

RODALE'S

AMERICAN WOODWORKER

FEBRUARY 1993 #30

CRAFTSMANSHIP
AWARD WINNERS

**YOU CAN
BUILD THIS
HARVEST
TABLE
P. 42**

**30 BRIGHT IDEAS
FOR LIGHTING
YOUR SHOP P. 22**

**QUICK & EASY
ROUTER DOVETAILS**

**SHARPENING
SECRETS**

- CHOOSING A GRINDER
- FAST EDGES FOR TURNING TOOLS



RODALE'S AMERICAN WOODWORKER

Issue No. 30

January/February 1993

Cover Photo: Mitch Mandel



Printed on Recycled Paper



Page 48 Grinders

DEPARTMENTS

A Word From the Editor

Just Call Us Guild Central.....2

Letters

Advice On HVLPS.....4

Q&A

Three-Phase Pros and Cons.....10

Tech Tips

Save the Impeller Blades.....16

Wood Facts

Granadillo.....66

Just Finishing

Polyurethane.....68

Toolbox

Testing the Veritas 32 Cabinetmaking System.....76

Calendar

Workshops, Seminars, Etc......80

Gallery

Work From the IWF Show.....84

Final Pass

A Chopper That Saws.....88

C O N T E N T S



Page 34 Oscillating Spindle Sander



Page 37 Rice-Paper Lamp



Page 56 Sharpening Turning Tools

FEATURES AND PROJECTS

Adding Light to Your Shop By Scott Landis

Tips to Make Your Shop Safer, and Enhance Your Work.....22

Wiring Your Lights.....25

Child's Workbench By Phil Gehret

Give Kids a Bench That's More Than a Toy.....27

Scrapers By Mac Campbell

Properly Sharpened, They'll Give You a Crisp Surface.....30

Tools To Speed Scraper Sharpening.....31

Oscillating Spindle Sander By Gene Paules

Convert Your Drill Press to a Sander for Less Than \$30.....34

A Dust Collector for Drill Press Sanding.....36

Rice-Paper Lamp By Andrew Curle

Build This Delicate Balance of Paper and Wood.....37

Harvest Table By Mitch Mandel

A Drop-Leaf Table That's Fit for a Feast.....42

Grinders for Sharpening By David Sloan

Cool-Running Systems That Won't Burn Your Tools.....48

Photographing Your Work By Mitch Mandel

Learn to Take Photos Like a Pro.....52

Sharpening Turning Tools By Stephen H. Blenk

How to Get an Edge on Gouges, Chisels and Scrapers.....56

AW's Craftsmanship Award Winners.....62

A WORD FROM THE EDITOR



JUST CALL US “GUILD CENTRAL”

“Solitary as an oyster.” Charles Dickens penned those words to describe the miser, Ebenezer Scrooge, totting up his money in a dismal little room. Woodworking, too, is a solitary pastime. But unlike Scrooge who thrived on seclusion, most of us like to get together with our fellow woodworkers. Trouble is, how do you find them? A personal ad? (“Youthful WWM seeks meaningful relationships with like-minded WWs. Send recent photo.”) Not likely.

The best way to connect with other woodworkers is to join a local woodworking guild. There you'll find fellow enthusiasts who share your love of the craft. You'll also find a forum for swapping ideas and information.

Case in point. I recently sat in on the monthly meeting of The Bucks Woodturners, a guild in Newtown, Pennsylvania. Members brought in their latest work for a lively “show and tell.” Each member got up to talk about the piece he'd brought and tell what he'd learned along the way. One had

some problems with his water-based finish. Another explained some outrageous techniques for doing off-center turning. Comments and suggestions flew thick and fast. I left that meeting with a lot of great ideas.

A big event for many guilds is an annual show where members display their very best work for the public. Last September, I was invited to judge a top-notch show put on by the Minnesota Woodworkers Guild in Minneapolis. These guys displayed more than 40 pieces of furniture and sculpture in the center atrium of a large shopping mall and drew quite a crowd.

We at AMERICAN WOODWORKER want to do our part to support existing woodworking guilds and encourage the formation of new ones. Send us your name, address and woodworking interests, and we'll mail you a computer-generated list of the guilds in your area. If there's nothing close by, we'll send you a pamphlet on starting one up. It won't cost you a cent.

Write to:
AMERICAN WOODWORKER
Guild Central
33 E. Minor St.
Emmaus, PA 18098
Or phone (215) 967-8315.

And if you're already a member of a woodworking guild, let us know. We'll add your organization to our Guild Database so others will know where to find you.

In this issue, we're proud to present the winners of the 1992 AMERICAN WOODWORKER Excellence in Craftsmanship Awards competition. (See page 62). We received hundreds of photos from amateurs and pros in the United States and Canada—plus quite a few entries from England. Start making plans now to enter the 1993 Excellence in Craftsmanship Awards competition. Details to come in the next issue.

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Editor and Publisher

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LETTERS

Scrap Article Fan

I enjoyed your series on scrap materials (AW #29). Hope you continue to do more on this topic. New ideas on what to do with scrap are always welcome.

Frank Foti
Moravia, NY

You Nasty Boys

The "Nasty Box" article (AW #29) was offensive and disgusting to me. What is so delightful about a warped sense of humor? It seems to me we have enough cruelty and violence in the world today, as companion to the flood of stupidity over the airwaves. Perhaps as a follow-up you can give us a recipe for a poison to coat the pins.

Another such article and you can cancel my subscription.

Bill Maslak
Verona, PA

Dangerous Tech Tip

I was disappointed with your publishing an item called "Scrap-Metal Splitter" (Tech Tips, AW #28). This suggestion may give the user a false sense of security that the [tablesaw] is now kickback-proof. However, there is nothing to stop the finger from getting in the way of the blade.

Guards are sometimes poorly designed and can be a real pain to use. Perhaps it is time for woodworkers everywhere to push the manufacturers of tools to supply better guards.

Robert Levister
Amherst, NH

How About Furniture We Can Live With?

Your magazine needs to feature furniture that is similar to what you can find in furniture stores. I like Shaker, but it doesn't go with furniture we already have in the house. I personally don't know a lot about furniture design, but my wife knows what she likes and more times than not when I ask her

about a project in one of the several magazines I get, she indicates not to bother making it because she doesn't want it in the house.

Rex Dailey
Naperville, IL

The way we see it, the whole point to woodworking is to build furniture that's special—stuff you can't buy in a store. When you figure your time and materials, it doesn't make sense to build hand-crafted knockoffs of factory furniture.

Blade Might Cause Burning

Martin Wale tells of his problem of burns and splintering in cross-cut on the radial arm saw, and binding in rip (Q&A, AW #29). His problem could be the same as I had: using the wrong saw blade.

I was using a Craftsman 64 tooth hollow ground planer blade on my Craftsman radial arm saw [because] the package recommended this blade. My saw sharpening firm pointed out that a hollow ground planer is better suited for a tablesaw than a radial, [because there's no] set to the teeth. I changed to a 50-tooth carbide tipped planer-combo blade and the results are more than satisfying—no burns, splinters or binding.

John F. Becker
Berwyn, PA

Your blade might be the problem but in most cases, the saw needs adjust-

ment. When a radial saw acts up, run through the entire series of adjustment procedures in your owner's manual. Don't skip steps—each adjustment depends on the one before it.

Not So True Grit

Re: "True Grit," (Letters, AW #28).

Mr. Dixon is correct that the grit number [on sandpaper] refers to the size of the particles, but it reflects the number of holes per lineal inch, not square inch. So a 100 mesh screen has not 100 holes per square inch but 10,000 holes (100 x 100). A screen with 100 holes per square inch will pass particles almost 1/8 in. in dia.—a bit coarse for most sanding jobs.

E.W. Renshaw
Nashville, TN

No Endangered Species Here

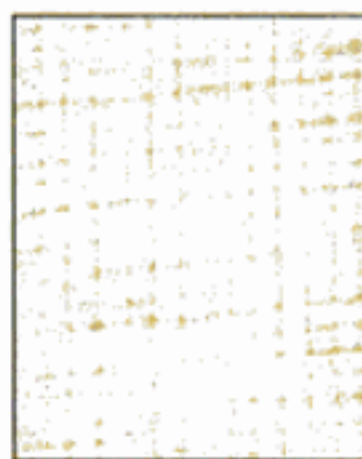
Re: "Selling Ecologically Correct Wood" (Final Pass, AW #29). Your article incorrectly uses the word "endangered" where the word "tropical" should be. I do not buy, use or sell any endangered species, and I never will.

The only tropical lumber we carry is certified under the Rainforest Alliance Smart Wood program. The domestic lumber we carry falls into two categories: 1) Lumber from sources that have been scrutinized by established third-party certification organizations and 2) lumber from sources that have not been certified but are the most ecologically sound source for a particular species. My criteria for judging these suppliers can include on-site inspection, but since I'm neither a forester or a field biologist, and because Wise Wood does not have the capital to do random field tests, I am relying somewhat on a gut-level approach.

Dennis Leahy
Wise Wood Inc.
McHenry, IL

Correction

A caption in the Wood Facts column (AW #29) incorrectly identified a piece of maple as flat sawn. The wood, pictured here, is actually quartersawn.



LETTERS

That's a Joke, Son

Re: "Trouble Brewing in Texas" (Letters, AW #28). I suggest [the angry Texans] take the money saved from canceling their subscriptions and buy a good book. *Laughter Is the Best Medicine* comes to mind. Someone who can't laugh at himself (or his state) is missing a wonderful source of humor.

A word of warning: If you ever change your irreverent, light-hearted ways I will cancel my subscription.

Jim Hayden
Falls Church, VA

I think [some readers from] Texas should grow up. When people get upset over a joke, something is wrong.

Chuc Morrell V
Pittsfield, NH

Advice on HVLPs

Your timely overview of HVLP systems is much appreciated. There are several other features and issues that woodworkers should consider when choosing an HVLP spray gun, whether turbine based or high pressure air conversion:

- weight of the spray gun, especially for production shops
- ease of gun maintenance and cost of maintenance kits
- parts availability and delivery
- technical support policies of the manufacturer, including availability of dedicated 800 number telephone support and regional seminars
- spray gun speed and transfer efficiency.

Neil Murray
Regional Manager
Accuspray Inc.

Model Maker Miffed

Re: "Leave Toys to Other Mags" (AW #28). I wholesale my toys and they are presently in shops from Massachusetts to North Carolina. I truly appreciate wood and know that my work is quality. The pieces may not some day be museum pieces [but] I have received many requests for my patterns. I hope that all true craftsmen continue to be represented in your magazine.

Norman I. Diem
Kenneth Square, PA

What's on your mind? We value your comments, complaints and corrections. Send your letters to: "Editor," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098, or telephone your message to us at 215-967-7776. FAX: (215) 967-8956.



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Q & A

Three-Phase Pros and Cons

Q *A lot of large woodworking machines are equipped with 3-phase motors. What are the pros and cons of these motors?*

Arthur O'Toole
Islip, NY

A Three-phase motors have some distinct advantages. First, they're considerably less expensive than their single-phase counterparts. They run at a more constant speed and with greater mechanical efficiency. Also, a 3-phase motor typically has more horsepower than a single-phase motor of equal size and draws less peak current, so you can use lighter-gauge wiring when connecting one to your electrical service. As a result of all this, 3-phase motors are more economical for use in machines requiring higher horsepower.

The biggest disadvantage of 3-phase motors is that they won't run directly on house current, which is single-phase. You can bring 3-phase power into your shop from the power lines outside, which requires special wiring by both the power company and you (as well as the rights to your firstborn or the financial equivalent), or you can purchase a phase converter to change single-phase current into 3-phase.

Phase converters are available in "rotary" or "static" models. A rotary converter delivers better balanced power, but it requires more wiring and costs \$1,000 to \$2,000 for one sized for a typical small shop. Static phase converters are compact solid-state devices that allow the motor to operate at only 70 percent to 85 percent of its rated power. They can cost \$175 to \$500 depending on the horsepower range of the motors you'll be running. Check with a technician before you decide which is best for your particular situation.

You can save some money and improve your power efficiencies without going to 3-phase by running your higher-horsepower single-phase

motors at 220 volts. This helps prolong motor life and gives better instantaneous power and fewer "brown-outs."

Stephen H. Blenk
Turner
Sequim, WA



Plane Facts

Q *Here's a photo of a plane manufactured by the Ohio Tool Co. Can you give me any information about it?*

Fred D. Stengel
Waco, TX

A Your plane was manufactured by the Ohio Tool Co., which was in business from 1823 until 1920, first in Columbus, Ohio, later in Auburn, New York, and finally in Charleston, West Virginia. When the patents on various Stanley planes ran out, Ohio Tool began manufacturing several of the Stanley models. Their Model #03 is a more-or-less exact copy of the Stanley No. 03, right down to the adjustment knob and the rosewood handles.

Bill Phillips, a knowledgeable tool collector, says Ohio planes are not quite as valuable as comparable Stanleys. Judging from its appearance in the photo, yours is probably worth around \$20 to \$25.

A good reference book on planes is *Patented Transitional & Metallic Planes in America, 1827-1927*, by Roger K. Smith (1981, R.K. Smith, Athol, MA 01331).

Ellis Valentine
Coopersburg, PA

What Next?

Q *I'm an intermediate woodworker with a tablesaw, router and all the basic power hand tools, but I don't know what to buy next. Which tool would increase my capabilities most, a drill press, lathe, bandsaw or jointer?*

Dan Erb
West Lafayette, OH

A There's no absolutely right way to outfit a shop, but everyone has an opinion. I think you should carefully evaluate the kind of work that you do before you reach for your checkbook.

If you specialize in cabinet work and furniture construction, where true and square edges and reference surfaces are essential, I'd go for a 6-in. jointer next. For years I got along with a tool collection much like yours. But once I got a jointer, I found it was invaluable when I had to glue up a tabletop, mill some rough stock or trim just a whisker off a door stile.

Many woodworkers put off buying a jointer. One reason is that it takes a while to learn to use and maintain a jointer, especially when it comes to aligning tables and knives. But those skills are important, and they'll come in handy if you buy a thickness planer later on. Another reason is that it's a tool without much sex appeal. *You'll* know you're working better and more efficiently, but nobody is going to look at your work and say, "Boy, you can really tell you bought a jointer."

If turning bowls and spindles appeals to you, consider buying a lathe, and continue to rely on hand tools or tablesaw and router jigs to do the work of the jointer. I really enjoy turning, so the lathe is one of the most important tools in my shop, especially when I have to come up with a few gifts in a hurry.

I should confess that once I had a lathe, I quickly found a way to get a bandsaw. You can certainly rough out bowl blanks with a bow saw, but it

Q & A

makes your turning session a little too much like an aerobics class at the YMCA. Many woodworkers also like bandsaws for ripping, resawing (especially if you want to make your own veneer), and cutting joints, but I still do most of my straight cutting on the tablesaw.

My tool budget has always been tight, so I avoided a drill press for a long time. I got by with a portable alignment jig, like those sold by Sears and other suppliers, or used my doweling jig as a drill guide.

Dick Burrows
Woodworker and author
Knoxville, TN

Got a woodworking question for the experts? Send it to "Q&A," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. FAX: (215) 967-8956.

READERS' NETWORK

The responses to last issue's question regarding old machines vs. new are still coming in, and we'll publish some viewpoints in our next issue.

Meanwhile, on the question about a first saw for a beginner, the tablesaw gathered more than three times as many votes as the radial arm saw. Surprisingly, several readers preferred a bandsaw to either.

This Issue's Question:
I'm currently enrolled in a two-year

woodworking program, and thinking of getting into the custom woodworking business. Most woodworkers I've talked to about this just roll their eyes and tell me to get a real job. What are the odds of succeeding in this field?

Randy Nelson
Atlanta, GA

Send your comments to: "Reader's Network," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. FAX: (215) 967-8956.

WHERE TO FIND IT

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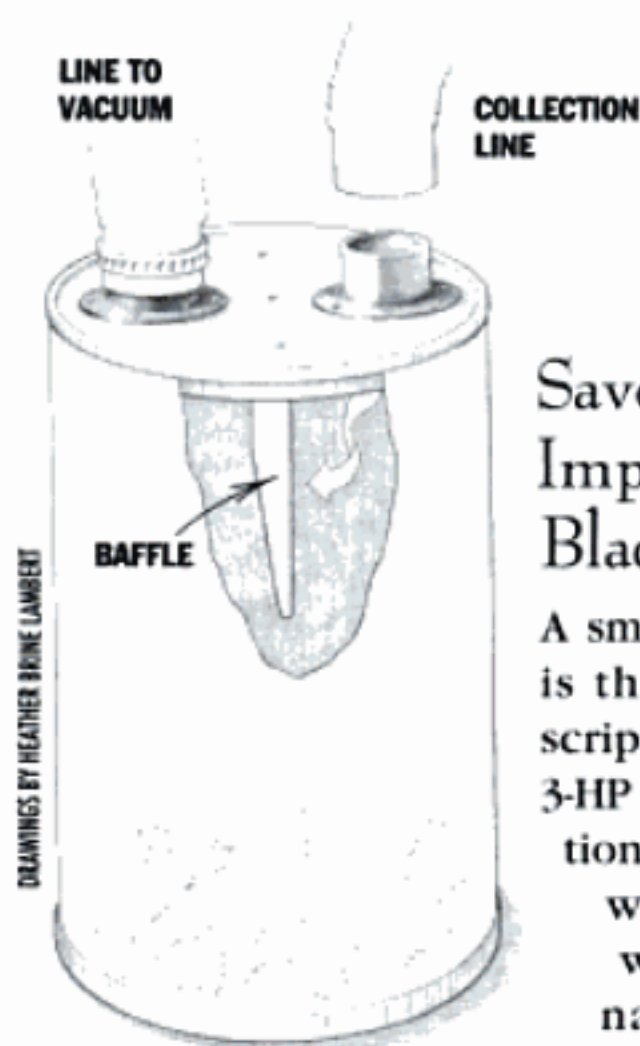
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TECH TIPS



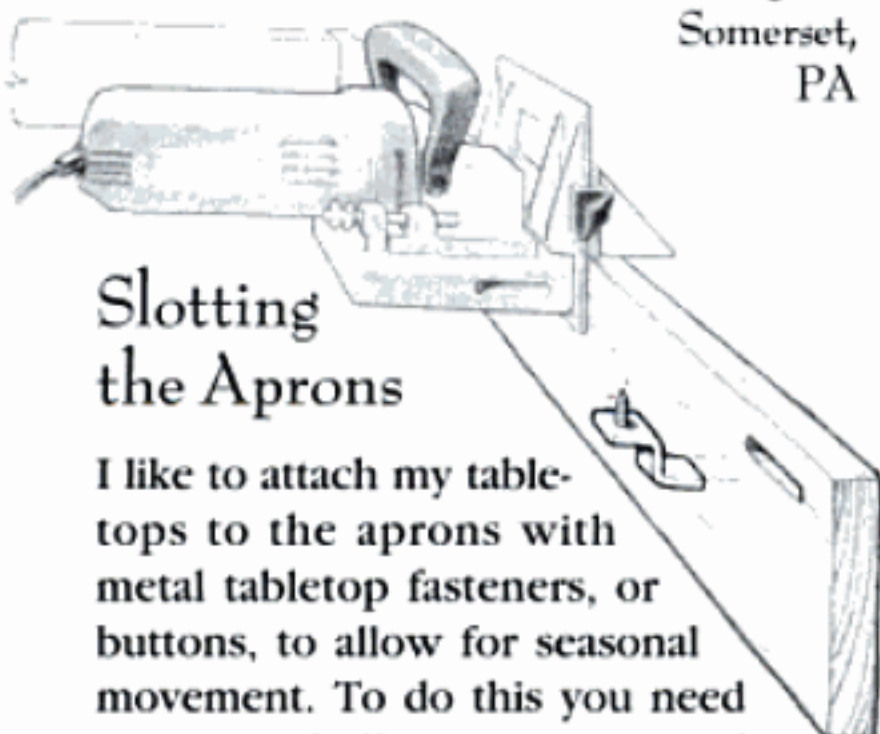
Save the Impeller Blades

A small tornado is the best description of my 3-HP dust collection system. It will pick up wrenches, nails, small blocks of wood

and anything else you leave in its path. The only problem is that those stray objects wreak havoc when they reach the impeller blades. After a couple of particularly loud reports I decided to solve the problem with an in-line baffle.

I took a 50-gal. drum and pop-riveted two 6-in.-dia. galvanized furnace flanges into holes I cut in the lid. On the underside of the lid, I riveted a 12-in.-sq. aluminum baffle between the holes. Now, anything the vacuum picks up just hits the baffle and falls to the bottom of the barrel.

Robert Campbell
Somerset, PA



Slotting the Aprons

I like to attach my tabletops to the aprons with metal tabletop fasteners, or buttons, to allow for seasonal movement. To do this you need to cut a shallow groove on the inside of the apron. At first I tried making a series of saw kerfs but then realized that my biscuit joiner was ideally suited for this job. It cuts accurate, neat-looking slots, and the #0 setting gives you the right depth. If the legs interfere with the location of the slots, cut the slot before gluing up the base.

George Pease
Fortuna, CA

Penny-a-Piece Drill Bits

Tired of replacing the smaller sizes of bits? I've stopped altogether and now clip the heads off finish nails and use them instead of drills. The smooth nails—not galvanized—seem to work best. I use these improvised bits for drilling pilot holes because the exact size of the hole doesn't matter. They'll cut even better if you file or grind the end of the nail to a chisel point.

H.R. McDermid
Vernon, B.C., Canada

Slip Not

I recently found the ideal material to stop work from sliding around on the bench. It's called "Slipnot" and is used in mobile homes to keep things in place when on the road. The advantage of Slipnot is that it's waterproof so you can just rinse it under a faucet (or give it a good shaking) when it gets dusty or full of wood chips. It comes in 12-in.-wide rolls, sells for about \$1 a foot and is available in camping-supply stores.

Douglas Mertz
Meredith, NH

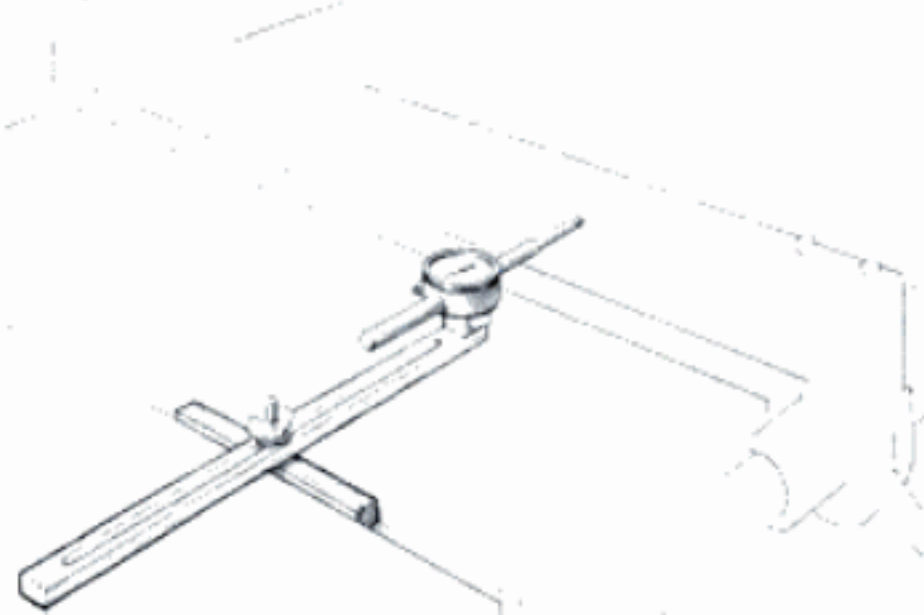
Everlasting Dust Mask

Years ago the foreman of a local coffin factory showed me how to make this dust mask. I've used one ever since and find it works much better than the store-bought variety.

First get a sponge, natural not synthetic, then cut a piece the size and shape of an average mustache. Tie a piece of string (or tape) to each end of the sponge and fasten a heavy rubber band to the ends of the string. It should slip comfortably over your head.

Each time you use the sponge, rinse it in clean water, squeeze out the excess and place it directly under your nose.

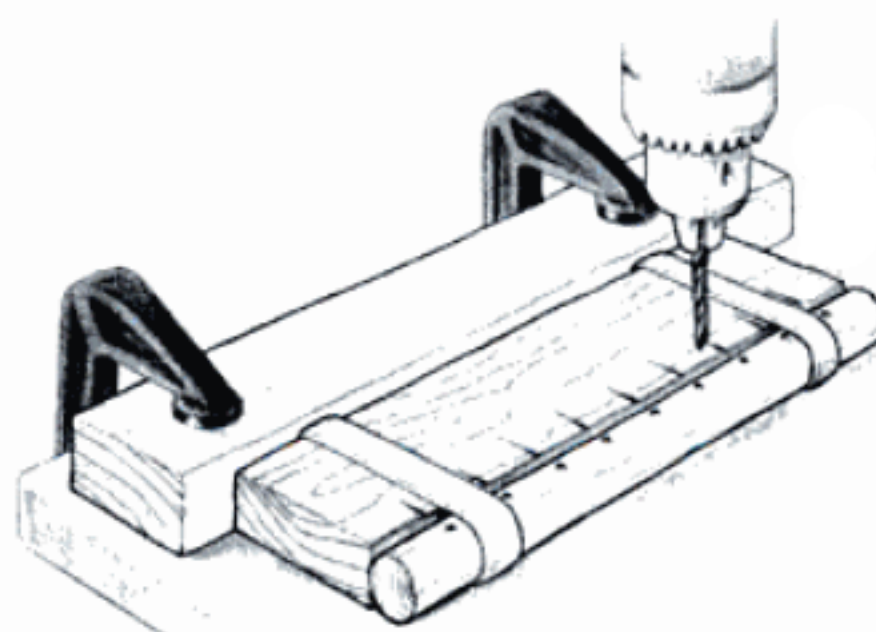
Harvey Beiler
Elverson, PA



Setting the Fence

Long ago I bought a tablesaw that was so cheap that setting the fence was a hit or miss affair. I finally built the gauge shown here using scrap wood and a machinist's dial indicator. With this jig I can quickly position the fence so it's exactly parallel to the slots in the table.

Gordon Davis
Houston, TX



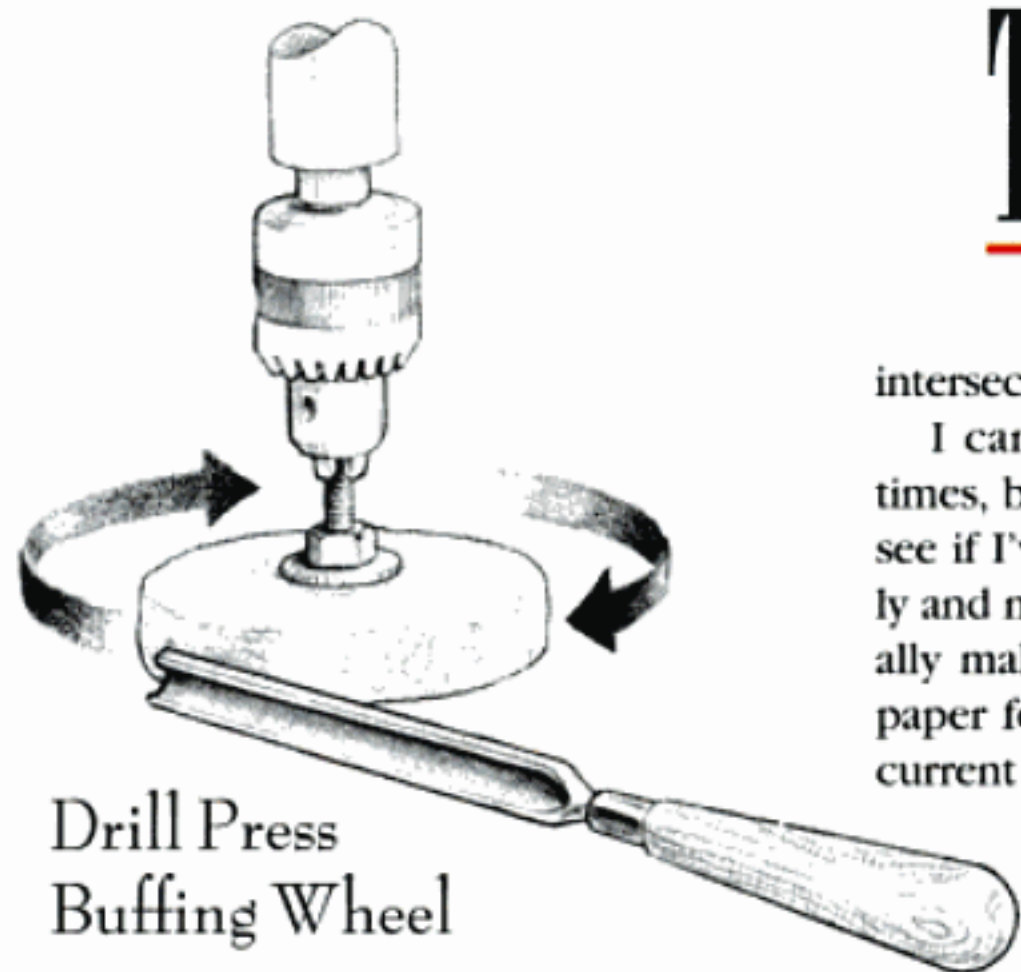
Drilling Dowels

Trying to drill a series of accurately spaced holes in a dozen pieces of dowel rod is awkward at best. My solution is to tape each rod to a straight piece of scrap so the rod can't turn, then mark the centers of the holes with pencil lines that extend across onto the scrap. To position the rod exactly under the center of the drill I put a small bit (or finish nail) in the chuck. I then clamp a fence to the drill press table and replace the bit with one of the right size.

To correctly space the holes on each succeeding rod, I just transfer the marks from the scrap. If you are drilling only one rod you can mark it directly.

Yeung Chan
Millbrae, CA

TECH TIPS

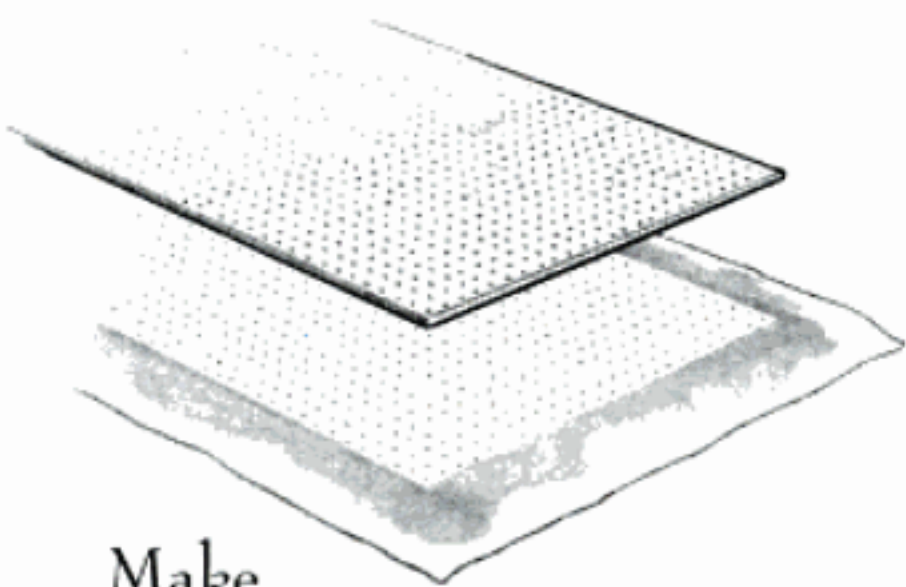


Drill Press Buffing Wheel

Instead of dedicating one side of a bench grinder to a buffing wheel we prefer to chuck the buffing wheel in a drill press. We find it's set at a more convenient working height and we like being able to control the speed (850 rpm or less works well with a 6-in. sewn muslin wheel). Also, we can keep the buffing wheel in a drawer when it's not in use.

When polishing the edge of a cutting tool be sure to work with the wheel's motion—not against it. Otherwise, the tool is likely to get caught by the spinning cloth and harpoon you.

Carolyn and John Grew-Sheridan
San Francisco, CA



Make Your Own Grid

Scale plans are often drawn on a grid of square lines so you can readily enlarge the original drawing. But enlarging means redrawing the grid to a larger scale—a tedious and time-consuming job. I've found a quick way to do this with 1/8-in. Masonite Peg-Board. I place the Peg-Board over the paper I am using for the enlarged drawing, then I lightly spray the surface with paint. I end up with a pattern of dots that form the

intersections of an exact, 1/8-inch grid.

I can reuse the Peg-Board several times, but switching colors helps me to see if I've covered the board completely and not missed any of the dots. I usually make up a supply of this "graph" paper for future use, as well as for the current project.

Dean St. Clair
Salesville, OH

New Life for Tired Abrasives

When my abrasive belts and discs are not getting the job done, I no longer throw them out. Instead, I keep them right on the machine—belt or disc sander—and use them to shape scrapers and grind hatchets and heavy chisels. Aluminum oxide belts remove metal fast but don't overheat the steel. Try it and watch the sparks fly!

Ronald Hughes
Milford, OH

New Angle on Belt Sanding

To remove a large amount of waste wood quickly with a belt sander, turn the sander to a 45° angle with the grain. Sand until you're near the level desired and then gradually change the angle so the final sanding is done with the grain of the wood.

David Johnson
Apple Valley, MN

Recycled Brush Cleaner

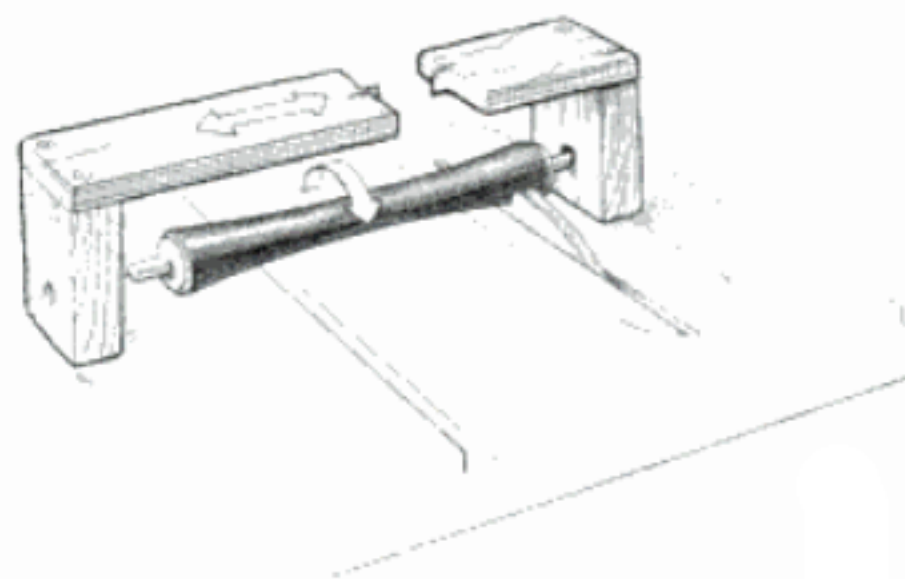
When using alkyd (oil-based) paints, I clean the brushes by rinsing them in kerosene. I keep the solvent in glass Mason jars which come with screw-on lids and rubber seals. I let the sediment settle to the bottom and then pour off the clear solvent into another jar and use it again. Kerosene evaporates slowly and so very little gets released into the atmosphere. The glass jars eventually go to their reward at the recycling center.

Laura Sanchez
San Francisco, CA

Lightweight Pipe Clamps

Pipe clamps made with iron pipe are tough and durable, but they tend to be heavy and hard to handle. That's why I use aluminum pipe. Clamps made with 3/4-in. or 1/2-in. aluminum pipe are lighter and don't stain the wood—as iron tends to do. I always thread both ends of the pipe so I can join two or more lengths to make a longer clamp using 3/4-in. or 1/2-in. PVC couplings.

Leonard Goldman
Encino, CA



Renewing Feed Rollers

After 10 years of service the rubber feed rollers on my Makita planer were worn badly in the middle. This put uneven pressure on the stock causing it to slip. Replacement rollers cost around \$300 so I decided to fix mine myself. I removed a roller and inserted the ends of the shaft in holes drilled in hardwood blocks. Then I put a 3/4-in. dado head in the tablesaw and gradually raised it until the teeth just grazed the surface at one end of the roller. After starting the saw I rotated the roller against the direction of cut, removing as little roller stock as possible, until I had a clean, uniform cylinder.

Ben Erickson
Eutaw, AL

Know a better way of doing something? Designed a clever jig? Send your woodworking tips, along with a sketch or a snapshot to: "Tech Tips," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. We'll pay you \$50 if we publish your tip.

SHEDDING LIGHT



PHOTOS BY SCOTT LANDIS

Mark Duginske's wall of windows floods his bench room with light during the winter. A 3-ft. overhang provides relief from the strong, summer sun.

BY SCOTT LANDIS

When I recently rigged a workshop on one side of my two-car garage, the last thing I thought about was light. The workbench is the most important tool in my shop and it's where I spend most of my time, so I installed it first, near the middle of the north wall. After that, I turned to machinery. I tuned up my bandsaw, tablesaw and jointer/planer and arranged them around the bench.

I put rubber mats on the concrete floor for comfort and was about to sharpen some tools when I noticed the

light or, more accurately, the darkness. Illuminated by only two 100-watt bulbs, the place was like a cave.

My actual work area is small (roughly 10 ft. by 14 ft.) and the shop space is temporary, so my problem was easily solved by hanging one fluorescent fixture overhead and installing a portable incandescent task lamp. But this haphazard approach to lighting is shared by too many woodworkers. After spending so much time, energy and money on the shop itself, we often muddle along in a dingy environment.

Apart from its obvious effect on the

quality and safety of our work, poor lighting has a negative impact on our state of mind. The best workshop lighting strikes a balance between daylight, fluorescent and focused incandescent lighting—and with a little forethought it's not that hard to achieve.

Natural Light

Many shops use natural light to great advantage. Double-glazed, south-facing windows in Mark Duginske's Wisconsin workshop (photo above) flood his bench room with light. They create a cheerful atmosphere and

IN THE SHOP

enhance the shop's passive solar design. The wall of glass consumes a lot of potential storage space, but Duginske gets more than a good view in return. In the winter, the sunlight streams onto the concrete floor, which acts as a heat sink. By the end of a sunny day it's warm to the touch.

Although its psychological benefits are manifest, natural light is a mixed blessing. Direct sunlight (and the shadows it casts) is hard on the eyes and harder still on a piece of wood, raw or finished. For soft, indirect illumination, windows should be placed high on the south wall or shaded by broad eaves, as in Duginske's shop. Awnings, window blinds, and screens covered with a translucent material like rice paper or Tyvek also helps diffuse harsh sunlight.

If your bench is placed directly against a south-facing window, consider its position carefully. By placing the bench perpendicular to the windows, rather than parallel, you can enjoy good side light, where a strong back light might obliterate details or swallow them up in shadow. (If your bench receives a steady supply of direct sunlight, you'll also want to provide another work surface where you can leave your materials without risk of damage.)

There's more than one way to get natural light and, in several shops I've visited, skylights or clerestory windows bathe the interior workspace in diffuse light while casting a minimum of direct light on the bench. (See photos.) On the next page is a clever, low-budget skylight, which runs the length of Michael Elkan's Oregon workshop. Elkan simply left his shop roof unplanked for 2 feet on either side of the ridge and sheathed the outside with corrugated fiberglass panels. To keep the heat in, he "glazed" the bottom of the triangle with clear plastic.

If your situation permits, consider orienting at least some of your workshop windows toward the north. This contradicts a basic tenet of energy-efficient architecture, but a soft, diffused north light provides the most comfort-



South-facing clerestory windows, left and below, provide excellent natural light all the way to the back wall of Peter Axtell's California workshop.

Good Lighting Can Improve the Quality of Your Work and the Safety of Your Shop

able, glare-free environment and renders color more naturally than direct sunlight. It is especially desirable at the bench or in a finishing area, where detailed work and color matching take place.

Artificial Light

When you work in the shop at night or in the winter, the importance of good artificial lighting cannot be underestimated. In a basement workshop, or in any space with inadequate natural light, it will be crucial at all times.

Fluorescent lamps are at the heart of most modern shop lighting systems. The fixtures and tubes are relatively inexpensive and are four to six times more efficient than conventional incandescents. Standard fluorescent lamps last at least 10 times longer than incandescents and the long fluorescent tubes are capable of uniformly illuminating a large area with very little shad-



ow. Fluorescent lamps are also much less sensitive to vibration than incandescent bulbs.

So why have fluorescents gotten a bad rap from some users? In the first place, despite the wide selection of fluorescents, most of us are familiar only with "cool-white" or "warm-white" tubes. These are the cheapest and least "natural," and they offer the poorest color rendition. What's more, the magnetic ballasts used to control the current in most fluorescent fixtures emit an annoying hum, and their slow pulse (about 60 times per second) can result in the notorious "strobe effect," which makes a rotating saw blade appear to be stationary. (If you use only fluorescent lamps, light your machine areas with at least two tubes to minimize this effect.) Standard fluorescents also flicker incessantly below about 50°F, which is a real nuisance in part-time workshops and



This low-tech, peak skylight runs the length of Michael Elkan's 100-ft.-long Oregon shop and offers plenty of diffuse natural light.

shops located in cold climates.

Many woodworkers who rely on fluorescents use a combination of warm-white and cool-white bulbs or the so-called "full-spectrum" fluorescents in each fixture. Full-spectrum lamps are more expensive, but they provide a "color temperature" that more closely approximates that of the noontime sky on a sunny day (about 5,500° Kelvin). One woodworker I know recently

replaced all of her cool-white fluorescent tubes with full-spectrum Duro Test Vita Lites and relocated them over specific task areas. (These and other bulbs and lighting mentioned in this article are available in most specialty lighting and electrical stores.) The upgrade resulted in about 20 percent more light and truer color rendition. "It cost a mere three hundred dollars," she reported, "but what a difference!"

For a lot less money, I installed Phillips Ultralume 50 lamps in my new fluorescent fixture. Though not full-spectrum bulbs, the Ultralume 50 lamps have a color temperature of 5000° K and a color rendering index (CRI) of 85. The higher a lamp's CRI, the more accurately it renders colors. According to the *Alternative Energy Sourcebook*, by John Schaeffer, editor (1992, Real Goods Trading Co., Ukiah, CA) you should specify a color rendering number 80 or above wherever you spend much time around fluorescent fixtures.

If sheer footcandles, or brightness, is what you're after, high-output fluorescent tubes (and fixtures), which are available in a more limited selection, generate about 50 percent more light than standard fluorescent lamps. You

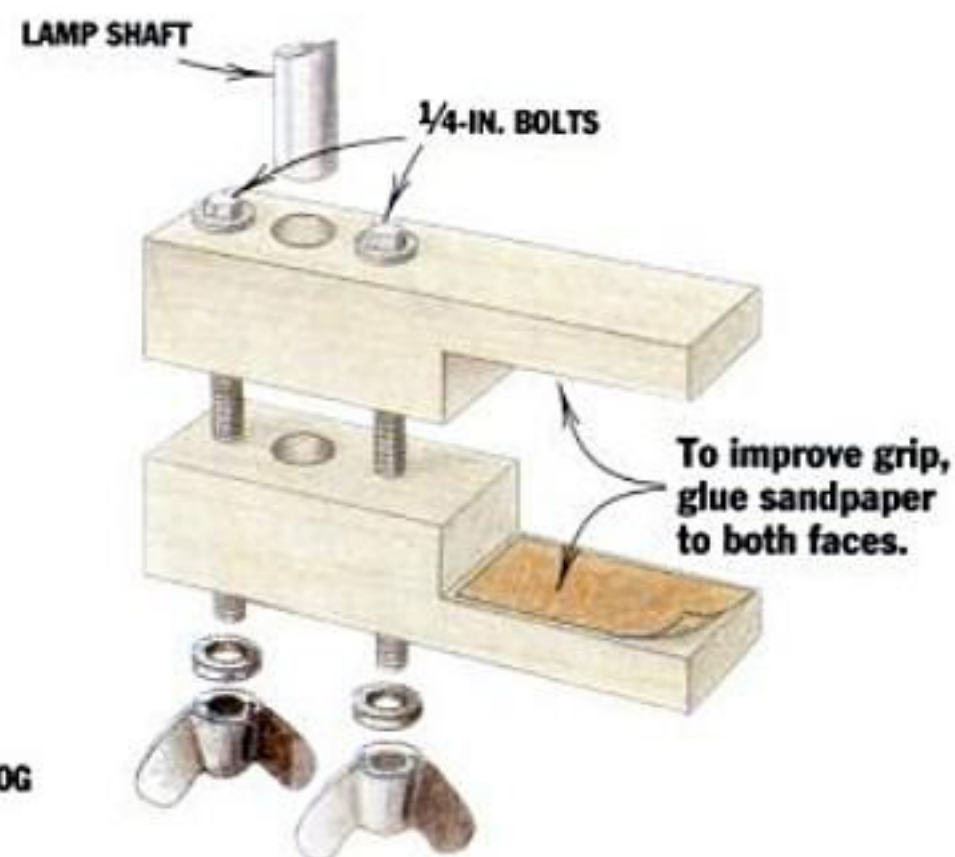
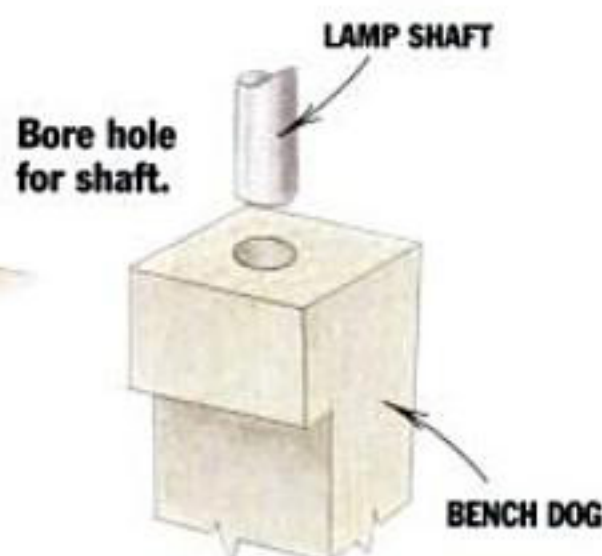
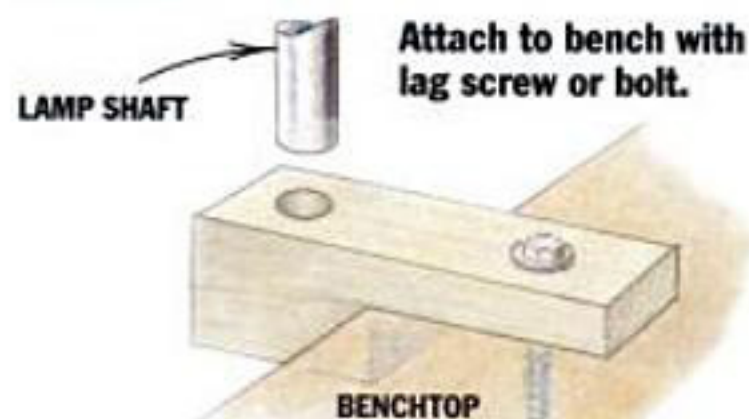


The Goodwin Giraffe costs about \$200, but it's ruggedly built and unusually flexible. The Giraffe has a variety of optional accessories, including magnifying glasses and two different bench mounts.

can also substitute electronic ballasts for the more common magnetic type, thereby increasing efficiency and eliminating the "strobe effect."

Whichever fluorescent lamps and fixtures you choose, it's worth spending a few dollars to protect them (and yourself) with plastic tube guards. These will prevent glass shards from raining on your head in the event of an encounter

STUDENT LAMP MOUNTS



WIRING YOUR LIGHTS

Whenver possible, lights should be wired on dedicated circuits, separate from machinery or wall outlets that will be used for major tools. That way, the surge in power that's required to start up a large saw won't dim the lights as much, and if you trip a breaker by overloading a circuit, you won't be left groping your way to a flashlight.

For convenience and economy, wire banks of lights on separate switches, so you'll only have to illuminate whatever part of the shop you're using. Locate switches at every major entrance so you can enter by one door and exit by another, turning lights on and off as you go. In a large shop, you may want to install additional switches at convenient access points.

For most shop lighting requirements, a good wiring layout would provide one or two 20-amp, 120-volt lighting circuits with 12-gauge copper wire. You might get by with a 15-amp circuit and 14-gauge wire, especially if it is dedicated to lighting, but there's very little savings and 20-amp circuits are becoming the standard in residential construction. To provide a cushion of safety, the total "continuous" load per circuit should not exceed 80 percent of the circuit rating, or "capacity" load. In other words, a 20-amp circuit

supplies about 16 usable amps.

To determine the total number of lights you can run on one 20-amp circuit, simply multiply usable amps (16) by volts (120) to arrive at the total available wattage (1,920). So seven 250-watt incandescent bulbs could be run on one 20-amp circuit, with power to spare for an electric drill or a few more smaller lights. When calculating the current draw for fluorescent lamps, allow an additional 20 percent to account for the energy consumed by the ballast. A two-lamp, 40-watt fluorescent unit, for example, will have a wattage drain of 80 watts, plus an additional 16 watts for the ballasts, for a total load of 96 watts.

All outlets, switches and fixtures must be grounded to avoid risk of fire and shock from a short circuit, and wires, breakers and switches must be rated for at least the maximum amount of current each circuit will carry. (Fluorescent fixtures won't start properly if they're not grounded.) Since wiring loses current to resistance, long runs require heavier wire. And stick to copper wire in the shop. It's more expensive than aluminum, but it's stronger and more flexible and a better conductor. Standard nonmetallic, sheathed Romex cable is appropriate for most workshop lighting applications, if it meets local building codes.

WARNING: Although wiring is not that complicated, electricity is inherently dangerous. Be sure you know what you're doing *before* you begin and verify your plan with a licensed electrician. The amount of electrical and lighting work you do yourself should depend upon your proficiency and confidence with these subjects. But in most towns and cities a permit is required for all new wiring installations and, in many places, any changes to the existing wiring must be inspected, approved and connected to the service panel by a licensed electrician. Rules and regulations are outlined in the National Electrical Code (NEC), but you should also consult your local city or county codes, which may be more stringent. When in doubt, hire it out.—S.L.

FOR MORE INFORMATION:

The following books are good sources for detailed information on electrical wiring.

Practical Electrical Wiring, by Herbert P. Richter and W. Creighton Schwan (1990, McGraw-Hill, New York, NY 10020).

The National Electrical Code Handbook, by Joseph A. Ross, editor (1987, National Fire Protection Association, Quincy, MA 02269).

between a wayward board and an overhead fixture. For finishing or restoration work, plastic tube guards are also available to filter ultraviolet rays.

Task Lighting

Even in a shop full of overhead fluorescents, you'll need focused task lighting for detailed operations such as turning or running the drill press. For these situations, smaller, directional incandescent lights are ideal, and the ubiquitous articulated student desk lamp is the most common solution. Many shops have a half dozen or more student lamps scattered about, with holes bored in benchtops, brackets and even benchdogs to receive the mounting shaft. (See drawing.) Clip-on

lamps with large reflectors are a popular and versatile alternative to student lamps, although the ones I've used always seem to come unclipped.

For the ultimate in task lighting, you might install a track-lighting system or consider a unit like the Giraffe Multi Purpose Task Lamp (available from Goodwin Manufacturing Inc., Box 208, Luck, WI 54853, 800-282-5267). (See photo.) The elegant Giraffe will accept a 100-watt bulb and its head is mounted on a sturdy flexible shaft and an adjustable stand, which rolls around on a hefty, cast-iron base. With a little imagination and even less cash, you can rig an effective task light out of cast-off parts, like Bob Stocksdale's drill-press lamp or Roger Heitzman's

detailing lamp. (See photos, next page.) Heitzman's lamp mounts on an old camera tripod and can be placed at whatever height he needs.

Efficient Lighting

More than 80 percent of the energy a standard bulb consumes is converted to heat, but incandescents are still the most appropriate light source for narrowly focused activities, or in situations where the lamp is turned on and off a lot or must function in the cold.

Among incandescents, quartz-halogen lamps cost quite a bit more than standard bulbs, but they produce 40 percent to 50 percent more light and they last a lot longer. They also produce a whiter light and truer color rendition

than other incandescents.

Some interesting developments in lighting technology have led to another alternative: Compact fluorescent bulbs produce the same amount of light as a standard incandescent bulb yet they last 10 times as long and consume far less energy. According to Amory Lovins of the Rocky Mountain Institute in Snowmass, Colorado, "a *single* compact fluorescent lamp replacing, say, 75 watts of incandescent lighting with 14-18 watts (but yielding the same light) will, over its life, keep out of the air a *ton* of carbon dioxide . . ."

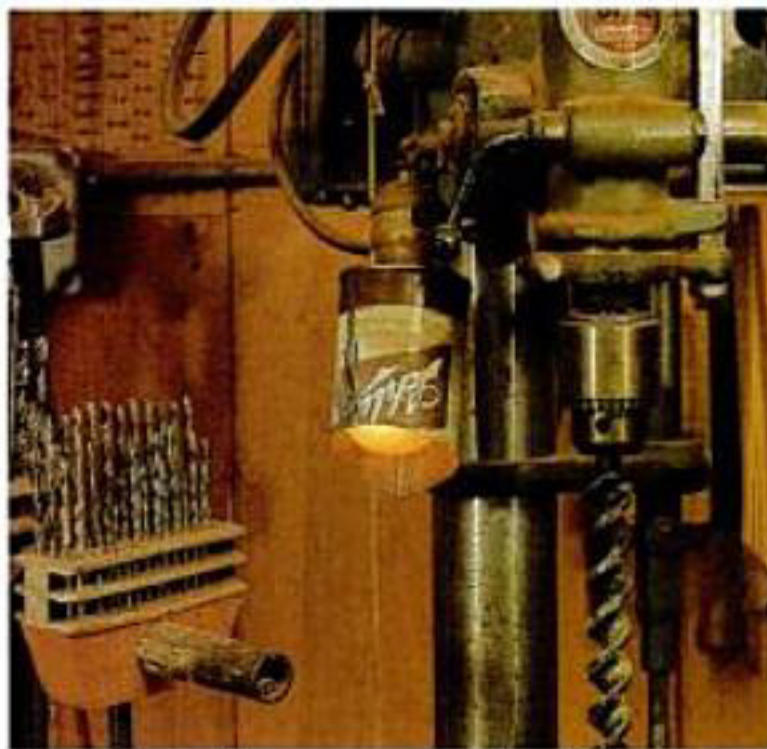
While they are sensitive to cold like standard fluorescents, the compact variety fit in a standard Edison socket (though they're a bit large for some small fixtures) and are quiet and cool in operation. In color temperature, they fall between household incandescents (warm) and standard fluorescents (cool). As you might expect, such lamps are much more expensive to buy, but they pay off over the long haul.

Planning a Lighting System

Once you determine the mix of artificial lights you prefer, you'll have to figure out the size and quantity you'll need and where to put them. A lighting engineer might arrive at an adequate formula, but it's a highly variable and subjective science. (In fact, most "engineered" plans I've seen would light up a shop like a supermarket.) An effective lighting system has more to do with the placement of fixtures and the way you use the workspace than with sheer wattage or footcandles.

With that in mind, you'll want to develop a lighting plan that takes into account the location of major machinery and accounts for the different requirements of each work area. Begin by blocking out the heavy activity areas, like the tablesaw and workbench, on a floor plan and locating fixtures over them that will provide a large amount of diffuse light. Then mark off the areas like the sander or drill press that will need specific task lighting. You can test your lighting concept by wiring a two-bulb fluorescent to a cord and holding it over each area.

Paul Silke took a simple approach to flood his 24-ft. by 40-ft. shop. He installed three banks of fluorescent fix-



A recycled beer can makes a serviceable shade for Bob Stockdale's drill-press lamp.



The strong shadows raised by an oblique side or back light are ideal for defining carved highlights or spotting sanding scratches and finish flaws. Roger Heitzman made this detailing lamp by mounting a cheap quartz-halogen floodlight on a camera tripod and wiring it with a retractable cord reel from a used vacuum cleaner.

tures, each with two 8-ft.-long high-output bulbs, and spaced 8 ft. apart. The lights run the length of the shop with the outside rows 4 ft. from the walls. Two of the lamps in each fixture are high-output fluorescents and these are augmented with a few small incandescent task lamps for detailed work.

Obviously, if you have a more complex layout or specialized circumstances such straightforward lighting might not work for you. But if you begin with good overall illumination, you can add or subtract fixtures to accommodate designated task areas. You won't need as much light, for example, in your wood storage or rough-milling area as

you would at the bench or in a space dedicated to carving. And finishing areas require vapor-tight fixtures and switches. A scale model will enable you to simulate the effects of natural light, drawing your attention to areas that may require more illumination at certain times of the day.

Lighting plans typically use square footage and ceiling height to calculate the volume of light required in the workspace. But many other factors affect the actual delivery of usable light. As one engineer told me, "In the real world you can expect to lose 20 to 30 percent of your light when the space is occupied."

Bulky, dark machinery absorbs light and casts shadows. And even the best overhead lighting may be blocked by your own body or the work itself as you lean over the bench or tablesaw. To reduce shadows, place ceiling fixtures to one side of the primary work area or use a secondary source of fill light. You might also take a tip from the auto body trade and hang your fluorescents at an angle, by hanging the chain off center, to reduce shadows.

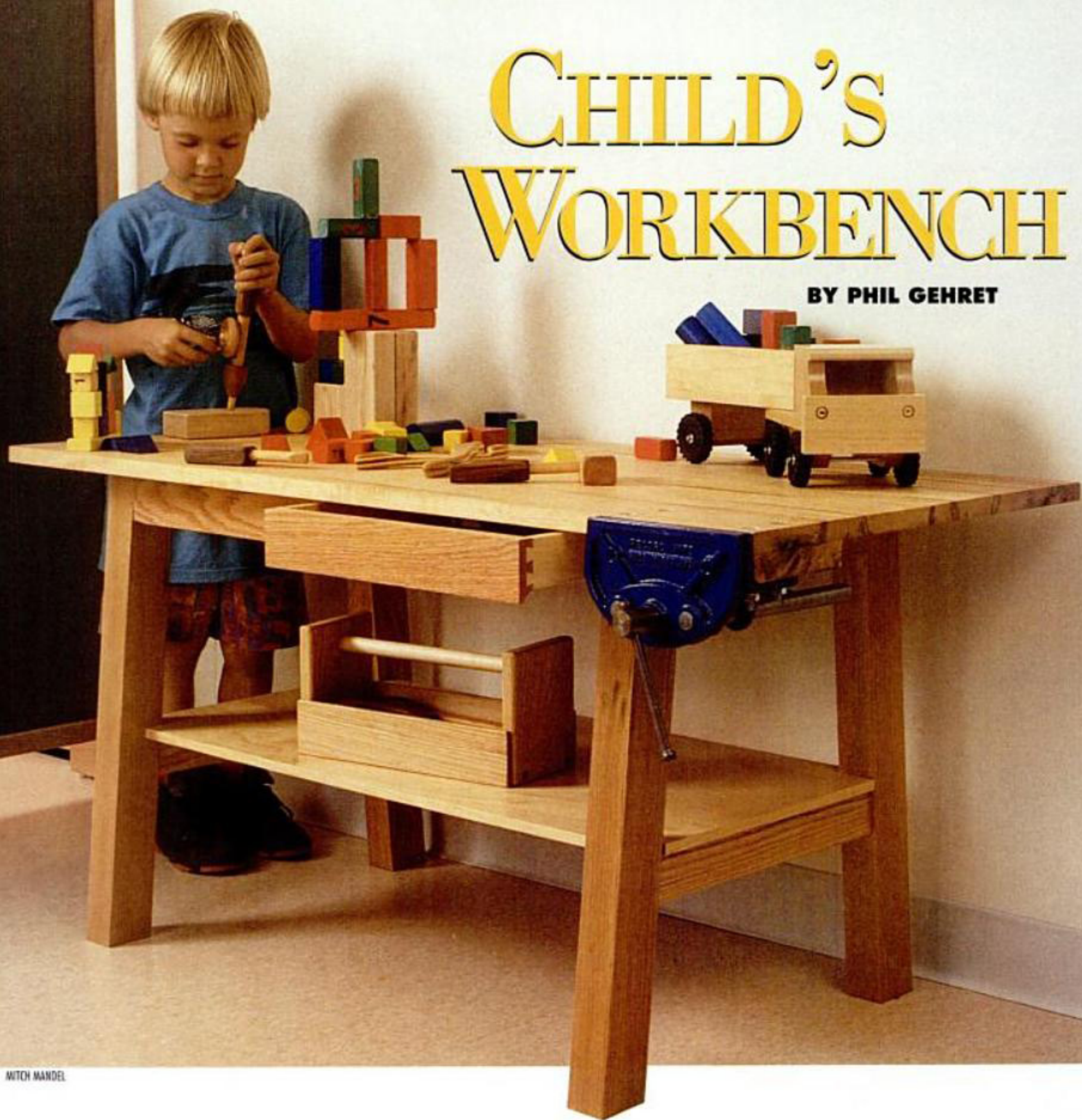
There are several other things you can do to lighten up your workspace, such as painting as much of the shop as possible in a light color and keeping it clean. The walls and ceiling are particularly important reflective surfaces, but a light-colored enamel paint or vinyl tile will also make a big difference on the floor. If you use wood paneling or flooring, choose a light-colored wood such as pine or maple. In a very small shop, you might also use mirrors to reflect light. Finally, white enamel reflector shields, available for both fluorescent and incandescent fixtures, will help put the light where you need it most. ▲



SCOTT LANDIS is author of *The Workbench Book* (1987) and *The Workshop Book* (1991), *The Taunton Press Inc., Box 355, Newtown, CT 06470.*

CHILD'S WORKBENCH

BY PHIL GEHRET



MITCH MANDEL

A few weeks ago I got a call from Pat Huxta, a teacher at the day-care center that Rodale Press runs for employees' children. It seems the school-age kids wanted to build a birdhouse. The center had a pile of scrap wood and a few old hand tools, but they needed a proper bench to work on.

Pat showed me a picture of a flimsy-looking child's workbench in a mail-order catalog. I knew I could do better, so I designed this one. It's sturdier, costs less and only took me a weekend to build.

The bench is 24 in. high—just

right for the 6- to 10-year-olds at the day-care center. To start the kids off right, I added a small V-175 Record bench vise (available from The Woodworker's Store, 21801 Industrial Blvd., Rogers, MN 55374, 612-428-3200).

I made the bench out of wood I

*Get Kids Started Right
With a Workbench That's
More Than a Toy*

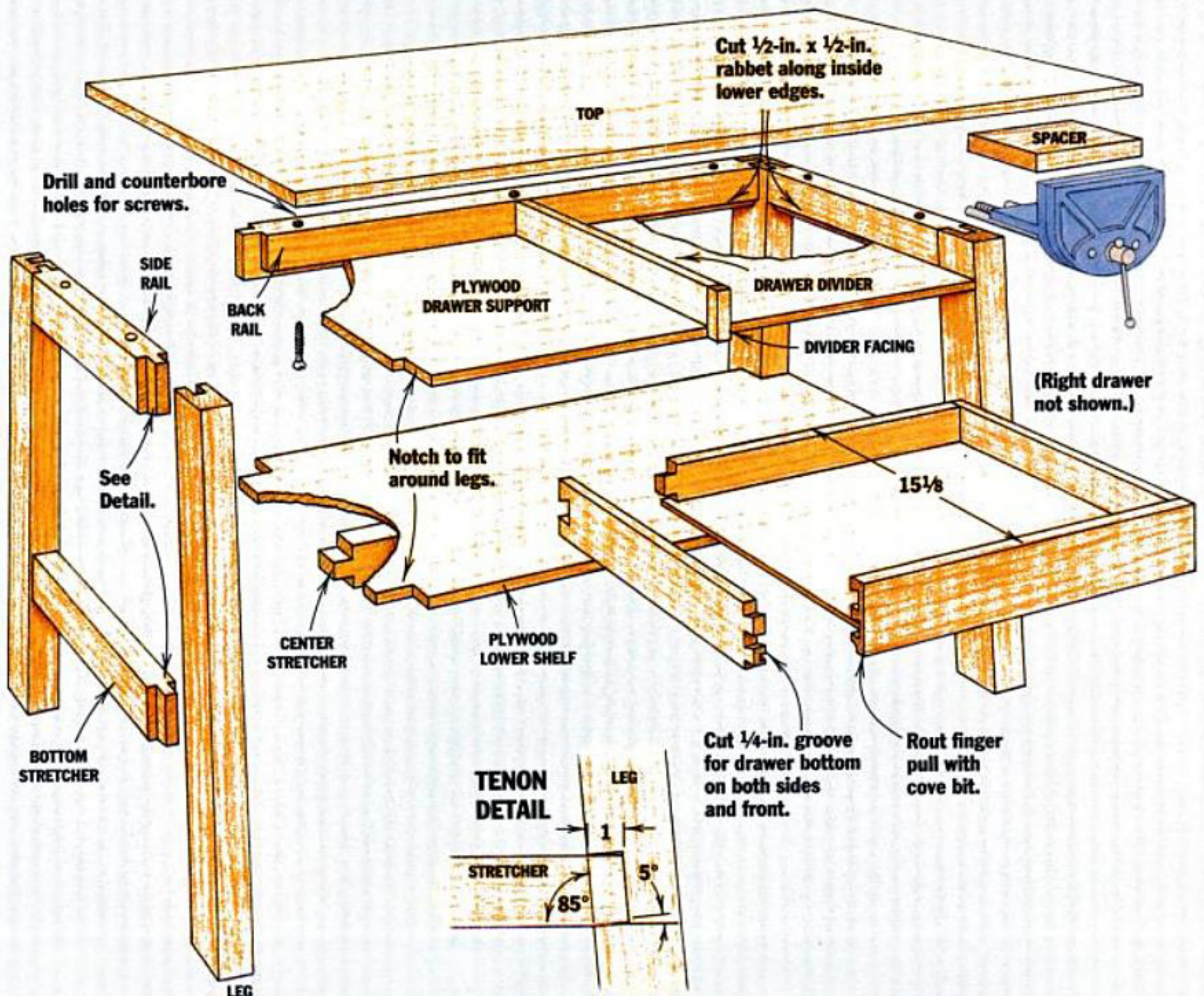
had handy in the shop—soft maple for the top, oak for the frame and drawer fronts, poplar for the drawer sides and backs and some pieces of birch plywood. There's no need to get fancy with the joinery for this type of project, so I kept things simple.

Making the Support Frame

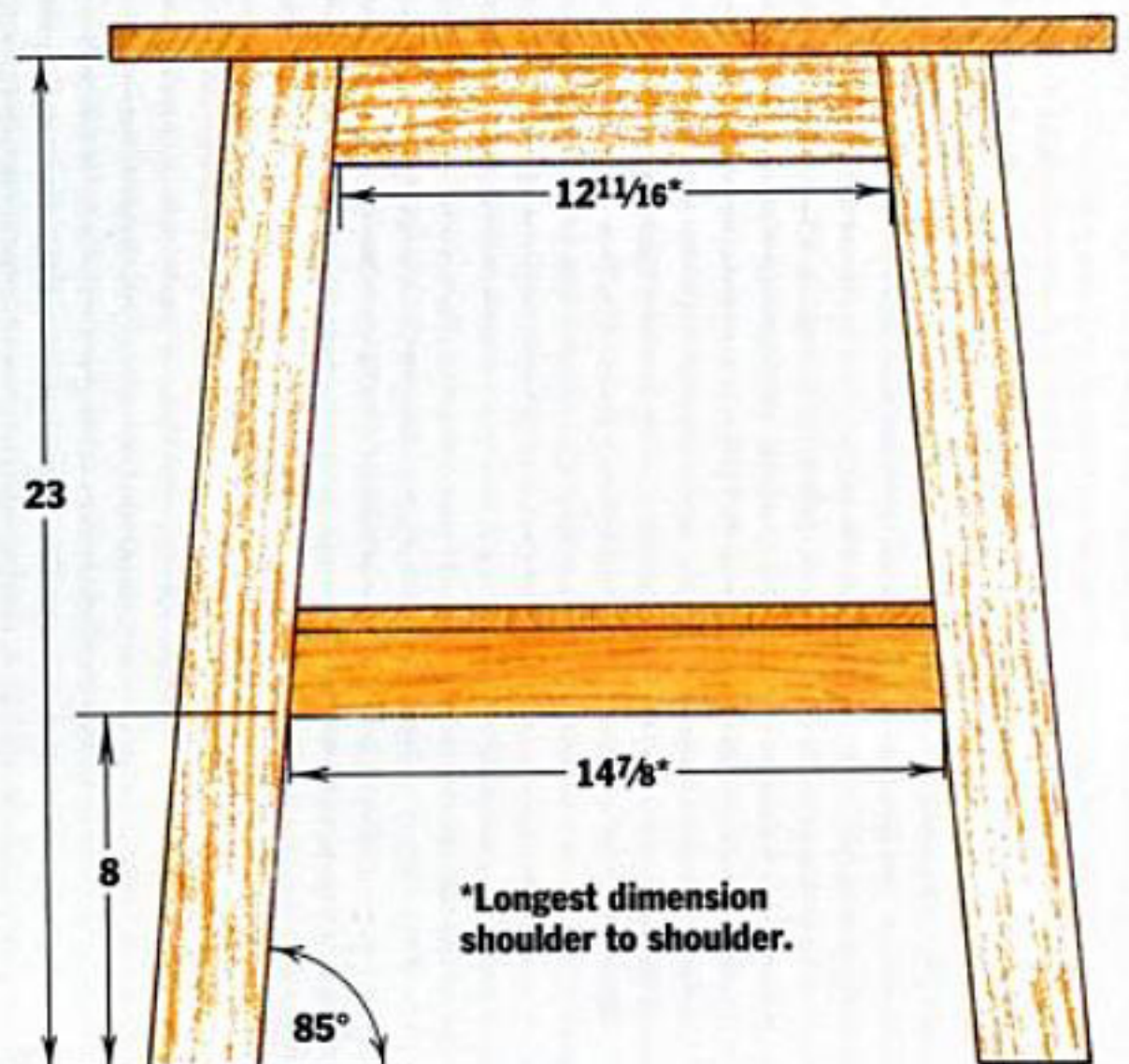
Begin by cutting the legs, stretchers and rails to the dimensions in the Bill of Materials. Cut the ends of the legs at 85°.

Next, lay out and cut all the mortises 1½ in. deep and perpendicular to the stock. There's no need to angle the

CHILD'S WORKBENCH



SIDE ELEVATION



BILL OF MATERIALS

PART	QTY.	DIMENSIONS
Top	1	3/4 x 22 3/4 x 46
Leg	4	1 7/8 x 2 1/2 x 23 1/16
Back Rail*	1	1 7/8 x 2 1/2 x 32
Side Rail*	2	1 7/8 x 2 1/2 x 14 11/16
Bottom Stretcher*	2	1 1/2 x 2 x 16 7/8
Center Stretcher§	1	1 1/2 x 2 x 32 3/8
Lower Shelf	1	1/2 x 16 1/2 x 33 3/4
Drawer Support	1	1/2 x 15 1/8 x 31
Drawer Divider	1	3/4 x 2 x 14 1/2
Divider Facing	1	3/4 x 3/4 x 2 1/2
Drawer Front	2	3/4 x 27/16 x 14 1/2
Drawer Side	4	1/2 x 1 15/16 x 14 3/4
Drawer Back	2	1/2 x 1 1/2 x 14 1/2
Drawer Bottom	2	1/4 x 14 x 14 3/8

*Tenons 1/2-in. W x 1-in. L

§ Tenons 3/4-in. H x 1-in. L

All measurements to longest dimension.

mortises in the legs. Now cut a 1/2-in. by 1/2-in. rabbet along the side rail and the back rail for the plywood drawer support. To attach the benchtop to the rails, drill and counterbore seven holes, making them a little bigger than the screws to allow the top to expand and contract across the grain.

Cut the shoulders of the rail and stretcher tenons at an 85° angle. (See drawing.) Then lay out and cut the bottom of the tenons at a 5° angle so they fit into the straight mortises in the angled legs. Cut square-shouldered tenons on the back rail and center stretcher, making the center stretcher tenons horizontal as shown in the drawing.

After dry-fitting all the pieces, glue and clamp the frame. While the glue is drying, cut and notch pieces of 1/2-in. plywood for the drawer support and the lower shelf. (See drawing.) Then glue and nail the drawer support into the rabbeted frame and set the shelf in place. Cut out the drawer divider and divider facing and glue and nail them in place. Finally, glue-up the stock for the top, and when dry, plane it flush and screw it to the frame.

Even though this is a quick project, I decided to dovetail the drawers. (See sidebar.) There's always the hope that seeing dovetails will inspire a beginning appreciation of good craftsmanship in the kids that use the bench—though I realize it's hard to compete with Nintendo. (See AW #19 and #29 for more on dovetails.)

The drawer construction was otherwise straightforward. I cut a 1/4-in. by 1/4-in. groove in the drawer front and sides to house the drawer bottom. After gluing the dovetailed corners together, I slipped the drawer bottoms into the grooves and nailed them to the drawer backs. Finally, I applied an oil finish to the bench, and mounted the vise. ▲



PHIL GEHRET
is a cabinetmaker in the *AMERICAN WOODWORKER Design Shop*.

QUICK AND DIRTY DOVETAILS



It doesn't take a fancy jig to make half-blind dovetails. At right, the author lays out the dovetail sockets using a piece of clear plastic as a see-through straightedge (note stop block for router), then simply pushes the router straight back freehand using a firm grip and sharp eye (above).



I make a lot of shallow, dovetailed drawers. After trying different methods, I worked out the following technique that lets me cut half-blind dovetails quickly using a router and bandsaw without any special jigs.

The key is cutting the half-blind dovetail sockets freehand with a router and dovetail bit. I do this with no guides other than a stop block to get the socket length correct. Because the cut is so short, I can push the router straight by eye.

First, I scribe dovetail baselines on the drawer front, sides and back. Then I clamp the drawer front on the edge of the workbench along with a stop block so the router bit stops right at my baseline.

Next I mark the locations for the

dovetail sockets using a small square piece of clear plastic as a straight-edge so I can see the wood underneath. (See photo.) I eyeball these marks without measuring, spacing them by what looks good. After routing the sockets as shown in the photo, I square-up the sockets with a chisel.

It's then a simple matter to lay out the tails on the drawer sides using the router-cut sockets as a guide. I cut out the tails freehand with a bandsaw and scroll saw.

After a lot of practice, I can dovetail a whole drawer in about 15 minutes.—P.G.

SCRAPERS

BY MAC CAMPBELL

Preparing the surface of wood for finishing may be the most critical step in a project. Yet this is where many woodworkers fall down. They resort to belt sanders or other power tools to "refine" the surface and end up with wood that looks dull from abrasion. There's a much better way which is inexpensive, fast and easy: Use a scraper.

When burnished to a hard, thin hook, the edge of a scraper will shear the wood fibers cleanly, leaving a smooth, crisp and shiny surface similar to one produced by a hand plane.

Scrapers are versatile tools too—strong enough to work down the most ornery piece of bird's-eye maple, yet still delicate enough to level out a single coat of lacquer. And they're a

snap to sharpen and use once you learn the basics. There are even some new gadgets on the market to make them even easier to maintain. (See sidebar, opposite page.)

There are two basic styles of scrapers. Hand scrapers, which are flat pieces of steel in either rectangular or curved shapes (see photo) and cabinet scrapers. Hand scrapers are unsurpassed for leveling out small imperfections, like tear-out from the thickness planer, or for working in tight corners. I also use them for freeing sticking drawers or fitting doors.

To smooth larger areas, the cabinet scraper is the tool of choice. The most common type consists of a scraper blade in a frame, usually made of cast iron, that looks like a spokeshave.

(See photo, below.) The frame holds the scraper blade at a constant angle, and its flat sole makes it work like a small, fine plane.

Buying a Scraper

Since scrapers depend on a very small burr for the cutting action, it's important to get one made of very hard steel. I've had the most success with the "super-hard milled scrapers" (available from Veritas Tools, 12 E. River St., Ogdensburg, NY 13669, 800-667-2986). They are hardened between Rc-48 and Rc-52 on the Rockwell hardness scale, and take and hold an excellent hook. These scrapers are available in four thickness (0.4, 0.6, 0.8 and 1mm), and a variety of shapes. I keep a more delicate hook on the thinner scrapers,



Planes and sandpaper aren't the only way to prepare wood for finishing. Author shows how easy it is to use a scraper. Scrapers come in different sizes and shapes to fit the contours of your work (inset).

Properly Sharpened, This Tool Makes a Super-Smooth Surface



TOOL-UP FOR SCRAPER SHARPENING

There are some specialized tools available that will help you sharpen your scrapers. Here are three that I've tried and liked.

The Jointer & Edger (above left) is a jig that holds your file perfectly square to the scraper's edge when filing. You can also use it for jointing hand-saw teeth (available from Veritas Tools, 12 E. River St., Ogdensburg, NY 13669, 800-667-2986).

The Veritas Variable Burnisher (above center) lets you set the exact burnishing angle you want by adjusting a knob. The tool has a super-hard, carbide burnishing rod mounted in a maple block with a slot for the scraper. You

slip the block over the scraper, then press down and pull the block to form the hook. It's quick to use, but it won't work on concave curved scrapers (available from Veritas Tools, 800-667-2986).

The SB-1 Scraper Burnisher (above right) is designed so you can more easily perform the two-step process of drawing the edge and turning the hook. It uses a short, hardened steel rod mounted in a hardwood handle. And it works on curved scrapers too (available from Timberline Tool, 28544 North Highway 67, Woodland Park, CO 80863, 719-687-9076).—M.C.

and find their flexibility very useful for working irregular shapes like chair parts. The Sandvik scraper is a popular Swedish brand rated at the same hardness, but it's available only in the 0.8mm thickness.

I've not found a great deal of difference among the various cabinet scrapers I have tried. Buying a brand name like Stanley, Record or Kuntz (available from many mail-order tool companies) is your best insurance.

Sharpening a Scraper

Unlike sharpening chisels and planes, in which metal is ground away to leave a sharp edge, scrapers are sharpened by burnishing. But the secret to getting a good hook on a scraper is to start by filing the cutting edges perfectly straight and square to the sides. I use a 6-in. mill bastard file and very light pressure and file each edge until it has an even, dull gray

appearance under a good light.

You can do the filing freehand with some practice, though beginners might feel more comfortable using a simple wood-block guide to keep the file square to the scraper. I prefer to use a file-holding tool made to keep the file square to the scraper edge. (See sidebar.)

After filing, many woodworkers hone the edge and face of the scraper on a fine stone. The theory is that a polished edge will produce a more perfect hook and, in turn, smoother scraping. (See sidebar, next page.) But I have not found this step improves the final edge significantly. So I go directly from filing to burnishing.

Burnishing the Hook

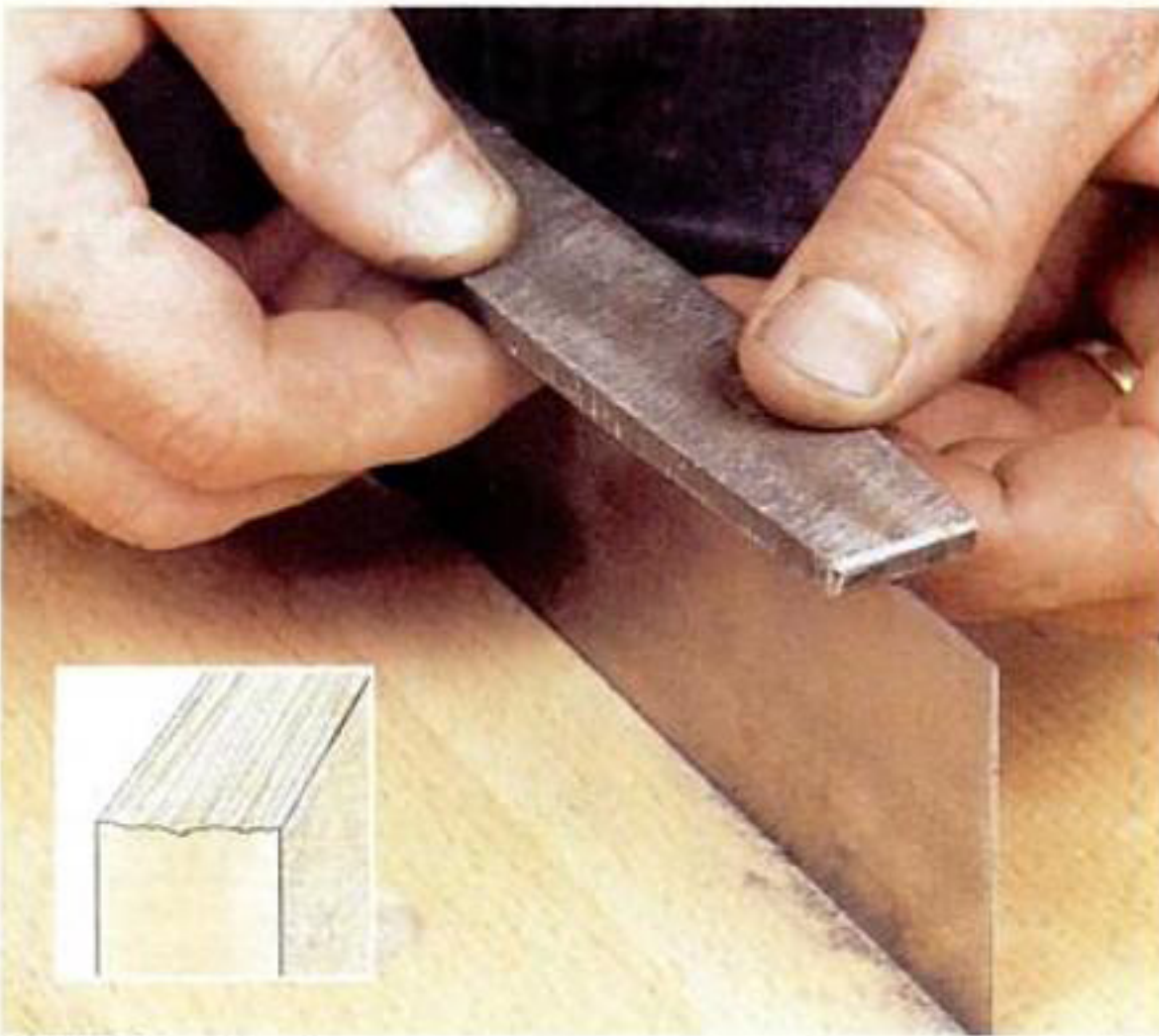
Theoretically, you can use any piece of smooth metal that's harder than a scraper to burnish a hook. For example, I've used the back of a chisel

for freehand burnishing of straight-edged scrapers. (If you do this, it's important to burnish with the area near the chisel's cutting edge because the steel gets softer a short distance from the edge.) For curved scrapers, I use the piston rod from a worn-out automotive shock absorber. It's very hard, and years of use have polished its surface to a mirror sheen.

Burnishing goes best if you first lubricate the edge of the scraper with a drop of light oil. (Leonard Lee of Lee Valley Tools has studied sharpening for years and suggests just touching a finger to your nose and rubbing this skin oil on the edge.) Then clamp the scraper in a vise, hold the burnisher at 90° to the scraper and make several passes with light to moderate pressure. This smooths out the fine marks left by the file, and begins to "bulge" the edge so the final hook will be stronger.

For very fine work, that's all the bur-

SHARPENING A SCRAPER



STEP 1: File edge square

Sharpening a scraper is a simple process. But woodworkers practice different techniques to get that sharp edge—some more involved than others.

Here's a "traditional" four-step procedure that will produce a very sharp, long-lasting hook for fine work like leveling a lacquer finish. The steps are illustrated in these photos, while the accompanying insets show you what the edge of



STEP 2: Hone edge smooth

the scraper should look like after each step is complete.

To begin, clamp the scraper in a vise and joint the scraper's edges straight and square with a file. Use a file guide or a block of wood to keep the file square, if you feel unsteady.

Now hone the edges to remove the file marks. Again a wood block helps keep the scraper square. After working the edges, hone the faces flat, similar to the way you'd hone

nishing you need to do. But for most scraper work, you'll want to make a more pronounced hook by angling the burnisher 5° to 15° from horizontal, and taking a few more passes. (See drawing.) Experiment with angle, pressure and number of passes to see what works best for the scraper and burnisher you have.

Once you've gotten the hang of it, you can have a scraper filed, burnished and ready to use in less time than it has taken you to read this far.

One of the most common mistakes people make is burnishing too much. This rolls the burr over too far and cre-

ates a brittle hook that won't cut well.

I discovered a quick way to sharpen the convex scraper I use for removing carving marks on chair seats. I sand the edge of the scraper very lightly on a disc sander, holding it flat on the sander's table which is set at 90° to the sanding disc. The coarse burr left by the sander works fine for rough scraping.

Cabinet scraper blades are sharpened the same way as hand scrapers except the edge is beveled instead of square. Most manufacturers suggest a 45° bevel. I keep one edge of my cabinet scraper at 45° but prefer to keep the other edge sharpened at 30° . I save

this edge for very fine work because the burr produced is more delicate.

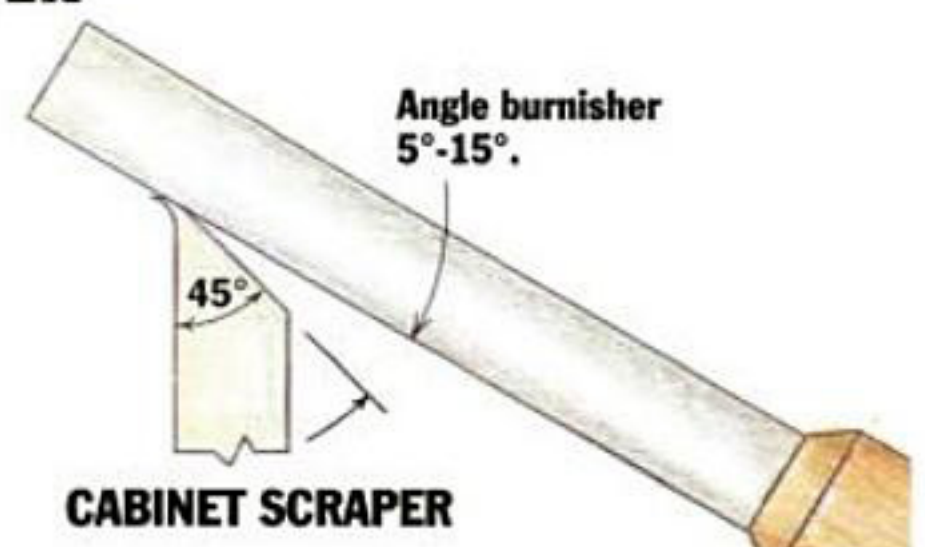
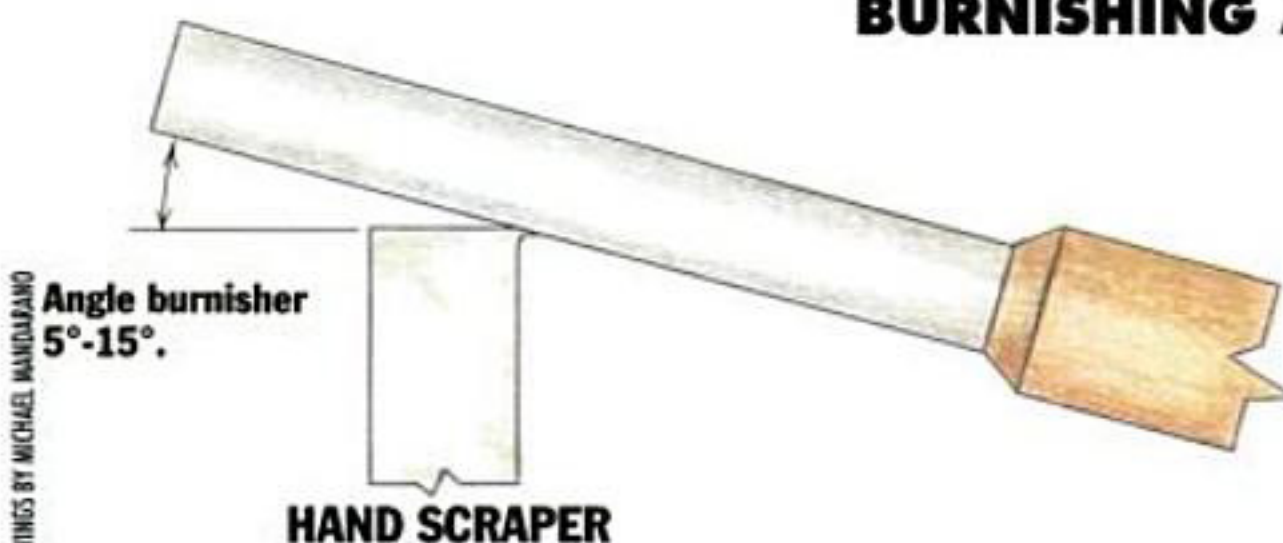
File the bevel to get it straight and smooth. Then tilt the burnisher about 15° relative to the bevel and burnish the hook away from the beveled side. (See drawing.)

Using the Scraper

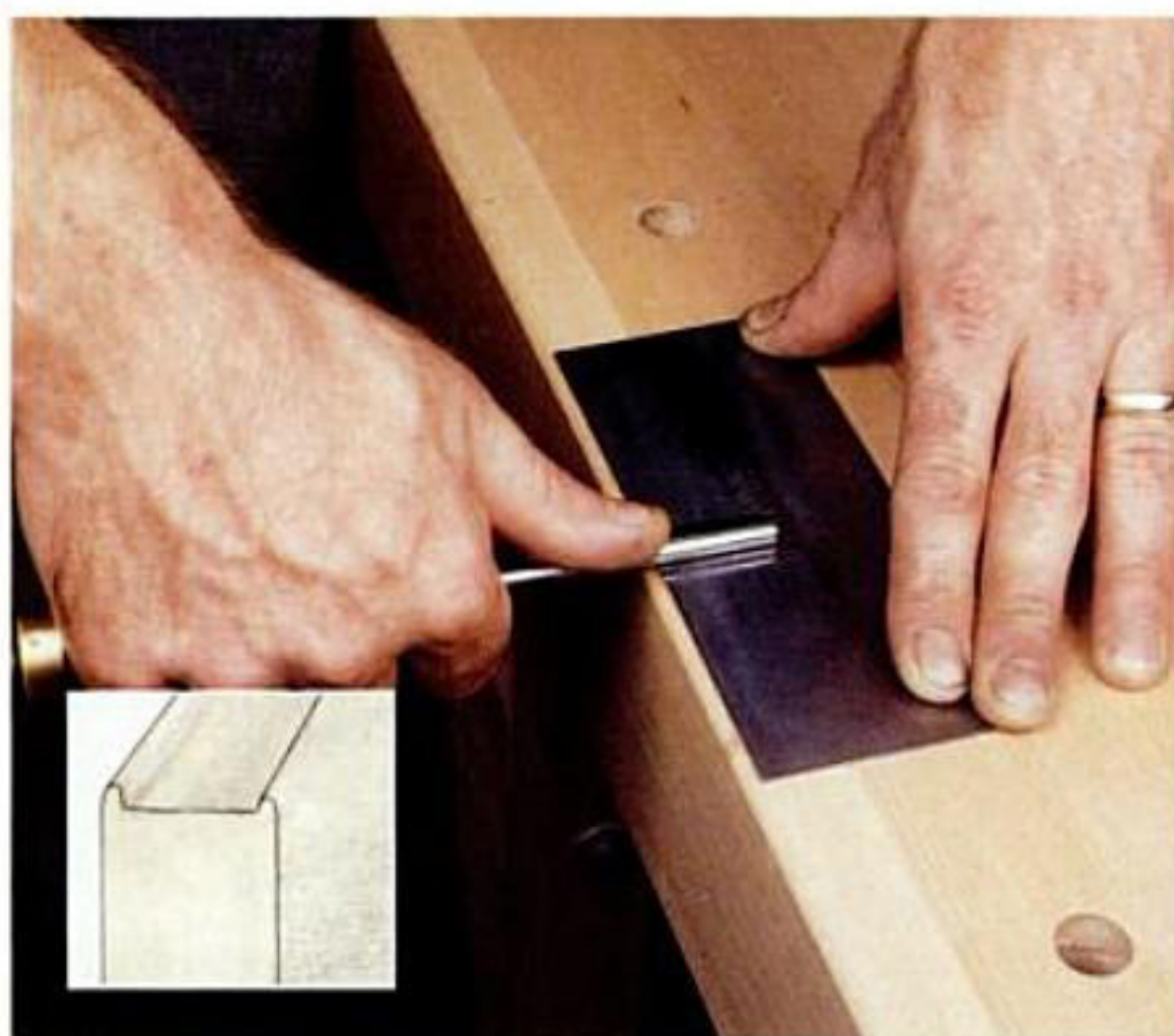
I'll describe the technique for using a rectangular hand scraper; curved ones are similar.

Hold the scraper vertically with its long edge resting on the wood. Place your thumbs near the center of the bottom edge, and wrap your fingers

BURNISHING A SCRAPER



THE TRADITIONAL WAY

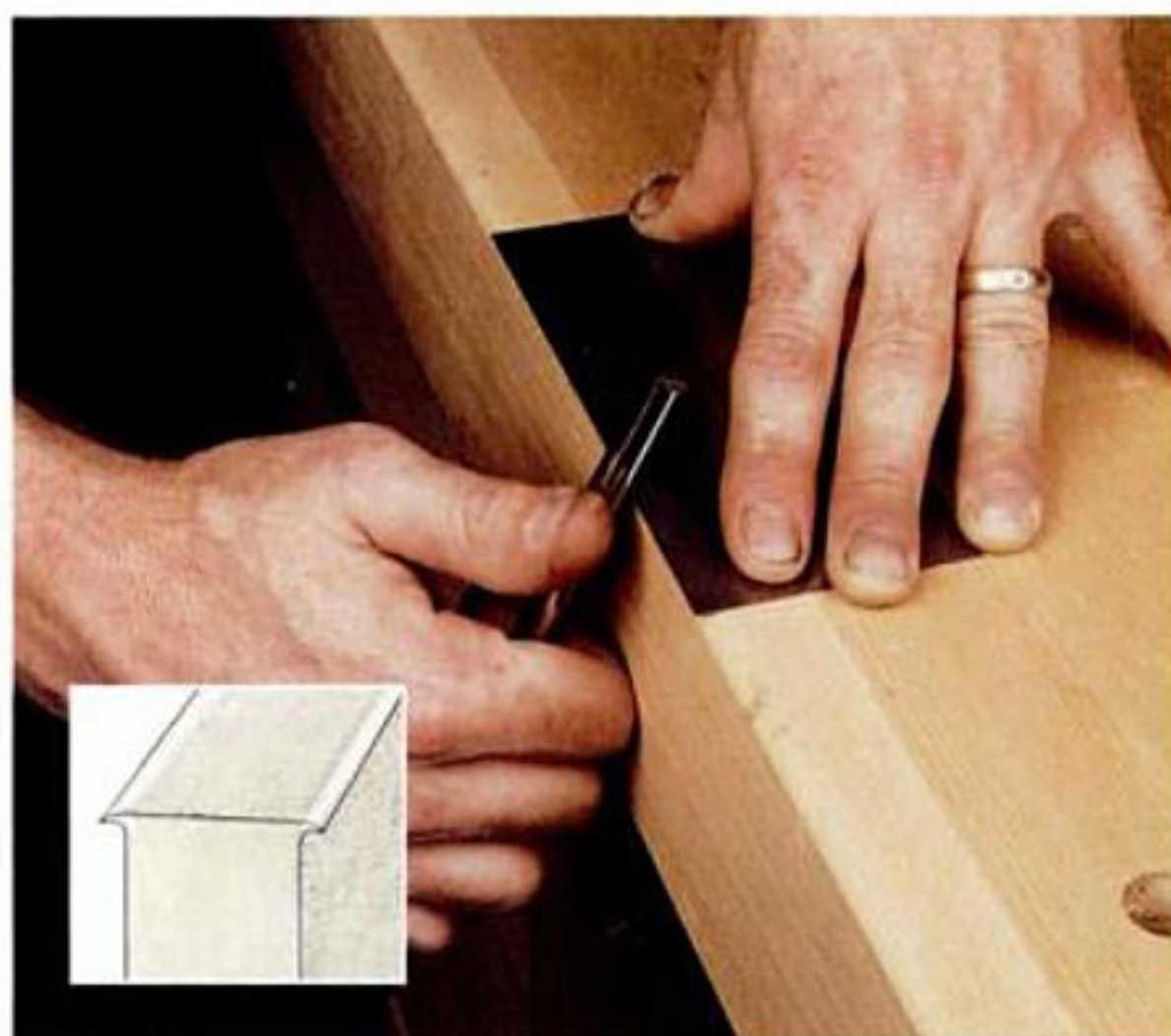


STEP 3: Draw edge with burnisher

the back of a chisel after honing the bevel.

Next, you want to draw the edges. Lay the scraper on the bench and stroke the edges with a hand burnishing tool. It will only take a few quick strokes to move the metal.

To turn the hook, place the scraper so the edge hangs off the bench, tilt the burnishing tool at a 5° to 15° angle to the edge of the scraper and stroke with an upward motion.



STEP 4: Turn hook with burnisher

That's all there is to it. When a scraper blade becomes dull, you can renew it by simply redrawing the edge and returning the hook. After a few renewals you'll need to start over by filing and honing the edge again.

Burnishing curved scrapers follows the same process, though on concave curves, you'll have to use a round file and slip stones to hone.—M.C.

around the ends of the scraper. (My fingers often sneak over the top corners as well.) Then bow the scraper slightly by pushing gently with your thumbs while you pull with your fingers. More bow makes the scraper easier to control, but increases the danger of having it dig in, since it reduces the length of edge that is cutting the wood.

Push the scraper along the wood, gradually tipping it away from you. At some point, usually 15° to 30° from vertical, the scraper will start to cut. You should see a fine shaving being pushed ahead of the scraper. If you see only fine dust, try the sharpening process again. The scraper will cut best and stay sharp longest if you hold it at the steepest angle at which it will cut. Curved scrapers require a lighter touch, since relatively little of the scraper's edge is in contact with the wood, and the risk of digging in is higher.

If you are doing heavy work, your thumbs will get hot very quickly. Some woodworkers use Band-Aids for insulation. Others use a piece of leather or the "rubber thumbs" sold in stationery

stores for sorting paper. I usually place a small stick, about 3/16 in. thick between my thumbs and the scraper.

Cabinet scrapers usually require some initial tuning to work well. It's a good idea to flatten and polish the sole just as you would with a hand plane. Then you need to position the blade in the frame for the proper depth of cut.

To do this, place the frame on a flat surface like the tablesaw. Slip a sheet of thin note paper under the front end of the scraper body to raise it slightly, then back off the blade clamping screws and adjustment screw. Now slide the blade into the frame, bevel side toward the adjusting screw, and let the blade come to rest against the saw table. Then, when you tighten the clamping screws, the blade will project the thickness of the paper, which is about right.

The adjusting screw pushes on the middle of the blade, bowing it to increase the depth of cut. Turn the adjustment screw in until it just makes contact with the blade, and make a test

cut on a piece of hardwood. Continue to tighten the adjustment screw until you get nice thin shavings.

Both the hand and the cabinet scraper perform best if you move them with the grain, and skewed at a slight angle to the line of travel. This produces a shearing action that results in a very smooth cut. It's best to take long, smooth strokes, using your body's momentum as you would with a hand plane.

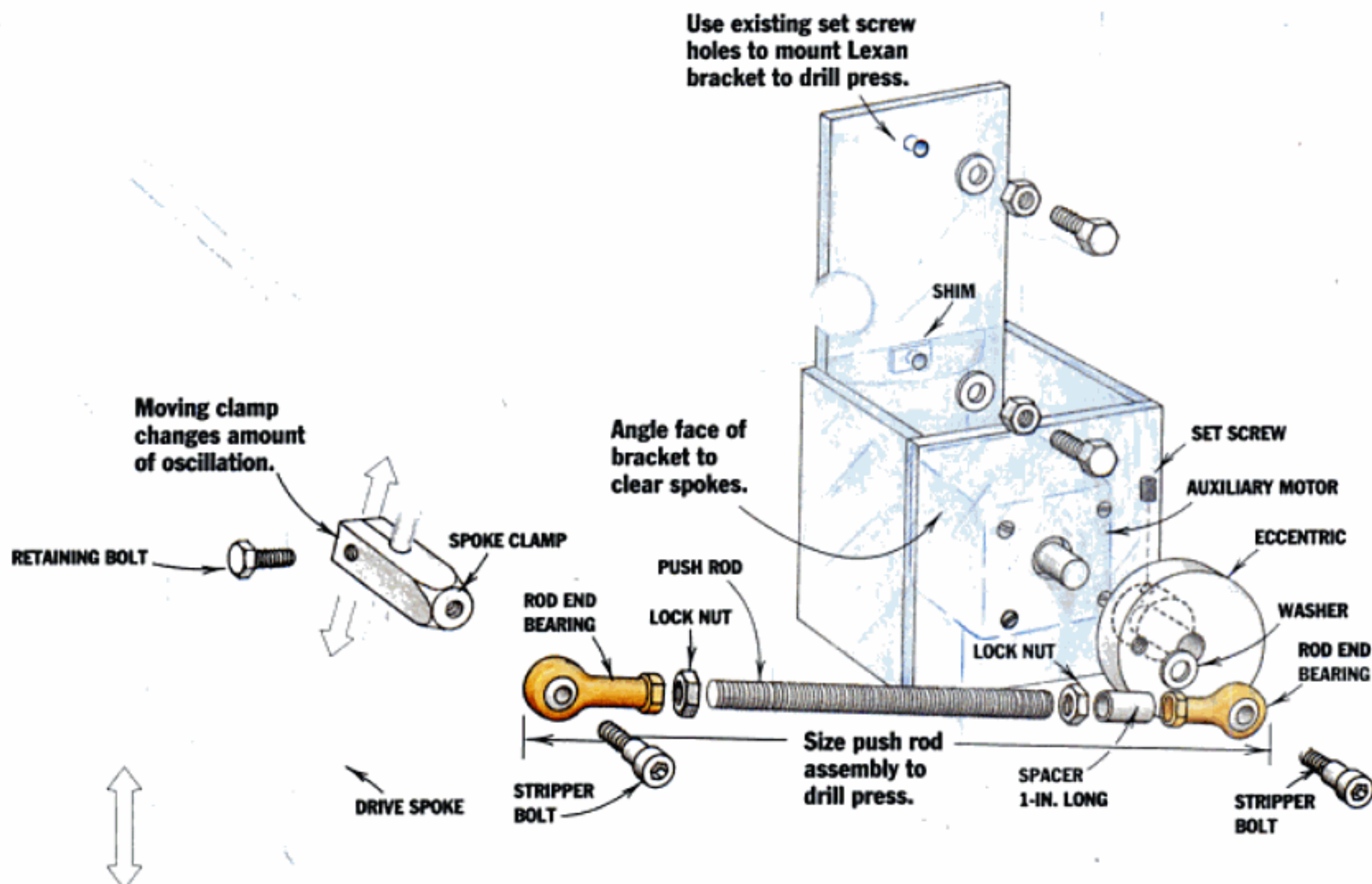
Once you get the hang of sharpening and using a scraper, I guarantee you'll wonder how you ever did without it. ▲



MAC CAMPBELL

ran a custom furniture shop for 14 years in New Brunswick, Canada. He's currently studying theology in Halifax, Nova Scotia.

FIG. 1: OSCILLATING SANDER



OSCILLATING SPINDLE SANDER

Convert Your Drill Press to an Oscillating Sander for Less Than \$30

BY GENE PAULES

As a design engineer, I'm always looking for a way to make machines more efficient. And if I can save money too, so much the better. With this shop-made oscillating sander I've achieved both goals. It costs less than \$30, takes up no extra space, and makes my drill press a more versatile machine. Best of all, switching from drilling to sanding takes less than a minute.

The mechanical principle is simple:

an auxiliary motor connects by an eccentric to a push rod assembly, and that drives one of the drill press spokes back and forth. This motion moves the quill and the sanding drum up and down. (See Fig. 1.)

Gathering the Components

You can find most of the specialized components for this attachment at industrial supply houses. (See Sources.) The geared motor is a sur-

plus item and costs only \$5.95. There is a trade-off with the inexpensive price, though. This is not a continuous-duty motor and the thermal protector inside will shut it down after a half-hour of steady use. I don't find this a problem, however, because I rarely sand that long.

I made the eccentric and spoke clamp from scrap aluminum, but you can use hardwood if you don't do machine work or don't want to pay a

machine shop to fabricate them.

I also made a modification in deference to my drill press (Delta model 17-900). Delta uses spokes with rolled threads that are larger in diameter than the spoke shaft. That means a clamp large enough to clear the threads won't fit tightly on the shaft. To overcome this, I replaced one spoke with a metric machine bolt and a brass extension rod. (See photo, right.) This gives me a standard size handle for drilling and allows me to remove half the handle if it interferes with sanding. If you opt for a wooden clamp, skip this step and bend the clamp until it clears the threads.

Setting the Oscillation

The distance the sanding drum moves up and down is determined by how far the spoke attached to the push rod assembly travels back and forth, and setting this oscillation is the key to making the sander work correctly. Too little oscillation and the sander is likely to leave scratch marks, too much and the drum may rise above the workpiece making sanding awkward.

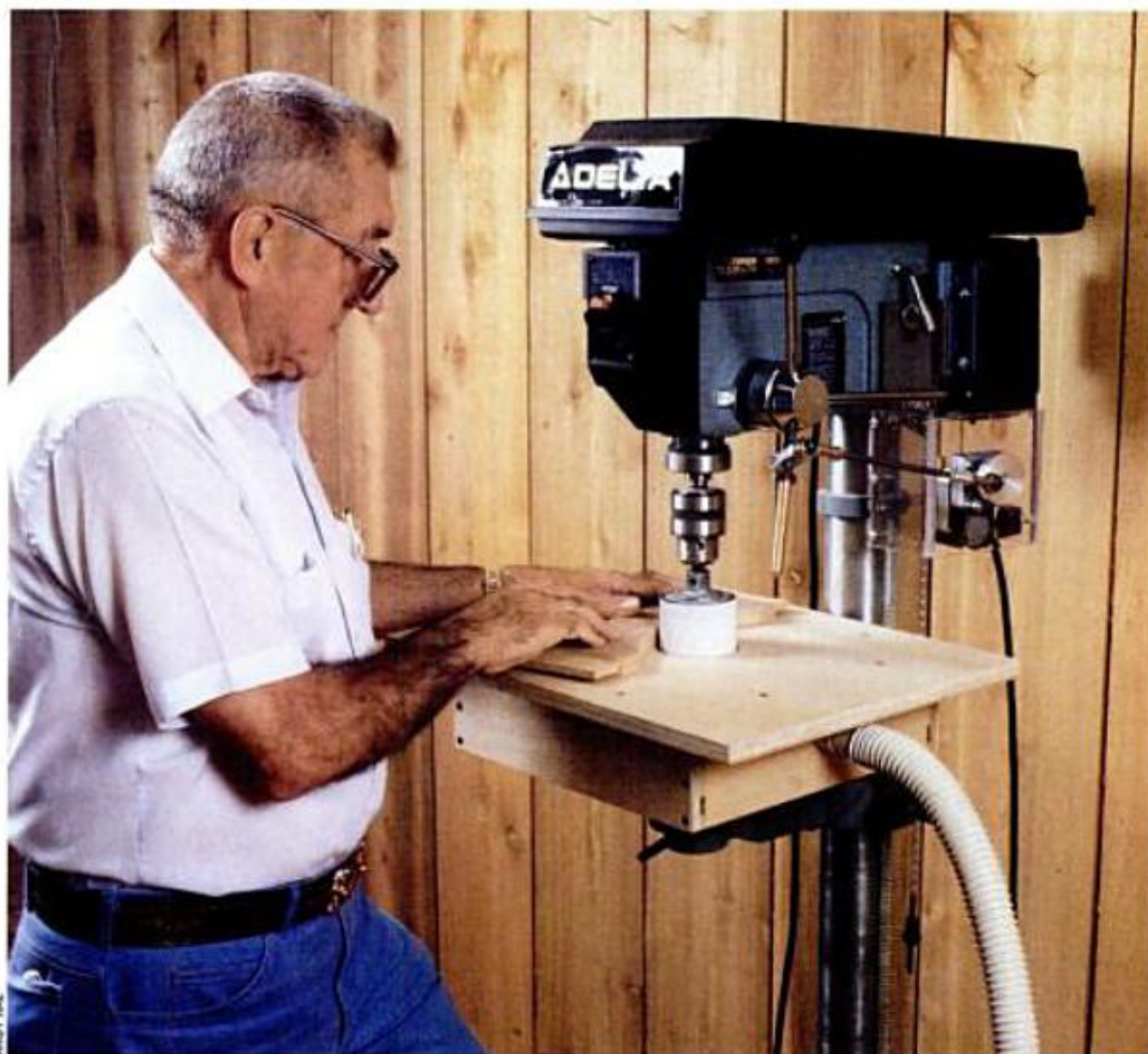
I find $\frac{1}{2}$ -in. oscillation best when using 2-in.-high drums. However, with my attachment you can also change the amount of oscillation for different tasks, a feature not normally found on commercial sanders. More on this later.

To set the sander for $\frac{1}{2}$ -in. oscillation, attach the spoke clamp to the spoke nearest the 7 o'clock (or further clockwise) position. This becomes the "drive" spoke. Then locate the clamp about 2 in. from the center of the spoke hub. (See Fig. 1.)

Now you want to move the "drive" spoke back and forth to create a $\frac{1}{2}$ in. of motion at the quill. (See Fig. 2.) The mid-swing of this arc should be around 6 o'clock to produce optimum thrust from the push rod, and the spoke should swing through a total arc of about 60° . Don't let the swing go beyond 90° because the push rod starts to lose its ability to "push," overworking the oscillator motor.

Mounting the Motor

To locate and mount the motor, position the "drive" spoke at the midpoint of its swing and sight a line



With a simple and inexpensive shop-built attachment, the author has converted his drill press into a scratch-free oscillating sander.

along the top of a square that is centered on the spoke clamp. You can place the motor shaft anywhere along this line.

My motor fits in a bracket made from scrap $\frac{3}{8}$ -in.-thick Lexan, though sheet metal or plywood would do as well. I attached the bracket to the side of the drill press casing using $\frac{3}{8}$ -in. bolts that fit the existing set screw holes on my Delta. (See Fig. 1.)

I angled the face of the bracket 10° to provide clearance for the spokes and to keep the back side of the oscillator motor clear of the drill press column. For convenience, I added an on/off toggle switch to the back of the motor.

Locating the Eccentric Hole

To determine where to locate the stripper bolt hole on the eccentric, first measure how far the spoke clamp travels in a straight line when you move the "drive spoke" through its arc. (See Fig. 2.) On my Delta the distance is $1\frac{3}{4}$ in.

Now halve this measurement. This is how far from the center of the eccentric the stripper bolt must be.

SOURCES

Components for the oscillating attachment are available from the following sources:

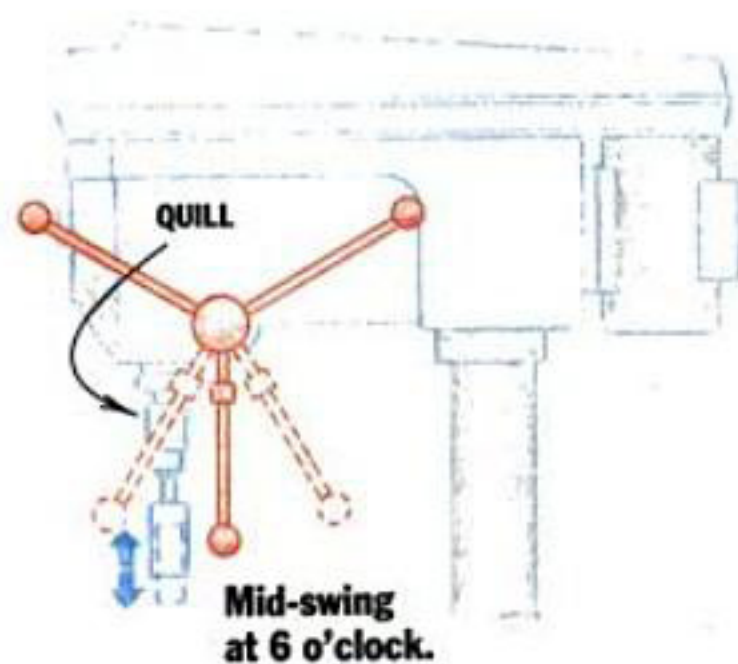
- ▶ **Geared motor** (#37051) (\$5.95);
- ▶ **Toggle switch** (#21763) (75 cents): American Design Components, 400 County Ave., Secaucus, NJ 07094, (800) 776-3700.
- ▶ **Push rod, 24 in. all-thread**, (#98791A030) (63 cents);
- ▶ **Rod end bearings** (#6072K42) (\$4.12 each);
- ▶ **Stripper bolts** (#91264A537) (\$1.08 each): McMaster-Carr Supply Co., Box 400, New Brunswick, NJ 08903, (908) 329-3200.

Attaching the Push Rod

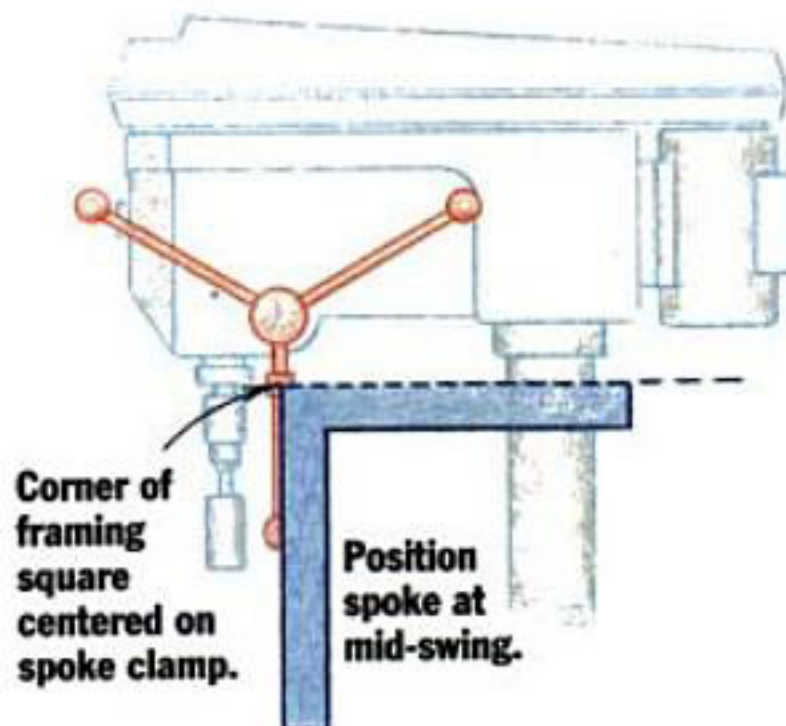
Now you can determine the length of the push rod. (See Fig. 1.) First, install both rod end bearings, then position the "drive" spoke so the quill is at the top of its sanding travel and rotate the eccentric so the stripper bolt hole is at its closest position to

FIG.2: SETTING UP THE SANDER

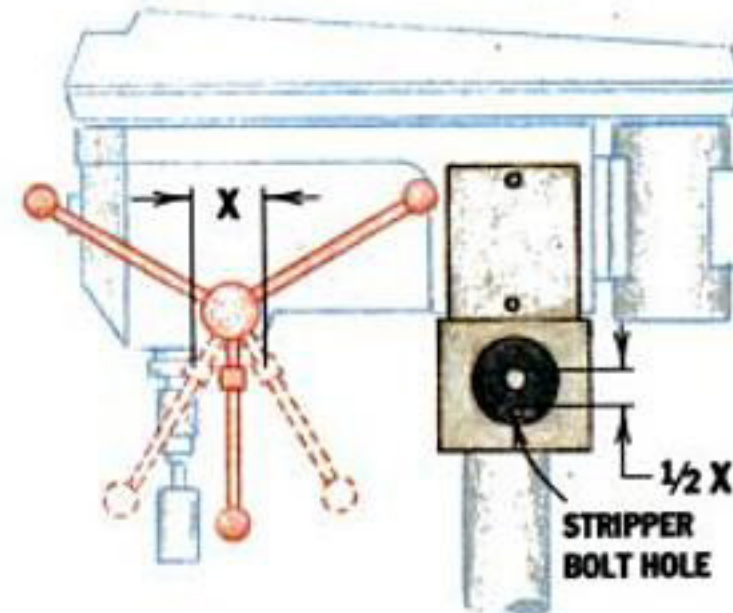
STEP 1: Move spoke to create 1/2-in. movement at the quill.



STEP 2: Sight line along top of square. Mount motor on line.



STEP 3: Measure horizontal travel of spoke clamp to determine location of stripper bolt hole.



the spoke clamp. Measure between each bearing and add 1 1/4 in. to provide a little leeway for later adjustments. Now cut the push rod to this length and install it.

If your quill hits its stop on the up stroke, simply decrease the distance between bearings by 1/16 in. You may need to add a spacer between the push rod and the back bearing to keep the lock nut from hitting the eccentric. (See Fig. 1.)

A unique feature of this sander is the ability to change the amount of oscillation. I find this handy because I

need to reduce the quill travel when using 1/2-in.-high sanding drums to clean up the edges of Christmas tree ornaments I make.

To change oscillation, I loosen the spoke clamp and move it out from the spoke hub by 1/2 in. (See Fig. 1.) This decreases the oscillation on my drill press to 1/4 in.—perfect for the thin stock I use. Moving the clamp closer to the hub increases oscillation.

Changeover from sander to drill press is simple. Remove the stripper bolt from the spoke clamp and let the

push rod assembly swing down from the eccentric. To go back to sanding, reverse the procedure. You're now ready for scratch-free sanding. ▲



GENE PAULES

is a retired corporation pilot and automation designer. He is now a full-time amateur woodworker.

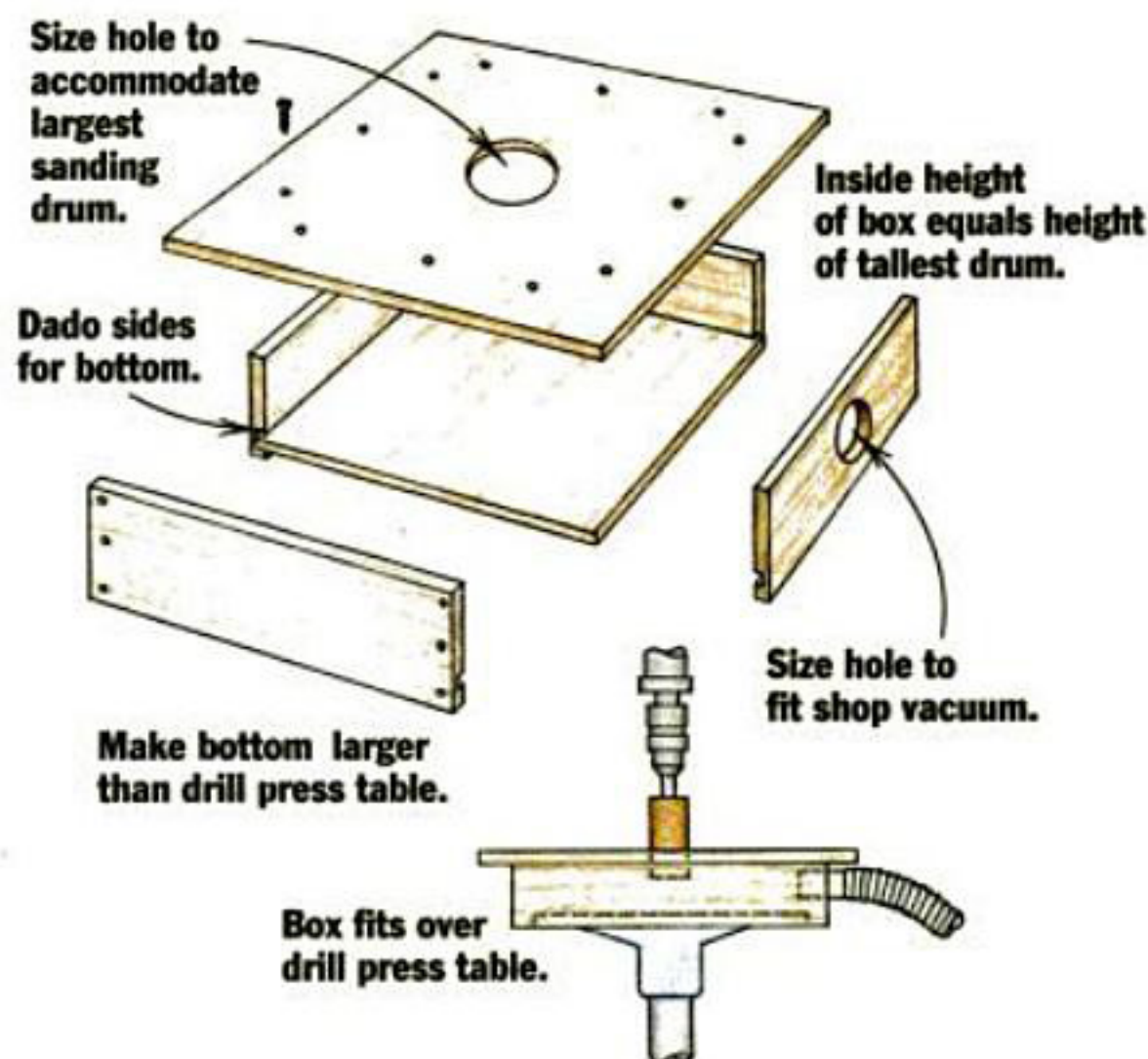
A DUST COLLECTOR SANDING TABLE

Using your drill press as a drum sander can be handy, but the dust is a hazard that I can live without. I built an auxiliary table with a dust pickup for my drill press.

The fixture is basically a box that sits on top of my drill press table. A hole through the top accommodates my sanding drum, and a hole in the side of the box lets me suck out the dust with my shop vacuum. (See drawing.) The box is high enough to allow my tallest sanding drum to oscillate without bottoming out.

As the drawing shows, I used 3/4-in. plywood for all the parts and glued and screwed everything together. The only important dimension is for the hole in the top. It should be just big enough to allow your largest sanding drum to pass through. This way your workpiece will have the maximum amount of support near the drum.

If you size the bottom of the fixture so it's 1/16 in. larger than the drill press table and make the dados in your side pieces 1/4 in. deep, you'll create a lip that will fit over the table. This way, clamping isn't necessary. When you're done sanding, it's a snap to lift off the fixture and store for later use. —G.P.



*A Delicate Balance of Paper and Wood, This Floor Lamp
Casts a Soft, Inviting Light*

RICE-PAPER LAMP

BY ANDREW CURLE

I became interested in Japanese woodworking about 10 years ago. I was employed in a library at the time, and started reading about woodworking so I could plan a shop. After seeing photographs of work from Japan, though, I knew that was where I had to go to learn.

Once there, I spent a couple of years studying the local woodworking and architecture, reading Buddhist literature and traveling in the Far East. Eventually I realized that in Japan, beauty is perhaps as important as strength in many objects. For example, this lamp, made with a thin frame and light-diffusing rice paper, weighs less than 4 pounds, so it seems more like a box kite than a household furnishing.

The lamp represents a fairly traditional style in Japan. The top rails are joined to the four legs with blind slip joints, while simple mortise and tenon joints connect the lower rails to the legs. (See Fig. 1.) These joints are tiny, but they are adequate for this job because they are under very little stress. Also, they represent the fragile nature of Japanese objects, which I admire. You could dowel the pieces together, if you prefer.

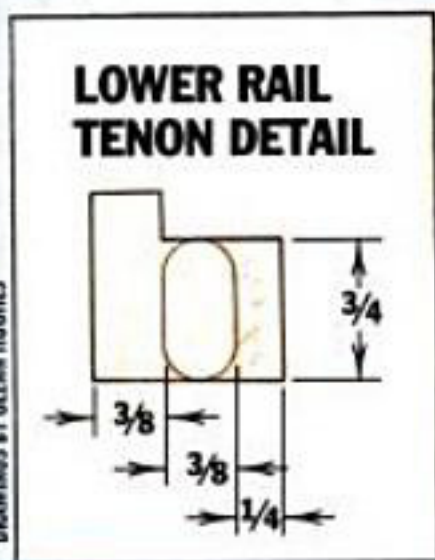
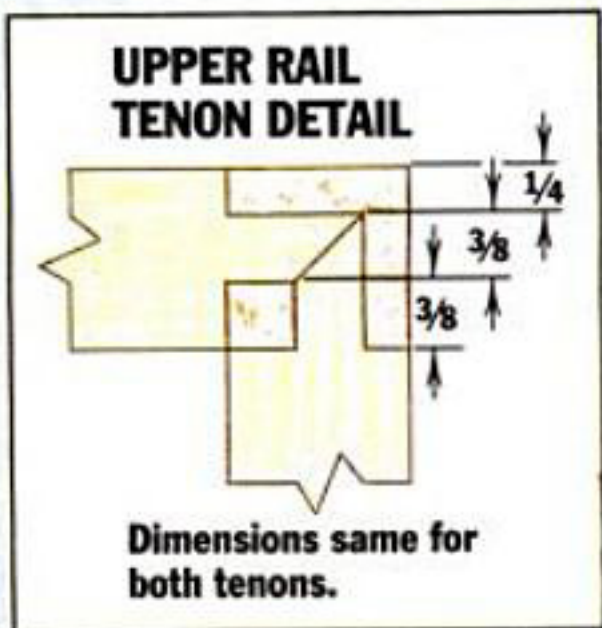
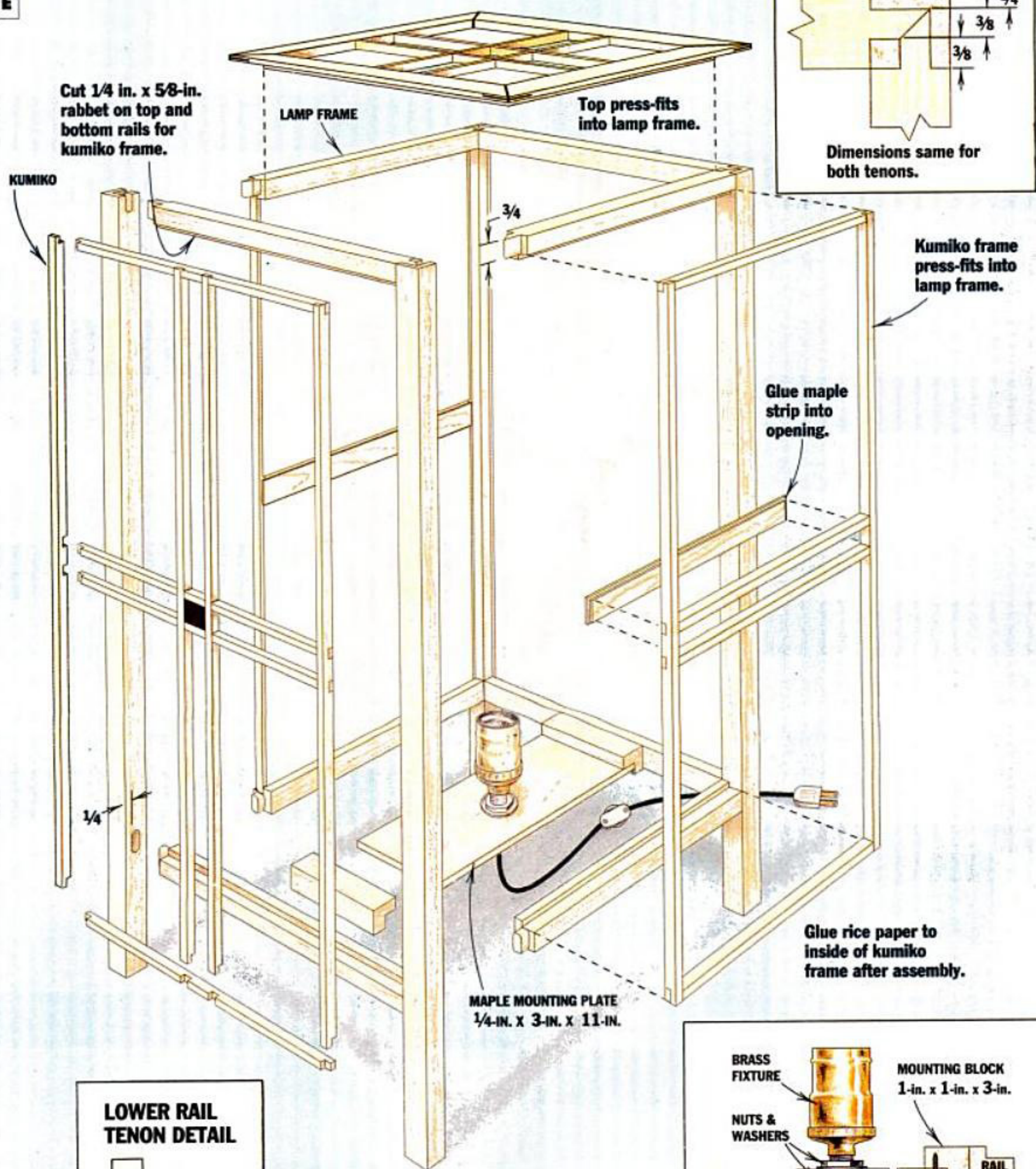
The thin latticework frame between the legs and rails is made of thin strips of wood, called *kumiko*. These interlock in half-lap joints where the vertical and horizontal strips cross and are held together with a drop of glue. The *kumiko* simply press-fit between the legs and rails, so they can easily be popped out if you need to replace the rice paper. Finally, the top is a separate mitered frame, that is reinforced and accented with splines and inlay.



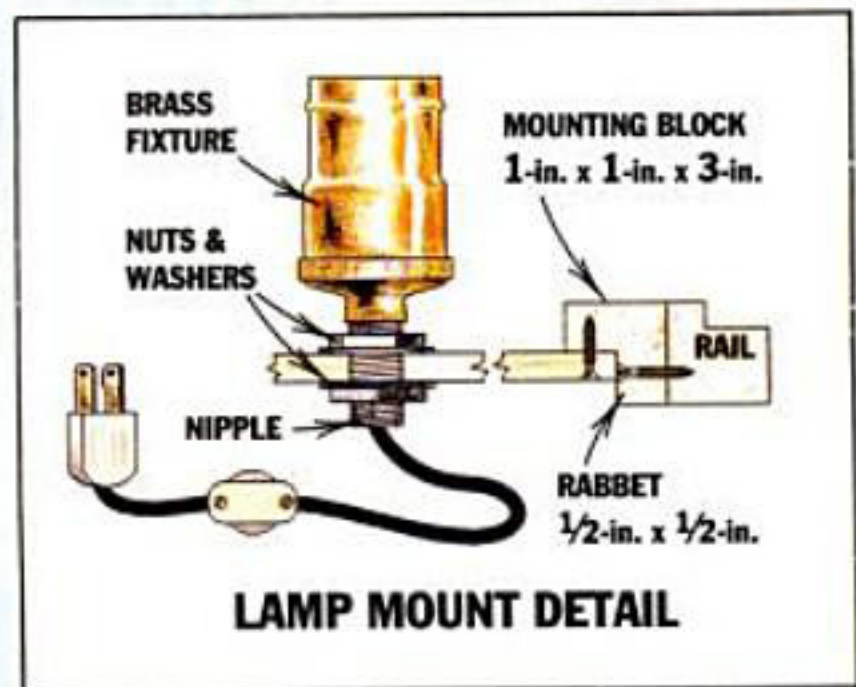
Lit by a simple incandescent bulb, this delicate paper-and-wood lamp produces a room full of ambience.

ANDREW CURLE

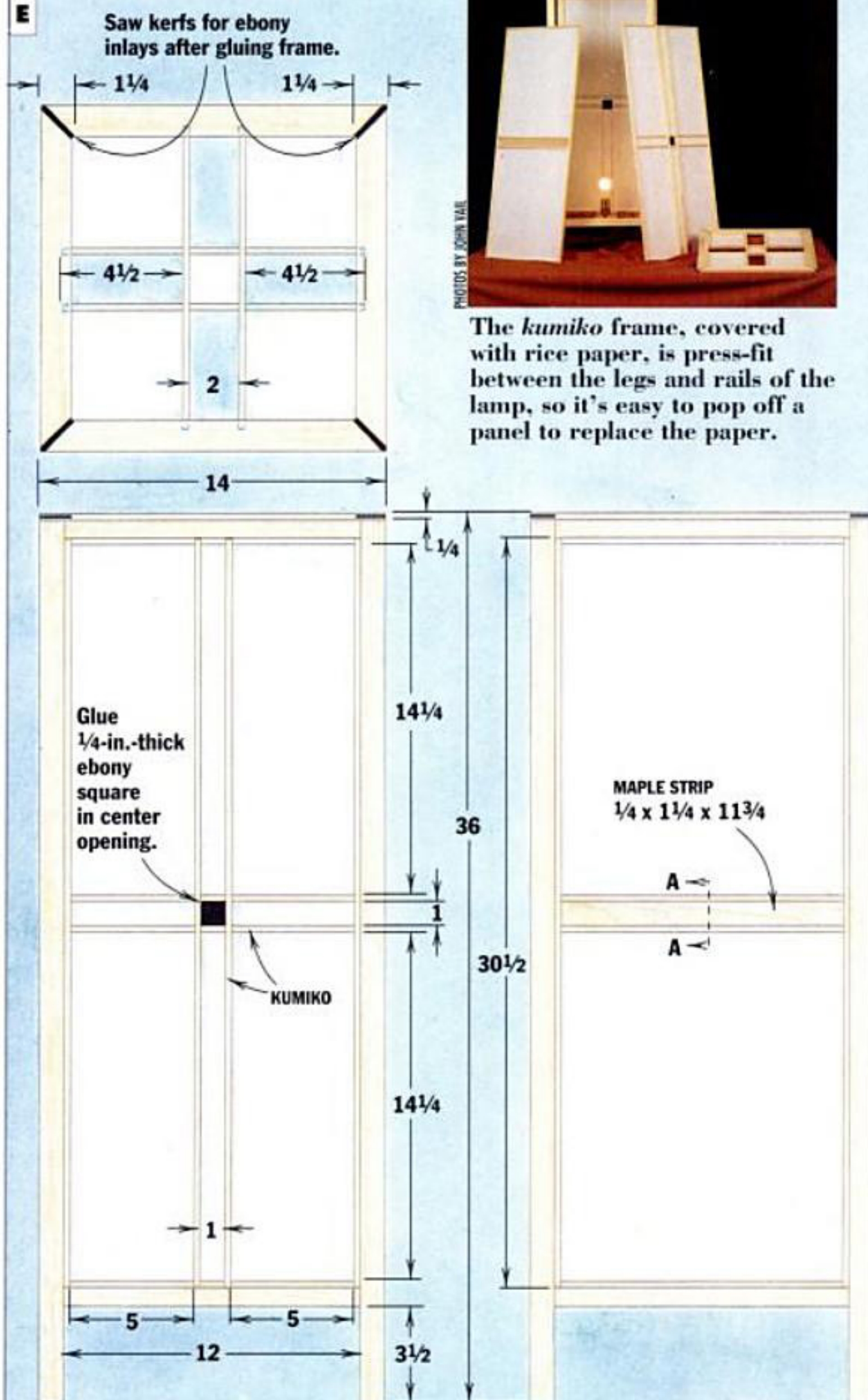
RICE-PAPER LAMP



DRAWINGS BY GLENN HUGHES



LAMP DIMENSIONS



Note: Legs and rails are 1-in. x 1-in.
Kumiko are 1/4-in. x 3/8-in.
Dimensions of kumiko frame are approximate. Size for press-fit.

Rabbet maple strip to fit opening between kumiko.

SECTION AA



The kumiko frame, covered with rice paper, is press-fit between the legs and rails of the lamp, so it's easy to pop off a panel to replace the paper.



To create a slight reveal between the frame and the kumiko, the author cut a 1/4-in. by 5/8-in. rabbet along the front of the rails.

It is important to be extremely precise in constructing all the parts. The inside surfaces must be flush so you can glue on the rice paper after the sides are assembled.

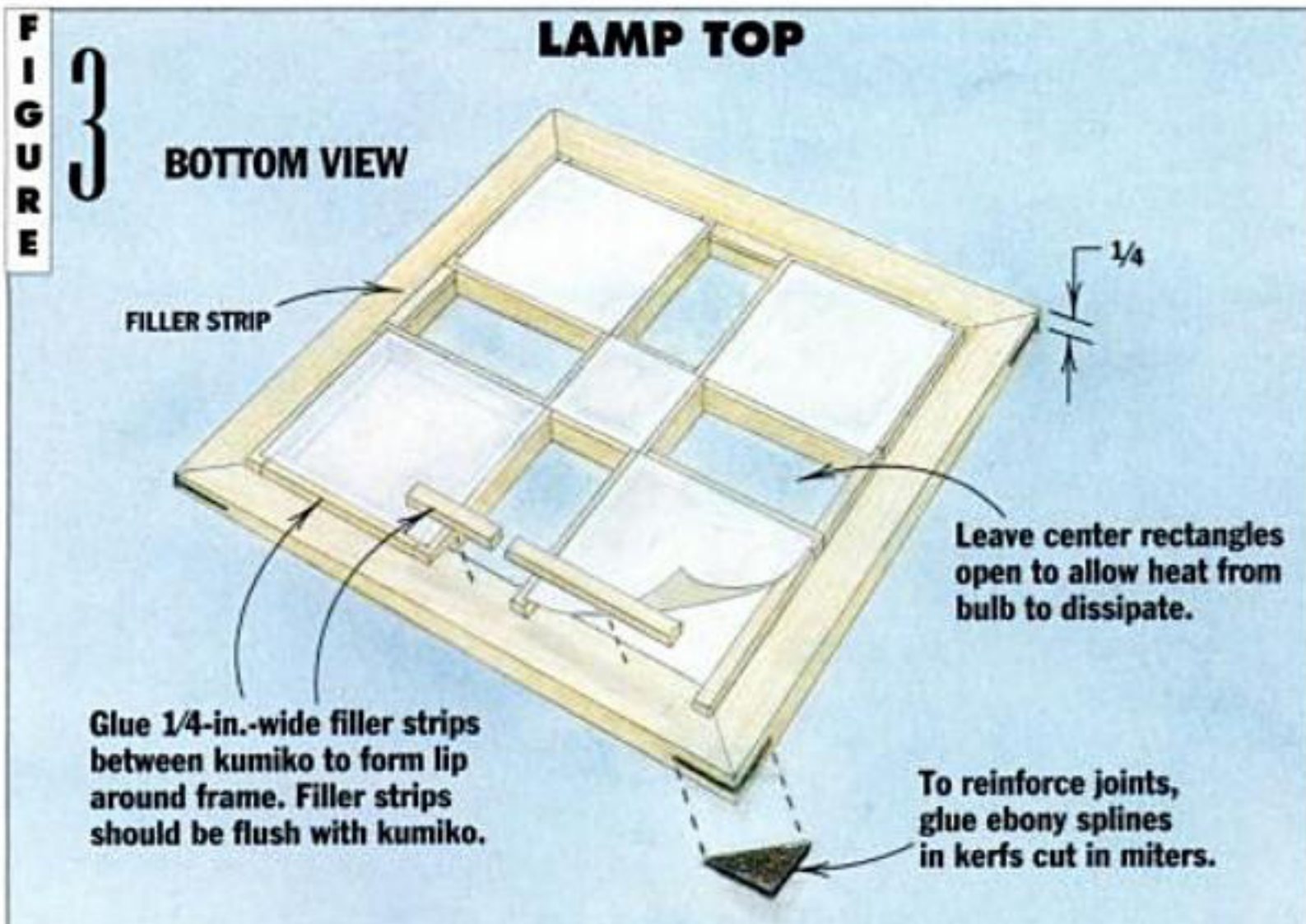
Two pieces of advice: First, if you decide to modify the size of the parts and the latticework patterns, remember, you have to cover the lamp with Japanese rice paper, which comes in a standard width of 11 in. The seams of the paper should overlap about the width of the kumiko. To make sure everything matches, buy your paper before deciding on the pattern and spacing of the kumiko.

Second, your design should consider how the lamp will be used. This lamp is not suitable for reading. Its purpose is to illuminate gently, creating a soft, warm ambience in a room. I'd avoid fluorescent bulbs, which are a bit too harsh for the paper.

Constructing the Lamp

I chose white pine for most of the parts, and added accents of maple and ebony. You could use any clear, straight-grained wood, but because the components are so delicate you should avoid stock with knots or other defects that weaken the wood. Also, be aware that darker woods will change the impact of the design by making the pieces look heavier than they are.

You should be able to get all the parts from an 8-ft. long 2x8 and a few board feet of 1-in. stock. Begin by ripping the legs and rails. Cut the pieces slightly oversize, then joint and plane them to 1-in. square. I ripped the stock



on a bandsaw to conserve wood. With small parts like this, two cuts with my tablesaw would have wasted enough wood to make one *kumiko*.

Next, cut the legs and rails to length on the tablesaw. I screwed an auxiliary fence to the miter gauge to support the long thin stock and clamped a stop block to the rip fence to ensure that matching pieces were exactly the same length.

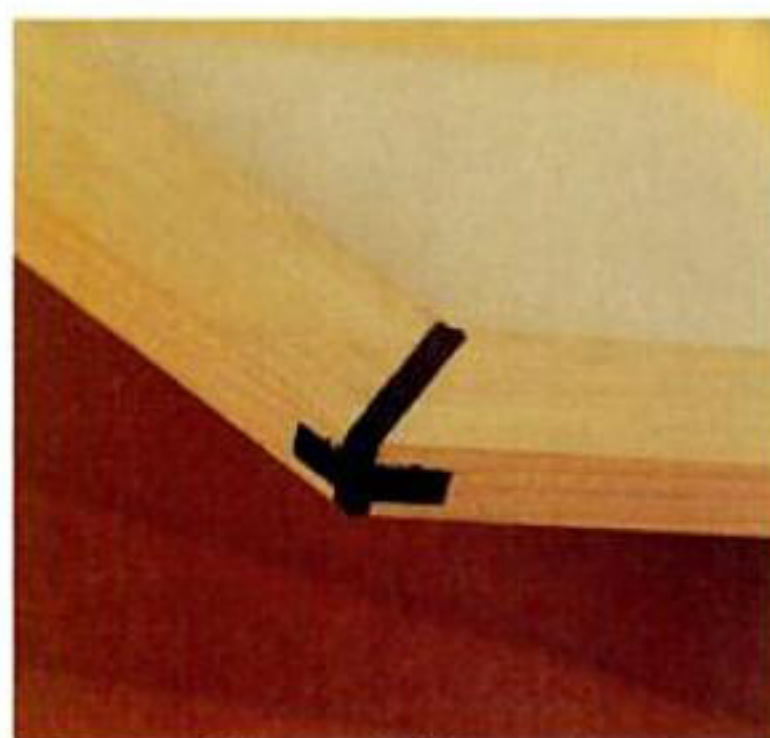
You might want to leave the legs a couple of inches longer than the final dimension, creating "horns" at the top. This extra stock minimizes the chances you will split the legs when you insert the rails; you can trim off the "horns" after assembly.

Cutting the Joints

After marking the mortises on the legs, you can drill out the waste with a 1/2-in. dia. Forstner bit chucked in the drill press. I cleaned up the cheeks of the mortise with a chisel, but didn't square the corners. I find it easier to round over the tenons to fit.

Next, rabbet the rails to create a slight reveal between the frame and the *kumiko*. (See photo, opposite page.) The thin *kumiko* tend to disappear visually if you leave them flush with the frame.

With this done you can cut the tenons and round the edges. Then dry-fit the frame together and measure diagonally corner to corner to check for squareness. If everything is OK, hand plane each piece, taking off the



Ebony splines reinforce the miters on the lamp's top. The ebony insert along the top of the miter is purely decorative.

slightest shaving with one or two passes. This burnishes the wood so it will reflect the light beautifully. This look of bare wood, planed glass smooth, is the perfect finish for me, though you might prefer to apply oil or some other finish. Just don't finish the back of the *kumiko* frames where the finish will interfere with gluing the paper.

The next step is to glue up the frame. Take great care here since applying too much clamping pressure can distort the frame. I find it best to glue up the two sides first, let them dry and then add the four remaining rails. While the glue dries I can start on the *kumiko*.

Making the Latticework

The *kumiko* frames are made from 1/4-in.-wide by 3/8-in.-deep strips that are

joined with lap joints. These frames should fit tightly between the legs and rails, so it's best to determine the dimensions by measuring the actual frame rather than relying on the drawing. Remember when determining the length of the vertical *kumiko*, measure between the faces of the rabbets, not between the rails.

I cut the *kumiko* strips to size in stages because this is the best way I've found to remove the saw marks from the thin strips and ensure that all the pieces are the same size. First, I joint one edge of a 3-ft. length of 2x8 and bandsaw off 1/2-in.-thick strips. Between each cut I rejoin my 2x8 so I'll have a square edge. I cut enough pieces to make all the components, plus a few extra for test-fitting and to cover any breakage. Then I plane each 1/2-in. piece to 3/8 in., the thickness of the *kumiko*, and bandsaw off 3/8-in. strips. Finally, I plane the newly sawn edge until the pieces are 1/4 in. wide.

After cutting the horizontal and vertical *kumiko* to length, I make the half-lap joints on the tablesaw with a 50-tooth carbide combination blade, which is 1/8 in. wide. This blade leaves a slightly convex kerf that is perfect for a drop of glue. You can use your miter gauge and fence to make this cut but be sure to attach a stop block to the fence and register your strips off it. If you butt the stock directly against the rip fence, you risk kickback.

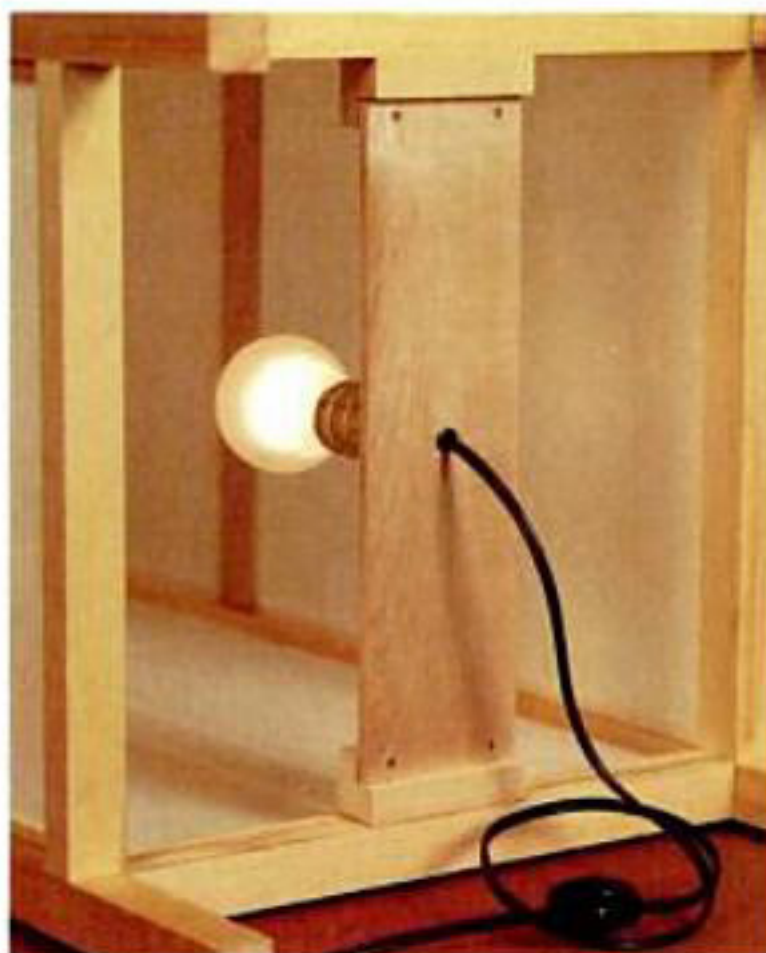
Before cutting all the half-lap joints, you might want to test-fit one pair of horizontal and vertical pieces to make sure they fit flush. Remember, you don't have to cut half-laps in the horizontal *kumiko* that go on the sides of the lamp frame because these don't have overlapping vertical strips.

After cutting all the laps, I make one final pass with a hand plane on the show face of each *kumiko*. From here on in, I handle the pieces with clean hands or cotton gloves to keep them pristine.

Assemble the *kumiko* latticework by putting one drop of glue on each lap joint and lightly clamping the pieces until the adhesive dries. Then, as an accent for the sides, cut maple inserts, rabbet them to fit between the side *kumiko* and glue them in place. (See Fig. 1.)



The light fixture attaches to a maple strip that is screwed to two rabbeted blocks. The blocks are screwed and glued to the rails.



The center openings on the front and back panels are fit with unrabbeted 1½-in. squares of ¼-in.-thick ebony. (See lead photo.) Trim the squares to fit and glue them in place.

You can now install the assembled *kumiko* latticework into the frame, although you may have to adjust the fit by trimming the *kumiko* frame slightly with a hand plane. It's a good idea to mark each *kumiko* frame for an individual side, front or back since the size may differ slightly. If they fit with very light friction, give yourself a pat on the back. If they are slightly loose, use a dab of wallpaper paste to glue them in place after they are papered. Also, you might consider permanently gluing ¼-in. filler strips to the legs to prevent light from leaking around the vertical *kumiko* as the frame contracts with heat and humidity. Don't get any glue on the *kumiko*, though, otherwise you'll have trouble removing the frames if you need to replace the paper.

Installing the Top

I put a top on my lamp to hide the end grain of the legs and create an attractive pattern that would project onto the ceiling when the light is turned on. If you design a top, leave open, unpapered areas to allow for air circulation and heat dissipation. Otherwise heat build-up may brown the paper.

My top is a mitered frame assembled from ¼-in. by 1½-in. stock, as shown in Fig. 3. I strengthen the frame by cutting a kerf at each miter and

installing ebony splines. (See AW #27, page 23 for more on splined miters.) The ebony inlays along the top and bottom of the miters are added after the frame is glued but before the *kumiko* are attached. After assembling the frame, I saw the grooves for the inlays on the tablesaw with the miter fence at 45° and the blade set for a ¼-in.-deep cut. Then I install inlays that are slightly proud of the surface, planing them flush after the glue dries.

I cut the *kumiko* as before, but rather than forming them into a frame I simply saw four 12-in.-long strips with half-laps on the ends and glue them to the underside of the mitered top, leaving them slightly proud of the surface. Then, to provide a "lip" so I can press-fit the top onto the lamp, I install filler strips in the space between the *kumiko*. (See Fig. 3.) The strips are ¼ in. wide and roughly ⅛ in. thick. Your goal is to make them fit flush with the *kumiko*. The strips also provide a gluing surface for the rice paper and prevent light from leaking along the inside edges of the top.

Wiring the Lamp

The light fixture inside the lamp is attached to a ¼-in. by 3-in. maple strip that stretches between the front and back lower rails. (See photo, above right.) The strip is screwed to two rabbeted blocks, and the blocks are screwed and glued to the rails. You'll need to drill a hole in the center of the ¼-in. strip to accept a threaded brass nipple that supports the socket. You

also may want to add a nut to each side of the nipple to help hold it tight.

Papering the Lamp

The paper I use for these lamps is regular shoji paper, which is made in Japan (available from Paper-YA, 9-10 1666 Jonston St., Granville Island, Vancouver, B.C. V6H 3S2, 604-684-2531, or Hida Tool and Hardware Inc., 1333 San Pablo Ave., Berkley, CA 94702, 510-524-3700). You can buy the paper plain or embellished with patterns, such as plum blossom or pine tree with clouds. Both types have a smooth and a rough side; for best light diffusion the smooth side of the paper should face the inside of the lamp.

To install the paper, cut pieces that are slightly oversize for your frame, then wipe the back of the *kumiko* with a damp, not wet, cloth and apply wallpaper paste or another starch-based adhesive. Make sure you clean any excess glue off the edges of the *kumiko* before applying the paper. Then align and press on the paper, working from the inside to outside edges and keeping it as taut as possible. Finally, very lightly mist the paper with water from a plant sprayer and set it aside for an hour or two. You should overlap adjoining edges by ⅜ in. so the seams don't show on the face. After the paper is dry, trim the edges with a razor blade.

If the paper ever tears or turns yellow, you can remoisten the paste and lift it off. Then it's easy to clean up any old glue and repaper.

This project can be a rewarding test of your skills, as the more precise you are the better the finished piece will look. When yours is done, turn off the other lights, pour a glass of wine and bask in the soft glow of light through rice paper. ▲



ANDREW CURLE is a professional woodworker in Ontario, Canada. For the next few years, he will be studying design and woodworking in Japan.



PHOTOS BY MITCH MANDEL

Leaves up, this traditional table seats eight people comfortably. Leaves down, it can stow against a wall to save space.

HARVEST TABLE

This Handsome Drop-Leaf Table is Fit for a Feast

BY MITCH MANDEL

Last fall, when we decided to host Thanksgiving dinner at our house, I found the perfect excuse to build the dining room table I've always wanted.

Because our dining room is small, the table had to be something I could easily fold up between meals. And I wanted a piece that would fit with the general Early-American style my wife and I like. I finally decided to adapt a Shaker drop-leaf design to produce a table that would seat eight comfort-

ably, yet stand neatly against a wall when the leaves were down.

This table features leaves with a classic rule joint and a traditional deep end drawer that I modified to incorporate a small secret compartment. (See Fig. 1.) You could alter my design to make a table that seats only six; however, I'd advise against narrowing the ends, or you might have trouble fitting a chair between the legs.

Harvest tables were often made of cherry, maple or even pine, but I made

mine out of walnut primarily because that's what I had in the basement. Also, my stock was mostly 5/4, but I've adjusted the Bill of Materials so the table can be made from 4/4 lumber.

Making the Legs and Aprons

Begin construction by thickening the stock for the legs, drawer rails and aprons, and cutting them to length. Then you can start the leg joints.

As the drawing shows, the legs at either side of the drawer have twin mortises for the bottom drawer rails and dovetail mortises for the top. To make the dovetail mortises, use the router table and a 1-in. dovetail bit raised $\frac{3}{4}$ in. above the table. Set the fence to center the cut on the end of the leg, then rout the mortise, making sure you cut just $\frac{3}{4}$ in. down the face of the leg. If you cut too far the bottom of the mortise will show when the drawer is removed.

With the router set at the same height, rout the dovetailed tenon on the top drawer rail by running each rail end vertically over the bit. (See photo.) The rail could kick back if fed between the bit and the fence, so for safety you should bury the bit in an auxiliary fence and use a backup block to keep the piece vertical. Also, to reduce the chance of tear-out, you'll want to make the cut in several shallow passes, moving the fence a little each time until you have a perfect fit. When you've finished the cuts, chisel the bottom corners of each dovetail tenon to fit the rounded bottom of the mortise.

For convenience, I made the mortises for the twin tenons $\frac{3}{4}$ in. deep as well. That way, the top and bottom rails would be the same length. You can cut these mortises on the drill press by using a fence clamped to the table to align the work and making lines of overlapping holes. Then clean up the sides and corners with chisels. Rather than bothering with complicated machine settings, I cut the matching twin tenons with a dovetail saw and chisel. You can use the drill press to rough out the six apron mortises, which are all 1 in. deep.

Now taper the two inside faces of each leg. I used the tablesaw and the variable taper jig described in AW #3, July/August 1988. (See photo, right.)

Next cut the tenons on the aprons by using a straight bit in the router and [a fence clamped to the work. \(See photo, page 46.\)](#) I used a handsaw to trim the narrow shoulders on the edges of each apron tenon.

You'll want to attach the top to the aprons in a way that allows it to expand and contract with changes in humidity. I used a center brace and corner braces that screw to the top and glue in a $\frac{1}{4}$ -in.-wide by $\frac{3}{8}$ -in.-deep groove along the inside edge of the aprons. (See Fig. 1.) This groove should be routed $\frac{1}{4}$ in. from the top of each apron and should stop before reaching the tenons.

When extended, the table leaves are supported by pivoting turnouts that are let into the table aprons. (See Fig. 1.) I cut these turnouts in several steps, first crosscutting the notches in the aprons with a handsaw, then using a jig saw to rip the notches to length. Finally, I cleaned the surface with a flush-trimming bit in the router. To guide the bit's bearing, I clamped a straightedge along my scribe line. I cleaned up the angled corners with a chisel, filed the fingerpulls in the notches and screwed the turnouts to the apron as shown in the drawing.

Don't attempt to glue up something as big as this table all at once. First, glue up the two narrow ends of the table frame, making sure everything is square, and let them dry overnight. Then glue the long aprons to the ends, remembering to add the middle cross



To avoid kickback while routing the top drawer rail, the author buried the router bit in an auxiliary fence (above), and used a backup block to keep the rail steady. At right, both inside faces of the legs are tapered using a shop-made adjustable-angle jig.

support before clamping. To clamp the nearly 6-ft. span along the table's long sides, I used threaded connectors and extra pipe to extend my pipe clamps. (See photo, page 47.)

After the clamps come off, you can add dowel pins to lock the tenons into the mortises. (See Fig. 1.) The corner braces further strengthen the frame and are easy to make. (See Fig. 2.)

Making and Hinging the Top

The tabletop overhangs the frame about 3 in. on each end and at least $\frac{11}{16}$ in. on each side. Check this last dimension—carefully—it ensures that the leaves hang properly. You'll want to carefully choose the color and grain of the wood for the top, keeping in mind how the table will look with the leaves open. Also, for the leaves to hinge smoothly, the stock must be perfectly flat and straight.

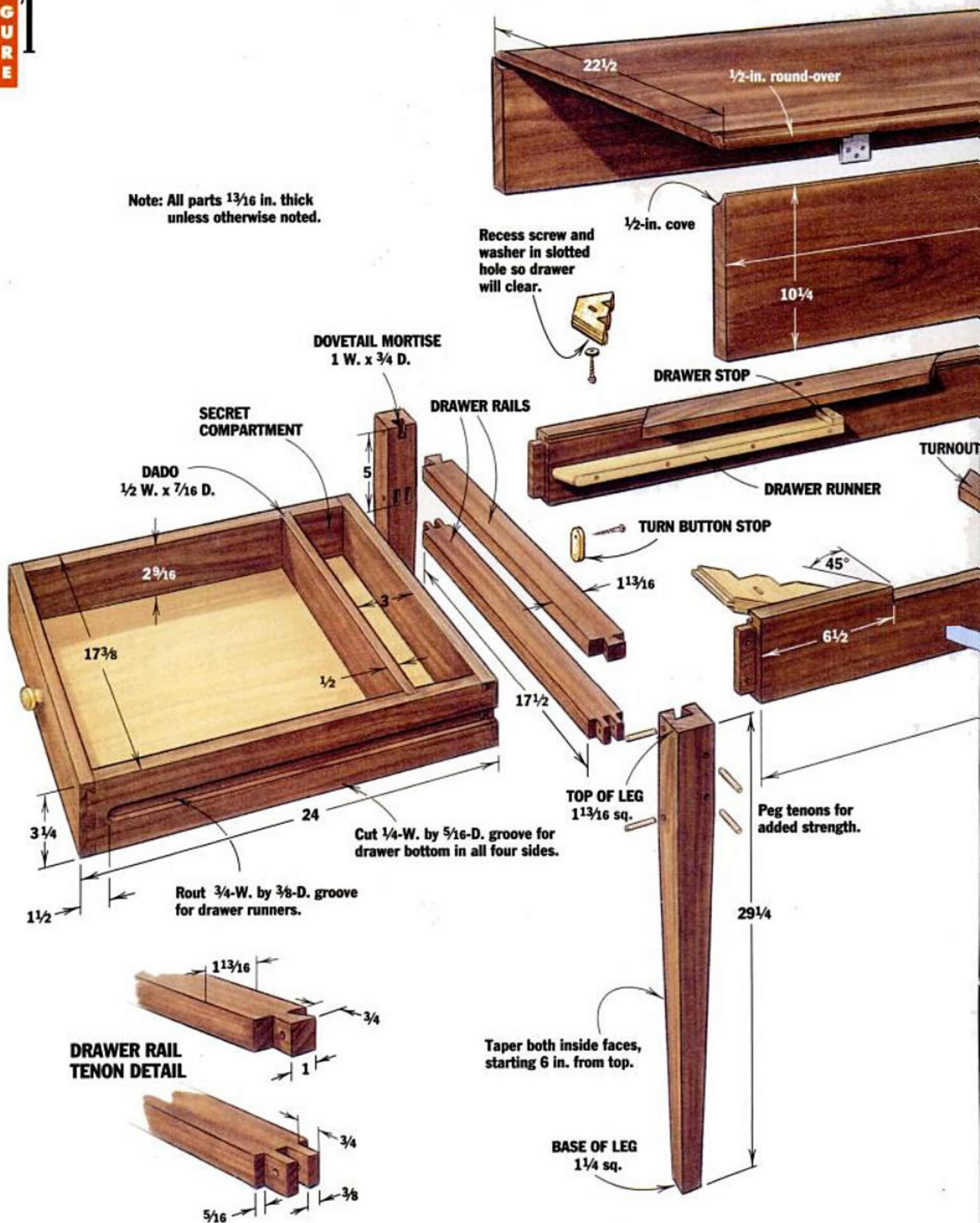
Assembling the top and leaves is straightforward. The only complex part is precisely fitting the rule joint (so called because it resembles the brass knuckle joint found on folding wooden rules). When the leaf is down, this joint conceals the hinges, and prevents an unsightly gap between the leaves and top. When the leaf is up, the rule joint helps support the leaf's weight.

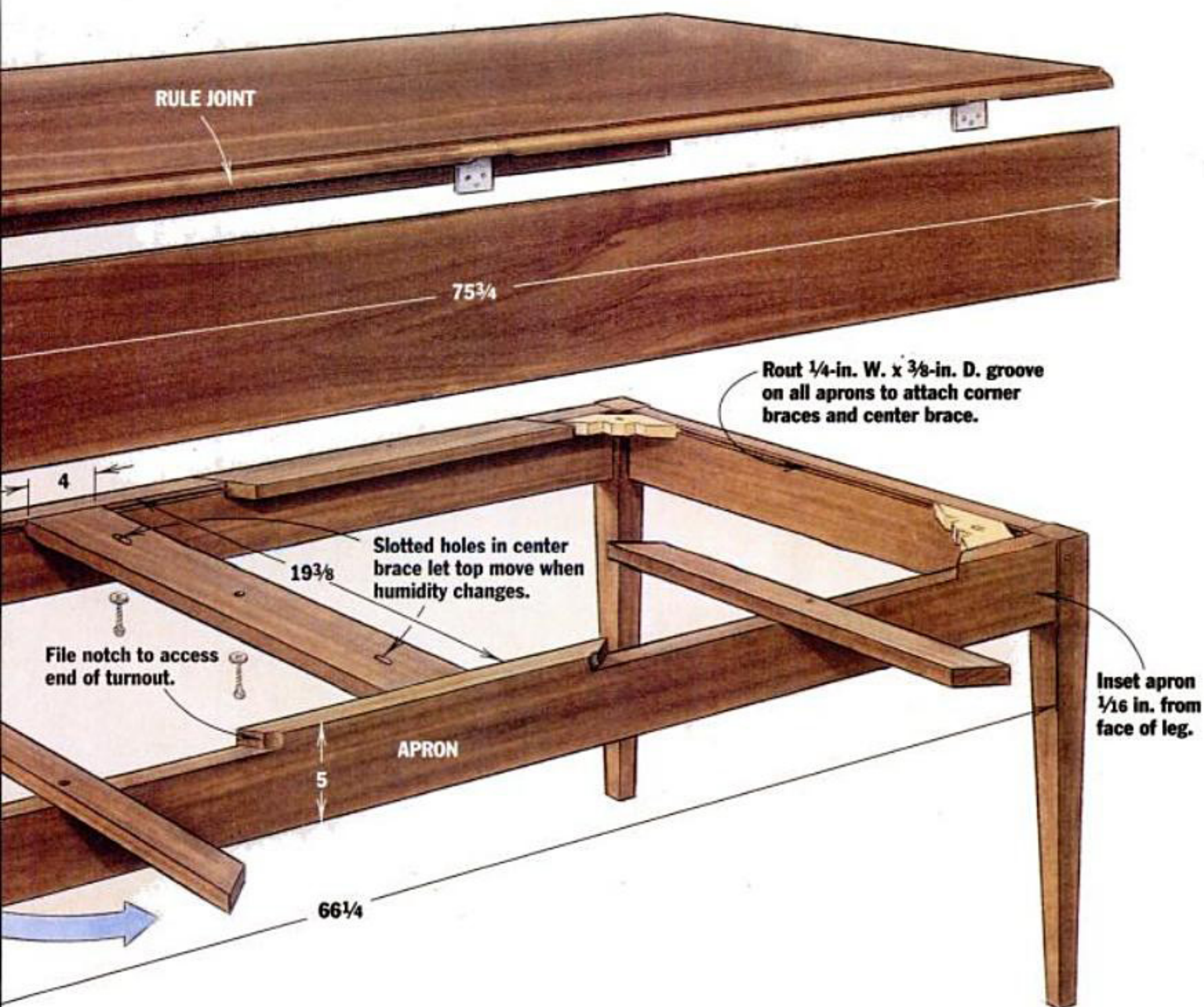
To make the joint, first use a $\frac{1}{2}$ -in. round-over bit, fitted with a pilot bearing, and rout the edge of the tabletop. Leave an $\frac{1}{8}$ -in. shoulder. (Before removing the bit, rout a piece of scrap to the same profile to use as a sanding block



HARVEST TABLE

Note: All parts $\frac{13}{16}$ in. thick unless otherwise noted.



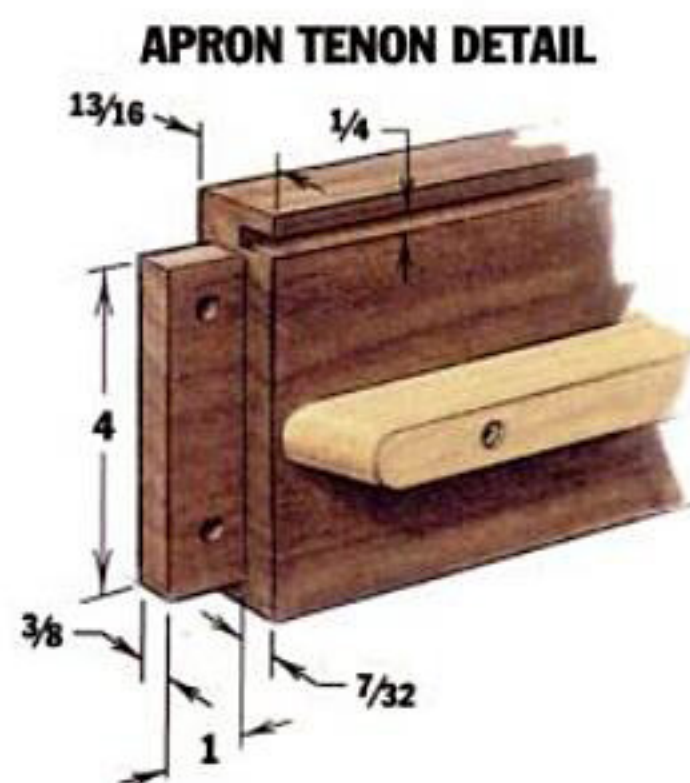


BILL OF MATERIALS

(dimensions include tenons)

PART	QTY.	DIMENSION
Legs	4	1 ¹³ / ₁₆ X 1 ¹³ / ₁₆ X 29 ¹ / ₄
Long Aprons	2	1 ³ / ₁₆ X 5 X 68 ¹ / ₄
Short Apron	1	1 ³ / ₁₆ X 5 X 19 ¹ / ₂
Drawer Rails	2	1 ³ / ₁₆ X 1 ¹³ / ₁₆ X 19
Center Support	1	1 ³ / ₁₆ X 4 X 20
Turnouts	4	1 ¹ / ₁₆ X 2 X 19 ¹ / ₂
Tabletop	1	1 ³ / ₁₆ X 22 ¹ / ₂ X 75 ³ / ₄
Table Leaves	2	1 ³ / ₁₆ X 10 ¹ / ₄ X 75 ³ / ₄
Drawer Front and Back	2	1 ³ / ₁₆ X 3 ¹ / ₄ X 17 ³ / ₈
Drawer Sides	2	1 ³ / ₁₆ X 3 ¹ / ₄ X 23 ¹ / ₄
Plywood Drawer Bottom	1	1/4 X 16 ¹ / ₄ X 22 ⁷ / ₈
Drawer Compartment Divider	1	1/2 X 2 ⁹ / ₁₆ X 16 ⁵ / ₈
Drawer Runners	2	3/4 X 1 ¹ / ₄ X 32 ¹ / ₂ *

*(includes extra length for fitting)



MAKING CORNER BRACES

STEP 1: Shape $\frac{1}{4}$ -in. tongue on edges of $\frac{3}{4}$ -in. plywood square.

STEP 2: Cut off corners to form braces.

STEP 3: Cut point off corner brace for clearance around leg, and notch brace for clamping.

for the mating edge.) Then use a block plane to round over the bottom edge of the tabletop to provide clearance for the folding table leaf.

Next rout a matching cove on the edge of the leaf, first testing the cut on a piece of scrap the same thickness as the leaf to ensure a perfect match. (Again, save the scrap for sanding.)

You'll need to use special rule joint hinges (available from Woodcraft, Box 1686, Parkersburg, WV 26102, 800-225-1153) to make the drop leaves work properly. You may also find these hinges at local hardware stores and lumberyards (Stanley lists them as "drop-leaf hinges"). While the geome-

try may vary somewhat from one brand of hinge to another, one leaf of the hinge is always longer, so the hinge knuckle can be set back from the table edge. (See photo, opposite page.)

The hinge pins must be located beneath the shoulder of the round-over, but offset $\frac{1}{32}$ in. toward the edge of the table. (See sidebar.) Carefully scribe the hinge pin locations, three per leaf, remembering to keep the hinges out of the path of the turnouts. Next, set the top and leaves upside down on the workbench with the hinge pins exactly over their marks and scribe the hinge mortises. You will have to rout or chisel the leaf mortises

and a secondary channel to accommodate both the leaf mortises and each protruding hinge knuckle. (See sidebar.) The depth of the mortises depends on the hinge design and the thickness of the stock.

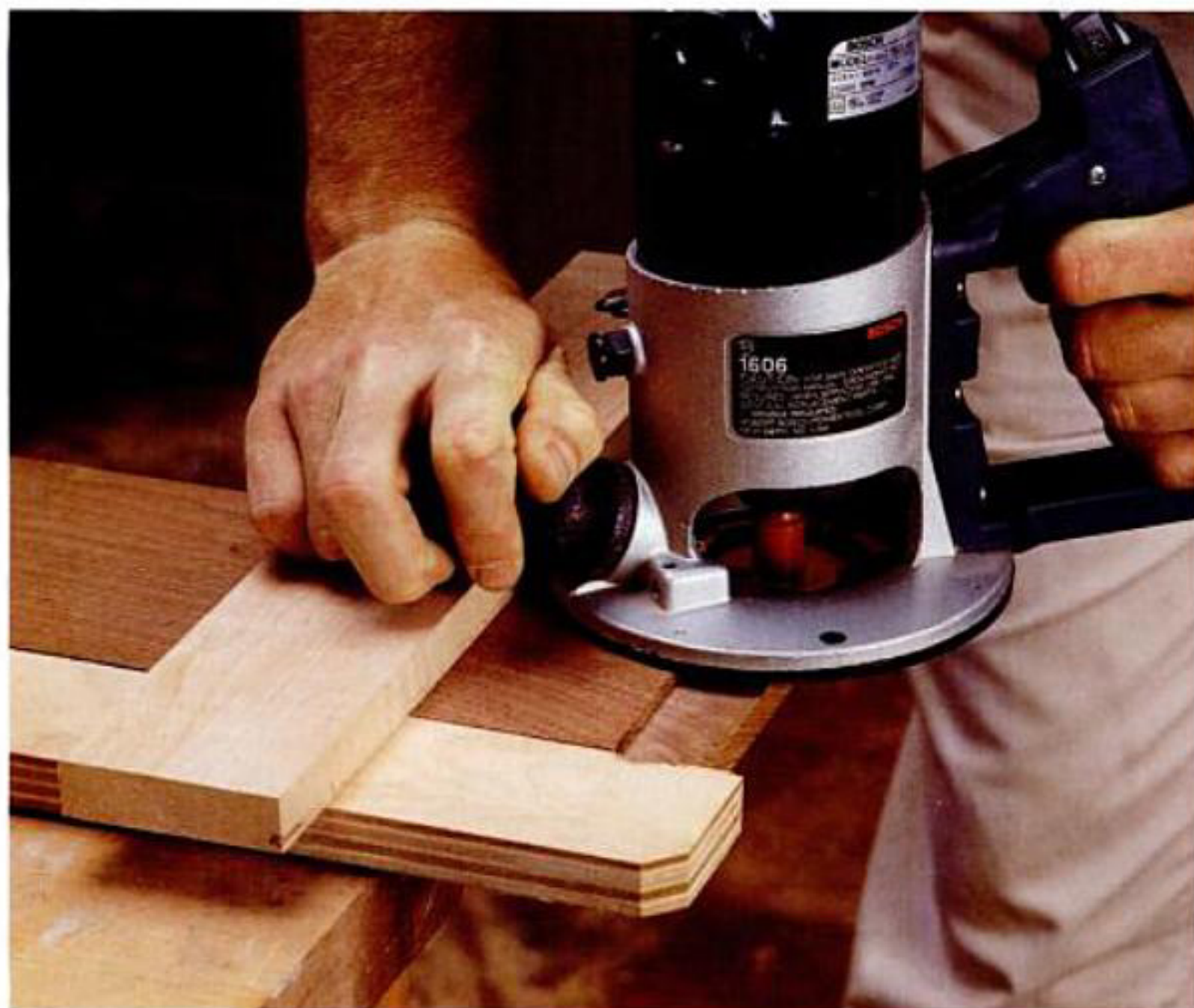
Set the hinges and check the action. If any spots rub, adjust the fit with a block plane or sandpaper. You want the leaf tight when it's up, but if it rubs now, it will really rub when the finish goes on.

The Drawer

The drawer for my table is held together with simple half-blind dovetails and has a plywood bottom. (See AW #23 and #24 for information on drawer design and construction.) I decided to give the drawer a little flair by adding a "secret" pocket behind a false back. This is easy to make. Just dado a false drawer back into the sides, about 3 in. from the real back of the drawer. (See Fig. 1.) Since the drawer is so long, no one will suspect anything unusual when the turn-button stop limits its travel to 20 in.

I hung my drawer on runners screwed to the aprons since another way of hanging drawers could have interfered with the turnouts. Doing this means you'll have to rout a $\frac{3}{4}$ -in.-wide by $\frac{3}{8}$ -in.-deep groove down the middle of each side of the finished drawer. Stop the groove $1\frac{1}{2}$ in. before the front edge of the drawer.

The runners' final dimensions are $\frac{3}{4}$ by $1\frac{1}{4}$ by $24\frac{1}{2}$, but the Bill of Materials shows them 8 in. longer than this to aid in positioning them. To fit them in place, put the drawer in the apron opening and clamp some temporary strips under the drawer to hold it



Rout the apron tenons with a straight bit and a right-angle fence clamped to the work.



The author used threaded connectors to extend his pipe clamps for long work.

steady. Then slide the over-long runners in from behind and mark their location on the aprons. The extra length allows you to hold the runners in position while removing the drawer and completing the marking.

Once they're marked, you can round the front edges to ease the entry of the drawer, trim the runners to length and screw them to the aprons with countersunk screws. Your runners should be long enough that you can attach a small block at the ends as drawer stops. You may have to plane the runners to get a good sliding fit. In any case, be sure to wax them and the channels.

Because my table would be exposed to heavy use and liquids, I finished it

with Waterlox (available from Woodworker's Supply, 1108 North Glenn Rd., Casper, WY 82601, 800-645-9292), which produces a hard and water-resistant coating. Then for a final crisp accent against the dark walnut, I chose a brass drawer pull, though the Shakers would have probably turned a wooden knob instead. ▲



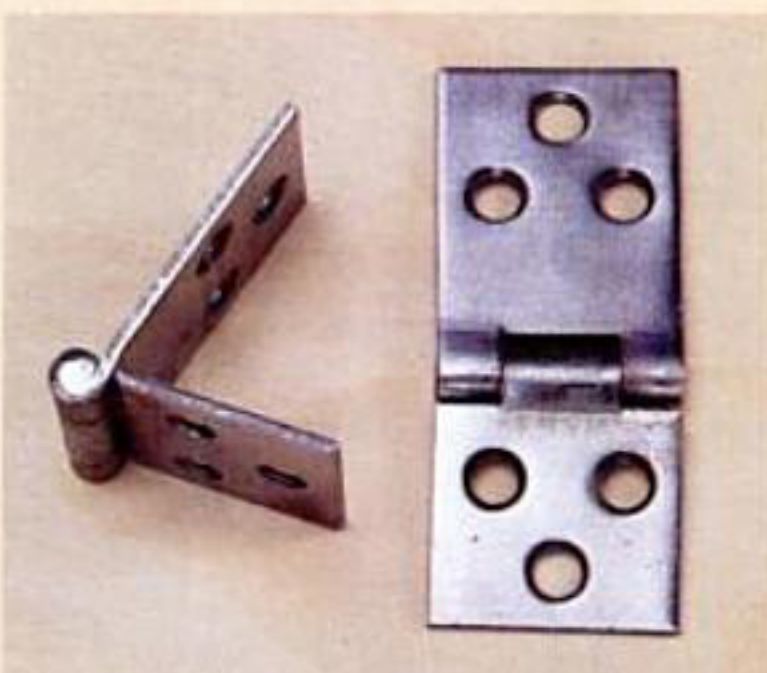
MITCH MANDEL
is a professional photographer and amateur woodworker in Pennsylvania.

INSTALLING RULE JOINT HINGES

When installing rule joint hinges it's important to precisely locate them; otherwise, the joint may bind or look sloppy.

In the "ideal" situation (A), you would set each hinge into the tabletop so its pivot point was exactly on the center of the joint. The leaf would be tight against the round-over throughout its travel and present no gap when down. However, in the real world, such a joint would bind because of wood movement and the thickness of the finish.

Craftsmen long ago found it's best to offset the hinge pin $\frac{1}{32}$ in. or so from the center of the joint, so it's closer to the edge of the tabletop. This causes the leaf to swing on an offset path (B) with two desirable results: First, as the leaf drops, clearance in the joint gradually increases to an amount equal to the offset. Second, the offset will increase the amount by which the



On rule joint hinges, one leaf is always longer, so the hinge knuckle can be set back from the table edge.

leaf tip overlaps the round-over, which helps cover the hinge mortises.

The last consideration is the depth of the mortise for the hinge leaves. You might be tempted to set them flush with the bottom of the table and the leaf. However, the correct location places the hinge pin as close as

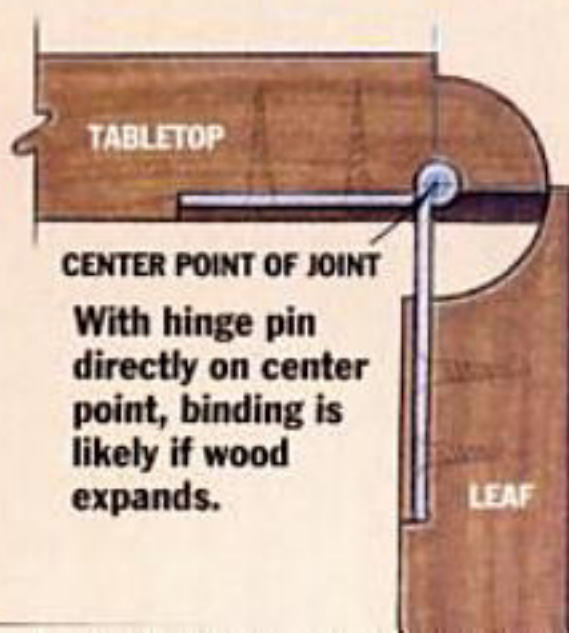
possible to the horizontal centerline of the joint, regardless of the thickness of the hinge leaves and stock.

To set your hinges, first find the center point of the rule joint. For a matched pair of $\frac{1}{2}$ -in. round-over and cove bits, this point will be $\frac{1}{2}$ in. below the shoulder line and $\frac{1}{2}$ in. back from the edge of the tabletop. Now scribe a line that is offset $\frac{1}{32}$ in. from the center and rout the pocket for the hinge knuckle so the pin is centered on the line.

Next set the hinge knuckle in its pocket, scribe around the hinge leaves, and set your router depth so the hinge pin will end up as close as possible to the horizontal centerline of the joint.

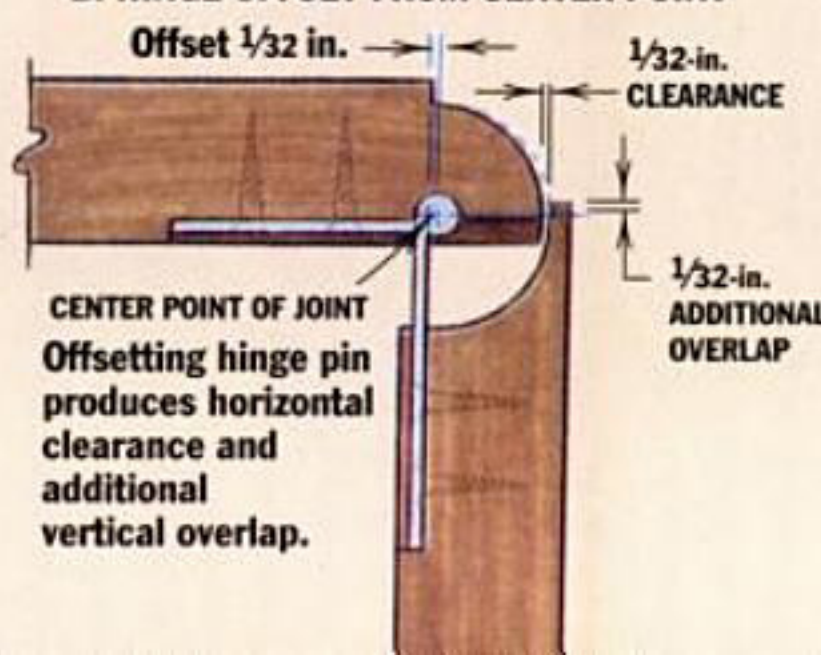
If the hinge is set too deep, the joint will bind and you will have to shim the hinges up higher. However, if the hinge is set too shallow (C), you will have an excessive gap when the leaf is down and you will lose some of the overlap.—M.M.

A. HINGE PIN SET ON CENTER POINT

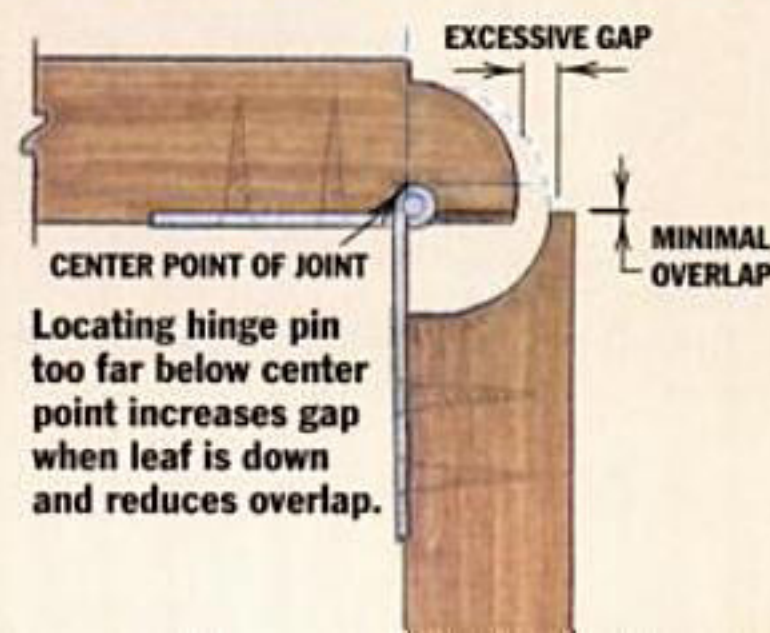


With hinge pin directly on center point, binding is likely if wood expands.

B. HINGE OFFSET FROM CENTER POINT



C. HINGE SET TOO FAR BELOW CENTER POINT



Locating hinge pin too far below center point increases gap when leaf is down and reduces overlap.

GRINDERS FOR SHARPENING

BY DAVID SLOAN

Cool-Running Systems That Won't Burn Your Tools

When an edge gets nicked or a bevel needs reshaping, a touch on the grinder sets things right in a hurry. Too much of a hurry sometimes. Things happen so fast that it's easy to mess up an edge if you don't pay attention. This is especially true with a typical high-speed bench grinder.

High-speed bench grinders aren't the best choice for sharpening delicate carbon-steel edge tools like plane irons, chisels and carving tools. Their dry, high-speed wheels grind so hot that it's easy to burn the edge.

Fortunately, there are gentler grinders designed specifically for

sharpening edge tools. Some are just low-speed bench grinders. Others feature water-cooled wheels that make it virtually impossible to overheat the edge. Some grinders use abrasive belts that grind a little cooler than a high-speed wheel. There are also hand grinders and a couple of hybrid machines that combine two types of grinders in a single machine.

For this article, I rounded up one or more grinders from each basic type. I tried them out in my shop and sharpened every woodworking tool I could find. In wasting all that steel, I formed some definite opinions about the pluses and drawbacks of each basic type. You may not agree with my conclusions (sharpening is, after all, a very subjective art) but my observations should help you decide which type of grinder best suits your sharpening needs.

Bench Grinders

Bench grinders are great for all-purpose metal grinding as well as some sharpening tasks. I use my bench grinder for sharpening high-speed steel turning tools as well as screwdrivers, center punches, cold chisels, lawn mower blades and the like. I don't risk my best blades on the bench grinder but I do grind my other woodworking tools. The trick is to keep the edge from getting hot—no small feat. I grind in light, quick, decisive passes and dip the tool in water after every pass. That's important, even with high-speed steel. High-speed steel can tolerate more heat than a carbon-steel tool but you still



Horizontal, water-cooled grinders produce a flat bevel and a superior edge. Counterclockwise from rear: the Makita comes with a jig for grinding planer and jointer knives, an option on the Matsunaga grinder, Woodcraft's combo has a high-speed wheel for rough grinding, the Rakuda sports a sheet-steel housing instead of plastic.

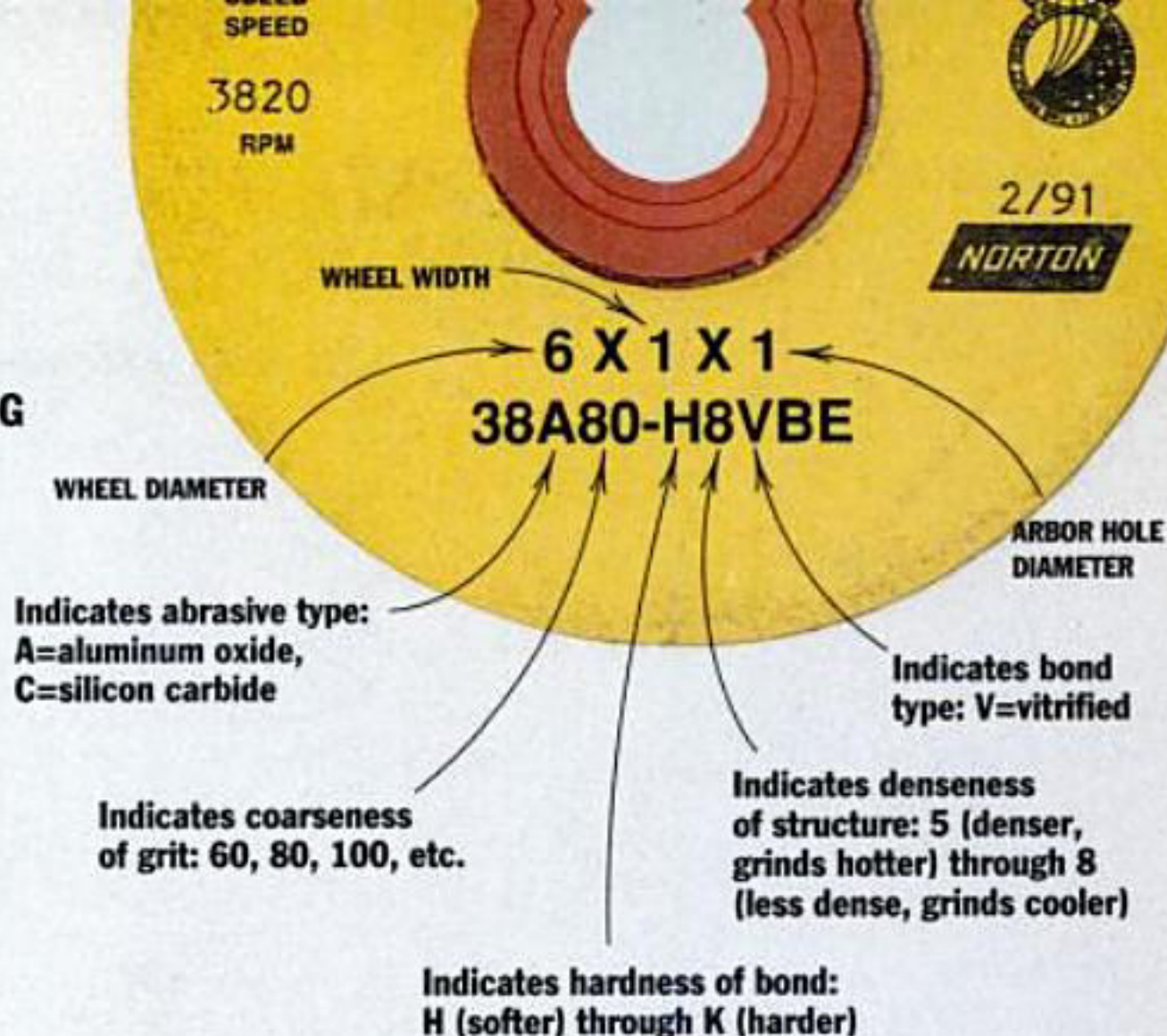
COOL WHEELS

On a dry bench grinder, the type of wheel you use is nearly as important as your grinding technique for keeping the edge cool. The gray silicon-carbide wheels that come standard on most bench grinders are fine for grinding mild steel but they're too hard and dense for tempered edge tools—they grind too hot. Aluminum-oxide wheels are a better choice for grinding tool steel.

Aluminum-oxide wheels come in many different grits, hardnesses and densities. A soft wheel with an open grain structure gives the coolest grind. Grinding wheels are marked with a code that tells you all you need to know about the abrasive, grit, hardness, structure (density) and bond type.

Aluminum-oxide wheels can be gray, white or pink in color. The white and pink wheels are more "friable" than the gray wheels—that is, the abrasive grains fracture more readily. This results in a cooler grind. It also means the wheel will wear down more quickly, but that's a small price to pay for staying cool.—D.S.

KEY TO GRINDING WHEEL CODES



can burn the edge if you aren't careful.

I keep two white, aluminum-oxide wheels on my grinder. Both are soft "H" grade wheel grinders. (See sidebar, above.) For light finish grinding I like a 100-grit wheel. For coarser grinding and sharpening lathe tools I use an 80-grit wheel.

Most high-speed grinders barrel along at 3450 rpm—faster than you need for sharpening. Highland Hardware and Garrett Wade sell an 1800 rpm Baldor bench grinder that goes slow and easy by comparison. It's built like a tank and has nice tool rests. Fitted out with a couple of aluminum-oxide wheels, you can't find a cooler-running dry-wheel grinder. Delta makes a 1720 rpm grinder but the rim speed of its 10-in.-dia. wheels is 60 percent faster than the Baldor.

One final advantage to owning a bench grinder: If you like to buff your edge tools instead of hone them you can mount a felt, leather or rubber buffing wheel on one side of your grinder. Always buff with the wheel rotating *away* from the edge—just the opposite of the way you grind.

While I'm on the subject of safety—never run a grinder without the guards in place. Cracked or defective wheels can shatter and cause serious injury—

even death. I always let my grinder run for half a minute before standing in the line of fire.

Hand Grinders—Hand grinders aren't as popular as they were years ago but they still have their devotees. Chief among them is James Krenov, noted furnituremaker, author and teacher at the College of the Redwoods in Fort Bragg, California.

Garrett Wade is the only mail-order company I could find that still carries a hand grinder in their catalog. While the slow-spinning wheel doesn't generate much heat, I found the tiny tool rest inadequate for supporting the tool with one hand while I cranked with the other. In his excellent book, *The Fine Art of Cabinetmaking* (1977, reprinted in 1992 by Sterling Publishing Co. Inc., 387 Park Ave. S., New York, NY 10016), Krenov shows how to make a wooden tool rest that supports the tool well enough that you can control it with one hand.

Water-Cooled Grinders

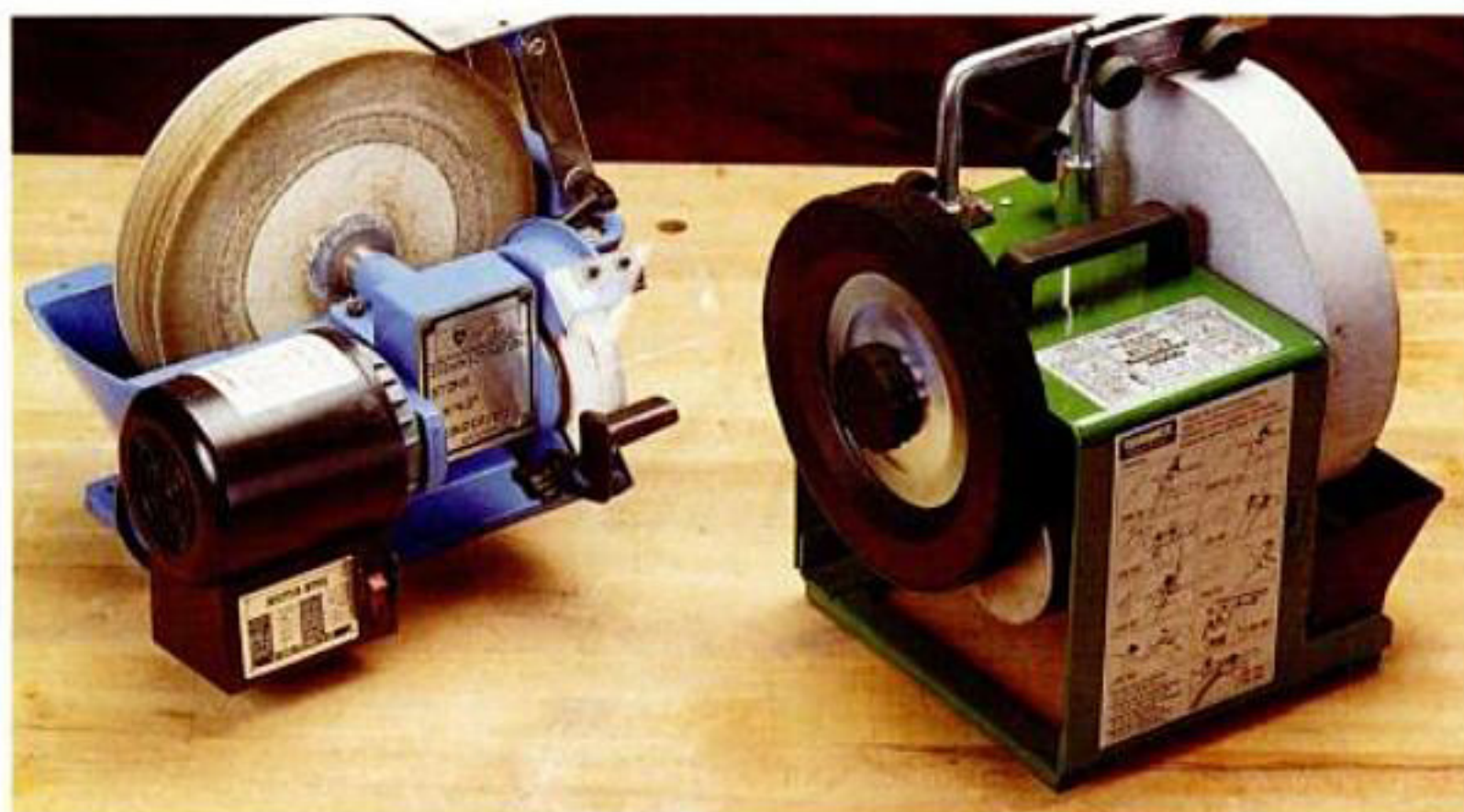
If the tool edge stays wet, it can't overheat. It's as simple as that. Water-cooled grinders fall into two basic types: those with a vertical wheel that turns in a water-filled trough and those with a horizontal wheel and an over-



Most bench grinders run at 3450 rpm—faster than you want for grinding edge tools. This Baldor grinder from Highland Hardware turns at a leisurely 1800 rpm so it grinds a lot cooler than a high-speed machine.

head reservoir that drips water down onto the stone. The abrasives, too, are different. The vertical wheels are usually medium-grit aluminum oxide. The horizontal wheels are made from the same fine reddish-brown abrasive as a 1,000-grit Japanese water stone.

Either type of water-cooled grinder will do a good job without any risk of burning the edge. The vertical wheels produce a hollow-ground bevel which some people prefer because it's faster to hone. The horizontal wheels produce a flat bevel which some people like because it's stronger than a hollow-ground bevel.



Combination grinders like this one from Grizzly (left) have both a water-cooled wheel for finish work and a high-speed wheel for rough grinding. Available later this year, the pricey Tormek SuperGrind 2000 (right) has a water-cooled grinding wheel and a leather buffing wheel for honing. Optional jigs sharpen everything from planer knives to scissors.

Horizontal Grinders—

Most of these grinders are made in Japan, where traditionally a flat bevel is preferred for plane irons and chisels. The slow-spinning, water-cooled wheel produces a highly polished bevel, just like a regular Japanese water stone. All four grinders I tried were fitted with a 1,000-grit wheel. Coarser and finer wheels are sold as accessories as are steel lapping plates for flattening the backs of blades.

I've been sharpening on water stones for years so I immediately felt right at home with the cool, slippery slurry these stones produced. Mastering these grinders, however, took a little practice.

The tool rest on the grinders I tried is simply a flat metal bar above the wheel. You adjust the rest to the bevel angle you want and support the tool on the rest. Sounds pretty easy but I found it difficult, at first, to keep the bevel flat and the cutting edge square. I'd grind for a few seconds then pick up the tool to check my progress. When I put the tool back on the stone, I could never get the bevel angle *exactly* the same. Result? A faceted bevel.

After an hour or so, I finally got the hang of it. I learned to grip the tool firmly and use the index finger of my gripping hand as a fulcrum against the



Abrasive belt grinders dissipate heat quickly so you're less likely to burn an edge. Shown here is Delta's 1-in. grinder (right) and a combination grinder from AMT (left).

back of the tool rest to pivot the bevel down onto the wheel. As long as I didn't shift my grip on the tool, I could repeat the same angle again and again. I even tried grinding tools freehand, without the rest, and found that that worked pretty well. I could get my fingers right near the edge for really good control on small tools.

Aside from their gentleness, the thing I like best about the horizontal grinders is that the edge they produce is so highly polished. With practice, I was able to go straight from the grinder to my 6,000-grit water stone. Every other type of grinder I tried required some work on my 1,000-grit water stone first.

The four grinders I tried were all very similar and frankly, I couldn't find any difference in the way they per-

formed except that the Woodcraft combination grinder had a bump in the stone. The Makita Blade Sharpener, however, comes with a jig for grinding planer and jointer knives—a really big plus in my book. A similar jig is available as an option for the Matsunaga grinder from Garrett Wade and Woodcraft.

Drawbacks? Not many. You have to keep refilling the water reservoir. The stones are soft and wear quickly, especially if you sharpen lots of narrow chisels or carving tools. The stones are easy to reflaten by holding a coarse diamond stone or silicon carbide stone on the spinning wheel. You can also rub the wheel on a wet concrete floor with some silicon carbide powder or sand. The standard 1,000-grit stones aren't designed for rough grinding. If you want more versatility, you can buy a coarser wheel for rough work or check out Woodcraft's hybrid machine. It has both a dry, high-speed wheel for rough grinding and a horizontal water stone for fine work. (See [photo, page 48.](#))

Vertical Grinders—This type of water-cooled grinder is great for all sharpening tasks: plane irons, chisels, drill bits, lathe tools, carving tools, knives—you name it. The slow-running aluminum-oxide or silicon-carbide wheels are hard enough that they don't wear quickly and they can be dressed with a wheel dresser if they get out of shape.

The most common vertical, water-cooled grinder is a Taiwan-produced hybrid. It sports two grinding wheels that run off the same motor: a 10-in.-dia. slow-speed, water-cooled aluminum-oxide wheel and a small, high-speed dry wheel. That big water-cooled wheel is a dream. Similar (but not identical) machines are imported by Delta, Grizzly, Trendlines and a few other companies.

One water-cooled grinder I've had my eye on for a while is the Tormek SuperGrind 2000, a "sharpening system" I've seen advertised in some of the British woodworking magazines. Made in Sweden, the Tormek isn't yet available in North America, but since Tormek expects to enter the North American market in mid-1993, we borrowed one to try out in our shop.

SOURCES

To request information, circle number on product information form.

Low-speed bench grinders are available from Baldor and Delta dealers and by mail from:

- ▶ **GARRETT WADE CO.**, 161 Ave. of the Americas, New York, NY 10013, (800) 221-2942. CIRCLE #611
- ▶ **HIGHLAND HARDWARE**, 1045 N. Highland Ave., Atlanta, GA 30306, (800) 241-6748. CIRCLE #612
- ▶ **TARHEEL FILING CO. INC.**, 3400 Lake Woodard Dr., Raleigh, NC 27604, (800) 322-6641. CIRCLE #615
- ▶ **TOOL CRIB OF THE NORTH**, Box 1716, Grand Forks, ND 58206, (800) 358-3096. CIRCLE #616

Abrasive belt grinders are available from Delta dealers and by mail from:

- ▶ **AMT**, Fourth Avenue and Spring Street, Royersford, PA 19468, (800) 435-3279. CIRCLE #621
- ▶ **TARHEEL FILING CO.**, (800) 322-6641. CIRCLE #615
- ▶ **TOOL CRIB OF THE NORTH**, (800) 358-3096. CIRCLE #616

Horizontal water-cooled grinders are available by mail from:

- ▶ **GARRETT WADE CO.**, (800) 221-2942. CIRCLE #611
- ▶ **HIGHLAND HARDWARE**, (800) 241-6748. CIRCLE #612
- ▶ **THE JAPAN WOODWORKER**, 1731 Clement Ave., Alameda, CA 94501, (800) 537-7820. CIRCLE #617

- ▶ **TRENDLINES**, 375 Beacham St., Chelsea, MA 02150, (800) 767-9999. CIRCLE #618

- ▶ **WOODCRAFT SUPPLY CO.**, 210 Wood County Industrial Park, Box 1686, Parkersburg, WV 26102, (800) 225-1153. CIRCLE #614

White aluminum-oxide grinding wheels are available by mail from:

- ▶ **GARRETT WADE CO.**, (800) 221-2942. CIRCLE #611
- ▶ **GRIZZLY IMPORTS INC.**, Box 2069 Bellingham, WA 98227, (800) 541-5537. CIRCLE #619
- ▶ **HIGHLAND HARDWARE**, (800) 241-6748. CIRCLE #612
- ▶ **LEE VALLEY TOOLS LTD.**, 1080 Morrison Dr., Ottawa, Ontario K2H 8K7, (613) 596-0350. CIRCLE #613
- ▶ **MSC INDUSTRIAL SUPPLY CO.**, 151 Sunnyside Blvd., Plainview, NY 11803, (800) 888-7270. CIRCLE #620

Combination wet/dry grinders are available from Delta dealers and by mail from:

- ▶ **AMT**, (800) 435-3279. CIRCLE #621
- ▶ **GRIZZLY IMPORTS INC.**, (800) 541-5537. CIRCLE #619
- ▶ **TARHEEL FILING CO.**, (800) 322-6641. CIRCLE #615
- ▶ **TOOL CRIB OF THE NORTH**, (800) 358-3096. CIRCLE #616
- ▶ **WOODCRAFT SUPPLY CO.**, (800) 225-1153. CIRCLE #614

For information about the Tormek SuperGrind 2000, CIRCLE #622.

The Tormek grinder features a slow-speed, water-cooled, 250mm-dia. (10 in.) aluminum-oxide wheel on one side and a leather buffing wheel on the other for honing off the wire edge from the grinder. A host of clever sharpening jigs and accessories (most of them optional) let you sharpen nearly any edge tool including planer knives, scissors and lathe tools.

The Tormek SuperGrind 2000 will sell for around \$400 in the United States. A lower-priced model, the SuperGrind 1200 has the same features as the 2000, but with smaller wheels and a housing made of ABS

plastic instead of steel. It will sell for around \$225.

Abrasive Belt Grinders

Abrasive belt grinders dissipate heat quickly so you're a little less likely to burn the edge on your tools. The best belt sharpening system I ever used was the Woodcraft Mark II which is, unfortunately, no longer made. Maybe Woodcraft will bring it back someday—it was an excellent machine.

The belt grinders that are on the market today are general-purpose sander/grinders that can do double duty for sharpening tools (I use a 60-

grit aluminum-oxide belt). They're especially handy for sharpening lathe tools. No abrasive belt grinder that I know of can produce a shallow hollow-ground bevel like the Mark II could, but any belt grinder makes a decent flat bevel.

I tried out the Delta 1-in. belt grinder (Model 31-050) and a 2-in.-wide belt/wheel combination machine from AMT. The Delta was handy for sharpening carving tools and lathe tools but it wouldn't be my first choice for plane irons and chisels. The AMT grinder is a little more versatile but the flimsy plastic guard on the grinding wheel wouldn't last a week in my shop. Its belt grinder works in two positions, vertical or horizontal—a handy feature. Delta makes a similar belt/wheel combination machine (Model 23-675) with better fit and finish.

Summing Up

Choosing a grinder is more a matter of habit and preference than anything else. You can sharpen your tools just fine on any of the grinders mentioned, but here are some factors to consider.

If versatility is important, check out one of the low-speed bench grinders or a combination machine with a wet wheel and a high-speed wheel. If money's no object, you might also consider the Tormek when it comes on the market later this year. It's an expensive machine but if you add all the optional accessories, it's the most versatile sharpening system around.

The horizontal water stones are more specialized. They produce a truly superior edge, but they aren't very handy for all-purpose grinding. Any one of these grinders will do the job fine but I prefer the Makita Blade Sharpener. It's priced right (around \$220) and it comes standard with a jig for sharpening planer and jointer knives up to 16 in. long. ▲



DAVID SLOAN
is editor and publisher of AW.



You don't need costly equipment to take photos that will attract the attention of contest judges. With an inexpensive camera and some very basic lights you can produce sharp photos like the one at right in a setting as simple as a garage (above).



You Don't Have to be an Expert to Take Professional-Quality Shots

PHOTOGRAPHING — YOUR WORK —

BY MITCH MANDEL

I have a friend named Rick who's a top-flight cabinetmaker. His joinery is tight and he's got a good sense of design. What he *doesn't* know is how to photograph his work when it's done. Invariably, Rick's photos look like a) he sneezed at the exact moment he snapped the picture, b) he shot the piece inside a dark cave, or c) the electric cords and wall hangings in his house lie in wait, ready to jump into

the photo frame as he takes each shot.

In truth, Rick ends up with poor photos because he doesn't take the time to plan them. Like many woodworkers, he doesn't realize he needs to give the same amount of thought and consideration to his photos as he does to the furniture he builds.

The Importance of Good Photos

High-quality photographs may not

seem that important, but they're essential if you want to enter your work and design ideas in contests or submit them to galleries, juried shows and magazines. Few magazines will publish a poor-quality photo. And all other things being equal, the better-photographed piece will always be the one that wins the prize. For professional woodworkers, good photo portfolios are even more important. They're

investments that will pay off in new commissions.

Fortunately, you needn't be a professional photographer or have thousands of dollars worth of cameras and lenses to do your work justice. You can produce good photos with simple equipment if you gain an understanding of some basic photographic principles and plan properly.

Basic Equipment

At the heart of every good photo is a good camera. It doesn't have to be expensive or have all the bells and whistles the new electronic models have, but it should be a 35mm SLR (single lens reflex). And you must be able to manually adjust the focus, shutter speed and aperture.

What focus and shutter speed control is self-evident, but not everyone understands how aperture works. Aperture is the opening in the lens diaphragm through which light passes before it strikes the film. The size of the opening is indicated by "F" numbers, and the higher the number, like F16 or F22, the smaller the opening.

Aperture is important for two reasons: It lets you control the amount of light for correct exposures and it controls your depth-of-field, or the portion of the photo that is sharply in focus. (See photos, above.) A small aperture will produce a better depth-of-field than a larger one, but since it lets in less light it will take longer to correctly expose the film. It may take four or five seconds to get a correct exposure at F16, for example. But this isn't a problem if you mount your camera on a tripod. As a rule, shoot with a small aperture (high number), even if it means using a slow shutter speed and a tripod.

Your camera should also be able to accept a variety of lenses. For most applications either a standard 50mm lens, a macro, which allows you to keep objects in focus even when the lens is very close to them, or a 35mm to 70mm zoom will work well as your basic lens. A moderate telephoto—70mm to 105mm—is also useful because it lets you frame the picture so you can minimize what is visible in the background. You will also want to buy a sturdy tripod to hold the camera.

The background blurs when you shoot a photo with the aperture set wide (low "F" number).



Here, a small aperture setting (high "F" number) produces an image where both the foreground and background are crisp.



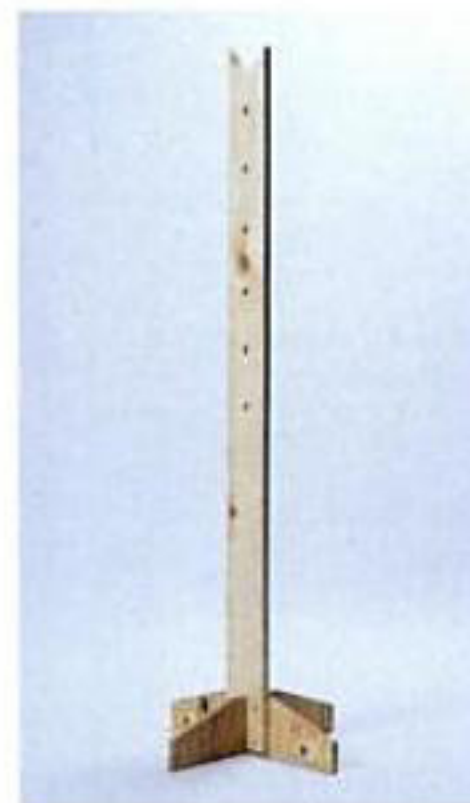
The Right Light

Even more important than equipment is the quality of the light that goes into the camera to make the image. The best camera in the world cannot correct inappropriate, shadowy or insufficient light. And if you're serious about producing high-quality photos of your work, you'll need more than a standard on-camera flash.

This doesn't mean you need to spend a lot of money. For about \$30 you can get three or four 8-in. reflector utility lights at your local hardware store. You can even make light stands out of scrap plywood (see photo, right) and buy utility lights that have simple spring clamps so you can attach them anywhere on the stand.

You'll want to be able to vary the intensity of your light, so I recommend getting bulbs in different wattages, such as 75, 100, 150, 200 and 500. Make sure your fixtures are rated to accept higher wattage bulbs or you'll create a fire hazard.

The type of bulb you use will also affect the photo. Most ordinary incandescent light bulbs have tungsten filaments, which produce a yellow-orange



This knock-down plywood light stand is a handy place to hang clamp lamps. The legs are held together with simple slip joints.

cast when photographed with a regular daylight balanced film like Kodak Ektachrome 100. (See photo, next page.) There are two ways to overcome this problem. First, you can use film that is specifically designed or "balanced" for tungsten lights, like Kodak Ektachrome 160 tungsten film. (Avoid using fluorescent lights with this film—they will turn the image green or other unpredictable colors as the photo on the next page shows.) Or rather than switching film, you can use an 80A or 80B filter over the lens when shooting daylight film with tungsten lights. These filters are blue and will



A bad match between film and light source can ruin a picture. This photo has a yellow-orange cast because the photographer used incandescent bulbs with daylight balanced film. The bluish tint in the photo above right shows how fluorescent lighting affects film designed for use with tungsten lights.



absorb, or filter out, the excess yellow.

It's also possible to get photo flood bulbs that are balanced for daylight film. These look blue when they're off because they have a blue phosphor filter coated on the inside. They're easy to use because they complement natu-

ral daylight, window light and the light from electronic flash. These bulbs (available from photo supply stores) are made by GTE-Sylvania. Model BCA is 250 watts and EBW is 500 watts.

Setting the Scene

Another item you might want to consider is a roll of white or light gray "seamless" background paper, so you can create a neutral setting and screen out distracting elements. (See photo, [page 52.](#)) This is available at most art supply stores and comes in rolls of 107 in. by 3 yds. (about \$35), 53 in. by 12 yds. (\$20), or 26 in. by 12 yds. (\$11). It's easy to hang it be-

hind the object you're photographing. Either run a long pole (electrical conduit works well) through the roll, and support the pole on stands, or hang the pole from the ceiling or wall.

Once you've got your equipment and photo space in order, it's time to go to work. The first rule of thumb is simplify, simplify, simplify. If it's at all possible, place your subject on a seamless, neutral-colored background. This will allow the viewer to concentrate totally on your woodwork and give the photo a professional look.

For smaller objects, a pressed, solid-colored bed sheet or other fabric can be acceptable (see photo, opposite page), provided the folds of the fabric are not distracting, but rather incorporate into the look of the photo.

If your subject is too large or awkward to place on a seamless background, you'll need to create an appropriate setting. This is a bit more difficult, since you'll have to make sure the room decor, wall treatments and decorating accessories complement the subject. Again, keep your setting simple and neutral and remember to showcase the *piece*, not the room setting. Remove anything in the photo that could be unsightly or distracting. This could include electrical cords, radiators, wall outlets, picture frames, the base or legs of furniture in the background, or even harsh shadows.

Lighting the Subject

There are as many rules of thumb about lighting as there are photographers, and the type of lighting scheme you use may be different for every type of woodwork you shoot. One scheme you might try is to set up your shot by a bright window or doorway. While you want to avoid direct sunlight, diffused window light has a beautiful modeling quality that could work quite well as a main light source.

You will, however, need to lighten or "fill" the shadow side of the scene with another light. This secondary light should be about half as bright as your main light. Instead of shining the light directly on the subject, try shining it off a large white board placed close to the subject. This produces a diffused light, with softer shadows.

If you do use window light, which is daylight balanced, make sure your fill light is daylight balanced as well. A tungsten fill light will give half your photo a yellow cast.

Another way you can provide



It's hard to get a good photo of a piece in its existing location. Here, the photographer shot at an odd angle to screen out some distractions, but electrical wires, wall hangings and rugs still intrude into the frame.

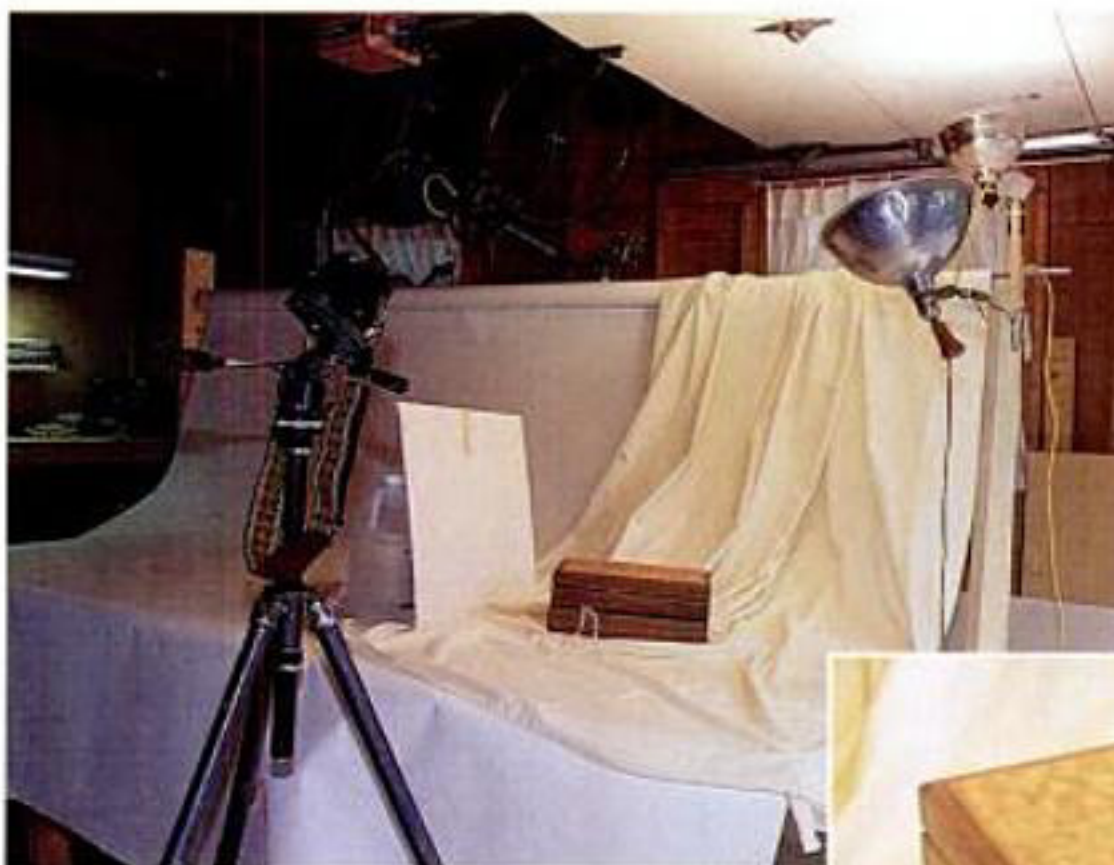
secondary light is to simply "bounce" some of the main light back onto the shadow side by placing a large white piece of cardboard very close to the subject but just out of the photo frame. (See photo, right.)

When taking advantage of natural daylight, you could use your electronic flash as a fill light. If your flash has the capability, aim it at the ceiling (if it's white), or "bounce" the light off a white board for a softer, more diffused effect.

One thing you should never do is use the flash as a main light by aiming it directly at the subject. This yields a harsh, flat look with sharp, unappealing shadows and glaring specular or pinpoint highlights.

If you can't aim the flash at the ceiling or toward a "bounce board," simply turn down its power to a stop or two below the ambient light reading of the scene. For example, if the camera light meter reading on the scene is $\frac{1}{4}$ second at F11, set the flash to expose a setting of 5.6. (This isn't possible on all flashes.) You still shoot the photo at $\frac{1}{4}$ second at F11, but you'll have "fooled" the flash to underexpose two stops. This is just enough to lighten the shadows.

You could also tune out all other light sources and solely use tungsten lights (with tungsten film, of course). Again, it's best to soften the shadows from the floodlights by bouncing the



An inexpensive bed sheet can make a fine background for small objects (below). At left, the photographer bounced light off the ceiling and a sheet of cardboard to reduce shadows.



light off white walls, ceilings or sheets of poster board.

Where you place the lights depends on the piece you're photographing. Make sure you get light onto the surfaces you want to highlight. As a starting point, your main light could be about 45° off camera, to the side. (See drawing.) If you're shooting in a garage, the light coming in from the open doorway could work well. You could augment it with fill lights placed on the other side of the object, and then place undiffused lights that are lower wattage than your fill lights above, or behind the subject. These will illuminate the seamless background and cast light onto the subject.

When you shoot, put the camera on a tripod and use a small aperture for maximum depth of field. Use a cable

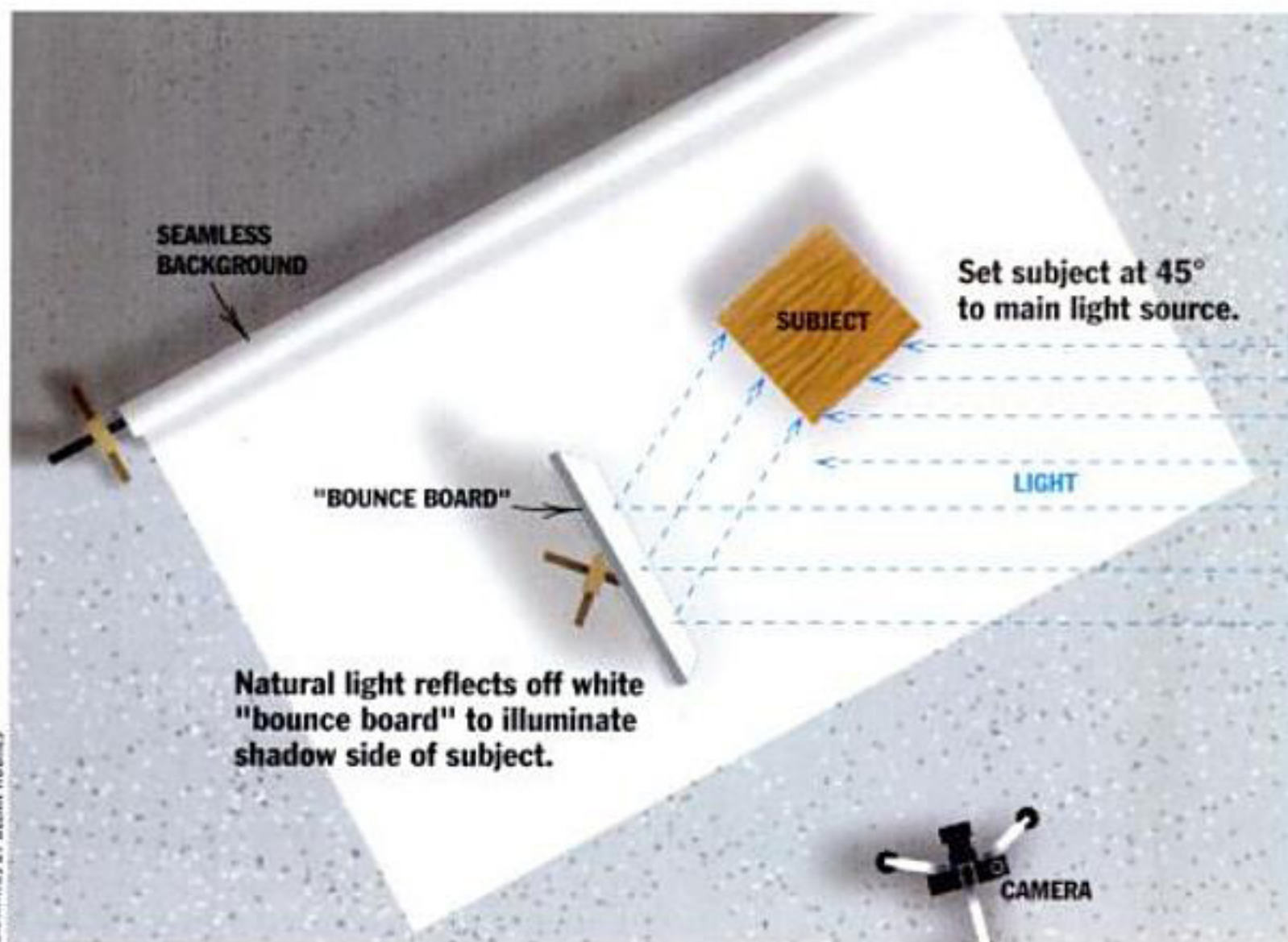
release since your shutter speeds could be as slow as several seconds, and triggering the shutter with your hand on the camera could shake the lens. Also, use a lens shade to keep light flare out of the lens.

You'll need to "bracket" your shots, shooting one F-stop up and one F-stop down from what you think the correct exposure should be. Bracketing will give you a better chance of getting a good photo even if your camera is misreading the light.

Some final advice: Just as in woodworking, developing the skill to do photography well takes time and experimentation. You'll have to try different lighting set-ups and types of film to see which one works best for you. I recommend you start with a medium speed daylight balanced film such as Kodak Ektachrome 100. (It's best to use slide film since most magazines and publications prefer slides. You can always get good quality prints made from slides afterward.)

Most importantly, when you're starting out, keep a record of the camera settings, lighting and film you use for each shot. That way you'll be able to duplicate your successes and cut down on your failures. ▲

MITCH MANDEL
is senior photographer for Rodale Press in Pennsylvania and an amateur woodworker.





SHARPENING TURNING TOOLS

BY STEPHEN H. BLENK

*A Pro Turner's Tips
for Getting an
Edge on
Gouges, Chisels and
Scrapers*

Every turner you talk to has his own pet system for sharpening lathe chisels. With so many viable methods to choose from, it's easy to get confused when you're learning. This article is an effort to simplify the mystery; to help you get your tools sharpened quickly so you can get back to the lathe.

The goal in sharpening is to create an edge suitable for cutting wood on the lathe. Turning creates a lot of friction (read heat) so an edge on a lathe tool is a temporary thing at best. The edge dulls so quickly that meticulous honing is overkill (skews are an exception). You want to produce a workable edge as quickly as possible.

The Steel Makes a Difference

Before buying any sharpening equipment, take a look at your turning chisels. If they are high-speed steel (and they usually will say it somewhere on the tool if they are) or one of the exotic hard

PHOTOS BY ROSS HAMILTON

steels like M2, D2 or A-11 you have an advantage. High-speed steel (HSS) can be ground hotter than carbon steel without losing its temper, so it's possible to sharpen with a standard, high-speed bench grinder. Remember though, you can still burn the edge of a HSS tool if you aren't careful.

If your tools are not HSS, you have fewer choices in sharpening equipment. It's easy to burn the edge of a carbon-steel chisel. For these tools, I suggest using an abrasive belt system and/or a wet wheel. If you must use a bench grinder, keep a light touch, remove material gradually, and keep a water can handy to cool the tool frequently. If the steel at the cutting edge turns blue, you've ruined it and you'll have to remove a lot of metal to get back to hard steel. Be careful.

Most of my chisels are HSS, so my primary sharpening station is a high-speed bench grinder. On one end of the arbor I keep an 80-grit carborundum wheel. On the other end, I keep a cotton buffing wheel loaded with white (stainless steel) buffing compound (a leather wheel works as well). Except for the skews, which I sharpen on a wet wheel, all my chisels get their serious treatment here. I have another grinder with a 120-grit aluminum oxide wheel which produces a finer edge than the 80-grit wheel (it also grinds hotter). If I could have only one dry wheel for sharpening, I'd choose the 120-grit aluminum oxide wheel.

Grinding wheels become clogged by particles of steel. When this happens, they cut poorly and run hot. A stone dresser, either diamond or mechanical, is a necessary part of the grinder bench.

Different Functions, Different Grinds

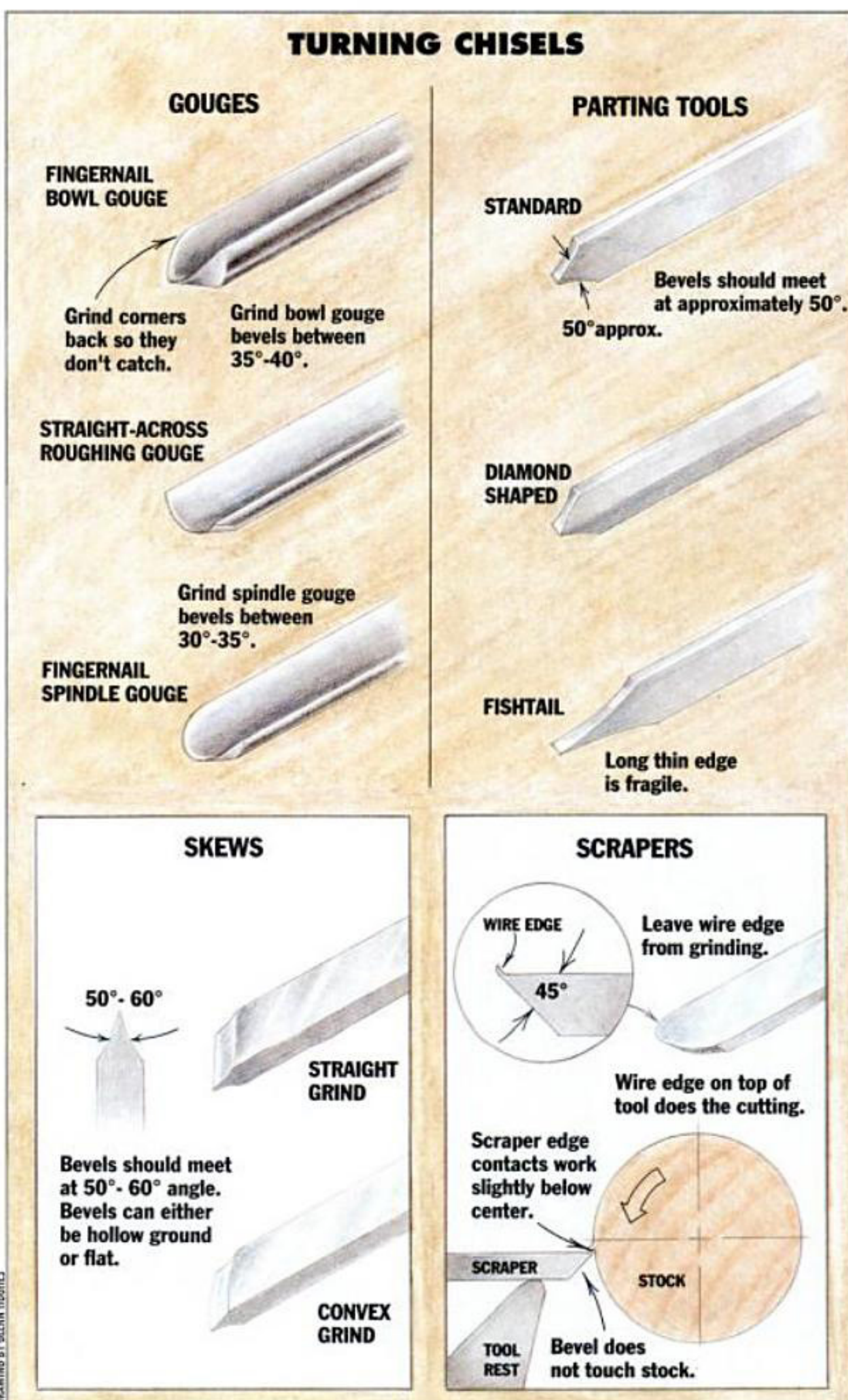
Lathe chisels have specific functions. This means that almost every type of chisel has a different profile and is sharpened a little differently. (I hear the cries of dismay already. Wait, it gets worse.) Each tool can also perform several different functions depending upon how it's sharpened. Thus, each chisel can have several different "correct" sharpening angles or profiles. No single one is right, they just work differently.

Generally speaking, gouges and skews are cutting tools. Their cutting edge is controlled by resting the bevel of the tool on the turning with the cutting edge tangent to the work surface. The bevel and the angle it maintains to the edge is an important part of the tools' function. Think of the bevel as the sole of a block plane. Change the bevel angle, and you change the cut.

Scrapers cut with a wire edge on

the top of the tool. (See drawing.) The bevel angle is less important because the bevel doesn't control the cut.

While I'm on the subject of bevel angles: Don't assume that the factory-ground angles on a chisel are necessarily the correct ones. They are often far from the best. In this article, I'll give a range of bevel angles for each tool instead of a specific degree. Experiment to find what works best for you.



In the following section, I'll explain how to grind the popular profiles for each type of tool. Think of these methods as starting points for your own experimentation. Some of you perfectionists may find my sharpening methods down and dirty because I don't spend long hours working on the "perfect edge." I strive for function, not perfection. I like to turn, not sharpen.

Gouges

Gouges can be divided into two broad categories: spindle gouges and bowl gouges. (See drawing, previous

page.) They are different tools requiring different grinds but the sharpening technique is the same.

Spindle Gouges—Spindle gouges are shallow, and can be sharpened to a fairly acute angle, since they aren't used for interior work. I grind my spindle gouges to an angle of about 30°-35°.

I use two basic configurations for spindle gouges. For roughing out and doing straight-line work like cylinders and tapers, I prefer a straight-across, or square-ground shape. (See drawing.) For concave and convex shapes like beads and coves I prefer a

"fingernail" grind, so called because of its shape. (See drawing.) This profile has a longer, tapered point, with the shoulders ground back to keep them out of the cut.

These two profiles—square ground and fingernail—are the extreme limits of the shapes of spindle gouges. Usable configurations can be anything in between, but the angle of the bevel should stay in that 30°-35° range.

Bowl Gouges—Bowl gouges, also called deep flute gouges, are used for hollowing out the insides of bowls and hollow vessels. (See drawing.) They are almost universally sharpened to a modified fingernail configuration with a bevel angle of about 35°-40°. This profile allows the turner to use the edge and bevel without easily catching a corner of the gouge on the bowl wall. You may see some turners who grind their bowl gouges straight across and use the corners of the edge, but they are a skilled minority. I don't recommend this approach for bowl gouges.

To sharpen a gouge, I approach the wheel as though it were a turning. I use the grinder's rest like a lathe tool rest and lightly bring the heel (rear edge) of the bevel into contact with the wheel. Once I am satisfied that I have the proper angle (the same angle as the bevel) I raise the handle slightly to bring the entire bevel into contact with the wheel. You should be able to see some small sparks at the very cutting edge of the tool, which means you're grinding at the edge.

If you have trouble holding the angle freehand, set the tool rest to the angle you want and hold the tool flat on the rest to maintain the angle. It may help to fit a wider tool rest to your grinder if you use this approach.

If you're a beginner, it's easiest to sharpen each half of the bevel separately. (See photos, left.) Starting in the midpoint of the edge, roll the gouge to the right while maintaining both the proper angle and light contact. For a square-ground gouge, you only need to roll the tool to grind a smooth curve from the tip to the right-hand shoulder. For a fingernail profile, you need to swing the handle to the right as you roll the tool.

Cool the edge and check the grind. If you're satisfied with the result, grind



It's easiest for beginners to grind each half of a fingernail profile separately. Starting in the midpoint (top left), roll the gouge to the right, swinging the handle to the right as you roll the tool (top right).



To grind the other side, switch hands and start at the midpoint again (left). Roll the gouge to the left, swinging the handle to the left, as you roll.



the other side of the gouge. Start at the midpoint and roll the gouge to the left, swinging the handle to the left, as you roll, for a fingernail grind. Cool the edge and check it again.

Eventually, you'll develop the ability to start at one shoulder and roll the cut from shoulder to shoulder on the gouge, marrying the two sides of the grind with no visible transition. That's how I sharpen my gouges.

The sharpening process is virtually the same on an abrasive belt system.

Grinding raises a wire edge on the inside of the gouge. There are several different ways to remove it. I use the easy method. I buff it off with the cloth buffing wheel I keep on my grinder. This can be a little tricky, as the buffing wheel can also dull the edge if you're too heavy-handed.

Buff on the bottom side of the wheel, with the rotation away from you. (See photo, above.) Don't buff with the sharp edge of the tool pointing at the oncoming wheel! This could cause serious injury from a sudden kickback. Try to just barely remove the wire edge without dulling the new edge it leaves behind.

You can also remove the wire edge with a slip stone. Work it over the wire edge, keeping the slip stone flat against the inside surface of the gouge. Don't roll the slip stone over the edge. If you're using an oil stone, be liberal with the oil (a mix of automatic transmission fluid and kerosene works well). I use a round, tapered, fine India

slip stone for this job when I'm away from my own shop and can't buff.

Skew Chisels

The skew, a cutting tool, works best when razor sharp, and not at all when even slightly dull. If you expect a skew to work well, keep it sharp.

Skews can have at least two configurations. The cutting edge can be straight, at an angle of about 60° to the long point. (See drawing.) Or the edge can be ground slightly convex, allowing the user a little more latitude in the types of cuts it will make. With a convex edge, it's possible to cut "uphill" from a smaller diameter to a larger one, and to work on surfaces that are slightly concave.

Whether you prefer a straight or convex grind, the two bevels which make up the cutting edge should combine at about 50°-60°. Skews can be flat ground (on an abrasive belt) or hollow ground (on a wheel).

Because of the long thin bevel, skews—even the HSS variety—are quite prone to burning on a grinder. I sharpen my skews on a wet wheel and hone them on an oil stone to remove the wire edge. I use a wide tool rest, and set the angle of the rest to match the bevel of the skew. (See photo, next page.)

The wire edge produced by grinding can be polished off on a buffing wheel or a bench stone. Skew bevels should be polished well, to help with the polishing effect that the skew imparts to the wood. A rough, angular



Buffing (left) is the quickest way to remove the wire edge produced by grinding. Author uses a felt wheel charged with white buffing compound. Buff lightly on the bottom side of the wheel with the rotation away from the edge. The wire edge can also be removed with a slip stone held flat against the inside of the gouge (above).



When a buffing wheel isn't available, author improvises by turning beads that match the inside shapes of his gouges and charging the wood with buffing compound. He then "buffs" off the wire edge on the wood.

bevel will not give the characteristic smooth finish the skew leaves behind when properly sharpened.

After grinding the skew on the wet wheel, I go to a fine India stone, and then to a black Arkansas oil stone. If all this honing seems like overkill compared with other turning chisels, you're right. The skew is the one lathe chisel that requires critical sharpening. I work with a fine India stone in my pocket at all times, and hone my skews frequently while turning.

With the fine India stone, I often "set up" the edge of the skew for a critical finishing cut. Honing creates a micro wire edge on the edge opposite the last side you've honed. This micro-edge can be made to work for the turner on especially fine cuts, or against

him if he doesn't know it's there. Simply finish cut on the side *opposite* the last side honed. A little experimentation will show you the difference in the cut.

Scrapers

Scrapers come in a bewildering variety of configurations but they share a common principle. A wire edge on the top side of the scraper does the cutting. (See drawing.) The sharper the wire edge, the better the cut. The problem is that the cutting action and the friction it produces wear down a wire edge quickly.

I sharpen scrapers on the bench grinder. For small-radius scrapers, I hold the tool on the rest and grind the bevel lightly, swinging the handle in an arc to grind the entire edge. (I shoot for a bevel angle of about 45°.) This raises a wire edge on the top side of the scraper. Light pressure and frequent cooling produce the best results for me. Heavy pressure produces a burnt edge, which will break down quickly.

I burnish flat scrapers and large-radius curved scrapers much like a cabinetmaker's hand scraper. After grind-



Even high-speed steel skews are easy to burn. Author prefers a water-cooled grinder with an aluminum-oxide wheel. He uses the tool rest to determine the bevel angle.

ing the bevel, I polish the wire edge back down toward the front of the chisel with the buffing wheel. This gives me an acute angle on the end of the scraper. Then I make one pass along the edge with a piece of hardened steel to burnish a wire edge on the top side of the tool. This burnished edge is sharper than a wire edge of the grinder and outlasts a ground wire edge. It takes a little practice to get this to work, but it's worth the time invest-



Author burnishes flat scrapers and large curved scrapers much like a cabinetmaker's hand scraper. He grinds the bevel then polishes the wire edge back down toward the front of the tool with the buffing wheel (left). Then he makes one pass along the edge with a piece of hardened steel to burnish a wire edge on the top side of the tool.



ed. Remember, you only get *one* try at setting up the edge. If it doesn't work, you have to regrind slightly and repolish before trying again. Repeated burnishing passes will only roll the edge back out of useful range. Some scraper profiles are difficult to burnish easily. But for flat or large-radius round scrapers, burnishing works well.

Other Tools

Parting Tools—The parting tool is sort of a hybrid; a cross between a scraper and a cutting tool. If the edge is held tangent to the workpiece, with the bevel rubbing, it's cutting. If it's fed straight into the workpiece at or slightly above the centerline, it's scraping.

Parting tools come in several varieties: flat, diamond cross-section and "spurred." The flat and diamond variety have two bevels, and are ground on both. The specialty spurred parting tools (available from Craft Supplies USA, see Sources) are sharpened on only one face. On diamond-shaped parting tools, be sure to keep the cutting edge in the center so the tool won't get stuck in the cut. The bevels on a parting tool may be either flat or hollow ground.

When you're grinding a parting tool, the two bevels should meet at an angle of approximately 50°. If you use the cutting technique exclusively, it's possible to exaggerate the bevel slightly into a more "fishtailed" shape. (See drawing.) It will give a cleaner cut, but will break down too fast if used for scraping.

I grind parting tools by lowering the bevel onto the wheel as though parting it with a cutting technique. Try to match the bevel of the tool, and keep light contact. Watch for the fine sparks at the cutting edge, and cool frequently.

Beading Tools—Traditional beading tools (not the shaped scrapers also called beading tools) are cutting tools used much like skews for cutting beads and shoulders. They're essentially oversized, flat parting tools and are sharpened in much the same way. Both bevels are ground to produce the edge.

I grind flat bevels on beading tools because they give me more control than a hollow-ground bevel. I grind on the flat sides of the wheel rather than the front edge. An abrasive belt system

SOURCES

Turning tools and sharpening equipment for turners are available from:

► **CRAFT SUPPLIES USA**, 1287 E. 1120 S., Provo, UT 84601, (801) 373-0917. CIRCLE #610

► **GARRETT WADE CO.**, 161 Avenue of the Americas, New York, NY 10013, (800) 221-2942. CIRCLE #611

► **HIGHLAND HARDWARE**, 1045 N. Highland Ave. N.E., Atlanta, GA 30306, (800) 241-6748. CIRCLE #612

► **LEE VALLEY TOOLS LTD.**, 1080 Morrison Dr., Ottawa, Ontario K2H 8K7, (613) 596-0350. CIRCLE #613

► **WOODCRAFT**, 210 Wood County Industrial Park, Box 1686, Parkersburg, WV 26102, (800) 225-1153. CIRCLE #614

would also produce a flat bevel.

When all is said and done, there is, unfortunately, no substitute for experience in sharpening lathe tools. Prior to the advent of HSS, it was recommended that a beginner start out with a cheap set of chisels, and learn how to sharpen them while learning how to turn. Once the process became familiar, they could be replaced with a good set of tools. With today's developments in metallurgy, it's easier to avoid ruining an edge (although still quite possible). I think a beginning turner should have all the advantages, and that includes good chisels. With a little bit of care, they'll last a lifetime and provide thousands of good edges. ▲



STEPHEN H. BLENK
is a professional turner in Washington state and founder of the Olympic Peninsula chapter of the American Association of Woodturners.

SHARPENING SYSTEMS FOR TURNING TOOLS

When it comes to equipment for sharpening lathe tools you have a lot of choices. There are "sharpening systems" with low-speed wet wheels, sanding drums or belts. There are bench grinders and buffing wheels, water stones, oil stones, diamond hones and combinations of the above. Someone, somewhere, doubtless has a sharpening system which uses a starship's phasers to zap up an edge. The trick is to find sharpening equipment that is suited to both your purpose and your budget. ([See article, page 48](#))

For the sake of simplicity, I'll try to lump equipment into recognizable categories.

Grinders—Grinders can be either low or high speed, and may run wet or dry. Some grinders have both wet and dry wheels on the same machine. Other grinders may have a stone on one arbor, and a buffing wheel on the other.

Dry, high-speed grinders usually have relatively coarse wheels (80-100 grit), remove metal quickly, and generate lots of edge-burning heat. Wet wheels are generally finer (220 grit), slower, and better suited for touch-up and polishing rather than removing large amounts of material. Wet wheels do not generate heat—a big advantage—so they can be used without the fear of ruining the temper of a chisel.

A cloth or felt buffing wheel on a high-speed arbor is useful for polishing off the wire edges produced by grinding.

Abrasive Belt Systems—Abrasive belt systems can do the work of grinders and polishers. These systems can use either a coarse belt for quick removal of large amounts of material, or a finer belt for polishing.

Many turners I know prefer a belt grinder with a 2-in.-wide abrasive belt on either a platen or a drum. Most turners favor zirconium abrasive belts (also called zirconia).

These blue-colored belts are covered with alumina zirconia, an extremely hard and durable synthetic abrasive ideally suited for grinding metal (available from Econ-Abrasives, Box A865021, Plano, TX 75086, 214-377-9779).

Abrasive belts run hotter than a wet wheel, but not as hot as a high-speed grinder. By keeping only light pressure on the tool and cooling it often in water, it's easier to avoid burning the edge. Keep a water container by each of your sharpening devices and cool your chisels frequently.

It's possible to use a standard 6-in. by 48-in. woodshop belt sander for sharpening lathe chisels. If you do, I recommend installing a 2-in.-wide belt on it for sharpening. (FIRE HAZARD! Disconnect any dust-collection hose, and vacuum sawdust before grinding metal.) This way you'll use the entire abrasive surface rather than just one narrow strip. Don't try sharpening on the disc sander however. The surface speed is too fast and you'll burn your edge.

Sharpening Stones—And of course, there are the stones: bench stones, slip stones and diamond hones. It's a great advantage to be able to touch up an edge without having to head for the grinder every time. Keeping an edge in shape with a quick stoning makes turning more enjoyable, and makes your chisels last longer. Stones are also useful for removing the wire edge left by a grinder.

There is still some controversy over the question of oil stones vs. water stones, and I'm not going to get into it. I learned on oil stones, and that's what I use. Both types work; use whichever you like. I recently had the opportunity to watch Jerry Glaser—the noted designer of high-speed turning tools—use an EZ-Lap diamond hone to dress an edge, and am planning to try one myself.—S.B.

1992 AMERICAN WOODWORKER

EXCELLENCE IN CRAFTSMANSHIP AWARDS

"He who works with his hands is a laborer, [but] he who works with his hands, head and heart is an artist."

—St. Francis of Assisi

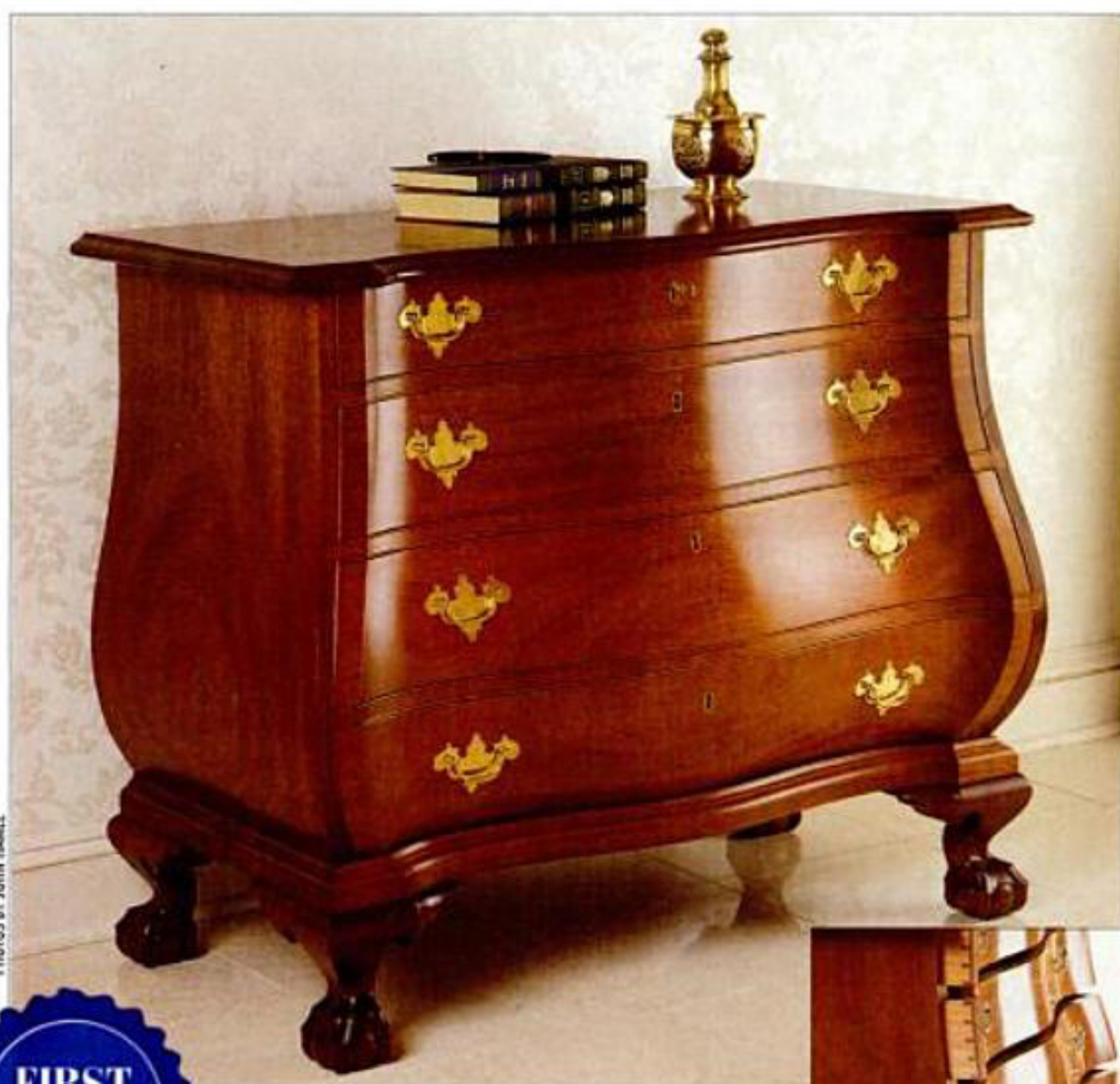
It's obvious from the quality of work submitted in AW's first Excellence in Craftsmanship Awards contest that many woodworkers aspire to St. Francis' creed. In fact, we received so many first-rate entries among the hundreds sent in from the United States and abroad that singling out the best proved

extraordinarily difficult.

Such a commitment to craftsmanship is encouraging to see, especially at a time when the emphasis on quality handwork seems to be on the decline. AW established this competition, in part, to help reverse that trend. We hope that by recognizing talented woodworkers and promoting high standards of workmanship and design, we will inspire the woodworkers of tomorrow. Certainly the work in this year's contest inspired us.

We applaud the 1992 winners and congratulate everyone who entered the competition, for they all show an exceptional dedication to the craft.

First-place winners in the professional and amateur categories receive \$1,000 and a custom-engraved plaque. Second-place and third-place winners have earned a certificate and \$100. Pick up our March/April issue for details on entering the 1993 AMERICAN WOODWORKER Excellence in Craftsmanship Awards.



PHOTOS BY JOHN HAMMEL



BOMBÉ CHEST BY
WALLY KUNKEL,
FLANDERS, NJ.



"Your heart is in your mouth the whole time you build something like this because you can't waste one piece of wood," says Wally Kunkel of his bombé chest.

Kunkel considers the 36-in.-wide chest a dream project. He spent years studying the "various problems and splendors" of the 18th-century original on which his is based before finally making the first cut. And he hunted much of the country to find the single 12 $\frac{1}{4}$ 26-in. by 20-ft. piece of Honduras mahogany that makes up all the chest's "public" faces.

The chest took 4½ months to build, with Kunkel doing much of the work by hand. He hand-dressed the raw board so he'd have time to study the grain, then hand-cut the joints, and used a scratch stock on the carcass to raise the beading around the drawers. The drawer sides are carved inside and out to follow the curve of the chest's sides. Kunkel also carved the insides of the drawer fronts so joining them to the sides meant dovetailing two curved surfaces at compound angles.

Except for the top drawer, the front of the chest (including the rails) was cut in sequence from the width of the mahogany board. The frame and panel back has book-matched panels.



PINE CORNER CUPBOARD BY KENNETH FOLK, HARRISBURG, PA.

Ken Folk loves traditional tools, and he had a chance to use many of them on this cupboard. But the craftsmanship here represents more than skilled woodworking. Folk, an electrical engineer by trade, designed and made the brass tulip hinges and door latches, and painted the Pennsylvania German folk design on the lower door.

Folk used some of the antique planes he has collected to run most of the moldings. The egg and dart dentil molding he carved by hand. He has no formal training in woodworking but used to do antique restoration and he says, that "gives you an education in furniture construction and design."

Folk calls the cupboard a marriage of Early American cabinetry with a German country motif that was popular in Pennsylvania in the 18th and 19th centuries.



STUART BROWN

PROFESSIONAL - SECOND PRIZE DINING TABLE BY RUPERT SENIOR AND CHARLES WHEELER-CARMICHAEL, SURREY, ENGLAND.

British furniture designer Rupert Senior says he and his partner, Charles Wheeler-Carmichael conceived this expanding dining table because, "we find so often furniture is a static thing and we wanted to make some change to that."

The table seats six when the leaves are closed, but the pie-shaped parts of the top rotate on roller bearings to expand the table into a 12-seater. The rectangular leaves and removable candlesticks store in a leaf carousel that doubles as a candle stand. The table took almost 1,000 hours to build and is made from American black walnut burl veneer, solid walnut, bubinga and bronze.

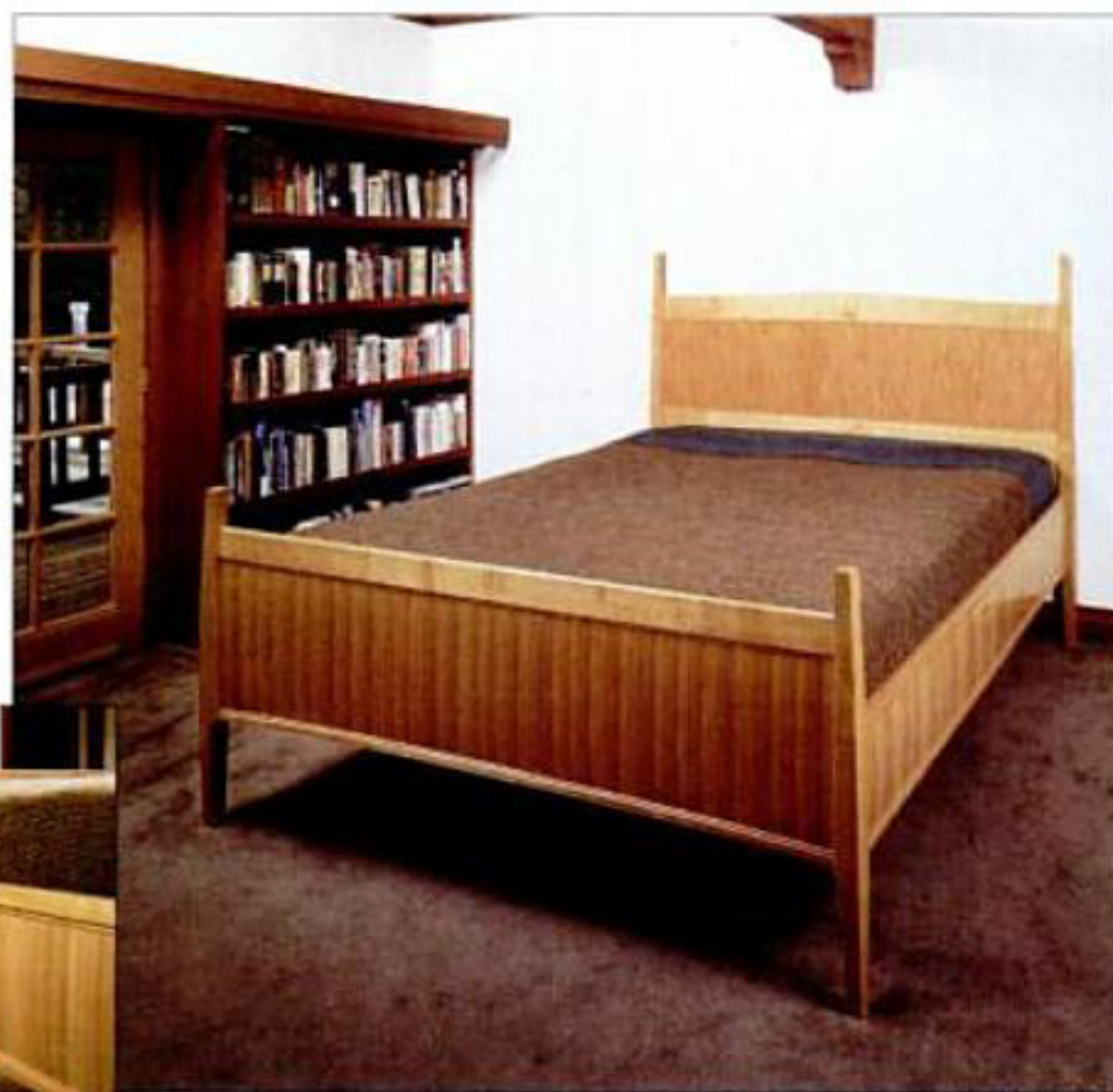
Continued...

Ejler Hjorth-Westh started his career in wood as a boat builder and today works full-time as a fine-work carpenter. But when it comes to furniture he's still an amateur. Indeed, he says, "I want to stay true to my amateur status. 'Amateur' meaning the root of the word as a lover of the craft."

He made this bed while studying under James Krenov at the College of the Redwoods in Fort Bragg, California. The footboard and headboard panels, along with the side rails are all "pillowed" so their surfaces bow slightly. He created the effect by shaping an apple-ply core and then veneering over it. Posts, pedestals and edgings are solid cherry.

AMATEUR - SECOND PRIZE

BED IN EUROPEAN CHERRY,
PEAR, MAPLE AND PINE
BY EJLER HJORTH-WESTH,
ELK, CA.



KAZ TSUKIUTA



THOMAS AMES JR.

PROFESSIONAL - THIRD PRIZE

WRITING DESK AND CHAIR
BY TERRY MOORE, NEWPORT, NH.

"I try not to let my design be a product of what my machines can accomplish," says Terry Moore, a self-taught craftsman who used a plywood mock-up to develop the design for this desk.

Moore says he has never used power sanders and prefers to work with hand tools when possible. All the dovetails on the desk drawers are hand-cut and 90 percent are fit straight from the instrument maker's saw he uses to cut them. The desk and chair took about 400 hours to make.



JAMES MATTHEWS

AMATEUR - THIRD PRIZE

TABLE BOX BY
TOM SHIMROCK,
GRANTSVILLE, MD.

It was serendipity that brought Tom Shimrock to wood-working. "I bought some exotic hardwoods from a friend because I liked the way they looked, and finally I said 'I have to start doing something with this stuff.'"

He made this turned box after 15 years as a hobbyist. The lid and base are cocobolo while the accents are ebony and brass. The pouch under the lid is stretched leather.

WOOD FACTS



PHOTOS BY ANDY RAE

Granadillo can vary wildly in appearance, with color ranging from brown to pink to purple.

GRANADILLO

BY DICK BOAK

SPECIES NAMES

Platymiscium pinnatum (Central and South America)

Platymiscium yucatanum (Mexico, Central America)

Platymiscium dimorphandrum (Central America)

Platymiscium duckei (Brazil)

TRADE NAMES

Macawood, granadillo, Panama redwood, trebol. In the past, the trade name "granadillo" has been used to describe many similar-looking woods (including rosewoods, such as cocobolo). Today when talking about granadillo (pronounced gran-a-dee-o) most dealers are referring only to trees of the *platymiscium* genus.

APPEARANCE

Granadillo varies widely in shade, and in color, from brown to pink to lavender with darker variegated streaks. Quartersawn planks often exhibit a narrow striped figure and the more common flatsawn boards run anywhere from plain to wildly grained. Because of these variations, it's best to personally select planks or ask about the visual characteristics of particular batches if buying by mail.

TECHNICAL PROPERTIES

With a specific gravity of .73 to .96, granadillo ranks as a heavy hardwood,

averaging about 60 lbs. per cubic ft. when dry. It is stable enough to kiln dry without appreciable defect. Pores are generally large and it is necessary to fill them with paste filler to achieve a dead-smooth surface when using a spray finish. A finely sanded surface yields a medium to high luster.

WORKABILITY

Carbide cutters are preferred for machining granadillo because of its density and its dulling effect on tool steel. It will glue well, however it is best to assemble joints immediately after machining or to rub the parts with an abrasive pad such as Scotch-Brite, because resins tend to rise to the surface, inhibiting a good bond.

USES

It can be used in furniture making and decorative joinery, but is more commonly seen in marimba keys, flooring and decking. It is not commonly available as veneer because of its varying grain patterns although this also may be due in part to granadillo's overall lack of use in the trade.

SIZES

Typical widths run 4 in. to 10 in., and thicknesses of 4/4 or 8/4 are generally available. Suppliers often sell the lumber planed because color and grain pattern determines quality and price.

TOXICITY

Granadillo is not toxic, though some individuals may experience an allergic reaction. As with many woods, the darker varieties are more likely to cause problems because of their higher extractive (chemical) content.

SUSTAINABILITY

Granadillo boasts more than 20 species and has been hard to classify because of its wide range over tropical America. One lesser known specie, *pleiostachyum*, is listed in Appendix II by The Convention on International Trade (CITES) as being at risk of over-harvesting for international trade. There are several certified sources on the market that make granadillo a good alternative to some of the more endangered species, especially the rosewoods.

AVAILABILITY

Exotic-wood dealers and specialty houses throughout the country sell granadillo, but supplies may vary because there hasn't been much demand up to this point.

COST

Wholesale costs (for 100 bd. ft. or more) range from \$4 to \$6 per bd. ft. Retail prices run from \$6 to \$10 a bd. ft., but expect to pay a premium for boards with consistent figure.

JUST FINISHING



POLYURETHANE

*Toughness and Durability
Come in Many Forms*

BY MICHAEL DRESDNER

For most people, the word “polyurethane” on a label implies a very strong and durable brushing varnish. Lately, though, polyurethane has appeared in some new and unusual forms, such as wiping varnish, oil/varnish mixtures, water-based polyurethanes and two-part polyurethanes. How do these compare with the original oil-based polyurethanes and what are the strengths and weaknesses of each?

Oil-based polyurethanes are still the most common. They are essentially oil varnishes buffered with polyurethane resin for extra scratch and heat resistance. Oil-based polyurethanes dry by “polymerization,” a process in which oxygen from the air helps resin molecules link up and grow larger. Like other oil varnishes, they add that familiar amber color to the wood. They are also applied like oil varnishes. (More on this later.) Because of these characteristics, oil-based polyurethanes are the perfect varnishes for high-wear surfaces like tabletops, hand rails and kitchen cabinets. Some are even suitable for exterior use.

Less familiar are **urethane oils**, which are thin versions of oil-based polyurethane varnish. These are widely used by woodturners to finish objects still on the lathe. They’re thin enough to simply wipe on with a rag, and they dry quicker than thick versions.

Recently, **water-based polyurethanes**, which are “emulsions” (mixtures of suspended droplets) of polyurethane and acrylic resins in water, have joined oil-based poly-

urethanes on the paint store shelves. These newcomers are at least as durable as their oil-based counterparts, and can be easily cleaned up with soap and water.

Like lacquer, water-based polyurethanes dry very quickly by solvent evaporation. The solvent and the water (the coating contains both) evaporate and the resins remain behind to merge or “coalesce” into a film. (See “Water-Based Finishes,” AW #29, page 68.)

Unlike oil varnishes, which add an amber cast to wood, water-based polyurethanes are clear. In fact, on very dark woods like walnut, they may impart a slight bluish haze.

Another difference is odor. The water-based variety smells quite different—and considerably less—than oil-based polyurethane. Water-based formulations also tend to foam more, trapping air bubbles in the finish, so they require a bit more care in handling.

Two-part polyurethanes, which must be mixed together before spraying, are primarily used in industrial coatings where extremely high solvent and abrasion resistance is required. Unlike oil- or water-based polyurethanes, these two-part finishes are often considered hazardous materials, and you must handle them with caution (and use a protective respirator).

Incidentally, the terms “urethane” and “polyurethane” are used interchangeably by the paint industry. Technically speaking, urethane is the “monomer” (single unit) which forms the polyurethane “polymer” (many units). This polymerization is what gives polyurethane its durability.

Using Polyurethanes

In general, polyurethanes are intended for brushing, although the water-based polyurethanes, which dry by evaporation, may be sprayed. Some people have had success spraying the oil-based variety, but I don’t recommend it. Since it dries slowly, it tends to sag, and the overspray is a sticky mess.

If you want a satin finish, use gloss polyurethane for the first two coats, then topcoat with a satin formulation. If you use the satin for all three coats, the accumulated dulling agents may obscure the wood.

Polyurethane bonds well to raw wood and seals admirably, so you don’t need to use a sealer. However, in certain applications, such as on floors and softwoods, a sanding sealer can save you some time sanding the first coat.

Regarding compatibility with stains, polyurethanes will adhere over almost any finish or stain. For best results with water-based polyurethanes, though, I’d recommend using only water-based stains or those expressly formulated for use under water-based finishes. Check the can for recommendations.

Oil-based polyurethanes:

Thinning. Manufacturers don’t usually recommend thinning their products, but I’ve found that thinning 10 percent with mineral spirits improves handling.

Application. Brush it on as you would any oil varnish. Choose a natural bristle brush (I like both China and hog bristle) with a “chisel” end and “flagged” bristles. (For more on choosing and cleaning brushes, see AW #26,

JUST FINISHING

page 62.) Prepare the brush by soaking the bristles for a few minutes in mineral spirits. Stir the varnish gently but thoroughly before dipping your brush. This will mix in the anti-skinning additives that have risen to the top of the varnish after it sits for a while. Squeeze the excess mineral spirits out of the brush and dip about a third of the length of the bristles into the varnish. Touch the brush to the inside or rim of the container to unload excess varnish. (Dragging it quickly across the rim will cause air bubbles.) Lay the varnish out slowly and smoothly in the direction of the wood grain. Keep your coats *thin*, sand lightly with 220-grit sandpaper between coats. I recommend three light coats, and no more than one per day. Since oil-based polyurethane dries slowly, you can "pick up" any runs or drips with the

brush after you have unloaded the varnish from it. Again, unload the brush by scraping the bristles slowly across the rim of the can.

Water-based polyurethanes:

Thinning. You shouldn't thin water-based polyurethane; just stir the finish gently to mix in any of the defoamers that may have risen to the top of the can.

Application. Choose either a paint pad or a nylon-bristle brush with a chisel end and tapered (not flagged) bristles. Prepare the brush or pad by soaking the bristles in water, then squeeze out the excess. Dip the brush a third of the way into the finish and touch the bristles to the side of the can to remove excess liquid. Brush slowly in the direction of the grain, moving the brush in just one direction; scrubbing back and forth will

cause foaming and air bubbles. Keep your coats *very thin*, and apply at least three, again at the rate of one per day. Sand lightly with 220-grit sandpaper between coats, and tack off with a damp cloth, not a tack rag.

Water-based polyurethane dries very quickly, so you won't have time to go back over any areas that have started to dry. If you don't catch drips immediately, let them go and slice them off the next day with a razor blade before sanding.

Which are Best?

Oil-based polyurethanes have been around for a long time, and they're all pretty good. My favorites are McCloskey, Red Devil, Valspar and Minwax.

Among the water-based polyurethanes, I prefer Carver Tripp, Minwax, McCloskey and Zar.

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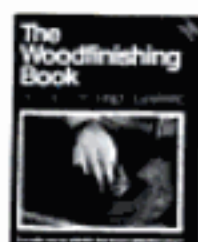
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TOOLBOX



Membrano Vacuum Press

Vacuum veneer presses are great, but the plastic bag can be awkward to load. Instead of a bag, the Membrano vacuum press uses a high-temperature silicone rubber membrane bonded to an aluminum frame. You simply place the workpiece on a shop-made platen, lower the frame and switch on

a vacuum pump (not included). The membrane automatically seals around the work. To reduce the pressing time from hours to minutes, you can add heat with an optional electrically heated platen (starting at \$2,000) or infrared heater (starting at \$3,000). The Membrano press frame

comes in four standard sizes and can be custom made to other sizes. (Price: \$1,178 for 36-in. by 48-in. frame)

Mercury Vacuum Presses, Dept. AWT, Box 2232 Fort Bragg, CA 95437, (707) 964-7557.

CIRCLE NO. 602 ON PRODUCT INFORMATION FORM



No-Drip Glue

Tired of dripping, running glue? Liquid Nails is a new glue with a gel-like consistency so it stays put when you apply it and won't run when squeezed out of a clamped joint. Its performance is similar to yellow (aliphatic resin) glue, but the manufacturer claims it has greater wet-tack and water resistance. (Price: \$2.49 for 4-oz. tube) *Macco Adhesives, Dept. AWT, 925 Euclid Ave., Cleveland, OH 44115, (800) 321-3647.*

CIRCLE NO. 606 ON PRODUCT INFORMATION FORM



The European "32mm system" of making cabinets has lots of advantages. It lets you quickly and easily build modular cabinets, using dowels to

join the panels at the corners. And since the holes for the dowels, the hinges, the shelf supports and the like are all spaced on 32mm centers (or multiples of 32mm), you can standardize construction and use off-the-shelf European hardware, which is well known for its variety and quality.

Until recently, 32mm construction meant investing in expensive machinery to drill the holes precisely.

The Veritas 32 Cabinetmaking System changes that. Now anyone with moderate skills can build something as complicated as a complete set of kitchen cabinets using no more than the system, an electric drill, a tablesaw, some clamps and basic hand tools.

The system consists of rails, rods, clamps and other parts that you assemble into a rigid frame. You clamp the frame to a cabinet panel, then drill the desired holes using a portable drill and drill bushings that fit into precisely spaced sockets along the rails.

The system comes in *deluxe* and *basic* versions. I tried the deluxe (see

Veritas 32 Cabinetmaking System

TESTED BY JOHN ELVRUM

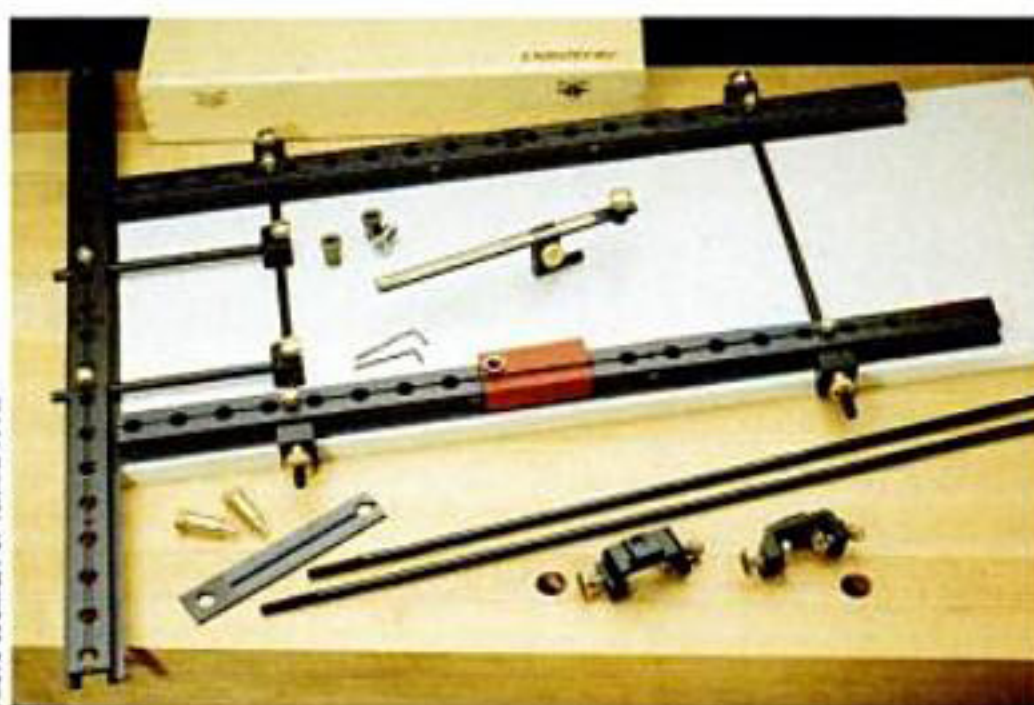


PHOTO COURTESY OF VERITAS TOOLS

photo), which consists of three 25-in. rails, two sets of rods for panels up to 24 in. wide and all the necessary fittings. The basic version includes one 25-in. rail, one set of rods for panels up to 12 in. wide and the fittings.

The array of parts seemed a bit intimidating at first. But with the help of the detailed instruction booklet, it only took me about 45 minutes to familiarize myself with the system.

To test it, I built a small cabinet with melamine-faced particle board panels and solid mahogany doors.

Once I learned that the key was getting the rails perfectly square to each other, and not to overtighten the

clamp fittings, I found the system easy to use. After I adjusted the rails and rods for the first side panel, I could simply transfer the set-up to the opposite panel without readjusting or measuring. Best of all, when I assembled the cabinet, it was perfectly square and had no gaps. The Veritas System is well-made and well-conceived.

After 25 years of working with 32mm cabinetry, I'm glad to see a company provide a simple, affordable 32mm drilling jig.

Because you can only drill one hole at a time, the system is best suited to short production runs and custom cabinet shops. But I recommend the system to anyone who wants to build cabinets with the 32mm method. It's worth buying to make just one kitchen's worth of cabinets. (Price: Deluxe Veritas 32 System, \$325; Basic Veritas 32 System, \$125)

Veritas Tools, Dept. AWT, 12 E. River St., Ogdensburg, NY 13669, (315) 393-1967.

CIRCLE NO. 623 ON PRODUCT INFORMATION FORM



Perfect Lathe-Cut Threads

The Thread Master lathe attachment lets you cut perfect internal and external threads on wooden boxes and other lathe-turned objects up to 8 in. in dia. The tool attaches to any lathe and accepts standard faceplates so you can mount work quickly. A special cutter fits in a Jacobs chuck in the headstock, and can cut the threads cleanly at a wide range of spindle speeds. Thread Master cuts a thread pitch of 10 tpi; accessories to cut 4 tpi or 16 tpi are available as options. (Price: \$249)

Craft Supplies USA, Dept. AWT, 1287 E. 1120 St., Provo, UT 84606, (801) 373-0917.

CIRCLE NO. 610 ON PRODUCT INFORMATION FORM



Template Sander

Robo-sander shapes wood like a flush-trimming router bit without some of the drawbacks. You can shape curved parts too thick to attempt with a router, and work highly figured wood without tear-out. Essentially a drum sander with a template guide bearing, it comes in two diameters. You can buy it with template guide bearing and sanding drum, or the guide bearing alone and mount it to your sanding drum. (Price: \$32 with 3-in. by 3-in. drum; \$15 with 2-in. by 1½-in. drum; \$7.50 for template guide bearing)

Ken Picou Designs, Dept. AWT, 5508 Mountview St., Austin, TX 78756, (512) 454-3425.

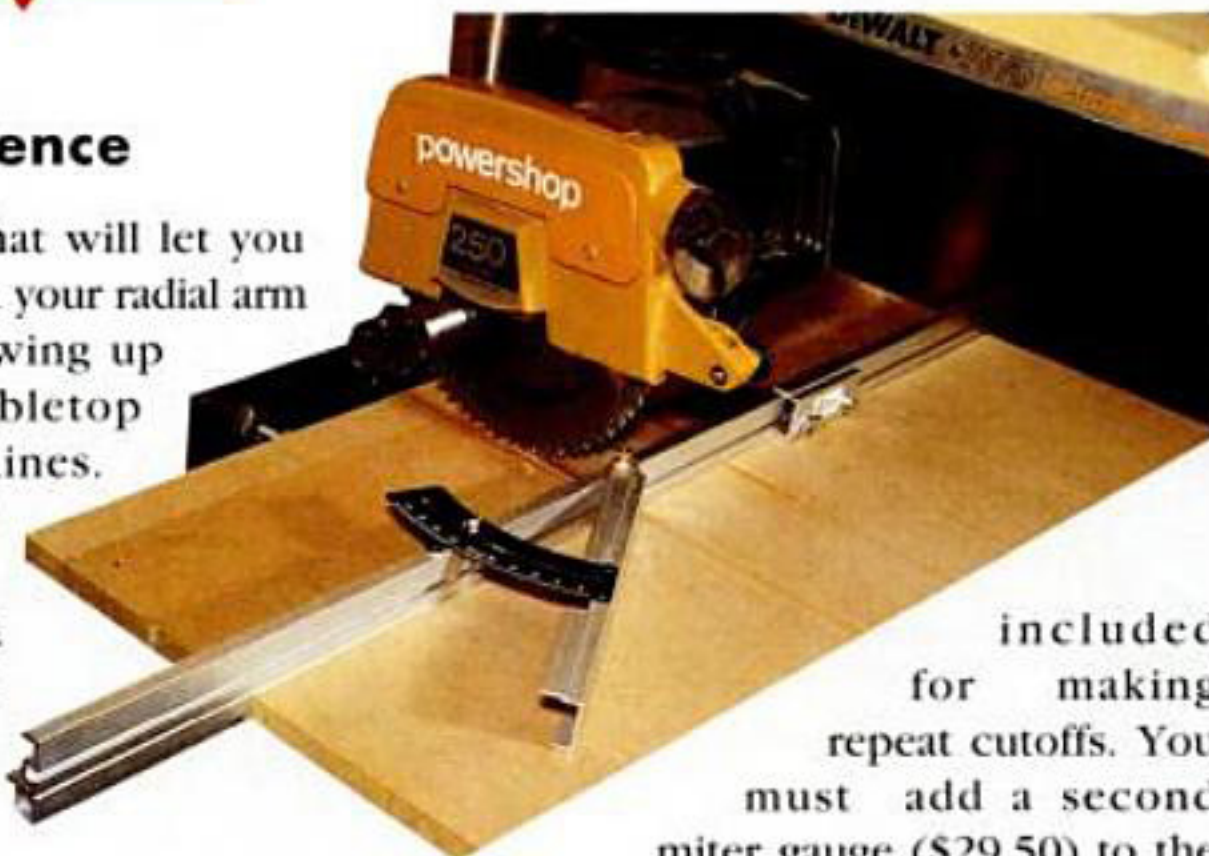
CIRCLE NO. 601 ON PRODUCT INFORMATION FORM

TOOLBOX

Radial Arm Saw Miter Fence

Here's a gadget that will let you make miter cuts on your radial arm saw without chewing up your fence or tabletop with lots of cut lines.

The Doyel Fence System is a two-piece aluminum fence with a built-in miter gauge so you don't have to swing the saw's arm. The gauge adjusts for miter cuts from 0° to 47°. A protractor scale shows the miter angle in ½° increments, but you can eyeball the setting to within ¼°. The miter gauge removes easily for crosscutting or ripping. An adjustable stop block is



included for making repeat cutoffs. You must add a second miter gauge (\$29.50) to the right of the blade to miter both ends of picture frame moldings. (Price: \$79.50)

Doyel Enterprises, Dept. AWT, Box 315, Yorba Linda, CA 92686, (714) 666-1770.

CIRCLE NO. 605 ON PRODUCT INFORMATION FORM

Planing Rasps

These new wood-shaping tools cut faster and give you a smoother finish than conventional wood rasps or thin "cheese grater" type rasps. Each tiny tooth acts like a hand plane, cutting a shaving rather than chopping out sawdust-like chips as an ordinary rasp would. They're available in five shapes. The round and square cross-section rasps are mounted in hardwood handles. The curved, flat and rectangular ones mount in a hacksaw

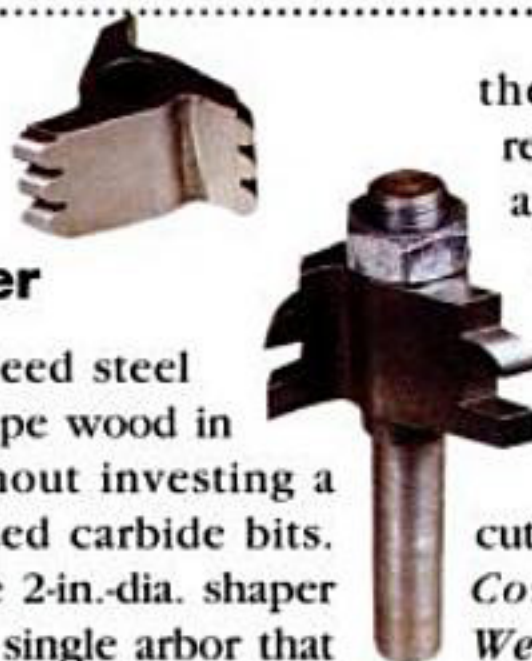


frame. (Price: \$9.10 to \$11.46 each)
General Tools Manufacturing Co. Inc., Dept. AWT, 80 White St., New York, NY 10013, (212) 431-6100.

CIRCLE NO. 604 ON PRODUCT INFORMATION FORM

Shaper Cutters for Your Router

With these high-speed steel cutters, you can shape wood in a router table without investing a bundle in specialized carbide bits. The interchangeable 2-in.-dia. shaper cutters mount on a single arbor that will fit ½-in. router collets. The cutters don't stay sharp as long as carbide, but

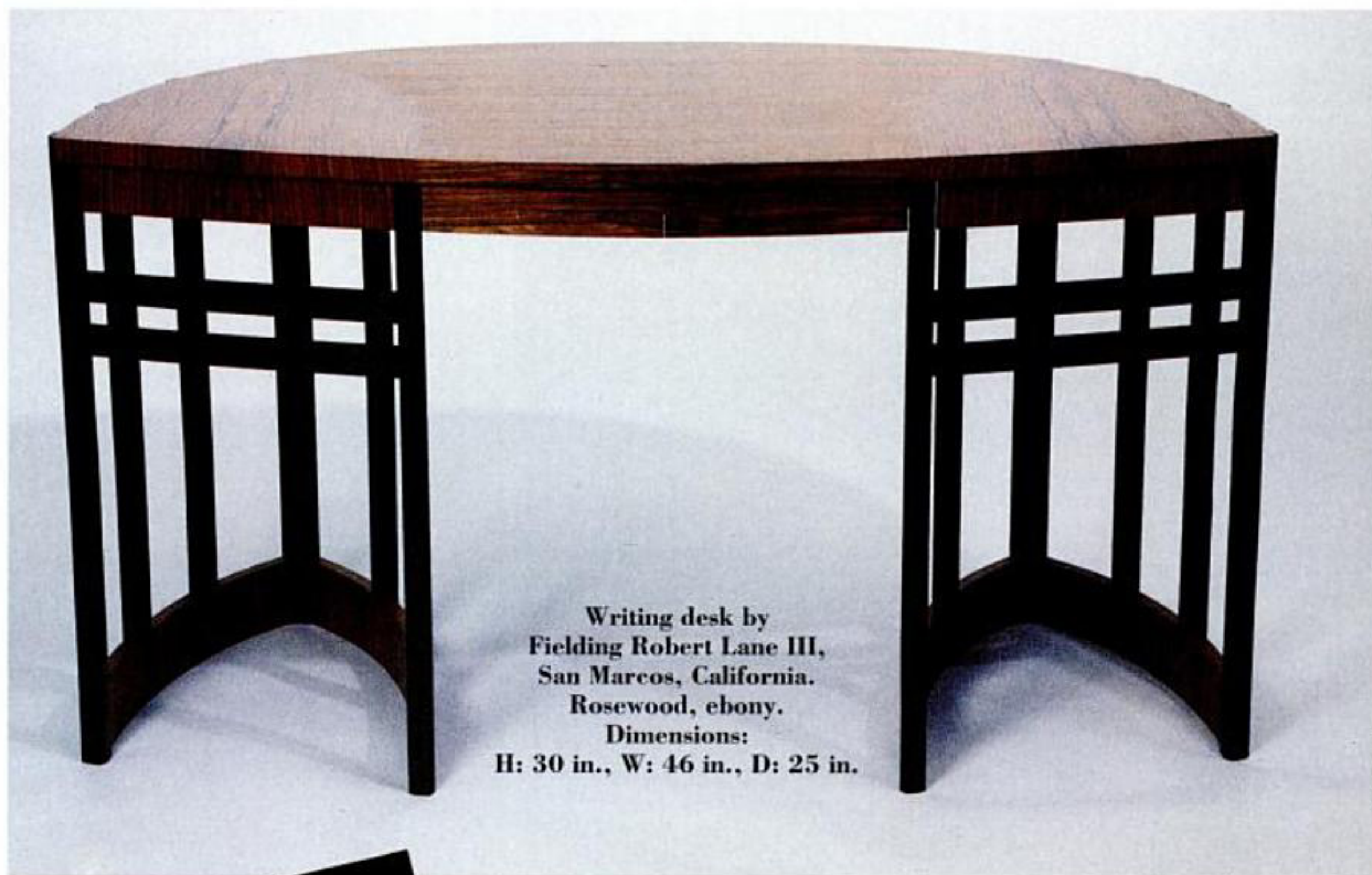


they're less expensive, can be resharpened with an oilstone, and are available in 56 profiles. The manufacturer recommends using the system with a speed-controlled router of at least 2 hp. (Price: \$15 for adapter arbor, \$15 each for shaper cutter)

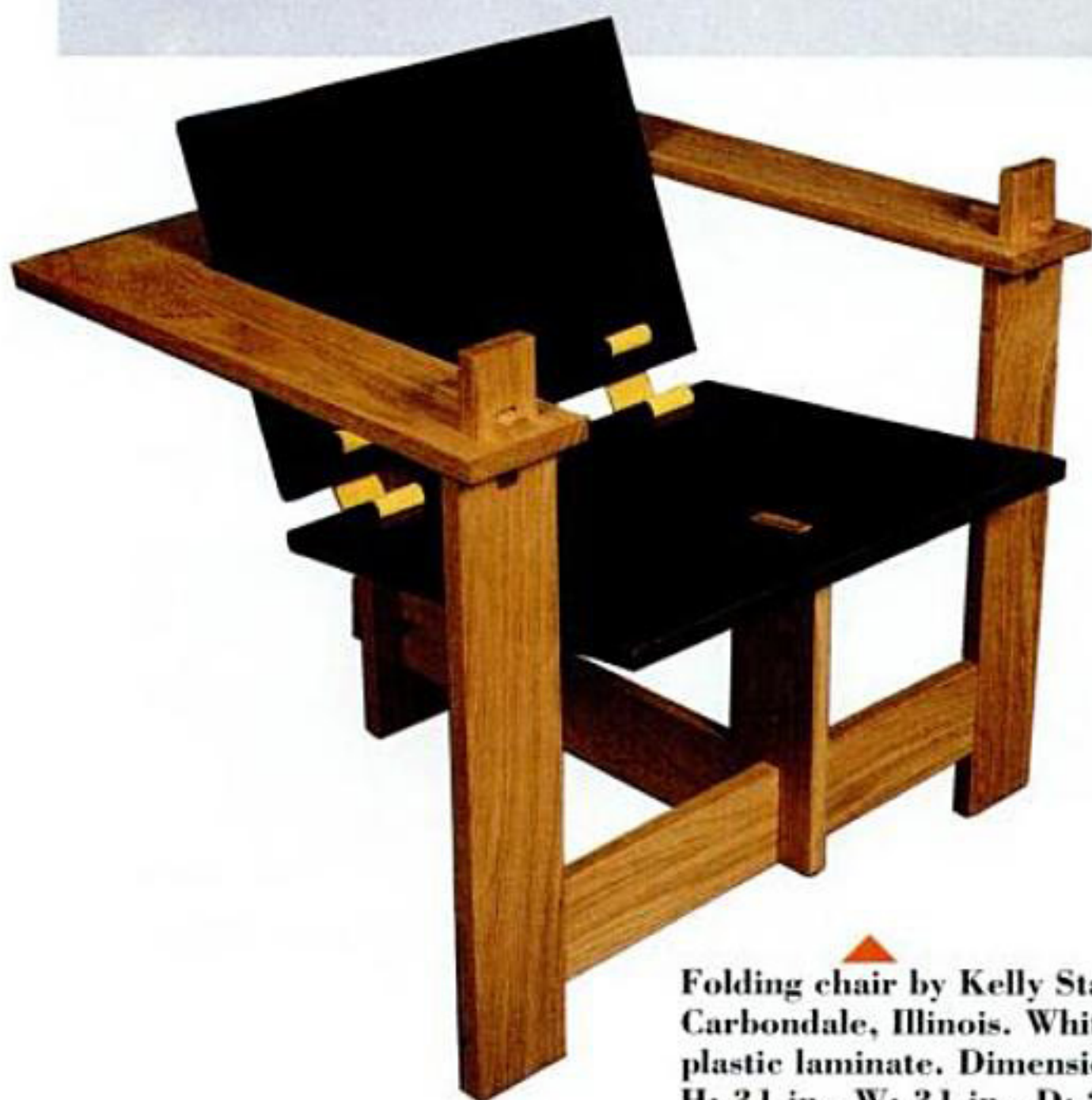
Corob Corp., Dept. AWT, 53 Westwood Rd., Shrewsbury, MA 01545, (800) 745-9895.

CIRCLE NO. 608 ON PRODUCT INFORMATION FORM

GALLERY



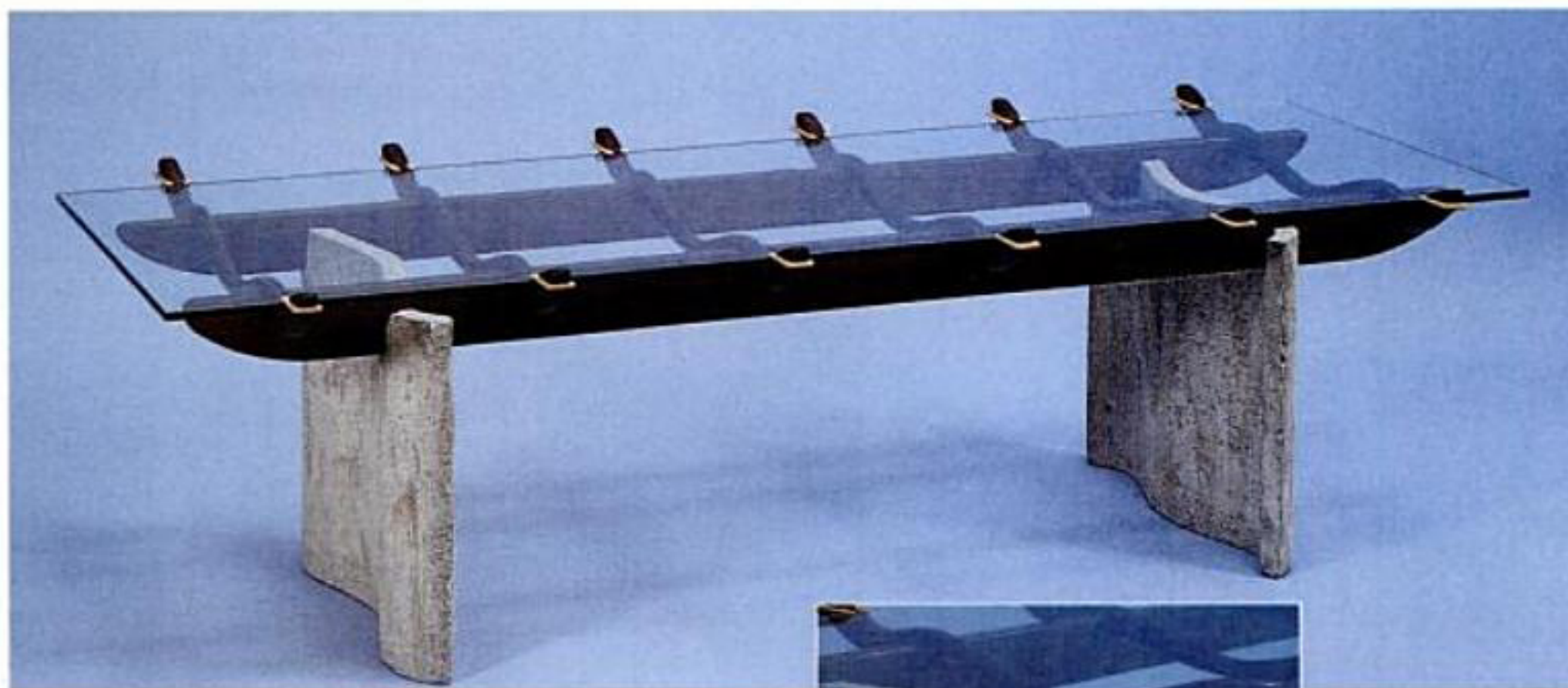
Writing desk by
Fielding Robert Lane III,
San Marcos, California.
Rosewood, ebony.
Dimensions:
H: 30 in., W: 46 in., D: 25 in.



Folding chair by Kelly Stark,
Carbondale, Illinois. White oak,
plastic laminate. Dimensions:
H: 31 in., W: 31 in., D: 25 in.

The student furniture designers at the 1992 International Woodworking Fair in Atlanta were so outstanding we decided to devote a whole Gallery section to their work. Featured here are five pieces, from the show entitled Design Emphasis-92.

GALLERY



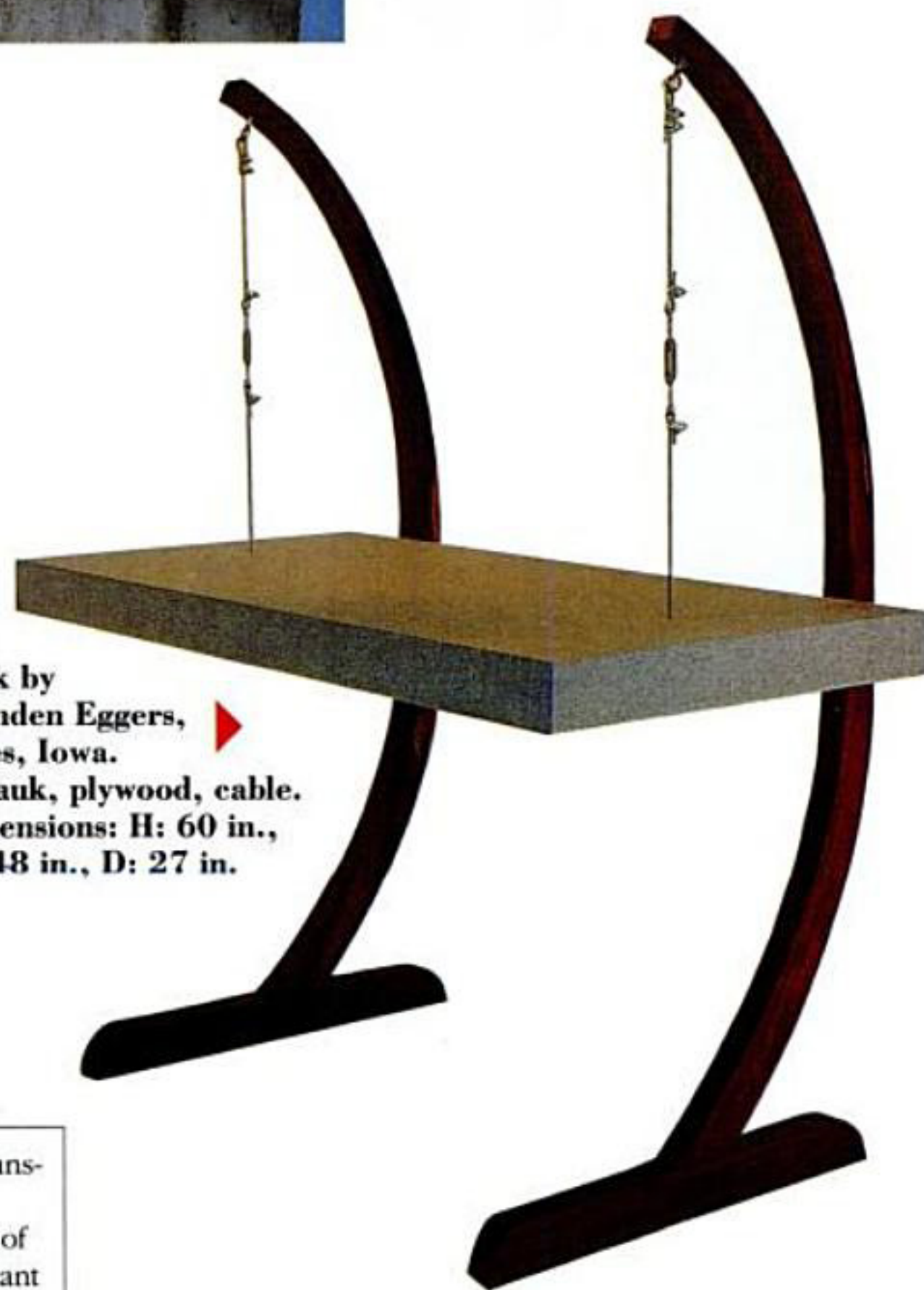
STEVEN DINYER



▲
Gazelle table by Lance Muscara, Pottsville, Pennsylvania. Rosewood (plantation grown), maple, concrete, glass.
Dimensions: H: 18 in., W: 24 in., L: 60 in.



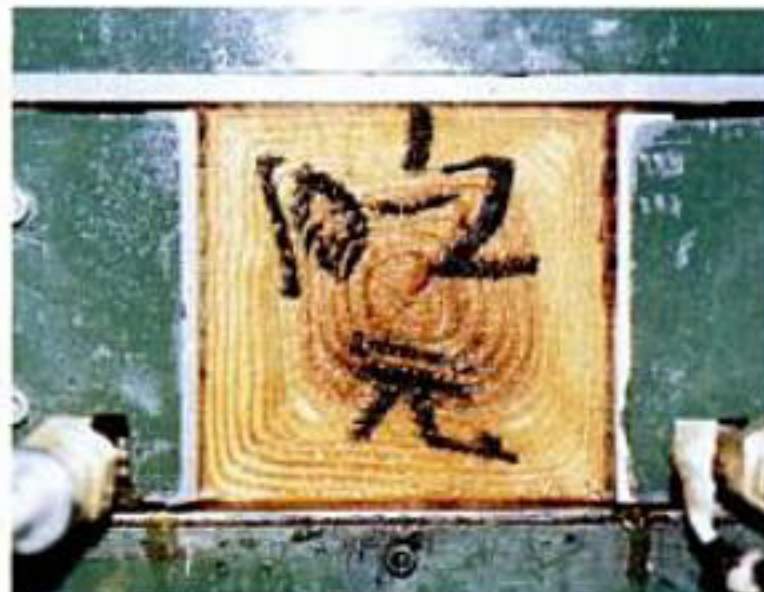
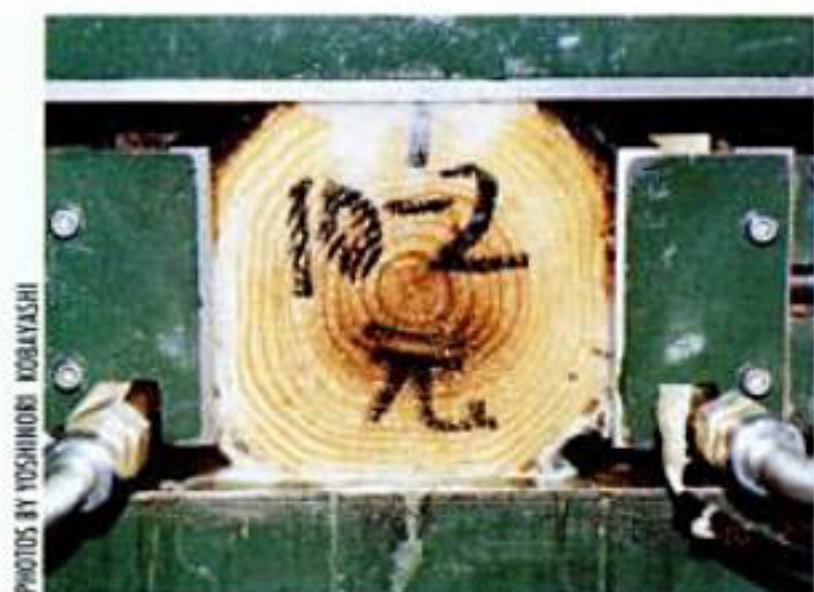
▲
Chest of drawers by Douglas Thayer, Rochester, New York. Cherry.
Dimensions: H: 44 in., W: 36 in., D: 17 in.



▶
Desk by Brenden Eggers, Ames, Iowa.
Padauk, plywood, cable.
Dimensions: H: 60 in., W: 48 in., D: 27 in.

Want to see your work in "Gallery?" Send color slides or color transparencies to "Gallery," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. Please include: materials, dimensions, name of photographer, your name, address, and phone number. If you want your photos returned enclose a self-addressed stamped envelope.

FINAL PASS



To turn marginal logs into straight, square timbers, Japanese researchers heat the logs in a microwave, then compress them.

Heat + Pressure = Wood Squared

Think of the time and wasted wood you'd save if you could grow trees square instead of cutting them that way. Well, a researcher in Japan has come up with the next best thing.

Yoshinori Kobayashi of the Nara Prefecture Forest Experiment Station has patented a technique to "cook" and compress raw logs to shape them into square framing timbers. (See photos.) This reduces sawing time and cutting waste, while yielding wood that is denser and hence stronger.

The experimental process starts in a special microwave oven where the

logs are "cooked" at 212°F until the lumber becomes limber. Then they're compressed, driving out the moisture. When they cool, the logs retain their new square shape, along with some interestingly wrinkled grain patterns.

Kobayashi's research grew out of efforts to create good framing lumber for homes. The Nara area of Japan has a large number of cypress trees, which were planted after World War II, but these trees only run 8 in. to 12 in. in dia., and the wood tends to be wide-grained and weak. With the squaring process, weak trees, and even those that are bent or misshapen, can be put to good use.

Hand-Sharpening Service

Superior Sharpening Services is a mail-order outfit that specializes in sharpening tools by hand. That's right. . .by hand. The company sharpens with Japanese water stones, and will tackle most hand tools as well as jointer knives and planer knives.

Prices range from \$1.50 for honing a new chisel to \$2.50 for a plane, if the bottom is already square and flat. Each tool comes back razor-sharp and with a mirror bright finish. For a complete list of costs, write George Foras, 8551 W. 102 Terrace 4-105, Palos Hills, IL 60465, (708) 430-7009.

Pre-Cut Wood for Projects

If you're in a rush to finish a piece for a special occasion or you'd just rather spend your time at the bench than the lumberyard, Paul Thieme has a service that might be of interest.

Thieme and his company Heritage Building Specialists market hardwood kits for woodworking projects. He concentrates on pieces that have been featured in magazines, including *AW*, but he's also willing to price out wood for your designs.

Each Project-PAK contains stock that is slightly oversize in length and width, but thickened to final dimension. All material is clear and surface sanded. Prices aren't bad; Cherry for the slant-top writing desk that appeared in *AW* #23 will cost you \$99.95 delivered, while the silver chest in the same issue will run you \$49.95 in oak. For more information contact Heritage Building Specialists, 205 N. Cascade St., Fergus Falls, MN 56537, (218) 739-9710.



A Chopper That Saws

When Jim Sunderland needed a cut-off saw for his Nova Scotia lumber mill he was put off by the \$300-\$400 price tag for a new one so he made his own "chopper" saw by mounting a saw blade to the rear axle of his son's old Honda motorcycle. (See photo.)

Modifying the bike took a good bit of work but using it is simple. You just start the engine with a lever welded to the kick starter, put the motor in gear and *carefully* pivot the rear half of the bike into the rough lumber.

The motorcycle redlines at 8000 rpm—fiendishly fast for a saw blade—so Sunderland runs it in second gear when cutting.

As to how efficient the "chopper" saw is, Sunderland says he doesn't know. He's never bothered to check how many board feet he gets per gallon.

Simon Watts

If you have a news item, anecdote or opinion you think belongs in "Final Pass," send it to AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098.