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October 1995, No. 114

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Preparing a scraper, p. 53



Tuning up a tablesaw, p. 60



Coloring wood with dye, p. 72

On the Cover: Pneumatic fastening tools are good for more than framing houses. These versatile tools also are well-adapted to cabinetmaking, as Robert Vaughan explains on p. 42. Photo: Alec Waters

Doing what to a plane sole? What barber worth his salt would put his razor on a belt sander? That's what Sven Hanson seems to be doing in his article on planes (*FWW* #112, pp. 40-44). The middle picture on p. 43 shows burned steel. This is the reverse of giving a blade temper. The discoloration under the thumb of the left hand shows the damage. This blade is now soft.

I would never touch a thin blade on a belt sander. The heat generated would be severe and enough to soften the blade. Because all blades and chisels are very thin at their cutting edge, this is a rule that should not be broken.

The article mentions difficulty in using the plane. I am not surprised. Once the blade is softened, this indeed would be the case. Any power tool used to sharpen a blade or chisel should have low rpms and water immersion. The same article also mentions flattening the sole. These parts are made on a machine costing many thousands of dollars. I would doubt if the process described in the article would reproduce the same results.

—Anthony Twohig, Ont., Canada

Frankly, I was appalled by the article on planes. Over the years, you've had many articles on how to tune up a plane, but I don't remember seeing anyone slapping a plane down on a stationary sander and flipping the switch. A sheet of wet-or-dry silicon carbide sandpaper on a tablesaw top, yes. A piece of plate glass and the same abrasive, yes. A granite slab, yes. At least you could guess that these things were fairly flat. My Baileys will never go near a power sander like that.

—David D. Williams

SVEN HANSON REPLIES: Some readers thought that the idea of power-sanding soles and blades on a belt sander more grievously offensive to the Woodworkers'

Built-in Furniture

Call for submissions: Do you create built-in furniture or cabinets? For an upcoming Taunton Press book project, we are looking for examples that demonstrate a good sense of design and solid craftsmanship. We're especially interested in clever solutions to unusual site situations. We'll acknowledge submissions and return all material we can't use. Please send photos of your work, and tell us about any special features you incorporated or challenges you faced in design or construction. Address your submission to Helen Albert, The Taunton Press, 63 South Main Street, PO Box 5506, Newtown, CT 06470.

Code than taking a Sam Maloof chair to the local Dip and Strip.

One reader pointed out that the metal was burning. He should have read the text more carefully; he didn't see burning but "bluing," applied with a black marker to highlight the grinding or honing action on the back of the blade.

By holding the blade near the edge, I can sense when it's overheating. Moderate pressure and an occasional spray of water prevent burning. The history of toolmaking didn't begin with the purchase of a Japanese power whetstone from a mail-order company. Iron tools come from earth, coal and fire. They get their basic shape in a bed of sand or from forceful hammer blows. Manufacturers grind those castings and forgings to shape. Their high-tech equipment often produces results inferior to the by-eye methods of our great grandfathers more than 100 years ago. For more information on the subject, I recommend Alexander Weygers' book *The Making of Tools* (Van Nostrand Reinhold, 1973).

Tips that don't add up—Over the four to five years that I've been a subscriber to your publication, I've watched its overall content go from of interest to the professional to somewhere between the ridiculous and the ludicrous when it comes to methods of doing things with wood or the tools that work that medium. Three prime examples were in *FWW* #112.

Garrett Hack's article (pp. 54-57) on attaching tabletops to carcasses neglects the common 3/4-in. plywood triangular corner block (and its plastic look-alike). These blocks hold roughly 90% of America's kitchen countertops and, I would estimate, 30% of its desks and tabletops together while also helping to square carcasses.

Lon Schleining's article (pp. 45-49) on shapers stresses safety, as well it should. But his advocacy of making multiple passes on it defeats its main purpose and advantage over a router table: long runs at relatively fast speeds and taking more meat at a pass. Granted, there are some jobs that a shaper does infinitely better, such as stopped flutes in door casings, wide crown molding and raised panels. But any experienced router user can set up a router and run 20 to 30 ft. of most other profiles in the time that it takes just to change and adjust the cutters in a shaper.

Mr. Schleining's main reason for preferring a shaper to a router table appears to be its elimination of chatter marks in the stock. He recommends a \$500 power feed for that purpose. On a properly built router table, a pair of shopmade featherboards and \$5 worth of C-clamps accomplish the same purpose. The resulting product from each is indistinguishable.

Mark Mullin sent in a shop tip (pp. 16, 18)

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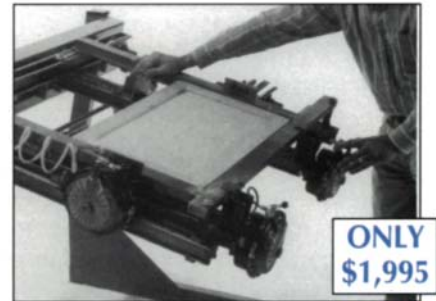
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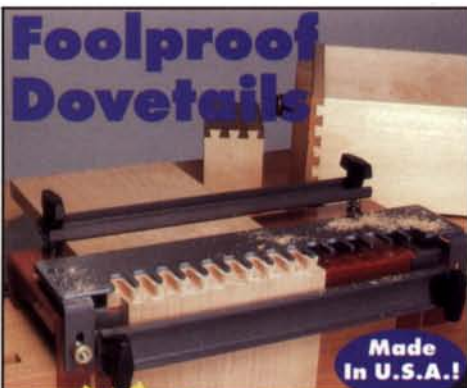
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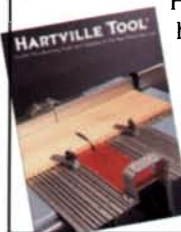
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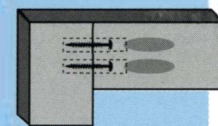
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regarding mounting a router to a table insert that requires three screws, a 1/4-in. bolt, a drill press, a file and (I estimate) an hour's work. Thirty-six years ago, my dad taught me how to do it in 10 minutes using masking tape, a pencil and a drill with the appropriately sized bit and a countersink. If you're not particular about the bit hole being in the exact center of the insert, you can eliminate the pencil and masking tape. You can do it in five minutes because all routers come with their own template (the plastic subbase). Here's how:

Tap over the center hole in the subbase. Lower a spinning 1/4-in. bit through it to create a hole. Remove the subbase from the router. Draw diagonal lines from corner to corner on the insert to find the exact center. Place the subbase on the insert so that the "X" you drew is centered in the hole in the tape. Drill the mounting holes using the holes in the subbase as a guide. Remove the subbase and countersink the holes. If you plan to run a variety of bits over the insert, chuck a 1/8-in. bit into the router, and bolt it to the insert. Lower the spinning bit through the insert to create a pilot hole for a Forstner bit of the size you need. Turn the insert over, and drill the hole without removing the router.

If you need a zero-clearance hole for a bearing-tipped bit, use a 5/8-in. straight bit to create the hole, insert the bearing-tipped bit you intend to use and lower it slowly through the 5/8-in. opening to ream its own hole. By leaving the plastic subbase off the router when it's used in a table insert, you pick up some much needed depth for your bits.

—George K. Rome, Louisville, Ky.

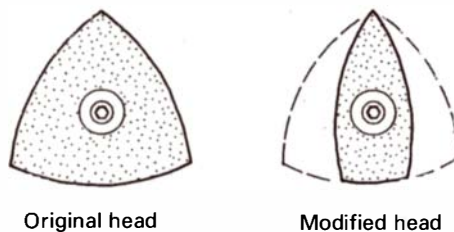
One more try at tapering on the jointer—In *FWW* #112, Chris Becksvort gives bad advice about tapering table legs on a jointer (p. 32). Glenn Dahl had asked how to eliminate the slight radius at the start of the cut caused by lowering the work into the cutter. The solution is simple: The last step in the process is to take a light cleanup pass, referencing off the newly created tapered surface. This will remove the unavoidable radius that was bothering Mr.

Dahl. I usually find that 1/2 in. is enough.

The technique is to clamp a stop block to the infeed table and lower the work into the cutter. At the starting point, there will be no cut (except for the radius), and at the trailing end, the cut will be the full depth to which the jointer is set. There is no need to adjust the outfeed table. If the taper is too great to do in one pass, which usually is the case, there is no problem with taking repeated cuts to add up to the desired taper. The final cleanup pass will make the taper longer. Practice on scrap. The jointer is by far the best way to cut tapers, much faster than a bandsaw and much safer than a tablesaw. It's how we normally do it in my shop. —Bruce Cohen, Boulder, Colo.

Easy modifications to Fein sander—I am writing to offer additional comment on the subject of detail sanders and on the Fein sander in particular (*FWW* #111, pp. 52-55). The Fein is the only detail sander that allows one to modify the head to any size required.

Modifying a Fein sander head



One of the principal purposes for which I bought a Fein was to sand the molded section of raised panels, which I had done with a shaped block and sheet sandpaper. The soft metal of the Fein pad is easily cut down to a size that will fit within my panel profile (see the drawing above). The only requirement is that one leave a curvature on the outside edges similar to the original. This is to accommodate the orbit of the pad. Then one simply cuts the paper to fit the new shape.

Although this was the original reason for

my purchase of the Fein, the tool has since proved useful in many other applications as well, especially cabinet carcass interiors.

—Daniel Foster, Leesburg, Va.

Use a wobble dado blade for coves—

The process of making coves on a table-saw can be speeded up by using a wobble dado blade (see *FWW* 102, pp. 82-85). The fence for guiding the workpiece can be a length of 2x4 or 2x6 clamped to the top of the saw table in front of the blade, perpendicular to the plane of the blade or at an angle. In this position, the drag of the blade will hold the workpiece firmly against the fence. It is also imperative that the workpiece be held down firmly against the tabletop.

To make a raised panel (half a cove), lower the blade until it is under the table surface, and clamp the wooden fence over the blade so that the front of the fence is slightly past the arbor. Turn on the saw, and raise the blade into the wooden fence—the height is established by making trial cuts in pieces of scrap lumber that are at least 2 ft. long (for safety). Feed the work from the end of the fence closest to the front of the tablesaw.

I have made a cove in pine and a raised panel in mahogany in one pass by setting the wobble dado for about a 1/2-in. dado. This procedure might not be suited for making more complex asymmetrical coves, but simpler ones might be attempted with the blade set for a narrower dado.

—Elwood S. Thompson, Stow, Mass.

Good finish for cherry cabinets—I'd

like to comment on Chris Minick's reply to Edward Jonke regarding a finish for cherry cabinets (*FWW* #112, p. 32). I agree that solvent-based polyurethane is the best finish for cherry kitchen cabinets. I've used it on two kitchens built as Mr. Jonke describes (cherry-ply carcasses and solid face frames and raised-panel doors).

I use foam brushes, with none of the problems I've heard associated with them. I believe the real secret to success is sanding between coats with wet-or-dry 400-grit paper and then, finally, rubbing the sur-

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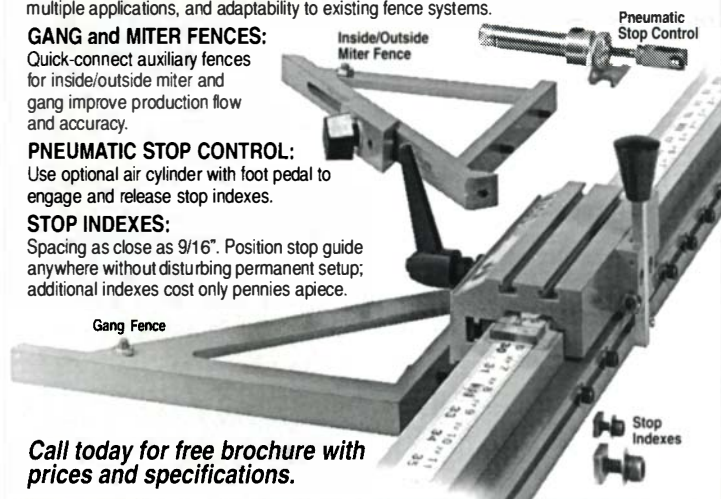
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face with oil and pumice (or if a higher sheen is desired, rottenstone). If, for some strange reason, one wished to stain cherry, I'd wait until the two coats of urethane were applied before wet sanding. Better not to stain—wait the six to eight months for that glorious dark honey color of cherry to develop.—*Bob Busch, Grand Isle, Vt.*

More information sought on finishes—I have been an avid reader of *Fine Woodworking* for many years and have made many of the projects that have been featured. Some of my favorites have been reproduction pieces that appear from time to time. Recently, I completed a mahogany piecrust table, partly modeled after the articles that appeared some while ago.

When I came to finish this table, I was unsure as to the most suitable way of doing this. I found there were no details in your original article or in another manual I used. I do not have spray equipment and considered sending the table out for spraying with lacquer. However, since this is a reproduction piece, this is probably not an appropriate finish. I suspect the original tables were French polished.

On reading back issues describing the many reproduction pieces (and for many of the projects in general), I discovered a general lack of details describing how a particular piece might be finished. I think it would be useful if the articles describing projects would include a brief section that describes the chosen finish and suitable alternatives.—*Peter Horsewood, Dundas, Ont., Canada*

Store your paint cans upside down—One of your readers recently talked about the trouble he'd had with paint containers (*FWW* #111, p. 4). As soon as you open the can, punch holes in the rim (three or four will do) where the lid goes, as another reader had suggested. Then, when you are finished, put the lid on, and turn the can upside down. I have cans that have lasted 20 years. New cans should be stored upside down as well.

—*Daniel Gillin, Wenonah, N.J.*

Call them what they are—Regarding the question about laminated cutting boards and butcher-block surfaces (*FWW* #111, pp. 18, 20): Though both surfaces are made up of laminated stock, cutting boards are several inches thick and meant to be used lying on their sides for light slicing of bread and vegetables and general food preparation. But true butcher block is made to form a thick square table using glued up lengths of wood standing on end, so the butcher can cut meat with a heavy cleaver on end grain, which will not splinter.

I can see no need to make a workbench with an end-grain surface. I vote for the

laminated cutting-board top even though it certainly would get damaged doing even the most careful work. Calling the two different materials by their proper names (laminated cutting board or butcher block) would perhaps end the confusion.

—*Gene de Prado, San Anselmo, Calif.*

Advice on getting product problems ironed out—Have you bought an expensive tool, machine or adhesive only to find that it was poorly made, poorly assembled, missing parts or didn't perform as claimed? I have. I used to just grumble and carry on, but about two years ago, I decided that I'd had enough. I would like to encourage my woodworking companions to do as I have done.

Find out the name and the address of the chief executive officer (CEO) of the company involved, and write him or her a letter. Don't write to the local distributor or customer-service department. Briefly and politely explain your problem, and ask for action, either replacement or upgrade parts, refund or change in product. Include your telephone number, and ask the CEO to call you to discuss the problem.

You will be amazed at the number of responses. It seems a lot of CEOs still care about their company's reputations and products. For example, last week, the president of the tool division of Stanley called me about a problem I had, made sure I got replacement parts and told me that he planned to change the specifications of the product based on my recommendations.

If we all do this, maybe the quality of tools and materials available to us will start to approach what you could get "in the good old days."

—*John D. Foster, Atlantic Beach, Fla.*

Dunk, don't paint, outdoor furniture—Several years ago, I built four Adirondack chairs. Before assembling them, I mixed a large pail of stain. I then "painted" all the boards by simply dunking them into the pail and draining them.

I have had excellent luck making my own stain. I use one-part oil-based paint, one-part boiled linseed oil and one-part Varsol. If you can't get Varsol where you live, use paint thinner. My chairs have been left outside in all sorts of weather. After several years, they still look as good as the day they were assembled. With spar varnish, I've had nothing but trouble.

—*H.A. Winter, Port Dover, Ont., Canada*

Why you can't pick your own lumber—In general, Vincent Laurence's article "Buying Lumber" (*FWW* #113, pp. 36-41) is well-written, informative and accurate. But I did want to comment on a few things.

Mr. Laurence urges your readers to visit their local lumberyards and pick through

their stacks. If they don't allow it, he says, go elsewhere. The hardwood lumberyard where I work has good reasons for its no-pick rule.

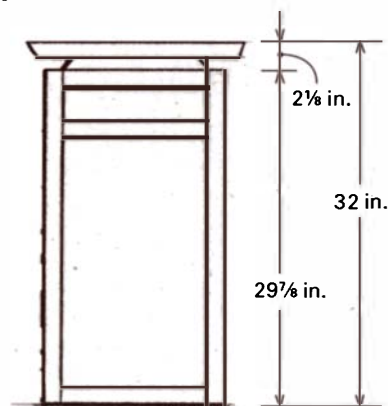
If we let customers select their own boards, they inevitably will take the widest, longest, clearest boards they can find. If we now sell that stack to an out-of-town customer as FAS1F & Btr, we are in error. Though every board in the stack may meet minimum FAS rules, the "&Btr" has been selected out.

My company faced two lawsuits in one year, both from customers who had been allowed in the warehouse. Our employees are required to wear steel-toed shoes; what do we say to a customer who shows up in tennis shoes? Our insurance company has made it clear: It will not cover a customer, period.

We do offer S2S and S3S lumber for sale in woodworking stores at most of our warehouse locations so customers can select boards. Our customers seem to be able to find enough flat boards to keep them coming back for more. Prices are adjusted only to include the cost of milling, the loss to straight-line rip and the handling.

—*Jeff Arnold, store manager, Paxton Lumber Co., Cincinnati, Ohio*

Erratum—A drawing in the article by Peter Korn in *FWW* #113 (pp. 52-55) included an inaccurate measurement for the overall height of his hall table. A corrected drawing appears below.



About your safety:

Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don't try to perform operations you learn about here (or elsewhere) until you're certain they are safe for you. *If something about an operation doesn't feel right, don't do it.* Look for another way. We want you to enjoy the craft, so please keep safety foremost in your mind whenever you're in the shop.

—*Scott Gibson, editor*

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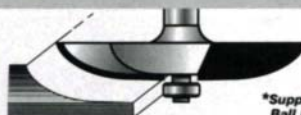
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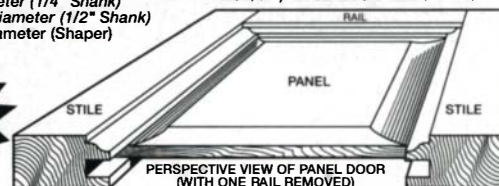
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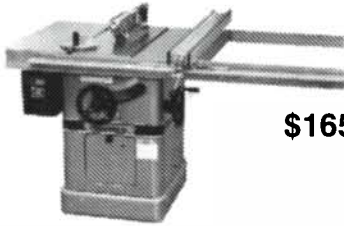
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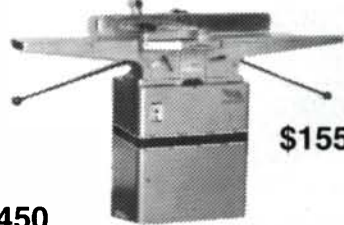
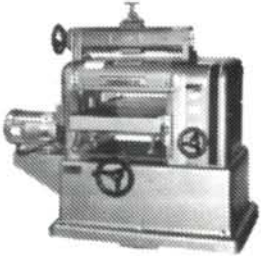
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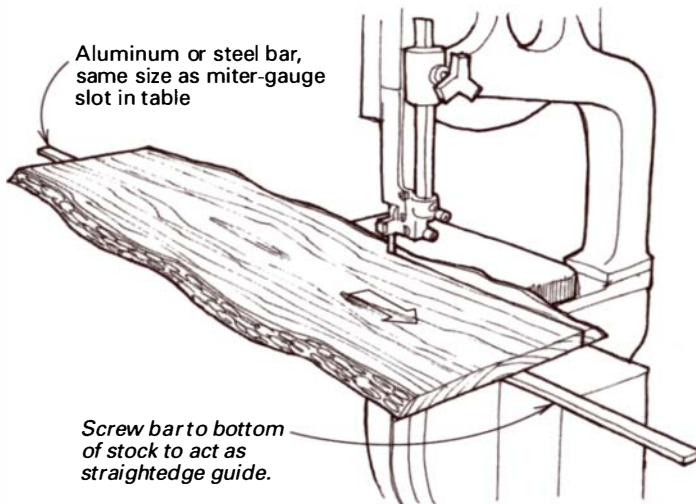
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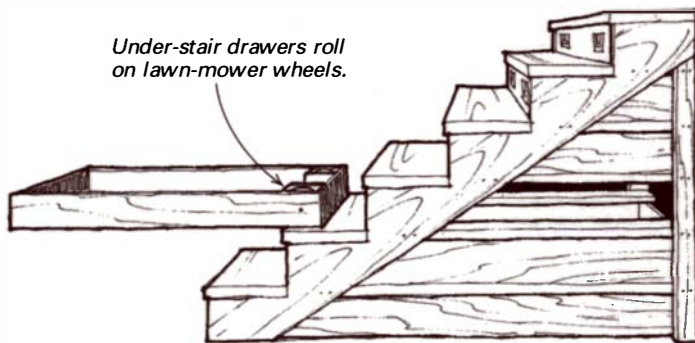


Here is a cheap, easy way to straighten a rough-edged or crooked board on the bandsaw. Screw a length of aluminum or steel-bar stock to the bottom of the board. Then push the stock through the saw with the bar riding in the miter-gauge slot to guide the cut. To know exactly where to fasten the bar, mark the cut line, and then space the bar over the distance from the blade to the table slot. Extend the bar several inches from each end.

When ripping on the bandsaw, you don't have to worry about kickback, which is a problem on the tablesaw. I prefer to use a 3/4-in. resaw blade for this operation because it doesn't deflect as much from the pressure of a heavy plank.

—David B. Bills, Fairport, N.Y.

Under-stair storage drawers



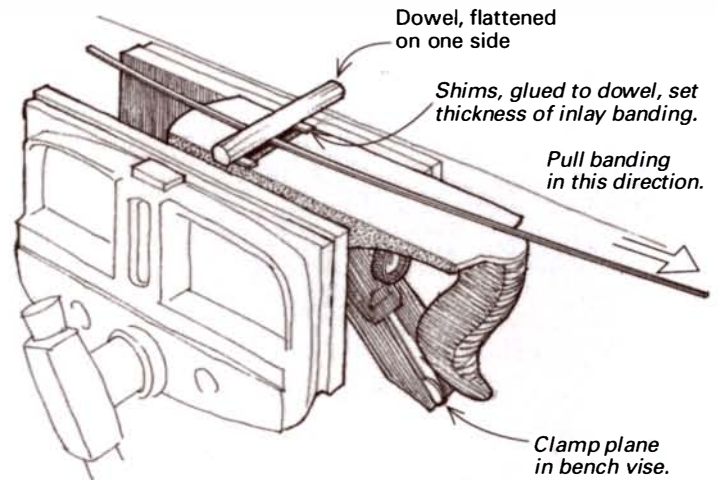
When I set out to add under-stair storage to my basement shop, my first idea was to build a set of drawers accessible from the side. But the drawers would be limited to a 40 in. depth (the width of the stairs), and I would have to keep the space in front of the drawers clear so they could be opened. My wife pointed out that if I turned things 90° and placed a drawer under each step, I could make them as deep as I wanted, and the drawers wouldn't waste any floor space. This approach really appealed to me because the stairway was probably the only space in the shop that was always clear and uncluttered. I could always get to the drawers, and I'd never have to move anything out of the way to open them.

The drawers are plywood boxes with poplar fronts and recessed handles. They vary in length, shorter on top, longer as you go down. The bottom drawer is 7 ft. long. Because the drawers are quite heavy, I mounted 4-in.-dia. lawn-mower wheels in the back corners, which roll on 2x4 tracks. There are

no wheels in front. To open a drawer, I lift the front slightly and pull. With gravity working as a latch, I don't have to worry about a drawer opening on its own. For safety, I keep the door at the top of the stair locked whenever I have a drawer open.

—William R. Robertson, Kansas City, Mo.

Dimensioning wood inlays

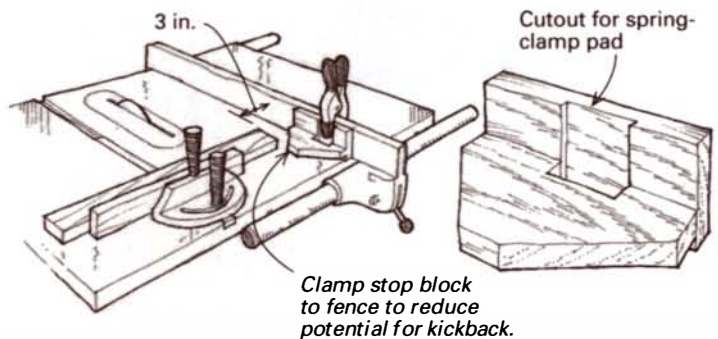


I recently discovered this low-tech but effective technique for planing strips of holly into 1/16-in.-thick guitar-edging inlay.

Clamp a sharp plane, sole up, in your bench vise, and adjust it for a fine cut. Glue two pieces of 1/16-in.-thick scrapwood to a 6-in. length of 1/2-in. dowel, flattened on the bottom. To dimension each strip of holly, hold it against the plane blade with the dowel while you pull the strip toward you. Repeat until the plane stops cutting. The scrapwood spacers will terminate the cut when the holly is precisely the same thickness as the spacers.

—Donnie Ross, Aberdeen, Scotland

A safer stop block for cutoff work



You might file this under the "what happened?" heading. I was making multiple crosscuts on a tablesaw with a miter gauge, using a 1-in. standoff (acting as a stop block) clamped to the rip fence. I had done it this way many times without incident. Anyway, I was cutting 5-in.-long blocks from 3-in.-wide stock. While removing a cutoff, I must have moved it in a twisting motion, so it touched the blade. The stock briefly jammed between the fence and blade. The block bounced off me and drove itself into the wall behind me. Recreating the accident, I found the diagonal measure of the piece exceeded the distance between the fence and the blade. Jammo-whammo.

So I made a 3-in.-wide standoff for the fence. It's nothing fancy: just two pieces of scrap, one vertical, one horizontal. I made

BOSCH

1003VSR	3/8" VSR DRILL W/KEYLESS CHUCK	85
1194VSR	1/2" VSR, 2 STAGE HAMMER DRILL	145
1272D	3" X 24" DUSTLESS BELT SANDER	208
1273D	4" X 24" DUSTLESS BELT SANDER	214
1273DVS	4" X 24" VS DUSTLESS BELT SANDER	229
1370DEV6	6" VS DSTLS RNDM ORB SNDR	234
1584VS	CLIC BARREL HANDLE JIG SAW, VS	148
1584VSA	1584VS JIG SAW W/CASE	164
1584VSB	1584VS JIG SAW W/CASE & 20 BLADES	179
1584VDS	BARREL HANDLE JIG SAW, DUSTLS	193
1587VS	TOP HANDLE JIG SAW, VARSP	148
1587VSA	1587VS JIG SAW W/CASE	164
1587VSB	1587VS JIG SAW W/CS & 20 BLADES	179
1587VDS	TOP HANDLE JIG SAW, DUSTLESS	193
1604	1 3/4 HP ROUTER	142
1608	LAMINATE TRIMMER	97
1609KX	DELUXE INSTALLERS KIT W/4 BASES	229
1613EVS	2 HP VAR SP PLUNGE ROUTER	198
1613EVSX	1613EVS 2HP/RA1051 EDGE GUIDE	216
1614EVS	1 1/4 HP VAR SP PLUNGE ROUTER	158
1615EVS	3 1/4 HP VAR SP PLUNGE ROUTER	289
1615EVSX	1615EVS W/RA1051 EDGE GUIDE	304
3051VSRK	9.6V CRDLS KIT W/2 BATT KEYLESS	139
3054VSRK	12V CORDLESS KIT W/2 BAT, CASE	185
3283DVS	5" VS DUSTLESS RANDOM ORBIT	95
3283DVSX	INCLUDES CASE, SANDER & ACCESSRS	119
3300K	12V CRDLS VSR DRILL W/2 BAT, CS & CHR9	193
3310K	12V CRDLS W/ HANDLE W/2 BAT, CS & CHR9	197
87000	TRIANGULAR CORNER SANDER	69
87000A	87000W 10 PCS PAPER, EXTENDER & POLISH PAD	84
B70001	VAR SP CORNER SANDER	92
B7001A	B70001 W/10 PCS PAPER, EXTDR & POLISH PAD 107	107
B2300K	12V CORDLESS DRILL KIT W/2 BAT	178
B4050	NEW IN LINE GRIP JIGSAW	113

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31-460	4" BELT/6" DISC SANDER	127
34-182	TENONING JIG	84
37-070	NEW! VS BENCH JOINTER	258
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AT550S	1 1/2 HP SHUTTLE COMPRESSOR	265
AT550T	1 1/2HP TWIN TANK COMPRESSOR	285
AT550P	1 1/2 HP PANCAKE COMPRESSOR	285

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C10FC	10" COMPOUND MITER SAW	255
C10FS	NEW 10" SLIDE COMPOUND MITER SAW	745
M12V	3 HP VAR SPEED PLUNGE ROUTER	235
NT45A	18 GA. FINISH NAILER W/CASE	289
NV83A	FULL HEAD CONSTRUCTN COIL NAILER	429
P205B	3 1/4" PLANER, 3.4 AMP	92
TR12	3 HP PLUNGE ROUTER	192

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AP12	12" PORTABLE PLANER	397
DC500	DETAIL CARVER	82
DP80	8" DRILL PRESS	109
DS2000	DETAIL SANDER	82
OS5450	OSCILLATING SPINDLE SANDER	165
SC162VS	16" VS SCROLL SAW	189

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310	PRODUCTION LAMINATE TRIMMER	144	743K	7 1/4" FRAMERS SAW, LEFT SIDED WITH CASE	128
314	4 1/2" TRIM SAW	141	843	7 1/4" FRAME SAW, 15 AMPS	138
315-1	7 1/4" BUILDERS SAW	129	2620	3/8" VSR DRILL, 0-1200 RPM W/CHK	87
330K	SPEED BLOCK FINISHING SANDER	60	2621	3/8" VSR DRILL, 0-1200 RPM. KEYLESS	87
330K	330 WITH CASE & 2-10 YD ROLLS PAPER	94	5008	DMOTILE TEMPLATE	47
332	QUIKSAND 5" RNDM ORB W/STKIT PAD	68	5009	MORTISE & TENON JIG	77
332K	332 W/CASE & 100 SHEETS PAPER	95	5116	OMNI JIG	257
333	QUIKSAND W/HOOK & LOOP, DUSTLS	75	31	PLUNGE ROUTER BASE	73
333K	333 W/CASE & 50 SHEETS PAPER	102	7116	NEW 2 1/4" OMNIJIG	293
334	QUIKSAND W/STKIT, DUSTLESS	75	7310	LAMINATE TRIMMER, 5.6 AMP	94
334K	334 W/CASE & 100 SHEETS PAPER	102	7312	OFFSET TRIMMER	127
340	1/4 SHT FIN SANDER W/DUST PAU	52	7319	TILT BASE TRIMMER	109
340K	340 WITH CASE & 10 SHEETS PAPER	75	73333	RANDOM ORBIT DUST EXTRACTION	24
345	SAW BOSS 6" CIRCULAR SAW	104	7489	CUTOFF TOOL	63
347K	7 1/4" FRAMERS SAW, 15AMP WITH CASE	128	7518	3 1/4 HP FIXED BASE ROUTER-5 SPEED	267
351	3" X 21" BELT SANDER	156	7519	3 1/4 HP FIXED BASE ROUTER-1 SP	233
351K	351 W/10 ASST BELTS & BELT CLNR	169	7536	2 1/2 HP FIXED BASE ROUTER	214
352	3" X 21" BELT SANDER W/DUST BAG	160	7537	2 1/2 HP FIXED BASE "D" HNDL RTR	203
352K	352 W/10 ASST BELTS & BELT CLEANER	173	7538	3 1/4 HP PLUNGE ROUTER-1 SPEED	242
360	3" X 24" BELT SANDER W/DUST BAG	198	7539	3 1/4 HP PLUNGE ROUTER-5 SPEED	269
360K	360 W/10 ASSORTED BELTS & BELT CLNR	211	7549	TOP HANDLE BAYONET SAW	134
361	3" X 24" BELT SANDER	189	7549K	7549 W/CASE & 10 BLADES	152
361K	361 W/10 ASST BELTS & BELT CLEANER	202	7649	BARREL GRIP BAYONET SAW	147
362	4" X 24" BELT SANDER W/DUST BAG	209	7700	NEW 10" LASERLOC MITER SAW	344
362K	362 W/10 ASST BELTS & BELT CLEANER	225	7800	DRYWALL SANDER	327
363	4" X 24" BELT SANDER	199	7810	POWER TOOL TRIGGERED WET/DRY VAC	258
363K	363 W/10 ASST BELTS & BELT CLEANER	215	9118	PORTA PLANE KIT W/CASE, CRBD BLD	214
410	UNDERSCRIBE LAMINATE TRIMMER	148	9314	4 1/2" TRIM SAW KIT	154
411	MITER FOLD LAMINATE TRIMMER	165	9315	7 1/4" BUILDERS SAW KIT	149
444	PROFILE SANDER	85	9345	SAW BOSS 6" CIRCULAR SAW KIT	128
447	7 1/4" FRAMERS SAW W/BRAKE 15 AMP	137	9444	PROFILE SANDER KIT WITH ACCESSORIES	114
505	1/2 SHT FIN SANDER	126	9447	7 1/4" CIRC SAW W/BRAKE & CASE	158
505K	505 W/CASE & 2-10 YD ROLLS PAPER	162	9637	TIGER SAW VAR SPD RECIP SAW KIT	146
511	CYLINDRICAL LOCK INSTALLATION KIT	139	9647	TIGER CUT RECIP SAW KIT	118
550	NEW POCKET CUTTER	178	9843	7 1/4" LEFT SIDE SAW W/BRAKE & CASE	158
556	BISC JOINER W/CASE & TLT FENCE	138	9853S	12V CRDLS KIT W/2 BAT, CASE	163
556K	SAME AS ABOVE W/1000 BISCUITS	160	97310	LAMIN TRIMMRKIT W/4 BASES & CS	198
690	1 1/2 HP ROUTER W/1/4" & 1/2" COLLETS	138	97335	5" RANDOM ORBIT SANDER W/CASE	129
690K	690 W/CS, EDGE GUIDE, & TEMP GD KIT	194	97336	6" RANDOM ORBIT SANDER W/CASE	134
691	1 1/2 HP "D" HANDLE ROUTER	155	97355	5" RANDOM ORBIT W/STEEL CASE & DUSTEXT	149
691K	691 W/CASE, EDGE GD & TEMP GD KIT	214	97366	6" RANDOM ORBIT W/STEEL CASE & DUST EXT	159
693	PLUNGE BASE ROUTER, 1 1/2 HP	174	7335K	5" RANDM ORB W/STEEL CASE, 73333 & PAPER	162
695	SHAPER TABLE W/ 1 1/2 HP ROUTER	222	7336K	6" RANDM ORB W/STEEL CASE, 73333 & PAPER	165

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EY6100CQKW	12V CORDLESS VSR KIT W/2 BAT, CASE & 15 MIN CHARGER	196
EY6207EQK	1/2", 12V CORDLESS DRIVER/DRILL W/BATTERY & CASE	235
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0565T	ANGLE FINISH NAILER 1"-2 1/2"	204
0626NK	NARROW CROWN 1/4" STAPLER 1/2"-1" WITH CASE & 5000 STAPLES	104
0645S	NARROW CRN 1/4" STAPLER 3/4"-1 3/4"	189
EZ-1	SHOOTS 1/4", 3/8", 1/2" CRN STAPLES & BRADS, 5/8" CAP, W/CASE & 5000 ASSORTED FASTENERS	98

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DA391DW	9.6V ANGLE DRILL KIT	175
6211DWE	12V KIT W/2 BATTERIES	175
5007NBK	7 1/4" CIRC SAW W/CASE & BLADE	129
LS1011	10" COMPOUND MITER	539
LS1211	12" COMPOUND MITER	849
N1900B	3 1/4" PLANER	129
BO5001	5" RANDOM ORBIT SANDER	69
DA3000R	3/8" ANGLE DRILL	189
9.6V BATTERY		29
7.2V BATTERY		24

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1605-02	BISCUIT JOINER	136
2736-04	12V VSR CORDLESS DRILL KIT	148
3400	10" TABLE SAW W/CARB BLADE & STAND	189

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DW421	5" DSTLS RNDM ORB SANDER, VELCRO	78
DW430	3" X 21" DUSTLESS BELT SANDER	165
DW431	3" X 21" DSTLS BELT SANDER VAR SP	184
DW443	6" RCS SANDER VAR SP, VELCRO	145
DW444	SAME AS ABOVE WITH PSA PAD	145
DW610	1 1/2 HP ROUTER, 9 AMP	149
DW615	1 1/4 HP PLUNGE ROUTER, VAR SP	164
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DW930	12V CORDLESS CIRCULAR SAW	118
DW930K	12V CRDLS CIRC SAW KIT W/BAT & CS	149
DW935	14.4V TRIM SAW	198
DW935K	14.4V TRIM SW KIT W/BAT, CHRGR, CS	239
DW972K2	NEW 12V CRDLS KIT W/BATTERY & CASE	189
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6490	10" MITER SAW	264
6494	10" COMPND MITERSAW W/CARB BLD	322
6507	VAR SPEED SAWZALL W/BLADES & CS	145
6511	SAWZALL 2 SPEED WITH CASE	139
6527	SUPER SAWZALL W/BLADES & CASE	178

SENCO

SLP20	BRAD NAILER W/CASE 5/8"-1 5/8" CAP	278
SFN40	FINISH NAILER 1 1/4"-2 1/2" CAP	388
SLS20	14" CRW NSTAPLER, 3/8"-1 1/2" OILESS W/CS	248

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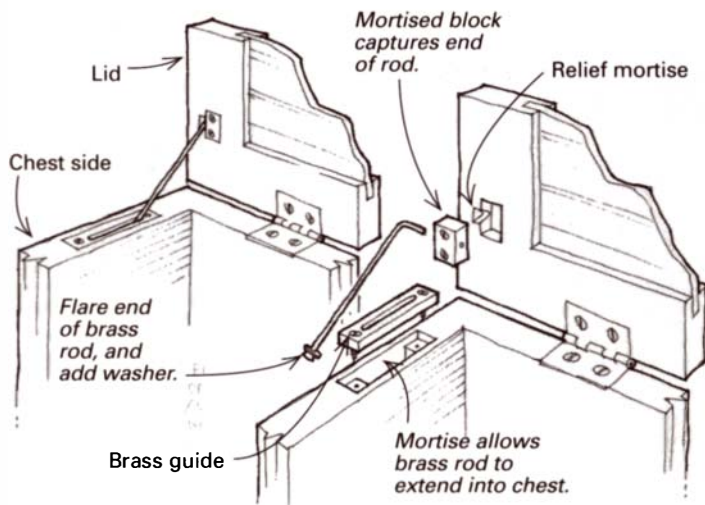
TR215	8 1/2" SLIDE COMPOUND MITER SAW	369
JS100	BISCUIT JOINER	164
FT2000E	3 1/2" hp ROUTER VAR SPD	205
EB100	EDGE BANDING SYSTEM	208
EDS132	13.2V CRDLS DRILL KIT W/2BAT	208
F410	10" X 40T QUIET BLADE	49
F810	10" X 80T QUIET BLADE	74
LM72M010	10" X 24T FLAT TOP RIP BLADE	36
LU82M010	10" X 60T CROSSCUT/RIP BLADE	45
LU84M010	10" X 50T ATBCOMBO BLADE	40
LU85M010	10" X 80T ATB FOR MIRROR FINISH	39
LU87M010	10" X 24T RIP BLADE THIN KERF	58
LU88M010	10" X 60T CROSSCUT THIN KERF	45
LU89M010	10" X 72T TCH NON FERROUS METAL	57
LU92M010	10" X 80T TCH - BEST FOR LAMINATES	59
LU98M010	10" X 80T TCH LAMINATES OR WOOD	67
SD308	8" SAFETY DADO WITH CASE	116
SD508	NEW 8" SUPER DADO SET	168
94-100	CABINET DOOR SET	158

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it exactly 3 in. wide, so I can clamp it to the fence and then set the fence 3 in. beyond the length desired. Now there is plenty of room to remove stock. There has been no repeat incident.

—Jim Wright, Berkley, Mass.

Lid support for a small chest



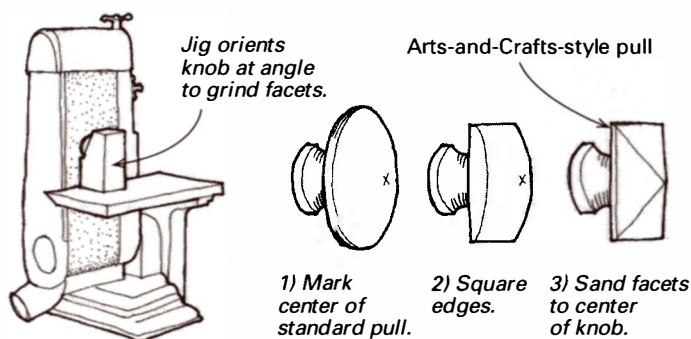
Here's how to make an inexpensive lid support for a small chest with 1/8-in. brass rod. Determine the length of the rod by making a life-sized sketch of the chest and lid. Bend the rod at 90° on one end, and flare the rod at the other end to catch a small washer. Insert the 90° bend into a wooden retainer block. Then fit the retainer block into a small mortise in the lid. Add a small relief mortise on the inside of the lid to accommodate the rod. Cut a deep mortise into the chest side, and cover the mortise with a slotted cover as shown. You can make the cover with brass or wood. The relief mortise in the lid and the deep mortise in the side should allow the rod to travel its full range as the lid closes.

—Mark Moffatt, Denver, Colo.

Quick tip: Remove pencil marks with lacquer thinner. It is easier and more effective than sanding, and it works in tight corners.

—Susan Caust Farrell, Searsport, Maine

Making faceted drawer pulls



My wife wanted me to reproduce square-faceted wooden drawer pulls to match the ones on her grandmother's Arts-and-Crafts-era highboy. None of my hardware catalogs had any good replacements. Then I realized that I could adapt the common rounded pulls that most hardware and lumberyards sell.

I marked the center of each pull with an X and belt-sanded the edges on four sides. This left a nice square pull with a rounded top. Then I made a jig out of scrapwood to align the pull against the stationary belt sander at an angle of 10° or so. I made the jig

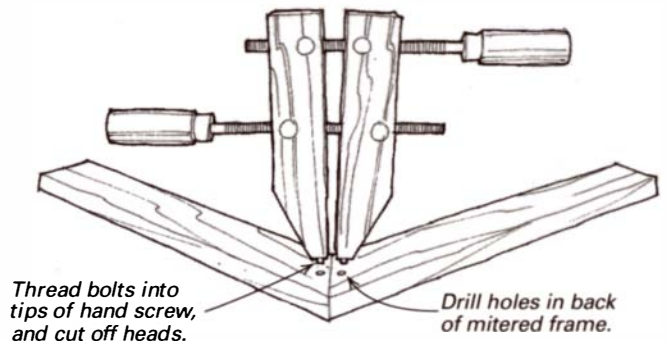
the same width as the foot of the pull, so I can get my fingers around the jig. I grip the setup with one hand to grind facets on the top of the pull. I push the jig into the belt sander, watching the facet grow until it reaches the center of the X. Next I flip the pull over to machine the opposite facet. Finally, I sand the remaining two sides, stopping when each facet approaches the center of the X.

—Robert F. Vernon, Indianapolis, Ind.

Quick tip: Use a dart sharpener to touch up your blunt awl. These sharpeners, which are 1-in.-long hollow cylinders made of Carborundum, sell for about a dollar in sporting-goods stores.

—John Burke, Northfield, N.J.

Modifying hand screws to clamp mitered frames

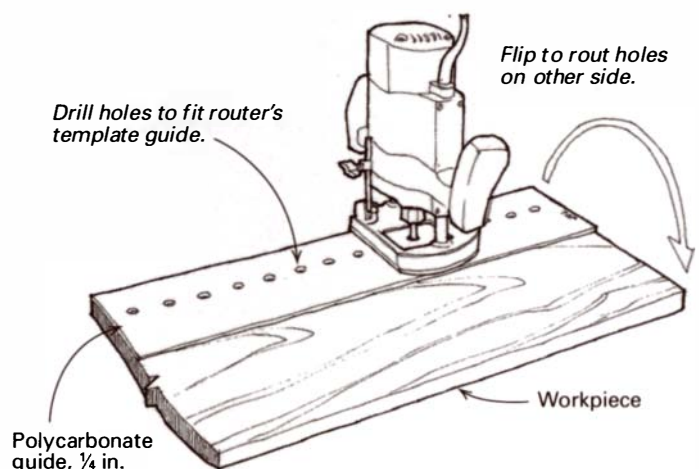


To clamp mitered frames, you can squeeze the joint via pocket holes drilled in the back of the adjacent parts. Two manufacturers offer clamps for this: Universal Edge-to-Edge clamp (W. MacNiven Conard, P.O. Box 250, Vershire, VT 05079; 802-685-4441) and Jorgensen adapter tips (Adjustable Clamp Co., 417 N. Ashland Ave., Chicago, IL 60622; 312-666-0640).

To make your own clamps, add metal pins to a hand screw, as shown. Make the pins by screwing bolts into tapped holes and then cutting or grinding off the heads. To use, drill holes in the back of the frame, and use the pins to apply pressure. Angle the tips toward the center of the work.

—Glen Carlson, San Diego, Calif.

Drilling adjustable shelf-pin holes



The best way to drill adjustable shelf-pin holes in cabinets is with a 1/4-in. bit in a plunge router. This is especially true for materials like melamine. You'll need a guide with holes to fit the router's template guide. M.E.G. Products (9 John Lenhardt

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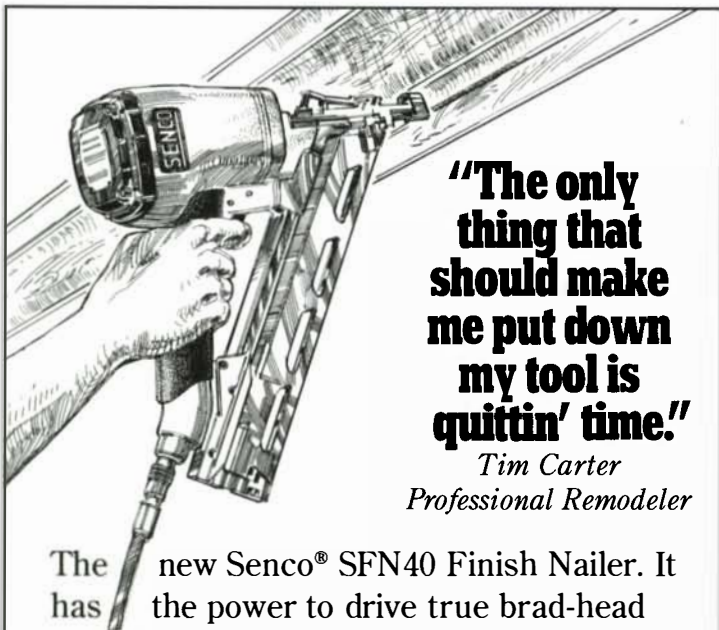
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thing that
should make
me put down
my tool is
quittin' time!"**

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Road, Hamilton Square, NJ 08690; 609-587-7187) makes an aluminum template for this. Polycarbonate, 1/4 in. thick, also is a good choice for the pin-hole guide.

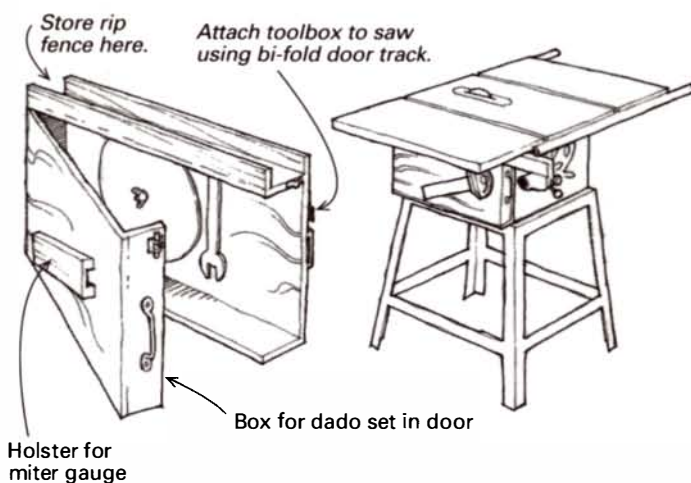
For my guide, I used a drill press to make 7/16-in. holes (to match the diameter of my router's template guide) on 1 1/2-in. centers. On one end of the template, write "top," so when you are setting up to bore holes in the workpiece, you can orient the template the same way.

To use, clamp the template along one edge of the cabinet with spring clamps and two pieces of double-faced tape. Then plunge the router in all of the pilot holes. When you are finished with one side, flip the template, and move it to the other edge, making sure "top" is at the top of the cabinet.

—L.L. Chip Lutz, Puyallup, Wash.

EDITOR'S NOTE: This method also was submitted by Leslie O. Payne, Gaston, Ore.

Removable toolbox for a tablesaw



I made this removable tablesaw toolbox for easy portability on construction jobs. The 3/4-in. plywood box holds sawblades, a dado set, table inserts and so on. I added a channel to the top of the box to hold the rip fence when it's not needed. A hollow cleat on the side holds the miter gauge. I attached the box to the saw with a section of a used bi-fold door track so that I can slide the box off the saw.

—Harvey W. Byler, Burton, Ohio

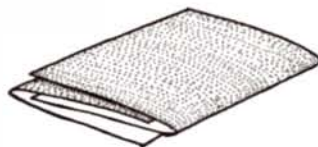
Quick tip: Use the plastic lids from 35mm film containers as wood-protecting cushions under C-clamp pads.

—Orv Dunlap, Phoenix, Ariz.

Fold and layer sandpaper to make it last



Traditional way of folding sandpaper causes it to wear out quickly.



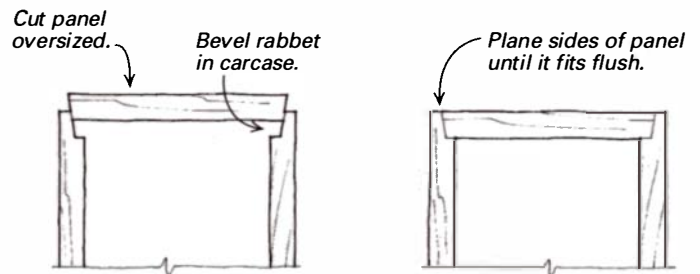
Cutting sheet in two and inter-leaving halves make sandpaper last longer.

Tear a piece of sandpaper in two, fold each piece in half and slip the pieces together (see the drawing at right above). The resulting sanding pad will hold its shape and last much longer than a pad made by folding a sheet in half and doubling it over again.

Having the paper side mate with the grit side eliminates the sliding and shifting that quickly breaks down sandpaper folded the more common way.

—Peter Moffa, Santa Barbara, Calif.

Getting tight-fitting back panels

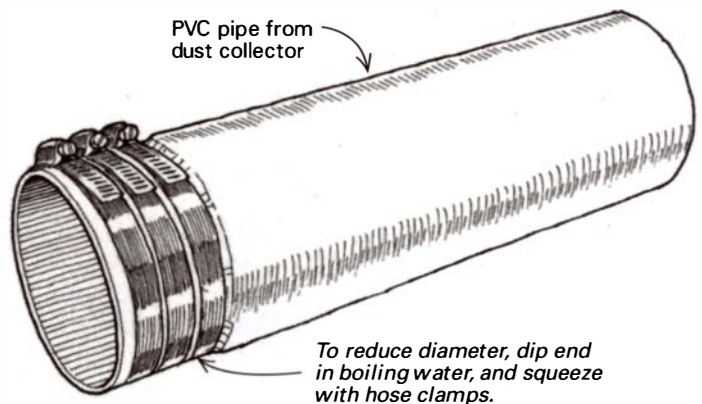


I like to finish the back of a cabinet neatly, so the buyer can use it away from the wall. But it is difficult to fit a back panel into the traditional square rabbet in the carcass without leaving an unsightly gap. You have only one good chance for a snug fit. An improved approach, which I discovered in Joyce's book *Encyclopedia of Furniture Making*, is to bevel both the rabbet and the back panel.

Start by cutting a rabbet, beveled 8° or so, in the carcass sides. You can use a router or your tablesaw to do this. Assemble the carcass. Now cut the back panel about 1/8 in. to 3/16 in. oversize. Bevel the edges of the panel to match the bevel in the carcass. For the first fitting, the oversized panel will sit proud of the carcass, so begin planing and test-fitting the panel into the carcass until it is flush. With patience and several test-fits, you should be able to achieve a no-glue joint on all four sides.

—Tony Konovaloff, Bellingham, Wash.

Snugging up dust-collector connections



Installation of my new dust-collection system went well until I tried to connect the 4-in. flexible hose I had ordered to 4-in. Schedule 20 PVC pipe. The hose was too small for the end of the pipe. To reduce the diameter of the pipe, I attached three hose clamps to the end and dipped the pipe into boiling water. Then I tightened the clamps just enough to make the pipe the proper size. When it cooled, the PVC-pipe end had retained its smaller size. It fit snugly into the flexible hose.

—Ian Walker, Stonington, Maine

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4. Print your name, address and title of the work legibly on each 35mm slide mount or on a label attached to the protective sleeve of each transparency or negative.
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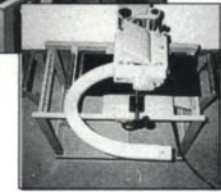
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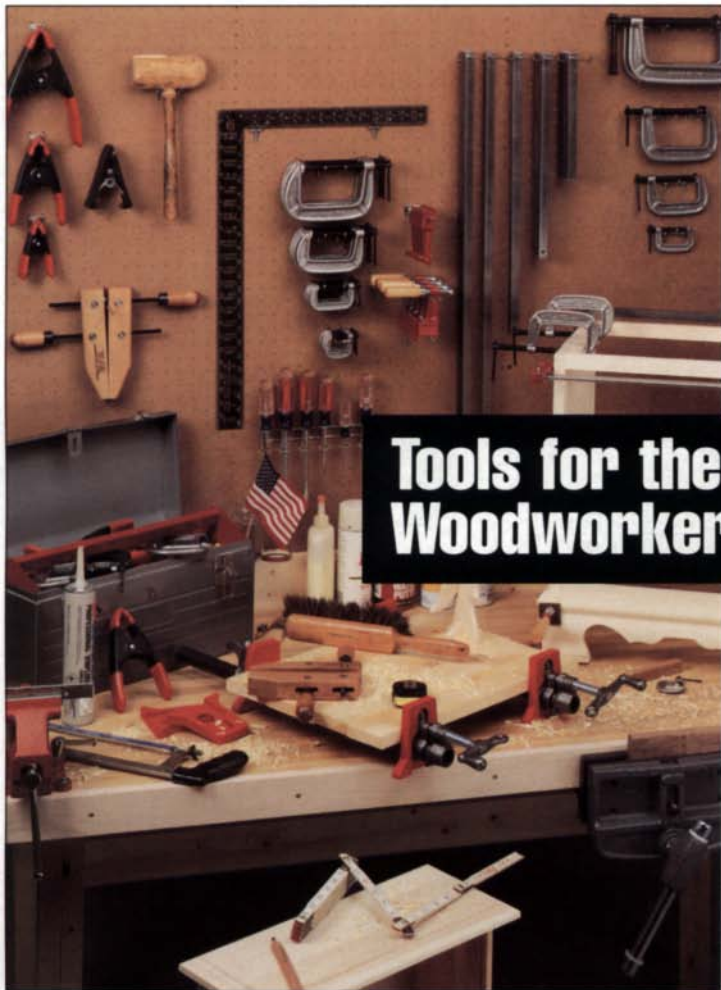
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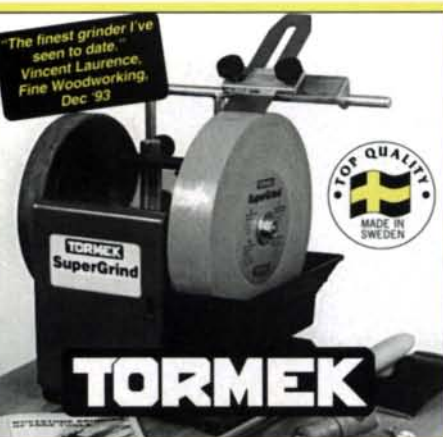
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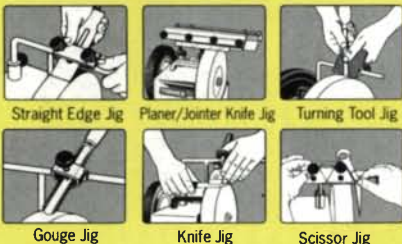
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Fitting a square shoulder to a round post

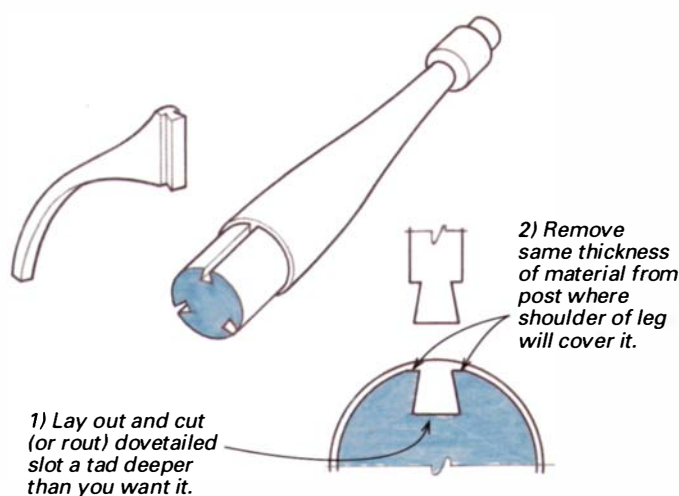
I recently built the Shaker round stand from Fine Woodworking #110 and had a problem with one step. After cutting out the sliding dovetails on the legs, I had the hardest time fitting them to the contour of the post. I tried using a chisel to get the shape but was less than successful. I ended up using wood filler, which I wasn't happy about.

I would like to make more stands in the future and was wondering if you knew of any technique that would make the procedure easier and more certain.

—Brian Harding, Tucson, Ariz.

Chris Becksvoort replies: The problem of the gap arises when you try to fit a square shoulder to a round post. There are two solutions. You could undercut the shoulder of the legs 10°-15°, using a chisel or knife. This would make the end grain of the shoulder quite fragile, though.

Mating a square shoulder to a turned post



Instead, I lay out the dovetail slot in the post a little deeper (about the depth of the gap you had to fill) and then chisel a flat the width of the shoulder on either side of the slot (see the drawing above). This way, you end up with a stronger joint, and no one can tell that the post is flat beneath the leg.

[Chris Becksvoort is a contributing editor to *FWW* and a professional furnituremaker in New Gloucester, Maine.]

Can MDF scraps be used to sticker lumber?

I recently acquired a number of pear-tree trunks from a local orchard and had them milled into lumber. I have the boards stickered in a shaded location. I used some medium-density fiberboard (MDF) scraps for stickers on some of the stacks. Am I risking sticker burn?

—Jeff Fagan, Grants Pass, Ore.

Jon Arno replies: Sticker stain, or burn, is caused by microorganisms and is the result of not allowing the surface of the wood to dry quickly enough. If you allow stickered boards to remain at a moisture level in excess of 18% or so, sticker stain is likely to occur. Both temperature and species of the wood can have an effect on this, though. Woods like maple and basswood have a naturally low resistance to sticker stain. Fruit woods are generally a little less susceptible, but given the light color of pear, even slight sticker stain would be noticeable.

Because wood stains where moisture is trapped, the drier the sticker stock the better. It helps absorb moisture from wood you're drying. This makes kiln-dried material your best choice for stickers. As for MDF, it certainly should be dry enough, but it wouldn't be my first choice. MDF is made by soaking wood chips in chemicals to break down the bonds between wood

fibers. The wood fibers are mixed with bonding agents and pressed into sheets. Though MDF stickers may have no greater propensity to hold moisture at the wood's surface than kiln-dried hardwood stickers, I'd be concerned about the possibility of chemical stains.

Pear and other fruit woods (including apple, cherry, plum, peach and almond) belong to the rose family, Rosaceae. To varying degrees, all woods in this family contain pigment-forming compounds, which tend to polymerize unpredictably. I wouldn't take the risk, especially with a nice batch of pear.

[Jon Arno is a wood technologist and consultant in Troy, Mich.]

Manual and parts for old Craftsman planer

I have an old Craftsman planer that looks nearly identical to the machine shown on the title page of your recent article on tuning up a planer (FWW #107, pp. 72-77). My machine, acquired at least thirdhand, is in serious need of maintenance and adjustment, and your article seems right on the nose. I've tried to find a maintenance manual for my planer, but Sears hasn't been able to help.

I have two problems. The first is with the large gearbox opposite the drive end of the machine. The oil has not been changed in years. What kind of oil do you recommend? The other problem is that my machine does not have a belt guard. Do you know where I can get one? And where do I attach it? There doesn't appear to be any good place to attach one, even if shop-built.

—George Lail, Marblehead, Mass.

Robert Vaughan replies: Parks built planers for Sears for many years, and about 40% of the Parks planers I see have the Sears brand on them. It's likely yours is one of them. A parts illustration and safety manual should be available from the Parks Repair Parts Division of the D.C. Morrison Co. (Attention: Greg Reeder, P.O. Box 586, Covington, KY 41011; 606-581-7511). Morrison also offers a rebuild service.

Gearboxes often are found filled with 90-weight gear oil, though the Parks manual recommends wheel-bearing type grease. I have seen both used with equal success. The 90-weight may drip a bit, but that's its only drawback.

Belt guards for your planer probably are unavailable unless it came with a factory stand. The originals were inexpensive sheet-metal affairs. The planers I've seen without original guards all have had some sort of shopmade sheet-metal or plywood guard fitted to them. These generally have been fastened with steel angles bolted to the machine's base. I've also seen some successfully screwed to homemade wooden stands.

[Robert Vaughan is a contributing editor to *FWW*. He tunes-up and restores woodworking machinery in Roanoke, Va.]

Can antifreeze be used to prevent waterstones from freezing?

I use waterstones for sharpening. Instead of bringing them in from the shop to the house at night seven or eight months of the year, could I store them in a mixture of water and antifreeze? Would this have any adverse effect on the stones?

—Eric Myers, Wyalusing, Pa.

William Tandy Young replies: There are two common types of antifreeze: one for plumbing and one for automotive use. Neither is a suitable winter additive for waterstone storage. Waterstones are quite sensitive, and their surfaces easily can be contaminated or clogged by foreign materials, which would ruin their cutting ability.

There's also a serious health issue. Antifreeze is considered hazardous when it comes in contact with skin. I wouldn't risk it.

Instead, build an enclosed plywood storage cabinet for your waterstones. Install a ceramic socket (make sure it's to code) for an incandescent light bulb, and isolate the bulb so it won't be broken. Even a 40w or 60w light bulb can keep several cubic

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feet of carefully enclosed space warm enough in cold weather to prevent your waterstones from freezing and cracking. You might try using a dimmer switch for the light, so you could control the temperature of the interior.

Such a cabinet also can be used to protect a lot more than your waterstones from extreme cold. You could store glue, window putty, masking tape, hand cleaner and other nonflammables in it as well.

[William Tandy Young is a furnituremaker, restorer and writer in Stow, Mass.]

Tough, easily renewable finish for a tabletop

I sure would appreciate your help in selecting a finish for an ash table I'm about to complete. It's an all-purpose family table for use in Atlanta, Ga. I want to leave the top clear to highlight the grain, but I will be painting the apron and legs white. I'd like to avoid a glossy, plastic look on the top, but I was wondering how to fill the open ash grain. Would you recommend a spray finish for the top?

—Clifton Myll, La Quinta, Calif.

Garrett Hack replies: I'd use a varnish/linseed oil finish for a few reasons. First, it is a relatively easy finish to use for large surfaces, and it can be rubbed out smooth. Also, it's easily renewable, which is very important for a table that's going to see some wear and tear. Finally, the finish will have a nice shine, but it won't look glossy or plastic. In fact, I am writing this sitting at a cherry table with just such a finish. The table has withstood beautifully the ravages of daily meals with three children and everything from gluing projects to watercolors.

Sprayable finishes such as lacquer also offer a good shine and provide more protection, but I am less familiar with them. On the down side, they require not only spray equipment but even more important, a nearly pristine shop area in which to spray. My small shop just doesn't have the space.

Start by preparing the top surface really well (by that I mean evenly sanded to at least 220-grit or planed and scraped). The better the preparation, the more clarity and smoothness to the final finish. The finish mixture is made up from spar varnish (available from hardware and paint stores or marine-supply dealers), boiled linseed oil and turpentine in roughly equal parts. You might want to thin the initial coat to get better surface penetration and to get a feel for the finishing process. Polyurethane varnishes and products that contain both urethanes and spar varnishes seem to work equally well, but I prefer spar for its high-solids content and moderate odor.

I brush on the finish so that the surface appears wet, let it soak in and tack up, and then I rub it thoroughly with a clean, dry cloth to remove any excess. How long it takes to tack up depends on the temperature, humidity and the proportion of varnish in the mix, but it should be something like 20 to 30 minutes. The first coat usually does not feel all that tacky because most of the finish soaks into the wood. It is really important to rub the excess off completely, though, or you'll have a sticky mess that's a pain to remove.

With an open-grained wood such as ash, the grain often is filled before any finish is applied. I find this step can be eliminated, though. Lightly sanding the wet finish with 220-grit (or finer) sandpaper smooths the surface and creates a pore-filling slurry. I would avoid wet-or-dry sandpaper on a light wood like ash because the silicon-carbide abrasive is dark and would inevitably lodge in the pores.

The finish will tack up more quickly with each coat and will require more rubbing to remove the excess. For a table that is going to see hard use, I recommend at least four coats, but a couple more wouldn't hurt. Additional coats only add to the depth and the beauty of the finish. For the topcoat, apply a mixture of beeswax, boiled linseed oil and turpentine, melted to-

gether in a double boiler, but not over an open flame. Be careful—the mixture is extremely flammable. I apply this last coat with 0000 steel wool.

To rejuvenate the finish if it ever looks dull, clean the surface with a little turpentine and linseed oil on 0000 steel wool, and then apply a coat of the varnish mixture followed by a coat of paste wax.

[Garrett Hack is a furnituremaker in Thetford Center, Vt.]

Expiration dates on Titebond glue containers

How meaningful are the expiration dates stamped on Titebond II glue containers? I recently checked at three woodworking supply stores and found expiration dates as much as 15 months past. Should glue be used after these dates have passed?

—F.J. Volek, Kansas City, Mo.

Chris Minick replies: I talked with Larry Lyons, director of sales for Franklin International, the manufacturer of Titebond II wood glue, to get the answer to your question. Mr. Lyons said the expiration dates currently printed on Titebond II containers are extremely conservative.

Standard practice at Franklin International is to set the expiration date one year from the date of manufacture. Mr. Lyons also mentioned that under normal storage conditions (75°F or less), tightly sealed bottles of Titebond II adhesive will remain usable for at least two years. Franklin International intends to amend its expiration-date policy to reflect more accurately the actual shelf life of the glue.

Regardless of the date printed on the bottle, it has been my experience that PVA woodworking glues (white, yellow and Type II) are usable as long as the adhesive is smooth, flows out well and is not stringy or gooey. Incidentally, the life of PVA adhesives can be dramatically extended by storing the adhesive in your refrigerator (not the freezer, though). Cold temperatures slow the chemical changes that cause PVA adhesives to go bad. [Chris Minick is a contributing editor to *FWW* and a finishing chemist and woodworker in Stillwater, Minn.]

What are white spirits?

I recently purchased a video on wood finishing that had a reference to mineral spirits. Can you tell me what this is? In Scotland, we have white spirits, which is a clear, paraffin-based solvent, and methylated spirits, which is an alcohol-based fluid, mainly ethanol but with methanol added to prevent people from drinking it. Are they the same as mineral spirits, or if not, what is the composition of mineral spirits?

—William D. Hendry, Midlothian, Scotland

Chris Minick replies: American English can be misleading at times. The term *mineral spirits* is a good example. Mineral spirits isn't derived from minerals, and it doesn't contain any spirits (alcohol). Rather, mineral spirits is a moderately fast evaporating petroleum derivative suitable for thinning oil-based varnish, stain or paint. I suspect white spirits is the equally misleading British English name for the same material.

Copying famous designers' furniture

I walked into a Beverly Hills gallery the other day and spied an interesting dining-room chair. The salesman told me it was a Frank Lloyd Wright design and cost \$1,600. What are the legalities of making and selling pieces copied from the work of famous designers?

—Curt Gantner, Redondo Beach, Calif.

John Pratt replies: Generally, furniture designs (and other products) that are not covered by unexpired patents or copyrights (copyrights rarely are applicable to furniture) can be freely copied under U.S. law without permission.

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the sale of copies or confusingly similar variations. [John Pratt is an attorney and woodworker in Atlanta, Ga.]

The Abernathy Vise & Tool Co.

I enjoyed the story "In search of a bargain" (Fine Woodworking #112, pp. 112, 114) in which Jack Danilchak narrates his experiences in finding and restoring his Desmond Stephan vise. I have a similar vise attached to my bench, which I inherited from my father. On the left side of the face, it says "The Abernathy Vise & Tool Company, Chicago Ill" and on the right side, "No. 80 D, Roller Nut Rapid Acting Screw Vise, Pat Appd For." Is this company still in business? And do the words "Pat Appd For" roughly date the vise? I think my father obtained the vise in about 1936, possibly used.

—Burton Hardin, Monument, Colo.

Vincent Laurence replies: I couldn't find a listing for The Abernathy Vise & Tool Co. in *The U.S. Industrial Directory* or *The Thomas Register*. If any reader has information about The Abernathy Vise & Tool Co. or the vise in question, drop me a note, and I'll forward the information.

[Vincent Laurence is an associate editor of *FWW*.]

Finish for exterior woodwork in arid climate

We are beginning to build wooden doors and windows for an art center in the southern Israeli wilderness. We chose imbuia on the advice of a wood dealer who claimed it's ideal for our climate, which is hot and dry most of the year. What finish would you recommend to protect and beautify the wood? We'd prefer a more natural finish, perhaps oil, hot oil or submerging the doors in hot oil, but we really don't know enough about it.

—Yoram Tencer, Eilat, Israel

Sven Hanson replies: Woodwork exposed to strong ultraviolet light will require continuous maintenance. In the American Southwest, that means sanding away dried wood and oil and re-oiling as often as four times a year. A varnished surface would require stripping, sanding and revarnishing at least once, perhaps twice, a year.

An overhanging roof helps a lot. Yet in most cases, light from the rising and setting sun still reaches the woodwork. Clear, dry desert air deflects very little of the sun's most destructive rays. In New Mexico, we sometimes see a sort of "farmer's tan" on buildings where the upper portion of the woodwork, which never sees direct sunlight, remains relatively undamaged, and the lower portion of the woodwork looks barbecued.

So for your situation, I'd recommend applying either paraffin dissolved in paint thinner or hot oil. A lamb's wool paint roller works well. Neither finish will last as long or protect as well as varnish, but they're easier to maintain and look far better between maintenance coats.

You can formulate your own finish with linseed oil, paraffin and paint thinner. Adding Japan drier will cause the mix to cure rather than just dry. Use a flameless heater away from your beautiful new building to warm and dissolve the paraffin, but don't overheat it.

Apply the mixture continuously until the surface remains wet. Let it soak in until glossiness begins to disappear, and then wipe it down. Repeat daily until you find the balance point between filling the pores and too much surface buildup.

[Sven Hanson is a woodworker and professional carpenter in Albuquerque, N.M.]

Clamping pressure and joint failure

Is high clamping pressure bad?

—Jack N. Kegley, Charlottesville, Va.

Chris Minick replies: In my experience as an adhesive formulator, relatively few glue-joint failures can be attributed solely to excessive clamping pressure. Dense tropical hardwoods are the

major exception. The adhesive absorptivity of these woods is relatively poor, so excessive clamp pressure can squeeze out virtually all of the glue, ultimately resulting in joint failure.

Most often, though, adhesive joint failure in common cabinet woods can be traced to poorly fitting joints and localized excessive pressure. An improperly machined joint invariably has high spots and low spots along its length. As clamp pressure is increased to draw the low areas together, the high spots experience excessively high pressures. The adhesive in the high-pressure area is either squeezed out of the joint or forced into the wood. The net result is a highly stressed area that is starved of adhesive. These highly stressed, non-bonded areas then serve as focal points for joint failure.

High clamping pressure alone is not necessarily bad, but high clamping pressure coupled with ill-fitting joints is the kiss of death for a reliable glue joint.

How best to handle glue squeeze-out

What is the best way to handle glue squeeze-out when clamping? What is the consensus of the experts?

—W. Malcolm Granberry, Houston, Texas

Gary Rogowski replies: I'm convinced that woodworking experts can agree on no more than two issues. First, that their own opinion is correct. And second, that everyone else's opinion is wrong. Consensus is a difficult thing to come by, even on a subject like how to clean up glue squeeze-out.

To my way of thinking, having a little squeeze-out is a good thing. It lets you know that the joint has enough glue in it to hold properly. A far worse situation is a starved glue joint that has too little adhesive. The other extreme—too much glue—may be messy, but at least you're assured of having enough glue in your joint. Unfortunately, it's likely you'll also have plenty of glue on your bench, on your clamps and on your clothes. So what I try to shoot for is tiny droplets squeezing out of a joint onto the surface of the work.

My own strategy for removing this excess glue is to let it set up until it becomes rubbery. Then I remove it with a sharp tool. For edge laminations, I use a putty knife, which pops those glue blobs right off the surface of the wood with little effort and good results. I generally wait for a few minutes, three to five minutes or so, before doing this. The putty knife is easily cleaned with a wet rag, and if I forget to clean it, it can be soaked and scraped clean later.

Water cleanup of excess glue with a rag can smear the glue instead of removing it entirely. This may cause a problem later when you apply your finish. The glue can prevent the finish from penetrating the wood in that spot.

Scraping glue blobs off after they're completely dry is too much work. It's also easy to remove chunks of wood along with the glue if you're using a particularly aggressive scraper. Some scraping usually has to be done, but I prefer to keep it light.

When glue squeezes out into a corner of a cabinet or frame, I let it dry until it's rubbery. But I use a very sharp chisel to slice off the glue, using either the back or the bevel of the chisel against a flat surface as a reference to get an accurate cut. I find that if I'm patient and let the glue set up long enough, it slices off cleanly and doesn't leave a stain on the surrounding surface.

I suppose other tools could be used, such as a razor, but I like the control I get with a chisel. No matter which method you use, just remember that glue-up isn't finished until the glue has been cleaned up.

[Gary Rogowski, a frequent contributor to *FWW*, teaches woodworking and is a professional furniture maker in Portland, Ore.]

Have a question you'd like us to consider for the column? Send it to Questions & Answers, Fine Woodworking, P.O. Box 5506, Newtown, CT 06470-5506.

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444	*New* Profile Sander-tool only	\$ 99.
9444	Same as above but with case & access.	\$129.
7499	*New* Cutout Tool-3.4 amp	\$ 69.
9352VS	3 x 21 Belt Sander, w/ dust bag & steel case	\$169.
410	Betterly™ Underscribe Trimmer	\$149.
447	7 1/4" Saw - 15 amp w/electric brake	\$138.
843	*New* #447 Saw w/blade on left side	\$138.
505	1/2 Sheet Sander	\$120.
550	Pocket Cutter Kit w/steel case	\$179.
556	Plate Joiner Kit, tilt fence, case	\$138.
691	1 1/2 hp D-handle Router - 10 amp	\$155.
5116	16" OMNIJIG® Dovetail Machine	\$258.
7116	24" OMNIJIG® Dovetail Machine	\$294.
7310	Laminate Trimmer 5.6amp	\$ 95.
97335	5" HD Plan. Cr. Sander-steel case	\$136.
97336	6" HD Plan. Cr. Sander-steel case	\$139.
7536	2 1/2 hp Router - production base	\$203.
7549	Top Handle Bayonet Saw, 4.8 amp	\$134.
7700	10" Miter Saw w/LASERLOC®	\$339.
7800	*New* Drywall Sanding Unit	\$327.
7810	*New* Professional Vacuum System	\$249.
9840	Cordless Drill Kit, 9.6 V, 2 Batteries	\$160.
9853S	Cordless Drill Kit, 12V, 2 batt.	\$167.
97310	Trim Kit	\$197.
97751	1/2" VS Hammer Drill Kit, 2 spd. ranges	\$150.
Biscuits	Box of 1,000 - choose #0, #10, #20 or assorted	\$19.95

DEWALT®

ITEM#	MODEL	DESCRIPTION	PRICE
1660	DW421	5" Palm R.O. Sander w/dust	\$ 79.
1610	DW431	3" x 21" V/S Belt Sander	\$184.
1825	DW318K	Top Handle Jigsaw w/ case	\$151.
1828	DW306K	Recp. Saw V/S w/ case	\$159.
1550	DW610	1 1/2 HP Router	\$149.
1552	DW615	1 1/4 HP V/S Plunge Router	\$159.
1555	DW625	3 HP V/S Plunge Router	\$274.
1425	DW675K	3 1/8" Planer w/Case	\$159.
1254	DW682K	Biscuit Joiner Kit	\$219.
2480	DW1705	12" Comp. Miter Saw	\$368.
1085	DW962K-2	9.6V Cordless V/S Kit, 2-batt.	\$179.
1088	DW972K-2	12V Cordless V/S Kit, 2-batt.	\$189.
1091	DW991K	14.4V Cordless, 1-batt.	\$199.

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BW-562M 4-SIDE MOULDER/5 SPINDLE \$15,995.

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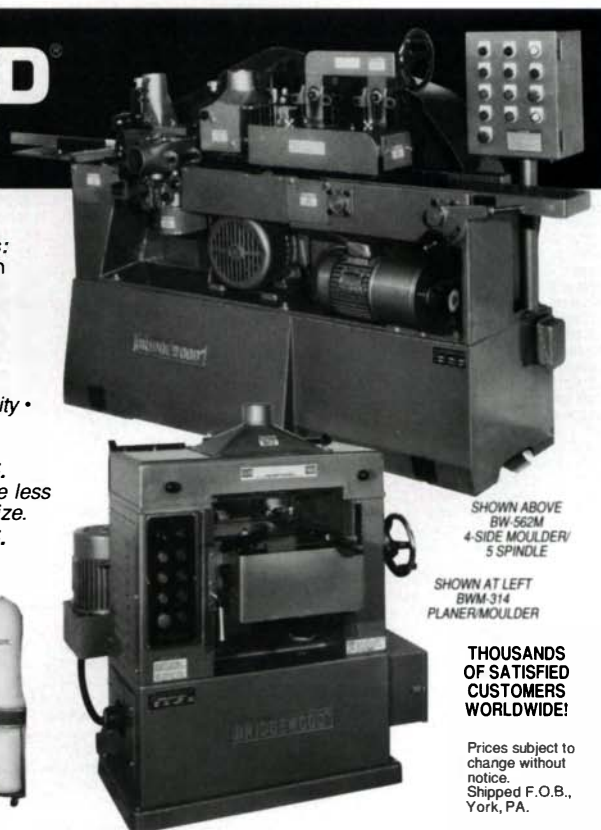
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3-SIDE PLANER MOULDER \$7,995.

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5 SPINDLE

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READER SERVICE NO. 182

MILWAUKEE TOOLS		
Model	Description	List Sale
9068	1/2" Impact Wrench with case	447 269
5455	7/9" Polisher 1750 rpm	260 158
0230-1	3/8" Drill 3.5 amp	218 124
5936	Belt Sander 4 x 24 w/bag 10 amp	449 249
6747-1	Drywall Gun 0-2500 rpm	186 116
6016	1/4 sheet Palm Grip Sander	97 54
6017	6016 Sander with dust bag	97 56
6008	1/3 sheet 12,000 orb/min 5 amp	209 124
8975	Heat Gun 570° & 1000°	98 59
8980	8975 Heat Gun with case, & access.	148 92
3102-1	Plumbers rt angle Drill Kit 500 rpm	389 215
5660	Router 1-1/2 HP 10 amp	352 198
6378	8-1/4" Worm Drive Saw 15 amp	341 192
6256	Variable speed Jig Saw 3.8 amp	264 152
6527	Super Sawzall with case	320 172
6528	Above Sawzall with wired cord	316 172
6125	5" Random Orbit Sander	200 119
0406-1	9.6V Drill Kit with 2 batteries	332 159
0407-1	12V Drill w/keyless chuck & 2 batt.	320 172
0224-1	3/8" Drill 4.5 amp magnum	227 128
0225-1	Same as 0224-1 but w/keyless chuck	203 128
0234-1	1/2" Drill 5.4 amp mag 0-850 rpm	237 132
0236-1	0234-1 drill with steel case	269 155
0235-1	Same as 0234-1 but w/keyless chuck	237 138
0244-1	1/2" Drill 5.4 amp mag 0-600 rpm	237 132
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	198 115
0228-1	3/8" Drill 3.5 amp 0-1000 rpm	195 112
0375-1	3/8" close quarter Drill	237 139
0379-1	1/2" close quarter Drill	268 158
6539-1	cordless Screwdriver 190 rpm	130 75
6540-1	6539-1 with bits & case	165 95
6546-1	cordless Screwdriver 200 & 400 rpm	141 84
6547-1	6546-1 w/bits 1/4" chuck & case	176 105
5399	1/2" D-handle Hammer Drill Kit	332 194
1676-1	HD Hole Hawg with case	499 275
6511	2 speed SawZall with case	249 139
6507	Original SawZall with case	264 144
6508	Above Saw with wired cord	260 144
6517	NEW 6.5 amp Sawzall with case	299 159
6175	1/4" Chop Saw 15 amp	499 279
6010	Orbital Sander 1/2 sheet	214 128
8977	Variable temp. Heat Gun	131 79
5397-1	3.8" var. speed Hammer Drill Kit	255 142
5371-1	1/2" var. speed Hammer Drill Kit	340 188
5377-1	5371-1 with keyless chuck	375 205
5371-1	1/2" var. speed right angle Drill Kit	359 219
6754-1	Drywall Gun 0-4000 rpm 5.4 amp	196 114
3900-1	1/2" variable speed right angle Drill	356 199
5680	Router 2 HP w/ 1/4" & 1/2" collets	362 165
6145	4-1/2" Grinder 10,000 rpm	168 104
6142	6145 with case & accessories	208 124
6749-1	Drywall Gun 0-2500 rpm 5.4 amp	218 128
6755-1	Drywall Gun 0-4000 rpm 5 amp	170 104
6767-1	Screw Shooter Kit	229 138
5367-1	Falcon 3/4" Rot. Hammer w/case	395 239
5353	Eagle 1-1/2" Rot. Hammer with case 97A	559 329
6365	7-1/4" Circular Saw 13 amp	218 122
6367	above Saw - double insulated	213 128
6366	6365 with fence & carbide blade	228 129
6368	6365 w/fence, carbide blade & case	249 139
6377	7-1/4" Worm Drive Saw	350 189
6369	7-1/4" Circular Saw with brake	259 148
6490	NEW 10" Mitre Saw	444 248
6491	6490 w/carbide blade & bag	532 279
6494	NEW 10" Compound Mitre Saw	444 231
0422-1	NEW 12V Hammer Drill w/2 batt.	403 249
0431-1	NEW 12V Drill w/2 batteries	385 229

FREUD SAW BLADES		
Model	Description	List Sale
L727M010	General Purpose 10" 40	69 39
L81M010	General Purpose 10" 40	78 44
L84M010	Cut-off 10" 60	93 45
L84M011	Combo 10" 50	78 42
L85M010	Super Cut-off 10" 80	115 59
L87M010	Ripping 10" 24	69 38
L73M010	Cut off 10"	60 84 45
L87M010	Thin Kerf 10"	24 72 39
L88M010	Thin Kerf 10"	60 88 45
L85M015	Mitre Saw blade 15" 108	175 99
L91M010	Compound Mitre Blade 60	88 54
L98M010	Ultimate 10" 80	128 68
L98M010	Ferrous metal 10" 72	104 58
F410	New Quiet Blade - 10" 40	95 49
F810	New Quiet Blade - 10" 80	135 74
TK203	7-1/4" Finishing - 24 tooth	31 18
TK303	7-1/4" Finishing - 40 tooth	38 22
TK306	10" Finishing - 40 tooth	47 29
TK903	7-1/4" Combo - 30 tooth	33 19
TK906	10" Combo - 50 tooth	53 32
SD306	6" Dado - Carbide	215 112
SD308	6" Dado - Carbide	230 119
SD506	6" Super Dado-carbide w/case&shims	292 155
SD508	6" Super Dado-carbide w/case&shims	344 168
F0	#0 - 1-3/4" x 5/8" Biscuit 1000 Qty	43 29
F10	#10 - 2-1/8" x 3/4" Biscuit 1000 Qty	43 29
F20	#20 - 2-3/8" x 1" Biscuit 1000 Qty	45 29
FA	Assorted Biscuits 1000 Qty	45 29
WC110	10 piece Chisel set w/cs 1/4" - 1-1/2" 145	92
FB107	7 piece Forstner bit set 1/4" - 1-1/2" 92	58
FB100	16 piece Forstner bit set with case	338 189
94100	5 piece Router bit door system w/cse320	159

FREUD POWER TOOLS		
EB100	Edge Banding Machine	409 209
TR215	8-1/2" Slide Compound Mitre Saw	688 369
EDS132	13.2 volt cordless drill kit w/2 batt.	415 209
JS102	NEW Biscuit jointer w/adj. fence&cs	355 179
JS100	Biscuit Jointer & 1000 biscuits	334 164
FT2000E	3-1/4 HP Plunge Router, speed 410	205

FT2000E comes with FREE FT210 Guide!

ACCU-MITER		
19-34	Professional Mitre Gauge	149 145

MAKITA TOOLS		
Model	Description	List Sale
6071DWK6070DW	w/ removable battery	216 125
6172DWE	3-3/8" var. spd Drill Kit w/2 batt.	220 109
5090DW	3-3/8" Saw Kit 9.6 volt	270 145
DA391DW3/8"	angle Drill Kit 9.6 volt	312 179
ML900	Incandescent Flashlight 9.6 volt	... Sale 37

NEW CORDLESS DRILLS WITH HIGH CAPACITY BATTERIES		
6202DWG9.6V	3/8" Drill Kit w/ LED battery	390 219
6212DWG12V	3/8" Drill Kit w/ LED battery	412 228
6312DWG12V	1/2" Drill Kit w/ LED battery	432 239
6201DWE	9.6V 3/8" Drill Kit w/ 2 batteries	351 185
6211DWE	12V 3/8" Drill Kit w/ 2 batteries	369 195
6311DWE	12V 1/2" Drill Kit w/ 2 batteries	399 205

5007NBA	7-1/4" Saw with electric brake	263 135
9900B	3" x 21" Belt Sander with bag	344 175
9924DB	3" x 24" Belt Sander with bag	329 184
4301BV	Orb. var. speed Jig Saw 3.5 amp	292 155
JR3000V	Var. speed Recip Saw with case	252 139
9820-2	Blade Sharpener	394 215
N1900B	3/8" Drill Planer with case	244 129
BO4552	1/4 sheet Pad Sander with bag	98 55
BO4530	6" Round Sander	117 75
DA3000R	3/8" Angle Drill variable speed	314 179
HP2010M	3/4" var. spd Hammer Drill w/case	335 199
2708W	8-1/4" Table Saw	585 305
2711	10" Table Saw with brake	1067 589
5005BA	5-1/2" Circular Saw	250 195
6405	3/8" Drill Rev. 0-2100 rpm	212 68
6510LVR	3/8" Drill Rev. 0-1050 rpm	168 98
6820V	0-4000 rpm Drywall Gun 5.2 amp	171 99
6013BR	1/2" Drill Rev. 6 amp	280 149
5402A	16" Circular Saw 12 amp	743 579
9401	4" x 24" Belt Sander with bag	378 229
4303C	Variable speed Orbital Jig Saw	351 205
5077B	7-1/4" Hypoid Saw	281 155
LS1030	10" Mitre Saw	428 225
5007NKB	7-1/4" Circular Saw w/case	346 129
2012	12" Portable Planer	959 625
LS1011	10" Slide Compound Saw	946 525
GV5000	5" Disc Sander	123 79
N9514B	4" Grinder 4.6 amp	111 65
N9501B	4" Grinder 4.0 amp with case	168 99
92075PC	7" Sander/polisher var. speed	350 189
2414B	14" Cut-off Saw AC/DC	403 225
4320	V/spd economy Jig Saw 2.9 amp	156 98
6302	1/2" Drill 0-550 rpm 5.2 amp	228 129
BO5001	5" Random Orbit Sander	120 69
LS1211	New 12" Slide Compound Saw	1550 795
3901	New Plate Joiner Kit	372 219

BOSTITCH AIR NAILERS		
Model	Description	List Sale
N80S-1	Stick Nailer	Super Sale 348
RN45	NEW Coil Roof Nailer 3/4 - 1-3/4	845 335
N60FN-2	Finishing Nailer 1-1/4" - 2-1/2"	650 335
N60FN-2K	N60FN-2 with case, oil, & nails	647 379
T50S4-1	Decking Sheathing Stapler	619 345
MIIFS	Flooring Stapler 15 gauge	931 529
S32SX-1	Finish Stapler - 1/2" - 1-3/8"	275 159
S32SX-1K	S32SX-2 with case & oil	269 169
BT35-2	Brad Tacker 5/8" - 1-3/8"	275 159
BT35-2K	BT35-2 with case, oil, and brads	299 169
BT50-2	Brad Tack 8-1-3/16" - 2"	335 189
BT50-2K	BT50-2 w/case, oil, and brads	395 209
PCW5001	NEW Power Crown Stapler	300 159
CXC100	1 HP Pancake Compressor	463 289

PANASONIC CORDLESS		
Model	Description	List Sale
EY6205EQK	Same as EY6205BC but comes with Ironman battery	368 192
EY6207EQK	12V 1/2" Drill w/keyless chuck var. spd w/15 min. charger, case & Ironman battery	420 229
EY6282EQK	Var. spd 9.6 volt Drill with 15 min. charger, case, and Ironman battery	315 169
EY6281DKW	9.6 volt Drill Kit w/2 batteries	395 162

NEW PREDATOR DRILLS		
EY6181CRKW	NEW 9.6V Predator Compact Drill Kit w/2 batt. - 10% more power than EY6281DKW	305 165
EY6100CRKW	NEW 12 volt Predator Drill Kit with 2 batteries, 1 hour charger, & case	358 188
EY6100CQKW	Same as EY6100CRKW but has 15 minute charger	420 198
EY6100EQK	NEW 12 volt Predator Drill kit with NEW Ironman battery, 15 min. charger & case	375 199
EY6100EQKW	Same as EY6100EQK but w/2 Ironman batteries	473 209

PRAZI BEAM CUTTER		
PR-7000	12" beam cutter for worm drive saws	149 124

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WW10407125	Woodworkerll	10" Carbide Blade	40 Tooth	List 156.00 Sale 99.00
WW10607100	Woodworker I	10" Carbide Blade	60 Tooth	List 162.00 Sale 109.00
DK08243	Dado King	8" Carbide		List 299.00 Sale 259.00

WW10607100	Woodworker I	10" Carbide Blade	60 Tooth	List 162.00 Sale 109.00
DK08243	Dado King	8" Carbide		List 299.00 Sale 259.00

DK08243	Dado King	8" Carbide		List 299.00 Sale 259.00
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VISE GRIP Quick Grip Clamps		
Model	Description	List Sale
00506	6" Quick Grip clamp	22.60 15.50 29.45
00512	12" Quick Grip clamp	27.25 18.65 35.45
00518	18" Quick Grip clamp	29.50 20.65 38.95
00524	24" Quick Grip clamp	31.95 21.75 40.25
00536	36" Quick Grip clamp	36.30 24.95 46.95
590L3	NEW 3/4" Quick Grip Pipe clamp - (does not require threaded pipe)	26.95 19.95

SKIL SIZZLERS		
Model	Description	List Sale
5825	6-1/2" Worm Drive Saw	257 165
2735-04	12 volt cordless Drill Kit	249 144
2736-04	2735-04 with keyless chuck	269 148
1705-02	Biscuit Joiner with case	221 135
5510	5-1/2" Circular Saw	166 119
5860	8-1/4" 60° Worm Saw	282 179
5860	8-1/4" 60° Circular Saw	238 149
5657	7-1/4" Circ Saw - pivot foot	205 118
5525	6-1/2" Circ Saw - big capacity	173 115
3400	10" Table Saw - Bench Top	270 189

SKIL WORMDRIVE SAW SPECIAL
 77 Famous 7-1/4" Worm Drive Saw... Sale 144
 77M NEW 7" Mag Worm Saw - 2 lbs lighter than Model 77... Sale 159
 Above saws come with FREE 7-1/4" carbide blade!
 AND
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PORTA NAILER		
401	Porta Nailer complete	265 205
501	Face Nailer complete	265 205

BIESEMEYER FENCES		
Model	Description	List Sale
B-50	50' Commer. Saw Fence	345 298
T-SQUARE 52	52' Homeshop Fence	279 238
T-SQUARE 40	40' Homeshop Fence	259 208
T-SQUARE 28	28' Homeshop Fence	249 198

WEDGE SMART LEVEL		
SM-PR2	2 FT Level with sensor	120 88
SM-PR4	4 FT Level with sensor	150 105
SM-PR6	78" Level with sensor	180 139
SERIES2002	FT Level with sensor	79 58

BOSCH		
Model	Description	List Sale
1587VS	NEW Top Handle "CLIC" Jig Saw	292 149

DELTA BENCH TOP TOOLS		List Sale
23-700	Wet/Drill Grinder	234 155
23-680	6" Bench Grinder 1/4 HP	86 75
23-880	8" Bench Grinder 1/2 HP	151 115
11-950	8" Drill Press	199 128
28-160	10" Hobby Band Saw	210 135
31-050	1" Belt Sander 2.0 amp	104 75
31-460	4" Belt/8" Disc Sander	198 129
31-340	1" Belt/8" Disc Sander	268 204
31-080	1" Belt/5" Disc Sander	134 89
40-550	16" 2 speed Scroll Saw	266 178
11-990	12" Bench Drill Press	276 184
11-990	32" Radial Bench Drill Press	399 305
43-505	1/2" Bench Router/Shaper	399 289
22-540	12" Bench Top Planer	595 385
FREE Set of extra knives included!		
36-220	10" Compound Miter Saw	350 215
14-650	Hollow Chisel Mortiser	668 289

NEW TOOLS BY DELTA		List Sale
11-980	NEW 10" Bench Drill Press	186 149
33-060	NEW "Side Kick" Miter Saw	510 389
14-070	NEW 1/4" Floor Drill Press	450 349
28-180	NEW Bench Band Saw	232 158
40-640	NEW 20" Bench Scroll Saw	466 295
28-190	NEW 12" Band Saw w/stand	465 395
20-150	NEW 14" Cut-off Saw	375 219
36-090	NEW 10" Sidekick Miter Saw	293 225
37-070	NEW 6" var. speed Bench Joiner	337 258
37-190	NEW 6" Deluxe Joiner	554 479
36-275	NEW 8-1/4" Builders Saw	444 265
36-210	NEW 10" Compound Miter Saw	438 255
36-070	NEW 10" Miter Saw	284 165
36-630	NEW 10" Contractors Saw II	700 579
34-555	NEW Sliding Table	459 329

Super Special
36-250 NEW 10" Slide Compound Saw Sale 489

DELTA STATIONARY		List Sale
34-444	Table Saw w/1-1/2HP motor & stand	812 645
17-900	16-1/2" Floor Drill Press	462 399
40-601	18" Scroll Saw w/stand and blades	1003 819
34-080	10" Miter Box	Xtra Special 194
33-990	10" Radial Arm Saw	818 695
37-280	6" Motorized Joiner	488 389
50-179	3/4 HP 2 stage Dust Collector	483 358
43-355	3/4" Shaper 1-1/2 HP	964 795
46-700	12" Wood Lathe	548 449
33-055	8-1/4" Sawbuck comp with legs	865 625
36-540	10" Table saw	210 169
34-670	10" Motorized Table Saw	511 395
32-100	Stationary Plate Joiner	645 255
36-040	8-1/4" Compound Miter Saw	224 149
36-905	30" Unifence	385 249
34-897	50" Delta Unifence	525 299
36-755	10" Tilt Arbor Saw	1264 1039
33-890	12" Radial Arm Saw	1829 1495
14-040	14" Bench Drill Press	382 345
28-560	16" Three Wheel Band Saw	487 465
28-245	14" Band Saw w/open stand 1/2 HP	719 598
28-283	14" Band Saw with enc stand 3/4 HP	910 779
34-445	34-444 Saw with 30" unifence	1200 829
34-445X	34-444 w/mobile base & carbide blade	899
22-661	13" Planer with 2 HP motor	1513 1239
37-154	DJ15 6" Joiner with 3/4 HP motor	1451 1239

DELTA Industrial Saw Blades		Hook Tth	List Sale
Carbide Tipped - 5/8" bore - Lifetime guarantee			
35-593	Sawbuck blade 8"	-6" 48	52 39
35-616	Crosscut 10"	12" 60	55 44
35-617	Combo 10"	15" 50	54 43
35-031	Professional Grade 10"	15" 40	22 15

DEWALT TOOLS		List Sale
DW944K	3/8" 9.6V cdss drill kit w/cs & 2 batt	283 165
DW945K	3/8" 12V cdss drill kit w/cs & 2 batt	309 179
DW364	7-1/4" Circ. Saw w/bake, 13 amp	285 158
DW306K	8.0 amp Recip Saw w/csae var. spd	291 164
DW610	1-1/2 HP 2 handle Router	274 149
DW411	1/4 sheet Palm Sander, 17 amp	97 58
DW705	12" Compound Miter Saw	706 359
DW704	12" Miter Saw	570 325
DW100	3/8" Drill, 4 amp, 0-2500 rpm, rev.	118 68
DW250	4.5A Drywall Gun, 0-4000 rpm, rev.	169 94
DW254	4.5A Drywall Gun, 0-2500 rpm, rev.	169 94
DW280K	NEW Screwdriver kit complete	207 124
DW402	4-1/2" Grinder 6 amp	158 92
DW682K	Biscuit Joiner with case	429 219
DW615	1-1/4 HP Elec. Plge Router	290 164
DW625	3 HP Electronic Plge Router	511 275

Above router comes with Free DW6966		List Sale
Fine depth adjustment!		
DW675K3	1-8" Planer with case	289 164
DW430	3 x 21 Belt Sander	291 168
DW431	3 x 21 var. speed Belt Sander	331 184
DW420	NEW Palm Grip Random Orb Sander	120 69
DW421	above Sander with dust collector	138 79
DW930K	NEW 12 volt 5-3/8" Trim Saw kit	370 199
DW444	6" Random Orbit Sander - PSA pad	266 139
DW443	DW444 with hook & loop pad	266 139
DW935K	NEW 14.4 volt 5-3/8" Trim Saw kit	444 237

NEW DEWALT CORDLESS DRILLS		List Sale
DW952K	3/8" v/spd incl. two 9.6V batteries	280 145
DW953K	3/8" v/spd incl. one 12V batt	306 175
DW962K	2 3/8" v/spd incl. two 9.6V XR batt.	324 179
DW972K	2 3/8" v/spd incl. two 12V XR batt.	352 189

Above drill kits come with Free bit set!
DW991K 3/8" v/spd incl. one 14.4V XR batt... 370 199
DW991K-2 above drill with 2 batteries... 225
Above drill kits come with charger & steel case!

DREMEL TOOLS		List Sale
3950	Moto Tool Kit with bits & case	134 79
3952	Super Moto Tool Kit with accessories	152 95
1672	16" Scroll Saw - 2 speed "Best buy"	302 174
1695	NEW 16" var. speed Scroll Saw	408 229
2690	Electric Engraver with point	25 16
1731	5" Disc 1" x 30" Belt Sander	189 114

JENSEN ADJUSTABLE HANDSCREWS		List Sale
Item #	Opening Length Capacity	Box of 6
#30	6" 3"	16.53 9.59
#20	7" 3-1/2"	17.75 10.35
#10	8" 4-1/2"	19.76 11.75
#1	10" 6"	22.63 12.50
#2	12" 8-1/2"	25.95 14.50
#3	14" 10"	32.88 18.00
#4	16" 12"	42.76 23.95

STYLE 3400 NEW E-Z HOLD II		List Sale
Model	Opening	Box of 6
3410	10"	15.95 11.95
3416	16"	17.20 12.75
3422	22"	18.40 13.25
3428	28"	20.00 14.50

JORGENSEN STYLE 37 2-1/2" Throat 1/4"x3/4"		List Sale
Item #	Jaw Length	Box of 6
3706	6"	10.65 6.05
3712	12"	11.80 6.65
3718	18"	13.00 7.45
3724	24"	14.25 7.99
3730	30"	15.88 8.85
3736	36"	17.36 9.99

JORGENSEN STYLE 45 5" Throat 1-3/8" x 5/16"		List Sale
Item #	Jaw Length	Box of 6
4512	12"	33.17 19.95
4518	18"	34.97 21.45
4524	24"	37.02 22.75

JORGENSEN STEEL "I" BAR CLAMPS		List Sale
Model	Size	Box of 6
7224	24"	34.36 19.50
7236	36"	36.88 21.50
7248	48"	40.54 23.50
7272	72"	46.64 28.50

PONY CLAMP FIXTURES		List Sale
Model	Description	Box of 12
50	3/4" Black Pipe Clamps	14.87 7.80
52	1/2" Black Pipe Clamps	12.40 6.70

QUICK DRIVE KITS		List Sale
Model	Description	Box of 12
SG-2000	Subfloor/drywall, drives screws 1" - 2", complete kit including extension	765 485
SG-3000	Deck/subfloor, drives screws 2" - 3", complete kit including extension	936 595

BLACK & DECKER		List Sale
1166	3/8" Drill 0-2500 rpm 4 amp	118 68
2800	3/8" Drill 0-1200 rpm 4.5 amp	167 98
79-034	Workmate 400	184 109
1349-09	1/2" Timberwolf Drill 2 speed	551 309
1180	3/8" Drill rev. 0-1200 rpm 5 amp	207 119
2037	Drywall Gun 0-4000 5.0 amp	184 95
2038	Drywall Gun 0-2500 rpm 5 amp	184 95
2054	Tek Gun 0-2500 5.0 amp	287 159
2750	4-1/2" Grinder 10,000 rpm 6 amp	156 89
2694	7-1/4" Super Sawcat Circ Saw w/cs 285 158	
2695	8-1/4" Super Sawcat Circ Saw w/cs 328 175	
3339	Elu 3 HP v/spd Plunge Router	511 269

Continuous Rim Dry Cut Diamond Blades		List Sale
Model #	Size Thickness Arbor List Sale	
40280	4" .080 7/8"	79 44
40281	4-1/2" .080 5/8", 7/8"	90 49
40282	7" .090 5/8"	154 79
40283	8" .090 5/8"	199 98
40285	12" .118 1"	419 195

Piranha Carbide Tooth Saw Blades by B & O		List Sale
Model #	Diameter # Teeth List Sale	
73-715	5-1/2" 16	14.39 8.25
73-716	6-1/2" 18	14.39 8.25
73-717	7-1/4" 18	14.60 7.99
73-737	7-1/4" 24	18.06 9.45
73-757	7-1/4" 40	32.87 17.49
73-718	8" 22	20.95 11.25
73-759	8-1/4" 40	46.88 25.95
73-719	8-1/4" 22	20.63 12.45
73-740	10" 32	34.63 18.85
73-770	10" 60	70.37 35.50
73-711	10" 50	68.33 35.50

DURA III-ADJUSTABLE STILTS		List Sale
Model	Description	Box of 12
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D1830	18"-30" extension	274 205
D2440	24"-40" extension	289 219

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658	5" Air Random Sander - dual action	281 155

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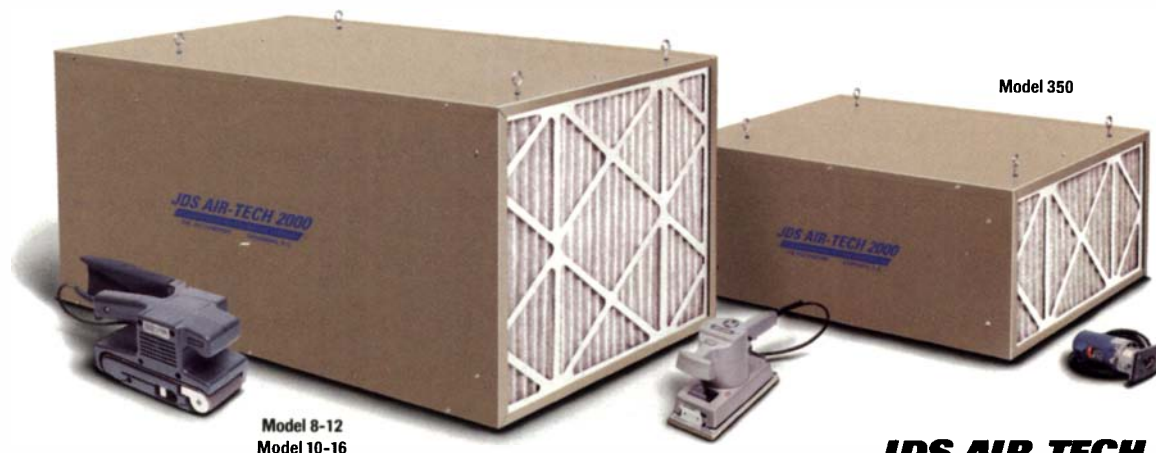
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D1232-2	32' 29'	53# 209.95
D1236-2	36' 32'	62# 239.95
D1240-2	40' 35'	73# 298.95

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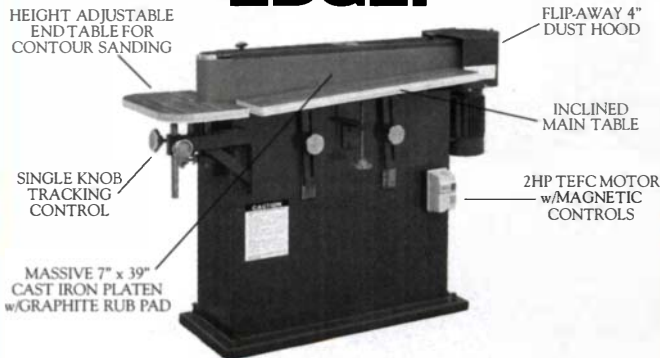
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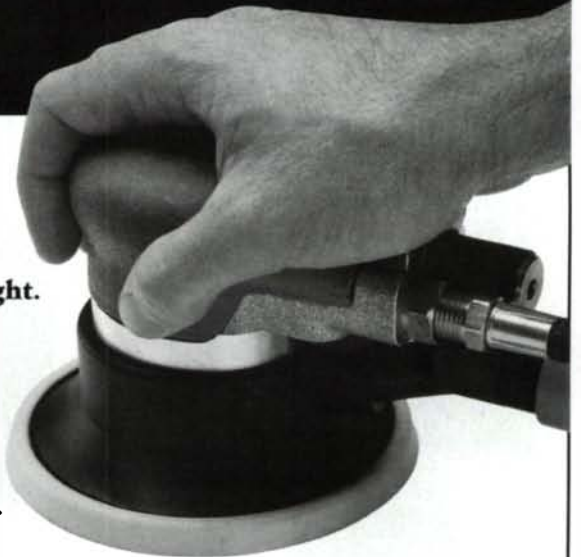
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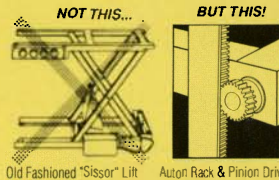
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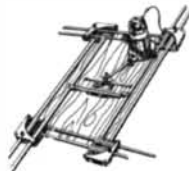


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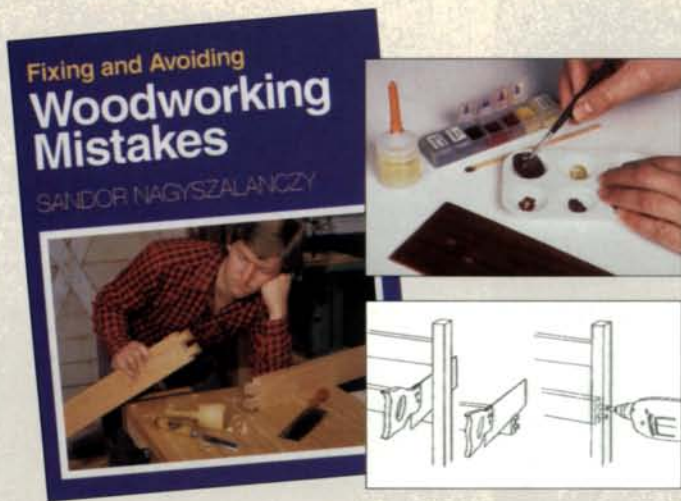
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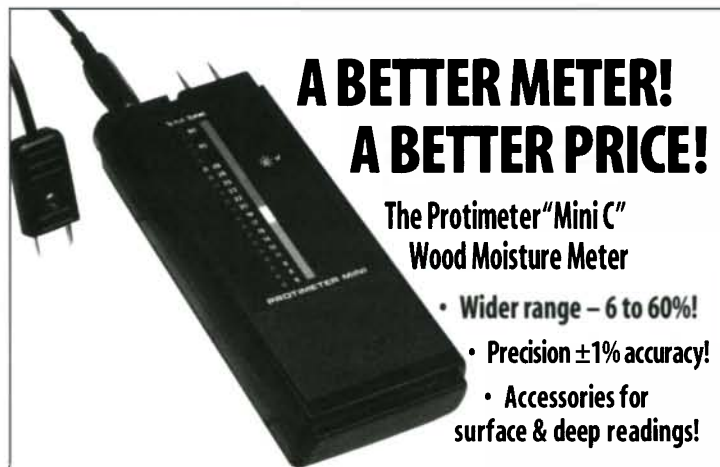
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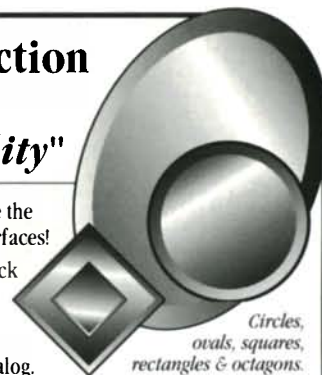
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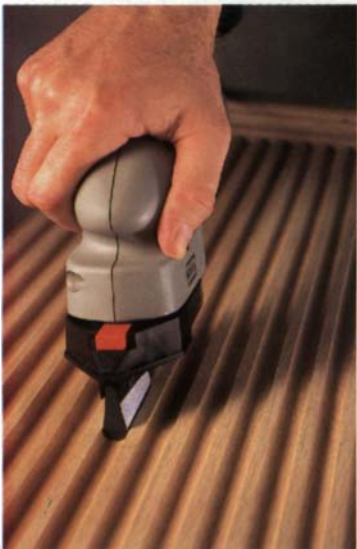


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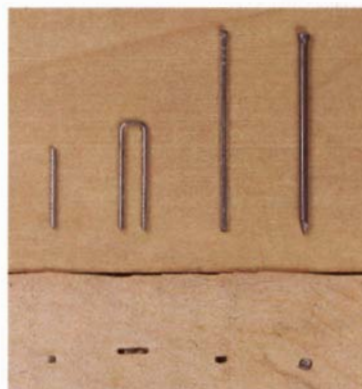
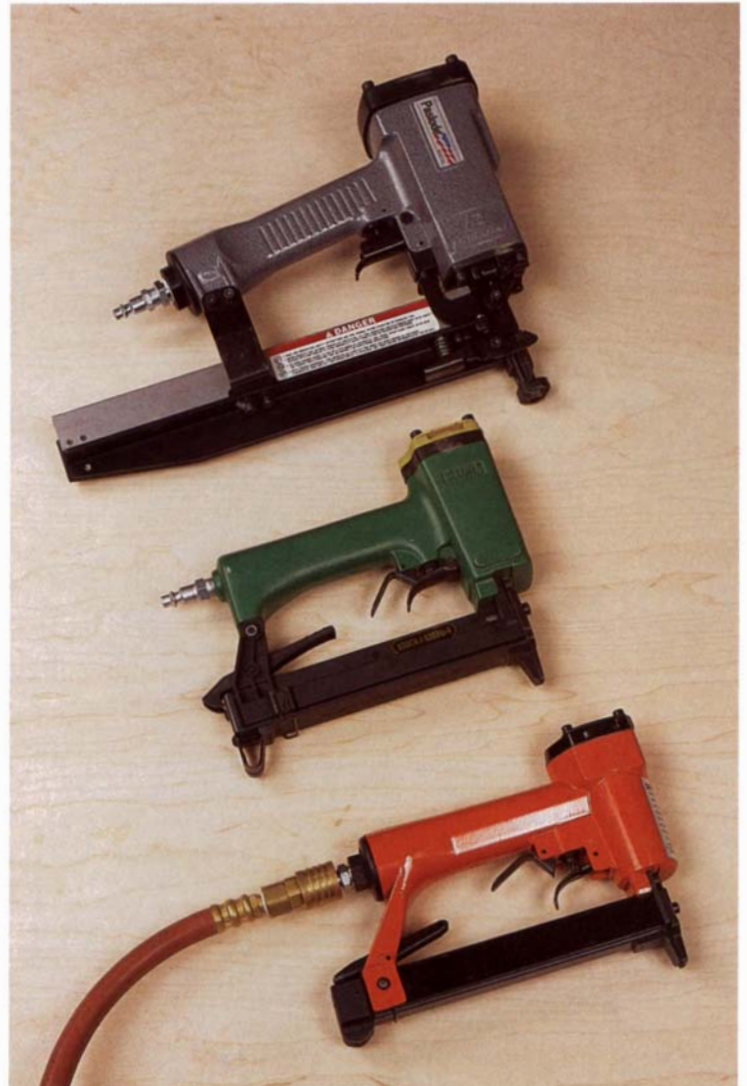
I cringed the first time I saw a nail gun. It was 20 years ago, and my boss was comparing finish nails hammered and set by hand to the same-sized fasteners driven by a pneumatic (pressurized air) gun. I changed my mind, though, after seeing how quickly the nail gun did the job and how accurately and cleanly the gun drove the nails. It left no ugly hammer dents on the wood—elephant tracks, as I call them (see the bottom photo). And the nailer could be used one-handed, leaving the other hand free to hold the work.

The most convincing part of the boss's impromptu demonstration was seeing that the air-driven nails stayed in the wood better than the hand-driven nails. A hammered nail breaks wood fibers each time it is struck, which reduces its grip. But an air-driven nail is injected into the wood all at once, which disturbs fewer fibers. The nail grips all the way up its shank. Guns drive nails with less splitting because the tips of the nails are like blunt chisels (see the photo at right). The ends of common finish nails are sharply pointed, so they tend to cleave the wood, causing splits. You can blunt the ends beforehand, but that's a time gobbler.

Early nail guns were used mostly in professional shops. These days, just about any shop can use one. You can pick up a good brad nailer for around \$200. I've managed to accumulate nine pneumatic fastening tools and use one in nearly every project I do. And these tools are widely available from building-supply dealers, hardware stores and by mail.

How pneumatic drivers work

With one exception (see the box on p. 47), all pneumatic nail and staple guns are powered by high-pressure air. Fasteners are driven by a rod or blade connected at one end to a piston in an air cylinder. When a gun's trigger is pulled, air flows to the back of the cylinder, which drives the piston/driver assembly forward. The trigger is a two-way valve, so when it is released, a shot of air is diverted to the front of the cylinder. The air recycles the piston/driver to the rear of the cylinder, so it's ready for another shot. Usually, the internal air chambers are sealed with rubber O-rings.



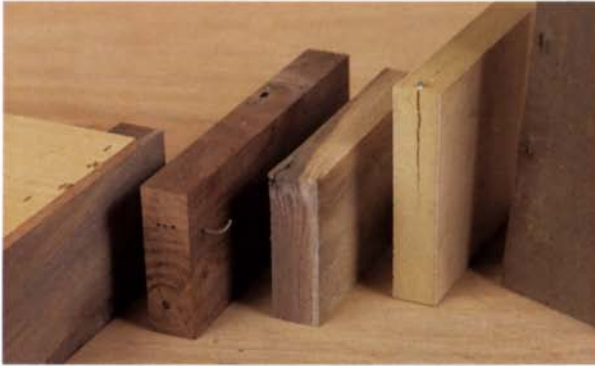
Three guns for furniture-making (above), from the top: finish nailer, narrow-crown stapler and brad nailer. At left are fasteners and the marks their drivers leave on the wood. A hammered finish nail is on the far right.

Sorting through the variety of guns and magazines

If you scan through a catalog from one of the big nail-gun companies (Senco, Paslode, Duofast or Bostich, for example), you'll probably be overwhelmed by the number of guns and fasteners. One of my catalogs shows nine gun-body styles, 11 nail sizes and brads, and 18 crown widths for staples. The fasteners come in several choices of tip shapes, wire material and coatings. But there are really only three pneumatic guns that are useful for furnituremaking: a brad nailer, a narrow-crown stapler and a finish nailer.

A brad nailer (sometimes called a pin nailer) together with a nar-

Nail-gun safety



Keep fingers clear—A nail driven by a pneumatic gun can deflect or even reverse directions if it strikes an embedded fastener, a knot or is too near an edge. The tearout in the lauan (left) and the bulge in the hardboard (right) were caused by staples.

Safety glasses are a must when you're using an air nailer. An errant fastener bouncing around the shop isn't the only danger. A small chunk of wood can dislodge from your work, or the blast of air expelled from the top of the tool can set dust and debris in motion. Hearing protection is also a good idea.

Accidental discharge is the prime danger with air nailers and staplers. All new ones are fitted with a safety device to prevent this. Some guns require you to depress a second trigger or lever before the main trigger will engage. Most guns, though, have a nose safety that must be depressed against a solid surface before the trigger can be pulled. I like nose safeties the best. Once you're used to them, they don't slow you down.

Deflected fasteners are also a hazard (see the photo above). I've seen the leg of a staple stick out of the wood in the opposite direction it went in. So keep your fingers away from the nose of the gun, and point the tool away from you. Be especially careful when you're shooting at an angle or tacking on light pieces.

Nail guns usually have a label that gives recommended air pressure. Periodically check your regulator to make sure the air pressure is in the safe range. When you're loading the tool, disconnect it from the air supply, and when you reconnect it, point the nose away. Finally, if the tool jams or you need to work on it, disconnect the hose, and remove the fasteners. —R.V.

row-crown (¼ in.) stapler will handle the majority of your around-the-shop jobs. If you're trimming the inside of your house or doing a lot of architectural woodworking, then you'll want to add a finish nailer, too. Unless you build homes, though, there's no need for a framing nailer or a roofing gun. The stories on pp. 46-47 and on the facing page describe the guns that several woodworkers use and a few of the jobs they are good for.

Unlike some framing and roofing nailers that use coil-style magazines, brad nailers, finish-nail guns and staplers use straight magazines. Staplers and brad nailers have their magazines 90° to the driver. Finish-nail guns can have right-angle magazines or angled magazines (see the top photo on p. 46). Angled magazines are

handy when you need to get the nose into a tight corner.

Magazines are either open or closed. The open style lets you see how many fasteners are left, and the closed type keeps out dust and dirt. Some new nail guns have see-through magazine covers, which is a nice feature. Typically, nailer magazines hold about 100 fasteners; stapler magazines usually hold more than 150 fasteners.

Unfortunately, you cannot interchange staples, brads and finish nails from one gun to another (one exception is the orange Airy gun shown on p. 43, which shoots brads and staples). Even worse, you usually can't swap one brand of fastener with another of the same length (they're often different gauges).

It's nice to be able to shoot a wide range of fastener lengths. But because magazines accept a limited size range, you'll need more than one gun to accomplish this. If you own a brad gun and want to sink 2½-in. fasteners in hardwood, for example, you'll have to buy or borrow a bigger gun.

Finish nails, brads or staples?

Common finish nails have thick shanks to withstand the pounding of a hammer. But if you're nailing hardwood, you still have to drill a pilot hole so the nail won't bend over or split the wood. By the time you've drilled the wood and blunted the end of the nail, you might as well use a screw. By contrast, pneumatic-fastener shanks are thin, and the guns will drive and set the fastener in one shot.

A staple will hold two pieces of wood together better than a nail of the same length, and because staples have thinner shanks, they are less likely to split the wood. Staples are less expensive per fastener than nails or brads. And more staples fit into an equivalent magazine space, so you'll have to reload less often.

Brad and nail holes, though, are more inconspicuous than staple slots. Some nailers shoot T-head fasteners that leave rectangular holes, which on reproduction work can resemble a cut nail hole found on an original molding.

Staples, brads and nails come in strips (single rows of glued-together fasteners), like desk staplers use. A spring-loaded follower in the magazine pushes the strip toward a launching chamber, just like a manual staple gun. Be sure to load only the recommended fasteners for the gun. Building-supply stores carry a wide selection, but if you can't find what you need, call the manufacturer, or look in the yellow pages under pneumatic tool distributors.

Shooting fasteners

To use an air nailer or stapler, hold the two pieces of stock you're fastening with one hand, and compress the joint by pushing down the nose of the tool. This will also release the gun's safety. Squeeze the trigger (or both triggers if your gun uses this type of safety), and the tool will drive and countersink a fastener so quickly that your pieces won't have time to shift—glue or no glue. The fastener will go in the direction that the nose is pointed.

To get the most fastener penetration, support the stock on something sturdy like a bench or in a vise. I've accidentally nailed things to my bench, so I put down a piece of particleboard to protect the top. I often shoot stop blocks to the particleboard to help hold work for routing, handplaning or sanding.

Other equipment you'll need

Pneumatic fastening tools need clean, dry, pressurized air. Besides an air compressor, you'll need a regulator and a filter (separator). A regulator lets you adjust the air pressure, so you can set how deep the head will go. You can vary the pressure in most compressors between 90 and 120 psi. The separator keeps moisture and compressor contaminants out of your tool.

Nail guns don't require a huge compressor, just one that outputs

Pneumatic guns excel in the shop

Queen Anne tables sure aren't nailed together, but metal fasteners can still be useful in building fine furniture. Case pieces may have assemblies that can be glued and nailed because the heads will be concealed. Even in places where nail heads will be exposed, you can use a brad nailer. Brad holes are so small that they are almost invisible when filled with putty.

Fasteners help in other cabinetmaking jobs, too (see the photos on this page). A brad nailer's speed and accuracy is handy when you're pinning together miters, installing stops for glass doors or tacking on solid-wood edging. And staplers are great for securing cabinet backs, utility drawer

bottoms and glue blocks.

But the biggest benefit of staplers and nailers is speeding up mundane shop tasks. My favorite use of these tools is making jigs and fixtures. Air guns work faster than screw guns. I hold the parts in place and pop in fasteners. When I'm finished, I pry up the stops and fences, pound over the fastener shanks and toss the parts in the scrap heap.

Staplers also are handy when I'm cobbling together boxes, bins and shelves. Try banging together a butt-joined drawer box using a hammer and nails. By the time you get things squared up and clamped for nailing, I'll already have made three boxes with a stapler. —R.V.



Installing face frames, cabinet backs and drawer bottoms.



Tacking on molding or solid-wood edging.



Securing glue blocks, cleats and supports in pedestals, cases and tables.



Pinning together mitered frames and other delicate assemblies.



Making jigs, like the one the author is putting together, to taper a leg.



Convenience that's built in—The finish nailer (top) has an angled magazine for getting into corners, a nose safety instead of a trigger safety and an easily removed nose for clearing jams. The bottom gun has a see-through magazine cover.

100 psi of pressure. The bigger the compressor's air-storage tank, the better. At 100 psi, each 2½-in. finish nail uses one-twentieth of a cubic foot of air; each 1-in. brad uses one-fortieth of a cubic foot of air. For furniture work, a ¼-in.-dia. hose is fine. I use a straight hose—the shorter the better. Coiled hoses and long hoses can snag things or drag a lightweight nailer or stapler off the bench. You'll also have to buy a quick-disconnect coupler.

Lubrication and maintenance

Pneumatic guns need periodic oiling and cleaning. This is to ensure that the O-rings seal properly and that the chamber stays lubricated. The instruction manual will show what to clean and where and how often to oil. A few of the newer guns have sealed, no-lubrication chambers.

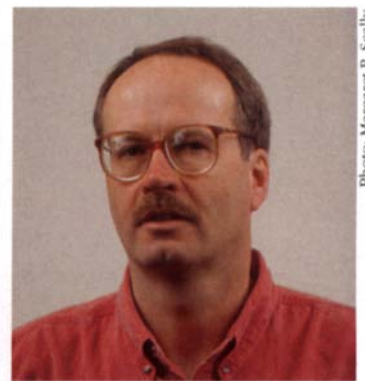
The two weakest parts of nail guns and staplers are the driver and the chamber below the head valve. Occasionally, the steel used in the driver is too soft or too brittle, which can cause it to wear quickly or to break. Luckily, drivers usually are easy to replace. You probably can change the driver and the critical O-rings yourself,

Relying on nail guns

Norm Abram, host of *The New Yankee Workshop* television show (see the photo at right), has inspired more woodworkers to use nail guns than any one I can think of. Because he is constantly finding new uses for them, I asked him what he likes most about them and what he dislikes about them. I also interviewed three other craftsmen—a period furnituremaker, a cabinet-maker and a custom stairbuilder—to find out which pneumatic guns they own, what fastener sizes they prefer and how important the guns are (compared to other tools they own) for the architectural work and cabinet-making they do. —Alec Waters, associate editor



Phil Lowe: I have a Senco SLP 20 brad nailer that's nice to have but not absolutely necessary, I suppose. I like being able to shoot different fastener lengths. When applying moldings and making jigs, I use the full range that my gun accepts, ⅝ in. to 1½ in. long.



Sven Hanson: I own an Airy 0241S gun, which shoots ⅝-in.-to 1⅞-in.-long, 18-ga. brads, and I rent a Senco SFN1 finish nailer for trim work. Their usefulness falls between my bandsaw and belt sander. Nailers are more efficient than other fastening methods.

Photo: Margaret R. Scally

but take the gun to a dealer to have more serious work done.

The chamber area can be a source of problems if it is made of soft steel or is inaccurately machined. The chamber guides the driver through its range of travel and also positions the fastener for firing. A worn or dirty chamber will let the driver ride over the fastener and jam the gun. An occasional jam is a fact of life with all air guns. The better guns have flip-up covers on the top of the chamber that let you clear the jam easily (see the top left photo).

What can go wrong and how to fix it

Nails and staples often go awry. They sometimes follow softer grain. This usually happens when I'm shooting into the edge of flat-sawn stock that has prominent annular rings, like southern yellow pine. Changing the tool angle usually fixes this. Just as with hand-driven fasteners, nails and staples shot with a gun can split the wood or blow out a corner. To avoid this, keep the nose in from the ends and edges of your pieces. If you're shooting staples, you'll sometimes get tearout between the prongs. By orienting the staple with the grain, you can usually prevent this.

Look ma, no hose!



Norm Abram: On the show, I use a Stanley-Bostich gun and Hitachi and Paslode models. I own a few old Senco guns that I use at home. For cabinet backs and drawer bottoms, I like 3/4-in. brads. I use staples to assemble lattice and 1 1/4-in. finish nails to install interior trim. For outside jobs, I like the new gas-cartridge guns.

The noses on some early guns marked the wood, so companies came out with rubber noses. But many of these noses won't let you get in corners, which is important if you want to toenail. Lately, on bookcases, I've been toenailing opposing brads under the shelves in the back to secure the parts until the glue sets.

Nailers certainly aren't as useful as a tablesaw, but most production shops would be hurting without them.



Photo: Joe Romero

Lon Schleining: I use a Senco brad nailer and finish nailer. Both guns shoot without vibration and impact. I can shoot a brad through a pencil without splitting it. I shoot 1-in. pins the most, mainly for molding work. Pinning a part without it moving is critical when I'm bending and tacking moldings around a circular staircase. Nearly as useful as my chop saw, nail guns fit into an assortment of tools that I use almost daily. □

Phil Lowe designs and builds period furniture in Beverly, Mass. Sven Hanson builds cabinets and furniture in Albuquerque, N.M. Norm Abram is a carpenter and furniture maker who lives near Boston, Mass. Lon Schleining teaches woodworking and builds custom staircases in Long Beach, Calif.

Say you're in a spot where you can't use a pneumatic nailer. Maybe there's no room for a compressor, or no electricity, or it's too awkward to be tethered to an air hose. Paslode has a solution. ITW Paslode (888 Forest Edge Drive, Vernon Hills, IL 60061-3105; 800-323-1303) makes two nail guns—a framing nailer and a finish nailer—that are combustion powered. Called Impulse nailers, these guns are fired by the ignition of gas, so they don't need an air line. They use a fuel cartridge (good for up to 2,500 shots) and a rechargeable battery to generate the spark (see the photo below). A small exhaust fan runs almost continuously when you're using the gun.

Air-driven guns are quieter, faster and much less expensive than Impulse guns, but many woodworkers like the Impulse for job-site work. —R.V.



When you're shooting fasteners, pulling the trigger too slowly can cause two fasteners to shoot at once. Push down on the safety nose, and then pull the trigger decisively. Sometimes the nose will dent the wood. This is caused from the piston recoil as it recycles. Some nailers are fitted with a rubber tip (see the top left photo on the facing page) to prevent this problem. But you can minimize the denting with most guns by holding the trigger until the fastener shoots, lifting the nose of the gun off the stock and then releasing the trigger.

Air-driven fasteners hold like crazy. If you drive one in the wrong spot or one comes out the side of your work, it's difficult to drive it back. If this happens, I clip the nail or staple prongs off as close as I can. I use a fine nail set to tap out the fastener, so the head or crown protrudes a bit. Then I use a pair of 10-in. Vise-Grips and a small block to lever the fastener out. Last, I putty the hole.

Which tools to buy

Choose a gun that shoots the longest fastener the magazine holds into the type of wood you usually use. If you work in oak fre-

quently, choose a gun that will drive a fastener all the way in. If you always work with poplar, pine and softer woods, then a low-powered tool is probably fine. If you need power, look for a gun that has a large-displacement air cylinder. It's true that this will make for a heavier and bulkier tool, but at least you won't have to set nails by hand. They usually bend over.

For cabinet-shop work, I recommend a narrow-crown stapler that can countersink a 1 1/2-in.-long staple in oak. I use 1 1/4-in.-long staples the most. The next purchase should be a brad nailer for light assembly work. I like 3/8-in. to 1 3/8-in. brad lengths. Airy makes a gun that will drive both brads and staples but only in short lengths and light gauges. One of these could be useful if you do upholstery, screening or make small craft items. Last, I suggest a larger gun for shooting up to 2 1/2-in.-long finish nails. Finish nailers can take care of heavy work, like attaching face frames and doing architectural work, and you'll appreciate one of these guns when you're nailing overhead. □

Robert Vaughan is a contributing editor to Fine Woodworking.



*This reproduction
revolver looks right
at home in the old
Ministry Shop on
the grounds of Han-
cock Shaker Village
in Pittsfield, Mass.*

The Shaker Revolver

Simple design develops a wide range of skills

by Mario Rodriguez

Back in 1986, I was lucky enough to attend a New York exhibition of Shaker furniture that had been gathered from private collections. One of the pieces was an unusual rotating stool called a revolver (see the photo at left). Like most Shaker furniture, the design was clean and spare, and the stool had been made with the Shaker's remarkable craftsmanship. Unlike most Shaker furniture, this stool was a completely original design. It was a versatile piece of 19th-century workplace furniture well-suited to any 20th-century interior.

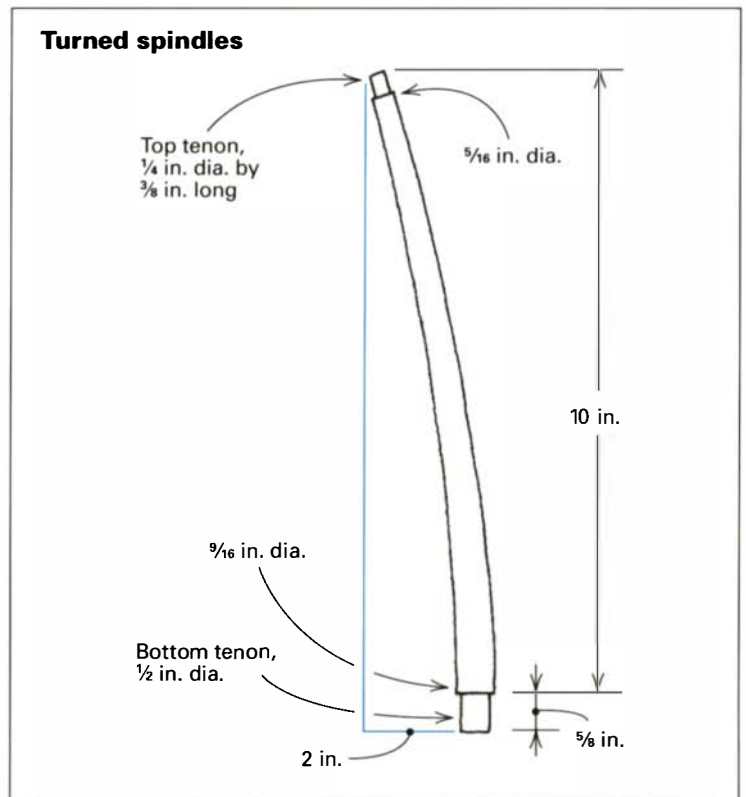
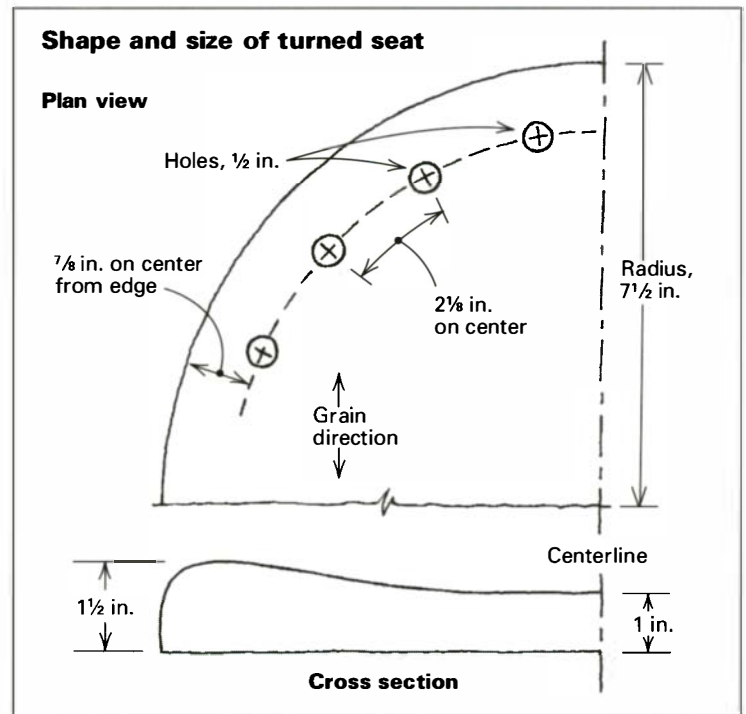
I put the stool out of my mind until recently, when I needed a compact home-office stool—something small enough to slip under a desktop yet large enough to be comfortable for more than a few minutes at a time. I didn't want some chrome and fabric contraption, so the revolver seemed like a good answer.

Although the stool requires both turning and steam-bending, it's still fairly simple to make. The only sticking point seemed to be a hardware problem: Where was I going to get the parts to make the rotating mechanism that connects the base to the seat? After a few failed trips to local hardware suppliers, I found Jeremy Lebensohn of Studio dell'Arte, who constructed a working mechanism from odds and ends he uses to fabricate staging platforms for theaters. His design is simple: a 1/4-in.-thick steel plate, 6 in. sq., welded to a 10 in. length of 3/8-in.-dia. Acme threaded rod. The rod passes through a 1-in.-sq. tapped block of steel that controls the vertical travel of the plate. Studio dell'Arte (Pier 63, North River, New York, NY 10011; 212-727-2914) will sell this mechanism for \$40, which includes shipping charges. You could also check with a machine shop in your area.

A look at the basic parts

Each of the stool's parts requires different skills. The base is made up of two identical arches of 3-in.-thick solid walnut joined with a half-lap joint at the center and secured to the bottom of the pedestal with four #10 flat-head screws. The pedestal is a two-part lamination that holds the tapped block of the mechanism captive. The seat is simply a round block gently dished in the center. After being turned to a perfect taper on the lathe, the spindles are steam-bent to a subtle curve. The back rail crowns the revolver with a gentle curve, steam-bent to a 9 1/4 in. radius.

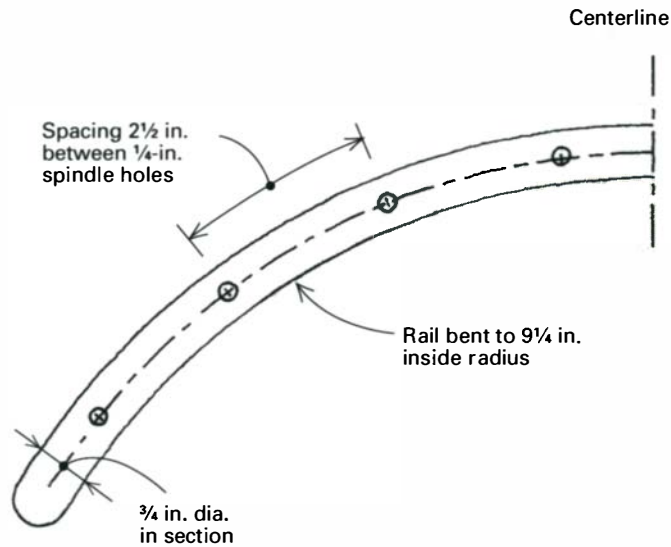
I made my stool of walnut. Shaker versions usually were a com-



Rough out the spindles with a gouge, and clean them up with a block plane. Cut the tenons with a parting tool.

Back rail

Blank is cut to 21 in. long and then turned on a lathe before steam-bending.



bination of several different woods: hickory for the spindles and rail, cherry or maple for the pedestal and base, and pine for the seat. These everyday stools were constructed from whatever was handy. Whichever wood you choose for the bent parts, it must be green (freshly harvested) to ensure successful bending. Kiln-dried wood does not bend easily and will spring back more readily.

Turning the seat, spindles and rail

The seat was glued up from two pieces of walnut, 1 1/2 in. thick, to form a 16-in.-dia. blank. To make turning easier, I bandsawed the shape to within 1/4 in. of the finished 15 in. dia. and mounted the blank on my lathe with a 6-in.-dia. faceplate.

When turning large pieces of wood on a lathe, it's a good idea to turn your project at a slow speed (I set my lathe speed at 600 rpm). Turning at a high speed will cause excessive vibration, posing risks to both you and your work. The shape of the seat is fairly straightforward (see the top drawing on p. 49). It has a rounded top edge and a 1/2-in.-deep depression in the center. After turning the seat, I sanded it to 400-grit at about 1,725 rpm.

Both the spindles and the rail should be turned before they are bent. A common problem in turning thin pieces is whip, which occurs when a workpiece vibrates and moves away from the cutting edge as force is applied. Sometimes the tool will slip between the workpiece and the tool rest, either deforming the spindle or popping it free. Once these pieces are damaged in any way, they must be discarded.

An easier way to turn the spindles is to use a block plane on the lathe (see the photo on p. 49). This technique leaves a smooth and even taper. I made sure to turn the top and bottom tenons slightly oversized to allow for shrinkage when the parts dried. Later, I shaved them down with a coarse file for a tight fit.

The back rail, at 21 in. long, required the use of a steady tool rest to reduce whip. If you don't have one, the back rail can be steamed square, and after bending, shaped with a 3/8-in. quarter-rounding bit mounted in a router. It's a good idea to prepare the back rail bending blank with a few extra inches at each end: this will give you leverage during bending and minimize kinking.

Pedestal, inside and out, before turning



The tapped steel block, buried in the glued-up pedestal, accepts the threaded rod attached to the seat bottom.

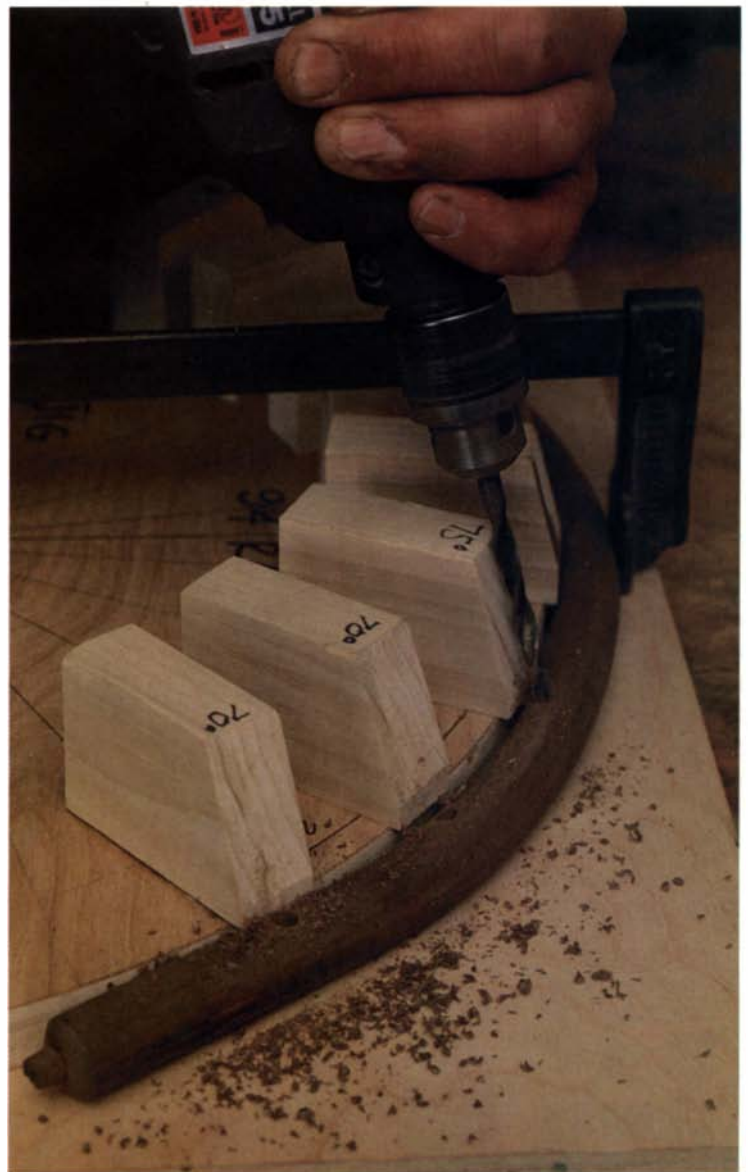
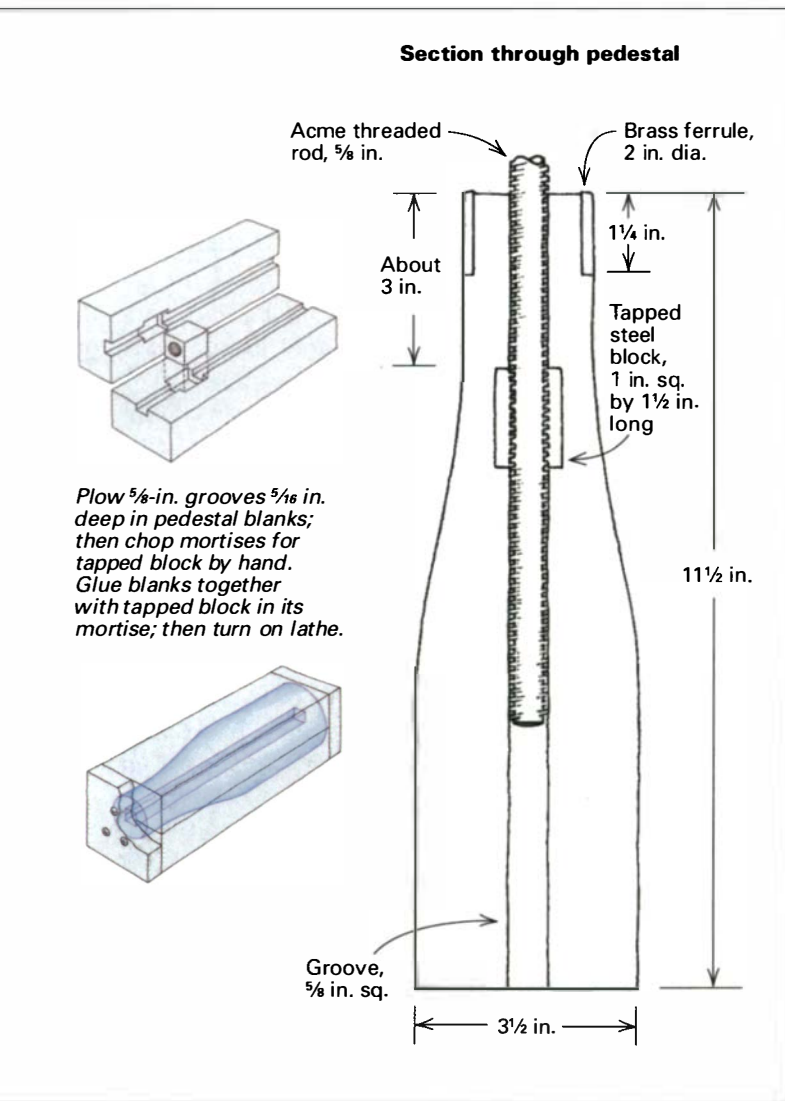


Scrap pine shoes make turning possible. Take care placing the screws, so they won't interfere with turning tools.

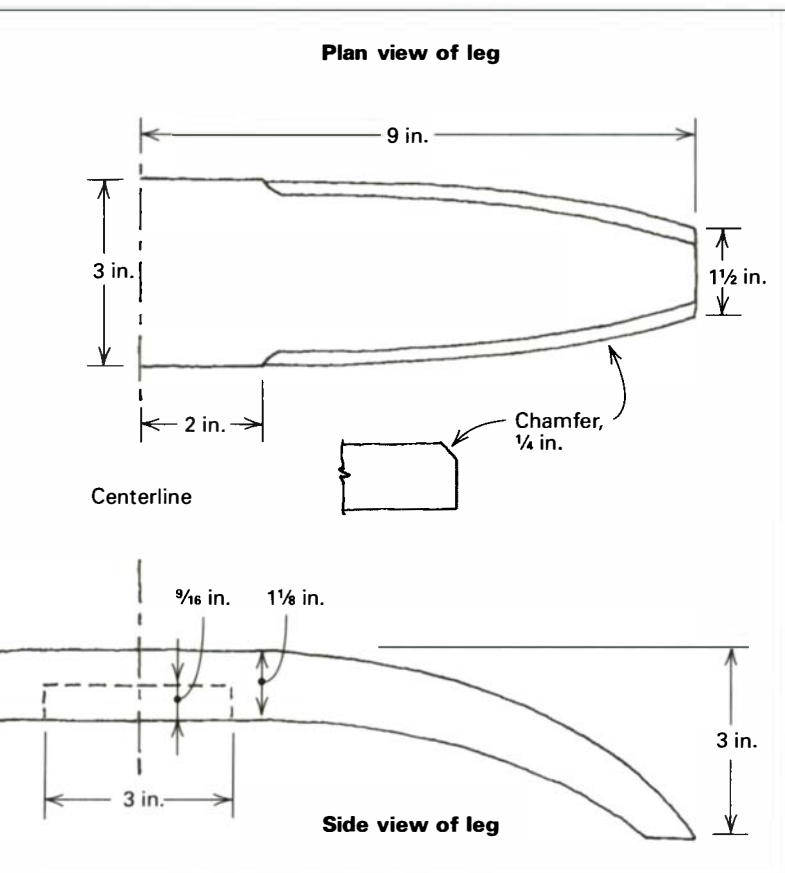
Arched legs form the base



Half-lap joint in arched leg. The joint is roughed out on the bandsaw and cleaned up with a chisel and shoulder plane. A few test-fits may be needed.



Back-rail drilling jig. Worth the time spent making it, this jig guides the drill at just the right angle for each hole. To keep the depth of all the holes consistent, you might want to put a piece of masking tape on the drill bit as a stop guide.



Glue up the pedestal, and then turn to shape

The pedestal is made from two pieces of 2-in. by 4-in. rough walnut. I plowed a $\frac{5}{8}$ -in. channel down the center of each piece on the table saw for the threaded rod. Then I marked out the position of the tapped block and chiseled out a mortise to receive it (see the top photo on the facing page). This part had to fit perfectly—any slop was eliminated with shims. Once the block fit, I dry-clamped the two halves together and engaged the threaded rod to make sure the alignment was perfect and the threaded rod didn't bind. Care and caution now saves work later on. The two pieces may now be glued together with the threaded rod in place.

To turn the laminated pedestal to the final vase shape, I added pine shoes at each end (see the center photo on the facing page). With the center channel cut, I needed a solid surface for mounting between centers on the lathe. I turned the top of the pedestal down to a $1\frac{7}{8}$ in. dia. to receive a brass ferrule, which strengthens and decorates the slender neck (I used a short length of brass pipe that I got from Space Surplus Metals, 325 Church St., New York, NY 10013; 212-966-4358). Then I mounted a $1\frac{1}{4}$ -in.-long piece of the pipe over the live tailstock center and checked the fit periodically

Bending rails and spindles

Bends for this stool are mild and easy to produce, but you'll need some sort of steambox. I use a fairly large one made of 6-in. PVC pipe, 60 in. long, mounted on a plywood cradle. But for a small, one-time project like this, I'd recommend constructing a small plywood box. A commercial wallpaper steamer, which can be rented from paint stores or rental centers, produces the steam.

The jig for the back rail (see the photo below) is a design based on one I use for Windsor chairmaking. It consists of a 3/4-in. plywood form mounted to a backing board. Around the form, I drill 1-in.-dia. holes to accommodate the pegs and wedges that hold the steam-bent blank in

place. I cut the pegs from dowels and the wedges from shop scraps.

I used a jig for the spindles to bend them all at once. I glued up pieces of scrap lumber to make an arched form. The bottom tenons fit into holes at the base of the arch. The top tenons are clamped down and held by a plunger.

The pieces are slender and require no more than 30 minutes in the steambox. When removing parts from the box, I always use gloves because the steam is hot enough to burn hands and forearms. I leave the steamed pieces in their jigs about five days, so they will retain their curved shape and not spring back. When dry, I clean them with 120-grit sandpaper. —M.R.



Rail-bending jig. Four hands are better than two for forcing the steamed rail into shape. The author is assisted by Les Katz, one of his students. Wedges hammered between the plywood form and the wooden pegs hold the rail tightly in place.

as I turned the neck. I left the last 1/4 in. of the pedestal neck a little oversized and tapped the ferrule into place. Later, I set a counter-sunk #4 brass screw to hold it secure.

So the rod wouldn't wear out the wood in the neck, I used a 1/4-in. chisel to clean out the top of the plowed channel and hammered home a 3/4-in.-dia. by 1/2-in.-long flush copper bushing (available from any plumbing-supply dealer).

Building the base with a half-lap joint

For the arches, I used 3-in.-thick solid walnut and oriented the grain lengthwise, like the original Shaker stool. Initially, I was concerned that any weight placed on the arches might cause the short-grained sections to split, but this construction technique was used by the Shakers. Many of their stools have survived, and nine hasn't split either.

The two legs are cut with a half-lap joint at the center. Because the legs taper in two planes, the sequence of cuts is important. I cut out the silhouette first and marked a centerline and a 4-in.-wide section for the half lap (see the drawing on p. 51). One arch was marked topside for the cut, the other on the underside of the curve. After laying out my joint on both pieces, I rough cut each half on the bandsaw by making multiple cuts to a depth equal to half the thickness of the arch, but just shy of my scribed lines. Then I chiseled out the waste and used a shoulder plane to clean up everything for a perfect fit (see the bottom photo on p. 50).

With the half-lap joint cut, I laid out the taper on the arches and cut them on the bandsaw. All of the curved surfaces, both concave and convex, were cleaned up with a spokeshave, files and a cabinet scraper. I finished off the curved arches with chamfered top edges.

Joining the seat and the rail

The position of the holes for spindle tenons on both the underside of the back rail and the perimeter of the seat are important. Properly placed, the spindles enhance the stool's grace and delicate beauty. If not, the stool will look lopsided and unbalanced.

There are eight holes, spaced 2 1/8 in. apart, bored on a drill press at 90° into the top of the seat. The holes in the rail are drilled at two angles—75° for the four center holes and 70° for the four outside holes. This fine degree of change helps to make the spindles fit right and look good. I made a drilling jig based on a 9/4 in. radius to help locate my holes at the correct angle (see the photo on p. 51).

Assembling and finishing the stool

It's always a good idea to dry-assemble any project before glue-up. In the construction of the Shaker revolver, it's critical. After the rail and spindles fit correctly, I drew registration marks on masking tape applied to both spindles and seat, so I could reassemble the parts exactly the same way later. When I went to glue-up, I simply lined up the marks on the masking tape.

Many of us have horrible memories of using shellac in junior high school shop class. It was thick and pungent, difficult to brush on and left awful streak marks. It never seemed to dry. I overcame these problems when I learned to mix my own, using fresh shellac flakes and a good-quality solvent blended to a water-like consistency. Such a thinned mixture makes shellac a versatile and attractive finish, and that's what I used for the stool, adding a little red pigment to warm up the color of the walnut. After four coats of shellac, I applied two coats of furniture wax. □

Mario Rodriguez teaches woodworking at the Fashion Institute of Technology in New York City. He's also a contributing editor to *Fine Woodworking* magazine.



Shavings, not dust. A well-prepared scraper works like a plane, cutting shavings and leaving a gleaming surface in its wake. Scrapers are available in different profiles and thicknesses.

Preparing a Scraper

*It's just a flat piece of steel,
but what a surface it leaves*

by Monroe Robinson

Many woodworkers think of scrapers as crude tools, good for little more than removing dried glue. Even those who use a scraper for surface preparation may think of scraping as an intermediate step between planing and sanding. And with the advice woodworkers are given, it's no wonder. I once read, for instance, that after scraping a surface, you could start sanding with 80-grit paper. Why bother? The truth is that if you're using a well-prepared, thin scraper, you can take off wispy shavings and get a surface as fine as you'd get from 400-grit paper—smooth, satiny, lustrous.

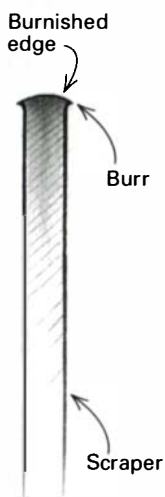
Planing figured woods and many hard, exotic species almost always is a frustrat-

ing experience. One time, I made a 12-ft.-long table with a surface of bandsawn Macassar ebony veneers. The little grain swirls that make the table's surface so interesting could not have been planed without some devastating tearout. Flattening and smoothing that surface with a scraper gave me a flawless surface with no tearout.

I started with a thicker scraper, which removes a lot of wood in a hurry. I scraped the whole table down, right off the bandsaw, in about as much time as it would have taken me to plane it. I filled several 30-gal. garbage cans with the shavings from that project. Then I followed with a thinner, conventional scraper, leaving a surface that was ready to finish. But this kind of performance is only possible with a scraper that's been properly prepared.

A well-prepared scraper

What you're trying to achieve when you prepare a scraper are four perfectly honed 90° edges. The edges are rolled over with a burnisher just enough to create a slight burr (see the drawing below). This burr works like a miniature plane, cutting the



wood fibers cleanly—creating shavings, not dust. A well-prepared scraper works for hours and will take a dozen or more new burrs before it must be re-honed. The photos and drawings on these two pages explain how to prepare a scraper in detail. It takes me about 10 minutes to prepare a new scraper. Re-honing an old one takes five minutes or so.

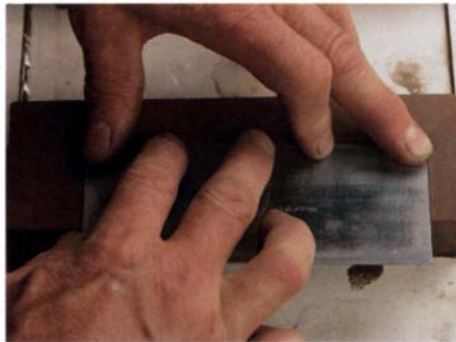
If the scraper's edge (or the 1/4 in. or so on either side of the edge) isn't perfectly polished, you won't be able to burnish the scraper more than a couple of times before having to take it back to the stones. Even the smallest scratches and nicks will yield an edge that, on a microscopic level, is ragged and weak.

When I was learning to work with scrapers, I found it helpful to look through a hand lens (available in most art-supply stores) at the sides and edges of the scraper. I studied the relationship between what I was doing and the results I was getting. When I got a good, sharp, long-lasting burr, I knew why. When I didn't, I usually could figure out why not.

What about burnishers?

Just as important as the polish on the scraper is the profile and polish of the bur-

PREPARING A SCRAPER



Flatten the scraper's sides. Apply pressure to the 1/4 in. or so next to the edge. Because you're just removing scratches and millmarks, stop with a medium waterstone (soft Arkansas for oilstone users).



File the edge flat and square. To avoid a belly on the edge, take two or three strokes at each end first. Then file the full length of the scraper. Follow with light passes with a smooth-cut mill file.

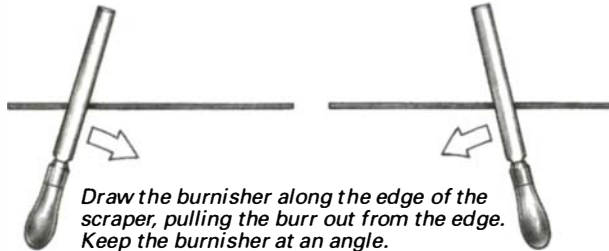
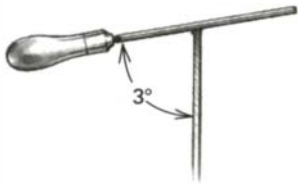
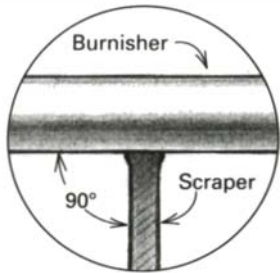


Hone the edge. Hold the scraper perpendicular to the stone and slightly flexed. Apply pressure, and move the scraper back and forth in line with the stone. For waterstones, take the edge to 6,000-grit or higher; for oilstones, finish up with a hard Arkansas.



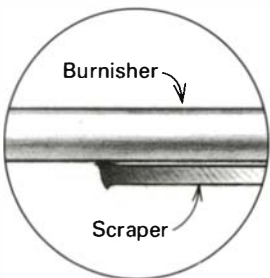
Hone the faces to remove the burr left from filing or honing. Start with a medium stone, and work up to your finish stone. Spread pressure evenly over the scraper.

Burnish the edge lightly. While holding the scraper in a vise or in your hand, burnish as shown in the drawings below. The first pass is perpendicular to the sides of the scraper. Gradually increase the angle until you're holding the burnisher at approximately 2° to 3°. An effective, long-lasting burr is very small.

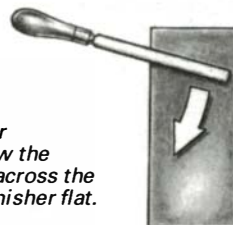


WHEN IT'S DULL

To re-burnish a dull edge, re-flatten the burr. Lay the scraper flat on the bench with just an edge overhanging. Draw the burnisher across the scraper diagonally, as shown in the drawing below, and keep the burnisher flat on the scraper, using only light to moderate pressure. Once you've flattened the burr, burnish the edge again.



To prepare the scraper for re-burnishing, draw the burnisher diagonally across the scraper. Keep the burnisher flat.



nisner. I use a burnisher with a profile that might best be described as a flattened oval. Its gentle radius distributes the pressure over a wide area, resulting in a long-lasting burr. At the other extreme are triangular burnishers, which concentrate all pressure on one tiny spot along the burr. With that kind of pressure on such a minute spot, it's easy to create a washboard effect or, worse, to fold the burr over the first time you burnish. Then you have to repeat the whole honing sequence.

I use a hard felt wheel charged with buff-



ing compound to polish my burnisher maybe twice a year. Whatever sharpening system you use, make sure your burnisher is free of any scratches, dents or nicks. Otherwise, the burr you're trying to create will be damaged.

Every time I read anything on scrapers, the writer recommends only certain brands. I use many brands of scrapers, and they all work well. Most scrapers on the market are made of hard steel and are fairly thin. I consider these to be finishing scrapers. I also use thicker, softer scrapers from Ski Kare (part #937SX, \$7.50 plus shipping, phone orders only; 800-525-5374). These scrapers are real wood removers, and their softer steel allows them to be re-burnished more times before re-honing. The surface they leave is still equivalent to 220- or 320-grit sandpaper.

Scraping tips

Burned thumbs are a common complaint. I once got some deep burns in my thumbs from hours of scraping. My solution is to use thimbles made of masking tape. They're not much to look at, but they work.

Burned or scraped knuckles are another common complaint. They're caused by holding the scraper at too low an angle. The scraper should be no lower than 45° to the wood you're scraping. If you have to scrape at an angle lower than that, you've either burnished the scraper with too much pressure or at too high an angle. □

Monroe Robinson is a sawyer in Little River, Calif., specializing in custom sawing salvaged, old-growth redwood. He was a professional furnituremaker for 22 years.



Veneering a Tabletop

Iron down veneer one piece at a time for tight seams and a reliable bond

by Michael Burton

Sitting in a dimly lit room, the old pool table looked more or less sound. Some of the veneer had started to peel, and the owner was anxious to know whether the table could be repaired. “Of course it can,” I told him.

Later, when I took the table and my bravado into the shop, it was a different story. Lots of veneer had to be replaced. I started to worry about the hot hide glue I’d always used for veneering. The glue holds down veneer just fine, but wood that isn’t veneered on both sides can warp. I didn’t see a way to get the table apart to get at both sides of all the pieces, at least not easily. I was stuck.

Before long, I was experimenting with aliphatic resin glue. I learned that once dried, this glue can be reactivated with a house-

hold iron to form a very good bond. Best of all, veneer applied this way to only one side of the workpiece doesn’t cause any distortion. The pool table was salvaged. Ever since, I’ve been using this iron-on technique on everything from repairs to new tabletops as large as 7 ft. dia.

The technique is simple. Glue is applied to both the veneer and the ground (the material the veneer is glued to). After the glue has dried, the two materials are ironed together. The heat from the iron melts the glue and bonds the two surfaces (for more on using this technique to veneer small surfaces, see *FWW* #108, pp. 48-51).

You don’t need any special or expensive equipment like bulky veneer presses or vacuum bags (mine is now gathering dust in a



Two coats of glue on both surfaces. The author uses a brush to spread thinned glue on the top of this game table.

corner of the shop). Nor is it necessary to join several pieces of veneer together with veneer tape before covering a large surface; the seams are made as the sheets are applied. This technique works with wrinkled veneers, even burls and crotches, and it may save you the trouble of flattening such rare and beautiful woods before application.

Like any other technique, though, ironing down veneer has its quirks. If you've tried this approach, you know that heat produced by an iron can shrink the veneer, opening up seams and causing some checking if you're not careful. When used with a little forethought, however, these problems are minimal at worst. The keys to success are pre-shrinking the veneer before ironing it down, applying the glue in several thinned coats and cutting the seams as you go. This is the same approach I used to veneer a small game table that my shop was recently commissioned to make (see the photo on the facing page). The iron-on method worked perfectly, and I'll show you how I did it.

Test veneer for shrinkage, and repair any holes

Before thinking about glue, the veneer should be checked for heat tolerance. Some species can shrink dramatically under the heat that will be required to bond them with dry glue. To check, measure a piece of veneer across the grain, and then heat the wood with your iron at the three-quarter setting (see the photo at right). After the veneer has cooled for a few minutes, measure again. If the shrinkage is significant, it's a good idea to pre-shrink all of the veneer you plan to use by thoroughly heating it with the iron. Even though the glue will swell the veneer when it's applied, pre-shrinking the material now reduces the chance of checks and open seams later.

If there are any defects in the veneer, such as holes or checks, now's the time to tape them on the face side. A number of wood-working suppliers sell veneer tape. It's just a strip of paper with adhesive on one side that you wet and stick down. When you're all done, you can scrape the tape off. It's not a good idea to use masking tape; heat from the iron will turn it into a gummy mess, and masking tape stretches.

The veneer tape will hold the veneer together and prevent the glue from reaching the face. If you're working with paper-backed veneer, which has a layer of paper bonded to the back side of the veneer, scuff the paper with 80-grit sandpaper before applying the glue. If you don't do this, the glaze on the paper can cause problems in getting an even glue coat.

Because I cut the seams as I go along, there's no need to fit the veneer precisely to the ground at this point. I lay out where the seams will be on the ground with a sharp pencil and make sure that the pieces of veneer will cover the area with a little bit to spare. With these steps out of the way, I can apply glue to both the veneer and the ground.

Spread the glue in several coats

Glue thinned about 10% with water spreads easier and covers better than one coat straight from the bottle. I use either Titebond or Elmer's yellow glue, thinning it until it's the consistency of heavy cream. Complete coverage is important, and a brush works much better than a roller (see the photo at right). A roller can leave air bubbles and an undesirable texture and is totally ineffective on wrinkled veneer.

Spreading glue on the ground is very straightforward—just brush on a good, even coat (see the photo on the facing page). Before spreading glue on the veneer, it's a good idea to mist some water from a spray bottle on the face side. This will help eliminate curling caused by the moisture of the glue on the back. After the glue



Getting the shrink out. Because some veneers shrink dramatically during the bonding process, the author starts by pre-shrinking all the veneer with the iron at a three-quarter setting.



Thin the glue, and paint it on. Aliphatic resin glue thinned about 10% with water spreads easily with a brush, eliminating the bubbles that can occur with a roller.

BONDING ONE PIECE AT A TIME



Bond first, trim later. With layout lines drawn on the tabletop, the author bonds the first piece of padauk veneer in the pattern. He keeps the iron away from edges that need trimming.

A sharp linoleum knife works best. With a straightedge and a linoleum knife, the author trims the edge of the first piece of veneer. Knife marks are extended beyond the edge as a reference for trimming the next piece of veneer accurately.



has been spread on the back side of the veneer, place the veneer on sticks so that air circulates around both sides.

If possible, stay with the veneer as the glue dries. If puddles form, spread them out with a putty knife or a scrap of plastic laminate. Make sure that edges that will be part of a seam are well-covered with glue. After the first coat of glue has dried (*dry* means that all of the creamy white color has been replaced with a transparent light yellow), feel the surface. If it has become rough, sand lightly with 80-grit paper. Then put a second coat of glue on both the veneer and the ground.

Some species of veneer and some ground materials, such as the raw edge of medium-density fiberboard (MDF), may require a third or even a fourth coat. The object is to have a smooth, glossy, transparent film of glue that looks a little like a thick coat of varnish. Veneer will have a leather-like feel when it's properly coated with glue.

Once you have enough glue on both surfaces and it has dried, pass a sanding block with 80-grit paper lightly over the ground and, if possible, the veneer. This will knock the top off any dust, coagulated glue or whatever may have settled on the glue as it was drying. Anything that the sandpaper won't smooth out should be cut off with a sharp knife or a chisel.

It's just like ironing your shirt

Now it's time to iron down the first piece of veneer. Position a rough-cut piece of veneer so that it overlaps any seams by $\frac{1}{4}$ in. or so (how much overlap you can afford will depend on the veneer and your pattern, but don't leave any less than $\frac{1}{8}$ in.). Heat, residual moisture and wrinkles can often distort the veneer as it's bonded. This is the reason I prefer trimming after the bonding process. With the iron turned up about halfway, use the tip to tack the veneer in place. Then with slow, circular motions, proceed to bond this first piece of veneer, staying $\frac{1}{4}$ in. or so away from areas that will be trimmed later (see the top photo).

How hard do you press the iron? Don't break the handle! But remember that the heated glue is plastic, not fluid, so the more pressure the better. There is no law against using two hands. You will often hear clicking sounds as you iron. These are small spots pulling loose. You should iron until the clicking stops. Keep the iron moving—don't linger in any spot. Overheating the glue will destroy its bonding characteristics.

Should you encounter a real stubborn wrinkle, moisten the area with a damp cloth, and iron it immediately. Don't give the area a chance to swell. The added moisture and heat will cause the area to compress, and the steam will penetrate the veneer to aid the glue bond. I've heard the suggestion that a steam iron be used for bonding. This works for single pieces and large sections of paper-backed veneer, but in a design with a lot of seams, the added moisture often can cause dimensional changes in the veneer that are completely intolerable. Keep your work as dry as possible.

Trim the first seam, and then test the bond

With the first piece bonded, I trim the seams with a sharp linoleum knife, my tool of choice. I just think of it as a veneer saw with one tooth. And like a saw, it works best when you make the cut in a number of passes.

When cutting the seam, I let the knife overcut the veneer into the border areas (see the photo at left). These marks will be used for lining up the straightedge for trimming the next piece. Should you encounter areas of waste that have been accidentally bonded, cut them loose with a sharp chisel (a dogleg is excellent for the job). If

MAKING A TIGHT SEAM

the glue has been removed from the ground, re-spread those spots.

After trimming, you may wish to check the bond. I always do. With your fingernail or a stiff brush, go over the surface and listen for a hollow sound indicating that the veneer isn't bonded. Then I moisten the veneer with a damp cloth. Loose spots will manifest themselves as bubbles. If you are working in a quiet area, the veneer often will talk to you. A clicking sound will be heard as the bubbles pull themselves loose. If any loose spots are detected, use the tip of the iron and a little extra pressure to bond them, and then pass the iron over the entire piece to dry it.

Cutting and fitting the next piece

That first piece is now well-bonded. In fact, if you tried to pry it up, the veneer would take chunks of the MDF with it. The next step is to rough-cut the second piece and position it for bonding. If you are working with flat veneer that doesn't seem to wrinkle much under heat, you may wish to pre-cut the second piece and shoot the edge with a sanding block. If this is the case, let the piece overlap the first by about .01 in. (about the thickness of a matchbook cover). Then bond the second piece of veneer, staying about 1½ in. back from the seam.

The secret to a tight seam is that little extra you've allowed. Take that .01 in. of overlap, and buckle the veneer slightly so that the seam edges are butted together. A piece of ¾-in. steel or brass rod pushed beneath the second piece of veneer near the edge is a great help (see the center photo). If the trimmed seam is a little ragged, carefully pass a sandpaper block over it. And if you are the type who wears a belt and suspenders simultaneously, you also may wish to brush a light coat of fresh glue on the edge of the veneer. I have often done this where I feared the veneer shrinking and the seam opening up.

After the pieces are butted together, withdraw the rod, and iron down the buckled seam (see the bottom photo). Position the iron so it spans the whole seam. The veneer often splits when the tip of the iron rides the center of the buckled area, so make sure the entire area is covered with the sole of the iron. A joint made in this manner places a great amount of pressure at the seam and is highly unlikely to open up.

If your veneer is wrinkled, the procedure is slightly different but gets you the same result. Let the second piece overlap the first by at least ¼ in.; then iron it down except for the 1½ in. next to the seam. After the veneer is down, trim the edge to be seamed with the first piece.

Make the cut so the second piece overlaps the first by about .01 in. (see the top photo). Cut through the top piece only. I use a scrap of plastic laminate to protect the bottom piece of veneer. This is not a double-cut. Do I have to tell you to work carefully? You have only one chance.

Test the surface with a damp cloth

I use this one-piece-at-a-time approach until I've covered the top with veneer. I make sure the veneer is well-bonded by dampening the surface with water and looking for bubbles. Bubbles detected now are easy to fix with an iron. If you find one later, don't panic. A product called Brasive (Mohawk Finishing Products Co., 4715 State Highway 30, Amsterdam, NY 12010-7417; 518-843-1380) introduced through a pin hole in the bubble will reactivate the glue and bond the veneer without reheating. □

Michael Burton and his three sons make furniture in a variety of styles at Burton's Furniture Studios in Ogden, Utah.



For wrinkled veneer, cut the seam in place. Heat can distort the edges of some veneers, so the author may choose to cut a clean edge once the second piece of veneer is mostly bonded.

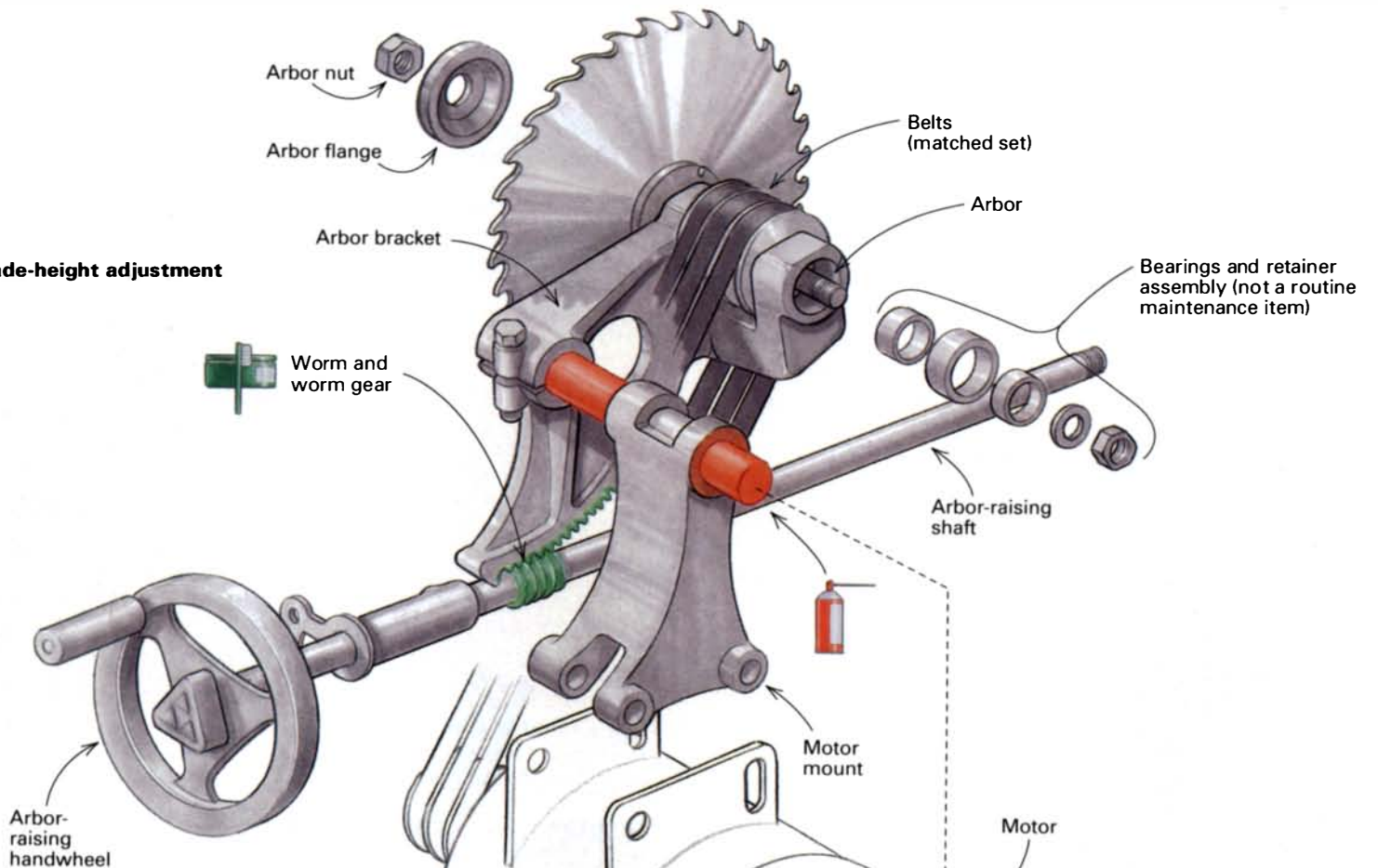


Secret for a tight seam. For a seam that won't pull open from the heat of the iron, the author cuts the second piece of veneer .010 in. wide. Then he buckles it over a piece of ¾-in. rod so that the edges meet.



Iron down the hump. Working from one end and withdrawing the rod as he goes, the author presses down the seam. It will stay tight.

Blade-height adjustment



Here's a view of your tablesaw you rarely see. The key on the facing page shows the appropriate lubricant for routine maintenance on the tablesaw.

Blade-tilt adjustment

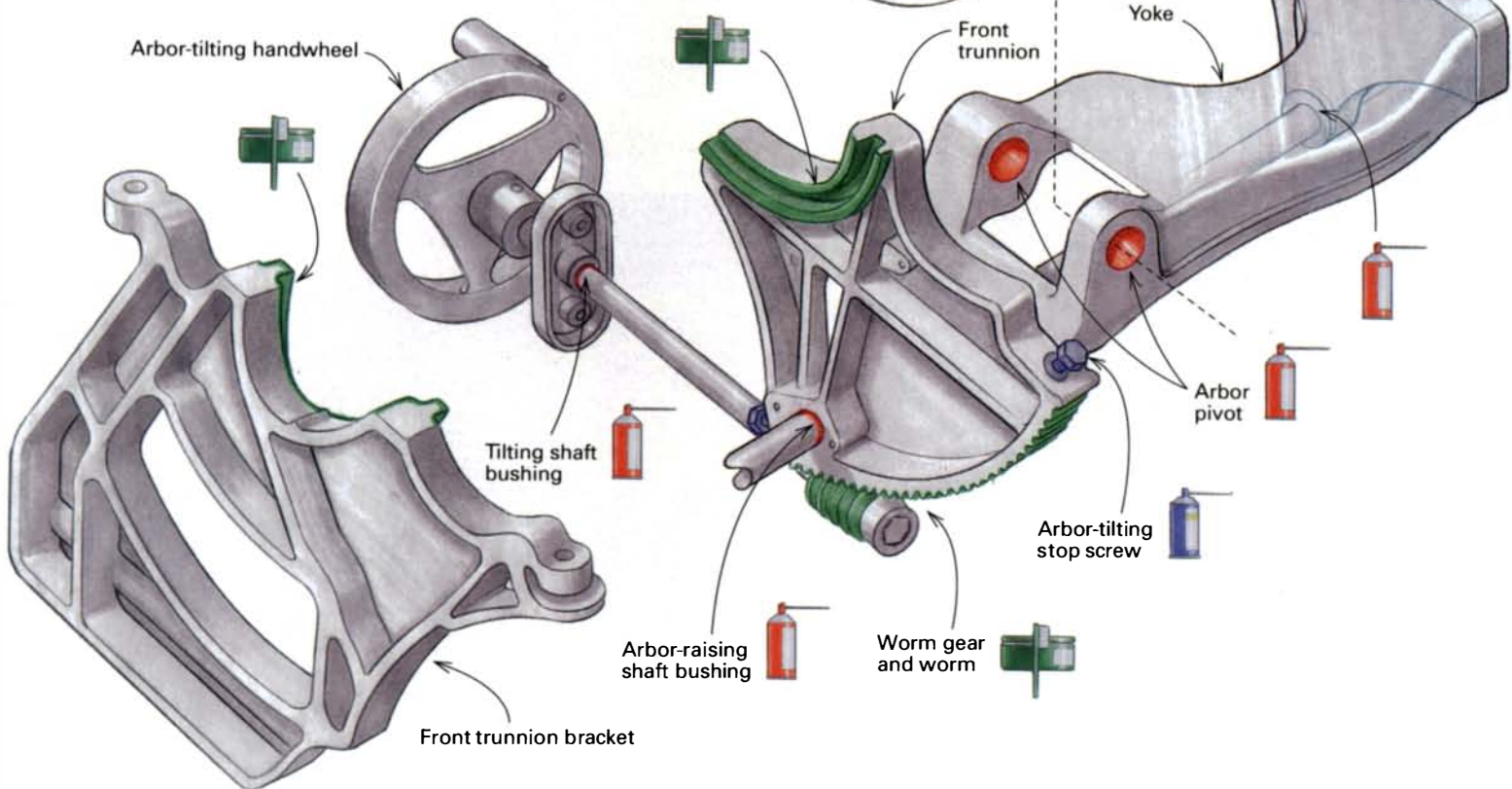
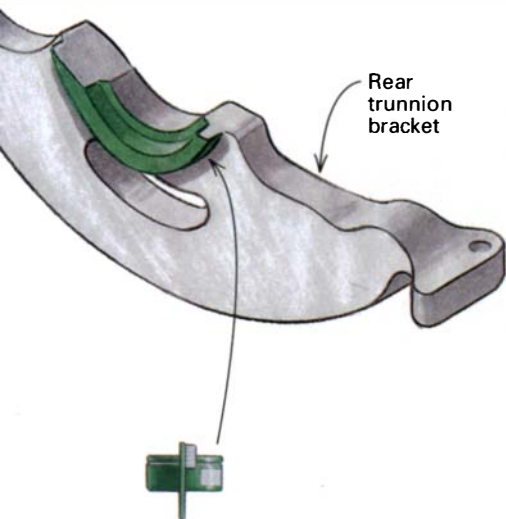


Table saw Tune-up

*What lies below
the top needs
attention, too*

by Kelly Mehler



Several times a day, dozens of times in the course of a week, I crank the handwheels to adjust the blade on my table saw. Each time, the smooth, precise response from this otherwise ordinary task gives me a brief sense of satisfaction—things are okay. But as the months and board feet of wood slide by, the once silky-smooth operation starts to take more muscle. Eventually, tugging on the handwheel raises the blade in intermittent jerks, and tilting the blade provokes a metallic squeal. My saw is telling me it's time for a tune-up.

The table saw is the most important power tool in my shop. Accurate and heavy, it's built for the long haul. But it's easy for me to take it for granted. I routinely check the cutting accuracy, but I don't have a schedule for servicing internal parts. The cabinet base, valued for its stability, noise reduction and dust containment, shrouds the motor and internals—out of sight, out of mind. So, even though I know that cleaning and lubrication keep the saw in top shape, it's only when I notice stiffness or noise while raising or tilting the arbor that I'm finally prodded into action.

The frequency of maintenance depends on how, and how often, the saw is used. Cutting abrasive materials, such as particleboard, Masonite and Formica, will increase the wear on internal parts. Sawing plenty of gummy, resin-rich or green wood creates pitch buildup. In my shop, internal parts should be cleaned and lubricated about once a year, and I set aside at least half a day to do it.

Table saw anatomy

It's a lot easier to maintain your table saw if you have the original instruction manual and the parts list. All of the machine's parts usually are shown as they would be assembled, which can be especially helpful when doing repairs and replacing parts. If you don't have a manual and parts list, ask for one. Most manufacturers will oblige if you give the name, serial and model number of your saw. Manufacturers' addresses can be found in the *Thomas Register* at your local library.

The drawing at left shows the guts of a typical cabinet-base table saw. The arbor assembly is the heart of the saw. It's a structural casting, with integral worm gear, that houses the sawblade drive shaft (the arbor) on a set of bearings. In addition, the motor, motor mount, belts and pulleys also are part of this assembly. The trunnion assembly, also with an integral worm gear, supports the arbor assembly and allows the whole unit to tilt about the two arc-shaped

slides, which are called trunnions. They engage mating brackets mounted to the front and rear of the cabinet. Handwheels control blade elevation and blade tilt by turning worms that engage worm gears on the arbor and trunnion assemblies. These parts work best when they're clean.

Remove the top

Before doing any work on your saw, make sure it's unplugged. The best way to access all the internal workings is to remove the top from the saw. Removing a few screws at the upper corners of the cabinet is all it takes. But before you run off to get the wrench, you should measure and record the distance from the inside edge of the miter-gauge slot to the tip of the sawblade. Take this measurement with the arbor set at 0° and the blade elevated to its maximum height. This will aid you in getting the top back to its original position. If you've built jigs for your saw and they use the miter-gauge slot to reference their position relative to the blade, you'll want to replace the top *exactly* where it was.

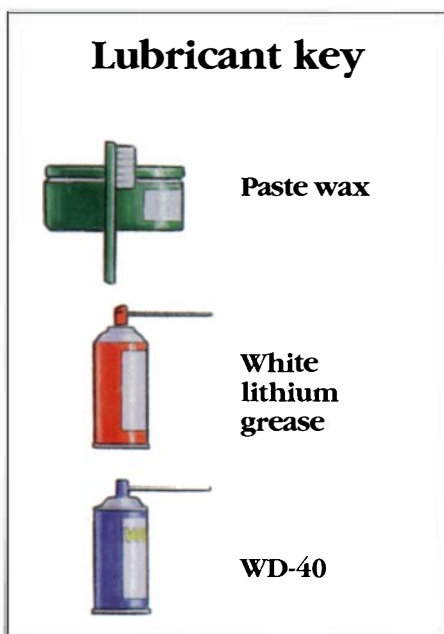
Realigning the top can be a fussy, painstaking process. If you don't want to mess with it and the interior is not badly loaded with pitch, then most of the work can be done (with some difficulty) through the throat plate and the other openings in the cabinet. It's a personal preference.

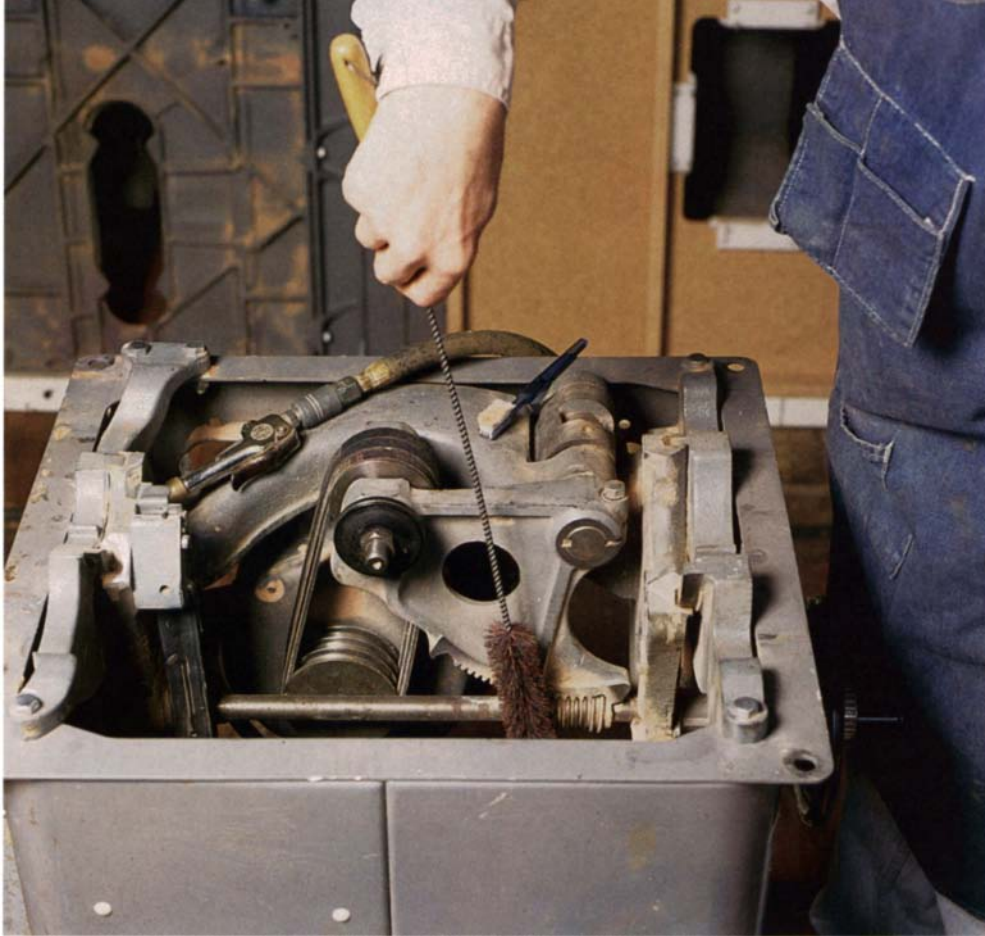
If your saw is in dire need of a cleaning, remove the throat plate, the blade, the miter gauge, the fence and any other loose items, and then remove the top. With the top out of the way, you can methodically work your way through the machine in a multi-step process of cleaning, inspecting and lubricating.

The arbor assembly

Cleaning the interior of your saw prevents the accumulation of pitch and sawdust, which increases wear and makes operation difficult. The first step is to clean out all the dust and gunk from all the moving parts. This will make inspection and lubrication easier (or possible). Use a stiff-bristle brush to knock loose sawdust from the arbor, arbor pivot, worm and worm gear (see the top photo on p. 62). If your shop has an air compressor, a well-directed blast of compressed air really helps to clean hard-to-get-at areas.

Next you'll need to remove the accumulated pitch, gum and packed sawdust. This is tenacious stuff, and you'll need some additional cleanup tools and solvent. A narrow putty knife, an old screwdriver, splints of wood and a wire brush will help to dislodge the cakes of pitch and sawdust.





Clean out all the accumulated sawdust prior to inspection and lubrication.

Paste wax applied with a toothbrush lubricates gears and doesn't attract sawdust.



The solvent I particularly like is Oxisol blade and bit cleaner (Oxisol Inc., 12055 Universal Drive, Taylor, MI 48180; 313-946-4440) because it's nontoxic, nonflammable and water soluble. It is as effective as oven cleaner without the noxious fumes, and it can be wiped off with a dry rag—no water needed.

The arbor and bearings—The arbor needs very little maintenance, but you should check for burrs on the face of the arbor flange, which will cause the sawblade to wobble. Also, check the arbor threads for burrs and caked sawdust. A wire brush will remove the crud from the threads, and a fine-cut file can be used to remove the burrs.

Any wear or looseness in the arbor bearings also will result in sawblade wobble. To check the bearings, loosen the motor mount, and take the tension off the belts. Turn the arbor by hand, feeling for roughness. Grasp the arbor and gently pull up and down to check for any slack in the bearings. Temporarily remount the blade, and see if it spins freely. Roughness or slack in the bearings or failure of the blade to coast smoothly means the bearings need to be replaced.

Replacement is not routine maintenance. This involves removing the trunnion assembly, unseating the bearings and replacing them using an arbor press—something probably best done at a machine shop or by a repair technician.

Blade wobble also can occur when the arbor flange is not perpendicular to the arbor. You can determine this by measuring the out-of-plane motion of the flange—this value is called runout. To determine the runout, use a dial indicator with a magnetic base. Mount the magnetic base to the closest rigid structure (the arbor bracket or the top if it's in place), and place the indicator tip against the flange. Rotate the arbor. Runout should be less than 0.010 in. More than that will cause enough vibration at the edge of the sawblade to cause rough cutting as well as splintering (especially with sheet stock). If the flange needs truing, remove the arbor assembly, and take it to a machine shop.

The motor—The motor runs in a dust storm inside the cabinet. Because of this environment, a quality saw has a totally enclosed fan-cooled motor (the motor

Tugging on the handwheel raises the blade in intermittent jerks, and tilting the blade provokes a metallic squeal. My saw is telling me it's time for a tune-up.

windings and bearings are sealed within a steel shell, and an external fan blows cooling air over the motor housing). For long motor life, make sure this fan is free of obstructions, such as caked sawdust, on the intake grill.

To promote free air circulation, the cabinet has openings. Keep the level of sawdust in the cabinet to a minimum, well below the motor. If you have a motor cover on the cabinet, then the vents in the base should be clear of accumulated sawdust. Too much sawdust and pitch inside the saw base also is a fire hazard—another reason to practice good housekeeping.

V-belts and pulleys—Most cabinet-base tablesaw arbors are driven from a motor via two or three V-belts, which are sold and installed as a matched set. Check for frayed or cracked belts, and replace them with new ones to the manufacturer's specifications. If only one belt is worn, replace them all as a set; otherwise, more of the load will be carried by the new belt. Uneven loading results in premature wear and vibration in the saw. Vibration transmitted to the blade causes rough cutting.

Pulley alignment and belt tension

The arbor and motor shafts should be parallel to each other, and the pulleys must be in alignment (see the drawings at right). Even a slight misalignment will cause excessive belt wear from poor tracking and will increase vibration and noise.

To make this alignment, loosen the setscrew in the pulley on the motor shaft. Place a straightedge on the arbor pulley so that it makes contact with both edges of the rim, and then move the motor pulley until the straightedge touches both sides of its rim, too.

If the pulleys are aligned, then the shafts will be parallel. If you can't get the pulleys to align, it's because the shafts aren't parallel. In that case, loosen the motor mounts, and shift the motor until you get the desired alignment.

Once the pulleys are aligned, slide the motor mount to tension the belts. When you can deflect the belts about 1 in. at the center span between the pulleys using light finger pressure, the tension is correct.

Arbor worm gears and arbor pivot

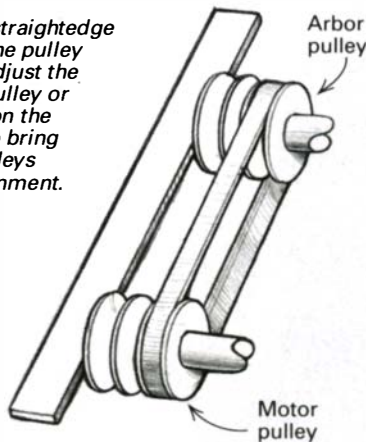
The arbor-raising worm and worm gear also are exposed to a blast of sawdust. They



White lithium spray grease is used to lubricate the hard-to-reach pivots.

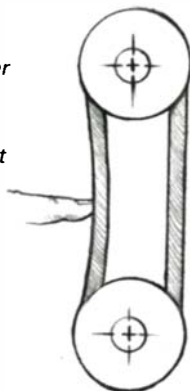
Checking pulley alignment

Place a straightedge across the pulley faces. Adjust the motor pulley or reposition the motor to bring both pulleys into alignment.



Tensioning the belts

Light finger pressure should deflect the belts about 1 in.



get packed with pitch and caked sawdust. Enough of this stuff can make operation difficult. Use a stiff-bristle or wire brush to dislodge the material. For really tough cases, like pitch buildup, use Oxisolv cleaner.

The best lubricant is one that does not attract sawdust, such as powdered graphite, hard wax or white lithium grease. For the worm and worm gear, I use furniture paste wax. Use a toothbrush to work it into all the gear teeth (see the bottom photo on the facing page).

Clean the accumulated gunk from the bushings that support the worm shafts. Strips of solvent-soaked rags used in a shoe-shine fashion work best here. Use this same technique for the arbor pivot. To lubricate these hard-to-reach areas, I use a white lithium grease spray (see the photo at left). Then raise and lower the arbor several times to make sure that the operation feels smooth.

The trunnion assembly

Because the trunnions carry the weight of the entire arbor assembly, including the motor, they work best when clean and lubricated. Using your arsenal of cleaning implements, pick and scour the debris from the arc-shaped trunnion grooves and their mating trunnion brackets. Because you'll have to tilt the assembly back and forth to get it all, clean the worm and worm gear at this time, too. Using paste wax and a toothbrush, tilt the arbor assembly from stop to stop to work in the lubricant.

Arbor-tilting stop screws—The final step in the tune-up is lubricating the arbor-tilting stop screws. These usually are a hex-head machine screw with a locknut and need only a shot of penetrating oil, like WD-40 or Liquid Wrench, on the threads. This will help them move easily when you set the arbor tilt for 0° and 45°.

Replace the top, and then align

After the parts inside the cabinet have been cleaned and lubricated, put the top back in place. Reinstall the screws holding on the top until they are finger tight. Raise the arbor to its maximum height, and replace the sawblade. Because the slot-to-blade reference measurement was made with the blade set at 0°, you need to reset the blade to perpendicular, and set the stops. Then you can align the miter-gauge slots so that they are parallel with the blade.

Using a combination square or a draftsman's 45° triangle, set the arbor-tilting stops. Hold the square against the blade, and nudge the handwheel until the blade is perpendicular with the table. Carefully turn the machine screw until it's hard against the fixed stop. While holding the screw with a wrench, tighten the locknut. Tilt the arbor away, and then bring it back against the stop. Check again that the blade is still perpendicular to the top. Now, using the 45° part of the combination square or the triangle, tilt the arbor over, and repeat this procedure for the 45° stop.

With the blade at its maximum height, nudge the top back into its original position using your recorded measurement of the sawblade to miter-gauge slot distance. Snug up the cap screws using light torque on the wrench.

The final alignment check involves making a test cut. Clamp a ¾-in.- to 1-in.-sq. piece of hardwood to the miter gauge so that it extends about 1 in. past the sawblade. Cut the stock, turn off the power and unplug the machine.

With the end of the workpiece at either the front or back of the blade, rotate the blade (backward so that no wood is removed) until you find the tooth that hits the wood the hardest and makes a scratching sound. Mark that tooth with a piece of chalk, and move the stock to the other side of the blade.

Look and listen as you rotate the blade. If the blade is parallel to the miter-gauge slot, the marked tooth will hit the wood and make the same sound. If the tooth does not hit the stock (it probably won't), the blade and miter slot are not parallel.

To jigger the top into the correct position, slightly loosen the cap screws holding the top to the base. Now tap the tabletop in the desired direction, as shown in the photo at right, rotate the arbor, and listen to the sounds the sawblade makes against the test piece. When the sounds match at the front and back of the blade, tighten the bolts and recheck.

Final tightening is best done in several go-rounds. If you crank down hard on the cap screws and go for the maximum torque in one yank, the phenomenon known as creep can throw the top out of alignment. So tighten the screws in steps, going from one to another, just as you would tighten the lug nuts when changing a tire on your car. □

Kelly Mehler is the author of The Table Saw Book (The Taunton Press, 1993) and a furnituremaker in Berea, Ky.



Tap the edge of the table to nudge the miter-gauge slot parallel to the blade.

When Wood Fights Back

*That special board you've been saving
may harbor hidden health risks*

by Jon Arno

It wasn't the British army, but an unseen foe, that caused the demise of seven of Napoleon's soldiers in 1809. They died not by sword or musket ball but from eating meat that had been barbecued on oleander spits. The shrub, *Nerium oleander*, contains a deadly, soluble poison.

Oleander is a great deal more toxic than most woods. But skin rashes, respiratory problems and other health concerns are common reactions to many species that woodworkers routinely handle.

Plant toxins act as a defense mechanism to deter browsing animals, so the toxins tend to congregate in the foliage, fruit and bark. The woody tissue, as a general rule, is relatively inert. But it's rarely, if ever, totally void of potential toxins. Depending on how they are handled and the unique sensitivity of those who use them, all woods should be viewed as potentially toxic.

Exposure occurs through skin contact, inhalation and ingestion. Airborne dust sticking to sweaty skin and dust that we breathe in probably constitute the chief forms of contact. Wood exposure affects people as either an irritant or a sensitizer.

Irritants affect a larger portion of the population and may be ei-



ther mechanical or chemical. With a mechanical irritant, fine dust particles dry out and abrade the mucous membranes. Perspiration releases acids and other soluble compounds contained in the dust to form chemical irritants, which are caustic to human tissue. The symptoms usually are skin rash and bronchial inflammation.

Sensitizers cause the body to produce histamines, which make the rash and the bronchial symptoms more severe. Most people are unaffected by sensitizers. But those who do experience allergic reactions, even from relatively modest contact, may find that these reactions get worse, not better, over time.

Offending compounds in wood, whether irritants or sensitizers,

Some unfriendly exotics

The wood species shown at right are potentially toxic. All of them, though, are popular and relatively important cabinet-woods. Individual sensitivity, however, depends on the intensity and the length of exposure to the wood.



Gonçalo alves (*Astronium graveolens*): This is a member of the poison ivy family, Anacardiaceae. Symptoms can include extremely severe skin rash, but individual sensitivity varies greatly.

Imbuia (*Phoebe porosa*): Sometimes called **Brazilian walnut**, imbuia contains potent alkaloids, which are cardiac stimulants and can cause vomiting, headache and diarrhea.

Teak (*Tectona grandis*): Skin rash is common when working teak. The primary sensitizer in the wood can trigger sensitivity to allergens in other unrelated woods.

Makoré (*Tieghemella heckelii*): Sometimes called **African cherry**, makoré contains a strong irritant. Symptoms include skin rash and respiratory problems.

may be substantially different chemically. Some of these compounds, especially ones called quinones, bear a molecular similarity to petroleum distillates, such as benzene and naphtha. And quinones frequently are identified in clinical tests as the probable cause of many allergic reactions.

Allergic reactions to sensitizers sometimes are severe. Occasionally, the reactions are fatal. And now there is growing evidence that irritants also have lethal potential. Correlations are being drawn between exposure to numerous irritants and higher incidences of cancer. Asbestos, tobacco, food dyes, solvents and a host of other substances in the modern environment are all suspect.

In this respect, wood is no exception. Certain relatively rare cancers of the nasal passage tend to occur more frequently among woodworkers than among the population at large. The cause is generally linked to long-term exposure to a lot of dust in a factory-like environment rather than home workshops where dust levels may be a good deal lower.

Troublesome timbers

Some woods seem to cause more problems than others. The wood samples shown above are some of the foreign species that have been studied for many years. These woods are known to cause problems like skin rash or respiratory irritation among some woodworkers. But their relative toxicity in comparison to other lesser-known imported woods is not clear.

It's not only exotic, tropical species that can lead to health problems. Some very common timbers, such as mahogany, oak, walnut, western red cedar, Douglas fir and pine, are cited as toxic by some authorities. But research on the subject is far from conclusive and hasn't been tackled comprehensively.

Simple precautions reduce health risks

Because many wood pigments, gums and resins contain irritants or sensitizers, often it is the most attractive, vividly colored and fragrant timbers that cause problems. It's a good idea to limit first-time exposure to unfamiliar woods.

Imported species aren't necessarily more toxic, but it is wise to be especially careful with them. Also, even though a certain species may be relatively harmless, there is a remote chance that it may be contaminated by a fungus or micro-organism that you've never been exposed to before. If you have no prior experience with a particular wood, even if it's a well-known cabinetwood, experiment with it by cutting or shaping it and then waiting a few days before filling your shop with dust.

Kitchen utensils and toys—Be careful when selecting woods used for kitchen utensils. Some woods can impart unwanted flavors. Acids in woods like oak and beech and alkaloids in species like *Peroba rosa* and *Masonia* are water-soluble, so these compounds can permeate food. Ironically, bourbon whisky and fine

Be careful when selecting woods used for kitchen utensils or toys.



Mansonia (*Mansonia altissima*): Sometimes called **African black walnut**. It's laced with irritants. Symptoms include headache, skin rash, nosebleed and cardiovascular problems.

Peroba rosa (*Aspidosperma peroba*): This wood belongs to the oleander family, which contains irritants and poisonous alkaloids. Symptoms include skin rash and flu-like reactions.

Rosewood (*Dalbergia spp.*): A high proportion of people are affected by the woods in the rosewood genus. Skin rash is the primary symptom.

Silky oak (*Grevillea robusta*): Sometimes called **lacewood**, this wood contains phenols, which are irritants and potentially sensitizing. The foliage and wood can cause severe skin rash.

Iroko (*chlorophora excelsa*): This exceptionally durable African timber often is used as a teak substitute. It can cause skin rash and respiratory problems.

cherries attain their final flavor from oak barrels by this same leaching process. Also, gums and resins from some woods—pines and firs, for example—are liberated by heat, which makes them a poor choice for cooking utensils.

The physical characteristics of the wood also should be a consideration. Coarse-textured and open-grained woods, like ash, chestnut and oak, may collect food residue that can affect the flavor of the food and harbor bacteria, which can cause food poisoning.

When choosing woods for toys, remember that infants often chew on them. Given a child's body weight, even small doses of some toxins can be lethal. Stick with wood species traditionally used to make toys and kitchen utensils. Maple is the best choice because it's fine-textured and doesn't harbor dirt, and the sugars in the wood are edible. Birch, white pine, poplar and basswood also are acceptable.

Avoid walnut for making toys because it contains juglone, which is a natural laxative and sedative. Clearly, don't use oleander. The imported woods discussed above are best used for projects other than toys and food-related items.

Minimize your exposure to wood—Many common woods have developed the reputation of being harmful to your health. But often it is the intense, prolonged exposure of these widely used woods, rather than a higher level of toxicity, that leads to health problems.

Allergic reactions often intensify with repeated or prolonged exposure. Aside from the risk this poses, the initial sensitivity may trigger a broader allergy to unrelated woods. If a particular wood causes a reaction, stop using it, and seek medical advice.

Installing a dust-collection system, using a respirator, wearing clothing that prevents dust from sticking to perspiration on the skin and washing as quickly as possible after working with wood are all sensible precautions.

Although it's smart to be prudent, don't panic. Sharp-edged power tools and organic solvent vapors probably constitute a greater danger to the average woodworker than exposure to wood. □



Photo: Vincent Laurence

Covering exposed skin and using a respirator are ways to limit exposure to irritating dust.

Jon Arno is a woodworker and consultant in Troy, Mich. He is a regular contributor to Fine Woodworking.

Joinery for Light, Sturdy Coffee Table

Wedged through tenons and inlaid butterflies are the keys that hold it together

by Lindsay Suter



I knew a wood supplier in California, a whacky old hippie, whose joy was salvaging trees everyone else overlooked and then turning the wood into spectacular lumber. His lumberyard may have been in complete chaos, but he had a gift for finding the raw material for truly memorable furniture. It was in these wood stacks that I found the curly cherry perfectly suited for a low coffee table I had designed.

The table, as shown in the photo on the facing page, looks quite simple. But its exposed joinery puts craftsmanship as well as the figured wood on display. Through tenons, wedged with butterfly keys, join the legs to the top. Narrow stretchers replace more traditional aprons, keeping the table looking light and airy. The design also is a little daring because the tabletop is fastened directly to the legs.

I wondered as I drew up the plans whether this feature might result in a split top. As it turns out, the frame of this table flexes slightly as the top expands and contracts across its width. This is a result of using relatively thin stretchers, only ½ in. thick, that are set well below the top of the frame. Because the frame isn't absolutely rigid, the top has enough freedom of movement so it won't split. I know because the first one I made went to a client in Massachusetts where summers are hot and humid and indoor winter conditions are bone dry. The table has been there for seven years and shows no signs of a problem. Even so, I would choose a

relatively stable wood for this design. Quarter-sawn white oak, nara or myrtle wood all seem like good choices to me.

Cutting mortises with a dado blade

The top is glued up from four book-matched pieces that give the table a symmetrical quality. The leg tenons penetrate the top at the two outside joint lines. The inlaid butterfly keys let into the tops of the legs not only reinforce the joints between the top boards but also wedge the leg tenons. Cutting mortises into the tabletop where the boards are joined simplifies construction.

I cut the mortises with a dado blade and a crosscut sled on the tablesaw before gluing the top pieces together (see the top photo on p. 70). After testing the setup on

a piece of scrap, I can complete the mortises in a couple of passes.

I used dowels to align and register the edge-glued top joints. I marked the location of the butterfly keys first, so I didn't end up with a dowel in the way later on. To give the top a light, thin appearance without compromising its strength, I tapered the underside of the top at the edge. I used a tall auxiliary fence clamped to the tablesaw's rip fence with the blade fully raised and tilted away from the fence at about 5°. The fence is positioned about ⅝ in. away from the blade, and the top is run through the saw on edge. A featherboard helps hold the top against the fence.

Tenoned, mortised and tapered legs

There are four steps in making the simple, tapered legs: sizing the stock, cutting the tenons, cutting the mortises and tapering the inside faces. Cutting the joints is much easier while the stock is still square. Leave the leg stock slightly long, so there will be an extra $\frac{1}{16}$ in. or so of the tenon protruding through the top. Although the tenon will be sanded or planed flush later, the result is a cleaner finished joint.

To prepare a tenon for a wedge, I drill a hole just above the tenon's shoulder, so the wedge won't split the leg. Then I band-saw a kerf down the tenon to the hole. Remember to orient the leg wedges so that they run perpendicular to the grain of the tabletop, not with it.

Before cutting the mortises for the stretchers, I mark each leg so I know where it belongs on the table and which faces are on the outside. Then I lay out the mortises on all the legs. I cut the mortises on a slot mortiser, but a router, drill press or mallet and chisel will work equally well.

I taper the legs on the tablesaw using a shop-built jig, a rectangular piece of plywood cut to an L-shape. After double-checking that I'm tapering the inside faces of the legs, I run the jig along the fence of the tablesaw with the leg snugly seated in the jig. The offcuts are handy for cutting the stretcher shoulders to the angle of the legs.

I rescued some small scraps of ebony for the feet. The $\frac{1}{4}$ -in.-thick ebony wears like iron and visually punctuates the ends of the tapered legs. I cut and glue the foot to the bottom of the leg and then countersink a screw for good measure.

Lay out stretchers from the legs

I measure and mark the stretchers by dry-fitting the legs into the top and clamping the stretcher in position at the correct height against the back of the legs. I leave a little extra length at both ends, so the tenons will protrude through the legs and can be sanded flush later. I use the tapered, inside edge of the leg as a guide to scribe the shoulder line on the stretcher.

To cut the tenon with an angled shoulder, I use a tenoning jig on the tablesaw. Instead of clamping the stretcher in a vertical position, I back it up with an offcut from tapering the legs. This ensures the angle of the shoulder will match the angle of the tapered leg. As before, I clean up, pare and fit the tenons and then drill and kerf them for wedges.

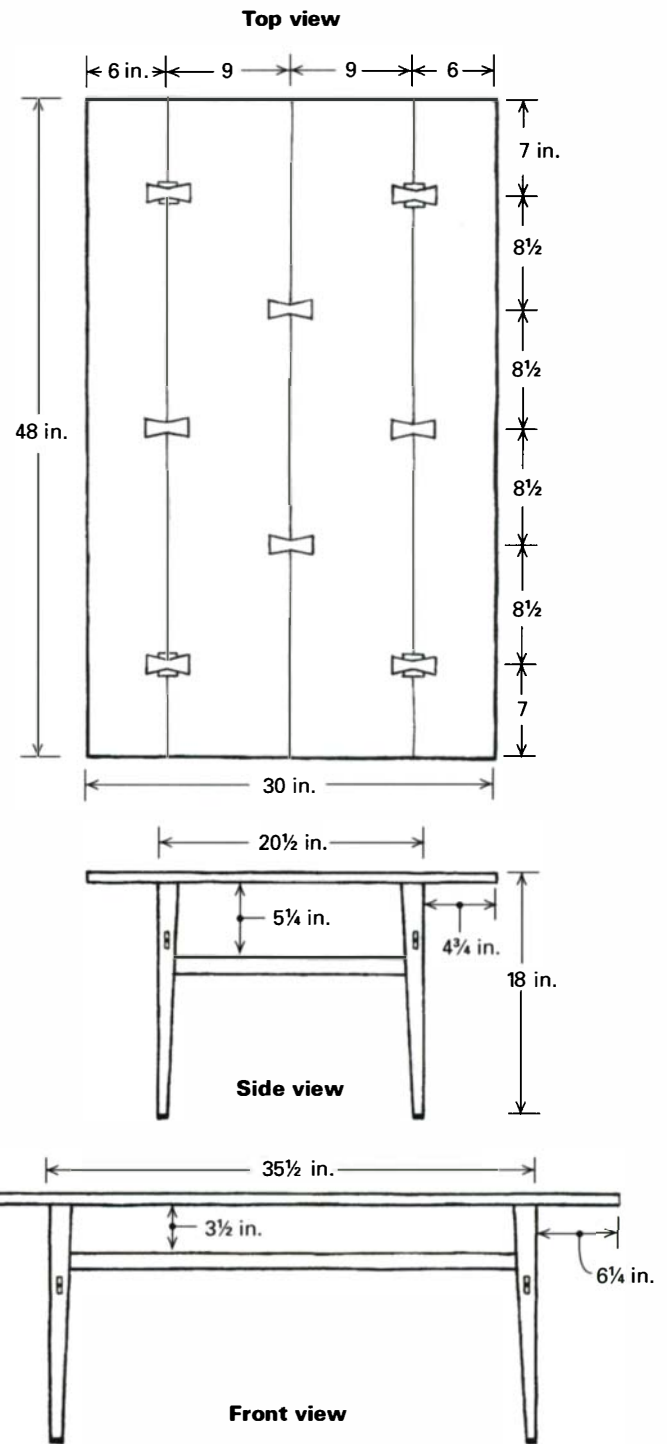
Assemble the frame in two steps

Before assembling the table, I make plenty of wedges from stock that's strong, straight grained and contrasting in color to accent the joint. I also scrape and sand all the parts. Then I glue up two sets of legs to the long stretchers only. After applying glue to the leg-stretcher joints, I fit the joints firmly and set them with a wedge. Then, immediately, I set the assembly into the tabletop (without glue). This holds everything in the correct position.

After the glue has cured, I repeat the procedure with the shorter end stretchers. When these are dry, I glue and wedge the leg/stretcher assembly to the top. I use the top wedges to keep the leg tenons tight in the top until the butterfly keys are finally put into place. When the glue is fully cured, I sand the tenons and wedges flush with the legs and the top.

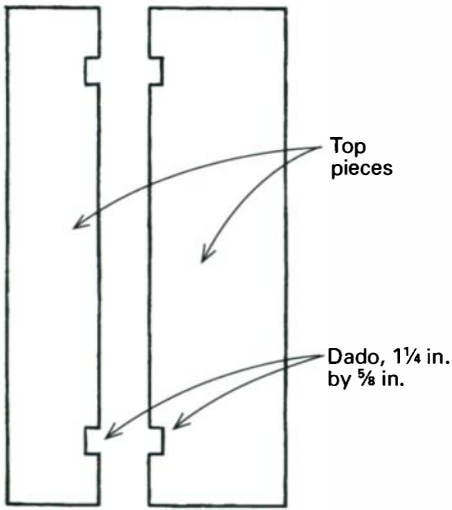
A jig simplifies the butterfly keys

When making multiple, identical butterfly joints, I like to cut all the mortises with a jig first and then fit the butterflies to the mortises (for more on making butterfly keys, see *FWW* #102, pp. 46-47). I make the butterflies with a slight taper on the sides, which helps



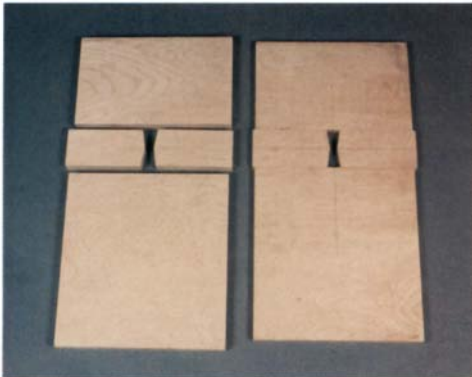
A low coffee table makes the most of wildly figured wood. Mortises are cut in the top before glue-up.

TABLETOP MORTISES

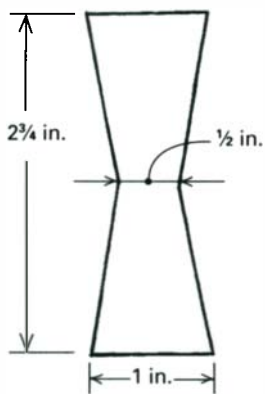


Mortises on the table saw—The tabletop mortises are cut with a dado blade and a cross-cut sled. Mating boards are clamped face to face against the sled's fence.

THE BUTTERFLY KEYS



Butterfly-mortise jig, made of plywood, is cut to shape and glued back together.



Align butterfly-mortising jig with layout lines. The rounded corners left by the router bit in the butterfly mortises are cleaned out with a chisel.

ensure a tight fit and keeps the leg tenons tight in the top.

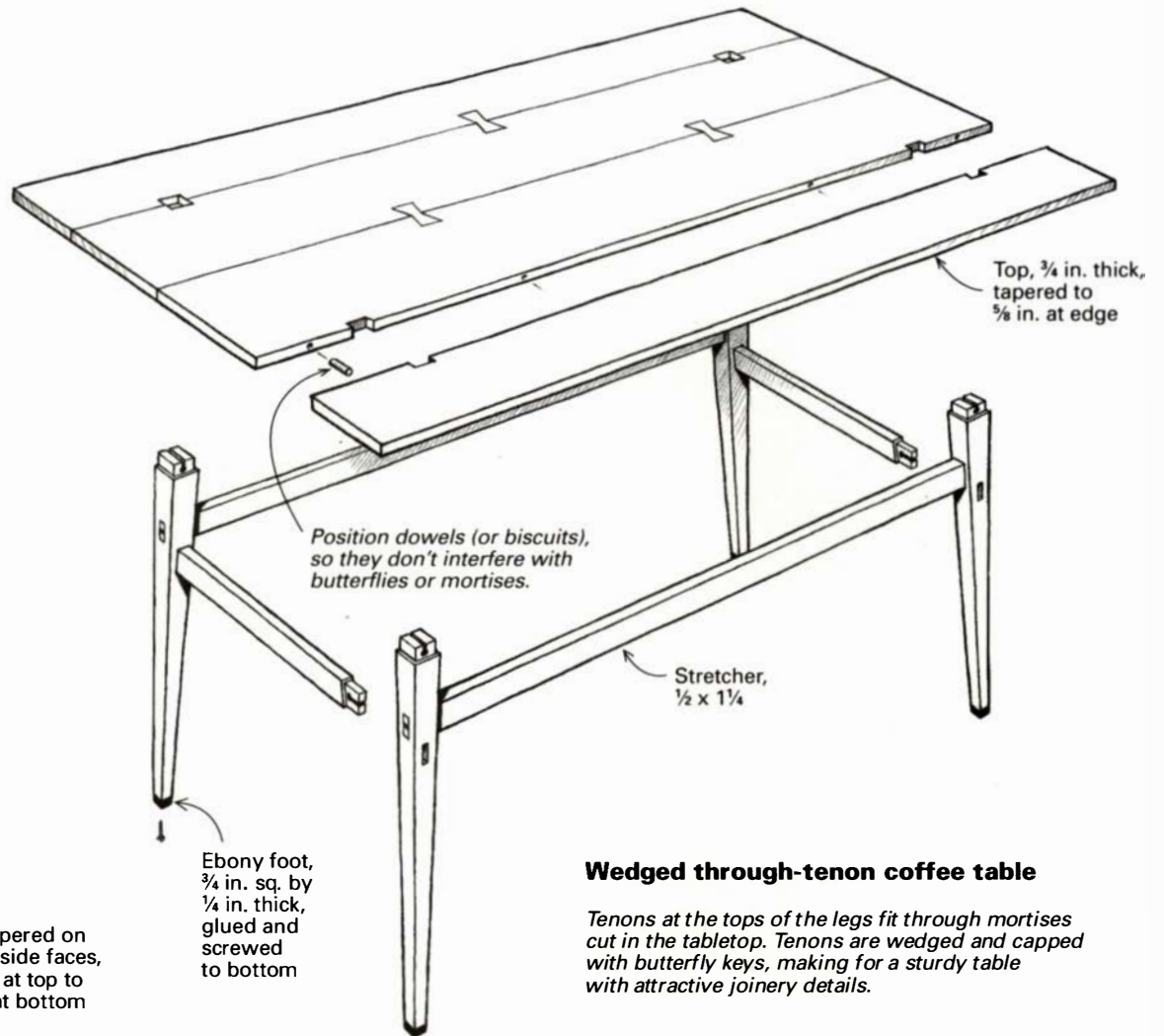
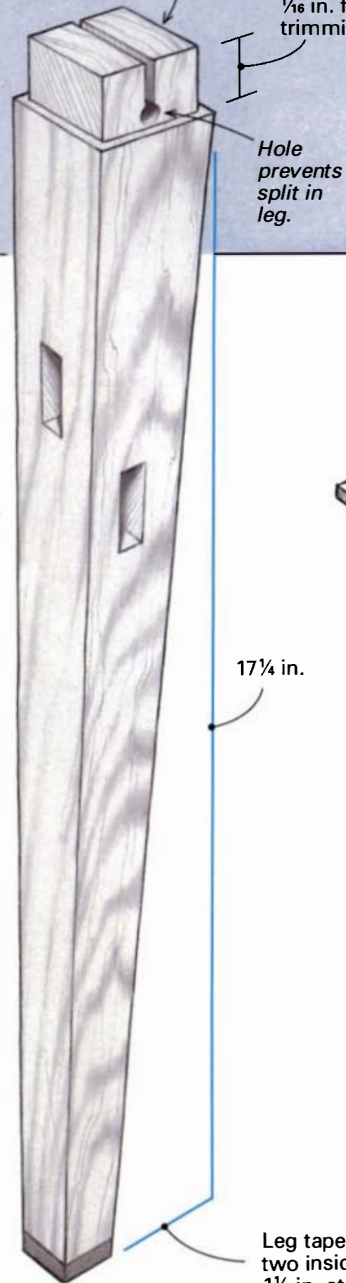
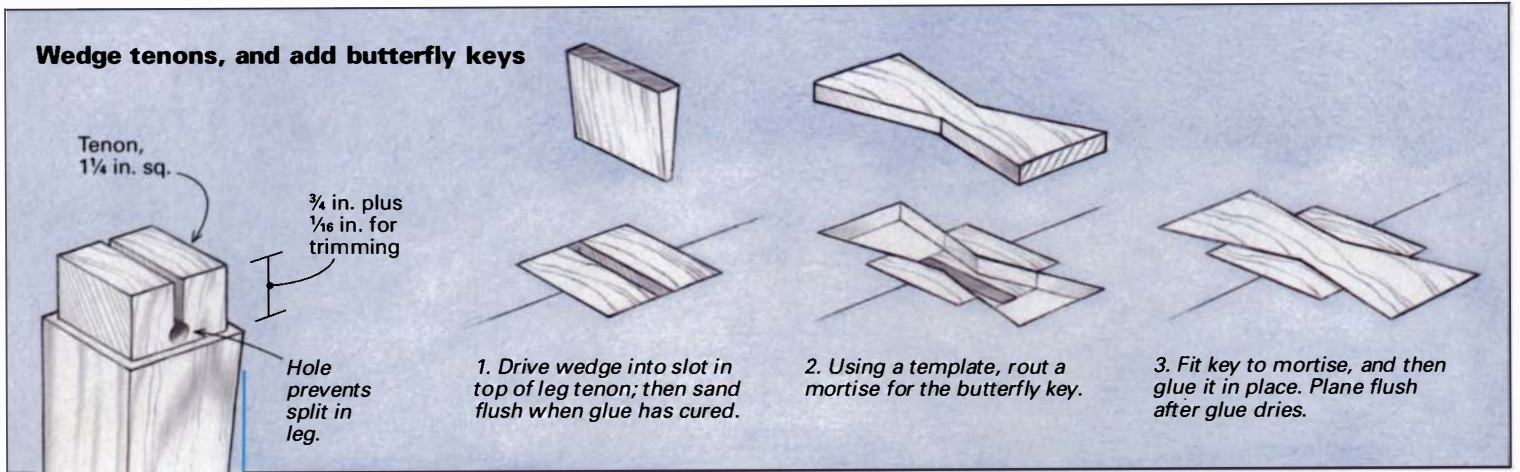
The butterfly jig is a rectangular piece of ¾-in.-thick plywood cut into three sections. I cut the center section with a chop saw to shape the butterfly (see the photo at left above). The pieces are glued back together, and centerlines are drawn to help with registration.

I lay out the centerlines for all the butterfly locations on the tabletop. Long layout lines make it easier to align the jig on the tabletop (see the bottom right photo). After clamping the jig securely in place, I rout the mortises with a flush-trimming, bearing-guided bit to a depth of about 7/16 in. To complete the mortises, I clean up the

corners with a chisel. I mill the butterfly stock to ½ in. thick and use the mortising jig to mark out the butterflies. After I bandsaw them to shape, I fit each butterfly, carving a slight taper on the sides. Each butterfly and its corresponding mortise are numbered.

I glue and clamp the butterflies in place, spreading the glue completely, but sparingly, on the taper and on the bottom of the butterfly. I use deep-throated clamps and waxed blocks between joint and clamp. The blocks spread the clamp pressure over the whole butterfly and protect it from damage; the wax keeps the block from being glued to the top. The center butterflies can be tapped

Wedge tenons, and add butterfly keys



Wedged through-tenon coffee table

Tenons at the tops of the legs fit through mortises cut in the tabletop. Tenons are wedged and capped with butterfly keys, making for a sturdy table with attractive joinery details.

into place with a hammer and a block of wood while supporting the top from below. Or they can be clamped with battens above and below the table with clamps at either side.

When the glue has dried, I use a sharp jack plane to level the protruding butterflies with the tabletop. Then I sand the top starting with 120-grit sandpaper, progressing up to 320-grit.

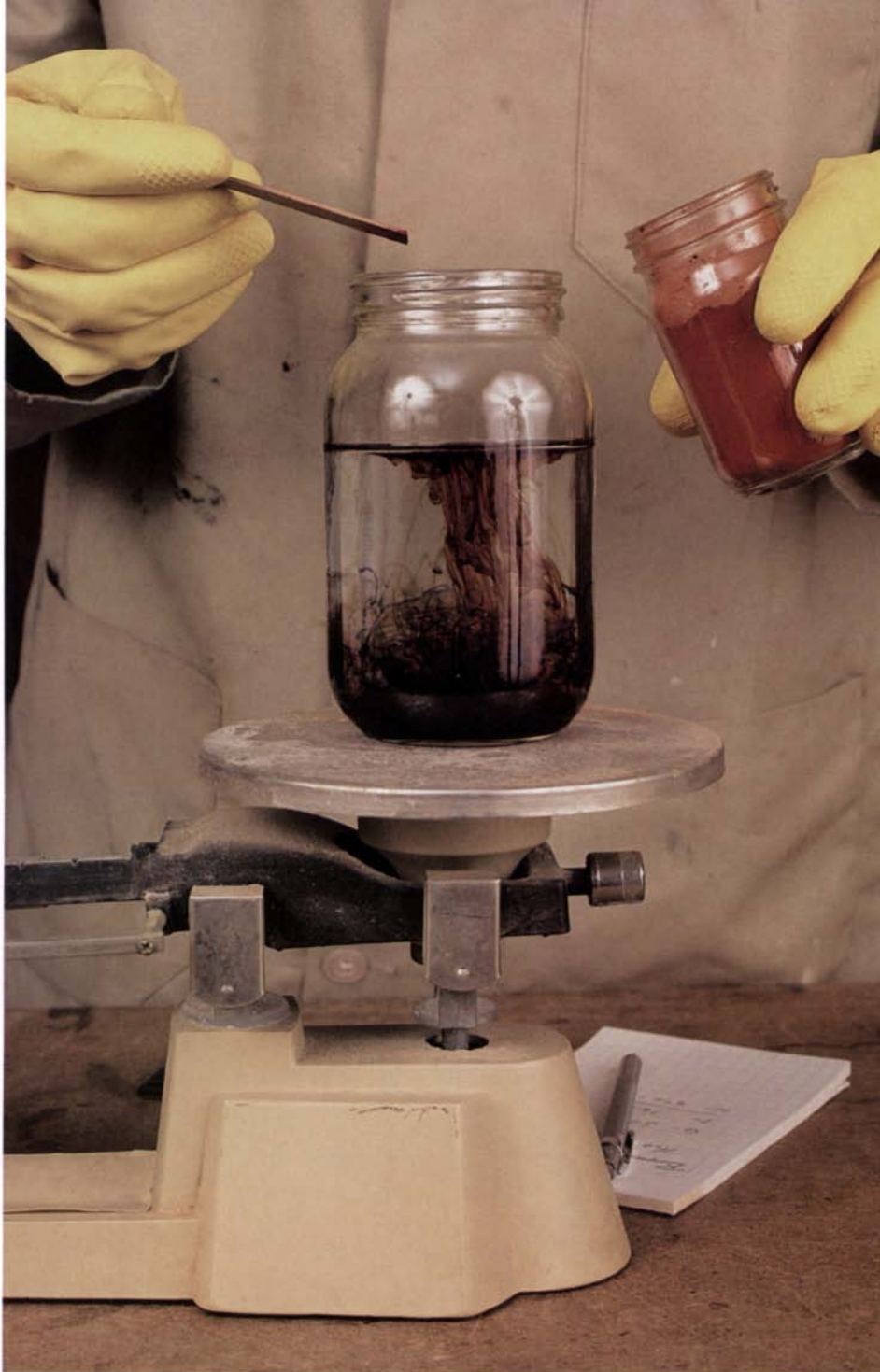
Finish up with oil and varnish

My favorite finish is a progressive buildup of four or five coats, starting with a straight oil finish, such as Watco. With each succes-

sive coat, I add a little semigloss varnish and mineral spirits in equal parts until the mix consists of approximately one-third of each ingredient.

This finish gives a soft, lustrous surface with better wear resistance than straight oil. After the final coat is dry, I wax and lightly buff the entire piece with #0000 steel wool and then polish with a soft cloth. □

Lindsay Suter has taught at California College of Arts and Crafts in Oakland, Calif., and is now a woodworker in Kingston, R.I.



For Vibrant Color, Use Wood Dyes

Aniline dyes enhance figure, even out tones

by Chris A. Minick

Getting consistent colors—Exact measurements and careful record keeping are important for duplicating colors. Wood dyes usually are a blend of colors, visible as dye powder dissolves in water (above) and in filter paper (right).



Aniline dyes are a good product with a bad name. Their nasty reputation is a holdover from the days when these versatile coloring agents were highly toxic. It's a misnomer not much different from golfers still calling their drivers "woods," even though many modern golf clubs are made of metal. Woodworkers still know dyes by the name "aniline," even though mod-

ern wood dyes no longer contain the chemical.

First used in the textile industry in the mid-1800s as a substitute for natural dyes, aniline-derived dyes worked fine, but they faded quickly and were soon replaced by more light-fast synthetic colorants. Unfortunately, the term *aniline dye* stuck. It is still used to distinguish transparent wood stains from their pigmented cousins.

Dyes are useful for special finishing effects, like layering (adding depth) and toning (applying tinted finish). Probably the best use for dyes is evening out differences in color, like those between sapwood and heartwood.

Dyes can work miracles on figured wood (see the photos on the facing page), but they aren't magic. For example, when an uninteresting piece of wood is dyed, it will just

become an uninteresting, colored piece of wood.

You can buy premixed-liquid or gel wood dyes or mix-it-yourself powdered dyes. I mostly use powdered dyes, which have an indefinite shelf life. Dye is classified by the solvent that dissolves it. The three classes are water-soluble, oil-soluble and alcohol-soluble dyes (see the sources of supply box on p. 76). Each type has finishing advantages.



Quartersawn lacewood—Burnt-sienna and then light-walnut dye bring out the ray-fleck figure.



Quilted bigleaf maple—Scarlet-red and then cherry-brown dye highlight the undulating figure.



Mottled mahogany—Yellow and then rosewood dye emphasize the chatoyance.

You can even use ordinary fabric dyes. Brands like Rit can be found at department stores, but you'll have to mix or layer several colors to get more natural wood tones. Powdered fabric dyes sometimes have fillers, so I buy the premixed-liquid type. They're fairly inexpensive, so they're good for experimenting.

Dyes are less hazardous than many household cleaners, but you will still need to

handle dyes carefully:

- Use a paper mask when mixing the dye.
- Wear rubber gloves, so you don't absorb the dye through your skin.
- Keep dye powders and solutions away from children and pets.
- When a dye is mixed with a flammable solvent, store it properly.
- If you get dye on your clothes, wash them separately.

Differences between pigments and dyes

What distinguishes dye stains from pigment stains is the size of the particle that's doing the coloring. Individual colorant particles in a dye solution are exceedingly small—there are more than 10 million trillion per quart. In comparison, the particles in pigment stains would look like boulders.

Pigments are suspended when in solution; dyes dis-

solve totally in solvent. The tiny size of dye particles explains why dye stains are so transparent and why they penetrate wood so deeply. Pigments stay near the surface of wood where they lodge in wood pores, which emphasizes the pores and any blemishes like sanding scratches. Dyes color everything similarly. Even end grain can be dyed so that it looks like the rest of the wood.

Water-soluble dyes have lasting color and clarity

Water-soluble dyes are the most versatile of the three wood-finishing dyes. Water-soluble dyes are easier to use, easier to repair and are more light-fast than the other two types. The exceptional clarity and penetration of water-soluble dyes help make figure come alive. Laboratory experiments confirm that water-soluble dyes penetrate the wood about five times deeper than alcohol-soluble dyes. The deep penetration and chemical structure of water-soluble dyes account for their superior fade resistance. (The story on p. 74 gives a general explanation of how fading occurs.)

To mix water-soluble dyes, I use a gram scale to weigh the water and dye powder (see the photo on the facing page). Keep track of dye brands, colors and concentrations every time you use them. If you ever have to match a color, a mixing logbook will save you hours of making up sample stain boards. Once the dye is mixed, sponge the wood with the solution until the wood is thoroughly wet. Wipe off the excess before it dries. (Leaving wet dye stain on wood for a long time will not darken the color any further.)

Because water raises wood grain and makes the surface fuzzy, water-soluble dyes do the same. Fortunately, there is a simple solution to this. I flood the wood with clear water after I have sanded to 180-grit. After the wood dries

overnight, I knock down the raised grain with 220-grit sandpaper. Once the grain has been sanded flat, the dye stain will not raise the grain again.

Blotch-prone woods like cherry and pine don't fair any better with water-soluble dyes than they do with solvent-based pigment stains. To minimize blotchiness, I substitute a hide-glue size for the initial coat of clear water. Make the glue size fairly dilute (by weight, I use one-part hide glue granules to nine-

parts water). If you use pre-mixed hide glue, you'll have to dilute it as well. Once dry, the size accepts the dye stain evenly. This only works with hide glue, though. I once ruined a butternut desk by trying white-glue size.

Oil-soluble dyes can customize stain color

Most woodworkers have used gallons of oil-soluble dye over the years and don't even know it. Pigment-stain manufacturers often include oil-soluble aniline dyes in their stain

formulations to add a little life to an otherwise dull stain. (To learn more about the uses of pigment and dye in stains, see *FWW* #101, p. 66-69.) Oil-soluble dyes will dissolve in common shop solvents, like mineral spirits or VM&P naphtha, but they dissolve most completely in lacquer thinner.

Once dissolved in solvent, oil-soluble dye can be added to linseed oil, Danish oil or varnish to make a custom color. In solution, oil-soluble dyes can also be added to a can of pigment stain to modi-

fy the color. One problem with oil-soluble dyes is their lack of clarity. Because of their muddy look, I don't like to use oil-soluble dyes on raw wood. But I still keep a full array of colors in my shop for tinting varnishes when I'm toning areas of furniture.

Alcohol-soluble dyes tint shellac, lacquer

Comedian George Burns once asked a clothing-store clerk what the shrink-resistant label on socks meant. She replied, "The socks will shrink, but they really don't want to." The latest alcohol-soluble dyes, touted as "fade-resistant," are somewhat analogous to this. I've found that most of these alcohol-soluble dyes will fade, but they really don't want to. They do have a place, though. Furniture restorers like them for tinting shellacs and solvent-based lacquers in touch-up work.

Alcohol-soluble dyes can be dissolved in methanol (wood alcohol) or ethanol (grain alcohol). I like ethanol because it's the least toxic of the two. Alcohol-soluble dyes dry very rapidly, so they can leave lap marks when brushed or wiped on. Spraying is really the only acceptable way to apply them to large surfaces. Because most alcohol-soluble dyes fade quickly, I find little use for them in my shop.

Non-grain-raising dye stains save sanding

Dye stains that do not raise wood grain are called NGR (non-grain raising) stains. Although NGR stains are technically not a separate class of dye stains, many woodworkers view them as such. But here's the rub: Some brands (the bad ones) are just oil-soluble dyes dissolved in solvent. They give wood the bland look of oil-soluble dyes. Good brands of NGR stains, like Behlen's Solar-Lux (see the sources of supply box on p. 76), are water-solu-

Dyes go deep but still fade

Pigments tend to obscure wood's fine details. By contrast, dyes are more transparent, which lets the wood show through. Instead of muddying subtleties in figure, dyes enhance them, as shown in the photo at right.

Even though dyes penetrate more than pigments, dyes fade more. Fading is a form of photochemical degradation. Though ultraviolet light plays a part in fading, intense visible light is mainly responsible.

Visible light is composed of seven colors: red, orange, yellow, green, blue, indigo and violet. White light is a blend of all these colors. A red dye stain looks red because the dye absorbs the other colors and reflects only the red.

Dyes are large, organic molecules primarily composed of atoms of carbon, hydrogen, nitrogen and oxygen. The arrangement of these atoms within each molecule dictates how a dye responds to light.

Quite often, enough light energy is absorbed by a dye molecule to initiate a photochemical reaction, which changes the arrangement of its atoms. Photochemically changed molecules usually are colorless. Because of this, the color becomes more dilute; therefore, the dyed wood appears lighter—faded. Pigments produce color the same way as dyes, but they are more immune to fading.

Alcohol-soluble dyes fade the fastest. The alcohol-dyed half of the sample shown in the photo at right faded from a nice walnut color to swamp-green in less than two months under fluorescent lighting. Water-soluble dyes fade the least (see the unfaded portion of the photo at right). Oil-soluble dyes fall somewhere in between.

Even though the fading of dyes is inevitable, don't let it prevent you from using them. If you use a fade-resistant dye, your project should remain the same color for decades. —C.M.



Pigment (top) vs. dye stain



Faded (top) vs. unfaded

ble or organic dyes that, through a chemical sleight of hand, offer decent clarity and penetration without making the wood fuzzy. If you drop some NGR stain in clear water and it dissolves, it's a good one.

NGR stains made with water-soluble dye still lack the depth of penetration of water-dissolved dyes, so they look a little flat by comparison. There are rare occasions, though, when a water-soluble dye is impractical. Intricately carved areas, for example, can't be sanded easily after a water-soluble dye has raised the grain. For these situations, I'll use an NGR stain. I make my own by mixing concentrated powdered dye with hot water and then diluting the solution with lacquer retarder from James B. Day & Co. (1 Day Lane, Carpentersville, IL 60110; 708-428-2651). A volume ratio of one-part dye solution to three-parts retarder is about right.

Adjusting dye color to suit the wood

Customizing the color of a dye stain is easy. All dyes within a solvent class can be intermixed. For instance, any two water-soluble dyes can be mixed or layered to produce a third color (see the top photo at right). Likewise, colors within the alcohol-soluble and oil-soluble families of dyes can be blended.

Dye colors are not always consistent from one supplier to the next or even from one batch to another from the same company. Luckily, you can modify the color slightly by adding small amounts of liquid dye-tinting colors. I use Dayco brand (carried by James B. Day & Co. and most professional paint-supply stores).

You can also tint dye to get that special color you want. A dull-looking walnut can be livened up, for example, by adding a bit of red tint.

Adding green to a cherry dye

stain (which is often too red) will cool the overall color to a more natural cherry tone. Conversely, dyes that are too blue can be warmed by adding orange dye.

Color intensity (how light or dark a dye stain is) is controlled by the amount of solvent in the dye solution. So if your dye stain is too light, just add more dye powder. I add a little black India ink to my dye stains when the standard color is a little too bright and needs to be toned down a shade or two. India

ink is not a dye, but rather a dispersion of very fine lamp-black pigment that imparts a neutral gray tone to dye solutions. Incidentally, quarter-sawn walnut stained with India ink makes a decent substitute for ebony.

Special effects: layering, shading and toning

Woods with large, open pores like oak look a little strange when stained with dye. The areas between the grain lines color evenly, but the open pores do not. Dyed oak

usually lacks contrast between the earlywood and latewood bands.

I solve this problem by layering a pigment stain over a dye stain. I start with a yellowish-brown, water-soluble dye, seal it with shellac (let it dry) and then wipe on walnut-colored pigment stain. The shellac prevents the walnut stain from coloring the areas between the grain lines. But the pigment does color the open pores. The result looks like antique oak.

The basic idea behind layer-



Use dyes for finish touch-ups. The author stains a sand through on a mahogany tabletop. After he applies an orange-red dye, he'll seal the repair with shellac. Once that's dry, he'll wipe on the rosewood dye and seal it in preparation for a topcoat.



Giving wood a new look—To give butternut a rich, two-tone look, dye the earlywood and latewood separately. With ring-porous woods, coloring between grain lines is easy.



Dyes are great for special color effects. After building a case for his son's electric guitar, the author custom-finishes the lid. Successive bands of color create a sunburst effect.

ing is to create distinct depths of color within the wood. Layering different dye stains produces an effect that cannot be achieved any other way. Dye-layered finishes look particularly stunning on wooden instruments.

One of my favorite layered finishes is for mahogany. I start by applying a bright yellow dye stain to all surfaces. This first layer, called a ground stain, highlights the figure deep in the wood and evens the color of the separate boards that make up a piece. The next layer is a coat of rosewood dye stain made by Clearwater Color Co. (Highland Hardware, 1045 N.

Highland Ave. N.E., Atlanta, GA 30306; 800-241-6748). The rosewood dye gives the wood a rich, reddish-brown hue. The topcoat of finish can even be tinted to bring out other highlights. The timing of the dye applications is critical to getting distinct layers. For instance, I apply the second dye when the ground-stain looks dry but feels damp. The second dye does not penetrate as deeply as the first, so two layers of color are formed.

As I mentioned, certain dyes are soluble in finishes. Oil-soluble dyes can tint oil finishes and oil-based varnishes. Alcohol-soluble dyes can tint shellac and lacquer. Water-soluble dyes and NGR stains can tint waterborne finishes. Because all these dye-tinted finishes are transparent, two fancy techniques, toning and shading, are possible.

Toning is applying a tinted finish to an entire piece to alter the overall color slightly. Shading is more of a decorative effect that's achieved by selectively applying a tinted finish to highlight areas of a piece. Shading the center of a tabletop darker than the edges, for example, gives the table a worn, aged look.

You can improve your dyeing methods with different applicators. With small brushes, for example, you can color in areas of wood or add detail, as shown in the bottom photo on p. 75. With a spray gun, you can cover large areas or add zones of color (see the photo above).

But the best advice for using dyes, no matter how you apply them, is to experiment with a dye stain on scrap until you're happy with the color. If you absolutely hate the results, don't despair. You can sponge on full-strength chlorine bleach, and the color will disappear. □

Chris Minick is a finishing chemist and a contributing editor to FWW. He works wood in Stillwater, Minn.

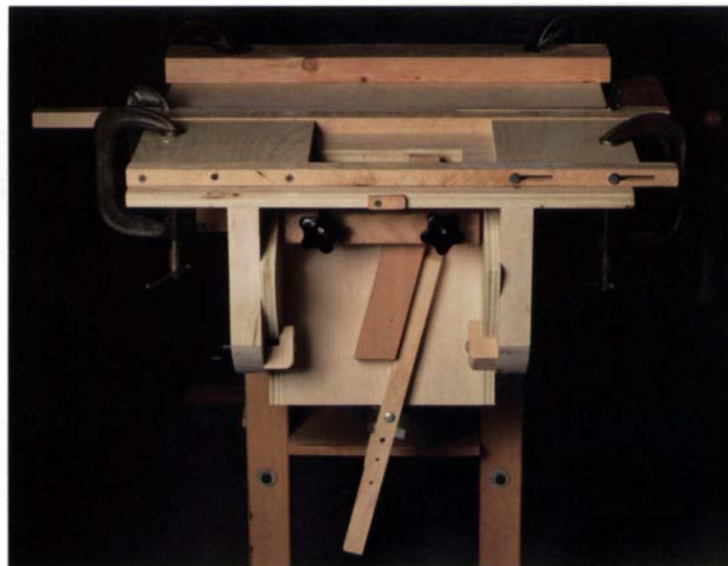
Sources of supply	 Water-soluble dyes	 Alcohol-soluble dyes	 Oil-soluble dyes	 NGR stain
H. Behlen & Bros., 4715 State Highway 30, Amsterdam, NY 12010; (518) 843-1380	✓	✓		✓
Furniture Care Supplies, 5505 Peachtree Road, Chamblee, GA 30341; (800) 451-0678	✓	✓	✓	✓
Garrett Wade Co., 161 Ave. of the Americas, New York, NY 10013; (800) 221-2942	✓	✓		✓
Homestead Finishing Products, 11929 Abbey Road, N. Royalton, OH 44133-2677; (216) 582-8929	✓	✓		
Lee Valley Tools, 1080 Morrison Drive, Ottawa, Ont., Canada, K2H-8K7; (800) 461-5053 (U.S.)	✓			✓
Olde Mill Cabinet Shoppe, 1660 Camp Betty Washington Road, York, PA 17402; (717) 755-8884	✓	✓	✓	✓
Woodcraft, 210 Wood County Industrial Park, Parkersburg, WV 26102; (800) 225-1153	✓			
The Woodworkers' Store, 4365 Willow Drive, Medina, MN 55340; (800) 279-4441	✓	✓		
Woodworker's Supply, 1108 N. Glenn Road, Casper, WY 82601; (800) 645-9292	✓	✓	✓	✓



Router Fixture Takes on Angled Tenons

Versatile device ensures tight joints every time

by Edward Koizumi



We live in a turn-of-the-century Arts-and-Crafts house, so it seemed quite natural to furnish it with pieces from that era. My wife bought a pair of Mission armchairs a couple of years ago to go with a 9-ft.-long cherry table I'd built for our dining room. Six months later, she bought two side chairs. It would be a while before we could afford a full set. Within earshot of my wife, I heard myself say, "How hard could it be to make these?"

"Oh, could you?" she asked.

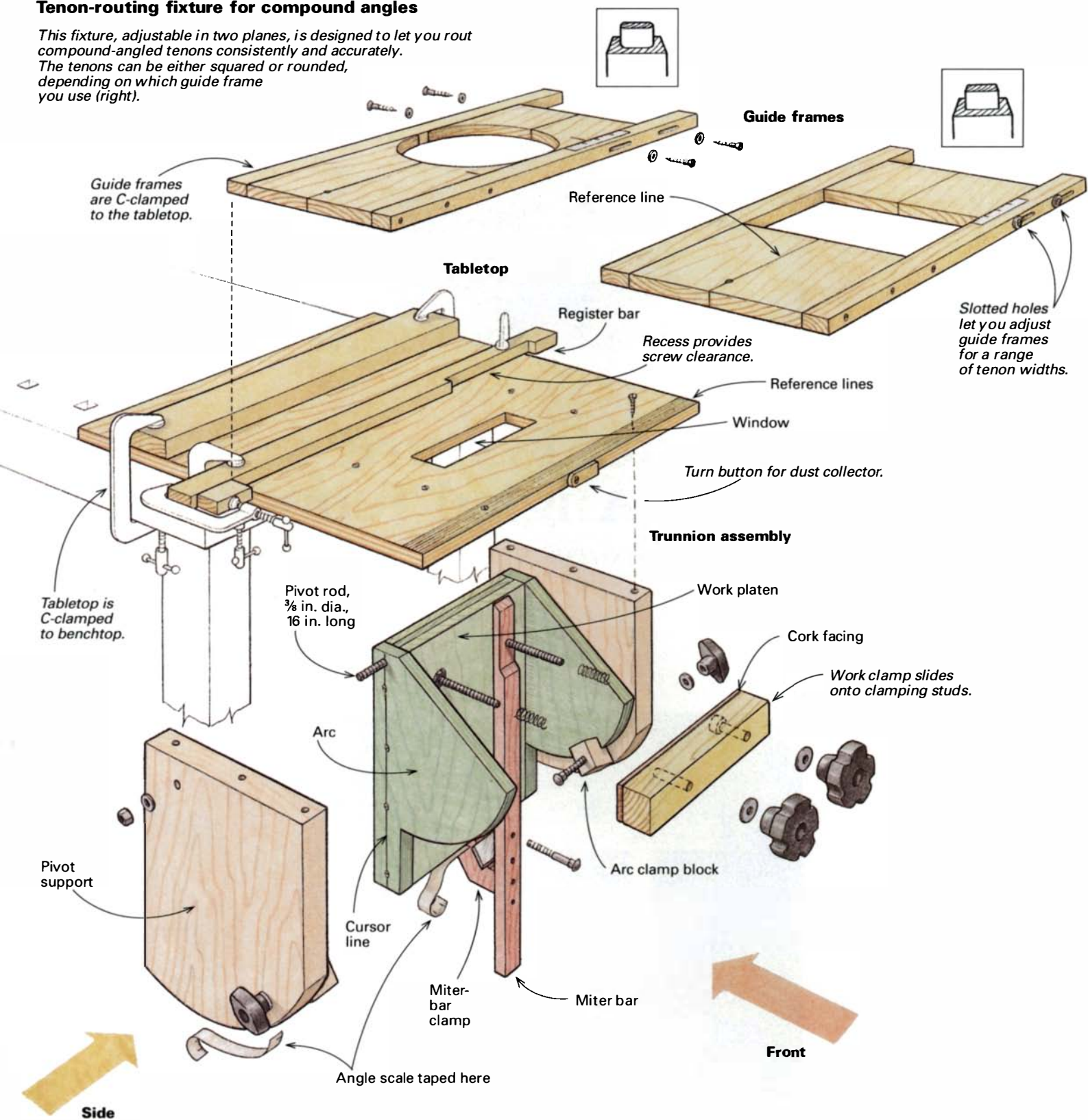
"Sure," I said. The chairs looked straightforward enough, just a

cube with a back. Upon closer examination, I realized that the seat was slightly higher and wider in the front than in the back. For the first time, I was faced with compound-angled joinery. I thought about dowels, biscuits and loose tenons, so I could keep the joinery simple, but I wasn't confident in the strength or longevity of these methods.

I wanted good, old-fashioned, dependable mortise-and-tenon joints. After some thought, I decided an adjustable router fixture would be the simplest solution that would let me make tenons of

Tenon-routing fixture for compound angles

This fixture, adjustable in two planes, is designed to let you rout compound-angled tenons consistently and accurately. The tenons can be either squared or rounded, depending on which guide frame you use (right).

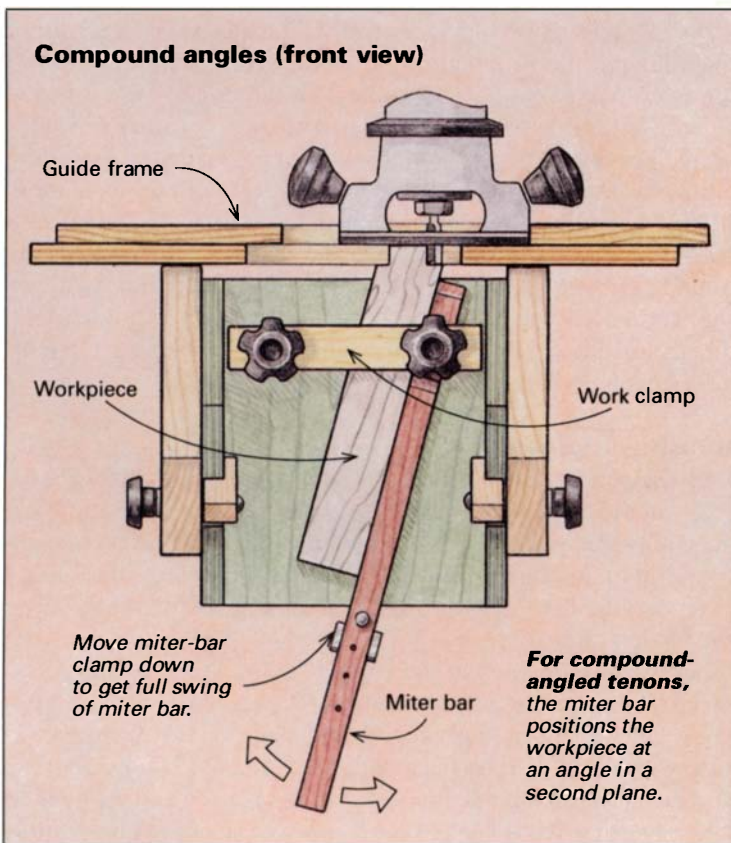
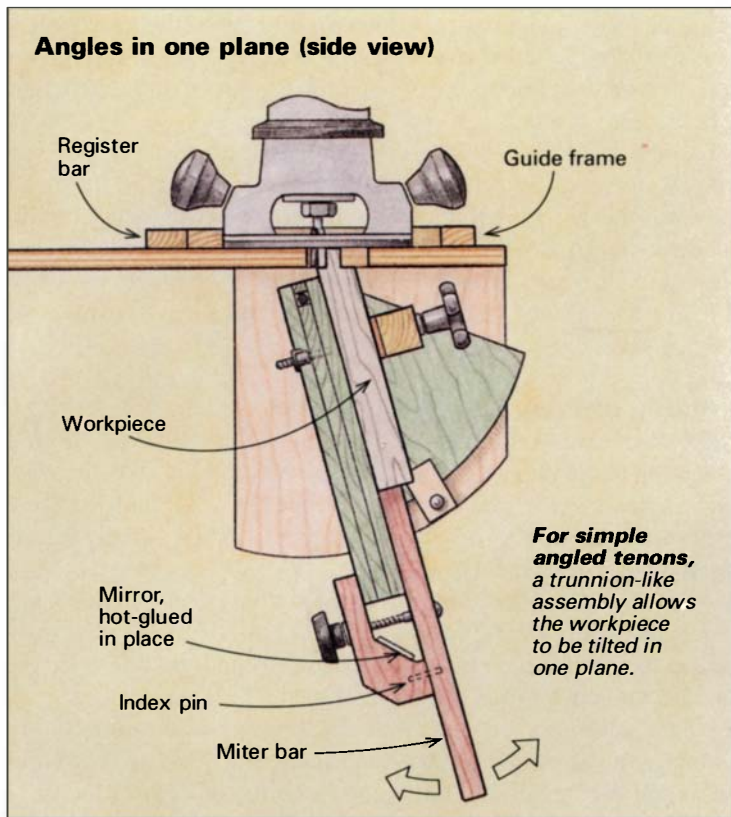


widely varying sizes and angles (see the photos on p. 77).

The fixture I came up with is as easy to set up as a tablesaw. In fact, there are some similarities (see the drawing above). The workpiece is held below a tabletop in a trunnion-type assembly that adjusts the tilt angle (see the bottom photo on p. 77). For compound angles, a miter bar rotates the workpiece in the other plane. The fixture can handle stock up to 2 in. thick and 5 in. wide (at 0°-0°) and angles up to 25° in one plane and 20° in the other. This is sufficient for chairs, which seldom have angles more than 5°.

To guide the router during the cut, I clamp a guide frame to the fixture over the window in the tabletop (more on positioning it later). And I plunge rout around the tenon on the end of the workpiece. The guide frame determines the tenon's width and length, as well as whether the ends will be square or rounded (see the photo on p. 81). I made two frames, both adjustable, one for round-cornered tenons, the other for square tenons.

The fixture and guide frames took me just over a day to make, once I'd figured out the design. Then I spent about an hour align-



ing the fixture and making test tenons in preparation for routing the tenons on the chair parts. The fixture worked just as planned and allowed this relatively inexperienced woodworker to produce eight chairs that match the originals perfectly.

Making the fixture and guide frames

The fixture is simple to build. It consists of only two main parts, the trunnion assembly and the tabletop. The trunnion assembly (see the drawing on the facing page) is essentially a pair of arcs

nestled between two pivot supports. Between the two arcs is a work platen, or surface, against which I clamp the component to be tenoned. There are other parts, but basically, the fixture is just a table to slide the router on and a movable platen to mount the workpiece on.

I built the fixture from the inside out, beginning with the work platen (see the drawing on the facing page). Because I didn't have any means of boring a 10-in.-long hole for the threaded rod on which the arcs pivot, I dadoed a slot in the platen and then glued in a filler strip. Next I located, center punched and drilled the holes for the T-nuts and retaining nuts that hold the clamping studs in place. Center punching ensures that the holes are exactly where they're supposed to be, which is important for a fixture that's going to be used over and over again. I center-punched the location for every hole in this fixture before drilling.

Before attaching the clamping studs to the work platen, I made the arcs, which go on the sides of the work platen. I laid out the arcs (and the pivot supports) with a compass, bandsawed and sanded the arcs, and drilled a hole for the pivot rod through the pair. I glued and screwed the arcs to the platen. After giving the glue an hour or so to set, I tapped the T-nuts into the back of the work platen, screwed in the clamping studs and twisted on retaining nuts, which I tightened with a socket and a pair of pliers.

I made the pivot supports next. Then I cut a piece of threaded rod 16 in. long and deburred its ends with a mill file. I slipped the threaded rod through the pivot supports, arcs and work platen, capped it at both ends with a nut and washer, and made and attached the arc clamps (see the top drawing at left).

Then came the tabletop. I cut it to size, cut a window in it and marked reference lines every $\frac{1}{8}$ in. along the front edge for the first 2 in. With the tabletop upside down on a pair of sawhorses, I put the trunnion assembly upside down on the underside of the tabletop. Then I positioned the front of the pivot supports against the front edge of the tabletop and made sure the work platen was precisely parallel to the front edge and centered left to right. That done, I drilled and countersunk holes for connecting screws through the tabletop into the pivot supports. I glued and screwed the pivot supports to the tabletop.

Then it was time to make the miter bar, miter-bar clamp and the work clamp (see the drawings at left). The mirror on the miter-bar clamp makes it easy to read the angle scale from above. I faced the work clamp with cork to prevent marring workpieces and counterbored it to take up the release springs. The release springs are a nice touch. They exert a slight outward pressure on the work clamp, causing it to move away from the platen when loosening the knobs to remove a workpiece.

The guide frames—Now for the guide frames, which clamp to the tabletop and limit the travel of the router. I made the frames adjustable lengthwise to handle a variety of tenoning situations. But their width is fixed. To determine the width of the frames, I added together the desired tenon width, the diameter of the bit I was using and the diameter of the router base. If your plunge router doesn't have a round base, you should either make one from acrylic or polycarbonate (you can cut it with a circle-cutting jig on a bandsaw), or buy an aftermarket version. I screwed the frame together in case I need to alter the opening later (for a new router bit, for example). I marked a centerline along the length of the frame on both ends.

Initial alignment

Before I could use the fixture, I had to get everything in proper alignment and put some angle scales on it. I printed out some an-

SETTING UP FOR ANGLED TENONS



Mark out the tenon on a test piece. The test piece should be the same thickness and width as the actual components, but length isn't important.



Make the workpiece flush with the tabletop. The author uses a piece of milled steel, but the edge of a 6-in. ruler would work as well.



Make a pattern. An outline of the tenon traced on acetate helps align the guide frame for cutting any tenons of the same size.

gle scales from my personal computer and taped them to my fixture with double-faced tape. But a protractor and bevel gauge also will work just fine to create angle scales for both the tilt angle and the miter angle.

To align the parts of the fixture, I flipped it upside down on the end of my bench and clamped it there. I used a framing square to set both the work platen and the miter bar at 90°, sticking the blade of the square up through the window of the tabletop and resting the tongue of the square flush against the inverted face of the tabletop. Then I stuck the angle scales on the two pivot supports and on the bottom of the work platen.

Routing test tenons

Next I routed test tenons with the fixture set at 0°-0°. I positioned the guide frame parallel to the front edge and centered on the window in the tabletop and clamped it to the fixture. I clamped a test piece the same thickness and width as the actual component in the fixture, with one end flush with the top surface of the tabletop. To do this, I brought the test piece up so that it just touched a flat bar lying across the window (see the near left photo). I set my plunge router for the correct depth and routed the tenon clockwise to prevent tearout.

I made a test mortise using the same bit I planned to use for the mortises in the chair. The fit wasn't quite right. So I adjusted and shimmed the frame until the tenon fit perfectly. If you rout away too much material and end up with a sloppy tenon on your test piece, you can just lop off the end and start over.

Once I had a tenon that was dead-on, I made an acetate pattern that allowed me to position the guide frame accurately for all tenons of the same size, regardless of the angle. I cut a heavy sheet of acetate (available at most art-supply stores) so that it would just fit into the guide-frame opening. I marked a centerline along the length of the acetate that lines up with the centerline down both ends of the guide frames. I also indicated which end was up and where the acetate registered against the guide frame. Then I put the test piece with the perfectly fitted tenon back into the fixture, laid the acetate into the opening in the guide frame and traced around the perimeter of the tenon end using a fine-tip permanent marker.

Routing angled tenons

With the pattern, routing angled tenons is pretty straightforward. I crosscut the ends of all the pieces I was tenoning at the appropriate angles and marked out the first tenon of each type on two adjacent sides, taking the angles off a set of full-scale plans. Then I extended the lines up and across the end of the workpiece (see the top left photo).

Having set the fixture to the correct angles, I brought the workpiece flush with the tabletop using a flat piece of steel as a reference (see the top right photo). Then I clamped the workpiece in place. Finally, I set the acetate pattern in the guide-frame opening and positioned the guide frame so that the pattern and the marked tenon were perfectly aligned (see the photo at left). With the guide frame clamped in place, I removed the acetate and routed that tenon. All other identical tenons needed only to be flushed up and routed. After the first, it was quick work.

There are pitfalls though. I found it important to chalk orientation marks on each workpiece. It can get confusing with two angles, each with two possible directions. And I had to be especially careful when routing the second end of a component. Make sure it's oriented correctly relative to the first. I messed up a couple of times and have learned to plan for mistakes by milling extra parts and test pieces. You might even end up with an extra chair.



Guide frame determines thickness and width of tenons. The author keeps the router's base against the inner edges of the guide frame and routs clockwise to prevent tearout. Guide frames can produce round-cornered or square-cornered tenons.

To get flat surfaces on curved parts so I could clamp them in the fixture, I saved the complementary offcuts and taped them to the piece I was tenoning. Or I could have tenoned first and hand-sawed the curves later.

For pieces with shoulders wider than the bit I'm using to remove waste, I clamp a straight piece of wood—a register bar—against the guide frame (a small pocket for screw clearance may need to be made), as shown in the drawing on p. 78. That way I can rout most of the tenon, unclamp the guide frame, slide it forward (using the reference lines at the forward end of the tabletop to keep it parallel), clamp it down and then rout the remainder. I start the next piece in the same place and return the guide frame to the original position to finish the tenon. □

Edward Koizumi is a professional model maker in Oak Park, Ill.



Set correctly, the fixture will yield tight joints, whether the tenons are straight, angled or compound-angled. Here, the author tests the fit of a seat-rail tenon into a leg mortise.



No-Hassle Panel Handling

Moving and storing sheet goods doesn't have to be backbreaking labor

by Skip Lauderbaugh

When you need big, flat panels that are stable, smooth and ready to be cut, you just can't beat sheet goods. But moving plywood, melamine or medium-density fiberboard (MDF) is a backbreaker. A single 4x8 sheet of $\frac{3}{4}$ -in. MDF weighs almost 90 lbs., and it's terribly awkward to maneuver, especially by yourself.

I used to think that schlepping panels by hand was a necessary evil in my cabinet-making business. Like many small-shop owners, I didn't have the space or the budget for material-handling equipment like a forklift. I stored panels near my saw in a stack. But it seemed whichever panel I wanted was always buried at the bottom of the pile. The day I needed a panel that was under 30 sheets of melamine, I just knew there had to be a better way.

It was time to stand back and analyze



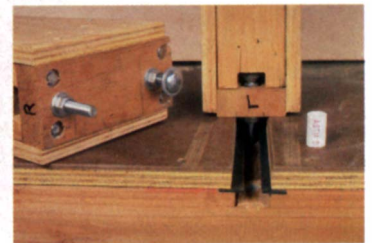
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2

1. Platform is at a comfortable height for unloading. The author slides plywood from his truck to the platform and tilts the panels up to the stack. He doesn't have to lift the full sheet.

2. Bolsters let you leaf through sheet goods. When sorting through panels, two bolsters act like buttresses to support sheets at the front of the stack. The bolsters adjust by sliding and locking in tracks in the top of the platform (below). An overhead rack holds small cutoffs.



3

3. The right space between sheets and the saw—After the author selects a panel, he pulls it end first from the stack. The platform is 6 ft. from his saw so that both ends of the sheet can be supported.



4

4. Panel supported at start of cut—The placement of the platform allows easy access to the saw and enables one person to move and cut panels. Leaving the front edge on the saw, the author feeds a panel into the blade by holding the unsupported back corner.

my entire panel-handling process—from unloading the truck to pushing panels through the saw. My goal was to devise a way for one person to unload, store, sort and move panels to the saw, using the least possible effort. So I came up with a storage system built around a low platform.

Panel-storage system saves labor, space and time

When I began studying how I had been moving sheet goods, I realized how inefficient I'd been. So I designed a panel-storage system to achieve five basic objectives:

- provide easy access to panels
- minimize lifting of entire sheets
- work at safe, comfortable positions
- organize panel cutoffs
- make the most of my floor space

At the heart of the panel-handling system is a 4-ft. by 10-ft. platform. The top of the



platform is 24 in. above the floor, which is easy on the back for those rare times that I have to lift an entire sheet. The top is also at the right height for sliding sheets directly off the tailgate of my truck. And by standing on the platform, I can leaf through panels or reach up to my overhead cutoff rack. Connected to the top are two panel supports (I call them holsters) that slide in tracks. The holsters can be removed for loading panels or adjusted to fit the stack of sheets as it grows or shrinks.

I store panels with the long edges on the platform and the faces leaning against the wall. To sort through the stack, I lean unwanted panels against the holsters and leaf through the rest like pages in a book. The end of the platform is 6 ft. from the front of my saw, providing plenty of cutting room. But I can still rest an end of a sheet either on the saw table or on the platform. To maximize floor space, I built two low assembly tables that roll under the platform.

The no-sweat panel shuffle

The beauty of the panel-handling system is that I almost never have to lift a full sheet. I either slide the panel or lift only one end. Photos 1 to 4 on pp. 82-83 show my typical panel-moving sequence. If I do have to lift a sheet off the platform, a cutout makes it easy (see the top photos).

There are only four elements in my panel-storage system: the platform, the holsters, the cutoff racks and the assembly tables. I'll briefly explain how I built the platform, but I'll leave the specific measurements and details up to you. If you don't have headroom for overhead racks, for example, you can mount them somewhere else.

The platform—The platform must be sturdy and big enough to hold 4x8 sheets. I designed the framework so I'd get the most storage area from the dead space underneath. I used 4x4s and 2x4s for the frame and secured it to a 10-ft.-long ledger I bolted to the wall. I anchored each leg of the platform to the floor.

The top of the platform has a pair of grooves running across the width, which serve as tracks for the adjustable holsters. I bored 7/8-in.-dia. holes in the grooves every 6 in. to register the holsters (the holsters have alignment pins on the bottom) at various preset positions. And I sleeved the holes with short pieces of Schedule 40 PVC pipe to keep the holes from wearing and to keep the pins clean.

I let in and epoxied 1/8-in.-thick steel bars along both edges of the grooves to create lips to secure the holsters (see the far right

photo on p. 83). The bars protrude 3/8 in. into the groove, leaving a 1/8-in. gap between the bars. The top of the platform—3/4-in. plywood covered by 1/4-in. tempered hardboard—is screwed to the frame. On the wall behind the platform, I attached a 1/2-in. sheet of particleboard, so the panels have a flat surface to lean against.

The adjustable bolsters—The bolsters measure 32 in. tall and are 9 in. wide at the bottom, tapering to 2 in. at the top. The cores are made of solid wood with 3/4-in. plywood gussets glued and screwed to the sides. At the bottom of each bolster are two pins. One pin is a 1/2-in. carriage bolt that fits into the track holes to align the bolster; the other pin, also a 1/2-in. carriage bolt, is inverted and has a 1-in. flat washer under the head. This pin prevents uplift on the toe of the bolster as sheets are loaded against it. The pins are height adjustable, so they engage both the holes and the lips of the track. Adjust the pins so they fit snugly in the tracks. Then carefully lean sheets against the bolsters to make sure they'll hold. You don't want a stack of sheets to crash against your legs later.

The cutoff racks—Because I have a nice high ceiling, I made a rack above the platform for various sized cutoffs. The overhead rack is divided into three sections. The left section holds 12-in.-wide pieces, the center 18-in.-wide pieces and the right 24-in.-wide cutoffs. I located the bottom edge of the rack 62 in. above the platform to allow for 5-ft.-wide sheets and metric-sized plywood on the platform. The rack is attached to a ledger bolted to the wall. To the right of my platform is a storage rack that I use for wide cutoffs and long rip-pings. I can also use this area to store full panels vertically.

The roll-out assembly tables—The space underneath the platform was the perfect place for storage-drawer units that also serve as cabinet-assembly tables. The two units are on wheels. They can be joined together to make one large surface, and when both tables are rolled under the platform, four drawers face out (see the bottom photos at left). I keep fasteners and hardware in these. When I pull the tables out, there are plastic crates in the back where I store power tools. The crates slide out on pull-out shelves. □

Skip Lauderbaugh is a sales representative for Blum hardware and a college wood-working instructor. His shop is in Costa Mesa, Calif.



Stored sheets are easier to lift—When the author has to carry a full sheet (top), he lifts it upright to keep his back straight. A cutout gives his hand clearance to grab the sheet's lower edge.

Drawers make use of floor space—A two-part assembly table rolls under the platform when not in use. Aligned by biscuits and clamped together, the table has slide-out bins in back (bottom).



A photograph of a light-colored wood cabinet door, partially open, showing a brass bullet catch mechanism on the edge. The door has a simple panel design with a recessed center. The background is a dark, solid color.

Keeping Doors Closed

*Pick a catch
that fits the
cabinet*

by Christian H. Becksvoort

A handsome cabinet door, hung precisely in its frame, is a pleasure to use. But the door isn't quite finished until it's been fitted with a proper catch. There sure are plenty of choices, from simple turn buttons to elaborate library catches. The hard part is picking the catch that's appropriate. What's appropriate? A catch that is in keeping with the period, style and function of the cabinet. Brass bullet catches, for instance, would look out of place on an Arts-and-Crafts piece with hand-wrought

iron hinges and knobs. Likewise, high-end furniture is no place for plastic-encased magnets or for steel touch latches that are stamped out by the carload.

Catches have functional as well as aesthetic differences, and some catches work better than others on certain kinds of doors. And like everything else, door catches vary in price. Their cost in relation to a piece of furniture is very small, though, so it makes sense to choose exactly the right one.

To help you sort through some of the choices, I have taken a look at a dozen of the most popular door catches. They include commercially available catches and locks (see the sources of supply box on p. 88), as well as mechanisms built in the shop. In addition to trying these different catches for single doors, I've also found some interesting ways to keep double doors closed, especially in those difficult situations where there is no center divider between the doors.

Magnetic catches

Magnetic catches come in a variety of sizes and shapes and can be used for single or double doors. For large doors, magnetic catches often are used in pairs—at the top and bottom of the door.



magnetic catches are housed in plastic, which I find objectionable for high-end work. However, there are some small, round magnets (see the photos above) that mount in holes drilled directly into a door stop or a fixed shelf. This neat installation is more appropriate for better-quality cabinets. Nevertheless, I still don't care for magnetic latches. They're generally ugly, they sound clunky and they can be difficult to fine-tune for just the right amount of holding power.

Touch latches

Touch latches, both mechanical and magnetic, are used most often on kitchen and bathroom cabinets. They also can be used for shop and office furniture. Mechanical touch latches operate with a ratchet and a spring mechanism. When closing the door, the ratchet

et engages and holds the door closed. Then, when tapped or touched, the ratchet releases, and the spring mechanism pushes the door open. Unlike a mechanical latch, a magnetic touch latch

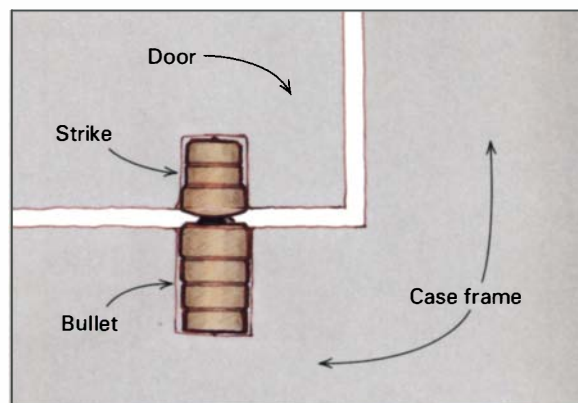


(see the photo above) uses a magnet on the end of a spring-loaded plunger. Both types require $\frac{1}{8}$ in. to $\frac{1}{4}$ in. of clearance between the door and the doorstop.

I find these latches gimmicky. I use them only on doors that don't get much use, such as secret-compartment panels, because they tend to wear out faster than other types of catches.

Bullet catches

Bullet catches (see the drawing and the photo below) should be used at the top and bottom of doors. These catches have a few drawbacks. They require fine-tuning, they're sensitive to any sea-



sonal changes in the dimensions of the door, and they can't handle warps in the door very well. Even so, they are among my favorite catches because they're unobtrusive and work so well when adjusted correctly. Bullet catches made by Brusso are undoubtedly the best. They are the only ones that have a groove in the strike (or keep) to allow the door to move seasonally. Most other bullet catches have a dimple in the strike, which doesn't al-

low any seasonal door movement. It is standard procedure to mount the bullets in the case frames and the strikes on the top and bottom of the door stile. This way, the bullets wear grooves on the inside edges of the door as opposed to the outside edges of the case frame where they would be visible.

Nothing sounds better than the click of a well-adjusted bullet catch. But these closures can be difficult to adjust and only should be used on small to mid-sized, perfectly flat doors because of their limited holding power. Bullets are appropriate for contemporary furniture as well as shop and office use.

Spinners

Spinners, also called turn buttons or button latches, have a wide range of applications. There are two basic types: exterior and interior. They are low-tech, virtually foolproof and work well in keep-



Photo: Charley Robinson



ing slightly warped doors closed. An exterior spinner (see the top photo) consists of a small (usually 1 1/4 in. to 2 in. long) bar with a hole in the center to take a screw. Spinners are mounted on the face frame next to the door stile. In the horizontal position, the spinner holds the door closed. Turned vertically, the door can be opened. Commercially made spinners usually are brass. Shopmade models can be made of wood. Victorian spinners often had brass backing plates to eliminate wear. Simple spinners are great for shop cabinets; more elaborate versions suit certain period pieces.

Interior spinners (see the bottom photos above) work on the same principle, but they are attached inside the door to the shaft of the door knob. Brass knobs have metal spinners threaded onto the shaft and usually locked in place with a small screw. Wooden knobs have shopmade spinners, usually oval in shape, which are pinned or screwed to the shaft to prevent them from slipping. Cabinets with full face frames are ideal for spinners because the spinner can catch directly behind the frame. Cabinets without face frames require a small groove in the cabinet side for the spinner to lock into. If there is any play between spinner and face frame (or spinner and groove), you can glue in a small tapered

shim that will draw the door tighter as the spinner closes. Thin plastic washers between the spinner and door and the knob shoulder and door virtually eliminate friction.

Double-ball catches

A variation of the bullet catch is the double-ball catch (see the photo below). This two-part catch consists of a contoured metal strike that pops between a pair of spring-loaded ball bearings.



Photo: Charley Robinson

This is a relatively recent innovation that permits some door movement, allows the holding power to be adjusted and keeps doors from sagging in the closed position.

A word of warning when using double-ball catches: Never mount them in a horizontal position when using solid-wood doors. When mounted vertically, the strike can slide side to side between the two ball bearings, providing 1/4 in. to 3/8 in. of movement. However, because there is only 1/64 in. or so between the strike and the ball housings, mounting this catch horizontally allows for no door movement. Double-ball catches can be particularly difficult to install on single-door cabinets, but they're well-suited to high-end furniture because the holding power can be adjusted for just the right feel when opening the door.

Key locks

Standard key locks (see the photo below) also can be used to keep doors closed, with or without any other kind of catch. These are most appropriate for little-used doors requiring extra security,



because the key must be used each time to open and close the door. Either full- or half-mortise locks can be used. If I go to the trouble of installing a key lock, I use a good one—a three-, four- or even six-lever or tumbler lock. The cheap, single-lever locks aren't worth the effort to install because they can be opened with just a piece of bent wire. On the positive side, a key lock is an attractive visual touch on a cabinet; the downside is that they take time and patience to install correctly.

Closing double doors

Double doors with a center divider can be treated just like single doors. When no divider (or fixed shelf) is present, keeping double doors closed becomes more challenging. The first and easiest



Photo: Charley Robinson

choice for inset doors is bullet catches because the catches are mounted above and below the doors and don't need to grab a fixed divider to work.

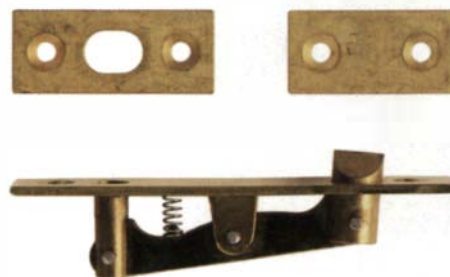
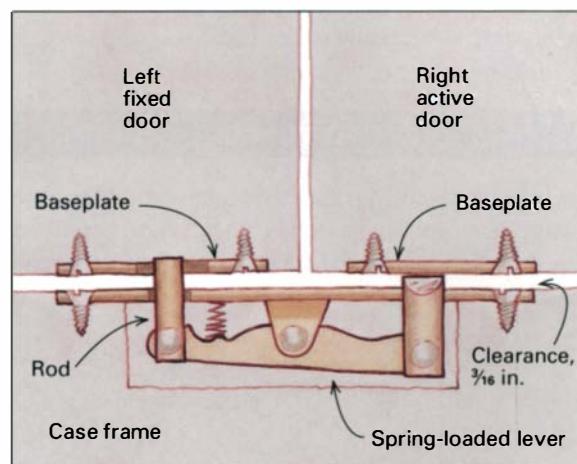
Another approach I often use is to anchor or fix one door (usually the left one) in place. Then I use it to incorporate one of the catches mentioned in this article to keep the second door closed. How do you anchor a door? There are three simple and readily available pieces of hardware that can be used. One of the easiest to install is a surface-mounted elbow catch (see the photo above) that is screwed to the inside of the door, either at the top, bottom or under a fixed shelf. Available in a variety of qualities, these catches can suit everything from a shop-grade cabinet to really high-end work.

Another option for anchoring a door is a pair of surface-mounted sliding bolts screwed to the inside of the door, one at the top and the other at the bottom. Holes need to be drilled into the top door stop and into the bottom shelf-door stop for the bolt barrel. Brass plates mortised into the front edges of the stops make a neat, clean installation. Surface bolts should be sized appropriately for the door. I like solid-brass bolts, even on high-end cabinets.

The third method is a little more costly and time-consuming, but looks more elegant. Flush bolts are mortised into the top and bottom edges of the door stiles. Then latching holes are drilled into the case top and bottom. For solid doors, these holes actually should be elongated slots to allow for door movement. I would use these closures only on top-end cabinets because installation is labor intensive.

Once one door can be locked in place (I usually pick the left one), it can be treated more or less like a divider. I often use an interior wooden spinner on the knob of the other door.

Library catches—Another approach to latching double doors is a library catch (see the drawing and photo below). This unusual piece of hardware is simple to use once it is properly mortised into the cabinet. It consists of a baseplate with a spring-loaded lever below. When both doors are closed, the right (or active) door forces a rod down, pushing another rod on the opposite side of the lever up into the left (fixed) door. The left door remains fixed



only as long as the right door is closed. As soon as the right door is opened, the spring retracts the rod and releases the fixed door. To hold the right door closed, use one of the catches suitable for single doors.

For medium and large cabinet doors, a library catch should be installed top and bottom. Clearances above and below the door must be kept to less than $\frac{3}{16}$ in., or the rods will not engage the door. Library catches are a relatively new type of closure that I've used only a few times. Both my customers and I have been pleased with the results. □

Chris Becksvoort builds custom furniture in New Gloucester, Maine, and is a contributing editor to Fine Woodworking.

Sources of supply

I've used the following companies and found they offer good-quality products and excellent service. There are plenty of other sources for quality hardware as well (see *FWW* #112, pp. 68-73).

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Garrett Wade Inc., 161 Avenue of the Americas, New York, NY 10013; (800) 221-2942

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Handwork for the details. Muir uses rasps, files, rifflers and sandpaper to create details like facial features and fabric folds.

The “toys” of Bryce Muir often begin with a phone call. After some pleasantries, the conversation goes something like this:

“Yes, what did you have in mind?” Muir asks.

“Well, I’m not really sure, but he loves skiing,” the caller says. “Yes, he loves skiing and Smitty. That’s our black Labrador. The two of them are almost inseparable.”

“Hmm,” Muir muses. The project begins to materialize. “How about a black Lab on skis?” Muir sees a dog in ebony or black walnut with some wildly grained cocobolo for the downhill skis. The poles could be curly maple or purpleheart. “Does he have a favorite piece of clothing, something he wears all the time?” Muir asks.

“Oh yes,” the caller says, “a red and white checked vest. He’s a little on the thin side, and he thinks the vest makes him look bigger.”

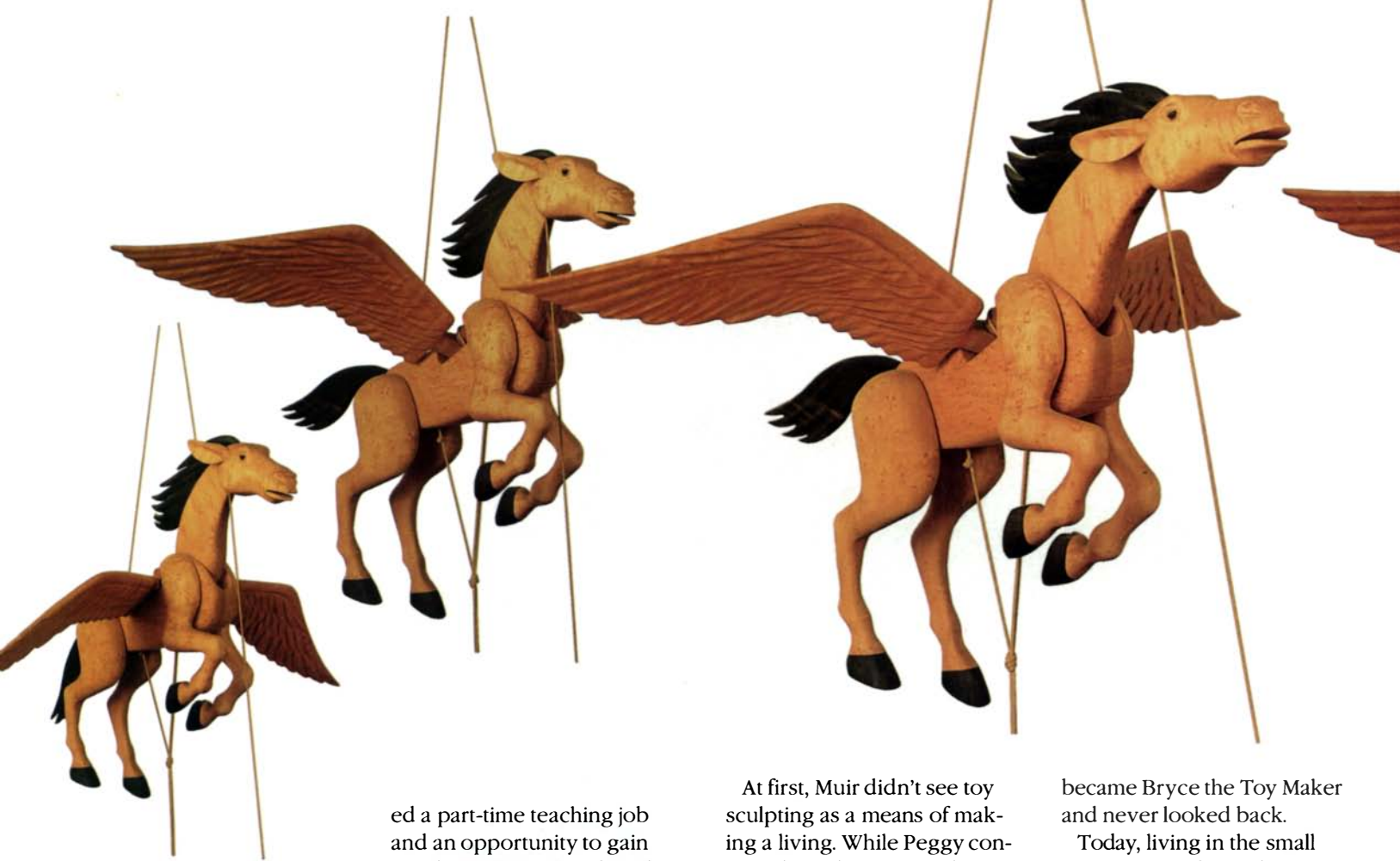
Muir now sees that the Lab will have to be wearing a checked vest—padauk and Osage orange glued together in a crisscrossing pattern. Muir doesn’t use paint or stain, only the woods’ natural hues.

“I never really planned to go into this business,” says Muir.

Bryce the Toy Maker

Sculptural toys aren’t typical playthings

by Ken Textor



"It sort of just evolved." He began carving wood in the early 1970s. He had been recently discharged from the Navy and his wife was a graduate student. Christmas was fast approaching and presents for nieces and nephews were needed. Money for groceries still held top priority, so Muir decided to make toys instead of buying them.

Those first toys were mostly trains, planes and fire engines. But Muir also included a few train engineers, pilots and firemen. Acquaintances saw his creations and asked if he could make something for them. A business was born.

For the next three years, he sold his work on the street corners of Providence, R.I. "The plays on words were the most popular for a while," Muir recalls. For instance, he would carve a pig driving a farmer's tractor through a fence and get *A Crashing Boar*. Most sold as fast as Muir could make them.

When his wife, Peggy, land-

ed a part-time teaching job and an opportunity to gain her doctorate in Newfoundland, Canada, Muir packed up his tools and headed north. Newfoundland provided a unique source of unusual woods for Muir. Its capital city, St. John, was a busy port where ships were often repaired. One common repair was replacing drive-shaft bearings. These were usually made of lignum vitae, a dense, oily tropical wood.

"Just walking along the beaches, I'd find huge chunks of this really hard wood all over," Muir recalls. "So I carved a lot of lignum."

His beachcombing brought him other exotic woods, pieces of packing crates from Malaysia, barrels from Botswana and the like. Often Muir didn't know what wood he was carving. But if it had interesting grain, color or natural shape, he usually could think of something to do with it. He made lots of seals, boats and poor fishermen wrapped up in wads of winter clothing. Some pieces were so impressive they ended up in the province's art gallery in St. John.

At first, Muir didn't see toy sculpting as a means of making a living. While Peggy continued her doctoral studies, he worked as a fisherman, boat-builder, organic farmer and sometime carpenter. In his spare time, he still made toys, but they became increasingly complex. People were willing to spend more and more on them, and it was becoming obvious which occupation was paying the bills. With a young son to consider, Muir

became Bryce the Toy Maker and never looked back.

Today, living in the small Maine town of Bowdoinham, Muir continues to make his living creating toys for adults. He'll take about 10 days to create something like the black Lab on skis and up to a month for a very complicated mechanical toy. A toy will cost between \$500 and \$2,000.

Muir's tools are basic. He usually starts a piece with some rough bandsaw work.

Confessions of a toy maker

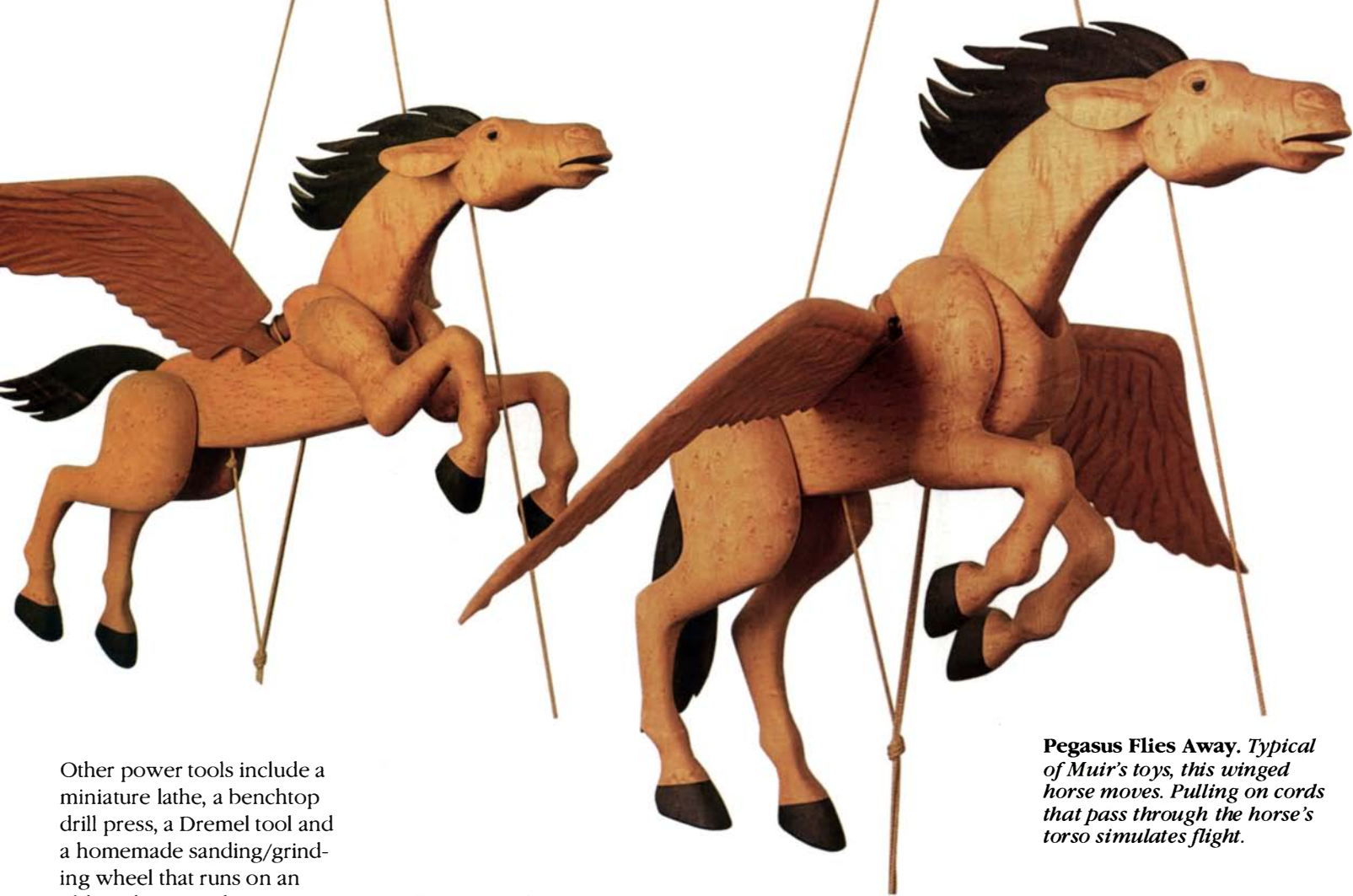
by Bryce Muir

Woodworkers rarely talk about their secret compulsion to create in wood. We tend to justify what we do in pragmatic terms: "It's an honest living; I'm doing quality work; at least I'm independent." But carving wood for a living doesn't make economic sense. And when you persist in irrational behavior for years, sooner or later you start questioning your motives.

Making wooden toys is the only work that has completely consumed me. On the good days, something magic happens. I sense a spirit moving through the work. I may pretend the woodworking is all business, but I know that it's a spiritual practice.

This is uncomfortable talk for a hardheaded woodworker. Let's talk about sharpening techniques or something else instead. But if we deny the spiritual potential of our work, we shortchange ourselves. Even the mundane tasks (like sharpening our tools) are symbolic rituals. Once we accept that, it's hard to keep the magic out. Now, about dressing that grinding wheel... □

Bryce Muir works his magic in Bowdoinham, Maine.



Pegasus Flies Away. *Typical of Muir's toys, this winged horse moves. Pulling on cords that pass through the horse's torso simulates flight.*

Other power tools include a miniature lathe, a benchtop drill press, a Dremel tool and a homemade sanding/grinding wheel that runs on an old washing-machine motor. Muir runs this last machine like a maestro conducting a symphony orchestra, using either a revolving drum or a disc depending on the desired effect. Years of practice have taught him just the right amount of pressure to apply to various wood species.

Muir details the toys using files, rasps, rifflers and hand-sanding (see the photo at right on p. 89). He doesn't sand the toys too finely, stopping at 100-grit sandpaper on most woods. "I like my portraits to have a tactile side. I don't like them too smooth," he says. In an age of smooth,

plastic finishes, he and his customers prefer to feel the wood as well as see it. He finishes his creations with mineral oil and wax only.

He glues the toys together with epoxy and uses small-diameter dowels at critical stress points. Muir gives his customers a lifetime guarantee for his carvings, so he builds them to withstand the worst treatment. "After all," he notes, "my first customers were children."

Most of the toys have moving parts. One of his most challenging pieces was for a bartender who had an affinity for racehorses. Muir built a toy that could be strung from the bar's ceiling and operated by a hand crank. Turn the crank, and two horses with riders burst from their gates and gallop across the air on strings. Reverse the crank, and they gallop backward into the

gates again. "It took me almost a month to perfect that one," Muir says.

Lately, Muir's work has been moving to more traditional wood sculptures of what he calls archetypal subjects (see the photos above). A recent project for a sailor was a set of raised-relief sculptures depicting the faces of the wind through the four seasons.

But Muir hasn't lost his sense of humor. "When I find myself getting too serious, I do some lawn ornaments," he says. Plywood pink flamingos and a young Elvis Presley adorn the lawn of Muir's Victorian house. There are even a few misguided plywood sea ducks in the lilacs out back. "They keep me company," he says. □

Ken Textor is a writer, boat-builder and sailor in Arrowsic, Maine.



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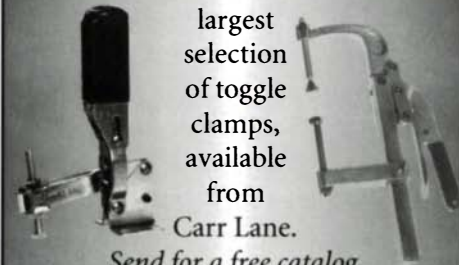
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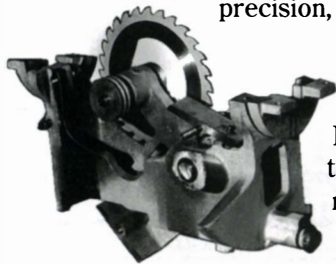
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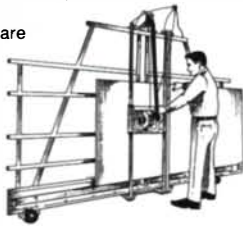
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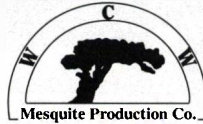
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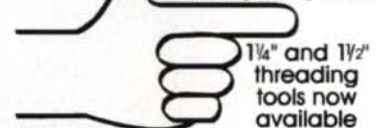
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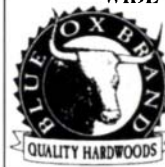
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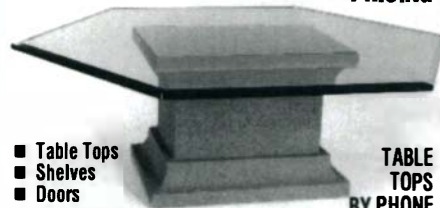
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1-1/2 HP Router w/Case \$144

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DW675K 3-1/8" planer w/case 164
DW402 4-1/2" angle grinder 89

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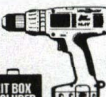
DW106 3/8" 4 amp keyless dr 74
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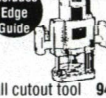
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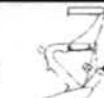
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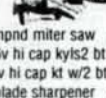
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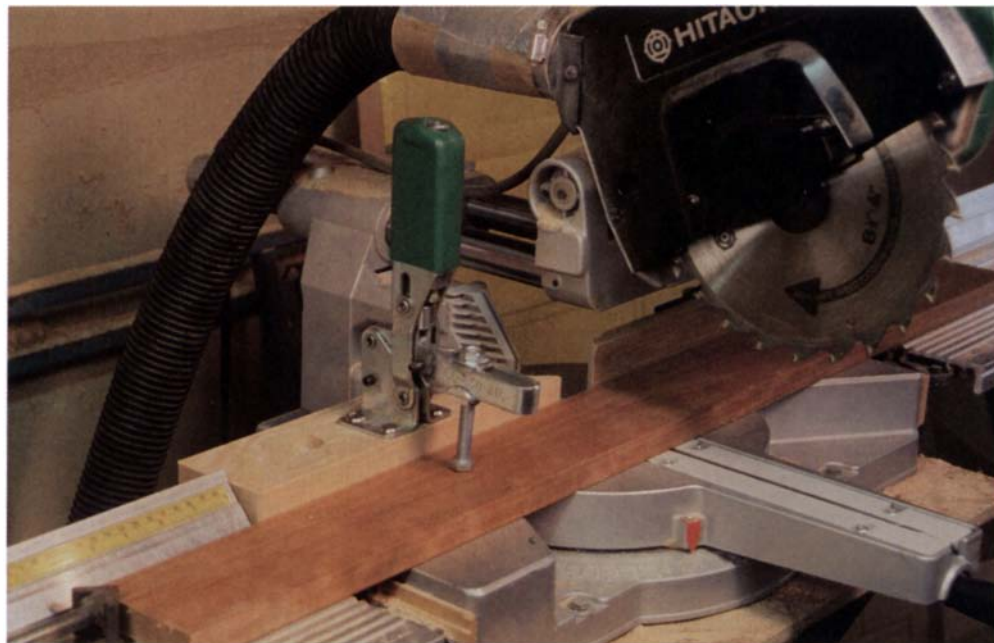
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Versatile, adjustable toggle clamps

Toggle clamps are great woodworking aids. Their strong, positive clamping pressure makes them invaluable for jigs and fixtures. Their drawback has been that they're not very adjustable.

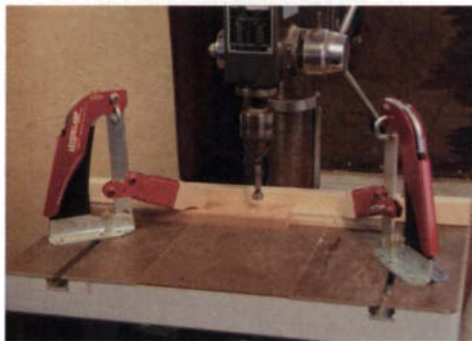
Until now, that is. Two relative newcomers, the MapleTek Engineering LeverClamp

(\$39.95) and the Carr Lane automatic toggle clamp (about \$35), adjust quickly to handle a range of stock sizes. The Carr Lane clamp automatically accommodates variations of plus or minus ½ in. without resetting the contact spindle. Its overall range is 1¼ in. The MapleTek LeverClamp



One setting handles a range of thicknesses. A Carr Lane clamp saves time by eliminating the need to reset the clamp for variations in stock thickness.

Quick, accurate positioning of stock on the drill-press table is possible with two LeverClamps and the LeverClamp auxiliary table. One clamp holds the stop block in place, and the other clamp holds the workpiece.



adjusts over a 4-in. range with a quick resetting of the lever arm via a thumbscrew. With either unit, you can avoid marring soft wood by adjusting the clamping force with a setscrew.

I installed the Carr Lane clamp on my compound miter saw fence (see the top photo at left). Now, instead of depending on hand pressure alone to hold a workpiece, I can count on the considerable pressure of a toggle clamp.

I increased the versatility of my portable Workmate bench (manufactured by Black & Decker) by bolting one of MapleTek's LeverClamps to the table through one of the stock peg holes. I no longer have to pinch narrow stock between the jaws of the table, a tedious procedure that can interfere with some woodworking operations. Even if the stock is wide enough to pinch between the Workmate's dogs, I usually find it more efficient to use the LeverClamp. When breaking down the bench for transport, a quick turn of a knurled locknut releases the clamp from the table.

MapleTek Engineering also offers a drill-press table and fence system for use with a pair of LeverClamps (see the bottom photo at left). Having installed and used the unit in my shop, I can't imagine going back to my old C-clamp days. Setting up a back fence and stop for production drilling of identically located holes used to be a time-consuming ordeal involving numerous C-clamps and scraps of wood. Not any more.

For more information on the Carr Lane automatic toggle clamp, contact the Carr Lane Manufacturing Co. (4200 Carr Lane Court, St. Louis, MO 63119; 314-647-6200). For additional information on the LeverClamp, contact MapleTek Engineering (1016 Morse Ave., #5, Sunnyvale, CA 94089; 408-377-4383).
—Jim Tolpin

Veritas router-table top

I don't have the space in my small shop, or the money, for a shaper. I use my only router either freehand or mounted in my shopmade router table. The frequent mounting and dismounting took a lot of time, and my tabletop wasn't too flat, which could result in a slight mismatch in the joinery I was cutting.

Veritas Tools solved these problems with its router-table top (see the photo at right). Straight out of the box, it was ready for use—no assembly needed. The top is a smooth piece of ¾-in. steel, measuring 16 in. by 24 in., with rounded edges. At a hefty 22 lb., it's solid. The finish is high-quality, too. A clamp assembly, located on the underside of the table, is designed to



Veritas router-table top is flat, smooth and solid. The clamps allow quick mounting and dismounting of a router without tools.

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hold any router. Once the initial setup for my router was completed, mounting and dismounting involved turning just two knurled screws. Also included are two fulcrum pins for use when shaping stock without a fence and six flush-mounting, plastic table inserts. These include two with openings already made in them (½ in. and 1½ in. dia.), a blank insert to custom fit any bit and three template inserts. The template inserts have a raised guide bushing for pattern routing.

I used the Veritas router-table top both on a home-built router stand and in a Workmate stand with great results.

Wood slides smoothly over the top, and the surface is sufficiently large. There is no miter-gauge slot, but because the bottom of the table is flat, clamps can be placed anywhere for mounting a fence. And because the top is relatively thin, I can leave the base attached to my router.

The Veritas Tools router-table top sells for \$149 plus shipping and handling and is available from Veritas Tools Inc. (12 E. River St., Ogdensburg, NY 13669-1720; 800-667-2986). —Richard Merrick



Bronze joiner's mallet is a pleasure to use. This mallet, with its heavy bronze head, is more efficient and requires less effort to use than wooden mallets.

Mallet is heavy and compact

David Calvo's new joiner's mallets are a lot more than pretty (see the photo at left); they're also efficient and enjoyable tools to use. The mallets are made of bronze and priced at \$40 for the 1½-lb. model and \$50 for the 2-lb. version. They're a little more expensive than their competition's lignum-vitae, laminated-birch and urethane mallets but not outrageously so.

I used the 1½-lb. mallet to chop a few mortises and to facet a surface with a shallow gouge. I didn't have to swing it hard. Its concentrated mass does most of the work, almost becoming an extension of my hand. Even my lignum mallet requires a good deal more energy to drive a mortise chisel than does this bronze mallet.

The mallets come with maple handles. For \$2 more, you can have a walnut handle. Shipping and handling is \$4.95. For more information or to order, call or write Calvo Studio (17 Mill Lane, Arlington, MA 02174; 617-648-5589). —Vincent Laurence

A bigger blade and more features on new Hitachi saw

Bigger is better, right? Well, if you like using a sliding compound miter saw for crosscutting in your shop (or at job sites), but you find the 8¼-in. or 8½-in. blade on your saw undersized, Hitachi has an alternative for you. Its latest saw, model C10FS, has a 10-in.-dia. blade as well as some important features that make it more versatile than the average sliding compound miter saw.

At first glance, the C10FS (see the photo at right) has many of the same traits as its baby brother, the C8FB (reviewed in *FWW* #100, pp. 44-48). The rotating base allows miter cuts up to 45° to the left and 57° to the right. Detents locate all the standard as well as crown-molding miter angles. There's a robust, twin-rail sliding carriage. Adjustable plastic kerf plates in the line of cut minimize tearout. The lightweight (44 lbs.), yet sturdy, cast-aluminum construction offers true portability (the retractable soft-plastic handle makes the C10FS comfortable to carry).

Hitachi's new saw, however, does even more. A bigger blade means greater capacity. With a 10-in. blade, you can cross-cut 3½-in.-thick by 12½-in.-wide stock at 90° and compound cut through 1¾-in.-thick by 8½-in.-wide stock with both the head tilted and table rotated to 45°. If



Compound miter saw has large capacity. Hitachi's 10-in. sliding compound miter saw permits bevel cuts to both the right and left.

you're tired of having to flip over workpieces during compound cutting jobs because the blade on your saw only tilts to the left, you'll love the C10FS's tilting head design, which allows bevel cuts in both directions (Makita's LS1211, reviewed in *FWW* #112, p. 94, is the only other sliding

compound miter saw I know of that tilts both ways). The bevel mechanism on the new Hitachi incorporates adjustable stops for 45° left, square and 45° right, so you can tweak them for dead-on accuracy if the settings go out over time.

Despite the fact that the C10FS's 10-amp

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From the unpainted blank stage to the completed stage, only the Sand Rite touches the boomerangs. It is a very large part of the reason that my company has grown from a hobby size operation to world wide sales.

Jim Mayfield

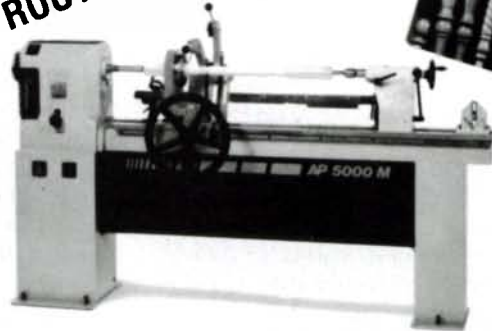
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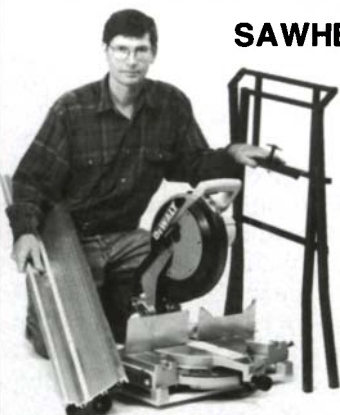


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motor is rated one-third lower than the 15-amp motor on the Makita LS1211 (and only marginally bigger than the 9.5-amp motor on the C8FB), the new Hitachi seemed more than capable of handling everything I threw at it.

The saw's narrow 40-tooth, belt-driven blade whizzed through most tough hardwoods I crosscut, including full-width cuts in 2½-in.-thick red birch. I did manage to stall the blade in a green, knotty fir 4x4 post but only when pivoting the saw's head very aggressively into the cut (hey, hurry up will ya? I need all 25 of those posts now!).

Like all new tools, I experienced a mix of delight and frustration getting acquainted with all the features of this newest Hitachi saw. I liked the C10FS's heavy-duty (but easy to adjust) work clamp and sliding plastic fence faces, which quickly adjust to support the workpiece close to the blade. I particularly liked the sliding rear guard, (see the photo below).

I didn't care for this saw's small on/off switch, which tired my trigger finger quickly. I found the saw's small bevel scale and cursor difficult to see, and they were impossible to use for setting odd-angle bevels without making and checking a few trial cuts. I also couldn't get used to the left-hand thread on the bevel-locking lever, which I kept trying to loosen or tighten the wrong way.

Despite these few peeves, I found the



A sliding rear guard provides support directly behind the cut and keeps small cutoffs from being thrown by the blade. The guard can be set to suit the angle of the blade.

Hitachi C10FS to be a versatile saw with enough power and accuracy for most cabinet or furniture-shop crosscut work. And it's a ready travel companion for on-site work.

—Sandor Nagyszalanczy

PowerPress bar clamp

American Tool Co.'s PowerPress bar clamp (available through retail hardware stores) works as a spreader for pushing things apart (see the photo at right) as well as a clamp. This plastic and lightweight-steel clamp is a stark contrast to the heavy, cast-iron, I-beam clamps found in many shops.

Our run-throughs at the Edinboro University (Pennsylvania) woodshop found the PowerPress delivered all that the promotion sheets promised. Retailing for about \$25, it mounts, remounts (for spreader conversion) and slides easily on ¾-in. black-iron pipe.

Positioning both jaws is simplified with a quick-release trigger, and built-in soft pads prevent marring. A nicely machined Acme screw gives the unit its punch, and the piv-



PowerPress clamp works as a spreader. Remove the head and foot, turn them around and slip them back on the pipe.

oting handle makes it operable in tight spots. However, the steel screw thread runs in a plastic housing, which may be a weak link over time.

—Bernie Maas



Scribing corners is easy. These colorful templates make fast work of marking out a chamfer, radius or concave corner.

Quick Corner templates

This set of four Quick Corner templates (see the photo above) will allow you to draw convex arcs, concave arcs and 45° chamfers. Three small templates cover seven different sizes in ¼-in. increments, from ½ in. to 2 in., and the large convex template has four arcs, 3 in. to 6 in., in whole-inch increments. Ribs on the templates align the curve or chamfer with the corner of the stock. You slide the template into the corner, and draw the line—that's it, quick and simple.

The templates are made of polycarbonate plastic, color coded for easy identification. I knocked them off the bench onto the concrete floor and sailed them like a Frisbee with no damage, so they should hold up in normal use.

The Quick Corner templates are available from Streamline Manufacturing, Inc., 210 East 1000 South, Brigham City, UT; (801) 723-8665. The suggested retail price is \$5.99 each or \$19.95 for the set of four, plus shipping and handling.

—Dennis Preston

Briefly noted

Grizzly discontinues radial drill press

Citing erratic delivery from its manufacturer, Grizzly Imports Inc. announced it has discontinued the G1131 radial drill press.

New Craftsman tool catalog

Sears announces 400 new products in its new 1995-1996 Craftsman Power & Hand Tools catalog.

A free copy of the catalog is available from Sears Shop at Home Services (800-948-8800, code #801204).

A new, large biscuit from Lamello

Lamello, the inventor of plate joinery, has added a new biscuit to its standard lineup. Made for heavy-duty applications, the S-6 plate is 85x30x4mm (3⅜x1⅜x½ in.) and requires a groove depth of 16mm (⅝ in.). The groove can be cut with the Lamello Top 10 or Standard 10 plate joiner without special attachments.

Set the groove depth of plunge to "max," move the machine over about ⅜ in. and plunge again. Lamello claims that the strength of one S-6 biscuit is equivalent to four ⅜-in. dowels.

The Lamello biscuit is distributed by Colonial Saw Co., Inc., 845 Milliken Ave., Suite F, Ontario, CA; (800) 252-6355. —D.P.

Jim Tolpin is a writer and woodworker in Port Townsend, Wash. Richard Merrick is a woodworker in Comox, B.C., Canada. Vincent Laurence is an associate editor of Fine Woodworking. Sandor Nagyszalanczy is a contributing editor to Fine Woodworking. Bernie Maas teaches woodworking at Edinboro University (Pennsylvania). Dennis Preston is an assistant editor of Fine Woodworking.

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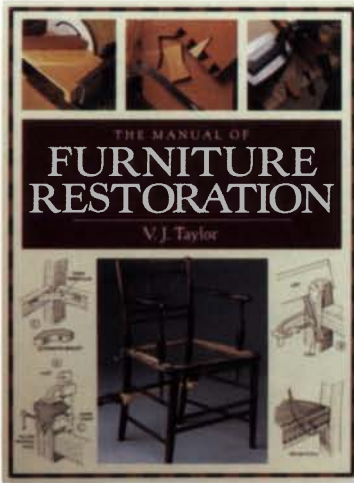
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READER SERVICE NO. 42

The Manual of Furniture Restoration by V.J. Taylor. *David and Charles, England. Distributed in the United States by Sterling Publishing Co. Inc., 387 Park Ave. S., New York, NY 10016-8810; 1994. \$19.95, paperback; 224 pp.*



V.J. Taylor has compiled a thorough, well-researched book to deal with a complex subject. *The Manual of Furniture Restoration* aims to lead the novice or accomplished woodworker through the basic steps of repairing antique and modern furniture.

This book is readable and well-planned. Starting with the basics of dismantling furniture, Taylor proceeds with step-by-step instructions for the most common problems by category: case pieces, chairs and tables. Each one is covered in a separate chapter. Particularly valuable are

the simple accessories and jigs the author sketches to simplify repairs. His drawings are well-done and easy to understand.

Throughout the text, the author emphasizes the use of hand tools. Because repairs usually involve non-repetitive operations, hand tools usually get the job done faster and better. Woodworkers who do not own a garage full of power equipment will appreciate that.

One warning: Many repair procedures in this book call for the indiscriminate removal of old wood to facilitate patching and splicing repairs with new wood. This practice should be avoided on any furniture that has possible historical value.

The author also leaves the reader in the dark about how to color patches of new wood that have been replaced. A short section on touching up repairs would have been helpful to the amateur. Also, the list of suppliers would be more useful if it had included American sources.

Despite these shortcomings, I find this to be an impressive book. Novice woodworkers will gain confidence in how to handle annoying household repairs. Seasoned professionals will find the technical information in the appendices helpful. Collectors will find the historical guide to decoration and fittings beneficial in checking antiques for authenticity. —*Jeff Jewitt*

Quaint Furniture: Stickley Bros. Co., Grand Rapids, Mich. edited by Peter A. Copeland and Janet H. Copeland. *The Parchment Press, 321 Park Ave., Parchment, MI 49004; 1993. \$25.50, paperback; 84 pp.*



If you appreciate Arts-and-Crafts furniture, buy this book. If you don't go for most of the heavy Stickley style, this may be the volume that changes your mind.

Without a doubt, this is the finest reprint of a Stickley catalog (1912 vintage) yet published—from the range and selection of furniture pieces to the clarity of the photos

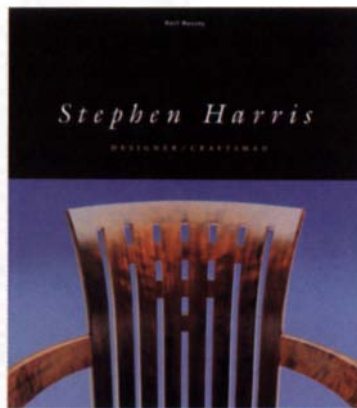
and the quality of the paper that it's printed on. An excellent introduction chronicles the history of the Stickley Brothers Co., which was founded by Leopold and J. George Stickley in

1900 after they broke away from their brother, Gustav.

I've always considered most Stickley furniture overly heavy, almost clunky. It lacked the grace of pieces by Charles and Henry Greene (who worked in California around the same time) or the work of Edward Barnsley (son of Sydney and nephew of Ernest, English contemporaries of the Stickleys who also produced furniture in the Arts-and-Crafts style). So I was more than pleasantly surprised to find a couple of beds, a few chests of drawers and some mirrors that had sweet, subtle curves, lighter frame members and a better overall sense of proportion. In addition to the fumed, quartersawn oak furniture one associates with Stickley, there's an entire section of this catalog devoted to designs in figured mahogany—a wood that gives the Stickley pieces a lighter, more refined feel.

Woodworking books fall into two major categories: those that provide information or solve problems and those that make you want to run to your shop to build something. This book performs that second task with gusto. —*Vincent Laurence*

Stephen Harris: Designer/Craftsman by Hart Massey. *Stephen Harris Monograph Committee. Distributed by The Boston Mills Press, 132 Main St., Erin, Ont., Canada N0B 1T0; 1994. \$32, hardback; 180 pp. (800) 565-3111*



When Stephen Harris died in 1991, Canada lost an extraordinary talent. For 20 years he had been quietly and meticulously making elegant furniture. Most people who knew Harris recognized that his way and his work were never easy. Even the design process was painstaking. As a woodworker, he was self-taught, and he spent his life learning. Harris sought and achieved perfection.

Harris did little to document his work or to promote himself. After his death, a small group of his friends met and deliberated on how best to honor him and to spread knowledge of his accomplishments to as broad an audience as possible. This wonderful monograph is the result.

The author, Hart Massey, was Harris' friend and neighbor for 20 years. He interviewed many of Harris' clients and woodworking associates. Their observations and recollections are woven into a compelling and illuminating narrative about an uncompromising furniture maker.

Stephen Harris: Designer/Craftsman presents more than 30 beautiful color images and many black-and-white photos of Harris' work taken by skilled studio photographers. The text includes some verbal and visual snapshots that may seem too personal for a woodworking book. But this book is about more than just woodworking.

This book contains little about tools, techniques and materials. It is about camaraderie, camping, and canoeing and Harris' concepts, concerns, and conversations. It is, in short, a testimony to his life and the effect he had on others. With Stephen Harris nothing was easy, but it was all worthwhile.

—*Donald Lloyd McKinley*

Jeff Jewitt specializes in the restoration and conservation of period furniture. Vincent Laurence is an associate editor for Fine Woodworking. Donald Lloyd McKinley is a professor in the furniture program he founded in 1967 at the School of Crafts and Design at Sheridan College in Oakville, Ont., Canada.

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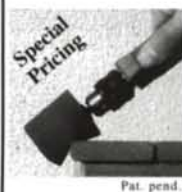
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Listings of gallery shows, major craft fairs, lectures, workshops and exhibitions are free, but restricted to happenings of direct interest to woodworkers. We list events (including entry deadlines for future juried shows) that are current with the time period indicated on the cover of the magazine, with overlap when space permits. We go to press three months before the issue date of the magazine and must be notified well in advance. For example, the deadline for events to be held in March or April is January 1; for July and August, it's May 1, and so on.

ALASKA: Meetings-Alaska Creative Woodworkers Association meets at 7 p.m. on the fourth Monday of each month at the Anchorage Museum. For more info, call (907) 345-3077.

ARKANSAS: Meetings-Woodworker's Association of Arkansas meets the first Monday of each month at 7:00 p.m. at Woodworker's Supply Center, 6110 Carnegie, Sherwood, 72117. For more information, call (501) 835-7339.

Workshops-Canoe making, kayak making, October thru November. White River Artisans School, PO Box 308, 202 South Ave., Cotter, 72626. (501) 435-2600.

CALIFORNIA: Workshops-Woodworking for women. Furnituremaking with hand tools using traditional joinery, weekends. San Francisco. For more info, contact Debey Zito (415) 648-6861.

Workshops-Classes on wood finishing and decorative painting for furniture and cabinets. For schedule, write Studio 1829, 1829 Stanford St., Santa Monica, 90404. (310) 453-0230.

Workshops-Shaker bench, sofa table, Mission lamp table, Adirondack chair, more. Saturdays and Sundays. No experience necessary. Private instruction available. For more information, contact the Woodworkers Place at (818) 952-3177.

Workshops-Woodworking and carving. Martin Pierce Furnishings, 5433 W. Washington Blvd., Los Angeles. For more info, call (213) 939-5929.

Workshops-Various workshops including Japanese wood-working, joinery and sharpening. For more info, contact Hida Tool Co., 1333 San Pablo, Berkeley, 94702. (415) 524-3700.

Show-California Carvers Guild 18th annual woodcarving show, Sept. 16-17. Coast High School, Cambria. For info, contact CCG Museum & Gallery, San Simeon. (805) 434-2677.

Show-Wildlife art show and carving competition, Sept. 30-Oct. 1. The Radisson Hotel, 18800 MacArthur Blvd., Irvine, 92715. For more information, contact Patrick Kennedy at (909) 785-6267.

Exhibition-Masterpieces from the Museum of Classical Chinese Furniture thru March. Pacific Heritage Museum, 608 Commercial St., San Francisco, 94111. (415) 399-1124.

Workshops-Building a lapstrake canoe with Simon Watts, Oct. 23-28. Hyde Street Pier, San Francisco. For info, contact National Maritime Museum Assoc., Building 275, Crissy Field, San Francisco, 94129. (415) 929-0202.

Lectures-George Hunzinger: New York chairmaker, Sept. 12; Leon Marcotte: New York cabinetmaker and interior decorator, Dec. 12. The American Decorative Arts Forum of Northern California, Trustees Auditorium, M.H. de Young Museum, Golden Gate Park, San Francisco. For more information, call (415) 456-8177.

Show-Celebration of Craftswomen, Dec. 2-3 and Dec. 9-10. Fort Mason Center's Pier 1 and Pier 2, Buchanan St. and Marina Blvd., San Francisco. For more info, call (415) 361-0700.

COLORADO: Classes-Woodworking and related classes, year-round. For more info, write Red Rocks Community College, 13300 W. 6th Ave., Lakewood, 80401. (303) 988-6160.

Workshops-Beginning to advanced woodworkers, thru August. For free catalog, call or write Gail Fredell, Program Director, Anderson Ranch Arts Center, PO Box 5598, Snowmass Village, 81615. (303) 923-3181.

Classes-Traditional hand woodworking, year-round. Contact Tom Larkin, Shadow Mountain School of Woodcarving, 32037 Stenzel Drive, Conifer, 80433. (303) 674-8560.

Exhibition-Woodworkers Guild of Colorado Springs 11th annual exhibit, Oct. 13-Nov. 25. Pioneers Museum, Colorado Springs. For info, contact William Jeavons at (719) 593-8461.

CONNECTICUT: Show-Woodworking show, Oct. 1-31. Gallery-12, 29 Whitfield St., Guilford, 06437. (203) 458-1196.

Exhibition-Shaker: The Art of Craftsmanship, Sept. 30-Dec. 3, Wadsworth Atheneum, 600 Main St., Hartford, 06103-2990. (203) 278-2670.

Classes-Veneering, turning, Shaker bench, boatbuilding, basic woodworking techniques and more. September thru November. For more info, contact Brookfield Craft Center, PO Box 122, Route 25, Brookfield, 06804. (203) 775-4526.

Classes-Hands-on woodworking, finishing and lathe classes. Call for complete schedule. Harris Enterprise Corp., 80 Colonial Road, Manchester, 06040. (203) 649-4663.

Show-17th annual Guilford Handcrafts Holiday Festival of Crafts, Nov. 4-Dec. 24. Guilford Handcraft Center, 411 Church St., Guilford. (203) 453-5947.

FLORIDA: Meetings-South Florida Woodworking Guild meets every second Monday at 7 p.m. Constantine, 1040 East

Oakland Park Blvd., Ft. Lauderdale. For further information, contact Woody McLane at (305) 565-2729.

Meetings-Central Florida Woodworkers Guild meets the second Thursday of each month at 7:30 p.m. Woodcraft Supply Corp., 246 E. Semoran Blvd., Casselberry. For more information, contact Bob Elliott (407) 695-8960.

Meetings-Palm Beach Country Woodturners, monthly meetings. For more info, call Steve Blank (407) 747-7035.

Meetings-St. Petersburg Woodcrafters Guild meets the fourth Thursday of every month at 7 p.m. Montgomery Electric and A/C, 1200 19th St. N., St. Petersburg, 33713. For more info, contact Don Montgomery at (813) 898-0569.

GEORGIA: Meetings-Woodworkers Guild of Georgia meets the second Monday of every month. Southern College of Technology, 1100 S. Marietta Parkway, Marietta. For more information, call (404) 299-3972.

Workshops-Japanese woodworking by Toshihiro Sahara. One Saturday each month. For further information, contact Sahara Japanese Architectural Woodworks at (404) 355-1976.

INDIANA: Classes-Carving, veneering, joinery, turning, chairmaking, more thru October. For info, contact Marc Adams School of Woodworking, Route 2, Box 121A, Franklin, 46131. (317) 535-4013.

Classes-Hands-on woodworking classes with Michael Van Pelt. Superior Woodworking Supply, Inc., 922 Ft. Wayne Ave., Indianapolis, 46202. (317) 635-5747.

KENTUCKY: Workshops-Woodturning and joinery instruction. For further information, contact Jim Hall, Adventures in Wood, 415 Center St., Berea, 40403. (606) 986-8083.

Meetings-Kyana Woodcrafters Inc. meets the first Thursday of each month. Bethel United Church of Christ, 4004 Shelbyville Road, Louisville, 40207. For info, call (502) 426-2991.

Workshops-Traditional Windsor chairmaking. One-week courses. For info, contact David Wright (606) 986-7962.

MAINE: Workshops-Two-week basic and intermediate furnituremaking courses. Faculty includes Peter Korn, Silas Kopf, Bob Flexner, Nora Hall, Michael Emmons. For more information, contact the Center for Furniture Craftsmanship, 125 W. Meadow Road, Rockland, 04841. (207) 594-5611.

Meetings-Guild of Maine Woodworkers meets the first Wednesday of every month. For time and location, call Guild of Maine Woodworkers at (800) 805-5100.

MARYLAND: Show-Shaker Forest Festival, Sept. 9-10, 16-17, 23-24. Seneca Creek State Park off Clopper Road, Gaithersburg. For info, call Connie Paulovich, Shaker Forest Festival (412) 643-8604.

Exhibition-Ghost Vessels: turned wood by Geoffrey Wilkes, Oct. 27-Nov. 18. Franklin Street Gallery, 7 W. Franklin St., Hagerstown, 21740. (301) 791-3132.

MASSACHUSETTS: Classes-Woodworking classes thru-out most of the year. Contact Boston Center for Adult Education, 5 Commonwealth Ave., Boston, 02116. (617) 267-4430.

Instruction-Full-time program in fine furniture construction. Complete facilities. For more info, contact Wm. B. Sayre, Inc., One Cottage St., Easthampton, 01027. (413) 527-0202.

Classes-Woodworking, turning, carving, finishing, veneering, more. One Cottage Street School of Fine Woodworking, One Cottage St., Easthampton, 01027. (413) 527-8480.

Workshops-Toolmaking for woodworkers. First three weekends of each month. Registration limited to two students per weekend. Contact Ray Larsen, Genuine Forgery, 1126 Broadway, Hanover, 02339. (617) 826-8931.

Workshops-Summer intensives. Faux finishing, chair basics, more. Horizons, The New England Craft Program, 108 N. Main St., Sunderland, 01375. (413) 665-0300.

Workshops-One-week woodworking and related workshops thruout the year. Contact The Heartwood School, Johnson Hill Road, Washington, 01235. (413) 623-6677.

Classes-Ongoing classes and one day seminars starting in September. Beginning thru intermediate. For information or brochure, call Michael Coffey at (413) 527-8480.

Show-Furniture, wood turnings, demonstrations and more, Oct. 7. Cape Cod Regional Technical Vocational High School, Pleasant Lake Ave., Route 124, Harwich. Sponsored by Woodworkers Guild of Cape Cod. For more info, contact Mr. Tune (508) 432-4500.

MICHIGAN: Workshops-Woodwrighting, more. Tillers International, 5239 South 24th St., Kalamazoo, 49002. For more info, call (616) 344-3233.

Classes-Carving, hand dovetail and mortise and tenon, more. September thru October. Woodcraft Supply, 37864 Van Dyke Highway, Sterling Heights, 48312. (810) 268-1919.

Meeting-Michigan Violinmakers Association, Oct. 29, 10:00 to 3:30 at the shop of Peter Psarianos, 79 E. Maple, Troy, 48063. (800) 697-8465.

MINNESOTA: Classes-Woodcarving classes year-round. For information, contact the Wood Carving School, 3056 Excelsior Blvd., Minneapolis, 55416. (612) 927-7491.

Meetings-Minnesota Woodworkers Guild meets the third Tuesday of each month at 7:15 p.m. Demonstrations present-

ed each month. Contact Richard Gotz at (612) 544-7278.

Exhibition-Virtual Rurality: exhibition of the woodcarvings of Fred Cogelov, thru Oct. 7. The Depot Museum, Duluth. (218) 727-8025.

Call for entries-Minnesota Woodworkers Guild 13th annual Northern Woods Exhibition, Oct. 19-22. Deadline: Sept. 29. Southdale Center, Edina. For more info, contact Tim Johnson (612) 378-2605.

Classes-Ongoing instruction and more offered thru Wild Earth Woodworking at a Minneapolis/St. Paul facility. Contact Wild Earth Woodworking, 401 Hunter Hill Road, #3, Hudson, WI 54016. (715) 386-3186.

MISSISSIPPI: Classes-Various woodworking classes. For more information on the classes, contact Allison Wells School of Arts & Crafts, Inc., Canton. (800) 489-2787.

MISSOURI: Show-Wood Concepts '95, Oct. 1-Nov. 9. For information, contact Columbia Art League, 1013 E. Walnut St., Columbia, 65201. (314) 443-2131.

NEBRASKA: Meetings-Omaha Woodworkers Guild meets at 7 p.m. the third Tuesday of every month. Westside Community Center, Omaha. Contact John Cahill at 334-5550.

NEW HAMPSHIRE: Classes-Fine arts and studio arts. For info, contact Manchester Institute of Arts and Sciences, 114 Concord St., Manchester, 03104. (603) 669-2731.

Classes-Various woodworking classes. Contact The Hand & I, PO Box 264, Route 25, Moultonboro, 03254. (603) 476-5121.

Auctions-Antique and craftsman's tool auctions, year-round. Contact Richard A. Crane, Your Country Auctioneer, 63 Poor Farm Road, Hillsboro, 03244. (603) 478-5723.

Workshops-Week-long Shaker-style furniture and chair-making workshops, year-round. For more info, contact Mary Sweet, Dana Robes, Wood Craftsman, Lower Shaker Village, Enfield, 03748. (603) 632-5385.

Classes-Make a Windsor chair with Michael Dunbar. For information, contact Michael Dunbar, PO Box 805, Portsmouth, 03802. (603) 431-4676.

Exhibition-Fine Finish: handcrafted wood furniture, Sept. 18-Oct. 27. New Hampshire Craftsmen League Gallery, 205 North Main St., Concord. For more info, call (603) 234-3375.

Exhibition-The Guild of New Hampshire Woodworkers 5th annual juried exhibit, Sept. 23-Oct. 29. Craftings, 52 Hanover St., Manchester. For information, call (603) 623-4108.

NEW JERSEY: Classes-Carving, Sept. 22-24 and Nov. 3-5. The American Woodcarving School, 21 Popton Plains Crossroad, Wayne, NJ 07470. Contact Eric at (201) 835-8555.

NEW MEXICO: Classes-Woodworking classes. For more information, contact North New Mexico Community College, El Rito, 87520. (505) 581-4501.

Classes-Woodworking classes. For info, contact Santa Fe Community College, Santa Fe, 87502. (505) 438-1361.

Show-Santa Fe Furniture Expo, Oct. 13-15. Albuquerque Convention Center. For information, call (505) 255-4271.

NEW YORK: Classes-Traditional 18th-century wood-working techniques with Mario Rodriguez. For more info, contact Warwick Country Workshops, PO Box 665, Warwick, 10990. (914) 986-6636.

Meetings and classes-New York Woodturners Association meets bi-monthly. YWCA, 610 Lexington Ave. (53rd St.) New York City. Contact Howard Alalouf (914) 337-0226.

Classes-Woodworking, traditional and contemporary, turning and finishing with Maurice Fraser and Bill Gundling. All levels. The Craft Students League at the YWCA, 610 Lexington Ave., New York City. For information, call (212) 735-9731.

Show-Marriage in Form: Kay Sekimachi & Bob Stockdale, thru Oct. 8. American Craft Museum, New York City. For more information, call (415) 329-2605.

Show-Westchester Crafts Show, Sept. 23-24. Westchester County Center, Central Ave. and Route 119 at the Bronx River Parkway, White Plains. For info, call (914) 232-6583.

Classes-Veneer matching, finishing, making a revolving Shaker stool, more, thru November. Garrett Wade, 161 Avenue of the Americas, New York City, 10013. (212) 807-1155.

Show-The Handmade Home Show, Nov. 17-19. Lexington Ave., Armory at 26th St., New York City. For more information, contact Richard Rothbard (800) 834-9437.

Classes-Wood inlay, routing, woodcarving, veneering, finishing, tablesaw techniques, more. Saturdays. January thru April. Contact Albert Constantine & Son, Inc., Woodworking Classes, 2050 Eastchester Road, Bronx, 10461. (718) 792-1600.

NORTH CAROLINA: Meetings-North Carolina Woodturners meets the second Saturday of each month. For more information, contact North Carolina Woodturners, PO Box 1833, Hickory, 28603. (704) 324-5960.

Show-The Chair Show, October-Nov. 36. Folk Art Center, Asheville. For more info, contact Katherine Duncan, Southern Highland Handicraft Guild, PO Box 9545, Asheville, 28815. (704) 298-7928.

Classes-Bedside table, Queen Anne bench, pencil post bed, September thru December. Benjamin C. Hobbs, Cabinetmaker, Route 1, Box 517, Hertford, 27944. (919) 426-7815.

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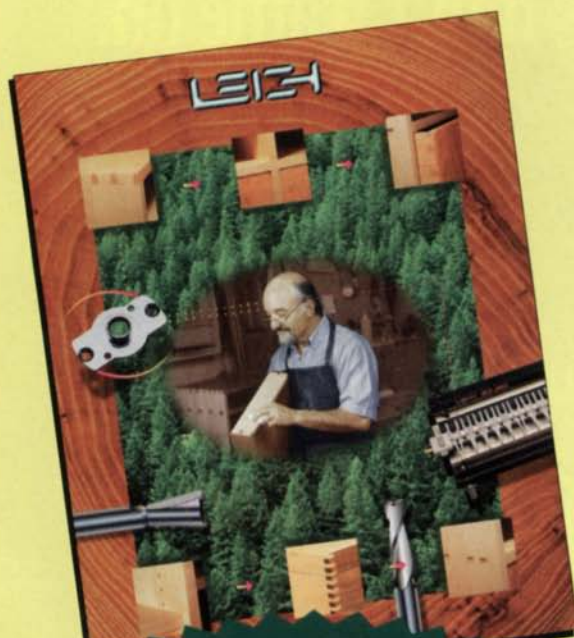
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OHIO: Meetings-Cincinnati Woodworking Club meets from 9:00 to noon on the second Saturday of January, March, May, September and November. Reading High School, 801 E. Columbia Ave., Reading. Contact the Cincinnati Woodworking Club, 5974 Gaines Road, Cincinnati, 45247.

Workshops-Windsor chairs, taught by Joe Graham. For more information, contact Lenox Workshops, 1192 Webster Road, Jefferson, 44047. (216) 576-0311.

Workshops-Various workshops, year-round. Conover Workshops, 18125 Madison Road, PO Box 679, Parkman, 44080. (216) 548-3491.

Meetings-Woodworkers of Central Ohio meets on the second Saturday of September, November, February, April, and June. For more information, call Chuck at (614) 457-3704.

OREGON: Meetings-Cascade Woodturner's Assoc. meets every third Thursday. Contact Cascade Woodturners, 11575 S.W. Pacific Highway, #104, Tigard, 97223. (360) 887-3903.

Classes-Oregon School of Arts and Crafts, 8245 S.W. Barnes Road, Portland, 97225. (503) 297-5544.

PENNSYLVANIA: Classes-Windsor chairmaking, weekly and weekends. For more information, contact Jim Rendi, Philadelphia Windsor Chair Shop, PO Box 67, Earlville, 19519. (610) 689-4717.

Meetings-Black Hills area woodworkers interested in organizing for purposes of sharing information and working toward a show. To be on mailing list, call (605) 343-1878.

Classes-Furnituremaking, joinery, chip carving, restoration, woodturning and more, thru December. For schedule, contact the Olde Mill Cabinet Shoppe, 1660 Camp Betty Washington Road, York, 17402. (717) 755-8884.

Workshops-Week-long woodcarving workshops, thru November. Sawmill Center for the Arts, PO Box 180, Cooksburg, 16217. (814) 927-6655.

Call for entries-Holiday ornaments, Nov. 17-19. Deadline: Nov. 1. Palmer Museum of Art, Pennsylvania State University, University Park. For information and entry form, send SASE to True Fisher, Friends of the Palmer Museum of Art, Penn State University, University Park, 16802-2507. (814) 865-7627.

Exhibition-Hazleton Art League juried exhibition, Oct. 7-20. Hazleton Art League, 225 East Broad St., Hazleton. For information, call Jayne Persico at (717) 454-3789.

Classes-Bowl turning with David Ellsworth, January thru March. Three-day weekend classes in private studio, begin-

ner to intermediate. Contact David Ellsworth, Fox Creek, 1378 Cobbler Road, Quakertown, 18951. (215) 536-5298.

RHODE ISLAND: Exhibition-Marriage in Form: Kay Sekimachi & Bob Stockdale, Nov. 16-Feb. 4. Museum of Art, Rhode Island School of Design, Providence. For info, call Palo Alto Cultural Center, Palo Alto, CA. (415) 329-2605.

SOUTH DAKOTA: Classes-Various classes and workshops, all levels. Iron Mountain Wood Shop, 4302 S. Highway 79, Rapid City, 57701. (605) 343-1878.

TENNESSEE: Workshops-Turning, carving and more, year-round. Arrowmont School of Arts and Crafts, PO Box 567, 556 Parkway, Gatlinburg, 37738-0567. (615) 436-4101.

Classes-Lumber selection, grading, stacking, drying, kiln operation, sawmilling, more. Tennessee Valley Authority, 17 Ridgeway Road, Box 920, Norris 37828-0920. (615) 632-1656.

TEXAS: Meetings-North Texas Woodworker's Association meets the third Tuesday of each month. Contact Bruce May, North Texas Woodworker's Association, PO Box 831567, Richardson, 75083. (214) 271-0125.

Classes-Woodworking classes year-round. Bowl turning basics to advanced furniture and cabinetry. For info, contact Woodshop, Inc. Woodworking School, 1225 West College, Suite 612, Carrollton, 75006. (214) 466-3689.

Meetings-Woodturners of North Texas meets the last Thursday of every month, 7:30-10:00 p.m. For more information, contact the Paxton Beautiful Woods Store, 1601 W. Berry St., Fort Worth, 76110. (817) 927-0611.

Classes-Carving classes with Don Schol, every Thursday, 6:00-9:00 p.m. For information, contact Paxton Beautiful Woods Store, 1105 Sixth St., Carrollton, 75006. (214) 245-1192.

Exhibition-Texas Turnings, thru October. Rock House Gallery, 1311 W. Abram St., Arlington. For more information, call Stephen Smith at (817) 275-7469.

VERMONT: Courses-Yesterday Design and Building School, Route 1, Box 97-5, Warren, 05674. (802) 496-5545.

VIRGINIA: Show-Beads on Target, Oct. 26-Nov. 25. Contact Friends of the Torpedo Factory Art Center, 105 N. Union St., Alexandria, 22314. (703) 683-0693.

Classes-Fundamentals of woodworking, router techniques,

bowl turning and more. Classes offered year-round. For class schedule, contact The Woodworkers Club, 216 Dominion Road, N.E., Vienna, 22180. (703) 255-1044.

Exhibition-Revolutions in Wood: Retrospective of the work of Mark Lindquist, Sept. 15-Nov. 12. Hand Workshop, Virginia Center for the Craft Arts, 1812 W. Main St., Richmond, 23220. (804) 353-0094.

Classes-Woodcarving, lathe, router, tablesaw, furniture and cabinetmaking. Individual and small group. Common Sense Woodwork 8231 S.E. 67th St., Mercer Island. For schedule, call (206) 232-1714.

WASHINGTON: Workshops-Build a sea chest, small boat construction, handplane repair and construction, paddle carving, woodturning. Northwest School of Wooden Boat Building, 251 Otto St., Port Townsend, 98368.

WISCONSIN: Workshops-Furniture design, cabinet construction, picture frames, planing, finishing, guest speakers, thru December. The Wisconsin Woodworkers Guild. For more information, call Matthew Bohlmann at (414) 258-3132.

CANADA: Workshops-Traditional Windsor chairmaking. Weekly courses. For more info, contact David Goodwin, Village Chairmaker, Sparta, Ontario, N0L 2H0. (519) 775-2751.

Association-Canadian Woodturners Association. Markham, Ontario. For more information and quarterly newsletter, call (905) 479-0755.

Meetings-West Island Woodturners Club (Montreal) meets every Tuesday, September thru May. Contact Dennis Brown, 8817 Cure Legault, Lasalle, Quebec H8R 2V9. (514) 366-6071.

Association-Superior Woodworking Association meets 7:00 p.m. the last Monday of each month. Confederation College, Ontario. For more information, contact Vic Germaniuk at (807) 767-5964.

ENGLAND: Workshops-Restoration, hand finishing, cabinetmaking for beginners, marquetry, furniture design, year-round. Bruce Luckhurst, Little Surrenden Workshops, Bethersden, Kent TN26 3BG. 0233 820 589.

SCOTLAND: Workshops-Ongoing workshops. For more information, contact the Myreside International School of Antique Furniture Restoration, Myreside Grange, Gifford, East Lothian, EH41 4JA. (062 081) 0680.

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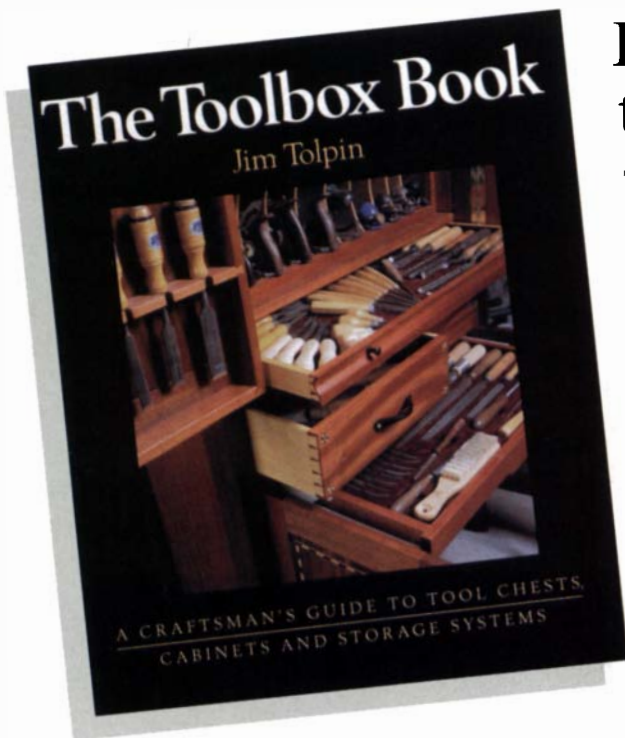
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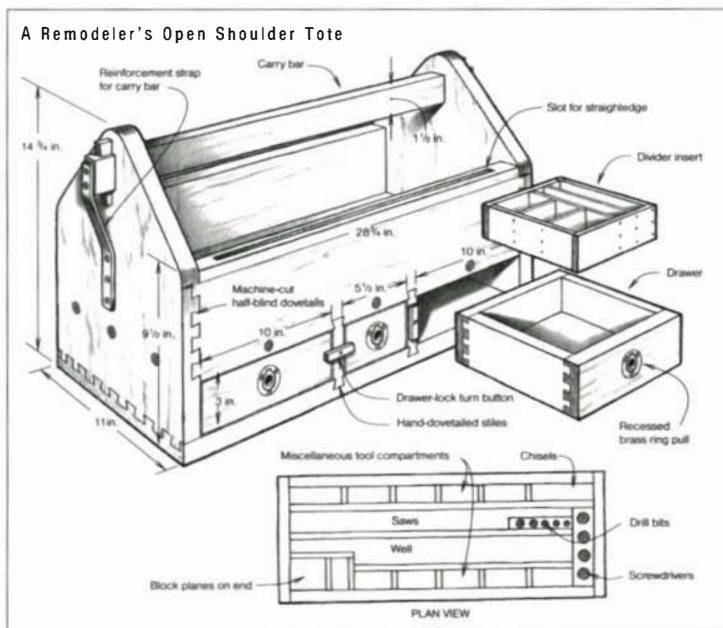
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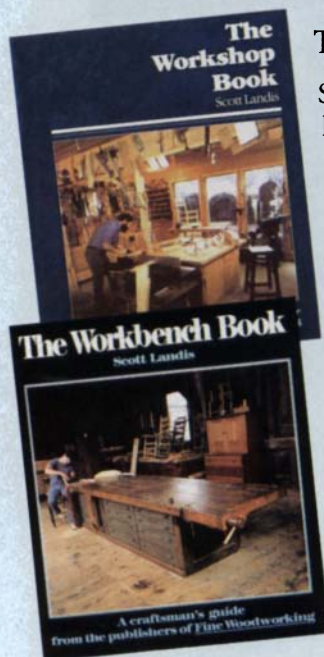
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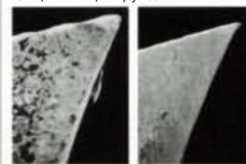
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Greenwood chairs from Honduras



One of the first things the conquistadors shed when they reached the American mainland was their metal armor. It was hot, heavy and hard to maintain. Modern woodworking machinery suits the tropics just about as well. Rust blooms on steel almost before your eyes. Sawblades are quickly dulled by dense and resinous hardwoods, and power supplies in many developing countries are erratic.

The Greenwood Furniture Project, recently launched in rural Honduras by the Woodworkers Alliance for Rainforest Protection (WARP), is taking a different approach to working with wood. Applying ancient technology in a new context, the program is training students in El Carbon, Honduras, to build high-quality furniture with split and shaved green (wet) wood, worked entirely by hand (see the photos on this page). The primary goal of this low-tech craft industry is to help support ongoing forest management efforts in this community of about 1,700 people in the northern foothills of Honduras.

In February 1994, WARP chairmakers Brian Boggs of Berea, Ky., and Curtis Buchanan of Jonesborough, Tenn., introduced seven teenage students to this basic technology. A second workshop took place in May, with follow-up sessions in December and again in February. In spite of these irregular contacts, or perhaps because of them, the students have shown a great deal of initiative.

Working part-time and with little or no supervision, the students have absorbed the fundamentals of an unfamiliar technology and completed more than 60 pieces of furniture in about six months. These include 17 low stools, 36 bar stools, seven chairs and a table.

The students designed the chairs and table themselves, applying the stool-making techniques they'd been taught. They



Greenwood furniture in Honduras. Ronny Antunes puts the finishing touches on a bar stool he built in a training program in rural Honduras.



Necessity is the mother of this steambox. A makeshift bamboo steamer (right) built by Curtis Buchanan and his students may be unorthodox, but it was perfect for bending chair legs. Before steaming, parts are split from logs (left).

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also learned to weave vine seats.

The wood used exclusively for the project furniture is cola de pava (*Cespedesia macrophylla*), an abundant local hardwood. It comes from the mixed conifer and broadleaf forests that surround El Car-



By hand and by eye. Curtis Buchanan shows a student the fine points of draw-knife and spokeshave work.

bon, managed by the Proyecto Desarrollo del Bosque Latifoliado (PDBL), WARP's Honduran cosponsor. PDBL forests have been certified "well managed" by the Smart Wood program of the Rainforest Alliance.

One of the most encouraging signs of the group's initiative is the effort they've made to sell furniture. Four bar stools and a couple of chairs have been sold locally. Eight more stools were built to use with the school's new treadle sewing machines. And all of the students have built stools, chairs or tables for their own homes. Last December, 11 bar stools were on display in the capital, Tegucigalpa.

For now, the project is cultivating local markets, but WARP plans to explore export markets in North America.

—Scott Landis, York Harbor, Maine

The industrious ant

Pownal, Maine, woodworker Alan Bradstreet doesn't have a whole lot of time for whimsy. That's the way life is when you crank out 15,000 wooden bookmarks a year, along with small boxes and desk accessories. But when Bradstreet went off to a workshop at the Haystack Mountain School of Crafts in Deer Isle, Maine, some time back, he took with him some rough sketches for a less mundane project. He

went home with this box, which measures only 6½ in. long, 3½ in. deep and 5 in. tall (see the photo below).

The box is constructed of cherry, walnut, ash, copper wire (for legs) and aluminum (the sawblade). Ants in the tunnel of light-colored wood on the side of the box are not inlaid, as they appear, but open scroll-saw work. The ant pattern becomes three-dimensional on the end of the box where you can just catch a glimpse of an ant as it disappears into a hole. —Scott Gibson



Photo: Dennis Griggs

Wild apron blues

Over the years, I've worn through about a dozen of those cheap, denim shop aprons. They've kept my clothes clean from neck to knees and served nicely as a dried-glue collection surface. Each apron lasted about one calendar year. By then it had become stiff and crazed with cracked glue like an Indian batik.

The aprons also were great for preserving my modesty. All my pants come equipped with a handy front snap. I call it the love-handles release valve. I just leave the snap undone and cover up the faux pas with my apron. Nobody knows but me. I can breathe comfortably and feel sly at the same time.

Eventually, I ordered two leather aprons from a wood boutique catalog—one for me, one for my assistant, Aaron. The new aprons were a rich brown suede with

snap-on cords at neck and waist. But they each had a knife-sharp crease running down the center from being folded and crammed into the box. When we put them on, we looked like two human chisels. We could hardly bend our knees beneath the leather armor. Horizontal creases, though less prominent, gave us a strange, waffle-like appearance. The convenient snap-on straps had a tendency to pop off when I bent over, leaving the apron hanging from my neck.

I thought Neatsfoot oil might help. I dug out a gallon, and we started rubbing the oil in. The more we dumped on, the more the leather soaked up. When we figured we had tenderized the old skins enough, we hung the aprons up to dry and went home for the weekend.

On Monday, my suspicions were aroused when I noticed a wet spot on the floor. The apron now weighed about 8 lbs.;

however, the crease had softened. I manfully strapped on my new apron and thought it gave me an old-world look: the no-nonsense craftsman with an eye for durability and quality.

Now when I moved, I made a gentle sloshing sound. I also noticed that the apron left a little oil on whatever it touched. It was, in fact, lubricating machinery on its own. How clever of it! I hadn't been able to get Aaron to do this in three years. I made a point of rubbing up against every machine I passed. At the day's end, they all gleamed with a healthy, rust-resistant glow. And my hands were rose-petal soft.

The downside was that my clothes and skin also were soaked in oil. I came in the next day determined to degrease my cow skin. I selected a sharp plane blade, spread the apron on the bench and proceeded to scrape, pulling the blade toward me at an

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angle. This work felt satisfying. It was just me, the skin and the steel. I probably removed a pint of oil that way.

After I figured I'd done enough, I slipped back into my hand-worked garment and turned to face the task at hand. I was gluing up panels for a bureau—a commission for a new client, the Prominent Collector. She was coming by the next day to see my new work and check the progress of her piece and, I thought modestly, to admire the craftsman in his quality garment. She'd enter, cock her head with a slight smile, and say something like, "Oh, my, I love a man in leather."

I figured I'd unclamp all those book-matched panels and have them casually displayed to show off their best features. I left my gleaming blade nearby, hinting that

all the work had been done by hand, that all these machines were merely props for the real work I do. I had my apron on and it was behaving itself pretty well. I'd arranged all but one of those panels, which I was carrying toward the bench, when there came a knock at the door.

"It's her," I thought with a hint of rising anxiety. "Ah, but I'm wearing my rakish apron," I told myself. I felt my stomach muscles relax and heard my confident, singsong voice answer, "Hello—come in."

This was perfect. Here I was, panel in hand, looking great, my work all around me, the shop gleaming, and the Prominent Collector entered. Just as I'd imagined it, she regarded me with a slight smile and, almost winking, said, "Oh...nice...."

I felt a rush of pride. I lifted the panel on-

to the bench so we could hear the satisfying thunk of solid wood and recognize its durability. As the panel touched down, it clattered into four even pieces, shattering exactly on the gluelines. I realized, too late, that the Neatsfoot oil my apron had been depositing so generously around the shop had infected the edges of the boards and repelled the glue. The pieces scattered toward the floor. I felt panic.

I bent to catch them, popping both straps to my apron. Instantly, the apron slunk away. My eyes rose to meet those of the Prominent Collector. Thinking fast, I straightened up and was just about ready to crack a joke when I realized that she was laughing already. The love-handles release valve had beaten me to the punch line.

—Steven Spiro, *Hillpoint, Wis.*



These rackets really work. Prescott Deininger combines a love of tennis with his wood-working skills to produce wooden tennis rackets for himself and his friends.

Rebirth of the wooden tennis racket

Not too long ago, tennis rackets were made of wood. Just about the only place you'll see a wooden racket these days is at a yard sale or in a corner of Uncle Fred's attic. Modern rackets are graphite, aluminum or some specialized composite.

Prescott Deininger of New Orleans, however, is still playing with wooden rackets and, in fact, prefers them over graphite or aluminum. He's been making them for himself and a few friends for a number of years (see the photo above). He says that the rackets have excellent power, are nice to look at and last a long time. They win matches. They also get a lot of attention, Deininger says, and can be used either to "intimidate opponents or to get sympathy and lull opponents into a false sense of security."

His early rackets weren't very stable, but four or five years ago, he switched to the oversized head, wide-body design that manufacturers use. Deininger bends wood strips with steam and then glues up the first five laminations for the outside of the rackets around a form with epoxy and a pressurized-air clamp made from a length of old fire hose. A final lamination completely wraps around the inside of the racket, and the blank is run through a thickness sander to taper the head. Ash makes a good racket, but he prefers walnut because it's a little stiffer.

Shaping is done with rasps, files and spokeshaves. Finished rackets, which weigh the same as the graphite rackets they're patterned after, are strung with synthetic gut. Deininger admits he owns a graphite racket, but he only uses it when he's traveling. If he's playing at home, he'll take the wood. —S.G.

Furniture companies now favor cherry

It's hard to imagine American furniture buyers losing interest in red oak, the wood that shows up in everything from kitchen cabinets to coffee tables. But tastes may be changing. A survey last spring at the National Furniture Market in High Point, N.C., found that cherry has overtaken red oak as the first choice for bedroom and dining-room case goods.

A booth-by-booth inspection at the show found that 16.3% of furniture in those categories was made of cherry. Red oak was close, though, with 15%. The surveys are conducted twice a year by two-person survey teams that inspect every booth on the floor. Results include both solid wood and veneer.

Next in line in the rankings were pine (9.3%), white oak (7.8%), hard maple (7.7%) and mahogany (7.5%). Woods that are all but ignored included American tulipwood (.7%), teak (.4%) and alder (.2%).

Most popular, though, wasn't wood at all. A category that includes printed and painted surfaces, plastic, metal and glass collectively accounted for 20.1% of the case goods. That was an increase over the 18.5% in the previous survey in October 1994. —S.G.

Notes and Comment

Feel free to send us material that could be used in Notes and Comment. That might include anything from photos of a project you've just finished to anecdotes about the triumphs and disasters of work in the shop. Submissions should be sent to Notes and Comment, Fine Woodworking, P.O. Box 5506, Newtown, CT 06470-5506.

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Photo: Jonathan Binzen



Photo: Jonathan Binzen



Woodworking Tradition at Its Best

Walking into the workshop of Edward Barnsley, the English Arts-and-Crafts furnituremaker, is to be enveloped by craftsmanship—old and new. Although Barnsley died in 1987, his workshop in Froxfield, southwest of London, is no museum. Craftsmen and their apprentices still make furniture. Some of it is built from Barnsley designs on file in an attached cottage. An extensive lumber supply in covered outdoor spaces includes stock Barnsley collected 50 years ago. And familiar furniture patterns are within easy reach on the wall. Furniture that leaves the workshop is wonderfully executed still.

