FREE! PULLOUT PATTERN

10 HOME-SHOP BRAD NAILERS See page 66

WOODWORKER'S JOURNAL

August 2004 Vol. 28 No. 4

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Ultimate Angle Jig

Fast-and-easy raised panels on your table saw!

Benchtop Tools

How much do you really save?

PLUS:

- Gluing Secrets
- Garden Bench
- Oak High Chair
- Introduction to Intarsia

Gluing Secrets Revealed

Gluing up stock is such a part of woodworking that it's sometimes easy to overlook. For many, it's a process to work though and get behind you ... until you run into trouble. Then you start looking for a better method. To help out, we've put together some of the Journal's *favorite gluing tips.*

Glow in the Dark Glue

Chris Marshall, one of WJ's contributing editors, clued us in to this keeper. Use Blacklite™ added to your favorite glue, and stray glue marks and fingerprints will shine out a warning under a black light. (See the photo on the opening page.) Just one ounce per gallon of glue will do the deed. In this case, an ounce of prevention is worth a perfect stain job. And one more thing: some glues already have fluorescents (the stuff that glows under a black light) in their standard formulation. Franklin's HiPURformer™ is one example. So get your old black light out of the attic (and while you're there, grab those tie-dyed T-shirts, too; they're back in style), and put it to use in your shop.

Just a few drops of a fluorescent compound like Blacklite will allow you to see glue marks and smudges clearly. As shown in the photo on page 27, the errant glue will stick out like a sore thumb(print).

Big, Flat and Far too Wide

It seemed so easy in your head ... gluing that wide panel to a wooden substrate ... and then you tried to figure out how to clamp the thing until the glue had cured. Rats! But don't fear, Rick White, the *Journal's* only practitioner of "White Magic", will help you pull a rabbit out of your ... um ... hat. As demonstrated in the photo below, combine square areas of contact cement surrounded by your woodworking glue. The contact cement acts like a clamp until the glue cures. As Rick says, this is really useful when you are fighting gravity in a vertical application. No muss, no fuss. It is a bit like magic after all: look Ma, no hands (or clamps)!

Dangerous Curves — The Jig is Up

Wood, given its druthers, grows pretty much in a straight line ... and sawyers prepare stock in the same manner ... straight and true. This is all well and good until a woodworker gets it into his head to build a non-linear project, like a round picnic table for example. How do you get that straight stock to go in a circle? The easiest way is dry-bent laminating. John English, our contributing editor, used that technique to build up the apron for his Spanish cedar table. Clamping three 1/4" pieces of stock around a jig and

5 Glue-up Quick Tips

1. When using polyurethane glue, moisten both edges of the joint with water just before clamp-up.
2. For best results when working with oily woods such as teak or cocobolo, wipe down the glue joint with acetone or alcohol before applying the glue.
3. Hide glue has absolutely no glue creep once it has cured.
4. Cut one long side of an old credit card with a pinking shears to create a serrated edge. Use it to evenly apply glue to large areas.
5. When gluing wood with epoxy, a rule of thumb is: the longer the open time of the epoxy, the better the bond will be.

Contact cement is a great way to hold large panels together until wood glue can cure.

Dry bent lamination is one of the best ways to curve wood. Once cured, the glued-up stock will retain the exact shape of the mold it was clamped to.

using waterproof glue (like Franklin's new Titebond III®), he had a perfectly shaped table apron in no time. One key advantage to curved laminations is that there is almost no springback ... the glued-up curve stays true to the jig's shape.

Quick! Hide the Edges

Hardwood veneered plywood or MDF are the mainstays of modern cabinetmaking. These manufactured panels are durable, dimensionally stable and beautiful. But their edges are ugly. The question is, how to hide those edges and make the panels look good? *Journal* editor, Rob Johnstone, has trimmed panel edges using every trick in the book, but his favorite is one that may surprise you. He glues a hardwood strip between the panels and then rips the glued-up pieces apart on the table saw — leaving exactly 1/8" of solid hardwood on the panel. By clamping the panels to the hardwood strip, you get a much better glue joint. Now you can use an 1/8" bearing guided roundover bit in a router (Rob prefers a laminate trimmer) to clean up the slightly oversized edging, and the panels are perfect. Plus, the 1/8" hardwood edge is much more durable than a thinner veneer ... ironed on or glued.

Sandwich a hardwood strip between two pieces of hardwood veneered plywood. After the glue has cured, rip them apart on the table saw.

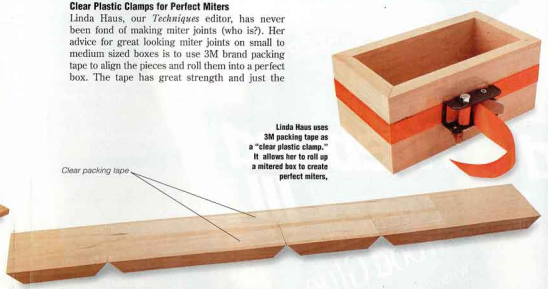
A Woodworker's Work is Never Done

Contributing editor Mike McGlynn is seemingly an endless well of slick woodworking techniques. Attaching veneer, especially wavy veneer, is a particularly trying piece of work in most cases. But Mike uses regular woodworking glue and a household iron to make short work of that task. Simply apply the glue to both the veneer and the substrate (in this case, a plywood shelf with its edges trimmed with mahogany to match the crotch-grained mahogany veneer) and let the glue dry completely. Then place the glued faces together and, with a very hot iron (see the photo above), smooth the veneer in place. It will bond immediately and not move a micron. (So be sure to have it where you want it when you start!)

Wavy veneer can be hard to handle, but Mike McGlynn's ironing trick tames this trying task.

Clear Plastic Clamps for Perfect Miters

Linda Haus, our *Techniques* editor, has never been fond of making miter joints (who is?). Her advice for great looking miter joints on small to medium sized boxes is to use 3M brand packing tape to align the pieces and roll them into a perfect box. The tape has great strength and just the right amount of elasticity for the job. It is also clear, so as you apply clamps to the box and square up the assembly, you can visually check the miters. This technique also keeps most of the glue squeeze-out inside the box which, in most cases, is preferable. Linda's toolbox is never without her clear plastic "clamp."



Linda Haus uses 3M packing tape as a "clear plastic clamp." It allows her to roll up a mitered box to create perfect miters.

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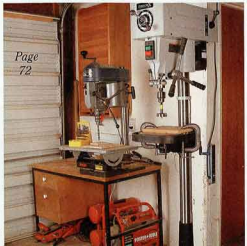

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Woodworkers

Techniques

Tools

Something for Everyone?

Bits — Over the Top?

OK, [I was] just looking through the *April 2004* issue. Carved spirals on the lathe, Arts and Crafts Library Bureau, inlaid tables with granite tops. Fine figured walnut chest with raised panels and fluted panels. Looks good ... Then eight, count 'em, eight whole pages on twist drill bits. I wish you all would get over your identity crisis! Maybe next month we can have a six-page article on the nail set.

Steve Day
Argillite, Kentucky

Editor's note: We did not make up the next letter. We swear.

Thanks for the article on lowly drill bits ... things do change and articles like that help. How about one on the even more lowly screw?

Dave Hoffman
Russell, Ohio

WJ Responds:

For an article on "the lowly screw," please see page 34.

Mail Call! Contact us by writing to "Letters", Woodworker's Journal, 4365 Willow Drive, Medina, Minnesota 55340, by fax at (763) 478-8396 or by e-mail: letters@woodworkersjournal.com We ask that all letters, including e-mails, include a mailing address and phone number. We reserve the right to edit for length and clarity.

His Lumber's Rolling

Enclosed, you'll find a picture of your Rolling Lumber Rack *[December '03]* that I recently built for my shop. I really liked your schematic drawing, and now have stained it in cherry. Looking good!

Gerald E. Huffman
Chillicothe, Ohio

Improving a Flip-stop

In the *December '03* issue, Bill Hylton describes how to make the flip-stop ["Bill's Excellent Shop Helpers"]. If a 3/8-16 stud is used in place of the 1/4-20 studs, precise adjustment can be made in increments of 1/16" in one complete turn.

Blaine W. Moyer
Telford, Pennsylvania

Sea Chest Shows Solutions

Enclosed are some pictures of a storage chest I made over the winter months. The chest was loosely based on a chest seen in a British antiques magazine. The material I used was salvaged from old church pews; the woods I used were poplar and some pine.

Inspiration from Bill Hylton's chest project — including the hand-forged hardware — helped Henry Lahneman finish his own.

Gerald Huffman found Chris Marshall's lumber rack helpful in organizing his shop.

I was overjoyed to see your *March/April* issue. The article by Bill Hylton ("Eastern Shore Chest") came almost too late — I was nearly finished — but two items stood out. One was the till and the till lid, which I installed in my chest. The second: I was not happy with some of the hardware I intended to use. Noting the phone number of Fisher Forge had the same area code as my own, I called up Dave Fisher and made a trip to his shop. The gentleman is an artist. He helped me with the style of hinges and then made them at a fair price, all within a week. All in all, this was a neat project. Keep up the good work in your magazine.

Henry C. Lahneman, Jr.
Coopersburg, Pennsylvania

Jigsaw History

The person who wrote in ["Talkin' Tools," (*Letters, October 2003*), stated the electric jigsaw "was not put on the market until about 1947."

Enclosed is a picture of myself using an electric jigsaw, given to me by my dad. I was seven years old. It was purchased from Sears, Dec. 14th, 1941, at a cost of $7.16.

I know not many things of metal were made after the war started, so I guess we were lucky to purchase the jigsaw at that time.

Edward L. Albrecht
Clarksville, Ohio

Edward Albrecht's boyhood memories include what was probably one of the first electric jigsaws on the market.

A Bedtime Story

I have been a fan of Rick White's articles for many years, and save many back issues of the *Journal* just for his projects. Recently my son was redoing a bedroom for his daughter, and I remembered Rick's bed project ["A Bed Designed for Reading"] from the *February 2001* issue. Attached are a couple of photos of my completed version of that project. I decided to hit the wood lightly with dark walnut Danish oil, to bring out the grain in the ash. I think it turned out great, and my granddaughter loves it.

DeWayne Landwehr
Anderson, Indiana

DeWayne Landwehr's granddaughter will have no trouble reading in bed. The Indiana woodworker decided to use dark walnut Danish oil to bring out the grain in the ash.

Safety First: Learning how to operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary guards have been removed from equipment shown in our magazine. We do not recommend using this equipment without safety guards and urge readers to follow manufacturers' instructions and safety precautions.

Sticky Arbor Nuts; Non-stick Coatings

Contact us by writing to "Q&A", Woodworker's Journal, 4365 Willow Drive, Medina, MN 55340, by faxing us at (763) 478-8396 or by e-mailing us at: QandA@woodworkersjournal.com
Please include your home address, phone number and e-mail address (if you have one) with your question.

How forceful do you have to be with your arbor nut? Kelly Mehler has tips for getting it just right: not too snug, not too loose.

Q Why do many woodworkers think they need a special jig to tighten down the nut on a table saw?

My woodworking teacher taught me to do it easy as one, two, three:

1. Place the blade and shim on the motor.
2. Add the nut till it just touches the blade.
3. Turn on the saw.

Since the nut is threaded on in reverse, the rapid initial torque of the turning motor is more than enough to tighten the nut the proper amount. Then when you have to loosen the nut, it takes very little force to unscrew it.

No fuss, no muss, no bother ... and no special jigs needed.

Ron Rosenthal, DDS
Fishersville, Virginia

A You do not need a commercial device to hold the table saw blade. We do tighten the arbor nut more than the necessary light snug fit.

Still, either the blade or the arbor shaft has to be held while the nut is loosened; otherwise the shaft and blade rotates. My usual low-tech method is to use a piece of wood at the front of the blade to stabilize it as I remove the arbor nut. A zero-clearance throat plate made of wood or plastic works great.

Your advice on bringing the nut and flange right up to the blade is important. If there is any space between the two, the spinning arbor will torque the nut on so tight that it will be difficult to remove using any device!

Tips: Look and see if the arbor toward the inside of the blade has flats on it. This is for using a second wrench to hold the shaft while you loosen the nut. The wrench either never came with the saw or may have been misplaced. I have also found that replacing the supplied arbor wrench with a better fitting longer one is much safer and easier. You gain leverage and your hands are a safer distance from the blade's teeth.

— Kelly Mehler

Q Why are router bits painted? My friend argues that paint hides a less costly finish. I say it just adds a nicer look for the buyer's eye. Who is right?

Wayne Smith
Ocala, Florida

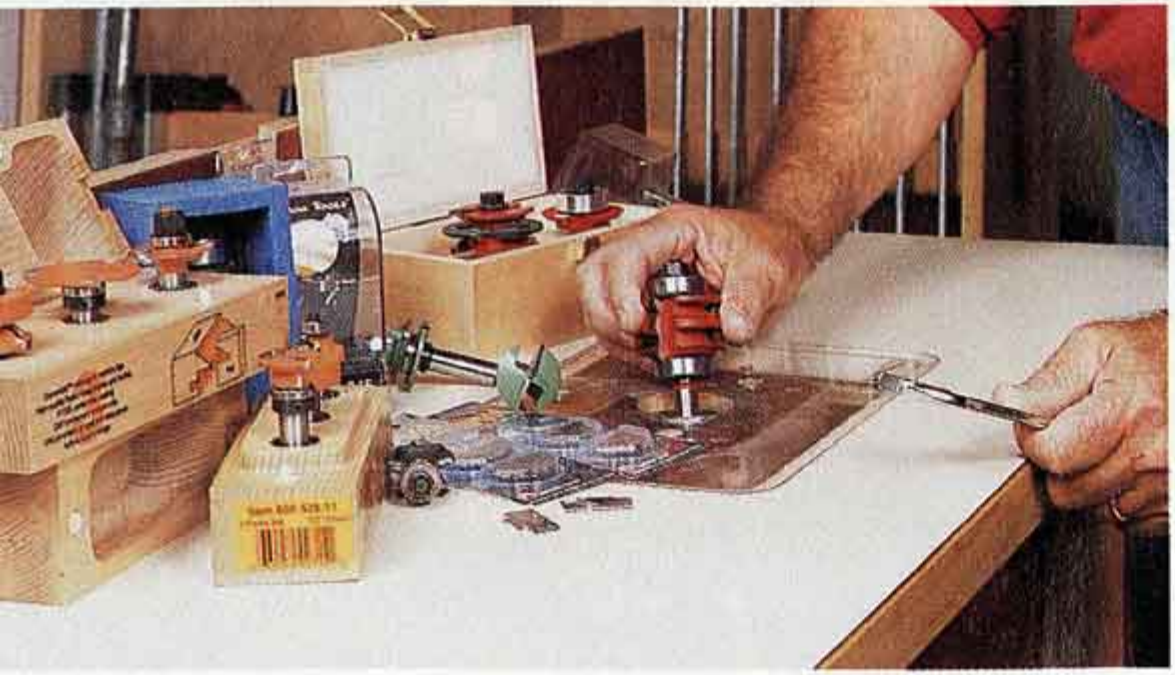
continues on page 16 ...

THIS ISSUE'S EXPERTS

Kelly Mehler *is the author of* The Table Saw Book *from Taunton Press.*

Bill Rylton *is the author of* Router Magic, *from Readers Digest.*

QUESTIONS & ANSWERS



Not just for looks: the colored coating on your router bits serves an important function in protecting your cutters, says Bill Hylton.

A Actually, Wayne, neither of you is correct. The colorful material you're discussing isn't paint, it's a high-tech industrial coating.

The heat-resistant, non-stick coating diminishes friction and drag, reduces pitch buildup, and prevents rusting. These are significant benefits for some, perhaps less for a hobby woodworker than for industrial operators.

Heat dulls cutters quickly, yet it's an unavoidable byproduct of any high-speed cutting operation. Since it's a lubricant between the tool and the wood, the coating reduces friction, translating into reduced heat. Because it is non-stick, it doesn't allow the resins and pitch to build up on the cutter surface. The coating seals the bit to prevent rusting and corrosion.

The fact that the coating can be colored and the color can be — and is — used as a brand ID is just icing on the cake.

— Bill Hylton

Everyday Shop Tasks Made Easy

Improved Disk Sander

The one shortcoming of my disk sander is the sloppy miter gauge that came with it. To solve that problem, I made a series of hardwood, pre-set miter gauges at 90°, 45°, 30° and 22.5°. I screwed the angled section of the gauges to the hardwood guide that slides in the miter track. If the guide becomes worn, it's a snap to replace them.

R. B. Himes
Vienna, Ohio

Tensioning the Band Saw

The usual band saw tensioning devices are not only awkward to use but have no reference point. Relieving tension when the saw is idle (as recommended) is a chore, so one tends to forget about it.

My solution is to make a wooden handle, as shown, to fit over the existing knob. I can now relieve the tension by cranking the handle a set number of turns and then return to the original tension by cranking the same number of turns in reverse.

Robert England
Eugene, Oregon

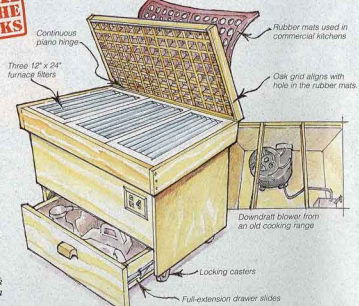
PICK OF THE TRICKS

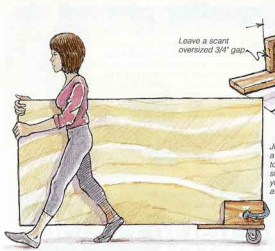
Downdraft Table

I used a downdraft blower from an old Sears cook range to help make this downdraft sanding table. Three easy-to-find 12" x 24" furnace filters collect the dust. For the working surface, I arranged six pieces of 12" x 12" rubber mat (the kind used in commercial kitchens) supported by an "eggcrate" grid made of 1/4" oak. The holes in the grid match those in the rubber mats.

The bottom third of the unit has a drawer for keeping sanders and sanding supplies. Locking casters allow me to move the unit around the workshop — and it is built at the same height as my table saw, so I can use it as an auxiliary table when cutting. Even when I'm not sanding, I sometimes run the unit to filter the air in my shop.

Peter Dulak
Red Wing, Minnesota





Sheet Dolly

Moving heavy sheets of plywood or particleboard in and out of my shop is awkward — especially when working alone. My solution was to make a one-wheel dolly as shown in the sketch above. I designed it for 3/4" sheets, but it is easily shimmed to hold thinner material.

Rudy Giadrosich
Barnesville, Georgia

WINNER!

In addition to our standard payment (below) Peter Dulak, of Red Wing, Minnesota, will also receive a **Drill Doctor DD400PK** *for being selected as the "Pick of the Tricks" winner. We pay from $100 to $200 for all tricks used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. Submit your Tricks of the Trade to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340. Or send us an e-mail:* **tricks@woodworkersjournal.com.**

(Circle No. 55 on PRODUCT INFORMATION form)

Not Exactly "Kids' Stuff"...

A Study in Talent

Trout's Students Going Strong

Springfield [Pennsylvania] High School teacher George Trout has started a tradition — of shaming woodworkers thrice their age with the works his students produce. Originally featured in the *October 2000 Woodworker's Journal*, George has gone on to be a member of a panel discussion on woodworking education at last year's Furniture Society conference — and to continue inspiring his students to "solve their problems" in wood as they produce masterpieces for the school's annual showcase of their talents.

Frank Higgins may be young, but the 2004 high school graduate looks to historical influences like ball and claw feet in his woodworking.

Although she's this year's high school graduate, Amanda Broemel made this Honduran mahogany bed as a junior.

Brad Stanton's cabinet of African ribbon mahogany, lacewood and ebony capped his career as a high school woodworker.

Chris D'Esposito's studies included tallying up a mahogany and African ribbon desk.

Puzzling out problems in wood is typical for students like Dan Lanciano.

Travels with LiLi

Woodworking in Maine

In her travels to various woodworking schools, *Woodworker's Journal* roving correspondent LiLi Jackson has explored a variety of aspects of woodworking. Her trip to the Center for Furniture Craftsmanship, she said, gave her a chance to put many of those skills together.

Her class on sculptural clocks, taught by Carter Sio, employed techniques of developing a plan, joinery and surface decoration. She also used a Dremel tool, creating a raised surface in cherry wood for one clock, as well as using the tool to soften the rough edges of copper clock hands she made.

While making a small but functional object like a clock, LiLi said, the class members were encouraged to experiment with different techniques, "because it's a small object, so you haven't invested as much resources of time and money."

While LiLi's class was a short four days, the other class taking place during her visit was a two-week tutorial on beginning cabinetmaking, taught by executive director and school founder Peter Korn. Even more intensive courses in woodworking are offered in 12-week and nine-month sessions at the rural Maine location — with, LiLi says, a potluck party (featuring lobster — of course!) and near-mandatory croquet after every class.

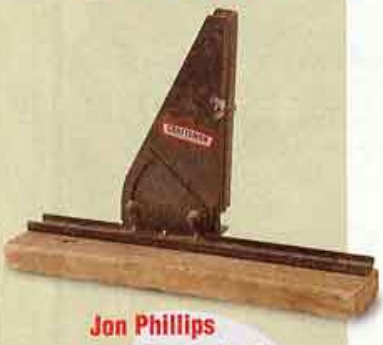
WJ's LiLi Jackson showed off her sculptural clock to Peter Korn, executive director of the Center for Furniture Craftsmanship in Rockport, Maine.

CFC has two classrooms plus one workshop for creating various woodworking projects.

For more information about the Center for Furniture Craftsmanship, call 207-594-5611 or visit *www.woodschool.org*.

Level Heads Solve Mystery

What's This?



Jon Phillips from Buena Park, California sent in the tool above. The numbers 605.29530 appear in the groove. Any crafty ideas on 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

A Survey of History

The [mystery tool] of *April 2004* is a miniature level. My dad used it in conjunction with straightedges of various lengths to establish a level between two distance pointers. The unit was fixed on the straightedge by tabs located on the side of each end and retained by the slotted head screw. I remember seeing my dad use it for determining levels on woven wire fence. He also used it as a surveying instrument.

Dad helped survey the Canadian River channel between Oklahoma and Texas City before he homesteaded in Oklahoma in 1906. I surmise that is where he obtained the level.

— Dr. John Sellers
Clayton, New Mexico

Many Level Heads

John's dad wasn't the only one who knew the lay of the land when it came to identifying the tool belonging to **Joe Wilkinson** of Happy Camp, California. It is, in fact, a level, and we heard about various uses for it from readers like **Janet Taylor** of Brighton, Michigan, who said, "My dad said they used to have one on his farm and used it to level the threshing machine," and **George Rebarchek** of Deighton, Kansas, who wrote, "it allows you to not only use it as a level, but to get pitches on roofs, etc."

Technically, though, it is "a pocket level," we heard from **Kathleen Wakeley** of Danville, Illinois, and others. "It may be attached to a framing square with the thumbscrew shown on the side of the piece," explained **Willis C. Davis** of Wayne, Nebraska. He continued, "The screw holds the level parallel to the framing square and transforms the square into a level that can be used on-site to level or make plumb whatever it is that the person is building."

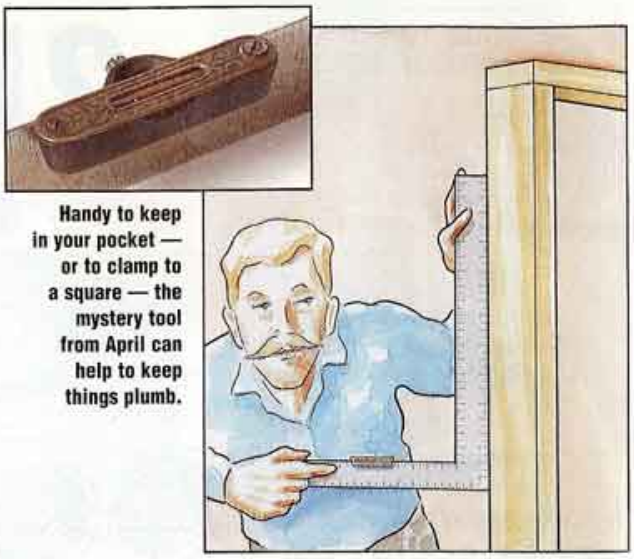
"It can also be used on the short edge of a carpenter's square as a plumb when the long edge is held against a wall or door," added **Barbara Jeffers** of Voorheesville, New York.

"A carpenter does not have to carry a large level in his toolbox," noted **Ron Hubay** of Northwood, Ohio: "Just attach the pocket level to the square with the set screw."

"Stanley Tools and others manufactured" the pocket levels, noted **Martin Seitz** of Sun Prairie, Wisconsin, with "most of the Stanley ones made from about the 1860s to the 1950s." In 1908, added **H.P. Gensler** of Kansas City, Missouri, "Sears Roebuck sold them for eight cents."

Of course, some readers, like **Michael Clayton** of Bakersfield, California, have not relegated their level to the past. "I use it frequently," Michael tells us, "since it can be easily attached or detached and stores in my pocket, saving me trips up and down the ladder with a larger level."

— Joanna Werch Takes



Handy to keep in your pocket — or to clamp to a square — the mystery tool from April can help to keep things plumb.

WINNER! *Dr. J. Courtland Robinson of Stevenson, Maryland, wins a Delta AP075 Dust Collection Table. We toss all the Stumpers letters into a hat to select a winner.*

The Turning of the Screw

By Ian Kirby

Wood screws as we know them began in 1849 when Cullen Whipple of Rhode Island was granted a patent for putting a gimlet point on what had been a blunt-ended screw that was not self-starting. For about a hundred years thereafter the wood screw didn't alter much. In the past 50 years most details of this "remarkable little object"* have changed a great deal. We now have a variety of head types, shank types and thread types. It's rare to come across what once was the "standard wood screw." Regardless of the differences in detail, they all work in the same way. For this reason I used the standard type as the basis for my illustration in this article.

Driving Power

Slotted screws were for the longest time driven by flat screwdrivers and muscle power. A Stanley spiral ratchet driver improved the speed of driving a screw by about 8 to 1. Early electric drills lacked a clutch and speed control, but they were effectively superseded by cordless drills which have both.

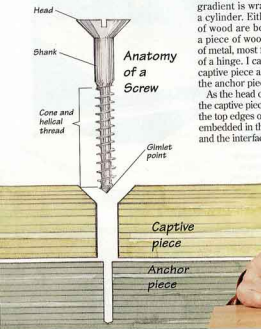
When you drive a screw using any of these methods, the aim is to seat the screw without causing damage, called cam-out, to the slot or recess. The key to preventing cam-out is to exert sufficient pressure to keep the driver engaged and control the speed of driving so that you stop when the screw is seated. A mashed-up screw head is a sorry sight, equivalent to a badly cut joint line.

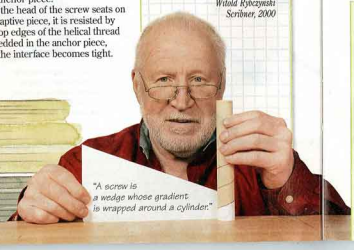
How a Screw Works

A screw is a wedge whose gradient is wrapped around a cylinder. Either two pieces of wood are being joined or a piece of wood and a piece of metal, most frequently the leaf of a hinge. I call the head end the captive piece and the thread end the anchor piece.

As the head of the screw seats on the captive piece, it is resisted by the top edges of the helical thread embedded in the anchor piece, and the interface becomes tight.

> "Take a close look at a modern screw. It is a remarkable little object. The thread begins at a gimlet point, sharp as a pin. This point gently tapers into the body of the screw, whose core is cylindrical. At the top, the core tapers into a smooth shank, the thread running out to nothing. The running-out is important since an abrupt termination of the thread would weaken the screw."
>
> *One Good Turn, *Witold Rybczynski* Scribner, 2000




"A screw is a wedge whose gradient is wrapped around a cylinder."

With any driver, (hand, battery-powered or corded), avoid cam-out by slowing drive speed and increasing pressure between driver and screw head.

Preparations for Inserting a Screw

For hardwoods, such as maple, oak, and cherry, you need three bits to make a countersink, a clearance hole and a pilot hole. The best results are achieved when the clearance hole in the captive piece allows the screw to freely pass through, and the pilot hole in the anchor piece is the diameter of the core of the screw. Use your vernier gauge to determine the core diameter. Finally, the screw head sits better if a countersink is prepared for it using a special tool. A rose countersink bit, like the one shown in the *photo* below, is typical.

For softer woods, such as poplar or pine, the three bits may be substituted by a single tapered bit with attached countersink. Adjust the length of the tapered bit using the stop collar.

Yet another alternative in softwood is a bradawl, which avoids the need for a drilled pilot hole. A bradawl has a sharpened end that resembles a fine screwdriver. The cut is started by pressing hard across the grain to prevent splitting, then turn the bradawl left and right several times to make a small hole. Screws hold well because the bradawl removes no wood during the cut.

Drive Designs and Drivers

The three basic drive designs are shown above. The slot was the first method of turning the screw. Once screws became standardized, slots became standardized, and screwdrivers followed suit.

The first departure was the square drive, developed by Peter Robertson in 1907. His correspondingly shaped screwdriver fitted with firm engagement — within 1,000th of an inch.

Henry Phillips was granted a patent for his cruciform recess design in 1937. It was used extensively for wood and metal screws in World War II and was a commonplace sight in mass-produced products. The Phillips driver also fits with a firm engagement. However, the perimeter of the cruciform is slightly radiused, which makes the screw well-suited to automatic driving, because once the screw is fully set the tip of the driver pops out of the recess.

Countersinking Without Thinking

As Ian indicates above, to prepare a countersunk screw hole in hardwood, you need bits to create two distinct borings with a cone-shaped finish (photo, top right). If you are working with a softwood, a tapered bit and countersink combo bit works well (photo, lower right). The latest and greatest option is a system that combines multiple drives, taper-countersinks or even self-centering bits. Very handy.

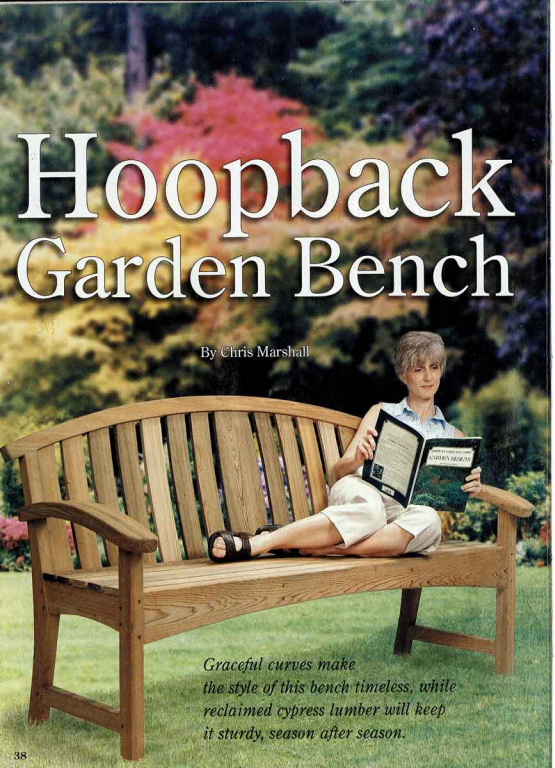
— Rob Johnstone

Three operations to sink a woodscrew in hardwood are minumum. Four, if you count driving a steel screw into the hole to prep for a brass screw — also a good technique.

The new Insty-Drive System from Rockler (800-279-4441) lets you move fast without re-chucking.

Hoopback Garden Bench

By Chris Marshall



Graceful curves make the style of this bench timeless, while reclaimed cypress lumber will keep it sturdy, season after season.

Before this garden bench came along, our patio seating amounted to a couple of Adirondack chairs and some fairly uncomfortable picnic benches. Relaxing was easy for two people but not for more. Now, thanks to this bench, even I get a good seat during outdoor entertaining.

I could've simplified the project's design by incorporating fewer curves, but a curvy bench seems to harmonize well with the irregular shapes of our patio and flowerbeds. The armrests and crest rail, in particular, make the bench feel more organic, informal and inviting.

A weather-resistant wood species is a must for this project. I used reclaimed sinker cypress (see the *sidebar* at right). Krantz Recoverd Woods in New Orleans supplied the lumber for this project, and it was a pleasure to build with. If you've never tried it, cypress cuts, routs and sands similar to cedar or redwood. It's not oily, has a pleasant odor and glues up without issue. Take the usual precautions when cutting or routing to minimize end grain tearout and splintering.

Templates and More Templates

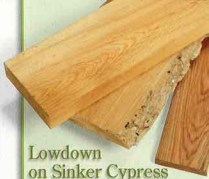
Laying out and assembling this bench will go much easier if you start with some full-size patterns and templates. I made a full-size gridded pattern of the bench's end view — a real help for positioning the armrests and setting up the rail angles. I also fabricated hardboard templates for the crest rail, back leg, armrest (both side and top views), seat rail and front rail. The templates were handy for locating mortises and for template routing the rough parts to final shape. Use the *Pullout Pattern* (between pages 47 and 54) and the *Drawings* on page 40 to make these shop aids. It's sure worth the effort.

Making the End Frames

Get rolling on this project by building the end frames, which consist of the front and back legs and the seat and lower rails (pieces 1 through 4).

Start with the back legs. Use your back leg template to draw the leg shapes on some 8½" wide stock. Orient the leg shapes so the longest flat edges of the legs line up with a stock edge. At this time, I suggest you stick the template to each leg blank with hot-melt glue or carpet tape. Mark and cut the seat rail mortises using whatever machining method you prefer (see *photo*, at left). I drilled mine out. Cut out the leg shapes, and refine them with a piloted, flush-trim bit in the router table. It will save you loads of sanding time. Cut the lower rail mortises with a router, 3/4" straight bit and edge guide. Both rail mortises are offset on the legs to create 1/4" shadow lines between these parts.

The author fixed a leg template to each leg blank and left it there for the entire machining process. Drill the mortise for the seat rail before you cut the back leg out of its blank.



Lowdown on Sinker Cypress

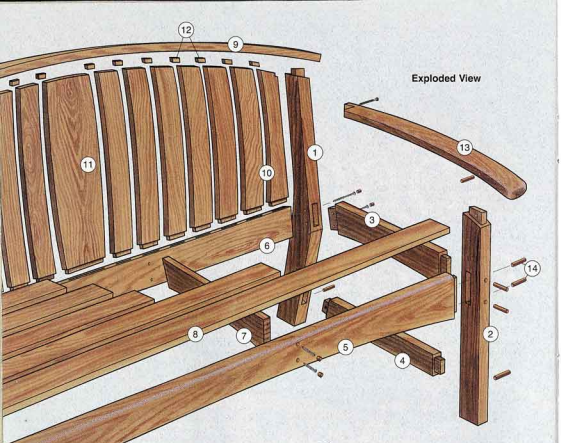
During the late 1800s and early 1900s, loggers used rivers for transporting logs to lumber mills. In Southern states much of this timber was virgin cypress, ranging in age from 300 to 1,200 years old. Some logs sank while in transit, where they've remained largely preserved under layers of mud and silt. Krantz Recovered Woods harvests these "sinker" logs from Louisiana lakes and rivers. The logs are sawn into boards and beams, then thoroughly air-dried before they're sold.

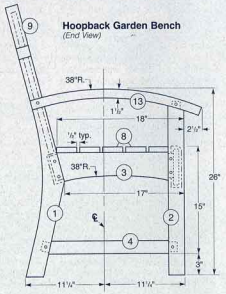
Recovered "sinker" cypress logs remained largely preserved under layers of oxygen-poor mud and silt for over a century.

Virgin cypress trees matured slowly in dense ancient forests. Recovered logs exhibit a whopping 30 to 50 annual growth rings per inch! Today's second growth trees average only five to 10 rings per inch. Higher ring counts make antique cypress exceptionally stable, fine-grained, largely free of knots and naturally insect- and rot-resistant.

Krantz offers sinker cypress in 4/4, 8/4 and beam thicknesses in widths up to 12" and in lengths up to 30'. Prices range from $4 to $8 per BF, plus shipping.

To learn more or receive a price quote on lumber, call Krantz Recovered Woods at 888-242-1050, or visit them on the web at: *www.KrantzRecoveredWoods.com.*





Hoopback Garden Bench
(End View)

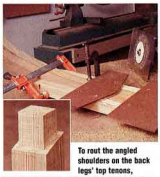
MATERIAL LIST

	T x W x L
1 Back Legs* (2)	1¾" x 8⅛" x 33"
2 Front Legs (2)	1¾" x 2¼" x 24¼"
3 Seat Rails (2)	1⅛" x 4" x 17½"
4 Lower Rails (2)	1⅛" x 2" x 19½"
5 Front Rail (1)	1½" x 5½" x 65"
6 Back Rail (1)	1½" x 4" x 62½"
7 Seat Supports (2)	1½" x 2½" x 16¼"
8 Seat Slats (5)	3/4" x 2½" x 66"
9 Crest Rail* (1)	1¾" x 8¼" x 71¼"
10 Narrow Back Slats* (14)	3/4" x 4" x Varies
11 Wide Back Slat (1)	3/4" x 7" x 21"
12 Back Slat Spacers (14)	3/4" x 3/4" x 1"
13 Armrests (2)	4"* x 4½" x 25"
14 Dowel Pins (30)	3/8" Dia.

*Width dimensions are prior to shaping

Templates are Worth the Effort

Turn to the top leg tenons next. Notice in the *Drawings* (left), and in the inset *photo* (below), that the front and back shoulders are angled to accommodate the curved crest rail. The bent leg shape won't allow for cutting these angled shoulders on a saw, so I routed them with a simple jig, rub collar and straight bit (see *photo*, below). The other pair of square shoulders and cheeks on these tenons can be trimmed to shape with a band saw.



To rout the angled shoulders on the back legs' top tenons, I made a jig that registered the angles and clamped to both legs, so I could mill them in one setup. A rub collar on my router followed the angled jig shape to cut the shoulders. Flip the legs over in the jig to make the second set of angled shoulders.

Both the seat rail and lower rails have angled tenons where they attach to the back legs. Cut the rails to size now (but don't cut the seat rail arches yet), and make the angled shoulders of these tenons on the table saw with a wide dado and the miter gauge set to 75°. Cut the short cheeks and shoulders on the band saw. Make the straight front tenons on these parts in the usual way, then cut the seat rail arches. Flush-trim the arches at the router table using the seat rail template as the bearing guide.

The front legs have tenons on top with angled shoulders similar to the back legs. Since these legs are straight, cut the angled shoulders at the table saw with the miter gauge set to 75°. Trim the front and back shoulders and cheeks to shape at the band saw.

Wrap up the front leg joinery by cutting mortises for the seat rail, front rail and lower rail. Keep the orientation of the front legs clear as you mill these mortises — the legs are mirror images of one another, not identical.

Dry fit the end frames, then give the parts a good sanding, ease the edges and glue up the frames.

Making the Seat

Follow the *Material List*, previous page, to cut the front and back rails and the seat supports (pieces 5 through 7) to size. Mill tenons on the ends of the front rail. Attach the front rail template temporarily, trim the broad arch about 1/16" proud of the template edge, then refine the shape with a flush-trimming bit and your router.

The back slats fit into a series of individual mortises in the back rail. Use the *Elevation Drawings* on the *Pattern* to lay these mortises out, and mill them. Some bench designs will substitute a long, continuous mortise here and separate the slats with spacer blocks, but I wanted to minimize exposed horizontal glue lines wherever possible. The fewer joints where water can soak in and cause trouble, the better.

The back slats fit into individual mortises in the back rail. A hollow chisel mortiser is the perfect tool for this repetitive chopping task.

The back ends of the seat supports are angled to hold the back rail in the same plane as the crest rail. This way, the back slats will fit into straight, rather than angled, mortises. Attach the seat supports to both long rails with pairs of countersunk 4" deck screws at each joint. The top edges of the seat supports should be flush with the back rail's mortised edge, but be careful that the supports attach 3/4" down from the top edge of the front rail. This way, the seat slats will align with the top edge of the front rail.

Rout the shallow step of the crest rail's continuous slat mortise first. Plow it from one back leg mortise to the other. Then mill the 3/4" deep stopped portion of the slat mortise with the same bit and edge guide setup.

Drawing parallel curves on the back slats is easy if you group the slats together in a jig. Make a template with a curve based on a 9-foot radius, and trace the curves onto the slats using the template. Shape the slat jig so the top edge matches the crest rail mortise curve. This way, you can scribe the slat top curves as well.

Bringing the Subassemblies Together

Join the front and back rails to the end frames to erect the bench seat. The back legs fasten to the back rail with pairs of countersunk 4" screws. Glue the front rail tenons into their mortises. Line up this center bench subassembly so the back rail and seat rails align properly, as shown in the *Pullout Pattern Elevations*.

Cut the five seat slats (pieces 8) to size, and round over the edges and ends. Instead of attaching these slats by driving screws down into the rails and seat supports, I used Titebond® HiPURformer heat-activated polyurethane glue to tack them in place, then drove weather-resistant 1½" pocket screws from underneath (see *photo*, next page). It was a good way to avoid rows of unsightly wood plugs on the seat slats.

On to the Back

The curved crest rail (piece 9) is easier to machine while it's still part of a wider, flat-edged blank. Stick the template to your stock so the bottom curve faces up and the pointed tips are flush with the stock edge. Cut the crest rail's inner curve and trim it flush with a router. The back slats fit into a continuous groove in this curve. Refer to the *Elevation Drawings* on the *Pullout Pattern* to see how it steps from a depth of 5/16" to 3/4" for most of the length. The shallower part of the mortise helps keep the back leg mortises strong while still hiding the top ends of the endmost back slats. Set up your router and edge guide to cut the 5/16" mortise depth first, and mark the back leg mortise locations. Rout the shallow portion of the step from one leg mortise to the other (see *photo*, previous page), then continue to hog out the deeper slat mortises to a depth of 3/4", stopping 1½" from each of the back leg mortises.

With the continuous mortise completed, bore the back leg mortises on the drill press with a 1½" diameter Forstner bit, and chisel the corners square. The flat bottom edge of the crest rail blank will ensure that these two mortises are square to the back legs. Once the leg mortises are done, finish cutting out the crest rail, rout it flush to the template and ease the edges.

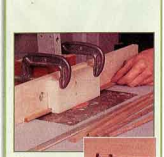
Prototyping

Initially, our author wasn't sure which armrest style would look best on his bench, so he made several prototype armrests from scrap (below). This is a great way, especially on a chair or bench project, to help you settle form, function and ergonomic issues.

The back slats start out as 4/8 or 7/8 straight-edged blanks but end up curved along both long edges. I tackled the task of marking these curves by butting the narrow and wide back slats (pieces 10 and 11) next to one another inside a jig. (See the *Pullout Pattern.*) I first cut the bottom tenons on the slats, then set them in the jig whose top curve matches the shape and position of the crest rail mortise at full depth. Then I marked the curved top line (which determines their length as well) using the jig. When I was done, I flipped the slats over and rearranged them in the jig so the curved cutoff line showed on top. I used a short template in the jig to draw the curved edges on the slats, one after the next. All these curves match those on the center slat (see *photo*, upper left). Index the curves on the slats so that each finished slat will be 1" apart. Make the center slat 6" wide and the other slats 3" wide. Leave the endmost slats flat on their outer edges where they'll meet the back legs.

Gang cut the narrow slats in groups of three or four on the band saw, then cut them to length individually. Smooth the slat edges. Note in their *Elevations* on the *Pullout Pattern* that the endmost slats need to be notched at the top corners to fit into the stepped crest rail mortise where it changes depth.

Test fit the slats and crest rail on the bench. When it all assembles without force, slip the slats into the back rail and crest rail mortises dry, but glue the crest rail onto the back leg tenons. Cut slats spacers (pieces 12) to size, and use dabs of glue and galvanized finished nails to install them in the crest rail mortise.



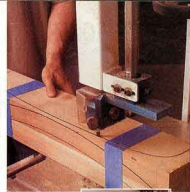
Cypress Dowels

Where can you find cypress dowels? Our author solved that problem by making his dowel pegs at the router table with a 3/8" diameter bullnose bit. Clamp a scrap tunnel against the fence to keep the dowels from chattering during milling. Run strips of square stock through the tunnel twice to round half of the curvature with each pass.

Adding the Armrests

I made blanks for the armrests (pieces 13) by building up two thicknesses of 8/4 stock. Notice that the final armrest shape is curved both lengthwise and widthwise. Here's how to sculpt the shape: Use your *Armrest Side View Template* to draw this portion of the curvature, then band saw the shape. Save the offcuts and tape them back in place to reform the blanks. Now, use your *Top View Armrest Template* to mark this dimension of the curvature onto the blank. Saw the armrest to shape here, and remove all the offcuts (see *photo*, above right).

If you made a *Full-size End View Pattern* of the bench, locating and making the armrest mortises for the front leg tenons will be a snap. Remove a portion of your pattern directly above the armrest and use it as the reference for making a drilling jig that holds the armrest square, relative to the front leg (see inset *photo*, above). I mounted this section of my pattern to some thick scrap, cut the scrap to match my pattern curvature, and attached it to a base. Then, boring the armrest mortises on the drill press was as easy as clamping them against the jig, marking the mortise dimensions off the pattern and drilling the stopped mortise holes. Square up the mortises, and refine the armrest by sanding. Ease the edges with a 1/4" or 3/8" diameter roundover bit in your router.



Sawing the armrests to shape is a two-stage technique. Cut the side profile first, tape the off-cuts back in place, then cut the top profile. Clamp the armrests in a drilling jig (see inset photo below) to cut the front leg mortises.

I used a portion of my full-sized bench end view pattern to make the jig. The goal here is to cut these mortises so the legs meet the armrests squarely, despite the curve.

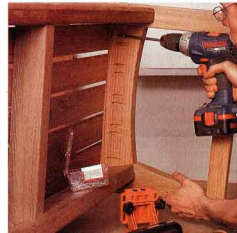
Set the armrests against the front and back legs to determine where to notch the armrests so they fit around the back legs. Cut these notches. Install the armrests with glue in the mortise and tenon joint and with a 1/4" x 2" countersunk lag bolt and washer to the back legs.

Pinning the Joints

Glue alone will certainly hold these mortise and tenon joints for a good long while, but eventually the glue might fail. As added insurance, I pegged all the interlocking joints and plugged the screw holes with 3/8"-diameter cypress dowel pins (pieces 14). You can't buy cypress dowels, but they're easy to make on the router table with a bullnose bit. Two passes through a scrap tunnel jig turns square strips into perfect doweling (see *sidebar*, above left).

Flush sand the dowel pins and give the bench a coat of penetrating wood finish to help preserve its color. Then, move it outside, rustle up the tiki torches and start planning your next patio party.

Chris Marshall is a Woodworker's Journal *contributing editor who builds projects and tests tools on a regular basis.*



To hide the seat slat fasteners, drive them in from underneath. The author used a pocket-hole jig and weather-resistant pocket screws.

Getting Started with Letter Carving

By Simon Watts

Our author started letter carving for practical reasons, including its appropriate nature for apartment woodworking. The results were signs that ended up in his Canadian retreat.

Having had the run of a large, well-equipped shop for most of my life, I find woodworking in my San Francisco apartment challenging.

I have to contend with a nosy landlord, cranky neighbors and three flights of stairs. Prior to climbing those stairs every day, I had never considered taking up woodcarving — perhaps because I associated it with duck decoys, garden gnomes and other geriatric nonsense.

However, this spring, needing to replace some old signs on a house in Nova Scotia, I thought of giving it a try. My ambition was modest: learn enough to carve good-looking name boards for friends and neighbors, for boats or whatever. I looked through the usual catalogs — and saw there was a multitude of carving tools on the market and I'd better get some advice.

Furthermore, buying a gouge, chisel or adze without being able to feel the heft and balance of the tool is chancy. So I called a professional woodcarver friend who invited me to his studio. We spent a couple of hours going over his collection of carving tools (over a thousand), "I need them all," he said "but some I may only use once or twice a year."

Not everyone has an opportunity to learn from a pro, so I thought I'd share some of my lessons and conclusions. First off, I was cautioned about taking the second-hand route. Even with familiar and respected trade names, I am told that it is asking for problems.

I decided that the faceted style of handles, usually octagonal, had a better feel than round handles (also they were less prone to roll off the bench and bite the dust — or my feet).

My friend also advised me to ignore sets and buy only the tools I needed to get started. So with his help, I made a list of essential tools and equipment — including a mallet and tool roll.

I went back to the catalogs, somewhat wiser, and decided, as a beginner, it would be prudent to buy pre-sharpened tools, already honed with the correct bevel. Suppressing my pro-British bias, I settled on the Lamp™ brand, made in Germany. I liked the octagonal, hornbeam handles, the honed and polished edges and having the size and "sweep" (degree of curvature of a gouge) stamped into both the handle and the steel shank.

While waiting for the tools to arrive, I practiced drawing letters directly on the wood with T-square and triangle ... with poor results. The letters looked awkward and mechanical, betraying my engineering background. My artist sister was amused by my efforts and observed that it took years of practice to draw well-proportioned letters in the various styles.

I then had the good fortune to come across a book called *Arthur Baker's Historic Calligraphic Alphabets*. It contains 33 complete alphabets, printed in black, two or more inches high, with no grid lines or other distractions. Here was a treasure trove indeed for the novice carver. Furthermore, the author granted permission to use up to 10 of the alphabets.

I bought several other books (of marginal value), until I came across *Letter Carving in Wood* by Chris Pye. This is the best book I found: clear, detailed information combined with close-up photos and excellent sketches.

Eventually, one has to take the plunge, so I chose an alphabet and made several photocopies until I had enough letters. Then I cut them out and arranged them on a piece of cardboard, cut to the same size as the wooden name board.

Part of Simon's preparation for learning letter carving was finding the best tools for the task. As is common to woodworking, he found that the right tools made all the difference.

A sharp edge on your carving tools is critical for successful letter carving.

I read and re-read the section on letter spacing (called color) and continued moving the letters around until the balance looked right. I then stuck the letters to the cardboard, photocopied a clean version, glued it with rubber cement to the wood, and began carving letters right through the paper.

This not only saves layout time but provides a mask if you plan to paint the letters, as I usually do. When the paint is dry, the paper can be peeled off or sanded down.

I was gratified by this first effort, until my sister kindly pointed out the various errors in layout — an E too close to an F, a W cramped by the adjacent letters and a forlorn looking O, marooned in space. However, the third and fourth efforts met with qualified approval, and I felt I was making progress.

Getting a good edge on a carving tool — chisel or gouge — is half the battle and takes considerable practice. Written descriptions are of marginal value, but video can be a great teacher. It was my luck to stumble on such a video by master carver Ian Agrell. Agrell is a gifted teacher. His video on sharpening carving tools is a model of brevity and humor.

So, that's how I got started — a total expenditure of about $300. I like the work: it's quiet, relaxing, has endless applications and there is no need for any of the body protection woodworkers find indispensible these days. However, after a newly sharpened chisel (my only round one) rolled off the bench and skewered my foot, I did decide to always wear shoes when I carve!

Simon Watts is a boatbuilder and teacher who lives in San Francisco. He is the Woodworker's Journal *West Coast editor.*

Eight Tips for Beginners

We asked techniques editor Linda Haus to try her hand at letter carving. After several attempts she came up with the following eight tips.

Use spray adhesive to attach your pre-printed letters to the wood. Carve pulling towards you.

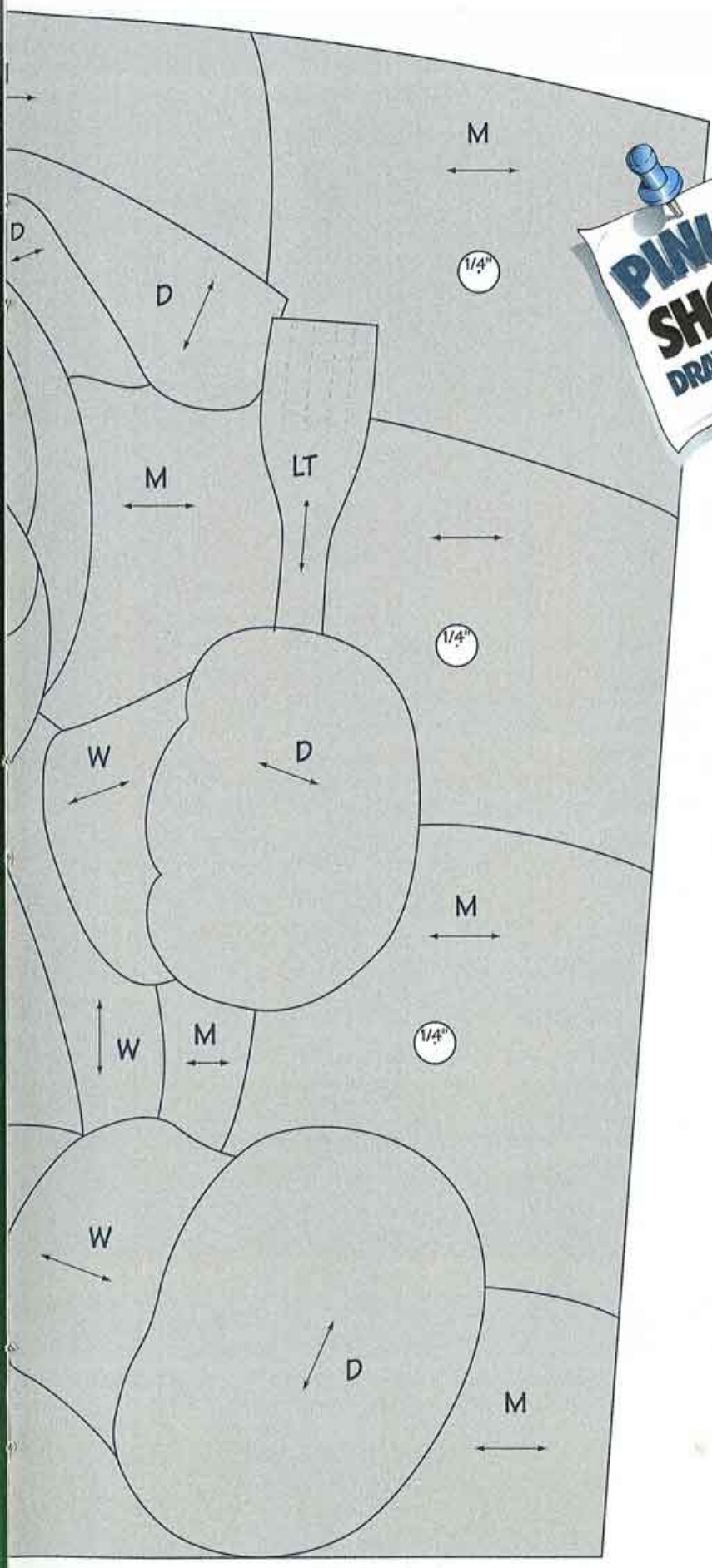
1. **Use proper carving tools: knives, gouges, etc.**
2. **Keep your tools sharp: hone them constantly as you carve.**
3. **Use a proper cutting angle.**
4. **Don't carve too deep.**
5. **Print out your words/phrases.**
6. **Enlarge your printout on a copier. (This keeps the spacing correct).**
7. **Use a wood species that is easy to carve, (like basswood, butternut or alder) or close-grained softwoods.**
8. **Don't lose the big picture: strive for consistency in depth of cut and cutting angle on each and every letter.**

At the intersection of letter segments, end the transverse, ascending and descending forms in a uniform manner.

Knife angle is the key to achieving uniform carved letters. About 65° is where you should start. Near perpendicular is most effective as you look at the side of the knife.

Remove the paper and sand the surface smooth. If you're painting the carved area ... leave the paper on.

Securing your stock is an important task. You also need to be able to spin the stock around easily ... it allows you to easily pull the cut towards you.



PINUP SHOP DRAWINGS

Full-Size Patterns

- Open staples carefully, remove pattern and fold staples back in place.
- Use graphite paper (available at art supply stores) or cut and trace full-size patterns onto your stock.
- Cut out the elevation drawings and pin them to your shop wall.

Hoopback Garden Bench
Elevation drawings and a slat jig to lay out all the curved pieces, plus key mortise and tenon details.

Intarsia Backed High Chair
A full-sized pattern and step-by-step instructions for the chair's intarsia back, plus elevations and construction details for the various pieces.

Ultimate Angle Jig
All the detailed elevation drawings required to build the jig.

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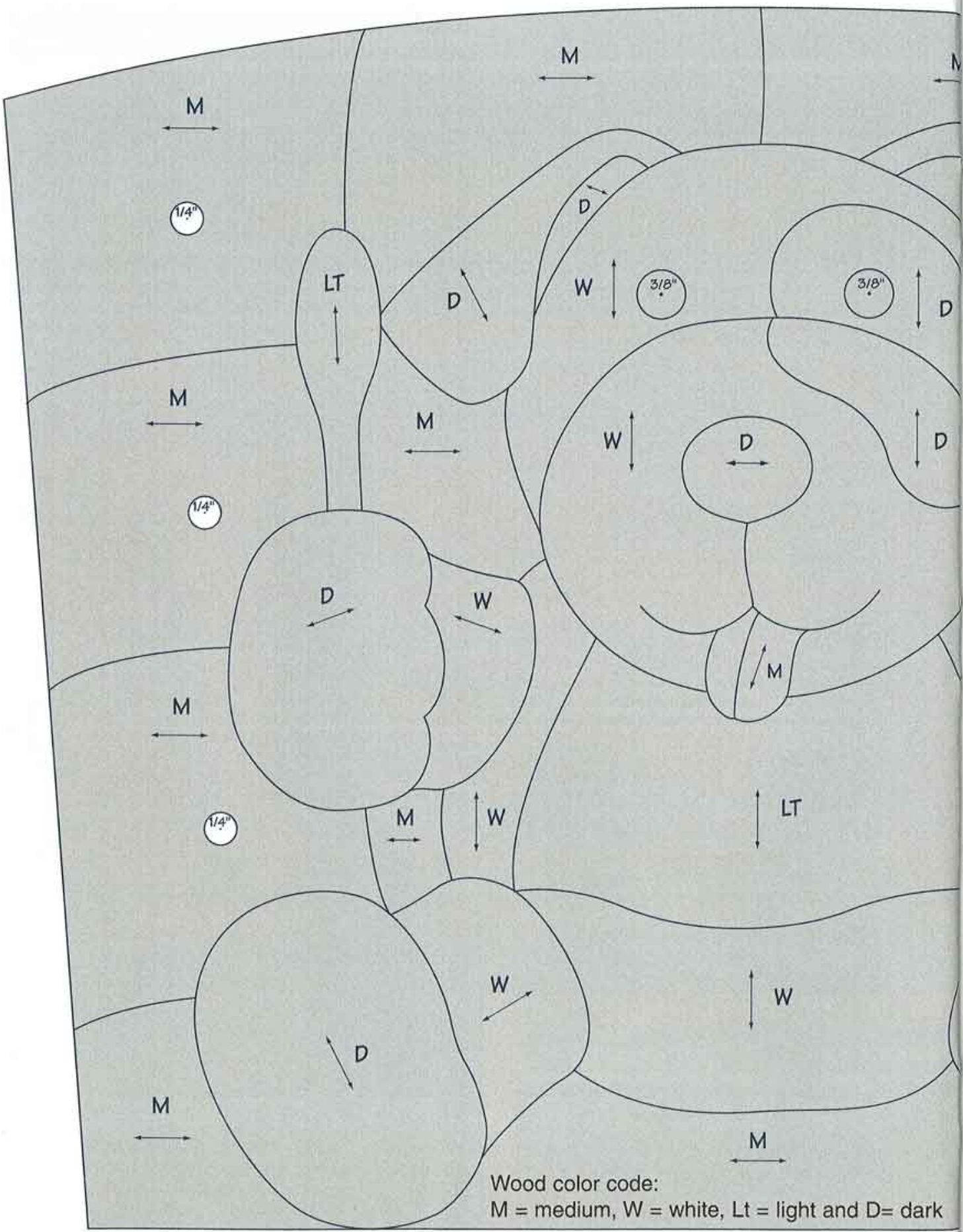
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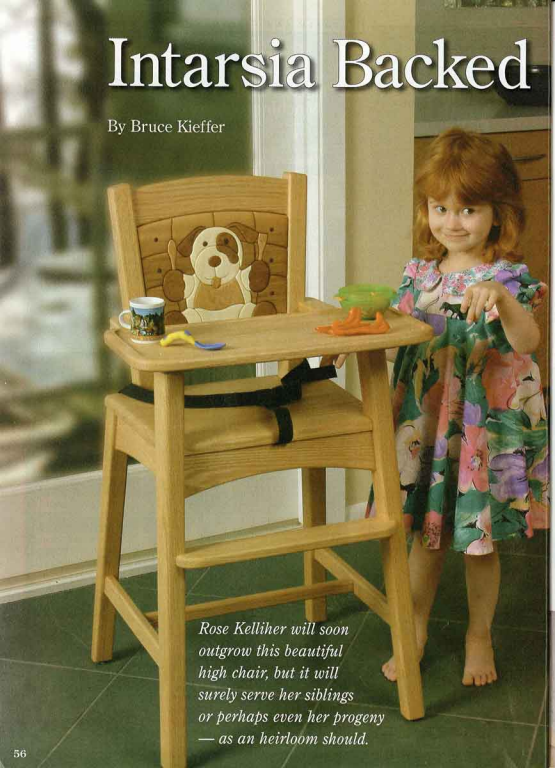
Wood color code:
M = medium, W = white, Lt = light and D= dark

Intarsia Backed High Chair

By Bruce Kieffer



Rose Kelliher will soon outgrow this beautiful high chair, but it will surely serve her siblings or perhaps even her progeny — as an heirloom should.

There's something about wooden high chairs that feels more inviting than their more prosaic plastic counterparts. And when you add Judy Gayle Roberts' intarsia "Chowhound" to this chair, you've got an inviting family heirloom. Intarsia is essentially a mosaic of different colored woods cut into shapes and assembled to create an image. This design was created by renowned intarsist Judy Gale Roberts and she tells you how to do it step by step on the *Pullout Pattern* located between pages 47 and 54.

The chair is made from red oak and built like a tank, yet it doesn't look heavy. Its wide stance makes it very stable. I designed it to be easy to build. For me, the hardest part of the construction was keeping track of which part was which, and which way the angled cuts were made. The legs and back posts have compound mitered ends, AND they're mirror images of each other. To make it less confusing, I labeled the legs and back posts as right and left, and labeled each part with front, back, in, out, up, and down. That helped a lot, but I also found as I was working that if I held the parts up in the orientation they would have in the finished chair, I could easily tell if I was about to goof up on the next cut. The lower stretchers, footrest, seat, arms and back panel are all fit during assembly. This eliminates the need to be "dead-on" when cutting the compound miters on the leg and back post ends, and the miters on the seat apron ends.

As I neared the end of my construction, I found it a bit difficult to fit the back panel. It's an odd shape and needs to fit well. What I ended up doing was making a template from scrap MDF. Once that fit, I used the template as a router guide to cut my final back panel. Enough said, let's make some dust!

Legs, Compound Miters and Tapers

The ends of the legs are cut 7° front to back, and 4° side to side (see the *Drawings* on the *Pullout Pattern*). Cutting these compound miters is easiest done prior to labeling and tapering the legs, using one setup. Then you will visually orient the pieces the way they will be set when the chair is assembled, label them, cut the footrest dadoes, and make your tapers.

Cut the front and back legs (pieces 1 and 2) to the sizes given in the *Material List*. Set your power miter saw to cut a 7° miter and a 4° bevel. On each piece cut one end, slide the leg across the saw's table, and cut the other end. This way the end cuts are perfectly parallel (see *Figure 1*, below).

Visually orient the legs and label them. Lay out the dadoes on the insides of the front legs for the footrest (piece 8). Mount a 3/4" dado in your table saw and angle the cut to 4° while setting the height to 1/4". Use a miter gauge set at 90° and cut the dadoes. Watch how you have the legs oriented on the miter gauge so you get the angles going the right way. One leg is cut with its bottom pointing right, and the other pointing left.

Lay out the leg tapers as shown in the *Drawings*, then cut and sand them smooth (see *Figure 2*, next page). Lay out and drill the footrest plug and screw holes in the front legs.

Figure 1: The ends of the legs are cut with 7° and 4° compound miters before they're labeled and tapered. Cut one end, slide it down, and cut the other end. The ends are then parallel.

Building a Solid Foundation

The work that remains to get the base assembled is fairly straightforward. I used a self-centering doweling jig to drill all of the base's dowel holes, making fast work of an otherwise tedious job. I also used spacers with my biscuit jointer to quickly align it when cutting the biscuit grooves for the offset apron to leg joints (see *Figure 3*, page 60).

Cut the front and back aprons (pieces 3) and the side aprons (pieces 4) to the sizes shown in the *Material List*. Step to your table saw to bevel the top edges of the front and back apron pieces 7°, and the top edges of the side apron pieces 4°. Use your power miter saw to miter the ends of the front and back aprons at 4°, and the ends of the side aprons at 9°. Lay out and cut the gentle curves on the aprons as shown in the *Elevation Drawings* on the *Pullout Pattern*.

Locate and cut the apron and leg biscuit joints. I used the back legs to find the height of the apron pieces on the front legs. Remember that the biscuits that join the side aprons to the front legs are #0s, the rest are #20s. The side aprons are set back 3/8" from the outsides of the legs and the front and back aprons are held back 3/4" from the non-tapered edges of the legs.

Cut the side and center stretchers (pieces 5 and 6) to size, but leave them a bit long. Dry fit the front legs, back legs and side aprons together as two separate side assemblies. Miter the ends of the side stretchers to 9°, slowly nibbling away at their lengths until they fit between the front and back legs. Mark where the ends of the side stretchers land on the insides of the legs. Dismantle the dry assembled base sides. Lay out and drill the leg to side stretcher dowel holes. Now dry assemble the entire base and fit the center stretcher just as you did the side stretchers. When it fits properly, dismantle the base completely, and lay out and drill dowel holes to join center stretcher and side stretchers.

Rout the large roundovers on the outside edges of the legs, and the smaller radius on the legs, aprons, and stretchers (see the *Drawings*). When rounding over the front legs, be careful to avoid the footrest dadoes or screw plug cover holes or you'll mess up your front legs!

Make and attach the seat cleats (pieces 7). The edges that join with the front and back aprons are cut at a 7° bevel, and the screw holes in the back seat cleat are elongated to allow for movement of the seat.

Finish sand the base parts. Glue and clamp the legs, side aprons, and side stretchers together to make the base side subassemblies. When these assemblies are dry, glue and clamp them together with the front and back aprons and center stretcher. Use a flat surface so the chair won't rock after it's assembled (see *Figure 4*, page 61).

Rout or chop a groove for the front center seat safety strap on the top of the front apron and seat cleat, checking to see that the strap fits well in its groove.

High Chair Project Supplies

The following supplies are available from Woodworker's Journal.

High Chair Hardware #30866.....$9.99
Safety Strap #85771.....$5.99
Oak Tray #32418.....$42.99
Toymaker's Finish #19655.....$8.99
Seven-On Slides (7/8" Dia.) #31035 ....$4.99

To order your supplies, call 800-610-0883 and mention code W4086.

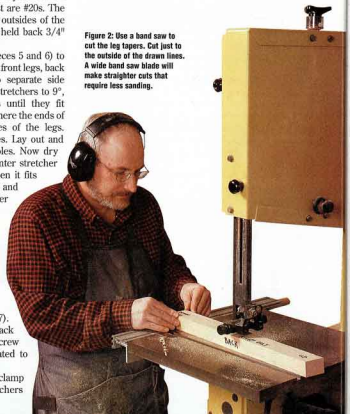
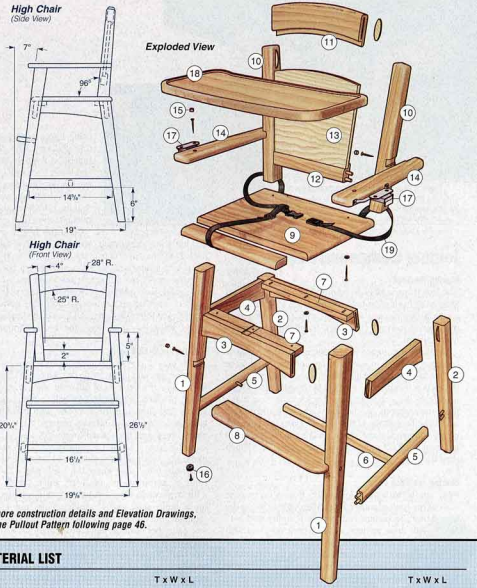


Figure 2: Use a band saw to cut the leg tapers. Cut just to the outside of the drawn lines. A wide band saw blade will make straighter cuts that require less sanding.



For more construction details and Elevation Drawings, see the Pullout Pattern following page 46.

MATERIAL LIST

	T x W x L		T x W x L
1 Front Legs (2)	1½" x 2¾" x 27½"	**11** Crest Rail (1)	1¼" x 4" x 12"
2 Back Legs (2)	1½" x 2" x 21½"	**12** Lower Back Rail (1)	1¼" x 2" x 10½"
3 Front & Back Aprons (2)	3/4" x 3" x 14½"	**13** Back Panel** (1)	1/2" x 10" x 12"
4 Side Aprons (2)	3/4" x 3" x 10¼"	**14** Arms (2)	3/4" x 2½" x 14½"
5 Side Stretchers* (2)	3/4" x 1½" x 15"	**15** Screw Plugs (6)	3/8" Dia. x 3/8"
6 Center Stretcher* (1)	3/4" x 1" x 17"	**16** Seven-On Slides (4)	7/8" Dia. nylon
7 Seat Cleats (2)	3/4" x 1½" x 13½"	**17** Tray Hardware(2)	Steel
8 Foot Rest (1)	3/4" x 3½" x 16"	**18** Oak Tray (1)	Red oak
9 Seat** (1)	3/4" x 15" x 17½"	**19** Safety Straps (1)	Black nylon
10 Back Posts (2)	1½" x 2" x 15⅝"		

*Cut to length
**Oversized, see Drawings and text for fabrication details.

Figure 3: Chop mortises for biscuits on the legs. Then cut the biscuit grooves centered in the ends of the side aprons with a 3/8" thick spacer placed under the jointer's fence. This creates the 3/8" offset.

Joining Compound Angles ...

Making the Seat

The seat is made large to begin with so you can cut off and fit the front edge between the front legs, and then reattach that piece. I found this method much easier than trying to hand cut angled notches on the seat's front corners.

Make the seat (piece 9) by edge gluing three boards together, cutting it to size after the glue has cured. Slice 1¾" off its front edge at a 9° bevel (see *Drawings*). Bevel the ends of this piece 4° so it fits between the front legs. Edge glue the seat front piece back on the seat blank flush and centered. Set the seat on the base and mark it to cut the final shape of the seat. Refer to the *Drawing* on the *Pullout*. Cut the shape, radius the back corners and rout the 1/2" radius roundover edges, then finish sand the seat.

Making the Back Frame

Next, cut the back posts (pieces 10) to size. Cutting the ends of the back posts is a little different than doing the legs. Miter the bottom ends with a 6° miter and a 4° bevel. With these settings, cut one back post end with that back post to the left of the saw blade, and cut the other back post end with that back post to the right of the saw blade. Visually orient the back posts and label them, then lay out and cut the 8° bevels on the top ends.

Mark the locations of the arm dadoes on the back posts (see *Figure 5*). Complete the dado layouts with a bevel square so you can see the entire cut. On a table saw, use a 3/4" wide dado blade set to 4° bevel, and a miter gauge set to 6° to make one of the cuts. You'll need to adjust the miter gauge to -6° to make the cut in the other back post. Lay out, cut, and sand the tapers on the back edges of the back posts.

Cut the crest rail (piece 11) and lower back rail (piece 12) to size. Lay out the arcs on the crest rail using information found on the *Pullout*. Cut the 4° mitered ends on the crest rail and lower back rail. Cut and sand the arcs on the crest rail. Using a 1/2" rabbeting bit, rout the rabbets on the crest rail and lower back rail.

Chop the biscuit grooves that join the leg posts and crest rail. The crest rail is set back 1/4" from the fronts of the back posts, so this time use a 1/4" spacer with your biscuit jointer. Lay out and drill the dowel holes that join the lower back rail and back posts. Hold it back 1/4" from the fronts of the back posts. I used dowel centers to mark the dowel hole locations on the back posts, and then drilled those holes on my drill press. Don't assemble the back frame yet.

Making the Back Panel

You're now at one of the more tedious aspects of the construction, that being fitting the back panel inside the back frame. I tried a lot of different ways to make this easier. My best solution was to make a template of the shape, and then use the template with a router and a top-bearing, flush-trimming pattern bit to cut the shape of my final back panel (piece 13).

Here's how it's done: Using scrap 1/4" material, make a template of the inside arc of the crest rail. Dry assemble (don't use glue) the back posts and rails. Find a scrap piece of 1/2" thick MDF that's a bit larger than the back panel. Using a miter gauge on a table saw, cut 4° angles onto the sides of template, but still leaving it wider than needed. Set the test panel between the back posts and check that the cut side angles are correct. Then nibble away at one side until the test panel fits against the lower back rail and back posts properly. When you get it right, mark where the crest rail inside arc ends intersect with the test panel. Use the arc template you made earlier to lay out the arc on the top of the test back panel. Cut this curve slightly large, then trim it until the test back panel fits. You'll be able to move the crest rail up or down a bit to help improve the fit. Now you have your back panel template. Cut the oak plywood back panel to size (piece 13). On the band saw, trim it a bit larger than the back template. Screw the back template to the oak back panel piece, and template rout the final shape.

Figure 5: Hold the back posts as shown above on the assembled base with the seat in place. Then locate the bottom of the dado cuts using the tops of the front legs as guides. Later, (left) you'll attach the armrests with glue and screws.

Assembling the Back

Drill the back post to arm screw holes. Rout the back post, crest rail and lower back rail rounded over edges. Finish sand the back frame parts. Glue and clamp the parts together with the back panel template set in place to align the crest rail. Remove the back panel template right after you apply the clamps.

Use the assembled back frame to lay out the back posts to seat screw hole locations. Drill 1/16" holes to transfer the hole locations from the top of the seat to the bottom of the seat. Drill 1"-diameter x 1/8" deep counterbore holes at these spots on the underside of the seat, then drill 5/16" diameter holes through the 1/16" diameter holes. These oversized holes will allow you to shift the back frame around a bit to align it when you're attaching the arms. Loosely screw the back frame to the seat, then set that assembly in place on the base.

Making and Fitting the Arms and Footrest

Cut the arms (pieces 14) and footrest (piece 8) to size. Lay out and cut the notches on the backs of the arms and ends of the footrest. Find the shapes of these pieces shown in the *Pullout*. Round over the edges, but don't go all the way to the ends where the backs of the arms meet the back posts or where the back edge of the footrest meets the legs. Instead, "blend" those ends to their adjoining pieces by sanding.

Set the arms in place to check alignment, shifting the back if necessary. When you get it right, slide the seat backwards just enough to snug up the seat to back post screws. Push the seat back in position and check the arm alignments again. Then screw the seat to the base, and glue and screw the arms to the back posts and to the tops of the front legs. Glue and screw the footrest in place.

Figure 4: Glue and clamp the base parts together on a flat surface. Laying a board across the tops of the side and front aprons will ensure that the front apron is at the proper height.

Final Touches

Make the screw plugs (pieces 15) using a 3/8"-diameter plug cutter. Glue them in place, trim and sand them flush.

Make and apply the intarsia to the back panel (see the article on the *Pullout*). Do any remaining finish sanding, and ease any sharp edges. Apply two coats of finish to the chair, tray, and intarsia back panel.

After a few days, secure the back panel to the chair with epoxy. Attach the tray hardware and tray, the seat safety straps, and the leg bottom glides (pieces 16 - 19). (See the *Pullout* for locations.) That's it ... you're done. It's best to wait a couple of weeks for the finish to cure before using the high chair. A general rule of thumb is; if you can smell the finish, it's not completely dry.

Now it's time to feed those future generations: whether they're chowhounds or picky eaters, both will enjoy this beautiful and practical heirloom.

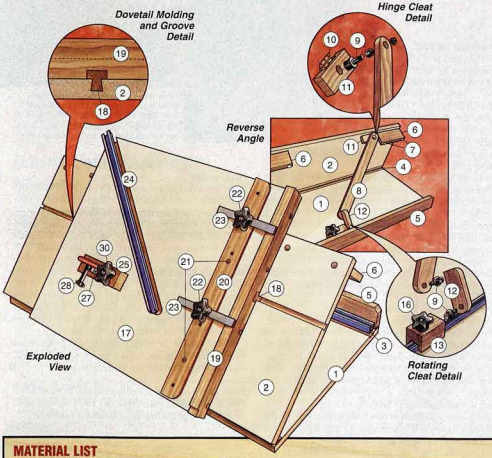
Bruce Kieffer is a professional woodworker and author from St. Paul, Minnesota. When he's not in his shop, look for him canoeing the Boundary Waters Canoe Area.

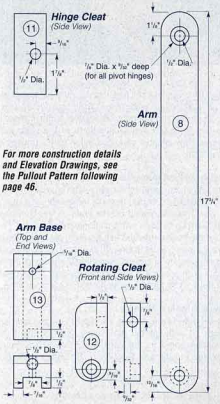
The Ultimate Angle Jig

By John English

Creativity often begins at home: While making a whole bunch of raised panel doors for my new kitchen, I came up with this labor-saving adjustable jig. As I moved on to other projects, I found it to be useful for a variety of shop tasks, like creating staves for multi-sided objects and milling spline-grooved mitered edges.

What sets this jig apart is the mechanism which lowers and raises its hinged plate. The arm is attached to the plate and the base with pivots, one of which slides in a T-track, as shown in the *Drawings* at left. The sled is set up to work safely with small or large parts. A piece of T-track set into a diagonal groove in the sled lets one of the hold-downs handle all kinds of workpiece shapes and sizes. A dovetailed groove keeps the sled (and workpiece) from falling into the blade when the jig is set at high angles.

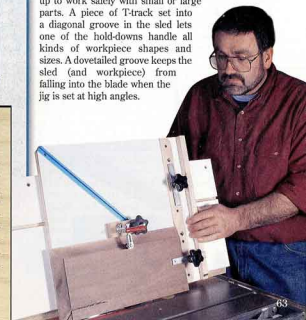




For more construction details and Elevation Drawings, see the Pullout Pattern following page 46.

MATERIAL LIST

		T x W x L
1	Base (1)	3/4" x 18" x 30"
2	Plate (1)	3/4" x 14" x 30"
3	Base T-track (1)	1/2" x 3/4" x 30"
4	Continuous Hinge (1)	1½" x 30"
5	Fence Cleat (1)	3/4" x 2" x 30"
6	Feet (2)	3/4" x 2½" x 6"
7	Nylon Glides (4)	7/8" Dia.
8	Arm (1)	3/4" x 1⅛" x 17⅞"
9	Arm Hinges (3)	Pivot hinges
10	Butt Hinge (1)	2" x 1⅛" Brass
11	Hinge Cleat (1)	3/4" x 1½" x 3½"
12	Rotating Cleat (1)	3/4" x 1½" x 3½"
13	Arm Base (1)	1½" x 1½" x 4"
14	Arm Base T-bolt (1)	5/16" - 18 x 2¼"
15	Washer (1)	3/8" ID
16	Arm Base Knob (1)	5/16" - 18
17	Sled (1)	3/4" x 17¼" x 18½"
18	Dovetail Molding (1)	3/4" x 3/4" x 19½
19	Handle (1)	3/4" x 1½" x 17½"
20	Sled Fence (1)	3/16" x 1¼" x 17⅞"
21	Threaded Inserts (4)	5/16" - 18 Brass
22	Hold-down Knobs (2)	5/16" - 18
23	Hold-downs (2)	1/8" x 3/4" x 5"
24	Diagonal T-track (1)	1/2" x 3/4" x 17½"
25	Sliding Block (1)	3/4" x 1½" x 4½"
26	Sliding Block T-bolt (1)	5/16" - 18 x 2½"
27	Sliding Block Bolts (4)	3/16" x 3/4"
28	T-handle Clamp (1)	350-lb. Capacity
29	Hold-down Nuts (4)	3/16" Locking
30	Sliding Block Knob (1)	5/16" - 18



Brad Nailers for the Home Shop

By Bill Hylton

For the average woodworker, the brad nailer is the most useful of the pneumatic nailers available. But a hammer is cheaper and it's not tethered to a noisy compressor ... so what's the attraction of a brad nailer?

How about speed, consistency, and convenience? Position the tip of the nailer, squeeze the trigger, and it fires a brad — as long as 2" — into the wood, setting its head just below the surface. It won't split the wood, either. That's pretty attractive, isn't it? Move the nailer to a new location, and fire another brad. Move it and fire again. In seconds, you can secure a molding or assemble a drawer.

Compare that to fumbling with clamps, trying to hold a tiny brad, and hammering it blow by blow. Maybe splitting the wood. Or bending the brad. Or denting the wood. Oooo! Love the possibilities.

The Basics

Brad nailers are manufactured by lots of companies, many that are familiar to woodworkers — like Porter-Cable, DeWalt, Grizzly, Makita, Hitachi, and Craftsman — and some — like Senco, Paslode, and Campbell Hausfeld — that may be unfamiliar.

Prices for a nailer alone range from $80 to more than $120.

But unless you already have an air compressor, that isn't your only outlay. At minimum, you need a small air compressor and a hose. I think you'll want quick-connect couplers, which allow you to separate the nailer from the hose from the compressor without tools.

Several manufacturers sell entry-level packages that combine a nailer with an appropriate compressor and hose. A few examples:

- Senco pairs a cute little compressor — just a 1 HP, one-gallon model — with a solid brad nailer for just under $200. The package includes a hose and fittings.
- Campbell Hausfeld has a similar package, pairing a 1 HP, two-gallon compressor with a bare-bones brad nailer/ stapler for about $100. While a hose comes with the package, fittings do not.
- Porter-Cable combines a brad nailer and a finishing nailer with a 2 HP, three-gallon pancake compressor and a 25' rubber hose with fittings. This package costs about $300.

Of all the air-power tools, a brad nailer is among the least demanding of air. If you have expansionistic ambitions, a package with a diminutive compressor isn't for you. A small compressor that'll drive brads, staples, and even finish nails, that'll pump up basketballs and even auto tires, will lack the wind for a framing nailer, truck tires, an HVLP sprayer, or air-powered wrenches and sanders.

Brad nailers are very handy in even the smallest woodworking shop. They are lightweight, versatile, accurate and dependable.

Have Nail Gun, Will Travel

Senco Finish Pro 18

Hitachi NT 50AE

Makita AF503

Craftsman 351.181720

Grizzly G607

Paslode T200-F18

Porter-Cable BN125A

Campbell Hausfeld NB00040

DeWalt D51238

Choosing a Nailer

To plumb the possibilities, I got 10 brands of brad nailers in hand and tried them on a variety of projects I had going. No formal testing per se, but a fair workout. In the end, it's difficult to single out just one. The plain truth is, they are remarkably similar.

Every one arrived in a plastic case. Some included sample brads, safety glasses, an Allen wrench or two if needed, and oil if needed. The DeWalt wasn't supplied with a coupling for an air hose, which seemed a cheesy omission.

All are similar in size and weight. All accommodate 18-gauge brads from 5/8" to 2" long. All have a tactile hand-grip. Only the Bostitch and the Craftsman are oil-less; all the others need a drop or two of oil in the air plug before each work session.

Fasteners: You need special brads for a nailer, of course. They are 18-gauge (like hammer-able ones), have square shanks and T-heads, and are bonded together in strips (called clips) of 100. The tips are chiseled, so they are unlikely to cause splits.

As a side note, I got a couple of units — one from Craftsman, one from Campbell Hausfeld — that drive brads and staples. This combination is attractive, since staples are better than brads for some common applications, such as fastening plywood cabinet backs. The tradeoff is that neither tool will shoot fasteners longer than 1¼".

Loading: Think of an ordinary office stapler. Slide open the magazine, drop in a clip, and close it up. Every magazine latch is a little different, but I can't say that any I tried was difficult to use.

The magazine cover should have a viewport or indicator to let you gauge how any brads are left. Beware of the models with a port that's too small or poorly placed.

Adjusting set depth: A good brad nailer should be adjustable, so you can set the depth you want, regardless of fastener length or material density. Nailers made by Bostitch, Craftsman, DeWalt, Paslode, Porter-Cable, and Senco all have a depth control, either a thumbwheel or a slide. To adjust the others, you have to alter the air pressure.

Bostitch BT200

Craftsman makes a tool that will shoot both brads and staples, expanding its versatility but limiting fastener length to 1½".

Place Each Brad with Precision and Power

Placing each brad: When you're assembling a cabinet or chest, unlike framing a building, you want to position each brad with precision. And you may need to squeeze a brad into tight quarters — an inside corner or the narrow fillet of a molding. Consequently, the size and design of the nailer's nose and safety are an issue.

Here's where there's differentiation amongst the brands and models. While I found none impossibly clumsy, check this before you buy. You'll see that some designs have a wide nose, others a very narrow one. The safety can be in front of the drive point or behind it. A plastic pad, intended to eliminate scratching and to cushion the impact of recoil, is a feature on some nailers. Often it expands the footprint.

Choose a nailer that has a footprint you can be comfortable with. But rest assured, with practice, you'll develop an eye for deftly placing brads, regardless of the particular tool you select.

Hazards

There are some hazards, even physical dangers, you should be aware of. Safety glasses were packaged with more than half the nailers; there's a message in that.

A louder message is the safety incorporated into every nailer. If you merely squeeze the nailer's trigger, nothing happens; it won't fire a brad across the room. The spring-loaded safety is deactivated by placing the tool's nose on the workpiece and gently pressing. Now when you squeeze the trigger, one brad is fired into the work. To fire a second brad, you have to release the pressure on the nailer momentarily to reset the safety.

The Makita is the only nailer I tried with a trigger-controlled return, which arguably makes it the safest nailer in this regard. So long as you hold the trigger, the safety won't reset. The system has two benefits, actually. One is that you can prevent recoil dings by holding the trigger until you've lifted the nailer's nose clear of the work. The other is that you can fire only one brad per trigger squeeze.

Why is this significant? Have you watched construction carpenters and roofers at work? They'll tap tap tap their way across a surface, firing nails in rapid sequence. What they are doing is holding the trigger and using the safety to fire the nails, an approach called bump (or bounce) firing. Of the nailers I tried, those from Hitachi, Grizzly, and Campbell Hausfeld would bump fire. The Craftsman nailer can be switched to a bump-fire mode. Paslode, Porter-Cable, and DeWalt make an optional trigger that enables bump firing. Other brands/models are incapable of it.

The obvious hazard of bump firing is accidental discharge. You get accustomed to holding the tool with your finger on the trigger, and you bump the nose against another tool, your workbench, or worse, against your body or someone else's. Pow! You've nailed it.

Errant nails are a significant hazard. The situation is this: Individual 18-gauge brads are very limber

Compressor and Brad Nailer Combos

For the woodworker without a compressor, getting into pneumatics is a costly step. A package combining a nailer with an appropriate compressor might help. For just under $100, Campbell Hausfeld sells a lightweight, low-capacity compressor and a no-frills nailer/stapler (right). For $200, Senco will put a pro-quality brad nailer and tiny compressor in your hands (left). The compressor is lightweight and won't power much more than a small nailer. Add a C-note to the kitty, and Porter-Cable (center) supplies a package with some legs. You get a brad nailer and a finish nailer, along with a 25' hose, quick connect fittings, and a 2 HP, six-gallon pancake compressor.

Details Determine the Difference

Each time you fire a brad, a puff of air is exhausted from the nailer. On the Grizzly (and others), you can rotate the top-mounted exhaust to direct the air away from your face.

and, when fired into a workpiece, they'll follow the path of least resistance. Should one encounter gnarly grain, a knot, or a nail, it probably will veer off course. It may burst through the surface, just where you don't want it. A friend of mine nailed a couple of fingers together, and to the work, when this happened.

The psychological part is the dismay that follows the emergence of a brad through a show surface. Believe me, you won't be able to pull that brad. Don't make the damage worse. Nip off the brad with diagonal cutters, sink the end, and patch the hole.

To avoid this trouble, always pay close attention to the alignment of the nailer before you squeeze the trigger. Aim — and I mean just that — to keep the brad in the meat of the work. And pay attention to your hand placement.

Dealing with jams: Every once in a while, regardless of how careful you are, you'll get a jam. Shouldn't be a big deal to clear, but with a few nailers it is.

To clear a jam, you must open the drive cover, remove the kinked brad, and reclose the cover. Most of the nailers I used have a latch system to secure the cover. Get a jam? Pop the latch, clear the brad, and snap the cover closed. Just a few nailers require you to remove (or at least loosen) two or more Allen-head screws. It's just soo inconvenient.

Sometimes a jam-up occurs. Some nailers, like the Makita (above), use an Allen-wrench to open the drive cover. Others simply pop a latch to open the cover and clear the jam.

Makita has a feature that controls the safety reset with the trigger of the nailer. Also note the window to see if brads are loaded or not.

There's one last hazard that comes to mind, and you may find it to be the hardest to avoid. It's the tool's seductiveness. It's so fast and easy that you'll start blowing brads into all your projects, whether fasteners are right for the application or not.

Bill Hylton is a regular Journal *contributor and the author of several woodworking books.*

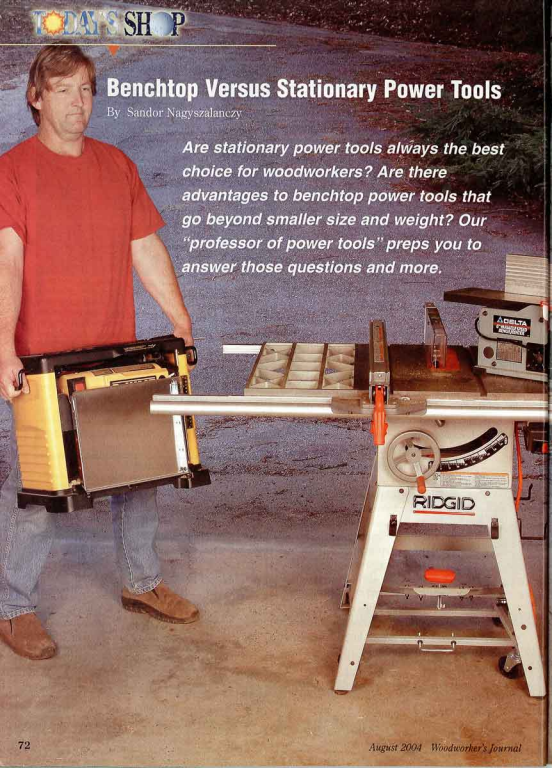
Nailing It: The Right Gun for the Right Application

Brand	Model	Price	Capacity	Depth Control	Nose Pad	Safety	Drive Guide Cover	View Port	Exhaust	Comments
Bostitch	BT200	$95	5/8" - 2"	Yes: 1,3	Yes	Front	Allen screw	Yes	Rear	Oil-less, bounce-fire
Campbell-Hausfeld	NB004099	$140	5/8" - 2"	No	No	Front	Latch	Yes	Top	Bare bones
	SB3232	$100	1/2" - 1½" (Brad/staple)	No	No	Yes	Allen Screw	No	Top	Bare bones, no air fitting
Craftsman	351.181172	$100	5/8" - 2⅛"	Yes: 2	Yes	Front	Allen screw	Yes	Rear	Oil-less, bounce/single fire
Craftsman	351.181174	$110	1/2" - 1½" (Brad/staple)	Yes: 2	Yes	Behind	Latch	Tiny	Rear	Oil-less, bounce/single fire
DeWalt	D51238	$120	5/8" - 2"	Yes: 2,4	Yes	Behind	Latch	Yes	Top	No air hose fitting supplied
Grizzly	G6047	$100	5/8" - 2"	No	No	Behind	Latch	Yes	Top	Bounce fires
Hitachi	NT50AE	$85	5/8" - 2"	No	No	Behind	Latch	Yes	Top	Bounce fires
Makita	AF503	$160	5/8" - 2"	No	Yes	Behind	Allen Screw	Yes	Top	Trigger controlled return
Paslode	T200-F18	$100	5/8" - 2"	Yes: 2	Yes	Behind	Latch	Yes	Top	Bounce-fire, trigger optional
Porter-Cable	BN125A	$80	5/8" - 1¼"	Yes: 2	Yes	Behind	Latch	Yes	Top	Bounce-fire, trigger optional
Senco	FinishPro18	$120	5/8" - 2"	Yes: 1,3	Yes	Front	Allen Screw	Yes	Rear	No bounce-fire, belt hook

Benchtop Versus Stationary Power Tools

By Sandor Nagyszalanczy

Are stationary power tools always the best choice for woodworkers? Are there advantages to benchtop power tools that go beyond smaller size and weight? Our "professor of power tools" preps you to answer those questions and more.



Space-challenged and budget-minded ...

It wasn't all that many years ago that having a really small shop meant you couldn't own all the machines you wanted — table saw, planer, jointer, band saw ... thanks to developments in tool design and the growth of the "do-it-yourself" market, power tool manufacturers have treated us to a steady flow of new benchtop models in recent years. Constructed from lightweight metals and advanced reinforced plastics, these portable machines feature sophisticated motor and drive technologies, solid ergonomics and upgraded dust collection. Advanced models often boast features not found on even the most expensive stationary models! Best of all, contemporary benchtop tools are compact enough and carry price tags low enough to allow even the most space-challenged, budget-minded woodworker to buy a whole shop's worth of benchtop tools for little more than the price of a single top-quality stationary machine.

But despite all their advantages, benchtop tools aren't for everyone. In order to make them light enough to be economically shipped and easily transported, many benchtop models employ universal-type motors, the kind used in portable power tools, like routers. While universals dish out impressive performance for their compact size, they're noisy and aren't much of a match for the beefier — yet much heavier — induction motors found in nearly all stationary machines.

With lighter-duty motors come compromises in capacity as well: Benchtop machines usually don't offer the depth or width of cut and rate of feed that stationary models do. These limitations are also in line with manufacturer's design goals. For example, limiting a benchtop table saw's rip capacity to only 24" or 30" helps keep it compact enough for a single adult to lift, for moving it to a job site or storing it under a workbench when not in use.

Are benchtop tools right for you? In addition to space and price considerations, carefully considering the kind of work you want to/need to do will ultimately be your best guide when choosing machines of a particular type. Sometimes, the capacity of the tool is the issue: If you're planning on turning only small bowls, a big, floor-model lathe is clearly overkill. Power and durability is another important issue: If you plan to sell surfaced lumber planed from rough planks, you're much better off investing in a durable stationary thickness planer that'll handle the load, rather than running a benchtop unit into the ground.

Even if you have the room for full-sized stationary machines, there are circumstances under which you might prefer a benchtop tool. For instance, the portability of a benchtop jointer or band saw is a blessing if you sometimes work at a remote job site.

To help make the task of deciding whether a stationary or benchtop machine is right for you, I've created a series of charts for seven of the most common small-shop machines: table saws, jointers, band saws, drill presses, combination sanders, lathes and planers. Each chart compares the attributes of stationary and benchtop machines, including motor power and capacity, features, weight and street price, as well as listing a few popular makes and models of each type of tool. It's worthwhile to carefully examine the capacities and features of each style of machine before deciding which one to buy. For example, if you're considering buying a benchtop table saw to use for joinery work, it's important to know that not all models have arbors that accept dado blade sets. In addition, I describe some advantages and disadvantages of stationary versus benchtop models, as well as offer advice about which machines are best suited for various types of work (the bottom line). If you're like most woodworkers I know, your real-world woodshop will end up with a harmonious blend of both benchtop and stationary machines.

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Set upon its folding workstand is the Bosch 4000 benchtop table saw. Lighter and smaller than the Ridgid contractor's saw behind it, the Bosch has the same maximum cutting depth and 24" rip capacity.

Table Saws: Contractor vs. Benchtop

	Contractor saws	Benchtop saws
Model #	Powermatic model 64, Delta 36505X XS and 36-444, Sears Craftsman #22849N.	Bosch 4000-07, DeWalt DW744S, Makita 2702, Porter-Cable 3812.
Power & Capacity	1½ HP 110-/220-V induction motor (most models); 10" maximum blade diameter; 3½" maximum depth of cut.	15 amp universal motor (most models). 8-¼" and 10" maximum blade diameters. 2-¼" to 3-¼" maximum depth of cut.
Fence Capacity	30" rip capacity (48" to 52" on models with long fence rails and extension tables). Features: 40" to 75¼" cast-iron tables (with extensions).	24" to 30" rip capacity. Telescoping rails (Bosch and DeWalt). 26" to 29½" long cast aluminum tables (with extensions).
Misc. Features	Built-in 4" dust collection ports (some models).	Soft-start and electronic motor feedback (Bosch). On-board blade and accessory storage. Optional fold-up stands (most models).
Weight	220 to 380 lbs.	40 to 60 lbs.
Street Price	$600 - $950.	$110 - $500.

need a table saw for work at a job site, or for occasional craft work, woodwork and do-it-yourself projects in a garage workshop, a benchtop saw's adequate capacity and ease of transport/ storage are probably a good fit. Folding stands (optional for some models) are very handy if you'll move the saw around often.

Jointers:

Up side/down side — Full-size: Long bed allows easier jointing of long boards; more powerful motor allows deeper cuts; long, wide fence supports wide boards run on edge. Knife adjustment on older models that lack jackscrews is time-consuming; long bed sticks out and is easy to accidentally run into.

Up side/down side — Benchtop: Small machine takes up little space; easy to lift and take to job site or store; variable speed model adjusts to density of material and speed of cut. Units must be clamped or bolted down before use; short bed makes it difficult to flatten and straighten long boards with warped surfaces and edges.

The Bottom Line: A long bed jointer is a mainstay in a serious cabinet or furniture shop. If you routinely joint

Although its cutterhead is only 2" shorter, this Delta model 37-070 8" benchtop jointer is dwarfed by the much longer, heavier cast-iron beds and fence of the JET JJ-8CS 8" jointer it sits atop.

Jointers: Stationary vs. Benchtop

	6" and 8" Stationary Models	4" and 6" Benchtop Models
Model #	Delta JT360 and 37-275X XS, JET 708458K, Powermatic 54A.	Craftsman 21788, Delta JT160, Grizzly H2801.
Power & Capacity	3/4 or 1 HP induction motor (6" models). 1½ – 2 HP induction motor (8" models).	10 amp universal motor (Delta). 4" (Grizzly) or 6" (Sears, Delta) wide cut.
Bed	46" to 47" long bed.	30" long bed (Delta).
Misc. Features	Three-knife cutterhead. Large wheels or levers for adjusting infeed and outfeed tables.	Two- or three-knife cutterheads. 6,000 to 10,000 RPM variable speed (Delta).
Weight	239 to 398 lbs.	33 to 62 lbs.
Street Price	$325 - $1,050.	$180 - $250.

Band Saws: Stationary vs. Benchtop

	14" and 15" Stationary Models	9" and 10" Benchtop Models
Model #	General 490-1, Delta 28-206 and 28475X XS, Grizzly G0555.	Delta BS100, Grizzly G1052, Sears Craftsman #21460.
Power	1 to 1½ HP induction motor.	1/3 to 1/2 induction motor (most models).
Throat	14" to 14¼" throat depth.	8¼" to 9½" throat depth.
Depth	6¼" to 6¾" maximum depth of cut (12" width riser block kit available for some models).	3¼" to 4½" depth of cut.
Misc. Features	15/8" by 135" table (General). Quick-release blade tension lever (Delta & Grizzly). Built-in 4" dust collection ports (some models).	11½" x 11½" aluminum table (Grizzly). Tilting head, stationary table (Sears).
Weight	225 to 345 lbs.	33 to 100 lbs.
Street Price	$375 - $1,400.	$100 - $280.

The General 490-1 is a 15" saw, with a heavy cast-iron frame, sturdy guides and a generously sized table. Its 3/4 HP induction motor and 6" cutting depth makes it suitable for resawing and heavy curve cutting.

or plane long, wide boards, you'll want at least a 6' model; an 8' model makes it even easier to joint really long boards and surface plane wide stock. A benchtop jointer is an economical solution for hobbyists, model makers, and woodworkers that only occasionally need to put a straight edge on stock before ripping it on the table saw. Also a good choice for builders and finish carpenters who need a job site jointer for cleaning up edges.

Ryobi benchtop; Delta variable speed. Both models have infinitely-selectable variable speed, a feature that makes them practical and versatile for drilling a variety of materials.

Band Saws:

Up side/down side — Full-size: Adequate power and depth capacity for resawing lumber (especially on models which accept a riser block) and cutting curves in wide panels; cast-iron construction dampens vibration; some models accept blades up to 3/4" wide. Big machines take up a good amount of floor space; guide sets are time-consuming to adjust; top models are very expensive.

Up side/down side — Benchtop: Small, compact machine that's easily stowed when not in use; adequate capacity for scrollwork and cutting small, curved parts. Can't be used for resawing heavy stock or cutting wide panels; limited choices for blades the machines will run; blades running over small-diameter wheels more prone to work hardening; inexpensive guide assemblies on some models.

The Bottom Line: If your goal is to resaw wood to make matched veneers, or cut turning blanks from branches and small logs, then a stationary band saw is a must-have machine. Boatbuilders and furniture makers who need to cut long and thick curved parts will also welcome the capacity and power of a stationary saw. Although they look like miniature versions of full-sized stationary machines, mini band saws really aren't cut out for doing serious curve-cutting or resawing work. However, they're a great choice for hobbyists and DIYers looking to cut out small parts from wood or plastics.

Drill Presses:

Up side/down side — Full-size: Has the power and capacity to bore large holes in tough materials; great range of speeds, for boring wood, plastics and metals; bigger work table keeps large workpieces stable. More expensive than benchtop models and take up more space.

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Drill Presses: Floor vs. Benchtop

	16" to 17½" Floor Models	9" and 10" Benchtop Models
Model #	Delta 17-965 and 17-925, Shop Fox G9974, JET JDP17MF.	Sears Craftsman #21912, Delta DP115 and DP350, Grizzly G7943, Ryobi DP100.
Power	3/4 to 1 HP induction motor.	1/4 to 2/3 HP induction motor.
Speed	16 speeds (infinite variable speed on Delta).	5 speeds; belt/pulley selectable.
Capacity	8" to 8¼" between column and chuck center. 44½" between chuck and base (Delta). 5/8" or 1/2" maximum capacity chuck.	4" to 6" between column and chuck center. 18" between base and chuck (Grizzly). 1/2" maximum capacity chuck.
Quill Travel	3¼" to 6".	2" to 2¾".
Features	13¼" round table (JET).	7" Diameter round table (Grizzly).
Weight	175 to 200 lbs.	40 to 50 lbs. .
Street Price	$325 - $800.	$60 - $210.

Table Saws:

Up side/down side — Full-size: Lots of power and capacity for cutting thick hardwoods; long fence rails allow you to cut large; plywood panels to accurate size; most motors can be wired to run on either 110 or 220 volts. New saws come packed in boxes and require fairly extensive assembly; saws too heavy and bulky for a single person to carry; some low-priced models employ less powerful universal-type motors.

Up side/down side — Benchtop: Lots of features in a lightweight tool that's compact and easy to transport and store; most saws can use the same miter slot-guided gauges and accessories other table saws do; most models have built-in dust ports. Arbors on most models too short for a dado blade set; universal motors make for slow going when cutting thick, dense hardwoods or sappy green softwood; not enough rip capacity for cutting up big panels and sheets of plywood.

The Bottom Line: If you routinely need to rip wet 2 x 6s or cut thick hardwoods or large sheets of plywood, you'll appreciate a contractor saw's powerful induction motor and large table and rip capacity. It's a great choice as an "all-around" power saw for carpentry, home improvement and cabinet/furniture building. If you

Up side/down side — Benchtop: Benchtop models have most of the features of floor models at a much lower price; compact machines that don't take up much bench space. Lack the power or depth-drilling capacity of floor models; smaller range of speeds to choose from limits versatility when boring different materials.
The Bottom Line: If you plan to use a drill press for boring big holes in wood, for drilling metals, or for occasional use as a mortising machine (fitted with a hollow chisel mortising accessory), you'll need a floor-model drill press's sturdy construction and long quill travel. For general drilling tasks, most woodworkers can easily get by with benchtop models, which have most of the features of floor models in scaled-down form. Most models have adequate power and quill travel for medium-duty wood boring and light-duty metal drilling tasks.

For sanding large flat or convex parts, nothing beats the large capacity and power of a stationary sander, such as the Delta Sanding Center shown here.

Combo Sanders:

Up side/down side — Full-size: Wide belt and large disc allow larger, thicker parts to be sanded effectively; big motor prevents belt from slowing excessively when large parts are sanded; cast-iron construction is durable and dampens vibration. Large belts and discs are more expensive; must be connected to good dust collection to reduce clouds of dust machine is capable of producing.
Up side/down side — Benchtop: Inexpensive means of adding a sanding machine to your small-shop arsenal; belts and discs are relatively inexpensive; units easily hook up to standard shop vacuums; end of belt can be used to sand concave parts; lightweight and easy to store. Small disc and narrow belt limit size of work the machine will handle; motors tend to bog down when parts are briskly sanded; Small, lightweight work tables offer little support for long workpieces.
The Bottom Line: For cleaning up a mitered frame end or trimming a dowel to exact length, nothing beats working on a well-made stationary combination sander. Although it costs at least twice as much as a benchtop model, a stationary sander's heavy, accurately machined disc, large cast-iron work tables and platen (the surface that aligns and supports the back of the belt) allow sanding that's accurate enough to create tight-fitting joinery. The lightweight construction of most benchtop models makes them suitable mostly for relatively light-duty work. But still, small combo sanders are great for shaping or smoothing small parts used in building craft projects, musical instruments, small pieces of furniture or cabinetry, etc. Narrow belt/disc combo sanders are terrific for not only wood sanding (the narrow belt can even sand concave curved edges!), but, fitted with the right abrasive belt, for cleaning up hardware and even sharpening tool blades.

Lathes:

Up side/down side — Full-size: Heavy construction helps dampen vibration; powerful motor prevents stalling when roughing out large turnings; variable speed control makes it much easier to change the rotation speed of your work; pivoting-head models allow easier turning of large bowls and plates. High weight makes stationaries and their stands hard to move.
Up side/down side — Benchtop: Relatively heavy construction and adequate power, given their smaller size; compact and light enough to take it with you to a friend's house or on vacation; optional bed extensions expand capacity of some models, for longer spindle work. Small swing-over size limits size of largest bowls and vessels you can turn; motor power of midi lathes barely adequate for turning dense woods; Klein lathe is expensive and comes without a motor.

Combo Sanders: Stationary vs. Benchtop

	6" Belt/9" or 12" Disc, Stationary	4" or 1" Belt/6" or 8" Disc, Benchtop
Model #	Powermatic model 31A, JET 708596K, Delta 31-300 Sanding Center	Fisch BDS99460, Sears Craftsman #21536, Delta SA180
Power	1½ HP motors (typical)	1/3 HP induction motor (Delta)
Capacity	6" x 48" belt; 9" or 12" disc 13" x 7½" work table (Powermatic)	4" x 36" or 1" x 30" belt; 6" or 8" disc 4½" x 8⅛" work table (Sears)
Misc. Features	Belt adjusts from horizontal to vertical position. Automatic belt tensioning with cam-lock lever (Delta).	Belt adjusts from horizontal to vertical position. Dust port for shop vacuums (most models)
Weight	182 to 247 lbs.	33 to 62 lbs.
Street Price	$270 - $1,000	$110 - $120

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The JET JWL 1442VS stationary lathe and Klein mini-lathe are built for completely different scales of operation. Made for turning small things, like earrings and pens. Klein also offers an optional thread cutting accessory.

Lathes: Stationary vs. Mini or Midi

	12" and 14" Stationary Model	Mini and Midi Benchtop Models
Model #	JET JWL-1236, Delta 46-715, Grizzly 1067G.	Fisch TC90-100, Delta LA200, JET JWL-1014, Klein mini lathe.*
Power	3/4 HP induction motor.	1/4 to 1/2 HP induction motors.
Capacity	12" to 14" swing over bed. 34½" to 40" between centers.	5" to 10" swing over bed. 11" to 14" between centers.
Misc. Features	Lever-selectable variable speed ranging from 550 - 3,000 RPM (JET). Swivel drive head allows larger-diameter faceplate turning (Grizzly, JET). 6 spindle speeds ranging from 500 to 3,975 RPM (JET).	Bed extensions that expand distance between centers to 39" (Fisch). Threading cutting accessory optional (Klein).
Weight	183 to 300 lbs.	9" to 70 lbs. *(Klein sans motor)
Street Price	$450 - $680.	$140 - $350.

The Bottom Line: If you're serious about getting into bowl or spindle turning, you'll want a decent-sized stationary lathe with adequate swing over and between-centers capacity for turning large bowls, table legs, lamp bases, and turned forms used in furniture and cabinetry. The heavier the lathe, the better: look for a model with a cast-iron (rather than sheet-metal) stand. Mini- and midi-sized benchtop lathes will do what full-sized stationary models will, just on a smaller scale. Therefore, there's no sense in buying a big, expensive lathe if all you want to turn are pens, boxes, salt/pepper shakers, chisel handles, bun feet for a chest, etc. Make sure all the accessories you want (faceplates, tool-rests, etc.) are available to fit the model you choose.

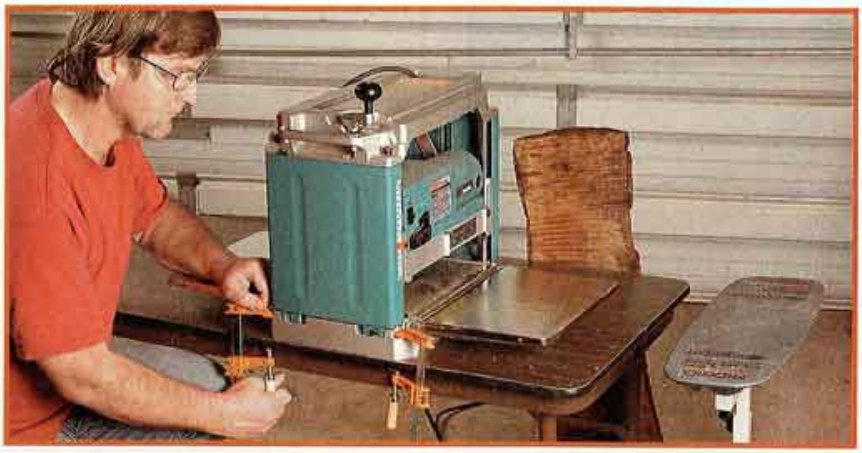
Planers:

Up side/down side — Full-size: Lots of power for a deep cut on each pass; bed rollers helpful when planing rough stock or green wood; 15 - 16" models able to handle wide stock and glue-ups. Expensive, heavy machine; traditional knife sets are time-consuming to change and usually must be sent out for sharpening. Planer beds move up and down, so outboard stock supports need readjustment after each change of cutting depth.

Up side/down side — Benchtop: Relatively heavy construction and adequate power; lots of useful features not found on stationary machines; easy to move outdoors (so chips don't fill up shop) or to job site when needed; knife changes are very easy on models with disposable, quick-change knives. Benchtops are noisier than induction motor-driven stationary models; limited depth and width capacity.

The Bottom Line: If you plan to save money by buying your lumber rough and planing it yourself, you won't regret the solid performance and power of a stationary planer. Also a necessity if you commonly glue up wide panels that then need surfacing. Affordable and compact, benchtop planers have been a blessing for small shop woodworkers who only need to flatten the occasional cupped board, or bring parts down to correct thickness. Also a boon for finish carpenters who need to thickness parts on the job site.

Sandor Nagyszalanczy is a writer, photographer and tool expert whose latest book, The Homeowner's Ultimate Tool Guide, *is available from the Taunton Press.*



The Makita 2012NB benchtop planer is clamped down to a low work table, preparing it for planing a couple of rough boards chainsawed from backyard harvested logs.

Planers: Stationary vs. Benchtop

	15" and 16" Stationary Model	12" and 13" Benchtop Models
Model #	Delta 22-780X X5, JET JWP160S, Grizzly G0550.	Ridgid TP1300LS, DeWalt DW735, Delta TP300, Makita 2012NB.
Power	2 – 3 HP 110/220v induction motor.	15 amp universal motor (typical).
Capacity	15" - 16" wide, 6" thick stock. 1/8" maximum depth of cut (typical).	12" - 13" wide, 6" thick stock. 3/32" maximum depth of cut (typical).
Misc. Features	Built-in fold-down support rollers.	Depth-stop turret, depth-of-cut gauge, quick-change knives (many models).
Weight	300 to 425 lbs.	65 to 90 lbs.
Street Price	$600 - $1,200.	$200 - $500.

Down to the Finish

By Steve Blenk

Even though some woodworkers look at finishing as a necessary evil ... it often marks the difference between a project's success or failure. Turning projects are no different. Here are a few finishing basics for projects turned on the lathe.

One reason turning is popular with woodworkers is what I call the "fast fun factor." Unlike most other types of woodworking, a turned project is often completed in just a few hours. And you can do your finishing right on the lathe too, if you know your stuff. This makes things even better for the "weekend woodworker" in all of us. Here are a couple of techniques and tricks for you to try during your next spin on the lathe.

Sanding

Sand your work clean of all tool marks and scratches. Reverse the lathe's direction if you can, to be sure the "nap" of the wood grain isn't just lying down. Reverse sand by hand if you must, but do it, or the grain will rise when you apply finish to the work. I tell beginners to go one grit further than they think they need to, just because it's easier to sand now than later. Be sure to protect your lungs with a mask: sanding on the lathe produces large amounts of dust, and the rotation throws it right in your face. Once you are done sanding you are ready to finish.

Safety Cautions

Two important things to remember:

1. When you apply any finish under power on the lathe, excess finish will "fling" off. Be sure to protect your face and especially your eyes from potential spray.

2. Take care when using rags or pads to apply or burnish finish while under power. Move all rests and other lathe accessories out of the line of fire, and keep all corners and ends tucked in away from possible wrap-up. Be sure you can release any material that might wrap in the turning ... DO NOT wrap the rag around your hand! Steer clear of irregular or natural edges as they will grab the rag (and you!).

Burnishing

This is an old-time turners' trick for getting a polished sheen on unfinished hardwoods like maple. After sanding, just grab a handful of your shavings and press them against the spinning surface under some pressure. Since the material is just as hard as the shavings, they polish one another rather than scratching. It works best on spindles, but BE CAREFUL as the heat this generates can burn an unprotected hand in a New York minute! A leather glove is a good idea (see *photo*, facing page).

A well applied finish brings out the beauty of a myrtle bowl. Below, the author uses shavings from a spindle to burnish the wood. Note the leather glove, which keep his hand from being burned.

PRO'S TIP

Burn dark detail lines for decoration on light-colored woods like maple just by running a piece of copper wire against a small V-cut on the the spindle. Friction quickly generates enough heat to do the job. The larger the wire diameter, the wider the burn. Be careful though: the wire gets REALLY hot. I made up a handle for mine to save my fingers.

— Steve Blenk

Waxes and Oils

There are a LOT of finishes in this category, from the old standby beeswax & mineral oil (food safe), to exotic 'polymerizing oils' and old favorites like Watco® or linseed oil. I just apply a good coating on the work, and then buff it up under power by applying a soft dry rag to the surface at medium speed. When using polyurethane oils (which are a thinned varnish of sorts) you will want to build several coats by waiting the designated drying time. You can apply these finishes directly to the wood without sealing, but they will soak in at first, especially on softer woods. The oils will penetrate, and when they "set up" will act as their own sealer for successive coats. You can speed things up a bit by burnishing the surface with a soft rag under power, generating a little heat at the same time. Be careful not to let the pad catch on a suddenly sticky surface. A little linseed oil on the rag can help here. You can also wet sand (with the lathe stopped!) very fine surfaces with the oil on them. Then buff off excess.

Waxing can help to protect these oil finishes. Apply wax by hand (paste) or at low speed under power, and buff with soft cloth or lambswool. Remember waxes are a soft finish that will have to be periodically renewed.

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WOODTURNING

Polishes and Compounds

These are finish products designed for very dense, hard exotic materials like cocobolo and ebony, which do not need sealing, and are popular finishes with pen turners. One common brand is the HUT products. There are various formulations of hard waxes and polishing agents, which can be applied directly to the wood and then buffed off under power. The result is a hard glossy finish that wears well.

Sealing Your Work

The process of turning produces both end grain and flat grain on the final surface. And as they will absorb finishes at remarkably different rates, it's a good idea to use a sealer coat, especially on exposed open end grain. This is particularly true if you are trying to achieve a uniform stain color, or build up to a glossy surface. One of the best sealers is shellac, thinned with denatured alcohol and mixed with a small amount of linseed oil. Furniture finishers will recognize this formula as "French polish," and indeed it can be used as a finish all by itself if you build successive coats.

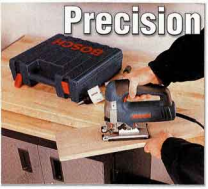
You can also use a nitrocellulose (lacquer type) sanding sealer for this purpose. Mix it thoroughly, thin it well, (50%) and let it penetrate. I am a bit leery of applying this stuff under power, as it does like to grab rags! Protect your lungs from the volatiles in this material; use a mask rated for organic vapor. Sand it well before progressing to the next step.

Padding Lacquer

This is a hybrid of French polish/shellac made by several suppliers. The one I use most often is sold by Mylands, a British outfit. It works like shellac, and probably contains some, but the formula finishes harder than shellac and has a better build rate. Apply it with a wet rag pad under power, and then polish it with a dry rag under power. It is great for small spindles and vessels made from exotic woods.

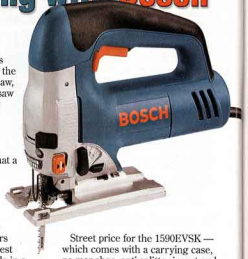
Steve Blenk is the newest contributing editor to Woodworker's Journal.

Precision Jigsawing with Bosch



Bosch's new jigsaw has been in development for several years, but the 1590EVSK is now on the market. Three of the distinctive new features on this tool are: a one-touch blade changing system (first seen on Bosch's cordless jigsaws last year); a tool-less foot bevel system that lets you change the angle of the cut without a wrench or screwdriver; and the Precision Control Blade Guide System®. This system is basically a blade guide that clamps together, very much like the guide blocks on a band saw, which helps control the saw blade much closer to the work surface. You can disengage it for coarse cutting, but it is recommended for about 90 percent of the work that a jigsaw is asked to do.

The 1590EVSK is currently available in a top-handle model; a barrel handle version will follow later this year. The 1590EVSK also enters the market with the biggest motor (6.4 amps) available in a handheld jigsaw. The motor features constant response circuitry, for added control and cutting accuracy.



Street price for the 1590EVSK — which comes with a carrying case, no-mar shoe, anti-splitter insert and three saw blades — is about $170. *For more info, call 877-267-2499 or visit* www.boschtools.com.

End Your Slide Alignment Struggles

Tired of struggling to mount drawer slides?

The Drawer Slide Mounting Board from Kreg simplifies the process. You can use it with many different styles of drawer slides: just put a metallic slide into position on the base of the tool and magnets will hold it in place while you align the Mounting Board. Drive the screws, and you're done — and aligned right. A similar process works with frameless cabinets, using the cabinet side as a reference to position the slide perfectly parallel to the drawer opening. The patent-pending Drawer Slide Mounting Board works with bottom-mount, full-extension as well as center-mount slides. It sells for under $30. *For more info, call 800-447-8638 or visit* www.kregtool.com.

Safety in a Pack

Can't find your safety gear? Find it uncomfortable — or unfashionable? Dynapaq is proposing the Safetypaq™ kit as a solution. Included in the kit are both indoor and outdoor safety glasses, reusable ear plugs and high-dexterity work gloves. The patent-pending Paq stores them all.

Both pairs of curved-profile glasses are single lens for a clear field of vision and "comfort fit" to accommodate different head shapes: the lens on the outdoor pair is tinted. The soft, pliable ear plugs come in a protective plastic pod, making it easier to keep them clean. The gloves have leather palm surfaces for durability, padded palms for comfort and a neoprene cuff for a tight fit that prevents debris from entering.

The storage Paq has integrated magnets and a fold-out handle with a peg slot to simplify storage, a clear lid to allow viewing of the contents, and a customized insert for organized storage. It also has a design inspired by performance cars.

The Safetypaq sells for $36.95. *For more information, call 312-924-3499 or visit* www.dynapaq.com.

Air Circulation for Your Shop

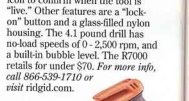
Summer is the season for fans, and Vornado Air Circulation Systems has a new one for your workshop. The AirMaxx is a portable shop fan that can be mounted on a shelf, floor or wall with the aid of its four cushion-grip feet and two pivot hinges that allow 360 rotation of the hoop base.

Once installed, the AirMaxx can shoot a beam of air up to 80 feet for use in cooling off your shop or aiding the drying time of your finish. The AirMaxx features a deep-pitch fan blade and an American-made, ball-bearing motor mounted in a high-density, shock-resistant polypropylene housing. This all rests on a 1½" diameter steel tube platform.

Each AirMaxx comes equipped with three-speed control switch, an easily removable grill for cleaning, and a 10-foot grounded plug cord. Suggested retail price is $100. For more information, call 800-234-0604 or visit www.vornado.com.

RIDGID's 6.5-amp Drill

RIDGID's R7000 Heavy-Duty 3/8" Drill has a 6.5-amp motor that makes it the most powerful corded drill in its class. That cord is 12' long, with a lighted plug and backlit icon to confirm when the tool is "live." Other features are a "lock-on" button and a glass-filled nylon housing. The 4.1 pound drill has no-load speeds of 0 - 2,500 rpm, and a built-in bubble level. The R7000 retails for under $70. *For more info, call 866-539-1710 or visit* ridgid.com.



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(Circle No. 28 on PRODUCT INFORMATION form)

French Polish: Classic Hand-rubbed Finish

By Michael Dresdner

French polish, as elusive as it is beautiful, is referred to as the Holy Grail of finishing, but the process is regarded as difficult to learn. A few guidelines will have you polishing in no time.

French polishing is a technique for applying shellac with a rag or pad, though the term is also used for the finish itself. Shellac dries very fast, so it is difficult to wipe it on without it becoming too sticky to manipulate. Each coat of shellac dissolves the previous coats, so you'll dissolve and remove the first coat as you try to apply a second. To get around these problems, French polishers rub shellac on in very thin layers, with the pad just barely wet. The technique takes a bit of practice, but the result is an ultra-thin finish that makes the wood look polished, but not plastic.

Shellac is fairly durable, but is subject to damage by heat, alcohol and alkaline chemicals. On the plus side, it's hard and brittle; resists water, stains and acid; will not discolor or darken over time, and is easily repairable and indefinitely renewable. The only application tool you need is a cloth pad. A French polished surface dries to the touch as you apply it, so it remains dust-free. There is no drying time, so a nice finish can sometimes be built up in one day.

By wrapping a center pad of trace cloth with a well-washed piece of linen, the author creates the perfect application pad.

Preparing the Surface

Sand all surfaces to 220 grit or finer. For the last sanding, use garnet paper and sand by hand, going with the grain. Seal the wood with dewaxed shellac. Flood the shellac onto the raw wood, then immediately wipe it off, leaving only what has been absorbed by the wood. Let the sealer dry thoroughly. Sealing will raise the grain of the wood slightly, creating whiskers. Remove them by sanding very lightly with 400-grit sandpaper.

If you're working on an open pore wood, now is the time to fill the pores. Traditionally, finishers used a slurry of shellac and pumice, rubbed on with a pad, to create a clear filler. Since the advent of clear pore fillers, this technique has lost its allure.

Woodworker's Journal editor Rob Johnstone rubs out a French polish finish to a high gloss. French polish finishes can be of ultra-high luster or satin ... as the finisher desires.

Making the Pad

Creating a good application pad is half the battle. I like to use trace cloth: an all-cotton, tightly woven cheesecloth for the center, and well-washed linen handkerchief material for the cover.

Dip the trace cloth in denatured alcohol to make it pliable, then wring it out. Fold about a 9" square of it repeatedly to form a smooth-bottomed, slightly conical mouse-shaped pad (a real mouse, not a computer mouse). The purpose of the trace cloth is to act like a sponge, holding and dispensing the shellac, and the purpose of the linen wrapper is to create a smooth surface to contact the wood. Wrap the linen tightly around the cotton, and twist the ends so that the bottom of the pad is smooth, wrinkle-free, and tight. Press the pad on a clean, hard surface to flatten the bottom.

I've been finishing wood for 30 years...

But I never have any luck with polyurethane. I get bubbles or bumps every time. Can you help me figure out how to get a smooth finish without spending hours and hours sanding and rubbing?

Mark Armstrong
Sacramento, California

You are not the only one facing this dilemma, but the manufacturers are listening to you. Two years ago, Rockler *(www.rockler.com)* started selling Rockler Polyurethane Gel. Designed as a foolproof wipe-on/wipe-off finish, it will give you exactly what you are seeking — a flawless polyurethane finish with no dust, bubbles or brush marks, and very little work. All you need to do is apply it correctly. Don a pair of vinyl gloves (it's not harmful, but it will make your hands sticky), and grab a piece of fine, gray Scotchbrite®. Dip the Scotchbrite into the gel, and use it to scrub the finish onto the wood. Go back with a cloth or paper shop towels and wipe it all off. Wiping off the finish will leave a very thin, but uniform, coat, free of brush or rag marks. Apply one coat per day in exactly the same way. Three coats are a bare minimum; six or more are better. There's no need to sand between coats for adhesion, as long as you apply the next coat within two weeks. Sand only if you need to remove dust nibs, an unlikely scenario with a wipe-off finish.

— Michael Dresdner

Winner! *For simply sending in his question on working with lacquer, Mark Armstrong of Sacramento, California, wins* **the Olympic Interior Wood Finishing Toolbox** *at left.*

Application

Charge the pad by adding a few drops of thin shellac to the alcohol on the pad, then press or tamp the pad on a clean sheet of paper to disperse the shellac. Ideally, the surface of the pad should feel only damp. If it's too wet, it will remove finish, leave marks in a partially polished surface, create a sticky surface or cause "curdling," ridges in the coating that look like shallow sand dunes. Working with too wet a pad is the most common beginner's mistake.

You must keep the pad moving as you rub the finish on. Stopping at any point will cause the pad to leave a rag mark or lift the finish. Start moving the pad before you touch down and keep moving until after you lift it off the surface. Rub the finish on, pressing lightly, in small circles. Rubbing in straight lines is fine for one or two strokes, but constantly going in one direction will create ridges. Try to cover the entire surface uniformly, working one area at a time. Rub until the pad is out of finish and the bottom is clean and almost dry. When it slips across the surface with no resistance, stop and recharge the pad with a few more drops of shellac, then continue.

Dealing with Problems

You should be applying finish so sparingly that the surface always feels dry. If it starts to get sticky or shows ridges or pad marks, stop and let it dry — even if it takes overnight. Keep your pad supple by storing it in a lidded jar with a few drops of alcohol. Once the finish is dry, sand the irregularities out with fine sandpaper and, when the surface is smooth, resume polishing.

If the pad itself gets too sticky, charge it with a few drops of alcohol instead of shellac. You can also add a drop or two of mineral oil to the face of the pad to help lubricate it so that it does not grab as easily. The oil will not mix with the shellac, but will stay on the surface, and you will be able to wipe it off with a soft cloth dampened with naphtha after you've finished polishing.