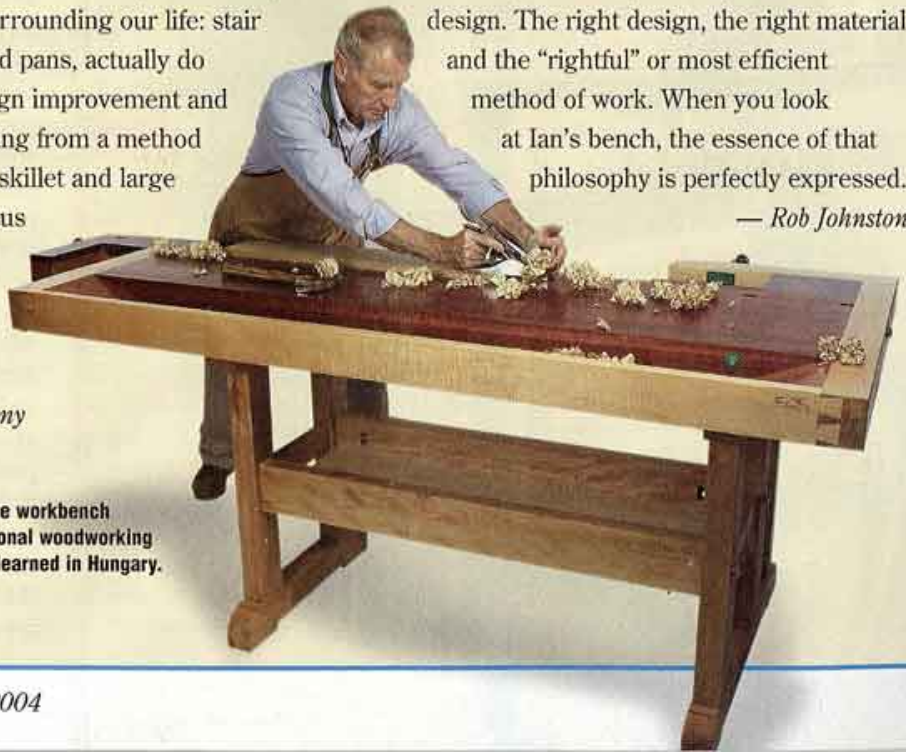
s & Crafts style reflective of the philosophical s of honest design and simple beauty.

hools ... One goal: craftsmanship of the highest level.

orkbench philosophy? At first blush many of us might find that concept amusing and start looking forward to the next article on "The ophy of Holding a Hammer." But closely examined, undane physical objects surrounding our life: stair ers, light switches, pots and pans, actually do significant history of design improvement and a cultural philosophy arising from a method k. (My kitchen's cast-iron skillet and large vok exemplify an East versus collision of culture and g "philosophy ... or d of work.") And so it is an and Frank's benches. nk told me, *"I learned all my woodworking skills on a bench like this, so naturally I feel the most comfortable with this design. It works! I would not know how I could improve on it."* The tradition that Frank was raised in is simply a method of work refined by years of improvement. His bench is perfectly suited to efficiently complement his woodworking techniques. An example is the tool tray: *"It keeps my frequently used tools — hammer, ruler, sanding blocks, dust brush — at my fingertips. If I want to clear my bench quickly, I just push everything into the tray; at the end of the day, I put everything away and sweep any sawdust or shavings up the ramps at the ends of the tray."* Elegant and efficient ... as Frank says: It works!

Ask Ian about the origins of his bench and he'll tell you, *"Bench design and working methods go hand in hand. My bench design and the working methods I use were developed by the furniture makers of the English Arts and Crafts movement ... and underscore the close relationship between design and methodology."* The British Arts & Crafts tradition is based on the concept of beauty in simple and honest design. The right design, the right material and the "rightful" or most efficient method of work. When you look at Ian's bench, the essence of that philosophy is perfectly expressed.

— Rob Johnstone



Frank's classic European style workbench perfectly matches the traditional woodworking techniques that he long ago learned in Hungary.

JessEm's Mast-R-Lift Excel™ Router Table

By Mike McGlynn

Most woodworkers I know, myself included, have favorite tools. Generally, this appreciation comes from a combination of utility — the tool works great — and art: the tool is made in a top quality way. Amongst my tools, my Lie-Nielsen block plane and Starret #8 combination square fit this category.

I mention this combination of reasons because it is exactly how I felt after reviewing the new Mast-R-Lift Excel™ router table from JessEm, along with their Mast-R-Fence™, Mite-R-Slide™, and router table stand. To put it succinctly: These tools operate flawlessly and are beautifully built.

Know-nothing Assembly

When I received this group of tools, I approached their assembly as if I were a complete novice ... in other words, I followed the assembly directions exactly as written.

I started with the stand. It's made of heavy gauge, black anodized aluminum extrusions. The directions were explicit and the hardware was all top quality, with all of the nuts being the nylon insert locking type.

Assembling the Mast-R-Lift and securing it to the base were simply matters of attaching the crank handle and then joining the table to the base with the included cap screws. A thoughtful touch here is the inclusion of a correctly sized Allen wrench to install the cap screws. The third step was to assemble the Mast-R-Fence and attach it to the table. As in the previous steps, this was easily accomplished. The final assembly was the Mite-R-Slide, actually the most complex assembly by far, but the directions were perfect and left no room for questions.

Tools by the Numbers

Master-R-Lift Excel

Phenolic Table	32" x 24"
Dust Port	2½" O.D.
Weight	46 lbs.
Warranty	1 year
Street Price	$529

Rout-R-Tablestand

Height	35"
Weight	17.5 lbs.
Warranty	1 year
Street Price	$159

Master-R-Fence

Length and Height	36" x 4"
Dust Port	2½" I.D.
Weight	18 lbs.
Warranty	1 year
Street Price	$179

Mite-R-Slide

Detents	Each 5° and at 22½°
Weight	16 lbs.
Warranty	1 year
Street Price	$229

866-272-7492 • ***www.jessem.com***

Made in Canada

Expert Examination

When the assembly was done, I was able to start analyzing the fit, finish and practicality of the JessEm setup. Most of us woodworkers have had the experience of looking at a tool (or, worse yet, buying it), and then wondering if the manufacturer knew anything at all about woodworking, or had ever asked a woodworker for an opinion. It is obvious that the people at JessEm are either woodworkers themselves, or have received extensive input from people who work with wood. I'm inclined to suspect it's both.

> **"When I received this group of tools, I decided to approach their assembly as if I were a complete novice ... In other words, I followed the assembly directions exactly as written."**
>
> *— Mike McGlynn*

The Mast-R-Lift

Lets start with the centerpiece of this system, the Mast-R-Lift. The first thing I observed was that the top was made of 3/4" phenolic. This is just about the perfect surface for a router table; it is strong, flat, smooth and slick. The only top that would be possibly better would be ground steel, but that's not as slippery. My second observation concerns the construction of the lift itself, which is made of heavy machined aluminum, steel and bronze. One of the most innovative things about this lift is the integrated, below-the-table dust collection port. One of the great drawbacks to a router table is all the dust that gets sucked down into the router motor. This is especially true when routing in the middle of a piece, where the fence-mounted dust port has absolutely no effect. God knows how many routers have, literally, bit the dust from sucking in chips and dust while being used in a router table. This innovation alone may double the life of any router used extensively in this router table.

The last innovative thing about the lift is what JessEm calls their Microdial. This is a precision graduated dial, about 3" in diameter, that is mounted under a clear cover on the right-hand corner of the table and is connected to the lift gearbox. Using the front-of-the-table crank and reading the dial, it is very easy to make vertical adjustments as fine as .001". In addition, the dial can be zeroed out at any position. At first I thought that this level of accuracy was a bit much for woodworking, but the more I used it, the more I liked it. It's similar to how I have gotten used to always having a .001" increment dial

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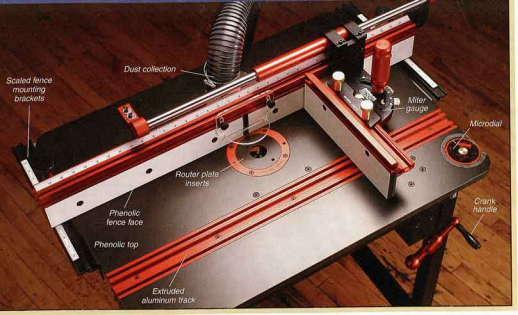

Featuring adjustments and accuracy that stand head and shoulders above what woodworkers regularly associate with router tables, this JessEm router table system is a premier product. The author found little to complain about and much to praise when he put it to the test. From the phenolic top to the machined aluminum components, its quality and durability are uncontested.

caliper on hand. The crank handle, by the way, is a lovely piece of machining that is a pleasure to use.

On to the Fence

Most router table fences seem to fall into two categories: sturdily built, or versatile. For some reason these two features seldom seem to be found in the same fence. The JessEm Mast-R-Fence hits this combination right on the head. The basis of the fence is a very heavy L-sectioned aluminum extrusion with a multitude of T-slots. The faces of the fence are also made of thick phenolic. These faces are easily adjustable for the bit opening. JessEm recommends using the phenolic faces as patterns to make your own, more disposable, faces. To this end, it would be nice to have a drawing of the faces and their holes, instead of having to measure the phenolic ones. In addition the fence comes with two shims of different thicknesses for jointing. The fence mounts to the table via L-shaped extrusions that mount to the edge of the table and contain adjustable scales. The dust collection on the fence is well thought-out and, in combination with the under-the-table dust collection, makes for nearly dust-free routing. I do have a slight worry about the long-term life of the clear polycarbonate dust shroud. It might last forever, but I would prefer phenolic or metal.

The Miter Gauge

The final part of the JessEm system is the Mite-R-Slide sliding miter gauge. My first reaction to this unit was to check if JessEm makes an aftermarket miter gauge I could use on my Unisaw (They don't... but they should). I've looked at a lot of aftermarket miter gauges, and this one easily tops them all in beefiness, quality and accuracy. The lever to switch from indexed movements to free floating was easy to use and, like the rest of the setup, nicely made. I was dubious at first about the whole overhead linear bearing/guide bar setup. After using the gauge for a while, I came to appreciate the ability to quickly move it out of the way and not worry about dust in the miter slot.

Looks Great: How Does it Work?

To put the JessEm system through its paces, I used three different operations to test whether the equipment was accurate and easy to use. First, I would make a coped stile and rail joint. Then I would move on to milling an even set of flutes. And for the final test I would joint the edges of several pieces of 1/8" - 3/4" wood. I chose these three tests because they are often a pain or, at the very least, time-consuming jobs on a more basic router table.

The problem that often crops up with stiles and rails is the necessity to make small vertical adjustments to accommodate slight differences in stock thicknesses. The pain with fluting is the need to make accurate, even adjustments of the fence. Lastly, when jointing on a router table if the fence isn't perfectly straight, or the shims aren't perfectly accurate, you end up with curved or bowed edges.

For my stile and rail test, I milled up several 3/4" by 2" pieces of birch. I intentionally made several pieces 1/64" thicker. I did this to test the ability of the Microdial, in combination with the crank adjuster, to accurately adjust the router vertically in small increments. It is my experience that when you mill up a large pile of parts that are supposed to be the same thickness, they will often end up being slightly different. This can be attributed to several things, including different densities of wood or planer head movement. The upshot of this is that when you make rails and stiles you need to make minute adjustments to get the panel slot to line up.

Using a stile and rail router bit set, I milled several pieces of stile. The first thing I noticed was how well the dust collection system worked — clean as a whistle without a bunch of chips getting sucked into the motor. Secondly, the router seemed to cut especially smoothly due to the vibration limiting mass of the lift and table.

After switching to the rail bit, I milled the pieces that were the same thickness as the stiles. To prevent blowout I installed an MDF face on the Mite-R-Slide. The mass of the miter gauge and the smoothness of the linear bearing made for very solid, sure and smooth cutting. (It certainly made me question my use of a wooden block held against the fence of my shop-built router table ... for the last 18 years!)

Turning to my second group of thicker pieces, I used a dial caliper to determine that they were in fact .019" thicker than my other rails. Using the crank, and reading the microdial, I raised the bit .019". After milling my thicker pieces, I checked their fit with my rails and was pleased to find a perfect fit.

To test the accuracy of the fence, and its scale, I milled four evenly spaced 1/4" flutes in a 3½" wide

continues on page 72 ...

Laguna replaces wheels or bearings with blocks of ceramic. These blade guides are stationary to dampen vibration and keep things cooler.

Dialing in blade tension on the Laguna was easier than on the others, thanks to a tensioning gauge with a large scale and numeric readout.

Changing blades always feels a bit like wrestling a shark, but Laguna makes the task simpler with a blade guard that hinges open.

na 16HLaguna 16HD

Laguna 16HD
Street price: $1995
HP/Amperage: 4½/19
Weight: 410 lbs.
Blade length: 145"
Table size: 22¾" x 16½"
Resaw capacity: 13½"
Phone: 800-234-1976
www.lagunatools.com

waiting for the here's no waiting for the blade to spin down with (left), a safety feetoothrake (left), a safety feature every saw should have. -made saws in theh Italian-made saws in this test have sturdy, cast-iron ning mechanismstade tensioning mechanisms and oversized tension springs r're built to handight). They're built to handle the tensioning requirements saw blades that q wider resaw blades that can exceed 20,000 psi.

blades, it's reasonably painless, but installing a wide resaw blade was more of a feat. The lower blade guide is tucked into a cramped space under the saw table, which made it difficult to adjust. I had to tip the table to loosen the guide mounts each time, and the Allen bolts that hold them in place tend to fill with sawdust that restricts wrenching them loose.

Finally, only extended use will prove whether the blade tensioning system on this saw will be up to the task of routine resawing. The coil of the blade tension spring is about half the thickness of the Laguna and Mini Max saws. JET's upper flywheel mount is made of thinner, angle iron components rather than the heavier iron castings on the other two saws. Still, given its resawing capacity and performance in this test, the JWBS-16 is a healthy step up from a 14" conventional band saw, especially if resawing isn't something you'll do day in and day out.

Laguna 16HD

With the JET and Laguna saws standing side by side, it's easy to see why the Italian-made Laguna 16HD is more than double the price. Starting at the power plant, Laguna sent me a test saw with a massive, 4.5 HP American-made Baldor motor. It's a well-known fact that Baldor makes superior electric motors, and Laguna recently switched to Baldor across its product line.

Overall, the Laguna offers almost a quarter more table area than the JET, 15% of resawing capacity, and heavier, precision-balanced solid flywheels. Torben Helshoj, president of Laguna Tools, says these flywheels deliver more inertial blade energy to keep the blade spinning through heavy resawing. The saw frame has more internal bracing in the upper cabinet than the JET saw to support beefy blade tensioning components, a large upper blade guide and that heavy flywheel.

For ripping or resawing tasks, the 16HD has a versatile high/low fence beam. In the "up" position,

continues on page 82 ...

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Price Points From Laguna

Laguna Model LT 14

Laguna offers several different resawing band saws to suit a range of budgets. The company recently reengineered its LT 14 model with a larger 2 HP motor and boosted the resaw capacity from 8¼" to 12". It sells for $1,150. Laguna also now offers a Bulgarian-made LT 16 band saw with a 2½ HP motor and 12" resaw capacity for $1,295. Both saws come with rip fences, footbrakes and Laguna's unique ceramic blade guides.

Laguna Model LT 16

the aluminum fence provides 5½" of vertical support for tall workpieces. Flipped to the "low" position, it hugs the saw table tightly for cutting thin veneer or laminates. The fence offers more blade drift adjustment than the JET fence, but I wish it came off the saw as easily. As is, you have to remove the blade and slide the fence off the front rail or unbolt it from the fence clamp.

Laguna has a unique blade guide system. Four blocks of ceramic positioned in aluminum housings keep the blade tracking laterally, and a pack of ceramic supports it from behind. Ceramic doesn't conduct heat like steel, so blades can rub against the guides without overheating. A pair of Allen bolts make each side guide fairly easy to adjust, and the thrust guide locks in place with a large thumbscrew. The only problem I can imagine with these guides is that in the event of a blade break, the brittle ceramic could chip. Otherwise, Torben says these guides should last indefinitely.

Regarding other key adjustment areas, the blade tracking and tensioning wheels are large and comfortable to crank, and the saw table locks where you put it on huge, cast-iron double trunnions. A sprocket-and-tooth mechanism controls the table tilt.

It seems European-made band saws adhere to higher safety standards than those made elsewhere, because this Laguna saw is nicely appointed with safety features. A large, bump-style kill switch above the power switch is easy to reach in an emergency, and there's a footbrake to stop the lower flywheel and motor in a few seconds. A trip switch on the saw frame makes it impossible to start the saw when the door is open for maintenance or blade changes.

Blades install through a slot in front of the saw table. I really liked the upper blade guard, which hinges open to make threading the blade more convenient. With the blade in place, the blade tension scale is easy to interpret when choosing a tension setting.

Once everything was dialed in, the Laguna delivered where it counted in my cutting tests. Hard maple and resin-filled pine were no match for the monster power driving the blade. General vibration was almost nil. Dust collection on this saw was decent, but it could probably be improved if the dust port were closer to the lower blade guides instead of near the saw's base.

There's no question in my mind that this Laguna 16HD is tailor-made for resawing all day every day. When compared with JET's sawing performance, a 4.5 HP motor seems excessive, but you can be sure it won't let you down in the heaviest cuts. If a lower priced Laguna is more in keeping with your budget, you can also buy this saw with a 3 HP Baldor motor for $1,995. Or see the *sidebar* on this page for more Laguna saw options.

Mini Max MM16

Mini Max's MM16 shares many of the same rugged features as the Laguna 16HD and also comes from Italy. The flywheels are 1/2"-thick cast iron and precision balanced to minimize vibration. The upper flywheel mount and blade tension are similar to Laguna's, with a cast-iron yoke sliding in a pair of channels on a cast iron base. It seems downright bulletproof. For optimal blade support, Mini Max suspends the upper blade guides from a massive 1½"-diameter post that moves on an iron mount.

Both the side and rear blade guides on this saw are Euro-style wheels. A combination of knurled adjuster posts and thumbscrews make these guides simple and painless to adjust by hand.

Blades load from in front of the saw through a table slot. Installing blades was easiest on the Laguna, but the task isn't tough on the MM16 either.

continues on page 84 ...

Tilting the table for bevel cuts is a tool-less operation. A large T-lever unlocks the table, which moves smoothly on a shaft and sleeve mechanism instead of the typical trunnions. It locks down tight, and the tilt scale is large and easy to read. The blade tension scale, on the other hand, has tiny demarcations that are too close together to interpret clearly. It wasn't much help for tensioning.

I liked the rip fence on this machine. The beam is milled cast iron. Loosen one bolt, and you can adjust it left or right to compensate for blade drift. The fence lifts off the front rail when you don't need it and clamps firmly in place when you do. The only glitch is the magnifier lens for indexing the fence on the front rail; it's located too far off the measurement scale and introduces parallax distortion.

Mini Max includes all the right safety features here, including a footbrake, motor trip switches on both the upper and lower frame doors and a kill switch next to the power switch.

Put all these features together, and the MM16 performed like a heavyweight in my cutting tests. Its 3.6 HP, 220-volt motor powered through each cut quietly and without issue. The flywheels, tensioning system and blade guides provide a strong and probably over-engineered platform for accurate cutting. Is all the excess metal worth it? Well, two grand isn't for every budget, but it buys you a rock-solid band saw that makes resawing seem like child's play.

Chris Marshall is a Woodworker's Journal *contributing editor.*

Mini Max MM16

Street price: $2095
HP/Amperage: 3.6/16.8
Weight: 488 lbs.
Blade length: 149"
Table size: 24" x 18"
Resaw capacity: 14 1/4"
Phone: 800-975-9663
www.minimax.com

Mini Max MM16

Mini Max outfits the MM16 with an oversized upper blade guide support and huge guide post to help keep the blade traveling in a flat plane from front to back and side to side.

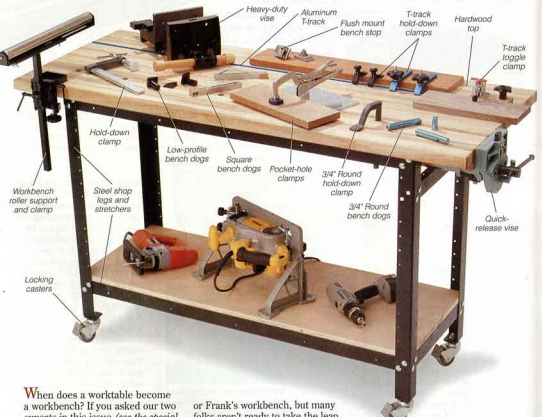
Knurled posts and large thumbscrews provide tool-free adjustments on the wheel-style blade guides of the Mini Max. The author found these the easiest to adjust.

Loosening one bolt on the Mini Max rip fence allows the beam to swing right or left for making blade drift adjustments.

Both the Mini Max (above) and Laguna saws feature solid-style, precision balanced flywheels. The added weight provides helpful inertia during cutting to keep the blade spinning.

An Instant Workbench?

By Rob Johnstone



When does a worktable become a workbench? If you asked our two experts in this issue *(see the special workbench pullout section starting on page 43)*, they would likely give you two different answers ... but their criteria would be similar: A worktable becomes a workbench when it performs the function of a workbench. And that is where a woodworker's method of work begins to define the answer.

While the table shown above is not a workbench in any traditional sense, it might just be the answer to many regular Joe (or Jill) woodworkers' needs as they learn the craft. This is not to say that all of us wouldn't benefit from either Ian or Frank's workbench, but many folks aren't ready to take the leap, committing the time and resources required to make either of those beautiful benches. So what might be a workable "Plan B"?

There are many actual workbenches on the market that are serviceable, but the solid hardwood top and metal frame components we assembled above (for under $300) are even less expensive and will serve quite well. Drill some dogholes, mount a vise, and you have a useful addition to your shop. Add to that the bounty of accessories available, and your woodworking just got a lot easier.

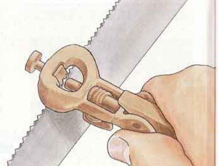
Instant Bench Parts

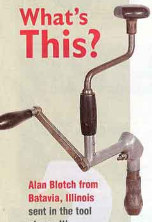
Hardwood Top #22024.....$189.99*
*Legs** #60749.....$43.99*
*18" Stretchers** #60757.....$18.99*
*48" Stretchers** #60780.....$37.99*
**Additional freight charges will apply.*
***Includes four of each.*

To order the above listed supplies, call 800-610-0883 and mention code W4103.

The various casters, vises and other accessories pictured above are available from Rockler Woodworking and Hardware: 800-279-4441 or visit www.rockler.com.

Ready? Set!





What's This?

Alan Blotch from Batavia, Illinois sent in the tool above. It's obviously a brace, but we're looking for specifics here. Know what it is? Send in your answer for a chance to win a prize!

If you have your own woodworking mystery tool (or the answer to this issue's entry), send it to Stumpers, *c/o Woodworker's Journal, P.O. Box 261, Medina, Minnesota 55340. Or send us an e-mail:* jtakes@woodworkersjournal.com

Sets for Different Saws

I've often seen the type of tool shown in [the June] *Stumpers* in antique shops described as "strange-looking pliers." It is, of course, a saw set, probably made by William Morrill in the 1880s or early teens. Into the 1940s, every carpenter carried several hand saws, each filed and set for a specific type of work or wood. Keeping those saws in top condition was a constant process, and no one would hire someone to do what one could do himself. One might need a different saw set for different saws. This resulted in much interest in designing and improving the saw set, much like the old story of building the better mousetrap.

— Tom Higby
Fowlerville, Michigan

Setting Up a Saw Set

It is indeed amazing, Tom, how many saw sets are out there. (WJ described one for band saws in our *December 2002 Stumpers* column.) This one, belonging to **Jim Knaub** of Etters, Pennsylvania, is "for setting the teeth on crosscut and bucksaws," says **JohnDeYoung** of Killeen, Texas. **George DeRosia** of Barnes, Wisconsin, helped his dad with logging jobs in the 1940s and 50s, and there were "no chainsaws for most of us then," he said.

Instead, "the tool is placed over the sharpened saw tooth and the handle given a squeeze to close on the tooth and bend the tooth to the desired set angle," explained **Bill Capaul** of Coeur d'Alene, Idaho.

Specifically, says **Oliver Cook** of Knoxville, Tennessee, "when the handles are squeezed together, a small triangular rod is pushed forward to press the tooth of the saw against the beveled anvil held in place by the wingnut protruding to the front of the tool. Loosening this wingnut allows the bevel anvil to be adjusted up or down to control the amount the tooth gets bent, or 'set.'"

"The lower thumb screw," says **Chuck Ward** of Redmond, Oregon, "adjusts the pressure bar to accommodate the thickness of the saw blade."

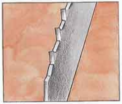
Tyrone L. Erickson of Asheville, North Carolina, adds, "Adjusting the tool to have a slight 'set' (angle away from the flat blade) to the tooth will result in a less aggressive cut and a finer kerf. A greater 'set' will result in a more aggressive cut and a wider kerf. Setting alternate teeth only to one side will result in a flush cut."

Les Sykes of Mission Viejo, California, had a woodworking teacher whose method of judging a good set on a hand saw was to "hold its teeth up by the handle at an incline and let a sewing needle slide down its length."

And **Oliver Cook** informs us, "My grandson thinks I'm an antique, and now you give credence to his thinking. I still use a model of the [June] mystery tool."

— Joanna Werch Takes

June's mystery tool is one of many varieties of saw sets — this set is for crosscut and buck saws.



With June's mystery tool, "set is applied to every other tooth, and then the tool is reversed to do the other half, so the set of adjoining teeth is in opposite directions," says David Farran of Waverly, Iowa.

WINNER! *Laura Chapman of Brockport, New York, will receive a* Delta ShopMaster Model CL180WWK Cordless Tool Kit. *We toss all the Stumpers letters into a hat to select a winner.*

Smooth

Table on New Delta Saw

Delta's new 36-682 is one of four new 10" contractor's saws the company is offering this year. Like all of them, it has a deluxe miter gauge with nine positive stops, including the standard 45° and 90°.

Equipped with the Biesemeyer® fence system of welded steel with laminated plywood faces, it's accurate to within 1/64" using the scale system. The 36-682 has one cast-iron extension wing on the left side and a laminated extension to its straight grind table surface on the right — a smooth, flat work area that has visual appeal.

A two-capacitor, 1½ HP, 120/240-volt motor powers the saw while a see-through blade guard with splitter and anti-kickback fingers protect the user. The 36-682 has an average street price of $799, while the other saws in this line — which come with different fence options — start at about $500. *To find out more about them and the 36-682, call 800-223-7278 or visit* www.deltamachinery.com.

French (Polish) Revolution

If you have tried to French polish in the past, but had problems, I have good news for you. Zinsser has announced the release of its newest product, Bulls Eye French Polish. Like its namesake, it is a self-sealing shellac coating designed to pad or rag onto raw wood as well as under or over any other finish. But unlike traditional French polish, it is as easy and foolproof as you can imagine. Even first-time users will get great results, no matter how they handle the pad. As Zinsser's Gene Hoyas says, "It puts tradition within the reach of ordinary woodworkers."

Laced with an odorless solvent additive that evaporates as the finish dries, it is so resistant to sticking and marking that you can work with a balled-up rag (as opposed to a properly made pad), work too wet (the death knell for plain shellac), or use it as a wipe-on/wipe-off finish, instead of padding it on. Because it is so user-friendly, it allows you to build up finish more quickly than regular French polishing techniques.

With apologies to those, myself included, who've spent years perfecting their skills with the polish pad, this new material is about to level the playing field. It will make everyone's job easier and their results better, for a price of $12.99.

For more information, visit www.zinsser.com or call 732-469-8100.

— Michael Dresdner

Starrett's ProSite For Perfect Miters

Even though it might remind you of high school math classes you'd rather forget, the Starrett ProSite Protractor is actually meant to make your life easier by reducing the need for calculations as you figure miter cuts. Simply measure the desired angle with the protractor and set your saw. A red scale and arrow show the angle for a miter joint, while the black arrows and scale provide the information needed to fit a single workpiece to an angle.

Cut the piece, and you have a perfect miter. "The ProSite Protractor," says Starrett Hardware Division Manager, Michael Connor "saves time and reduces waste." Street price is about $50. *For more information, call 978-249-3551 or visit* www.starrett.com.

What is the prettiest, most compatible and long-lasting finish for the aromatic cedar chest I'm building?

Clifford Sorenson
Kathryn, North Dakota

Let's see... you want a beautiful, long-lasting, clear, easily repairable finish that will cure over aromatic cedar. Sounds like shellac to me. It fills the bill, and then some.

You are correct in being concerned about compatibility. Aromatic cedar is one of only a very few woods that can prevent oil-based coatings from curing properly, but shellac will cure on it.

Widely regarded as one of the most beautiful finishes, it brings out the best in wood, adding depth and clarity. Unlike oils, which tend to darken after years of exposure to sunlight, shellac retains its clear color even when exposed to ultraviolet light. It is the most repairable of all finishes, allowing virtually invisible repairs decades after it is applied. You can also rejuvenate it indefinitely by adding extra coats using a brush or spray gun, or you can pad it on as French polish.

Just in case that's not enough to convince you, shellac is also fast-drying, user-friendly, easily reversible (in case the worst happens), and the only solvent it emits when drying is ethanol, or "grain" alcohol. That's the same alcohol you ignite when making banana rum flambé, or flaming cherries jubilee in brandy. I'm even told that some folks (I won't mention any names) have been known to drink ethanol in the form of beer, wine, and "the hard stuff," but of course, that's mere rumor.

— *Michael Dresdner*

For simply sending in his question on finishing cedar, Clifford Sorenson of Kathryn, North Dakota, wins the Olympic Inferior Wood Finishing Kit *shown at left.*

A variety of masking tapes, some fairly new to the market, are now available. Here the author demonstrates how he burnishes green lacquer tape. Rolls of triangular and corner tape can be seen at the top of the photo and in use on the board.

on pigmented stain to give a mottled burl texture to the contrasting blocks. When the board was done, I masked it, exposing only the last two inches around the edge. These got a thick pigmented glaze, which I wiped with fine steel wool to make a grain pattern going 90 degrees to the edge of the table. Miters were made not by masking, but by holding a piece of coarse sandpaper, rough side down, over the wet glaze while creating the directional lines with steel wool. The rough grit sits over the wet glaze without smearing it, creating a very effective masking shield.

The stringers were stained directly into the raw wood. I first masked the thin line that would become the stringer, then sealed all the rest of the board. After removing the stringer masking, I masked on either side of the raw stripe before staining the wood. For the inlaid fish, I cut the shape out of clear book cover material, then pressed it down, protecting both the unstained areas and the stringers. A light spray of toner lacquer created the inlay.

Michael Dresdner's latest book, Wood Finishing Fixes: Quick Answers to Over 175 Most Frequently Asked Questions, *is available from Taunton Press.*