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January/February 1992



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The Woodworker's Journal

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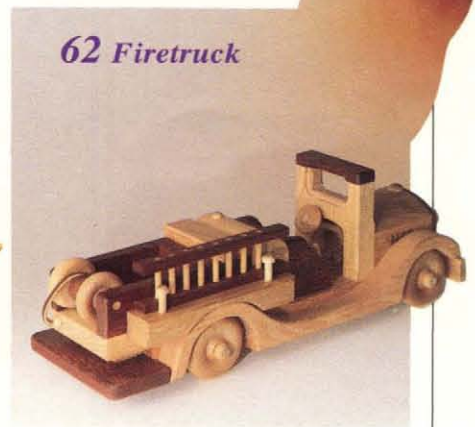
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Shoptalk

I'm at an age when I've started to get a bit set in my woodworking ways and sometimes need some prodding to try something new. It's not an attitude I'm proud of, and to combat this creeping ossification I've been making a conscious effort to add to my home shop a few new tools and methods that will enhance my woodworking in some way.

Years ago I started using Phillips head drywall screws more than the standard slotted wood screws. This coincided with my purchase of a cordless electric drill and a Phillips head bit. Assembly time and frustration levels dramatically decreased because of this simple change.

Recently I started using square drive screws and now wonder what took me so long to try them. It's comforting to drive screws with the driver bit held securely in place, delivering all the torque you need. A little comfort and security in this life is always welcome.

If you're the type who has difficulty in making choices (do you wear both belt and suspenders?), there's also the Recex (R) type screw which takes either a square or Phillips head driver. Either style is an improvement and certainly worth giving a try.

Also new in my shop is the pistol-grip bar clamp that can be adjusted quickly with one hand. Apart from their convenience of operation, I also like these clamps because they come fitted with soft clamping pads to protect the work. No more groveling through the scrap bin for pads and then struggling to keep them in place while the clamp is tightened.

For other than heavy-duty work, I find these new clamps more convenient than large C-clamps. My only complaint is that they don't store as neatly on the wall, but then I'm obsessed with and never totally happy with my tool storage.

Even in my most tranquil moments, switching from a drill bit to a countersink and then to a screwdriver bit was always a bit of a nuisance. Long ago I started using combination drill/countersink bits and these were a big improvement, but there was still that Jacobs chuck and sometimes elusive key to deal with.

Now I've discovered devices which enable me to switch quickly from drill/countersink to a driver bit by using a quick release chuck or, in another case, by just slipping off an adaptor.

The advertisers in this issue and this year's crop of tool catalogs offer many new products that will help make your time in the shop safer and more enjoyable. If you think about certain operations that have been bothersome for you, perhaps there is a new tool that will help you do a better job with less hassle.

One other addition to my shop is my new shop cap sporting *The Woodworker's Journal* logo. It looks quite snappy, keeps the dust out of my hair and is much more appropriate than the cap I've been wearing which designates me as a Party Animal.

Jim McQuillan

The Woodworker's Journal

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Letters

We welcome opinions and comments (both pro and con) from our readers. Address correspondence to: Letters Dept., *The Woodworker's Journal*, Box 1629, New Milford, CT 06776.

Your September/October 1991 issue featured plans for a Dump Truck. In the first paragraph of the article, your writer wondered where all those wooden toys end up. When my grandson was born two years ago, I started going through all the back issues of your magazine. Using most of them, I started him on a "Toy-Of-The-Month Club." Each month he gets to open a box with a new toy inside. (This gets to be a bit expensive since he lives in Rochester, New York—850 miles from Iowa). The Dump Truck is a Christmas present from grandpa.

Since the "Club" only has enough toys to last through this year, please keep the plans coming. The kid and I are counting on you.

Donald E. Ullrich, Burlington, Iowa

Thanks for listing my request for information in the Reader's Information Exchange column of your September/October 1991 issue. I needed parts and an owner's manual for a Sprunger band saw.

Several readers responded, and I was sent parts sheets and saw instructions, along with addresses and telephone numbers for ordering the parts. I've been able to restore my band saw to new condition. The response was small, but the readers understood my plight and responded in kind. Things like this restore my faith in humanity.

Francis G. Howard, St. Anthony, Iowa

I made the Shaker Drop-leaf Table from plans in your July/August 1991 issue. It was a gift to my daughter and she loved it. Although I do a lot of woodcarving, the pleasure I get when I finish a woodworking project is hard to beat.

Harry W. Spiegelberg

Where can I get 1/8 in. thick oak, ash, cherry, and walnut?

John Eastwood, San Antonio, Tex.

The mail-order company, *Woodworker's Dream*, P.O. Box 329, 10 West North Street, Nazareth, PA 18064, carries over thirty species of 1/8 in. thick kiln-dried stock, including those you listed. Write for current prices.

I'd like to build a Windsor chair, but to date I haven't been able to find much information on the various techniques involved. Can you help?

Doug Hassan, Oakland, Calif.

A good book on the subject is *Make A Windsor Chair with Michael Dunbar*. It's available in softcover (\$13.95) from Taunton Press, 63 South Main St., Newtown, CT 06470. Dunbar has been making Windsor chairs since 1970, so he knows what he's talking about. The book takes you through each step of the process, from sculpting the seat to finishing the wood.

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#DC2 \$299.95 (UPS \$30)



610 CFM Dust Collector:

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- 1HP, 110/220V • 1 outlet @ 4" • 2 Bags @ 20 gal • Wt: 75lbs • 610 CFM • Free: 8' of hose, 1 ea 4" to 3" & 4" to 2" adaptors.. \$15 Value

#DC1 \$199.95 (UPS \$20)

Odds and Ends

Our November/December 1991 issue included plans for a Keepsake Jewelry Box. The box requires a pair of 10 mm barrel hinges (part L on our plans) and we listed Woodcraft of Parkersburg, West Virginia as the mail-order source for the hinges. Apparently the project was popular, because Woodcraft recently informed us that they have just run out of stock, and although the hinges have been reordered, the new supply is not expected in the near future. They suggest substituting a nearly identical hinge, one that fits a 1/2 in. diameter hole. It's Woodcraft's part number 06D51 and the price is \$9.25 per pair.

The North Texas Woodworker's Association was formed in April of 1991. The association, which has already grown to more than 50 members, meets the third Tuesday of each month at various locations in the Dallas area. Membership is \$25 per year. For more

information, write to the association at P.O. Box 831567, Richardson, TX 75083.

Woodworkers in northwest Florida may be interested to learn about the Florida Woodworker's Association. They meet regularly in the Fort Walton Beach area and new members are always welcome. For membership information write to: the Florida Woodworker's Association, P.O. Box 1023, Fort Walton Beach, FL 32549-1023.

The Woodworking Association of North America (WANA), P.O. Box 706, Plymouth, NH 03264, tells us that they will be providing free space at their nationwide shows for local woodworkers to display their work. Space will be on a first-come basis, and certain restrictions will apply (you supply your own tables, you can't sell your work unless you pay \$30 for a vendor certificate, and you can't sell anything that competes

with a paying exhibitor). For more information, write WANA or call then at (603) 536-3876.

Your safety is important to us... We strive to present our plans and techniques as accurately and safely as possible, and we try to point out specific areas and procedures where extra caution is required. But because of the variability of local conditions, construction materials and personal skills, we can't warn you against all potential hazards. Remember to exercise common sense and use safety measures when operating woodworking power equipment. Don't attempt any procedures you're not comfortable with or properly equipped for. Sometimes, for the sake of clarity, it's necessary for a photo or illustration to show power tools without the blade guard in place. In actual operation, though, you should always use blade guards and other safety devices on power tools that are equipped with them. Remember... an ounce of prevention really is worth a pound of cure.

—The Editors

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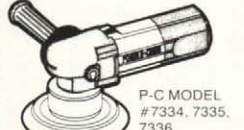
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Events

We will gladly list as many events of interest to woodworkers as space permits. Listings are free and may include shows, fairs, competitions, workshops and demonstrations. The deadline is eight weeks before publication—January 2 for the March/April 1992 issue. Please address announcements to the Events Department. Readers planning on attending events should call ahead if possible. Scheduled dates and locations sometimes change between publication and the date of the event.

California: California Design '92—A museum quality exhibition of furniture and decorative arts by 70 of California's exceptional studio craft artists, Jan. 16–Feb. 16, Contract Design Center, San Francisco. Call (415) 331-8520 for more information.

Connecticut: Application deadline for the July 1992 Guilford Handcrafts Exposition is March 1. For application, write to: 35th Annual Guilford Handcrafts Expo, P.O. Box 589, Guilford, CT 06437.

For information on classes and weekend workshops at the Brookfield Craft Center, Brookfield and Norwalk, call (203) 775-4526.

Florida: Handcrafted Furniture Show, Feb. 5–16, Florida State Fairgrounds,

Tampa. For information, contact Lynn Keiter at (813) 877-9585.

Illinois: Woodworking World—The Springfield Show, Feb. 29 – Mar. 2, Illinois State Fairgrounds, Springfield. For information call 1-800-521-7623.

Indiana: The Indianapolis Woodworking Show, Feb. 21–23, Indiana Convention Center, Indianapolis. For information call 1-800-826-8257.

Maryland: ACC Craft Fair, Feb. 21–23, Baltimore Convention Center, Baltimore. Call 1-800-836-3470.

Michigan: Woodworking World—The Grand Rapids Show, Feb. 7–9, Grand Rapids Junior College Fieldhouse, Grand Rapids. For information call 1-800-521-7623.

Minnesota: Woodworking World—The Twin Cities Show, Jan. 17–19, Minneapolis Convention Center, Minneapolis. For more information call 1-800-521-7623.

Missouri: The St. Louis Woodworking Show, Feb. 7–9, Gateway Center, Collinsville, Illinois. For information call 1-800-826-8257.

The Kansas City Woodworking Show, Feb. 14–16, Hilton Plaza Inn, Kansas City. For information call 1-800-826-8257.

New Jersey: The North Jersey Woodworking Show, Feb. 28–Mar. 1, Westfield Armory, Westfield. For information call 1-800-826-8257.

(continued on page 10)

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JB02	40mm	\$1.57	\$5.45
JB03	50mm	\$1.65	\$6.10
JB04	60mm	\$1.94	\$7.32
JB05	70mm	\$2.11	\$8.14

JOINT CONNECTOR SCREW W/13mm DECORATIVE HEAD

LOW PROFILE STEEL DIE CAST		BRONZE PLATED • 4mm HEX DRIVE	
ITEM CODE	LENGTH IN MM	PKG. 10	PKG. 50
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JS02	6x40mm	\$1.65	\$5.90
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CD05	1/4-20	3/4"	\$1.70
CD12	1/16-18	5/8"	\$2.78
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FH20	8x1-1/4	\$2.13	\$8.30	\$15.65
FH21	8x1-1/2	\$2.29	\$8.98	\$17.20
FH22	8x1-3/4	\$2.55	\$10.35	\$19.47
FH23	8x2	\$2.68	\$11.04	\$22.08
FH25	8x2-1/2	\$3.00	\$12.68	\$24.42
FH32	10x1	\$2.52	\$9.57	\$17.95
FH33	10x1-1/4	\$2.94	\$10.53	\$19.38
FH34	10x1-1/2	\$3.15	\$11.47	\$21.49
FH35	10x1-3/4	\$3.51	\$13.08	\$23.76
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ITEM CODE	THREAD SIZE	PRONG HEIGHT
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BK10	1/8-16	\$4.56

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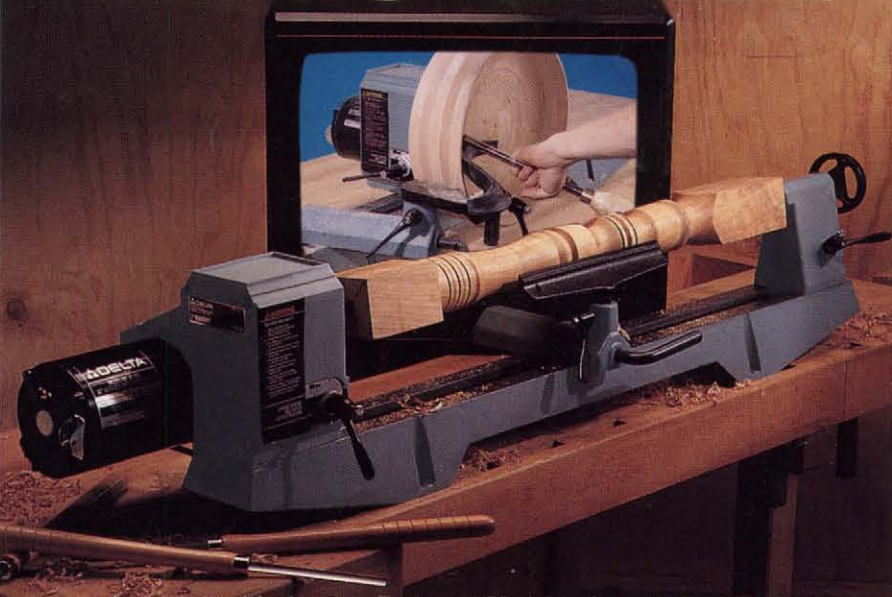
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The Charlotte Woodworking Show, Jan. 24 - 26, Charlotte Convention Center, Charlotte. For information call 1-800-826-8257.

North Dakota: Woodworking World—The Bismark Show, Jan. 24-26, Bismark Civic Center, Bismark. For information call 1-800-521-7623.

Ohio: Woodworking World—The Columbus Show, Jan. 10-12, Veteran's Memorial Hall, Columbus. For information call 1-800-521-7623.

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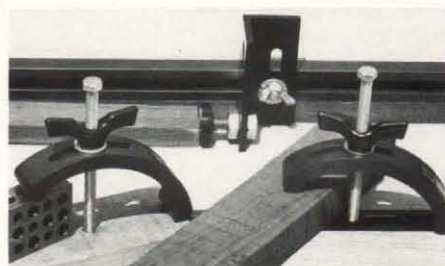
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Product News

To keep our readers up-to-date, this column features brief descriptions of new tools and supplies on the market. The product descriptions are provided by the manufacturer and are not the result of tests or reviews by the editors of *The Woodworker's Journal*.

Hold-Down Clamp, T-Track and Stop

New from Alpha Pioneer are a pair of products that mount in aluminum tracks. Mounted to an auxiliary miter gauge fence on the table saw, or to the fence on



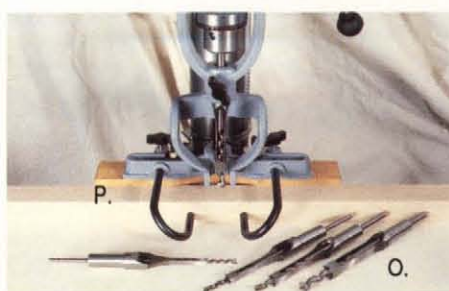
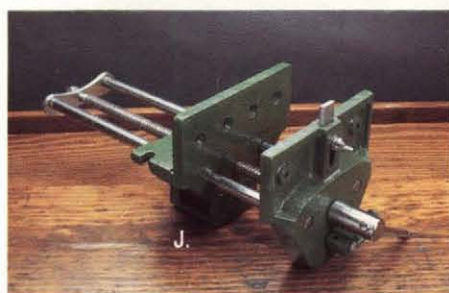
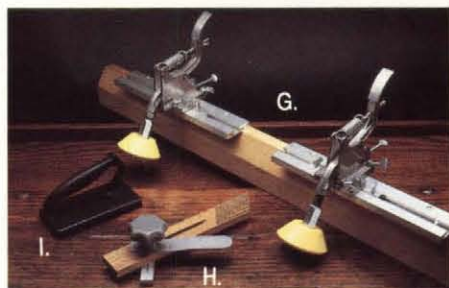
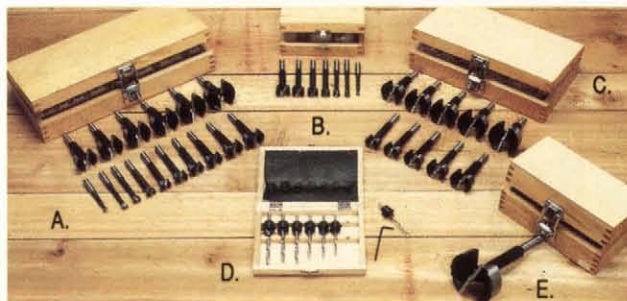
a miter saw, router table or drill press, the Tool Trak and Stop Assembly serve as a micrometer-adjustable stop. The T-Clamp is a bench-top style hold-down clamp that can either be mounted by itself in a fixed position or in a length of Tool Trak mounted in a groove in the bench top. Stop Assembly is \$24.95; T-Clamp is \$14.95; Tool Trak is available in 12 in. to 48 in. lengths (\$24.95 for 24 in.). Contact Alpha Pioneer, 4822 S. Orange Ave., Unit 9, Orlando, FL 32806; tel. (407) 851-1990.

Water-Based Polyurethane

New from UGL, makers of ZAR wood finishes, is Aqua ZAR, an interior water-based, non-toxic polyurethane finish with the durability of traditional oil-based polyurethanes. Aqua ZAR is non-yellowing and goes on clear unlike other water-based polyurethanes that appear milky when first applied. It dries crystal clear, making it an ideal finish for use over white or light-colored stains. Aqua ZAR's fast drying, self-leveling, (continued on page 13)



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A. 16 pc. Forstner Bit Set #77581 \$87.95
All bits 3 1/2" overall, precision ground, HRC 50-52. Sizes 1/4" through 2 1/8" in wooden case. All 3/8" shanks. Sizes over 1 1/2" supplied with saw teeth to eliminate overheating.

B. 7 pc. Forstner Bit Set #77571 \$27.95
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C. 10 pc. Forstner Bit Set #53982 \$74.95
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D. 22 pc. HSS Tapered Drill, Countersink/Bore, Stop Collar Set #12232 \$26.95
For screw sizes #5, 6, 7, 8, 9, 10, 12. Wood case included.

E. Jumbo Forstner Bits #18302 \$139.95
8 pc. Set includes 2 1/2" thru 3 1/8", all with saw teeth.
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2 3/8" Bit #18242 \$22.95 2 7/8" Bit #18282 \$31.95
2 1/2" Bit #18252 \$24.50 3" Bit #77591 \$33.99
2 5/8" Bit #18262 \$25.50 3 1/8" Bit #18292 \$35.95

F. Classic Bench Hold-down #54012 \$6.95
Tap on top secures your work, tap at the back releases it. Great for any workbench top.

G. Special Anti-Kickback Device
Tablesaw Anti-Kickback #50179 \$31.95
Radial Anti-Kickback #74131 \$31.95
Shaper Anti-Kickback #74141 \$31.95
Optional 2 pc. Aluminum Track #74201 \$10.95

H. Anti-Kickback Featherboard & Hold Down
Featherboard fits into miter gauge slot of your tablesaw and locks into position. Also prevents material from raising off the blade. #29402 \$11.95

I. Safety Push Block
Sure grip 3" x 5" pad. Helps keep hands away from planer, jointer or tablesaw blades. #54032 \$3.95

J. Quick Release, Large Capacity Bench Vise
Heavy cast iron construction with built-in steel bench dog. Jaws are 7" wide and predrilled for adding wooden faces. Opens to 11" and mounts to a 2 5/8" or thinner section of your bench. #54002 \$37.95

K. 5 pc. Jumbo Bradpoint Drill Set
Comes in sizes 9/16", 5/8", 7/8" & 1". All with 3/8" shanks. #54992 \$18.95

L. 7 pc. Carbide Tipped Bradpoint Drill Set
Creates clean entry holes with no overheating. Sizes 1/8", 3/16", 1/4", 5/16", 7/16", & 1/2". Wooden case included. #53992 \$31.95

M. 25 pc. Bradpoint Drill Set #77611 \$17.95
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N. 7 pc. Stop Collar Set #93361 \$4.95

O. 4 pc. Mortise & Chisel Set #54022 \$39.95
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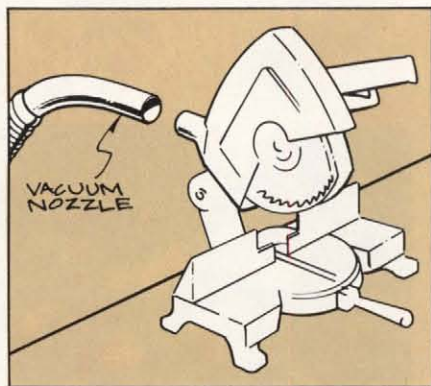
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Shop Tips

Most miter saws have a dust bag, but the bag doesn't collect 100 percent of the dust. However, I recently discovered that a standard vacuum cleaner nozzle



will fit perfectly on my saw's dust port. Now, using a vacuum cleaner I picked up at a tag sale, I can collect almost all the dust that's made by my saw.

George Hetson, Kent, Conn.

When assembling a frame and panel, glue can sometimes squeeze out of the frame joints, effectively gluing the panel in place. If a solid stock panel can't move with changes in humidity, stresses will build which could cause the panel to crack. You'll avoid the problem if, before assembly, you apply a thin coat of paste wax to the areas of the panel (mostly near the edges) that may come in contact with glue squeeze-out. The glue won't stick to the wax, so you won't be stuck with a problem.

Many woodworkers have a few unused handsaws in their shops, or they can be purchased cheaply at tag sales. Remove the blade, and the handle of an old handsaw makes a very comfortable file holder. Just drill a hole for the file tang, loosen the blade screws, insert the file tang in the hole, and re-tighten the screws. The handle allows you to apply maximum force while maintaining excellent control of the file. The handle also protects against bruised knuckles or blisters.

Next time you need to fill a countersunk nail hole, check your kid's crayon box before heading out to the hardware store for wood putty or one of those wax filler sticks. The crayons work great, and since they come in a wide range of colors, your likely to find one that closely matches the wood tone or the finish you have.

Most woodworkers can always use some extra bench area. By making this portable worksurface, you'll be able to quickly convert your table saw into a handy workbench when you need additional room for light assembly and finishing work. Use 1/2 in. thick plywood, cutting it to overhang the saw

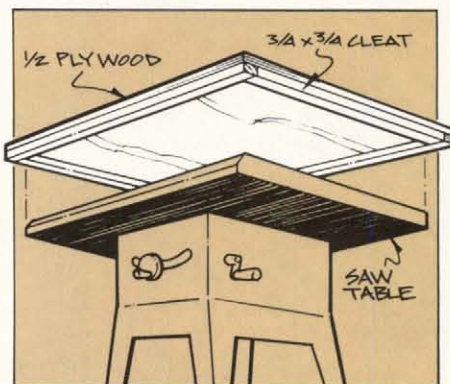


table by a few inches all around. The cleats serve to help position the top while preventing it from sliding if bumped. When the worksurface is not needed, a hole in one corner makes it easy to hang.

Jack Bruce, Olivet, Mich.

The Woodworker's Journal pays \$25 for reader-submitted shop tips that are published. Send your ideas (including sketch if necessary) to: **The Woodworker's Journal P.O. Box 1629, New Milford, CT 06776, Attn: Shop Tip Editor.** We redraw all sketches, so they need only be clear and complete. If you would like the material returned, please include a self-addressed stamped envelope.

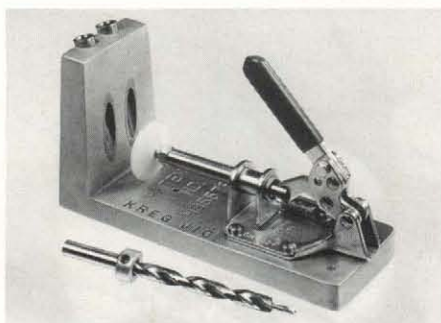


Product News Continued

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Pocket Hole Jig

If you prefer screwing together pieces of wood instead of using complicated joinery, then the Kreg Jig can handle a



multitude of pocket hole jobs, from face frames for cabinet construction to mounting table aprons or corner braces. The jigs feature hardened steel drill guides and a sturdy toggle clamp to secure the work. The manual double guide jig shown (Kreg Jig M-2) is \$114.95. Contact CAS Enterprises at 1-800-447-8638.

Ryobi Random Orbit Sander

Ryobi's new Random Orbit Sander (model RS115) produces virtually swirl-free, scratch-free surfaces while removing stock up to 50% faster than tradi-



tional sanders. Filter-Flo Dust Removal System and Dust Trap extend disk life and keep work area clean. Disk size is 4 1/2 in. Variable speed (0-11,000 orbits per minute) and a powerful double-insulated 2-AMP motor handle the toughest jobs with ease. About \$100. Contact Ryobi at 1-800-323-4615. 

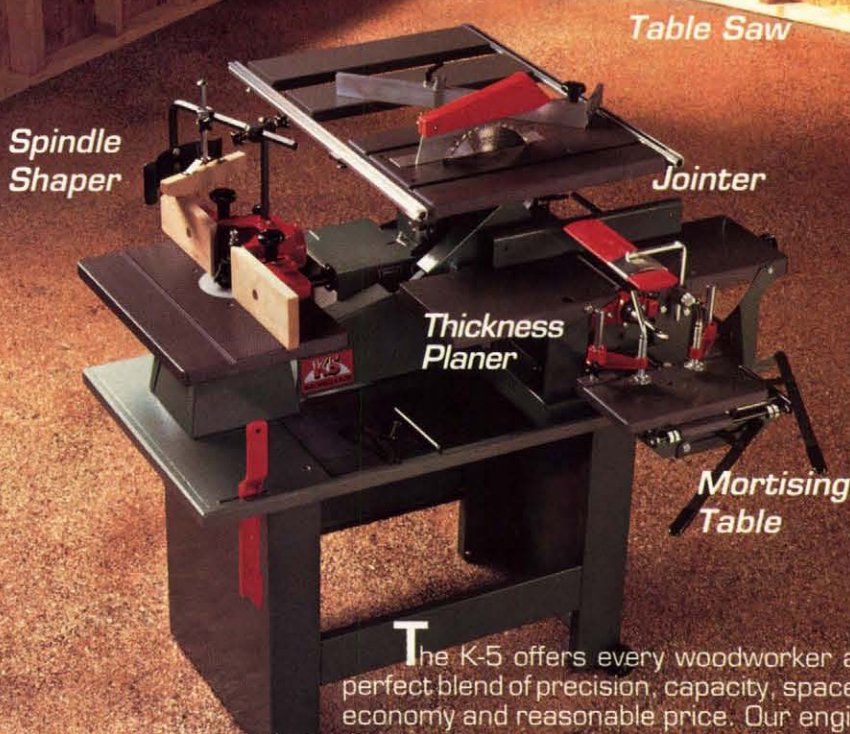
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Readers' Information Exchange

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I need owner's manuals and parts lists for: Craftsman floor drill press, model no. 103.23141 and a Craftsman 8 in. table saw, model no. 103.24242, both manufactured by King Seely. In particular I need to know how the motor mounts on the table saw.

Bill Doviak
65 Berkley Ct., Wayne, NJ 07470

I need a new or used gear, drawing ref. no. 31-A, part no. 152-20 for a Porter Cable bayonet saw, model no. 152.

Carl J. Fischer
2606 Jonathan Rd.
Ellicott City, MD 21042

I need an owner's manual and parts list for a Delta Homecraft 4 in. jointer planer. The tag has no model number, but the serial number is BU4521. I'm also looking for planer blades and the blade setting gauge for the tool.

Keith O. Tolman
330 Fairway Dr., Pocatello, ID 83201

I need a tailstock for a Delta 39 in. lathe. The center should be 5 in. over the bed.

Mike Finkle
Box 584, Round Lake, NY 12151

I need an owner's manual and parts list for a Craftsman 6 in. jointer, model no. 102.05600.

N.R. Keough
P.O. Box 632, Big Pine, CA 93513

I need an owner's manual and parts list for a Craftsman shaper, model no. 101.23810.

Dick Slifka
3205 Tallyho Dr., Kokomo, IN 46902

I need an owner's manual and parts list for a Craftsman table saw, model no. 113.242820.

Jack Moore
1595 Los Osos Vly Rd. 25-A
Los Osos, CA 93402

I need an owner's manual for a Craftsman table saw, model no. 113.299110.

John Wood
P.O. Box 359, Springfield, VT 05156

I am looking for an owner's manual and parts list for a Craftsman small metal lathe, model no. 101.21400.

Anthony Tucciarone
P.O. Box 2739, Plainfield, NJ 07062

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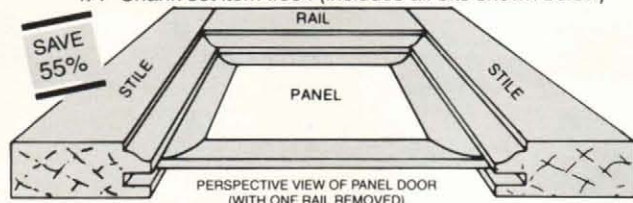
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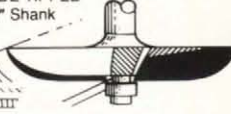


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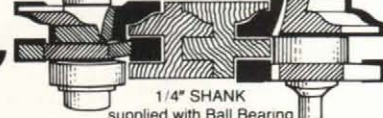


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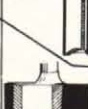
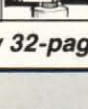
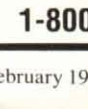
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#904		3/8" Spiral Cutter		3/8"	1"	1/2"	\$24.00
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#355		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/4"	\$17.00
#655		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/2"	\$17.00
#656		3/4" Round Over	3/4" R	2"	7/8"	1/2"	\$21.00
#199		Multiform Moulding	Unlimited Patterns	2 1/4"	2"	1/2"	\$40.00
#205		1/4" Cove	1/4" R	1"	1/2"	1/4"	\$12.00
#206		3/8" Cove	3/8" R	1 1/4"	9/16"	1/4"	\$13.00
#207		1/2" Cove	1/2" R	1 1/2"	5/8"	1/4"	\$14.00
#643		1/2" Cove	1/2" R	1 1/2"	5/8"	1/2"	\$15.00
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#231		3/32" Roman Ogee	3/32" R	1 1/4"	1 3/32"	1/4"	\$16.00
#232		1/4" Roman Ogee	1/4" R	1 1/2"	3/4"	1/4"	\$17.00
#506		1/2" Pattern	Flush Trim	1/2"	1"	1/4"	\$15.00
#508		3/4" Pattern	Flush Trim	3/4"	1"	1/4"	\$17.00
#366		1/8" Slot Cutter	3/8" Deep	1 1/4"	1/8"	1/4"	\$14.00
#368		1/4" Slot Cutter	3/8" Deep	1 1/4"	1/4"	1/4"	\$14.00
#204		3/8" Rabbeting	3/8" Deep	1 1/4"	1/2"	1/4"	\$13.00
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#212		1/2" Core Box	round nose	1/2"	1 1/32"	1/4"	\$13.00
#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	\$15.00
#213		1" Core Box	round nose	1"	3/4"	1/2"	\$17.00
#548		Lockmitre		2"	7/8"	1/4"	\$32.00
#214		1/4" Straight	plunge cutting	1/4"	3/4"	1/4"	\$ 6.50
#216		3/8" Straight	plunge cutting	3/8"	1"	1/4"	\$ 6.50
#474		1/2" Straight	plunge cutting	1/2"	1"	1/4"	\$ 7.00
#219		3/4" Straight	plunge cutting	3/4"	1"	1/4"	\$ 9.50
#779		3/4" Straight	plunge cutting	3/4"	1 1/2"	1/2"	\$10.00
#462		1/2" Bull Nose	1/2" Dia. of Circle		3/4"	1/4"	\$16.00
#464		3/4" Bull Nose	3/4" Dia. of Circle		1"	1/4"	\$21.00
#764		3/4" Bull Nose	3/4" Dia. of Circle		1"	1/2"	\$21.00
#545		Tongue & Groove	Straight	1 5/8"	1"	1/4"	\$29.00
#845		Tongue & Groove	Straight	1 5/8"	1"	1/2"	\$29.00
#546		Tongue & Groove	Wedge	1 3/16"	1"	1/4"	\$29.00
#846		Tongue & Groove	Wedge	1 5/8"	1"	1/2"	\$29.00
#450		1/8" Beading	1/8" R	3/4"	3/8"	1/4"	\$11.00
#233		1/4" Beading	1/4" R	1"	1/2"	1/4"	\$13.00
#454		3/8" Beading	3/8" R	1 1/4"	5/8"	1/4"	\$15.50
#455		1/2" Beading	1/2" R	1 1/2"	3/4"	1/4"	\$17.00
#500		3/8" Flush	Trimming	3/8"	1/2"	1/4"	\$ 7.00
#501		3/8" Flush	Trimming	3/8"	1"	1/4"	\$ 7.50
#503		1/2" Flush	Trimming	1/2"	1"	1/4"	\$ 8.50
#221		1/2" Flush	Trimming	1/2"	1 3/16"	1/2"	\$ 8.00
#558		Thumb nail		1 3/16"	3/8"	1/4"	\$18.50
#858		Thumb nail		2 1/2"	3/4"	1/2"	\$35.00
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The Fein Sander

by Dennis Preston

The Fein MSX 636 sander is a special-purpose finishing tool made specifically for getting into corners and along edges where other pad sanders can't. The tool has a motor body similar to a mini grinder with a right angle drive.

The heart of the tool is a small (about 3 in.) triangular sanding pad that oscillates through an angle of just 2 degrees. This small angle allows the tip of the pad to work into the corner without beating the sides. The sander runs at a fairly high speed of 20,000 oscillations per minute. By comparison, typical pad sanders run between 10,000 and 15,000 oscillations per minute.

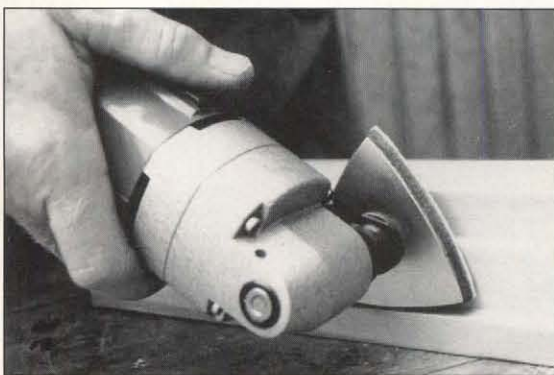
Two types of triangular pads are available—one for pressure sensitive adhesive (sticky back) and one for hook and loop (Velcro). The sandpaper is currently available only from Fein and costs \$12.50 to \$13.50 per 50-sheet pack, depending upon the grit. The sandpaper has a fairly heavy backing to give it the necessary stiffness for being poked into nooks and crannies.

Unlike many power tools, this sander comes with a generous 10 ft. long supply rubber jacketed cord. The sander is easy to use, handles well and has little transmitted vibration into the hand. The unit removes stock quite fast due to the high speed and the small pad area. The overall shape allows easy access to corners. Care must be taken not to dwell in one area too long, because the tool will start to cut a triangular depression.

Of the two pad types available, I liked the Velcro better, because I could easily change back and forth among different grits. Although the adhesive-backed paper that I tried stuck tenaciously when new, it didn't hold well when it was put on and taken off several times. Fein tells me that a new and improved adhesive backing has been developed and will be available by the time you read this. While the Velcro backing works well for hardwoods, I learned in a discussion

with personnel at Fein that this backing can melt due to the high speed and high frictional loads that occur when working on sappy or gummy surfaces that are encountered when refinishing. For these cases they recommend the adhesive backed paper.

All that said, I was skeptical that the tool was going to be of much use—after all, how many corners do you sand during a week? Well, after having the tool sit idle on the bench for a while, other uses came to mind. I found that the tip of the pad can do a nice job at



cleaning up sculptural and relief carvings when you are looking for a very smooth polished look. And while doing some wood turning, I discovered that the sander could be used in conjunction with the lathe running at a low speed. Again the small pad was very useful in smoothing the wood turnings faster than the usual method of holding the stationary paper against the rotating work.

Overall, the Fein sander is a well made tool and looks like it will last a long time. As promised, it does remove stock right into the corners and up to the edges. It's a little pricey for a limited-use tool (suggested list \$330), but if you experiment, as I have, you'll probably find other sanding tasks where this tool will really shine.

For more information, contact Fein Power Tools, Inc., 3019 W. Carson St., Pittsburgh, PA 15204; tel. 1-800-441-9878.





Dutch Turning

Band saw technique yields turned look without the lathe

There's no arguing the variety of work that can be produced with a lathe, or the exquisite beauty of a finely-turned piece. But many woodworker's don't have the luxury of a lathe, or the consummate skill that really fine lathe work demands.

Dutch turning has long been recognized as the poor man's substitute for a lathe. The technique—where profile cuts are made on adjacent faces of square stock—yields a well-shaped finished piece that captures much of the symmetry that defines lathe work, yet imparts its own very distinct look. Tradition-



ally, Dutch turning was a hand tool technique, utilizing fine-toothed coping saws. Today, the band saw simplifies and speeds the task.

But the technique of Dutch turning is hardly limited to projects where a lathe would have been a better choice, had one been available. You may not think of it as a Dutch turning technique, but the traditional method of crafting a cabriole leg is exactly that. Profiles are layed out on two adjacent faces of a stock, the first profile is cut out, then the stock is rotated 90 degrees and the adjacent profile is cut. Masking tape can be used to hold the waste pieces from the initial profile cuts in position, or better yet, by not entirely severing the waste pieces, they remain in place without the added fussiness of taping. Later, the narrow uncut bridges are severed to remove the waste. Files and sandpaper are then used to smooth the piece.

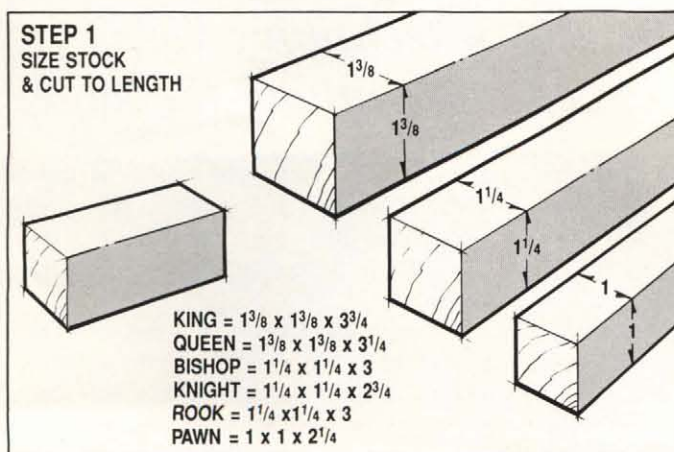
The Dutch turned chess set shown is a perfect project with which to try this interesting technique. The look of the pieces that the Dutch turning technique produces is quite distinct, sculptural in quality but with a clean and elegant simplicity. You may even prefer the look to that of more traditional lathe-turned chess pieces.

Step-By-Step

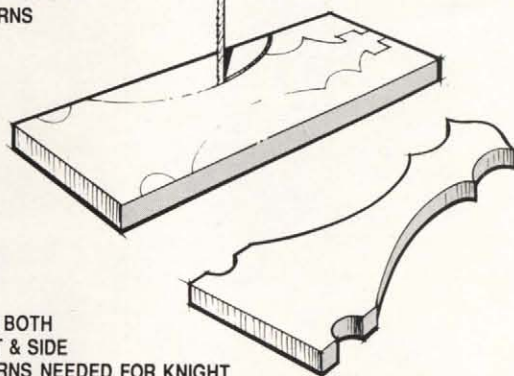
Step 1. Size your stock. Our set is crafted of ash and walnut. You'll need two 8 in. lengths (one ash, one walnut) of $1\frac{3}{8}$ in. square stock for the kings and queens, two 20 in. lengths (one ash, one walnut) of $1\frac{1}{4}$ in. square stock to yield the bishops, knights and rooks (castles), and two 20 in. lengths (one ash, one walnut) of 1 in. square stock for the pawns. Crosscut the stock to yield the required lengths. You should now have a total of 32 pieces (16 walnut, 16 ash), including 2 kings, 2 queens, 4 bishops, 4 knights, 4 rooks and 16 pawns.

Step 2. Now make hardboard (Masonite) patterns of each piece. One pattern will do for all the pieces except the knight. For the knight you'll need both a front and a profile pattern.

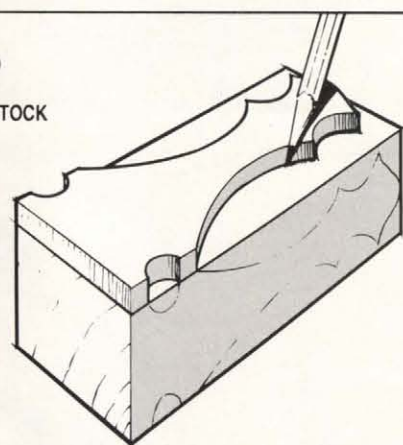
Step 3. Transfer the patterns directly to the stock. It's best to transfer the patterns to all four sides of each piece. That way, no matter which side of the piece you are cutting on, the pattern will be there for you as a guide.



STEP 2 CUT HARDBOARD PATTERNS

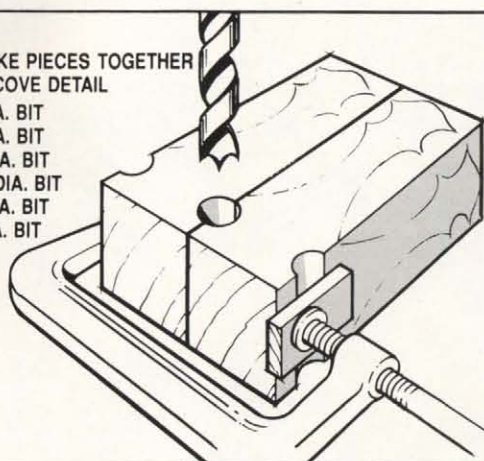


STEP 3 TRACE AROUND PATTERN ONTO ALL SIDES OF STOCK



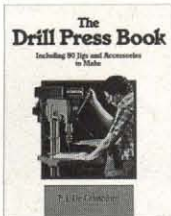
STEP 4 CLAMP LIKE PIECES TOGETHER & DRILL COVE DETAIL

K = $\frac{3}{8}$ DIA. BIT
 Q = $\frac{3}{8}$ DIA. BIT
 B = $\frac{5}{16}$ DIA. BIT
 KN = $\frac{5}{16}$ DIA. BIT
 R = $\frac{5}{16}$ DIA. BIT
 P = $\frac{1}{4}$ DIA. BIT



Step 4. Establish the cove detail. The easiest way to make the cove detail is to clamp like pieces side-to-side and then establish the cove using the drill press and an appropriately sized bit. Forstner or brad point bits will yield the smoothest cove, but sharp twist drill bits will be fine if that's all you have. A $\frac{3}{8}$ in. diameter bit is used for the kings and queens, a $\frac{5}{16}$ in. diameter bit for the bishops, knights and rooks, and a $\frac{1}{4}$ in. diameter bit for the pawns. Clamp a pair of like pieces as shown, then rotate the pieces to adjacent sides, reclamp and drill again until the cove is established on all four sides.

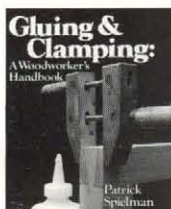
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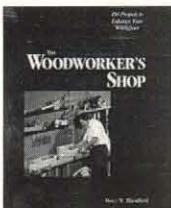
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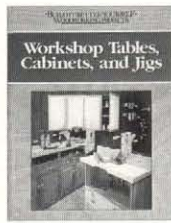
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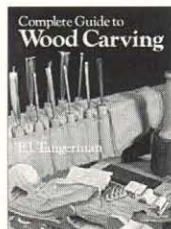
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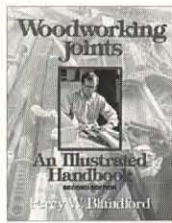
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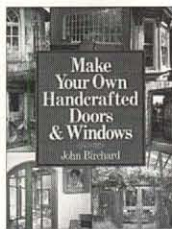
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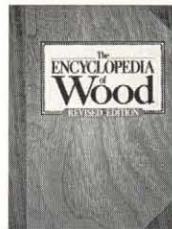
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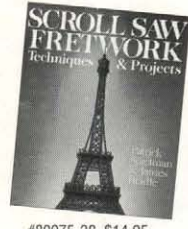
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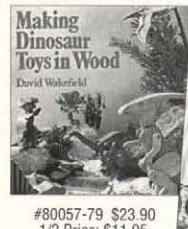
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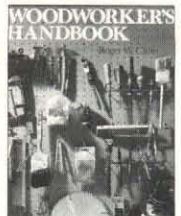
#80075-38 \$14.95
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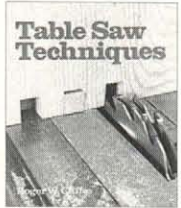
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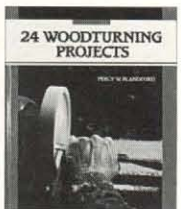
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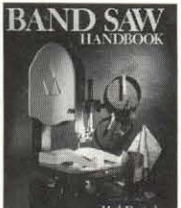
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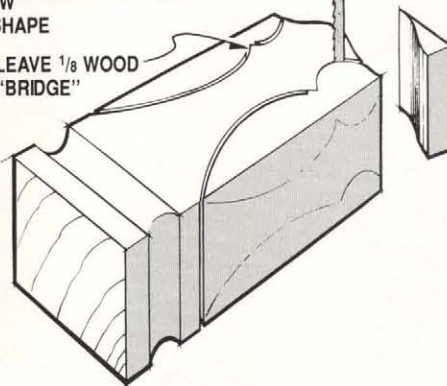
Special Techniques

Continued

STEP 5

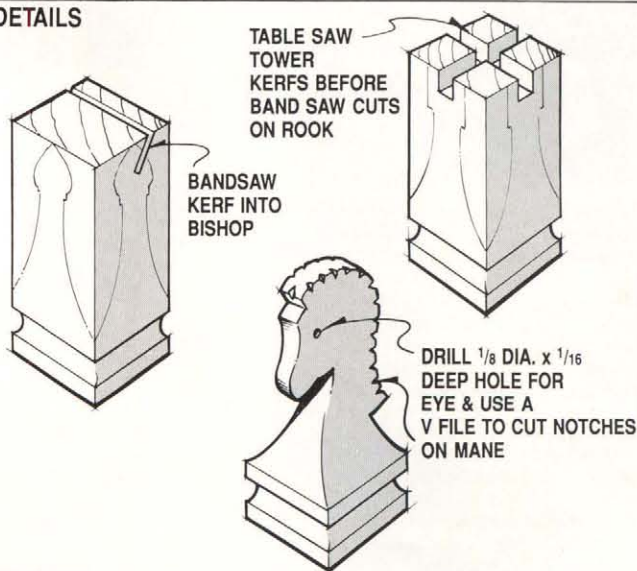
USE 1/8" BAND SAW
BLADE TO CUT SHAPE

LEAVE 1/8" WOOD
"BRIDGE"



Step 5. Make the band saw cuts on one side. We used a 1/8 in. wide band saw blade, which was adequate for even the tightest curves. As shown in the illustration, for cutting the queen, you will cut away the top corner, and then make two sweeping cuts, one from the bottom and the other from the top, stopping each cut just a little short of where it would exit. By leaving the small bridge of wood connecting the scrap to the piece, you'll avoid the fussiness of having to tape the waste back in place. Note that the band saw technique will vary a little for the different pieces. For example, with the king, your initial cuts should be straight in from the side, establishing the bottom of the cross. With the bishop, as shown in the Details illustration, the first cut is to establish the kerf in the bishop's top. For the knight, you'll make the long cuts on the sides first, and the profile cuts next. For the rook, as also illustrated in Details, use the table saw to establish the kerfs in the castle tower before starting the band saw work.

DETAILS



Step 6. Once the cuts are made on one side, flip the piece to an adjacent side and make the same series of cuts. Note that with the knight, the cuts made now will not be identical to the cuts made in Step 5, but will instead be of the horse's profile.

CAPS! CAPS! CAPS!

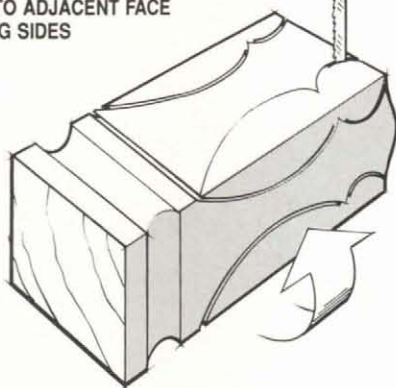
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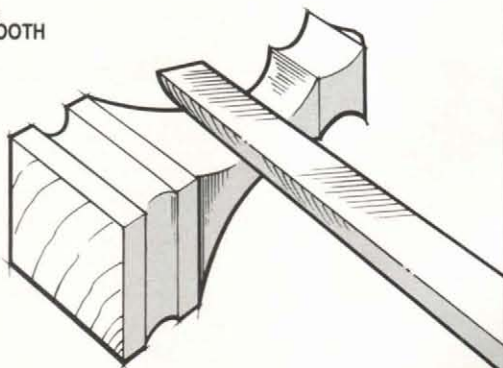
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STEP 6
ROTATE STOCK TO ADJACENT FACE
& CUT REMAINING SIDES



STEP 7
CUT "BRIDGE" TO
REMOVE WASTE,
FILE & SAND SMOOTH



Step 7. Cut through the bridges to remove the waste, then use files and sandpaper to smooth the various pieces. You can easily cut through the bridges on three sides of each piece with the band saw, but for the final cut you'll need to slip one of the waste cutoffs under the piece for support and in order to keep the piece square to the band saw table. A half-round and round file will make short work of most of the smoothing, but if you have a set of needle files, you'll find they come in handy for some of the finer work. The amount of smoothing and sanding will depend on the care you take with the band saw work.

STEP 8
DIP PIECES INTO
CAN OF FINISH



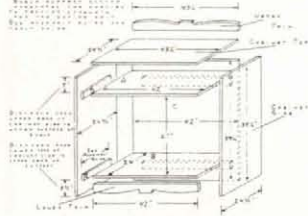
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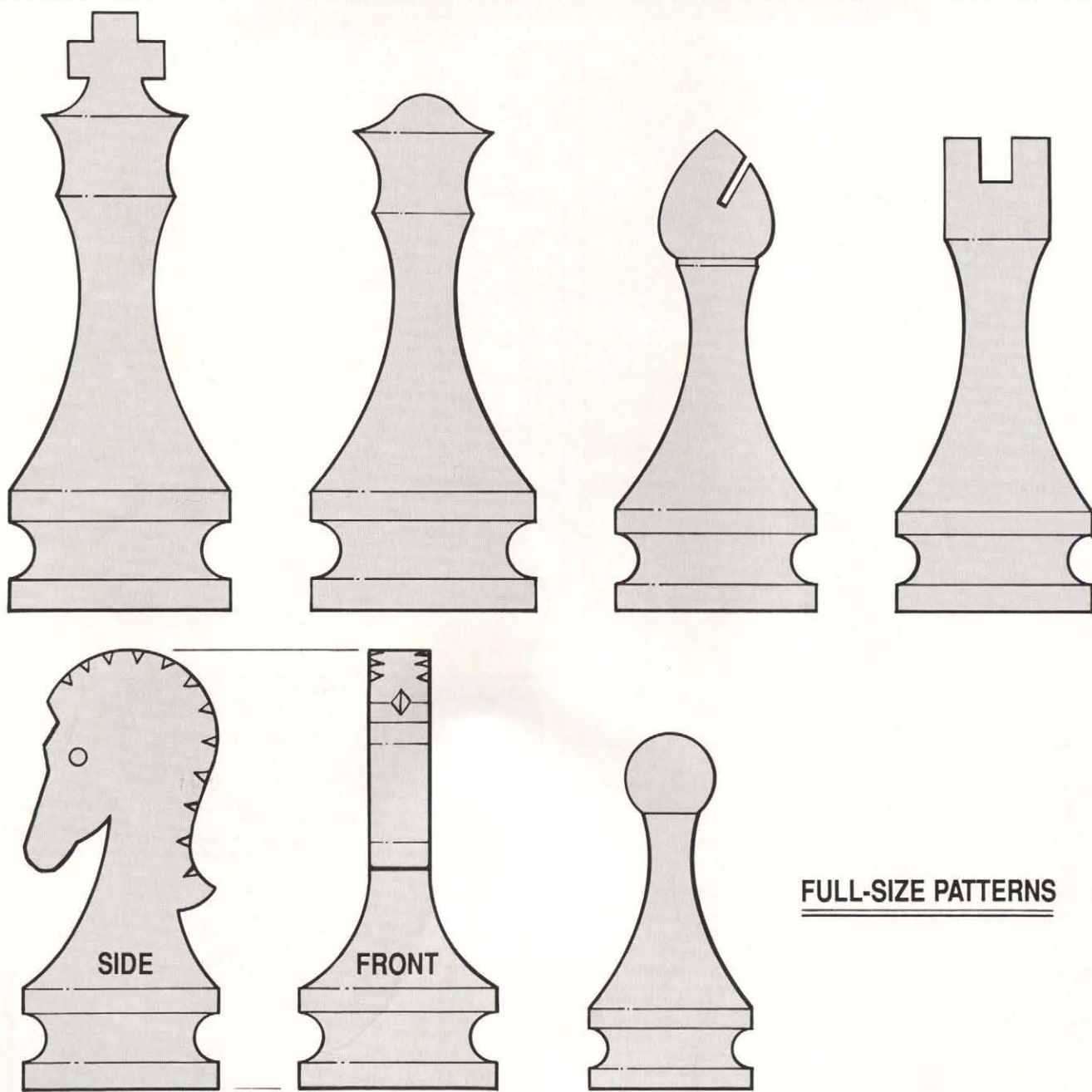
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Should the cove details require sanding, wrap appropriately sized dowels with sandpaper to make an accurate sanding tool.

Now is a good time to finish the detail work on the knight. Use a 1/8 in. diameter drill bit to establish the eye holes as shown, and a triangular file or a sharp knife to make the decorative V-notches along the mane.

Step 8. We finished our chess set with Watco Danish Oil followed by an application of wax. Fill a coffee can with Watco, then immerse each piece for about 15 minutes. Several pieces should fit into the can at the same time. Use a weight to keep the pieces totally immersed. Once dry, clean off the excess Watco with 00 steel wool, then immerse the pieces for another

15 minutes. When dry, use 0000 steel wool to remove any excess finish.

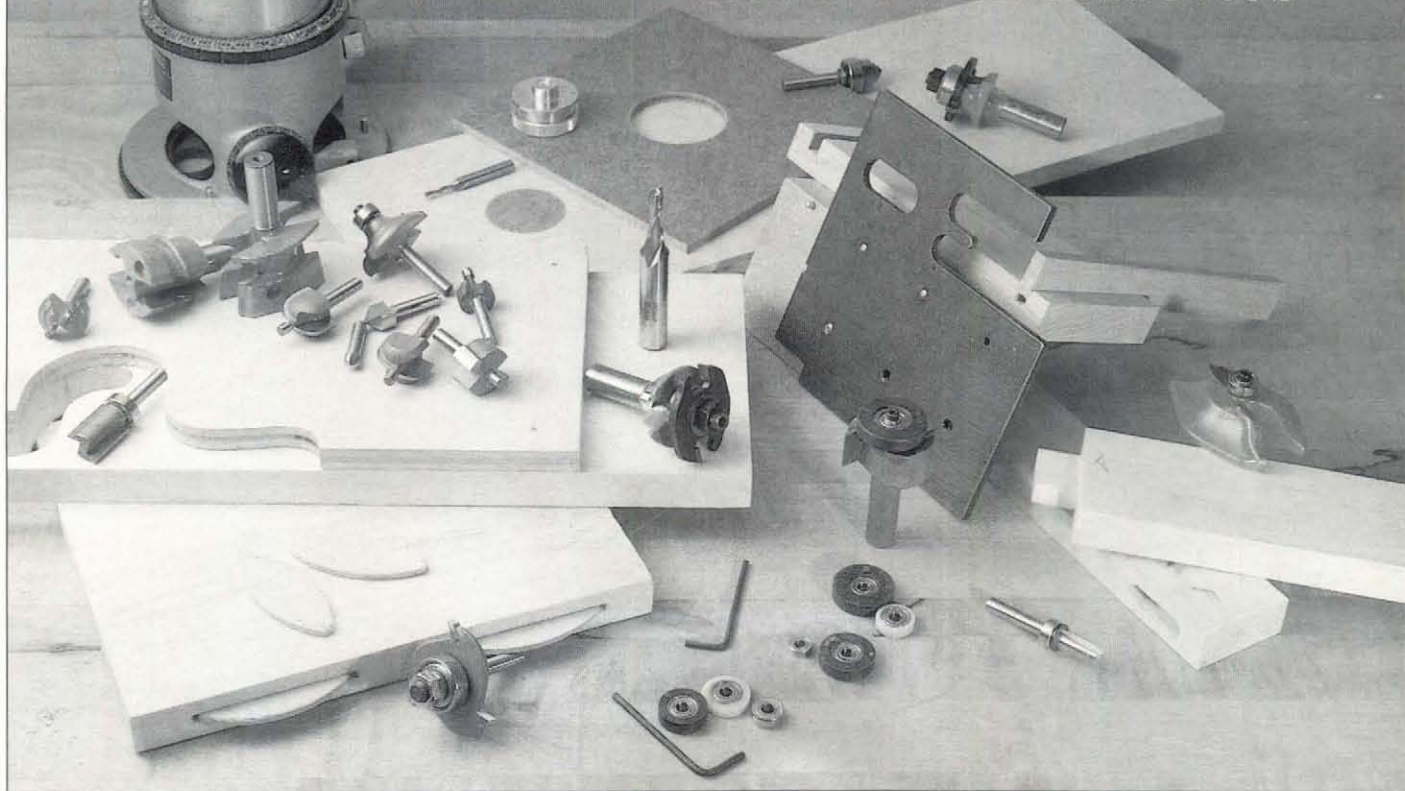
Next, apply a coat of wax. Butcher's wax is fine for the ash pieces, but for the walnut pieces use a brown shoe polish (the wax variety, sold in tins). The brown shoe polish helps even out the tone of the walnut and eliminate any blotchiness from the various different grain directions that are exposed on the shaped sides of the pieces. Take care not to get any wax on the bottom, since that's where you'll glue the felt.

The green felt and the Ververette glue that we used to glue the felt to the bottoms of the pieces were both purchased at a craft store.





For The Router—*Safer Router Bit Design and New Accessories*



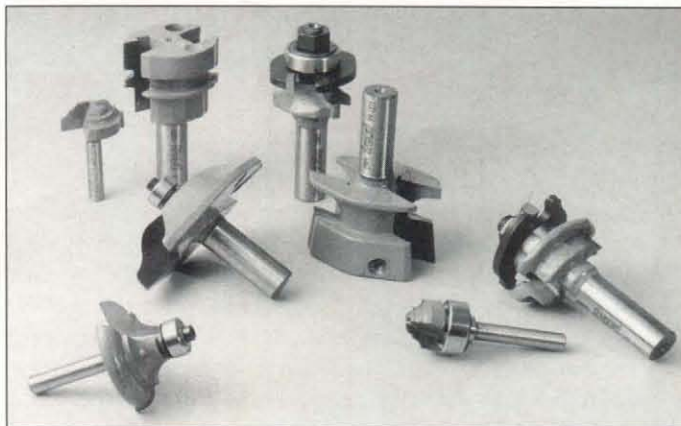
If you've just read Jim Barrett's Plunge Router article (page 72), then you've probably got a good idea of just why these versatile new routers have become the router workhorses of so many home and professional shops. But even if you already own a plunge router, you may not be aware of the vast range of new products that have been developed—and continue to be developed—specifically for these tools.

Here's just a taste of the new products that are out there. Most of these accessories can also be employed with standard routers, but keep in mind that accessories like the mortise-and-tenon jig usually work best when used with a more powerful router or better yet a plunge router. We won't list all the standard router bits, stile-and-rail sets, combinations bits and the like that are available from just about any woodworking tool and equipment catalog, but remember that many of the large-diameter specialty bits sold today require the power of either a big router or a plunge router to operate properly and safely.

A Safer Bit?

In Europe, and Germany in particular, large-diameter edge-forming bits typically employ a chip-limiting or safety design. Although American tool companies have been aware of these new bits for several years, only recently have any companies announced their intent to actually market chip-limiting bits in the United States. Freud, a major supplier, was first, when it

began phasing in chip-limiting bits this past summer. Jim Brewer, research and marketing manager at Freud, tells us that while it's difficult to predict when the new bits will be available nationwide, they should be on most store shelves sometime in Spring 1992. Brewer also said that Freud expects to increase their variety of router bits, and that any new bits that can employ the chip-limiting design will feature it. Brewer notes that the new chip-limiting bits, and eventually all of Freud's bits (except for solid carbide bits) will carry a red color instead of the old black.



A doormaking set plus assorted new "safety" bits from Freud.

Meanwhile, at Bosch, safety bits—called BG style—have been available for years, although they've never been actively marketed in the United States. According to Al Russo, product manager at Bosch, the BG designation in Germany is roughly the equivalent of the Underwriter's Laboratories (UL) designation in the United States. He noted that the bits have been available in Europe since 1985-86. However, Russo added that the introduction of safety bits by Freud probably won't change Bosch's marketing strategy here, at least for the near term. Russo said he felt the problem with labeling certain router bits as safe implied that the remaining router bits—those that can't employ the chip-limiting feature—were unsafe. Since only certain bits—mainly large edge forming bits and certain other edge and groove forming bits over a certain diameter—can



Assorted "BG" style bits from Bosch.

employ the chip limiting feature, Russo asked rhetorically, "Does that mean that all other router bits are unsafe?" However, Russo left open the question as to whether Bosch might reconsider their marketing plan. "If consumers are out there clamoring for these bits, then we'll probably start making them available."

Other router bit manufacturers expressed similar sentiments. Though none of the other companies we contacted had any immediate plans to add chip-limiting bits to their lines, most agreed that the introduction of the bits by Freud will be closely watched, and that should they prove popular, we can expect to see the other companies following suit.

What Is A Safety Bit?

According to Bosch's Russo, the safety features of chip-limiting bits are a narrow gullet behind each cutting edge, and the addition of an oversize shoulder that effectively limits the size of the chip that each cutting edge can remove in each revolution. The most obvious result of these features is that the bits will have a limited feed rate. Feeding the stock too quickly past the bit (such as on the router table) or feeding the bit too quickly into the stock (such as when the router is advanced along an edge) are the situations that most often result in dangerous kickback. By limiting the feed rate, kickback

accidents can be significantly reduced. However, kickback will still be a problem with those bits that can't employ the chip-limiting design. Also, Russo pointed out that the new bits—at least in production situations—will increase work time, a fact that could add to product cost, and may make them unpopular with manufacturers.

So what's the bottom line regarding user safety with chip limiting bits as opposed to standard bits? Bosch's Russo says that where a regular bit can pull your finger or hand into the bit, which could produce a severe hand injury, a safety bit would make a shallow, non-debilitating cut, and then throw the hand or finger out away from the cutter. The bottom line therefore, is less serious injuries when using chip limiting bits.

The photos show some of the chip limiting bits: assorted bits from Bosch and a stile-and-rail set and several bits from Freud.

Some Useful Bits and Accessories

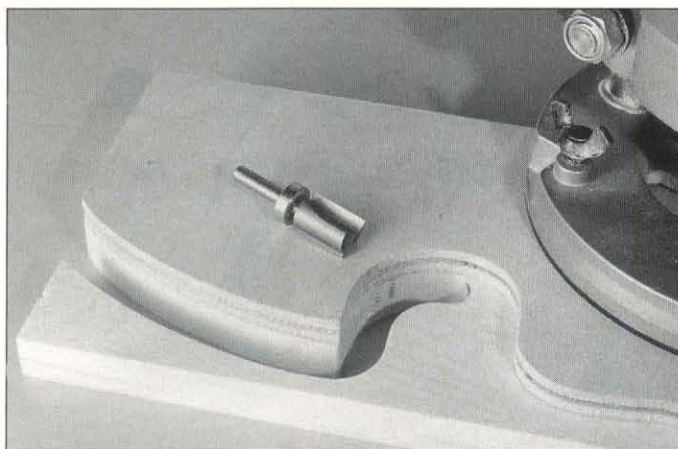
The following are router bits and accessories that we think go a long way toward making your router a more versatile tool. They are just a few of the innovative products that continue to be developed for the router. Either these products or similar products are available in most better woodworking supply and mail order catalogs.



Spiral end mill cutters.

Spiral End Mill Cutters: If you use your router for mortising or inlay work, there's no better bit for the job than spiral end mill cutters. The bits are available in a variety of sizes, and many sizes are available in both high speed steel and solid carbide. The bits cut without chatter and the spiral design (see photo) efficiently clears waste from the cut, leaving smooth sides and a smooth bottom.

Pattern Cutting Bits: If you are like most woodworkers, you've probably used your router along with a ball-bearing guided straight cutter for template routing. The problem with this setup, though, is that with the template on the bottom of your workpiece, it's difficult to see if you are cutting right up to the template. Pattern cutting bits, with the ball bearing guide on top, enable you to locate your template above the workpiece (see photo), which allows an unobstructed view.



Pattern cutting bit

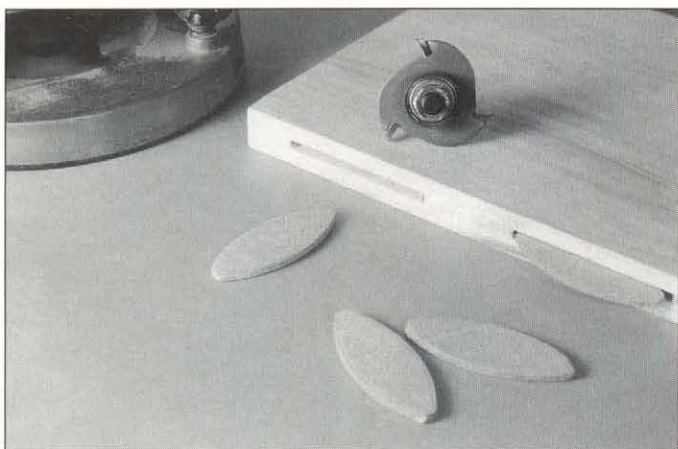
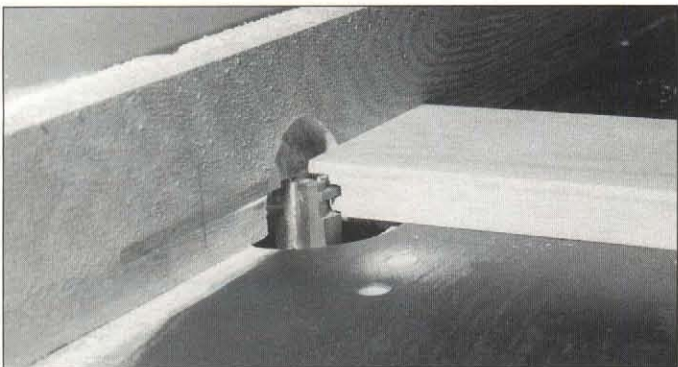


Plate joint slotting cutter

Plate Joint Slotting Cutter: Slotting cutters aren't new, but what is new is this $\frac{5}{32}$ in. cutter, which is sized specifically for plate joining biscuits. Now, you don't need to buy a plate joiner to take advantage of this new way of joining solid wood, plywood or particleboard.

Locking Drawer Joint Bit: These bits aren't really new, but they are a simple and effective way to construct a drawer with a minimum of fuss. The bits are used in the router table with the fence; the drawer front is run against the bit with the workpiece flat on the router table, cut the sides with the workpiece on end.



Cut the drawer front as shown.

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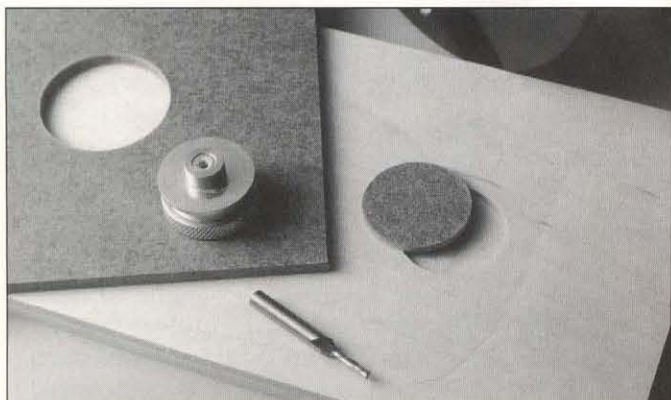
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Mill the drawer sides on end.



The completed drawer joint.



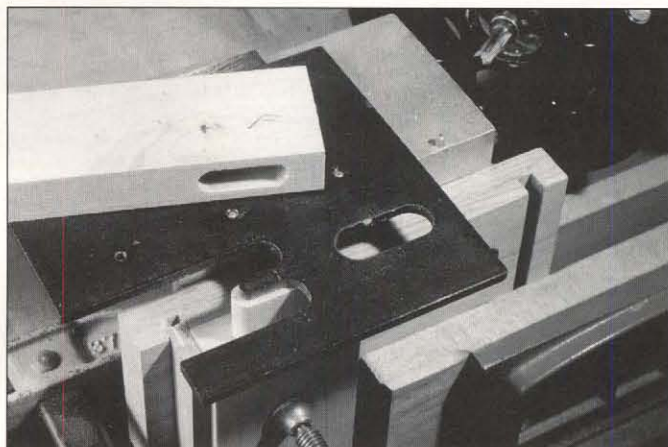
Router inlay set with cutter

Router Inlay Set: The set includes a universal bushing for Porter Cable type router bases, a snap-on brass collar, and a $\frac{1}{8}$ in. diameter spiral down-cut router bit. Make a template of the inlay out of $\frac{1}{4}$ in. thick plywood, install the bushing with collar, then follow the template to cut the inlay recess in your background material. Next, remove the collar from the bushing and use the same template to cut the inlay itself. You should now have a perfectly matched inlay and recess.

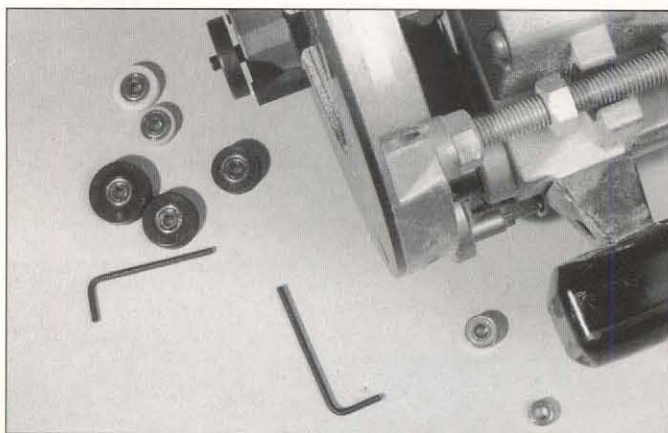
Mortise and Tenon Router Jig: If you've been boring mortises on the drill press, or perhaps just avoiding mortise and tenon work altogether, this jig enables you to cut dead-accurate matching mortises and tenons, using just your router, a simple template, and a special $\frac{5}{16}$ in. diameter ball-bearing guided bit.

And don't be scared away from mortises and tenons because of the hours of time they used to take. This jig produces a tightly fitting joint in as little as two minutes.

Bearing Enlarger/Reducer Kits: How many times have you wished you had several rabbeting bits, instead of just one, or a beading bit in addition to the roundover bit you now own? Call it Murphy's law, but somehow the bit you always need is just the one you don't have. Now here's the answer to those odd-size rabbeting jobs, and a host of other applications. Bearing enlarger or reducer kits let you replace the existing bearings on your bits with larger or smaller bearings. Now, by mounting a smaller bearing on your roundover bit you can turn it into a beading bit, or by adding an oversize bearing to your rabbeting bit you'll get the shallow rabbet you need for that box bottom or case back. This is one of the best ideas in a long time, helping you get more out of your router bits without spending a lot of money to actually buy more bits.



Mortise-and-tenon router jig



Bearing enlarger/reducer

Editor's Note: Chip limiting bits courtesy of Freud (919-434-3171), and Bosch (1-800-334-4151). Spiral cutter, drawer joint bit, pattern cutting bit, plate joint slotting cutter, router inlay set, mortise and tenon jig, bearing enlarger and reducer kits courtesy of Woodcraft (1-800-225-1153).





Veneering

A Simple Approach

by Roger Holmes

I started out as a committed solid-wood woodworker. Most of the veneered furniture I'd come in contact with was cheap or gaudy, or both. Plastering furniture with thin sheets of splashy veneer seemed somehow dishonest, an attempt to hide poor materials, shoddy construction or ill-conceived design.

I quickly discovered how ignorant I was about veneer. Sure, it can clothe a multitude of mass-produced sins. But it can also open whole new worlds of possibility to a conscientious woodworker. Woods that, in the solid, are too expensive or too difficult to work, are often affordable and malleable as veneer. By gluing these sheets onto a stable material such as plywood or particleboard, you need not worry about expansion and contraction, the ever present demons of solid-wood construction. Freed from concern for wood movement, with veneer you can create designs that would be difficult, disastrous or impossible in solid wood.

Enticing as veneer can be, many woodworkers find the process of applying it daunting. Few muster the courage to lay it by hand with hot hide glue and

veneer hammer. Others are put off by expensive, space-hogging veneer presses. Fortunately, there's a simple alternative. With common white glue and ordinary tools—utility knife, hand-plane, some sturdy clamps—you can do a lot of veneering.

The essentials of the method are straightforward. After cutting the veneers with the knife and jointing their edges with the plane, you tape them together to form large sheets, one each for the top and bottom of the panel. (Veneering both surfaces keeps the panel flat.) Spread glue on the sheets of veneer and the plywood or particleboard substrate and sandwich them together between two pieces of plywood (called cauls). A makeshift veneer press—pairs of heavy wooden bearers and clamps, regularly spaced on the sandwich—squeezes the panel together, the cauls distributing the pressure evenly over the veneered surfaces.

This method can be used for tabletops, carcass sides, drawer and door fronts and many other flat panels. Unlike some veneering methods, there are few restrictions on the size of the job. I once used bearers and cauls to veneer two

horseshoe shaped conference tables whose six, 3 ft. wide tops totaled over 60 feet in length.

Materials: The Veneer and the Substrate

Let's start with something a bit smaller, a panel 18 in. square, the size of a small tabletop, a cabinet door or small carcass side.

Veneer: Most local lumberyards, even those with a decent selection of hardwoods, don't often sell veneer, so you may have to mail order it. (See Sources on page 32). Veneer is commonly $\frac{1}{32}$ in. to $\frac{1}{40}$ in. thick, though $\frac{1}{28}$ in. and $\frac{1}{16}$ in. are sometimes offered. Most of the time, thickness is a given, not a choice.

I think veneer is most useful when bought as consecutive sheets, in the order they were sawn or sliced from the log. (A bundle of consecutive sheets is sometimes called a flitch.) Because veneer is so thin, any sheet in a flitch will look almost identical to the one above and below it. Because of this repeating figure, you can create a great many handsome patterns by arranging (or "matching") consecutive sheets in

Woodworking Basics

Continued

different ways. If you're not interested in matching, randomly selected sheets are often a bit cheaper.

When you order, let the supplier know the size of the area you intend to veneer so he or she can make sure you get enough matched sheets to cover; the supplier can also help you determine an adequate allowance for waste. (Smaller suppliers, such as hobby shops, may offer only random sheets.)

Resist the temptation to buy some lovely crotch, blister, burl or other highly figured veneer for your first attempt. The distorted grain that makes these veneers so attractive also makes them difficult to work. Build up your skill and confidence with straight-grain veneers, then tackle the wilder stuff.

Substrates: Don't skimp on the substrate. Buy good quality hardwood plywood or particleboard, with smooth, flat faces. An expensive, but excellent substrate is medium density fiberboard (MDF), a sort of super particleboard.

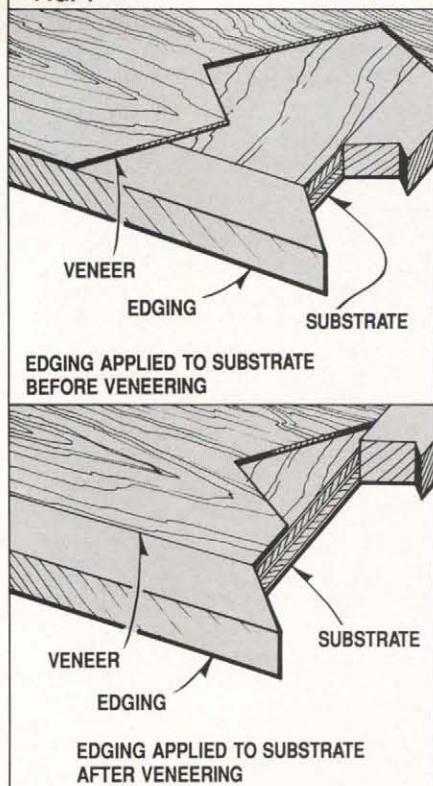
Unless the edges of a panel are concealed by a joint, you'll probably want to cover them with wood. It's possible to veneer the edges of a panel, but I think thicker, solid-wood edgings are more durable. These can be added to the panel before veneering, so they show only on the edges. Or they can be added after veneering to form a border around the panel (Fig. 1).

Preparing the Substrate

I chose $\frac{5}{8}$ in. hardwood plywood as the substrate for my small panel, and decided to add a $\frac{1}{4}$ in. wide solid-wood edging before veneering. I cut the plywood so that the overall size of the panel, including edgings, would be about $\frac{1}{8}$ in. larger than its finished dimensions, to allow for clean up after veneering. If you're using a plywood substrate, orient the grain of the surface veneers so it will be at a right angle to the grain of the veneers you're applying. (Even veneer expands and contracts slightly across its width. If the underlying layer moves, face veneer applied in the same direction may develop hair-line cracks.)

Cut the edgings slightly wider than the thickness of the plywood, glue them

FIG. 1



in place, and plane them flush with the surface after the glue has set. I sand the faces of the edged panel with 120 paper to ensure they are smooth and flat. Finally, mark center lines on the edges and ends to help you align the veneer when gluing up.

Matching and Cutting the Veneer

The symmetrical, mirror-image pattern shown in Fig. 2 is one of the most attractive ways to use consecutive veneers. Called bookmatching, it's also one of the easiest, requiring only that you flip every other sheet front to back.

To bookmatch the cherry veneer for my panel, I first had to figure out what part of the sheet would make the nicest pattern. I held a mirror on various possible joint lines to get a sense of what the resulting match would look like (Photo A). I roughed in an outline in heavy pencil on the portion I liked, allowing at least $\frac{1}{4}$ in. over the lipped substrate's dimensions on all sides.

Bookmatching is commonly done in multiples of two—two, four or six sheets and so on—but my veneer wasn't wide enough to cover with two sheets and I

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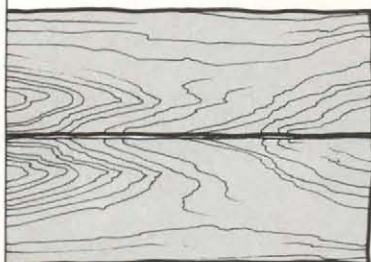
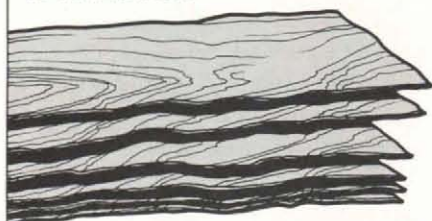
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FIG. 2

STACKED SHEETS OF VENEER
AS CUT FROM LOG



TWO SHEETS "BOOKMATCHED"

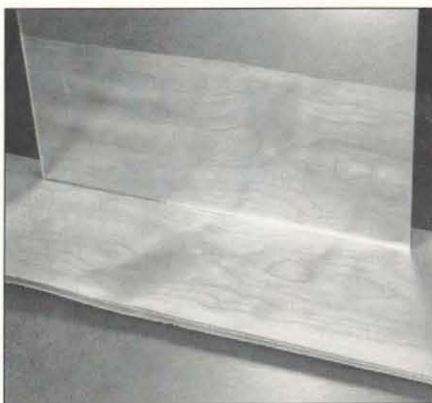


Photo A

didn't like the pattern four narrow sheets would make. Fortunately the figure was symmetrical down the center of a sheet, so I decided to use three sheets, each of the two side sheets producing a slightly different bookmatched, mirror-image pattern with the center sheet.

To cut the veneers to size, I stacked the three consecutive sheets, aligned carefully along the edges and ends, then cut along the outline with a sharp utility knife and straightedge. Place the straightedge over the material you want to keep—if the knife strays, it will cut only into the waste. Cut the ends, across the grain first (Photo B), then the edges (Photo C). You can cut a number of sheets at the same time. Take numerous light, shallow cuts rather than forcing



Photo B

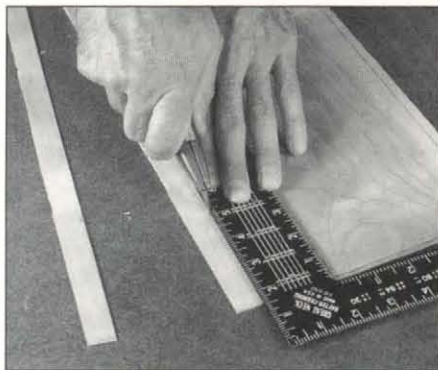


Photo C

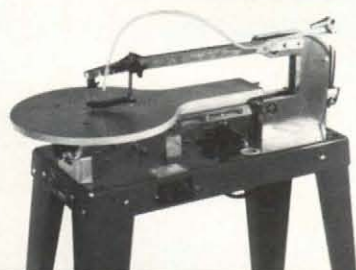
deep ones, which risk splintering the veneer.

Veneering both sides of a panel equalizes the forces of expansion and contraction and keeps the panel flat. Because different woods respond differently to humidity, it's safest to use the same species on both sides or, at the least, use veneers of the same thickness. If you're not going to see the panel back, you needn't worry about matching; if you have enough scrap, you can piece it together to cover.

Jointing the Edges

Mating edges of veneer, like those of solid boards, must be straight and at right (or complementary) angles to form a seamless joint. Like solid wood, I edge-join veneer with a hand plane. Veneer, however, is too flimsy to hold in a vise, so I clamp a stack of sheets in a simple straightedge jig (Fig. 3) and plane them as shown (Photo D). Resting the straightedge jig and the plane on the benchtop ensures square edges.

Here are a few tips: When using the straightedge jig, position the bolts near the ends of the veneer for best results. Once jointed, the mating edges should



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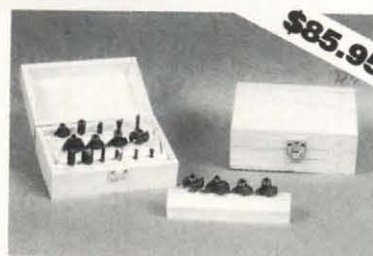
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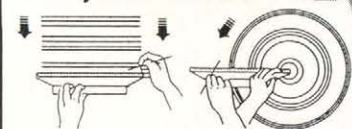
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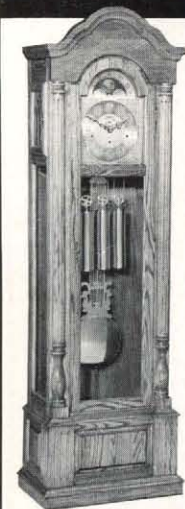
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FIG. 3

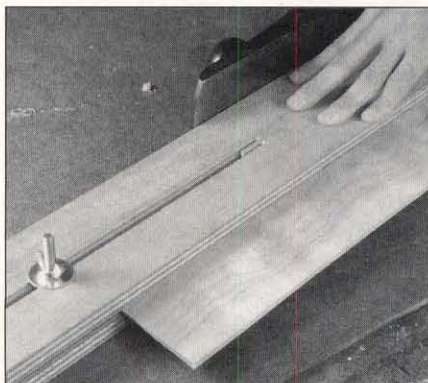
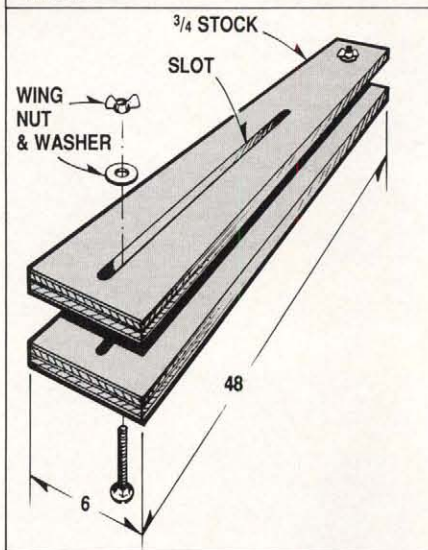


Photo D

be perfectly straight. However, errors can occur. Veneer edges that are very slightly concave in their length can be pulled together with tape; but avoid convex edges—the joint is likely to gap at the ends. It doesn't matter if the last pass of the plane takes a shaving off the straightedges. Before jointing the next batch of veneer, just make sure the straightedges are indeed straight.

Taping

After jointing the edges, you need to tape the veneers together before gluing them to the substrate. Lay the sheets in order on a flat surface. (Remember, the tape goes on the faces that will show.) Draw the edges of the first pair together, checking to make sure the faces of the sheets are aligned to produce the pattern you want. I start taping in the middle, pulling the edges tightly together as I stretch a piece of tape across the joint

(Photo E). Then I apply additional cross-grain strips, working from the center strip out to the ends, spacing the strips from 2 in. to 6 in. or more apart, depending on what it takes to pull the joint snugly together. Place the final strips right at the ends of the sheets. Finally, apply a strip to cover the entire length of the joint (Photo F). Add subsequent sheets to the first pair in the same way.

I usually tape veneer with masking tape. It's somewhat elastic and by stretching a strip as you pull it across the joint, the tape draws the edges tightly

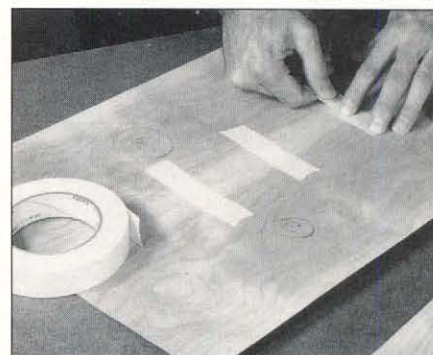


Photo E

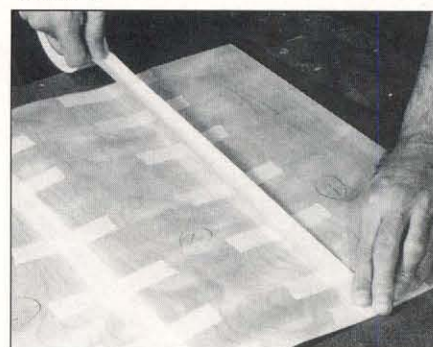


Photo F

together. It sticks well and stays put, but can be a pain to remove after the glue has set—what doesn't peel up must be scraped or sanded off. Much easier to remove are the brown paper tapes sold especially for veneering. I've found them difficult to apply the few times I've tried, but you might have better luck.

When the sheets are taped together, mark center lines on the face near the edges and ends to help you align the veneer on the panel when gluing up.

Assembly

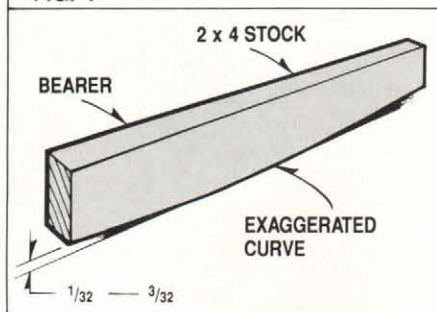
At this point, you'll need glue, cauls and clamps. Here are some thoughts on each.

Glue: White or yellow woodworking glues, like those made by Borden or Franklin, are easy to apply, give you a reasonable amount of time to work before setting up and are strong and durable when cured. I don't recommend contact cement for veneer; the bond isn't as strong as with other glues and is prone to fail at the edges and ends of a panel.

Cauls: Make the cauls slightly larger (say 1/2 in. overall) than the panel being veneered, and as thick as possible. A sheet of 3/4 in. plywood or particleboard makes an adequate caul; two sheets are even better. The contact surface should be flat and smooth, to prevent damage to the veneer. Don't use cauls that are irregularly bowed or twisted—they can distort the panel.

Bearers: The stouter the bearers, the better. If you're making a set to keep, use poplar, oak, ash or a similar sturdy hardwood, about 2 in. by 4 in. in cross section; 2 ft. lengths will handle many needs. If you don't do a lot of veneering, use what's on hand; 2x4s and 2x6s make perfectly serviceable bearers. As shown in Fig. 4, plane one edge of each bearer slightly convex along its length, between 1/32 in. and 3/32 in. or so lower at the ends than the middle. (The longer the bearer, the greater the amount.) When both ends are pulled flush to the panel, a convex bearer applies pressure in the center of the panel.

FIG. 4



Clamps: It takes considerable pressure to pull two robust, slightly bowed bearers flat, so choose your clamps accordingly. I prefer quick-action clamps because they're easy to use if you're working on your own. The hefty Wetzler clamps shown in the photos are ideal; lighter clamps will do for small panels and bearers, but they don't pack

enough punch for larger work. Sturdy C-clamps work too, and frequently are garage-sale bargains.

Gluing Up

First, make sure you have ample room to work. If possible, use one worktable for spreading the glue and another, close by, for clamping up. Set up the bottom bearers and caul before applying the glue. I place the bottom bearers on top of a couple of 2x4s to provide room for the clamp heads. Cover the surface of the bottom caul with a sheet of plastic or wax paper to keep squeezed out glue from sticking the panel to it.

Cover both the mating surfaces, ve-



Photo G

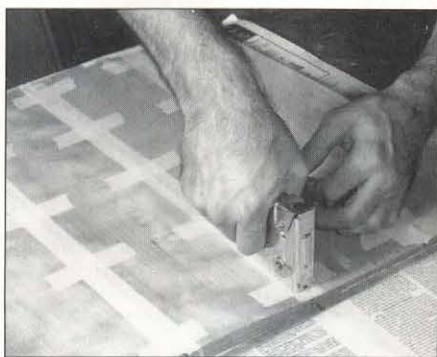


Photo H

neer and substrate, with a thin coat of glue, spreading it evenly with a wide piece of wood, plastic or metal. A putty knife or joint compound spreader is ideal (Photo G). Then position the veneer on the panel, flatten the sheet with your hands and align it with the center marks on the panel edges and ends. I fix the veneer in place with one staple in the waste near the centerline at each end (Photo H). Flip the panel over, apply glue to its other face and the reverse side



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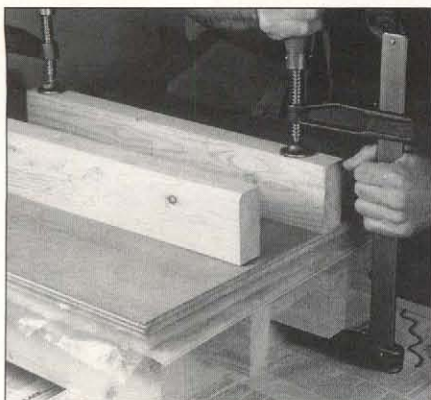


Photo I

veneer and repeat the procedure. Don't forget to add the plastic or wax between the veneer and the caul. If, after both sheets of veneer are in place, they curl away from the edges, I pull them down with a few strips of tape stretched from face to face across the edges.

Clamping

As quickly as possible, position the assembled panel on the bottom caul and

cover the top surface with plastic and the other caul. Then place the top bearers directly over the bottom bearers and begin clamping. Start with the pair of bearers in the middle, drawing first one end then the other snug, but not tight, to the cauls. Position the clamps so the clamping pads are at least a couple of inches in from the edges of the panel. When both clamps are in place, tighten them down. Proceed in the same way with the other bearers, working out from the middle toward both ends, spacing them 5 in. to 6 in. on center (Photo I).

Clean up

I let the glue cure overnight before pulling off the clamps, bearers and cauls. If all has gone well, the panel should be flat, no lumps or bumps on the surfaces and no gaps at the edges and ends. Cut away the waste veneer overhanging the substrate; I remove the waste along the edges first with a knife, handsaw or handplane, then trim across the grain at

the ends with the tablesaw. Now comes the tedious chore of removing the tape. But revealing the handsome veneer beneath makes the effort worthwhile. By the way, don't worry if some glue has seeped through the veneer, and puddled against the wax paper or plastic. It may look bad now, but once you've sanded to expose the wood, the surface should accept a finish without a problem. 

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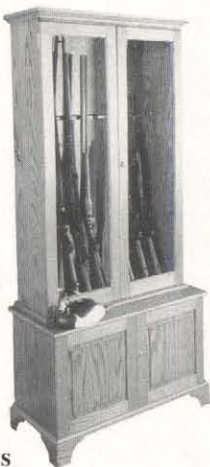
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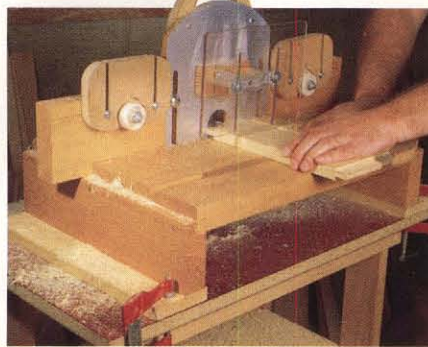
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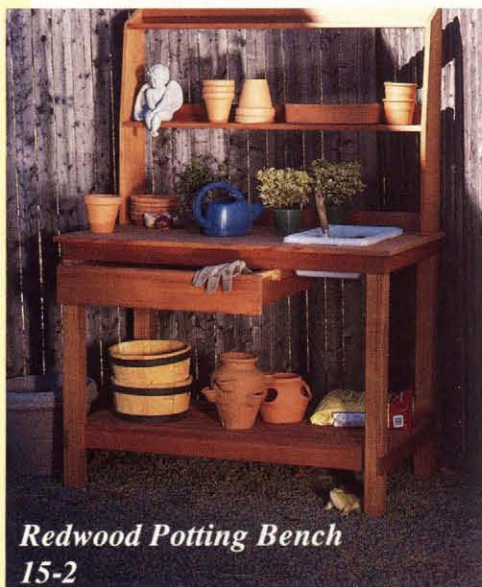
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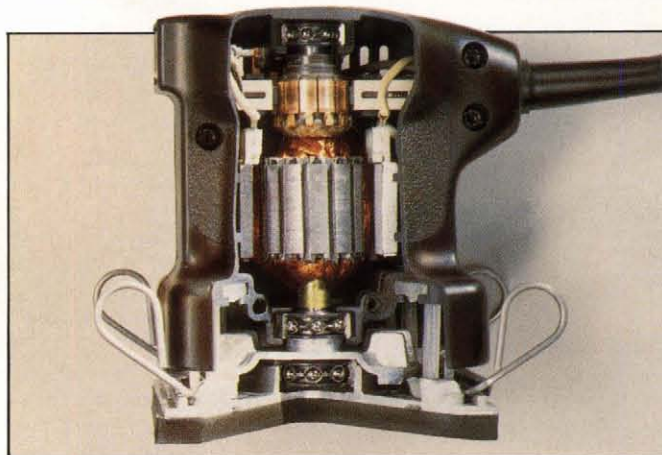
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Country Pine *Mirror and Shelf*

A handsome mirror like this can be put to use almost anywhere in the house. The chip carving provides an interesting detail, while the shelf will come in handy for storage or display. The antique finish we give it lends a lovely patina to the pine, adding to the warm, country-style look.

Begin by cutting the frame parts—the two stiles (A), the top rail (B) and the bottom rail (C)—to the dimensions shown in the Bill of Materials. Before starting, though, you'll want to make sure the stock for these parts is the same thickness; it helps to insure accuracy when the grooves are cut in the next step. Also, since the parts must be cut square, it's a good idea to check your table saw (including the rip fence and miter gauge) for accuracy.

After the frame parts have been cut to size, arrange them on a flat surface and decide which ones are to face front when the mirror is assembled. Once decided, use a pencil to mark the front face of each one. Next, use the table saw and a dado head to cut a $\frac{1}{4}$ in. wide by $\frac{3}{8}$ in. deep groove along the entire inside edge of all four pieces. When making each of these dado cuts, always keep the front face against the rip fence. Keeping the same face against the fence insures that later, when the parts are assembled, the grooves will be aligned even if the dado is not perfectly centered.

Now, using the table saw, the miter gauge and the dado head, cut the $\frac{1}{4}$ in. thick by $\frac{3}{8}$ in. long tenon on each end of the top and bottom rail. You'll want the tenons to fit snugly in the rail grooves, so it's a good idea to first make a few practice cuts on scrap stock. Just make sure that the scrap stock is the same thickness as your project stock.

The chip carving (sometimes called incised carving) is done now, before the frame is assembled. First, transfer the patterns from the drawing to the stock, marking them in pencil. All the carving can be done with an X-Acto brand knife



(we used their blade no. 19). If you have a chip carving knife, though, this is a perfect time to use it. Several light cuts pared to the line are usually more effective than trying to complete the deeper cuts with one pass.

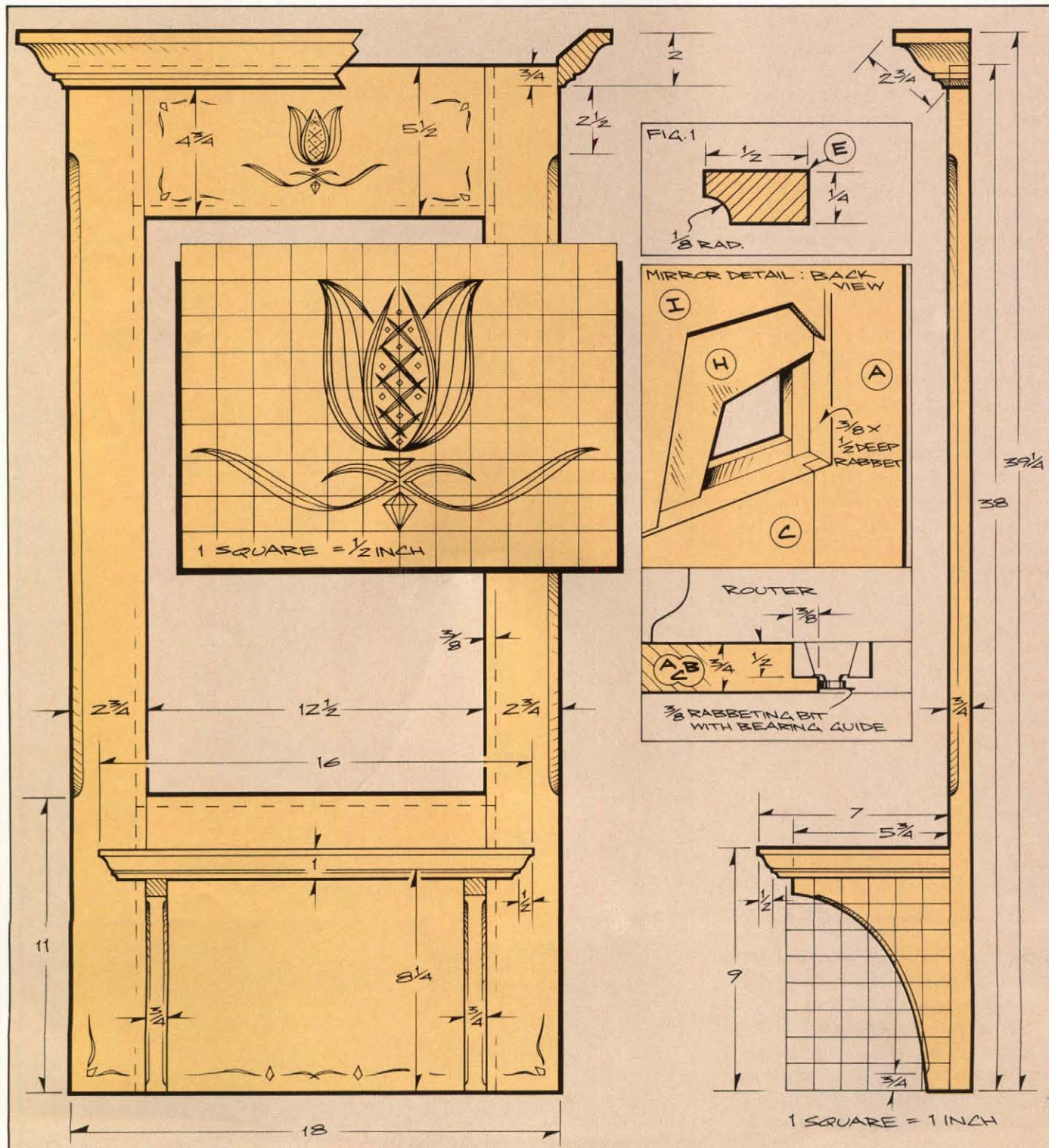
With the carving completed, you can add the $\frac{1}{2}$ in. wide chamfer along the outside edge of each stile. Use a ball-bearing guided chamfering bit, stopping the cut 11 in. from the bottom end and $3\frac{1}{4}$ in. from the top end, as shown.

Next, assemble the frame parts. Apply a coat of glue to the rail tenons and to the mating grooves in the stiles. Clamp with bar or pipe clamps, then check the frame for squareness. Make any needed adjustments and, once all looks okay, set aside to dry.

Once dry, remove the clamps and clean up any excess glue that may have squeezed out of the joints. A sharp chisel comes in handy here.

Now, clamp the frame to the work-

bench so that the front of the frame is facing down. You'll need blocks under the four corners to raise the frame about $\frac{1}{4}$ in. Using a $\frac{3}{8}$ in. bearing-guided rabbeting bit, cut the $\frac{3}{8}$ in. wide by $\frac{1}{2}$ in. deep rabbet. Later, when everything is assembled, this rabbet will accept the mirror (H) and the mirror backing (I). Note that the rabbeting bit will not need to cut all the material, since much of it was removed earlier when the grooving cuts were made. Also, since the router



leaves rounded corners, you'll need a chisel to cut them square.

Cut the shelf (D) to size, then use a 1/2 in. bearing-guided Roman ogee cutter to mold the front and side edges

The shelf molding (E) is made next (a cross-sectional view of the part is shown in Fig. 1). For safety's sake, start with a piece of stock measuring 1/2 in. thick by about 3 in. wide and 16 in. long. Using the router equipped with an edge guide and a 1/4 in. core box bit, apply a 1/8 in. radius to both edges of the stock. Then use the table saw to rip the molding to 1/4 in. wide.

The shelf molding can now be mitered at the corners and attached to the underside of the shelf. Use a thin coat of glue and a few brads to secure the front piece. However, to allow for wood movement, the two side pieces are best joined using only brads.

Make the two brackets (F) next. Cut them to length and width, then transfer the grid pattern to each one, cutting them out with a band saw. After smoothing

no. 3 Blend-Fill wax pencil, a color that pretty closely matches the color of their Puritan Pine Stain.

The mirror glass (H) is available at any glass shop. It's best to have them cut it to allow about 1/16 in. clearance all around (If the fit is too tight, the mirror could crack if the frame expands during periods of high humidity).

We used 1/4 in. birch plywood for the mirror backing (I). The backing is important because it helps protect the mirror silver on the back. If the silver

gets scratched, it will show on the mirror front. Cut the backing to the same size as the mirror, then install the mirror and the backing, securing it with several push pins or brads driven into the inside edges of the frame.

To complete the project, drill a pair of angled holes in the back of the frame to allow it to be hung on a pair of angled nails driven into your wall. For maximum support, space the holes 16 in. apart to permit the nails to be driven into wall studs.

Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
A	Stile	3/4 X 2 3/4 X 38	2
B	Top Rail	3/4 X 5 1/2 X 13 1/4 *	1
C	Bottom Rail	3/4 X 11 X 13 1/4 *	1
D	Shelf	3/4 X 7 X 16	1
E	Shelf Molding	1/4 X 1/2 about 32 in.	
F	Bracket	3/4 X 5 3/4 X 8 1/4	2
G	Crown Molding	2 3/4 in. about 3 ft.	
H	Mirror Glass	1/8 X 13 1/8 X 22 1/8	1
I	Mirror Backing	1/4 X 13 1/8 X 22 1/8	1

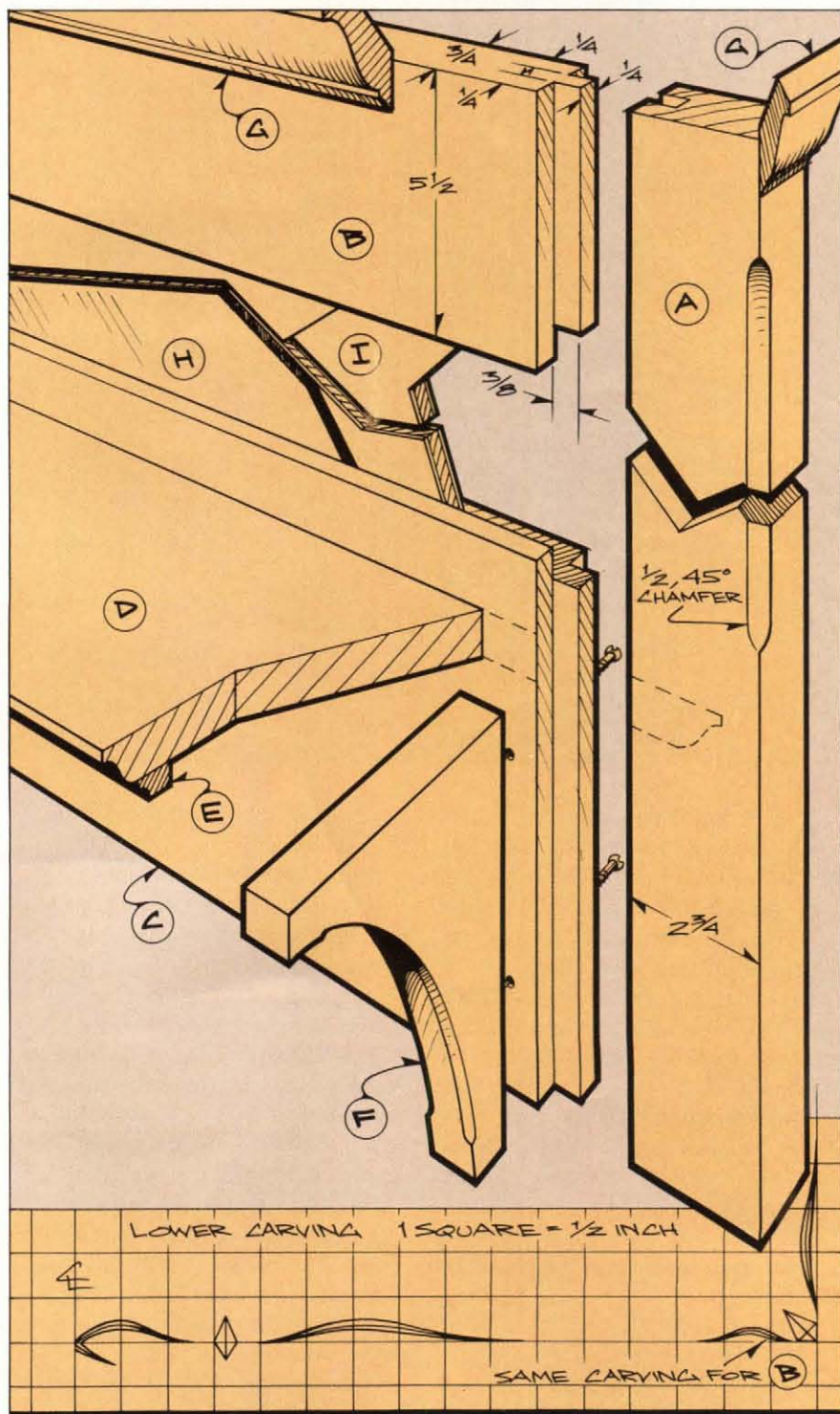
* Length includes tenons.

the band sawn edges, use a chamfering bit to add a chamfer to each bracket, as shown.

You can get 2 3/4 in. crown molding (G) at just about any lumberyard. Miter the corners as shown and attach to the frame with glue and countersunk finishing nails.

After final sanding all parts, the shelf is joined to the brackets with a few countersunk finishing nails. The shelf/bracket assembly is then joined to the frame with glue and several wood screws.

Two coats of Minwax Puritan Pine were applied next. When dry, a coat of orange shellac was added. Following the shellac, two coats of satin varnish complete the project. The countersunk nail holes were then filled using Minwax's



Cherry Drop-leaf Dining Table



Ask woodworkers what their first serious project was, and many will tell you that it was a table. It's not that tables are particularly inspiring. It's just that as projects go, they offer a lot of bang for the buck.

This classic oval double drop-leaf cherry dining table, by Massachusetts furniture maker Gene Cosloy, is an impressive piece. Its size notwithstanding, the table is a fairly easy build. We've included simple how-to instructions for laying out the oval top (see *Making The Oval*, page 47), and a source for a matched pair of router bits for cutting a flawless rule joint (see *Bill of Materials*).

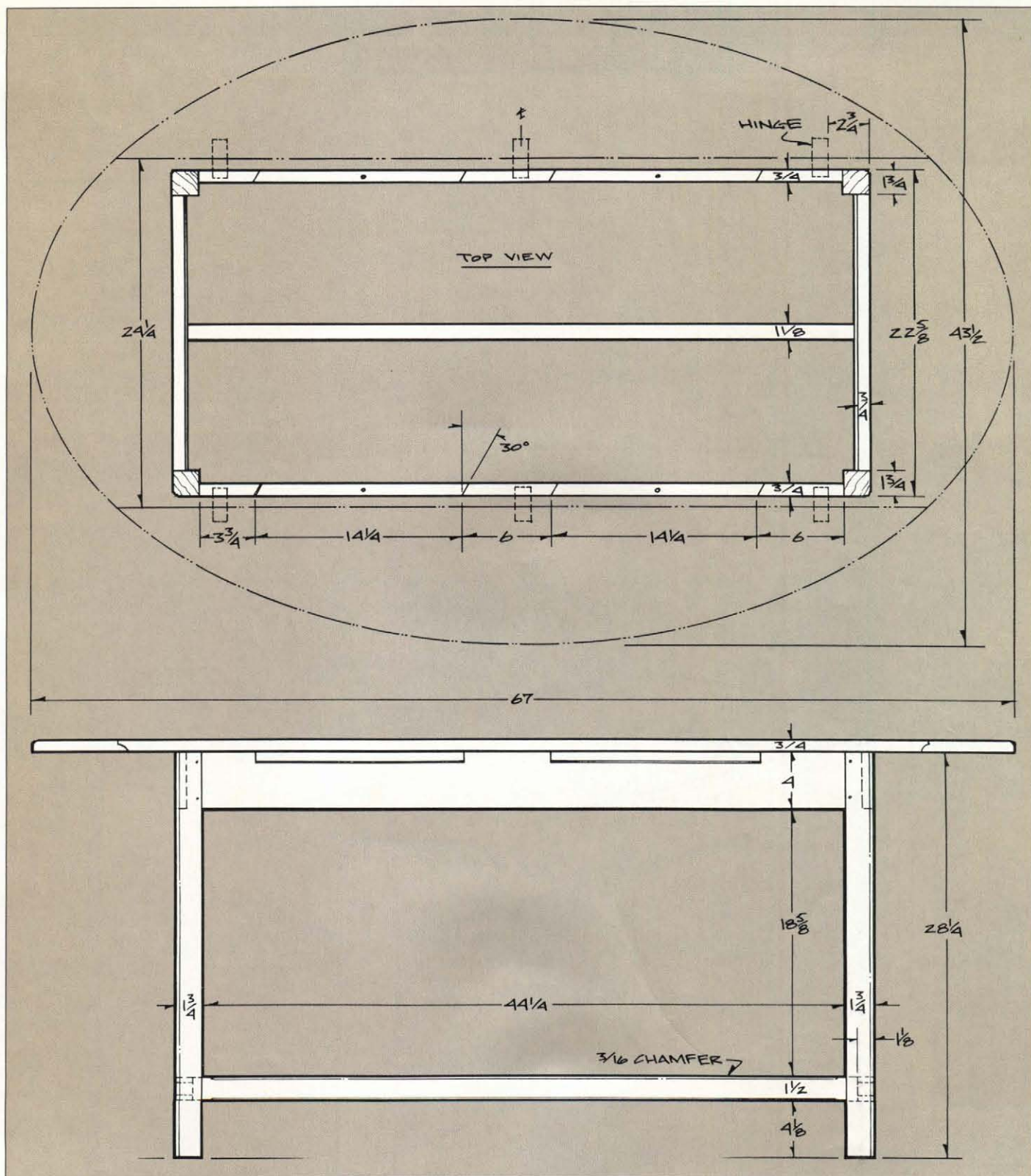
Start by preparing your stock. You'll need $\frac{3}{4}$ in. thick material for the top (A), drop leaves (B) and aprons (F, G), $1\frac{3}{4}$ in. square stock for the legs (C), and $1\frac{1}{8}$

in. thick stock for the stretchers (D, E). The leaf supports (H) and cleats (I) can be cut from $\frac{3}{4}$ in. thick stock.

You'll need to glue up several pieces of narrower stock to yield the $25\frac{1}{4}$ in. wide top. You may be tempted to use single boards for the two leaves, but they'll be less likely to cup if they are glued up from two narrower pieces. Cut the top and leaves to the sizes listed in the Bill of Materials, but don't lay out and cut the oval shape now. That's not done until after the rule joint has been cut. Although you can use anything from the table saw molding head to a pair of old hand planes to make the rule joint, the easiest method is with a matched pair of ball-bearing guided router bits. Note that the cove in the leaves is cut with the bottom side of the leaves facing up. Make your initial cove and roundover

cuts with the bits set a little shy of the final $\frac{1}{8}$ in. shoulder depth. Then reset the bit depth to yield the $\frac{1}{8}$ in. shoulder and make a final pass. This last light cut will clean up any burn marks or roughness from the first cut.

Round the bottom edge of the roundover slightly, as shown in the Rule Joint Detail, then mortise for the solid brass table hinges (J). To properly locate the hinge mortises, the top and leaves should be laid out upside down and butted up tight on a flat surface. Note how the hinge mortise is positioned so the knuckle pivot point is just a hair to the drop leaf side of the roundover shoulder. This allowance is critical, since it prevents the rule joint from binding as the leaves are raised or lowered. Mount the hinges and test the leaf action.



If the action is smooth, now lay out the oval shape (see Making The Oval) and cut the edge. The easiest way to get a good, even edge all around is to use the oval layout instructions to make a hardboard template that's just a little larger than one quarter of the oval. Use the template to scribe the oval profile all around, then use a jigsaw to cut just

outside of the scribed line. Note that you'll need to scribe a pair of perpendicular center lines on the top, and index lines on the template, so the template can be properly located. Next, using the center and index lines, locate the template over one quarter section at a time, and use the router and a pattern cutting bit (see page 24) to get a perfectly

smooth oval. The slightly oversize quarter-section template allows for a smooth transition as you go from one quadrant to the next. With the oval complete, mount a ball-bearing guided 3/8 in. radius roundover bit in the router and round the top edge of the oval.

With the top done, now go to work on the table frame. The legs are square, with

Bill of Materials

(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Top	3/4 x 25 1/4 x 67	1
B	Drop leaf	3/4 x 10 x 57*	2
C	Leg	1 3/4 x 1 3/4 x 28 1/4	4
D	End Stretcher	1 1/8 x 1 1/2 x 20 5/8**	2
E	Center Stretcher	1 1/8 x 1 1/2 x 47 3/4**	1
F	End Apron	3/4 x 4 x 20 5/8**	2
G	Side Apron	3/4 x 4 x 45 3/4**	2
H	Leaf Support	1 1/16 x 3/4 x 14 11/16	4
I	Cleat	1/2 x 1 3/4 x 1 1/2	8
J	Table Hinge	1 1/2 x 2 7/8***	3 pair

* Width and length of drop leaves is before oval top is shaped.

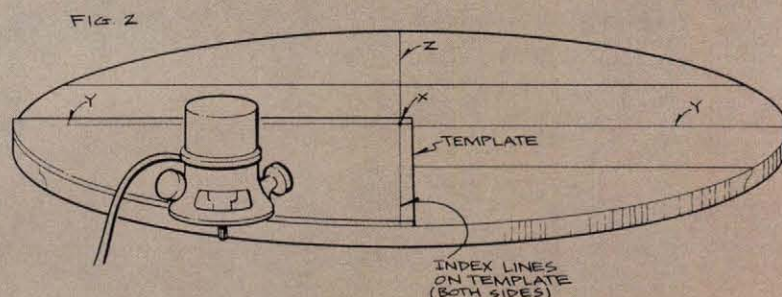
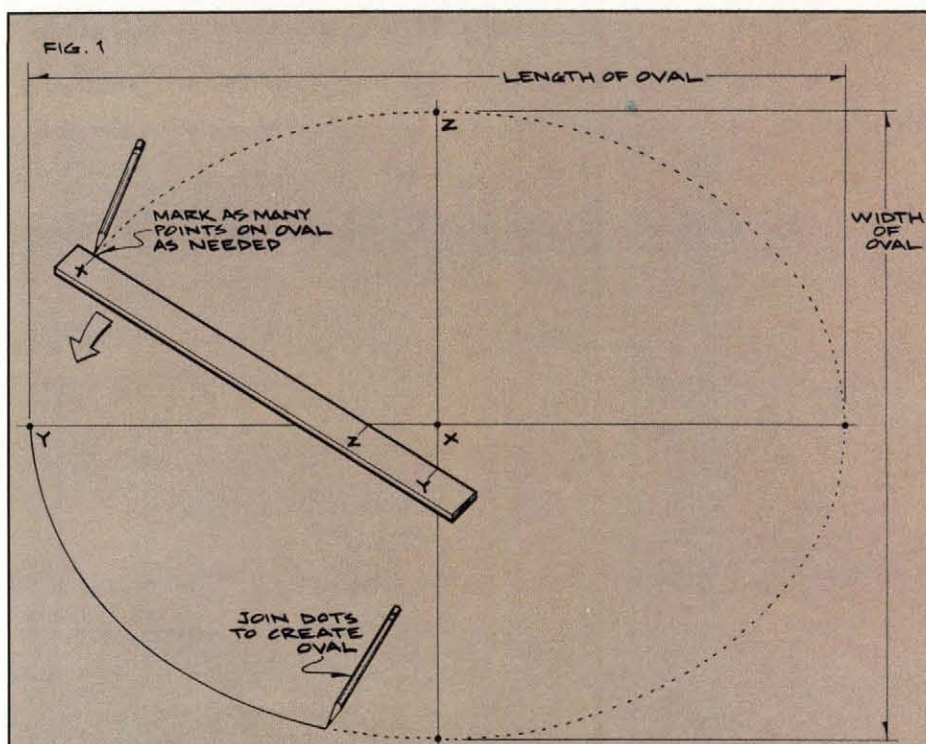
** Length includes tenons.

*** Solid brass table hinge is available from Woodcraft, 210 Wood County Industrial Park, P.O. Box 1686, Parkersburg, WV 26102; tel. 1-800-225-1153. Order part no. 16R42 (3 pair required). Matched cove and roundover bits (in both 1/4 in. and 1/2 in. shanks) are also available from Woodcraft. The bits simplify cutting the rule joint.

a 1/4 in. radius bead on the outside corner, and a 24 in. long tapered chamfer on the inside corner (see detail). Pegged mortises and tenons (see Joinery Details) are used to join the stretchers and aprons to the legs. By slightly offsetting the peg holes through the tenons toward the shoulders, the pegs will help draw the mortise and tenon joints up tight. This technique is especially useful with glue-ups like this, where you may not have clamps long enough to stretch the length of the table. Through-tenons, secured with pegs through the bottom, join the center stretcher to the end stretchers. A 3/16 in. chamfer softens the stretcher corners.

Don't forget to cut a 1/4 in. by 1/4 in. groove on the inside face of the aprons, 1/4 in. from the top edge, to fit the tongue on the cleats that are used to anchor the top. Note that for strength, the cleats are cut so the tongue is established on the end grain. Also cut the leaf supports. The 11/16 in. thickness of the leaf supports allows for a washer between the supports and the bottom of the corresponding apron notches.

Final sand and finish the table with several coats of tung oil. A beeswax furniture polish will lend the wood a fine luster, and the top a modicum of protection.

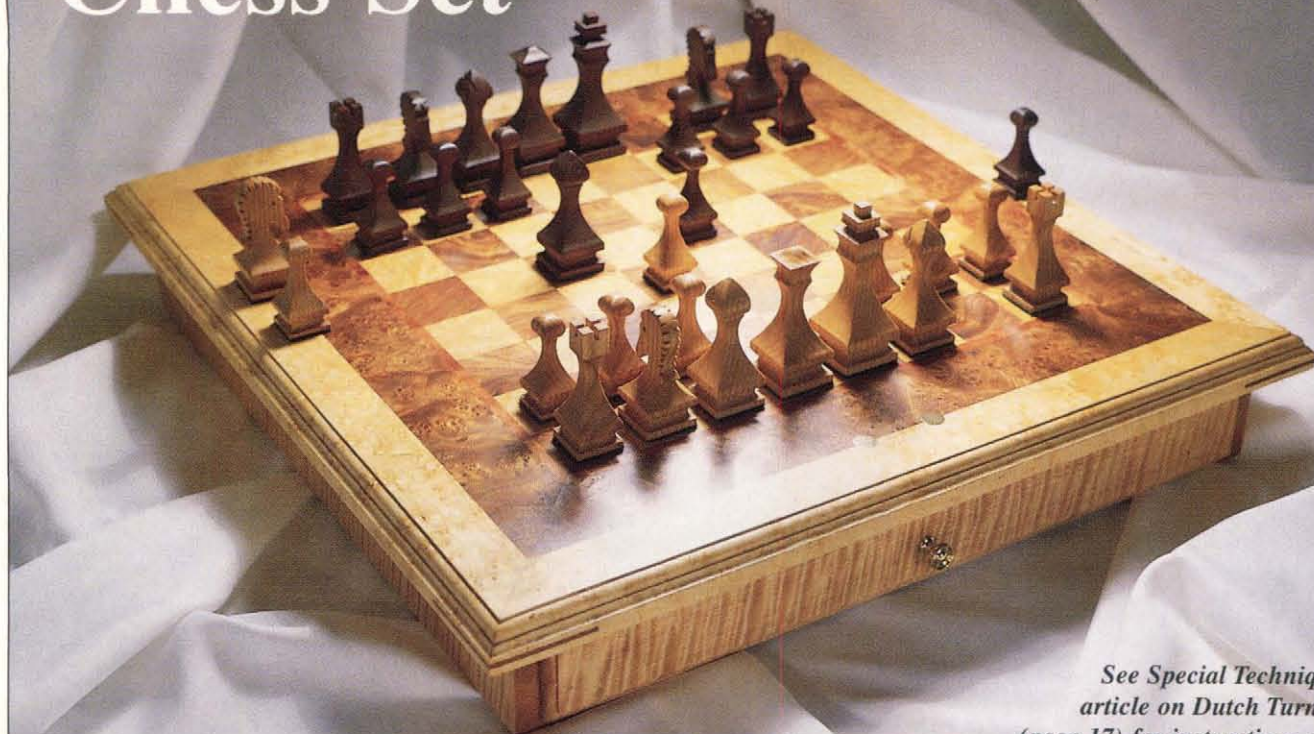


Making The Oval

Here's a simple way to make any size oval. Draw two perpendicular intersecting lines, the horizontal line representing the length of the oval, the vertical line the width of the oval. Label the intersecting center point X, and the ends of the two lines as Y and Z. Now cut a stick a little longer than one-half the length of the oval. Mark a point X near one end of the stick, a second point Y (the distance XY being one-half the length of the oval) and a third point Z (the distance XZ being one-half the width of the oval).

By rotating the stick, all the while indexing the points Y and Z on the stick with the corresponding horizontal line Y and vertical line Z, you can use point X on the stick to mark a series of dots that when connected will form the oval (Fig. 1). Although the entire oval can be laid out this way, it's much quicker to just lay out one quadrant of the oval on hardboard, make a template, and then use the template to mark and cut the entire oval. Your template should slightly overlap the ends of the quadrant, so there's ample bearing surface for a smooth transition from one quadrant to the other as you move the template. Index lines on the template will help align it properly with the intersecting perpendicular lines on the table top (Fig. 2). Use doublestick tape to hold the template in position on the top as you flush-trim the edge with the router and a pattern cutting bit.

Chess Set



See Special Techniques article on Dutch Turning (page 17) for instructions and patterns to make the chessmen.

One of the better feelings in woodworking is the satisfaction when something you made looks like it took weeks of hard work, when in fact only a day or two were needed. Start-to-finish, this chessboard is an easy build in a day, once you've laid up the board veneer.

The board shown has a figured veneer top, with bird's-eye maple edging. The tiger maple drawer case houses a pair of drawers for storing the chess pieces. The drawer boxes are cherry, with drawer faces also in tiger maple. The splines at the miters of the chessboard edging and the drawer boxes are walnut.

The Chessboard

Start by laying up the chessboard veneer (A) and backing veneer (B). Several attractive pre-assembled veneer faces in the 18 in. by 18 in. size are available from Constantine's (see Sources for description and ordering information). Note that the 18 in. by 18 in. size of the veneers and the plywood base (C) listed in the Bill of Materials is the final trim size. The chessboard veneer as purchased should be slightly oversize to allow for trimming later to the final 18

in. by 18 in. size. Start with a plywood base that measures a little larger than the rough chessboard veneer face size.

If you haven't tried veneering before, just use the caul method described in Woodworking Basics (page 27). Be sure to also apply the backing veneer to the reverse side of your $\frac{3}{4}$ in. thick plywood base to balance the face veneer. Don't skimp on the glue; you don't want to find dead spots in the veneer after the clamps and cauls have been removed. Leave in the clamps for at least 24 hours.

Once the veneer and base sandwich is out of clamps, trim it on the table saw to the final 18 in. by 18 in. size. Ideally, the miters on the corners of the chessboard veneer will fall precisely at the corners of an 18 in. square trim size. But that is usually not the case. You may need to cheat a little so the miters fall on the corners. Just make sure that your edging (D) is cut to fit each side, if the final trim size isn't exactly square.

Now rip enough stock to yield the four edging pieces. Measure carefully before cutting the miters. Although you may have heard the old maxim "measure twice, cut once," when working with miters, the best advice is "measure

twice, cut twice." It's difficult with most homeowner table saws to achieve a really clean, smooth miter with a single cut through a fairly thick board. If you check a miter made with just a single cut, you'll often find some ridges and unevenness along the face of the cut. For glass-smooth miters, make your initial cut about half the thickness of the saw blade ($\frac{1}{16}$ in.) away from the mark. Then make a final pass splitting the pencil line, to yield a perfect miter. Test fit each edging piece to the base, and mark it so you know which side it's for.

Now glue and clamp the edging up around the base. Splines or a biscuit joiner come in handy for adding some mechanical alignment so the edging doesn't slip out of alignment on the base as clamp pressure is applied, but since the edging is considerably thicker than the plywood and veneer sandwich, you have a margin for error. Be sure to leave the edging just a hair proud of the chessboard veneer face all around. Later, you'll sand the edging flush.

Once the edging is out of clamps, sand the chessboard top flush. Take care with the board veneer; it's only about $\frac{1}{28}$ in. thick and you don't want to sand

through. Now mount a classical bit in the router and rout the profile in the edging. But don't set the final bit depth immediately. Take a first cut with the bit set about $\frac{1}{32}$ in. shy of the final depth, then re-set to the final depth and make a last light cleanup cut. This cleanup cut should remove any burn marks that the bit left from the initial cut.

Use a simple spline cutting jig on the table saw to cut the spline grooves in the miter corners. As shown in the Spline Groove Jig detail, the jig is just a pair of guide boards screwed to a section of particleboard or plywood. The guide boards must form a 90-degree angle and be located at 45-degrees from the table saw surface. Cutting the ends of the guide boards parallel to the table surface helps lend the jig added stability as you advance it along the rip fence. The blade height setting for the edging spline grooves should be $1\frac{5}{8}$ in.

The splines (E) are cut to just fill the

kerf left by your table saw blade. A safe way to cut splines, if you don't have a zero-clearance insert for your saw, is to stop the cut a little short of severing the wood, and then turn the saw off. Remove the stock and break the spline off after the blade has stopped. Cut enough spline stock to also yield the splines for the drawer boxes.

Generously coat the splines with glue, and insert them into the grooves. A gap filling glue is a handy way to avoid gaps if your splines aren't perfect. When dry, trim the splines flush with the edging.

The Drawer Case

Cut the drawer case sides (G), center divider (H) and stretchers (I) to length and width. Now run a pair of $\frac{1}{4}$ in. by $\frac{1}{4}$ in. grooves as shown on the inside face of the sides, and a single groove on both sides of the bottom edge in the center divider. Dado the sides to fit the center divider, and notch the ends of the

stretchers to fit into the $\frac{1}{4}$ in. by $\frac{1}{4}$ in. grooves in the sides. Cut a rabbet in the top inside edge of the two bottom stretchers to serve as a lip for the plywood bottom panels (K) to rest on. Also, make the $\frac{1}{2}$ in. thick drawer guides (J), and cut a rabbet on one edge to establish a tongue that will fit the groove in the sides. Then cut the plywood bottom panels to size. If you have access to a local dump, you can usually scavenge plywood drawer bottoms from discarded chests of drawers.

Test-fit the drawer case parts, then glue, assemble and clamp. You'll need glue on the ends of the center divider and stretchers, on the drawer guide tongues, and where the plywood bottoms rest on the lip of the bottom stretchers. Check the diagonals on the assembly to make certain the drawer case is square.

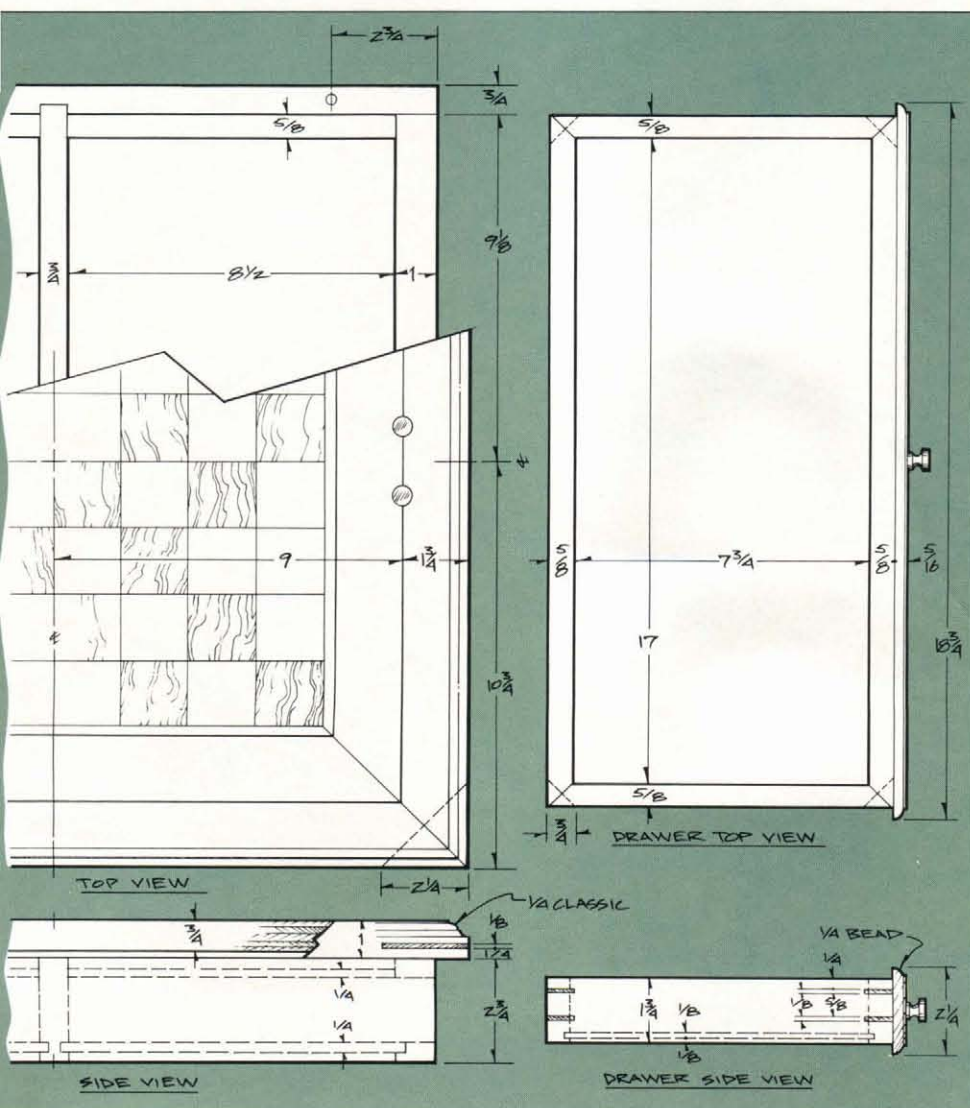
The Drawers

Making drawers is a challenge for many woodworkers. After sailing along through a project, they find themselves spending as much time making drawers as the rest of the project required. Dovetails are beyond the capability of some, the rabbet and dado joint can be fussy to set up for, and a plain butt joint, while adequate for some applications, seems a poor compromise for an elegant project.

But when two identical drawers are needed, there's a surprisingly simple way to make both drawers at the same time, and end up with gemlike drawer boxes that look like they could double as jewelry boxes.

The secret is to make both drawers in a single assembly. Unlike dovetails or the groove-and-dado joint, there's no fussy measuring, adding and subtracting, or test cutting involved. Simply rip stock that's wide enough to yield both drawers, allowing an extra $\frac{1}{4}$ in. for ripping the assembly in half and final trimming. For our pair of drawers, your stock width should be $3\frac{3}{4}$ in. Next, measure the width of the drawer case opening ($18\frac{1}{4}$ in.) and figure the drawer box depth. Our drawers are 9 in. deep, which allows for the installation of double ball catches (U) between the backs of the drawers and the center divider. The catches are needed to hold the drawers closed when the chessboard is in storage, or hung on a wall.

Now crosscut your drawer box stock



to yield the fronts/back (L) and the ends (M). By stacking each pair of parts for the final trim-to-length cut, lengths should be identical. Tilt the table saw blade over to 45-degrees and miter the ends of the pieces. As before, make your

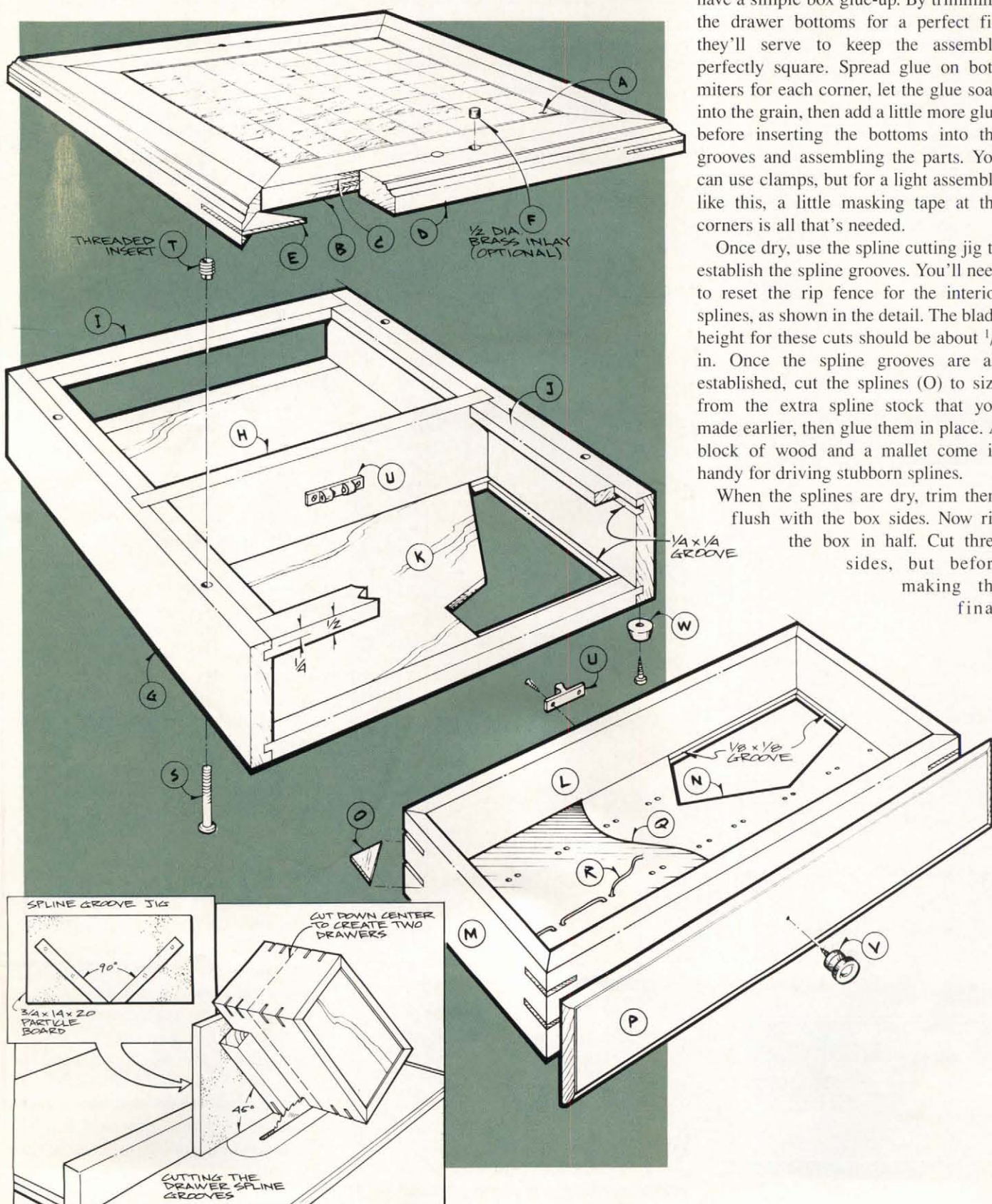
initial miter cuts just shy of the end, then use a final light pass across the blade to cut the miters to a sharp point. Check each pair of parts to insure uniformity of length, then return the table saw blade to 90-degrees, set the blade height for an 1/8

in. deep cut, and locate the rip fence 1/8 in. from the blade. Now establish a pair of drawer bottom grooves on the inside faces of the four drawer box parts.

As you can see, once the two drawer bottoms (N) have been cut to size, you'll have a simple box glue-up. By trimming the drawer bottoms for a perfect fit, they'll serve to keep the assembly perfectly square. Spread glue on both miters for each corner, let the glue soak into the grain, then add a little more glue before inserting the bottoms into the grooves and assembling the parts. You can use clamps, but for a light assembly like this, a little masking tape at the corners is all that's needed.

Once dry, use the spline cutting jig to establish the spline grooves. You'll need to reset the rip fence for the interior splines, as shown in the detail. The blade height for these cuts should be about 1/2 in. Once the spline grooves are all established, cut the splines (O) to size from the extra spline stock that you made earlier, then glue them in place. A block of wood and a mallet come in handy for driving stubborn splines.

When the splines are dry, trim them flush with the box sides. Now rip the box in half. Cut three sides, but before making the final





cut to separate the drawers, place a shim between the drawers and tape across them. That way the outside drawer won't drift into the blade after it's been severed. Reset the rip fence and establish the final drawer height (1³/₄ in.).

The drawer faces (P) are cut from a single piece of ³/₄ in. thick stock. Cut the piece to length and width, then use a beading bit to establish the stepped roundover on each side. A router pad comes in handy for routing small pieces like this, or you can do it on the router table. Now move to the band saw and resaw the drawer face stock to establish the ⁵/₁₆ in. thick faces. After sanding the faces may measure a hair under ⁵/₁₆ in. thick, but that won't affect anything. The faces are glued to the drawer boxes, a good long grain-to-long grain joint.

Hardware

The brass inlay (F) is mainly decorative, but is also a reminder of where the king and queen are located at game's start. Just cut the brass to length, drill a ¹/₂ in. diameter by ¹/₂ in. deep hole, and epoxy the inlay in place. Leave the inlay a little proud, then file and sand flush.

The chessboard is joined to the drawer case with four joint connector bolts (S) and threaded inserts (T). Drill the bolt

holes first, then position the drawer case on the upside down board and mark for the threaded inserts. Although the threaded inserts are sized for a ³/₈ in. diameter hole, for a hardwood like bird's-eye maple, drill the holes about ¹/₃₂ in. oversize. Chamfer the perimeter of the holes so the threaded inserts won't lift and splinter the grain as they're screwed in. If you don't have an installation bit or T-wrench, take a 1 in. long ¹/₄-20 bolt, thread an insert on it so ¹/₂ in. of the bolt thread remains exposed, then use a socket and ratchet to set the threaded inserts. A power drill also works great for this job, but you'll need to grind the bolt head down to fit in a ³/₈ in. chuck. Take care that the inserts are held perpendicular as they are set.

The double ball catches, drawer knobs (V) and rubber feet (W) aren't mounted, nor is the board assembled to the drawer case until after the finish is applied.

Finishing Touches

The board shown has a very simple finish, just two coats of Watco Floor Finish followed by an application of bees' wax furniture polish. Watco Floor Finish is similar to regular Watco, but dries a little harder, making it ideal for a playing surface. Flood on the first coat of Watco, reapplying to thirsty areas of the wood as the finish is absorbed. Wipe the excess off after about 30 minutes and let dry. Apply a second coat, using the same procedure as the first. If the first coat of Watco seems to raise the grain a bit, use 400-grit wet-or-dry silicon carbide sandpaper to final sand the surface while the finish is still wet.

Once the surface is completely dry, use a soft cloth to apply a light coat of the bees' wax polish. Let dry for at least 15 minutes, then buff to a soft sheen.

Since you don't want your chess pieces knocking around inside the drawers, some method must be used to secure them. A length of elastic cord (R), inserted through a series of holes drilled through the felt (Q) and drawer bottoms will hold the chess pieces in place. Secure the ends of the elastic on the underside of the drawer with a dab of epoxy. The felt and elastic cord are sold at fabric supply stores. Secure the felt to the drawer bottoms with the same Velvelette adhesive (available at craft stores) that you used to glue the felt to the bottoms of the chess pieces. 

Bill of Materials

(all dimensions actual)

Part	Description	Size	No. Req'd.
Chessboard			
A	Chessboard Face*	18 x 18	1
B	Backing Veneer*	18 x 18	1
C	Base	³ / ₄ x 18 x 18	1
D	Edging	1 x ¹³ / ₄ x 21 ¹ / ₂	4
E	Edging Spline	¹ / ₈ x 2 x 4	4
F	Brass Inlay**	¹ / ₂ dia. x ¹ / ₂ long	4
Drawer Case			
G	Side	³ / ₄ x 2 ³ / ₄ x 19 ³ / ₄	2
H	Center Divider	³ / ₄ x ³ / ₄ x 18 ³ / ₄	1
I	Stretcher	¹ / ₂ x 1 x 18 ³ / ₄	4
J	Drawer Guide	¹ / ₂ x ⁷ / ₈ x 8 ¹ / ₂	4
K	Bottom Panel	¹ / ₄ x 9 x 18 ³ / ₄	2
Drawers			
L	Front/Back	⁵ / ₈ x 1 ³ / ₄ x 18 ¹ / ₄	4
M	End	⁵ / ₈ x 1 ³ / ₄ x 9	4
N	Bottom*	¹ / ₈ x 8 x 17 ¹ / ₄	2
O	Spline	¹ / ₈ x ⁵ / ₈ x 1 ¹ / ₄	16
P	Face	⁵ / ₁₆ x 2 ¹ / ₄ x 18 ³ / ₄	2
Q	Felt	8 ¹ / ₂ x 17	2
R	Elastic	As shown	3 yds.
Hardware			
S	Connector Bolt***	¹ / ₄ -20 x 80 mm	4
T	Threaded Insert***	¹ / ₄ -20 x ¹ / ₂ long	4
U	Catch****	⁵ / ₁₆ x 1 ¹ / ₁₆	2
V	Knob****	⁵ / ₈ dia. x ⁵ / ₈ long	2
W	Foot	¹ / ₂ dia.	4

Sources

- * Game board veneer faces, backing veneer, and ¹/₈ in. thick plywood (for the drawer bottoms) are available from Constantine's, 2050 Eastchester Rd., Bronx, NY 10461; tel. 1-800-223-8087. Order part no. 78C3W for a board with walnut and maple squares surrounded by a walnut border, and part no. VF3 for a board with striped ebony and figured maple squares accented with a striped ebony border. Order part no. MV13 for a plain mahogany veneer, suitable for backing (order about 4 sq. feet, to allow for waste). For a piece of ¹/₈ in. by 24 in. by 24 in. plywood (enough for both drawer bottoms) order part no. WPP3.
- ** Brass bar stock is available from Small Parts Inc., 6891 N.E. Ave., P.O. Box 381966, Miami, FL 33238; tel. (305) 751-0856. Brass bar stock, ¹/₂ in. dia. by 3 in. long, is part no. J-ZRB-8-3.
- *** Joint connector bolts and threaded inserts are available from Bruss Fasteners, P.O. Box 88307, Grand Rapids, MI 49518; tel. (616) 698-8314. Order part no. JB06 for a package of ten ¹/₄-20 by 80 mm long joint connector bolts, and part no. BK06 for a package of twenty-five ¹/₄-20 threaded inserts. A T-handle insert installation tool (part no. LV03) or an installation bit (part no. LVT5) for use with a hand drill or the drill press are also available from Bruss.
- **** Double ball catches and knobs are available from The Wise Company, 6503 St. Claude Ave., P.O. Box 118, Arabi, LA 70032; tel. (504) 277-7551. Order part no. BC240A for the double ball catch (2 required), part no. K93B for the knob (2 required).

When we first asked contributing editor Dennis Preston to design an outfeed table, we had a concept of a small table that would be little more than a surface providing support behind the table saw for ripping cuts. As an added feature, we'd include some provision for storing blades and accessories. But, as Dennis went to work designing the outfeed table, it soon became apparent that by making the table a little larger, and adding adjustable work supports and a plastic laminate top, the outfeed table could become much, much more. The result is truly a multifunctional shop worksurface, useful as a miter saw table, an assembly table, an outfeed table, and as a storage center for all your portable power tools.

By adding a power strip, as shown, you can keep several tools plugged in and at the ready. Then just reach below the workcenter top to the convenient storage cubbies for your drill, pad sander, and other portable power tools as needed.

It's distressing to have stock fall off the table saw when completing a ripping cut. And it can be dangerous. The longer the overhanging stock the greater the downward force needed to keep the work on the table at the end of the cut. When a board does start to fall, there's a natural tendency to reach over the spinning blade to grab it. For this reason most cabinet shops have some sort of table behind the saw to support the work coming off the saw. For safety and convenience, I consider an outfeed table a necessity. In my small



Shop Workcenter

Build this multipurpose miter saw/storage/assembly workcenter and outfeed table from just 2 sheets of plywood

by Dennis Preston

shop, however, space is too precious to allow the volume below the table to go unused. So I set out to design a multifunctional cabinet.

What resulted is a multipurpose roll around cabinet. It's an outfeed table for the table saw, it's a miter saw stand with adjustable supports for long stock, it's an easily accessible portable power tool storage center, it's a set up and glue up table, and best of all it's easy to build. The unit shown has solid stock edging on all the exposed plywood edges, but if you are looking strictly for maximum functionality with minimum cost and fuss, then omit the edging.

Casters provide the mobility that's so important to a small shop. The top is covered with plastic laminate to provide a smooth surface for the stock to slide.

The interior is fitted with adjustable shelf standards so that the shelf spacing can be modified to suit current shop needs (recognizing that most shops are constantly evolving).

The design is optimized to get the most out of two sheets of plywood (see Plywood Cutting Diagram). All the edge banding and trim was cut from scrap hardwood—white oak in this case.

Before you start building the table, you should give some thought to how it will be used. The overall height of the table shown was set $\frac{1}{4}$ in. lower than the top of my table saw. Having it slightly lower assures no stock will hang up even if it's warped. You can modify the height to suit your table saw by adjusting the height of all the vertical members. Some outfeed tables are made exactly

Plywood is typically $\frac{1}{32}$ in. less (and sometimes as much as $\frac{1}{16}$ in. less) than the nominal dimension. Set up the dado head to suit your $\frac{3}{4}$ in. stock. Use scrap from the actual plywood to make test cuts prior to cutting the joints. Once satisfied with the fit, cut all the joints. Organize your stock so that identical cuts can be done with the same set up; this prevents little dimensional errors from creeping in and accumulating.

Finish Interior Prior to Assembly

Because sanding and finishing inside partitions after assembly is literally a pain in the neck, I sanded and varnished all the interior surfaces prior to assembly. Try not to get the finish into the joints as this may affect the fit and bond. I also fit the shelf standards (S) into place prior to assembly. The shelf standards that I used are made of plastic and are press fit into a precisely cut dado. I made a number of test cuts in scrap to get the correct fit prior to cutting the actual stock.

Assembly

The carcase is assembled with glue and finish nails. Be sure to dry-fit everything

together first. Insert the sides and partitions into the grooves in the bottom, then slide the center divider into place. Next add the top, carefully aligning sides and partitions into the appropriate dado grooves. Check dimensions across diagonal corners; they must be equal for the case to be square. Then set aside to dry. Once dry, measure the interior dimensions of the case and cut the shelves.

Apply Plastic Laminate to the Top

Laying down plastic laminate is a pretty straightforward job, but it's important to approach the task methodically. I used contact cement, since it's the best adhesive for working with plastic laminates. Two things assure success: always cut the laminate oversize so that the excess can be trimmed flush with a router and flush trim bit, and use wooden dowel rods between the laminate and the case to allow positioning of the laminate prior to bringing the two surfaces into contact. Contact cement is just that—once the two surfaces touch they stick like crazy and are almost impossible to separate.

Cut the laminate about 1 in. oversize. Coat the mating surfaces (both the workcenter top and the bottom surface of the laminate) with contact cement and set aside until the surface of the contact cement appears dull and is no longer sticky (generally about 20 minutes). Use five $\frac{1}{2}$ in. diameter wooden dowel rods (about $2\frac{1}{2}$ ft. to 3 ft. long) to hold the laminate off the workcenter top. Position the laminate over the top making sure there's overlap on all four edges. Starting in the middle, remove the first dowel and gently push the laminate into contact with the top. Using your hand, smooth back and forth across the top to push the laminate down. Work carefully from the center to the edge to avoid trapping any air pockets. Now remove the next dowel

Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
A	Top/Bottom	$\frac{3}{4}$ x $23\frac{1}{2}$ x $45\frac{3}{4}$	2
B	Side	$\frac{3}{4}$ x $23\frac{1}{2}$ x $29\frac{1}{2}$	2
C	Partitions	$\frac{3}{4}$ x $11\frac{3}{8}$ x $29\frac{1}{2}$	6
D	Center Divider	$\frac{3}{4}$ x $44\frac{3}{4}$ x 29 *	1
E	Narrow Shelf	$\frac{3}{4}$ x $11\frac{1}{8}$ x 9	8
F	Wide Shelf	$\frac{3}{4}$ x $11\frac{1}{8}$ x 12	6
G	Plastic Laminate	$23\frac{1}{2}$ x $45\frac{3}{4}$ **	1
H	Narrow Edging	$\frac{1}{4}$ x $\frac{3}{4}$	about 38 ft.
I	Wide Edging	$\frac{5}{8}$ x $\frac{3}{4}$ ***	about 8 ft.
J	End Edging	$\frac{3}{4}$ x $1\frac{1}{2}$ x $23\frac{1}{2}$ ***	2
K	Base Trim	$\frac{7}{8}$ x $1\frac{3}{4}$	about 12 ft.
L	Glue Block	$\frac{3}{4}$ x $1\frac{1}{2}$ x 10	2
M	Stock Support Guide	$\frac{3}{4}$ x $1\frac{3}{4}$ x $11\frac{1}{2}$	4
N	Stock Support	$\frac{5}{8}$ x 8 x $11\frac{1}{2}$	2
O	UHMW Plastic Edging	$\frac{1}{2}$ x $\frac{5}{8}$ x 8****	2
P	Threaded Insert	$\frac{3}{8}$ -16****	2
Q	Threaded Rod	$\frac{3}{8}$ -16 thread x 2 long	2
R	Plastic Knob	$\frac{3}{8}$ -16 thread, $2\frac{3}{8}$ dia.****	2
S	Shelf Standards	29 long****	32
T	Casters	3 dia.****	2 pair
U	Power Strip	As shown	1

* Note that center divider is laid out so face veneer runs top-to-bottom.

** Size shown is final trim size. Start with laminate about 1 in. oversize all around.

*** Final width of wide edging and thickness of end edging will be equal to the combined thickness of the top and plastic laminate.

**** See Sources for ordering information.

closest to the center and repeat the process. Continue working from the center to the sides until all the dowels have been removed. Once the laminate is down, use a smooth wood block (about 4 in. square) and a hammer to set the laminate. Do this by holding the block against the laminate and tapping the block with the hammer. Again, start at the center and work to the edges of the top. Trim the excess laminate using a router and flush trim bit.

Cut Edging

The edging (H, I, J) dresses up the raw plywood edge and protects it from chipping. It is cut from $\frac{13}{16}$ in. solid stock. This provides just enough overlap at the edges, and for the top, the little extra allows for the combined thickness of the top and the plastic laminate. The excess is trimmed later with a router and flush trim bit. Apply glue to the case and shelf edges and apply the wood strips using small ($\frac{5}{8}$ in.) brads to hold it in place. After the glue has dried, trim the excess with the router and flush trim bit. Note that the end edging is $1\frac{1}{2}$ in. wide, and is shaped and cut out to allow clearance for the stock supports (N).

Sources

United States Plastic Corp.

1390 Neubrecht Rd.

Lima, OH 45801

Tel. 1-800-537-9724

For Ultra High Molecular Weight (UHMW) plastic edging and plastic knobs. UHMW plastic is part no. 46-46260 (order 2 ft.). Knobs are part no. 83-85213 (order 2).

Woodworker's Supply

5604 Alameda Place NE

Albuquerque, NM 87113

Tel. 1-800-645-9292

For shelf standards and clips. Shelf standards are part no. 804-493 (strips are 8 ft. long, order 16). Clips are part no. 804-514 (12 clips per bag, order 5 bags to support the 14 shelves shown).

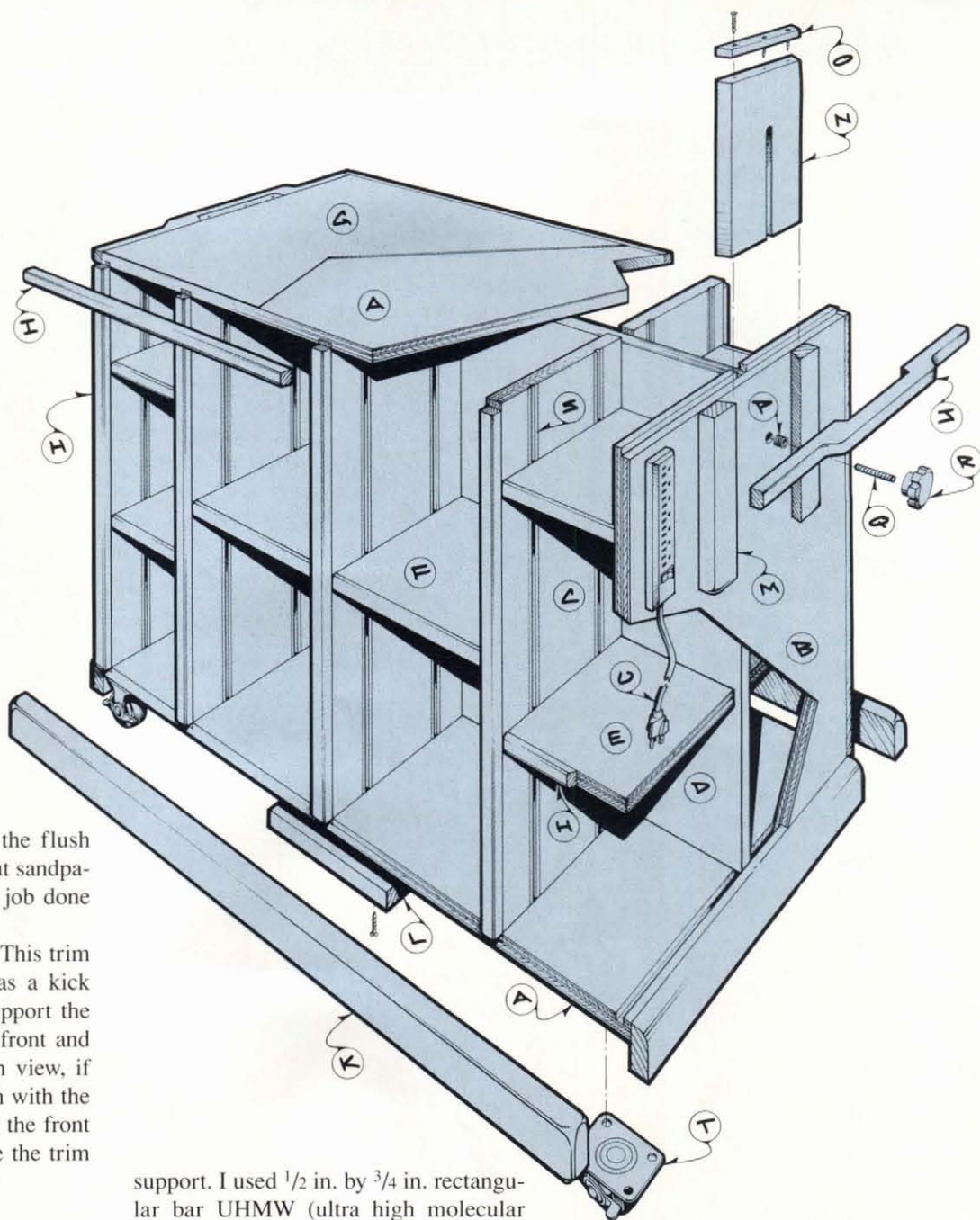
Woodcraft

210 Wood County Industrial Park

Parkersburg, WV 26102

Tel. 1-800-225-1153

For threaded inserts and casters. Threaded inserts are part no. 11M40 (a package of 10), casters are part no. 13X60 (order 2 pair).



You can't use the router and the flush trim bit to flush this edging, but sandpaper and a scraper will get the job done instead.

Also add the base trim (K). This trim protects the bottom, serving as a kick plate. Glue blocks (L) help support the long runs of base trim at the front and back. As shown in the bottom view, if you locate the casters (T) flush with the inside edge of the base trim at the front and back, you'll need to shave the trim to provide clearance.

Stock Supports

The stock supports (N) are a handy feature when cutting long pieces with a miter saw. The supports are made of $\frac{5}{8}$ in. stock. Rip or plane a 20-degree bevel on both edges to form a large dovetail. The slot in the center of the support is cut with a router in several passes using a fence or edge guide. The stock support guides (M) are cut from $\frac{3}{4}$ in. stock. Bevel the inside edges to the same 20-degree angle as the support. Then round the outside edges with a router and roundover bit.

Locate the stock support guides so the stock supports move freely up and down. Then cut and fasten the plastic edging (O) to the top of the stock

support. I used $\frac{1}{2}$ in. by $\frac{3}{4}$ in. rectangular bar UHMW (ultra high molecular weight) polyethylene (see Sources) because it's both slippery and inexpensive. This plastic is easily cut with woodworking tools to its final $\frac{1}{2}$ in. by $\frac{5}{8}$ in. size. When fastening it to the support, be careful not to overtighten the screws as they will cause the plastic to bulge and prevent the supports from seating flush with the top.

The large plastic knobs (R) make the supports easy to lock in place. These knobs come with a $\frac{3}{8}$ -16 thread. You'll also need $\frac{3}{8}$ -16 threaded inserts (P), and a 2 in. length of $\frac{3}{8}$ -16 threaded rod (Q). You can either buy the threaded rod (hardware stores often carry it), or just cut the short length from a bolt. Drive the threaded insert into the sides, then

epoxy the threaded rod into the knob.

Finishing

After final assembly, sand the exterior and edging. I finished this project with two coats of Carver-Tripp Super Poly water-based polyurethane, sanding between coats. The power strip (U) is available at any hardware store.

Once you've completed the cabinet, quickly put it to use. As I discovered, what seemed the perfect multipurpose shop cabinet to me, would have been something entirely different for my wife. She's requested that I build her one (but without the stock supports) to use for laying out sewing patterns and storing her craft supplies.

These lovely heart-shaped boxes will make perfect Valentine's Day gifts. Designed and built by Don Mason, a craftsman from nearby Warren, Connecticut, they are made almost entirely with the band saw. Don has been doing them for years, and he has refined the procedure to a few basic steps. We think you'll find these boxes surprisingly easy to make.

Don makes them in a variety of sizes. Our step-by-step instructions show you how to build one that is about $2\frac{1}{2}$ in. high by $5\frac{1}{4}$ in. wide by 6 in. long, but you can vary any of the dimensions to suit your fancy.

Just about any wood can be used, but as the photo shows, the boxes become especially interesting when a contrasting or highly figured grain is used.

Boxes like this will usually have a rabbet cut into the edge of the lid, which serves to position the lid on the box and prevent

it from sliding. Don finds it easier to glue a smaller inner lid to the underside of the lid, thereby creating a rabbet.

Step 1: Cut $2\frac{1}{2}$ in. thick stock to $5\frac{1}{2}$ in. wide by $7\frac{1}{2}$ in. long.

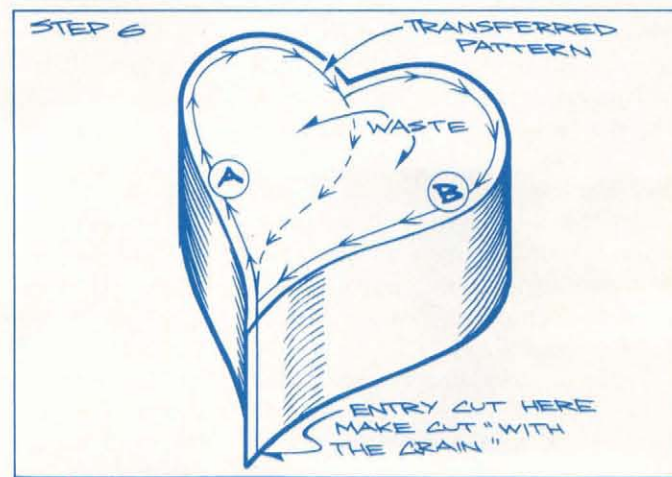
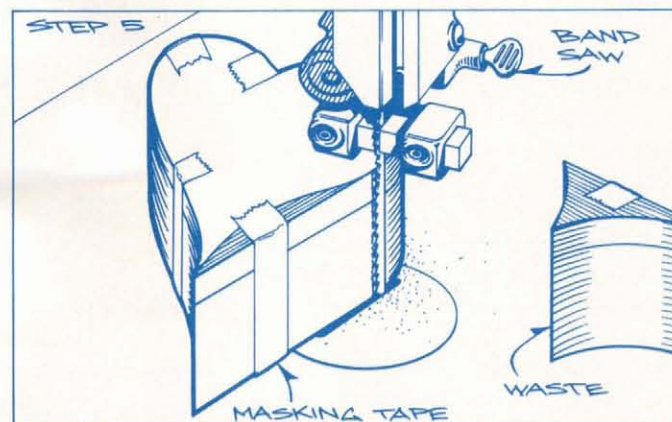
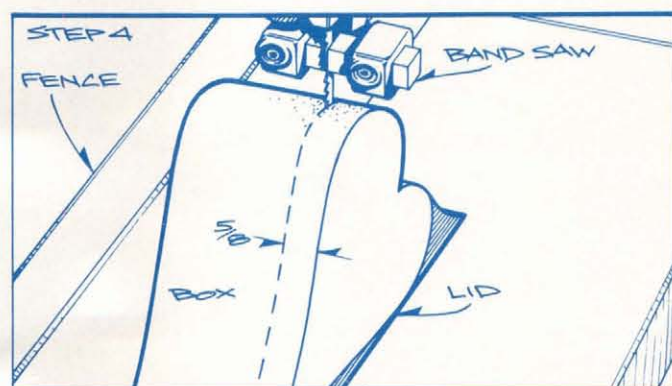
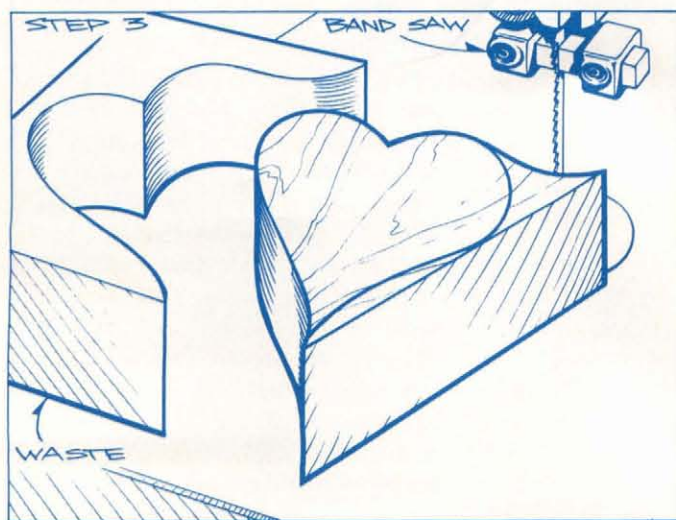
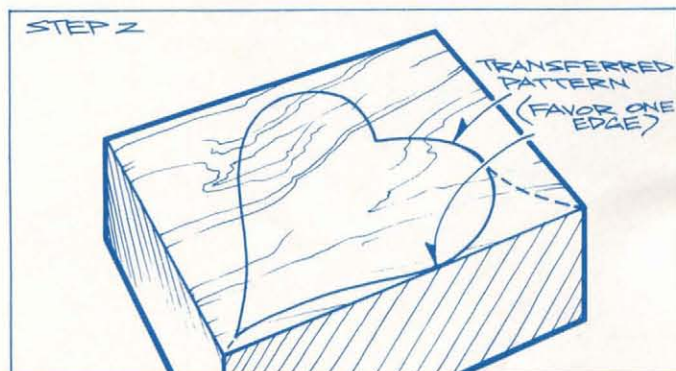
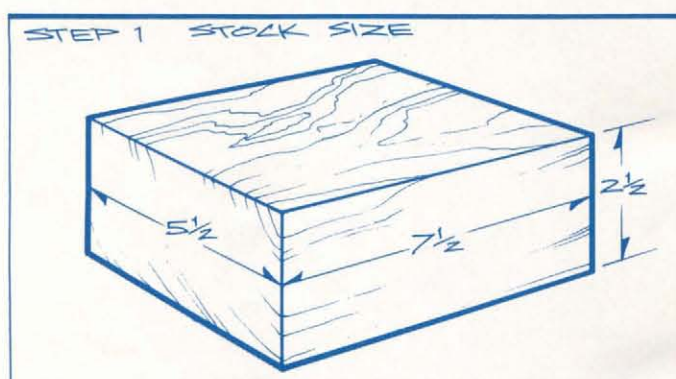
Step 2: Transfer the full size *outside* pattern (see page 58). Locate the pattern so that it's adjacent to one edge of the stock.

Step 3: Cut the box profile with the band saw. However, don't cut the profile along one edge, as shown. You'll want that edge to remain flat for the next step.

Step 4: With the flat edge on the table, use the band saw to cut a $\frac{5}{8}$ in. thick lid from the box.

Step 5: Tape the lid to the box with several pieces of masking tape, then use the band saw to finish the cut started in Step 3.

Step 6: Remove the lid before transferring the full-size *inside* pattern to the box. Using the band saw, make an entry cut as shown, then make the cut labeled "A". Note that this cut



For Your Valentine . . . Bandsawn



Heart Box



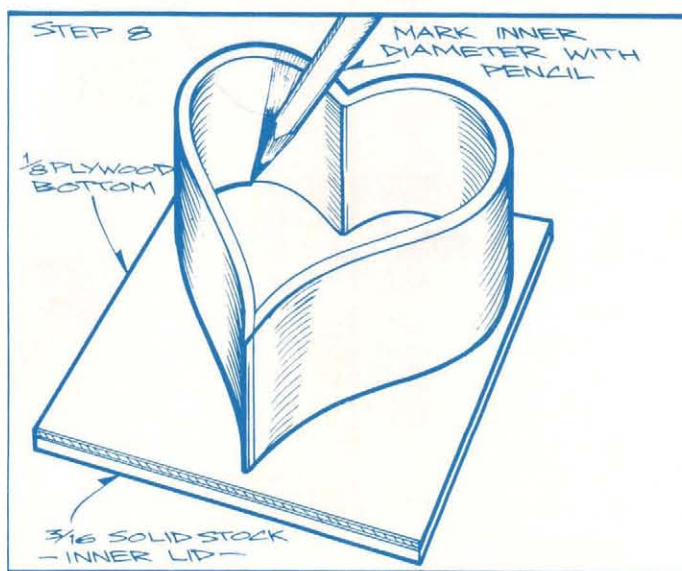
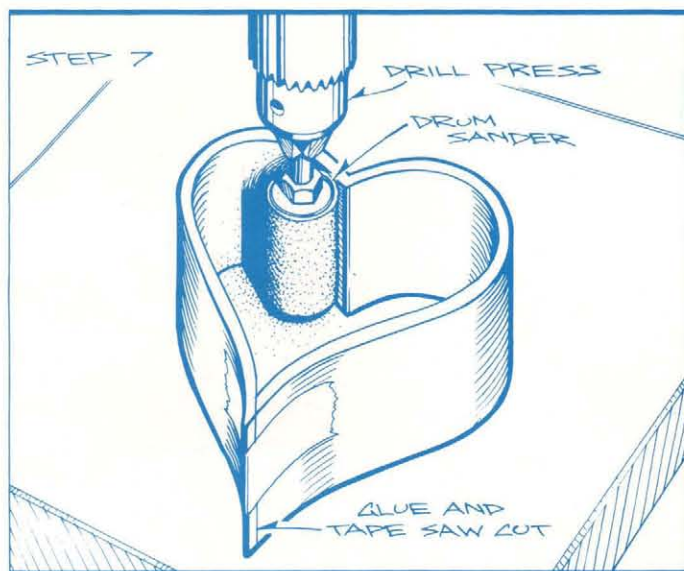
exits the entry cut. Next, again using the entry cut, complete the cut shown as "B". When making the entry cut, it's important to make the cut parallel to the grain direction (often referred to as cutting "with the grain"). This will insure maximum strength when the cut is glued together in the next step.

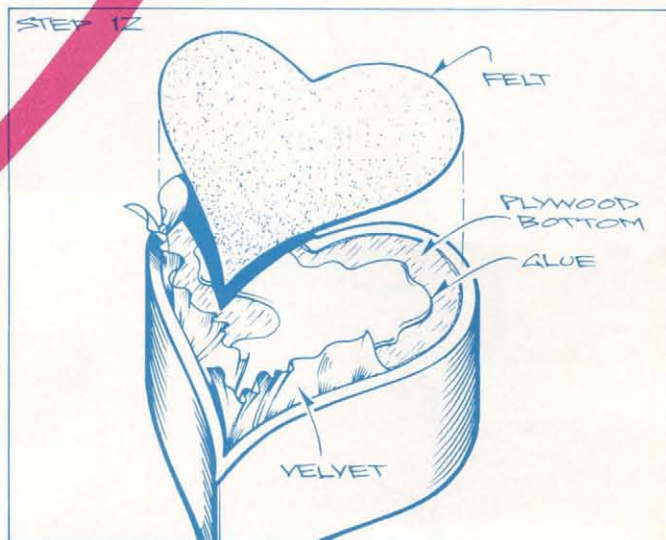
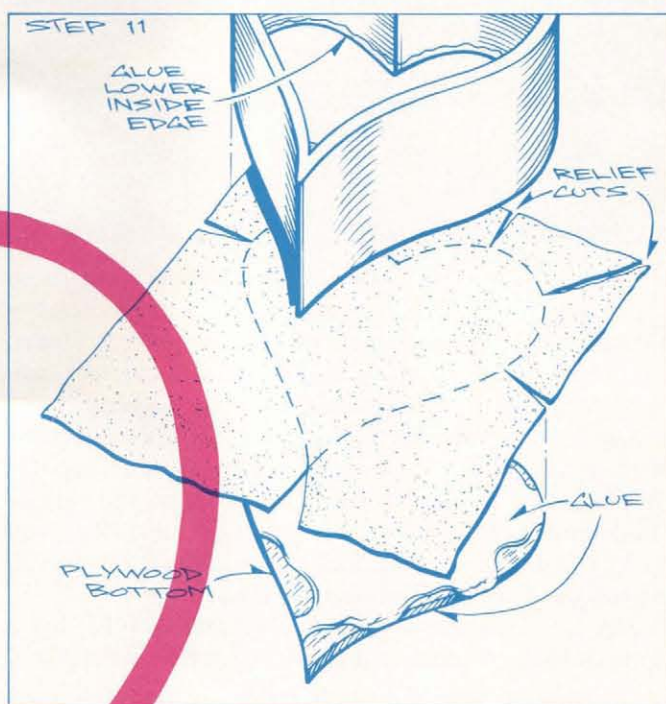
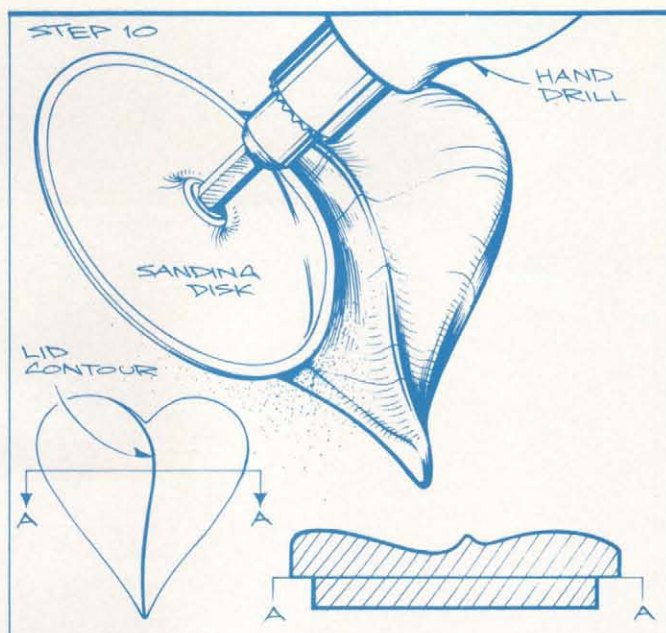
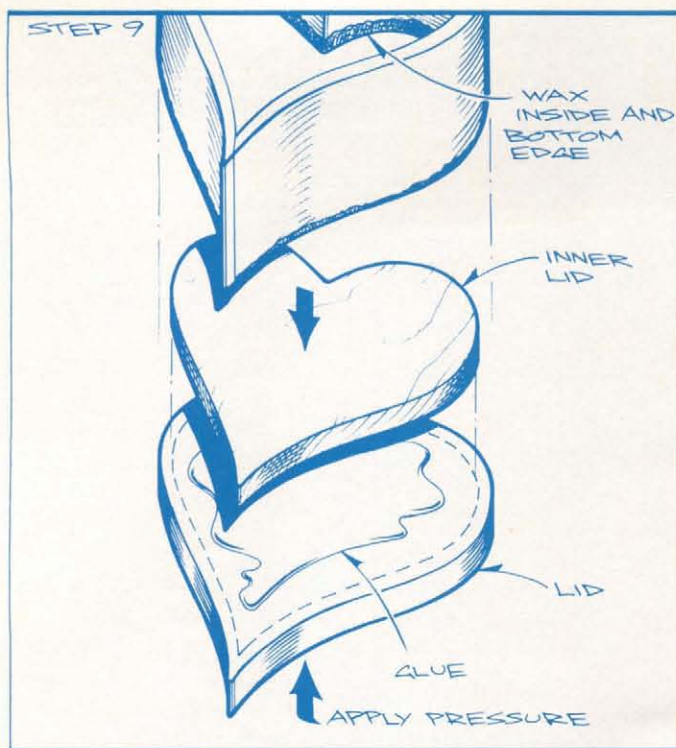
Step 7: Use glue to join the entry cut. Two or three pieces of masking tape will do a good job holding the joint together. When dry, use the drill press and a drum sander to sand the inside surface of the box. Start with 80-grit, then follow with 120, 150 and 220. Since the drum sander can't get into the tight corner, you'll need to hand sand that area.

Step 8: Cut $\frac{3}{16}$ in. thick solid stock (for the inner lid) and $\frac{1}{8}$ in. thick birch plywood (for the bottom) to 6 in. square. With

double-stick (carpet) tape temporarily holding the two pieces together, use the box as a template to scribe the inner profile. Then use the band saw to cut both parts at the same time.

Step 9: Glue the inner lid to the underside of the lid. In order to insure that the two parts are properly located, it helps to place the box in position while the glue dries. However, to prevent the box from sticking should there be any glue squeeze-out, you'll need to apply a coat of paste wax to the inside and bottom edges of the box as shown. One or two C-clamps are all that's needed to apply adequate pressure to the glue joint. To keep the parts from sliding out of alignment when clamp pressure is applied, it helps to secure the box to the lid with masking tape. When dry, use some steel wool soaked in





denatured alcohol to remove the paste wax. (When the penetrating oil finish is applied later, any wax that remains will prevent the finish from soaking-in properly.)

Step 10: The sculpted look of the top adds much to the appearance of the box. It's surprisingly easy to do with an electric drill and a 3 in. or 4 in. sanding disk. If you can't find that size disk, trim down a 6 in. disk. Transfer the lid contour (shown in Step 10 and the full-size pattern) to the top of the lid. Then, using the waste cutoffs from the inner lid to clamp the lid securely in the bench vise, go to work with the disk. Start with a coarse grit to rough-out the shape, then progress to finer grits to smooth the surface. Carving gouges, if you have them, can also be used. The section A-A shows the profile of our lid when viewed from the front, but feel free to create your own shape here. Some hand sanding may be necessary in order to smooth all the curves.

Step 11: After thoroughly sanding the outside of the box, the velvet-lined bottom can be added. Start by cutting a piece of velvet big enough to fit over the bottom. Since this piece will be wrapped around the bottom, it helps to make a few relief cuts in the velvet as shown. Add white or yellow glue to the face and the entire edge of the bottom, and also to the lower inside edge of the box. Place the back of the velvet on the glue, wrap it tightly around the edges of the bottom, then press the bottom into the box until it is flush with the lower edge. Use caution here. If the fit is too tight, the box could split. It's best to dry-fit everything first, and sand any areas that are tight. Once the bottom is in place, use a damp cloth to remove any glue that squeezes into the inside of the box.

Step 12: Allow the glue to dry before trimming the excess velvet with a sharp knife. Once trimmed, use a disk sander to sand the box bottom so that everything is flush. Spread a thin coat of glue to the bottom and apply a 6 in. by 6 in. piece of felt. When dry, trim the felt flush with the box sides. Two coats of penetrating oil will complete the project.



Scroll Saw Door Harp

Some projects seem to possess an enduring popularity, even as tastes and styles change. Door harps are in this genre, and there is certainly no lack of designs. From the traditional heart shape, to whimsical shapes, to ridiculous cartoon faces, there is a door harp for every preference.

But if your taste, like ours, runs more toward the classic and traditional than toward the sublime or ridiculous, then we think you'll appreciate this elegant, easy-to-make version. It's from the Round Mountain Woodworks studio of Nicholas Mariana, in Victor, Montana. To help make building the door harp easier, Round Mountain Woodworks has put together a kit that includes all the hardware that this project requires (see Sources of Supply).

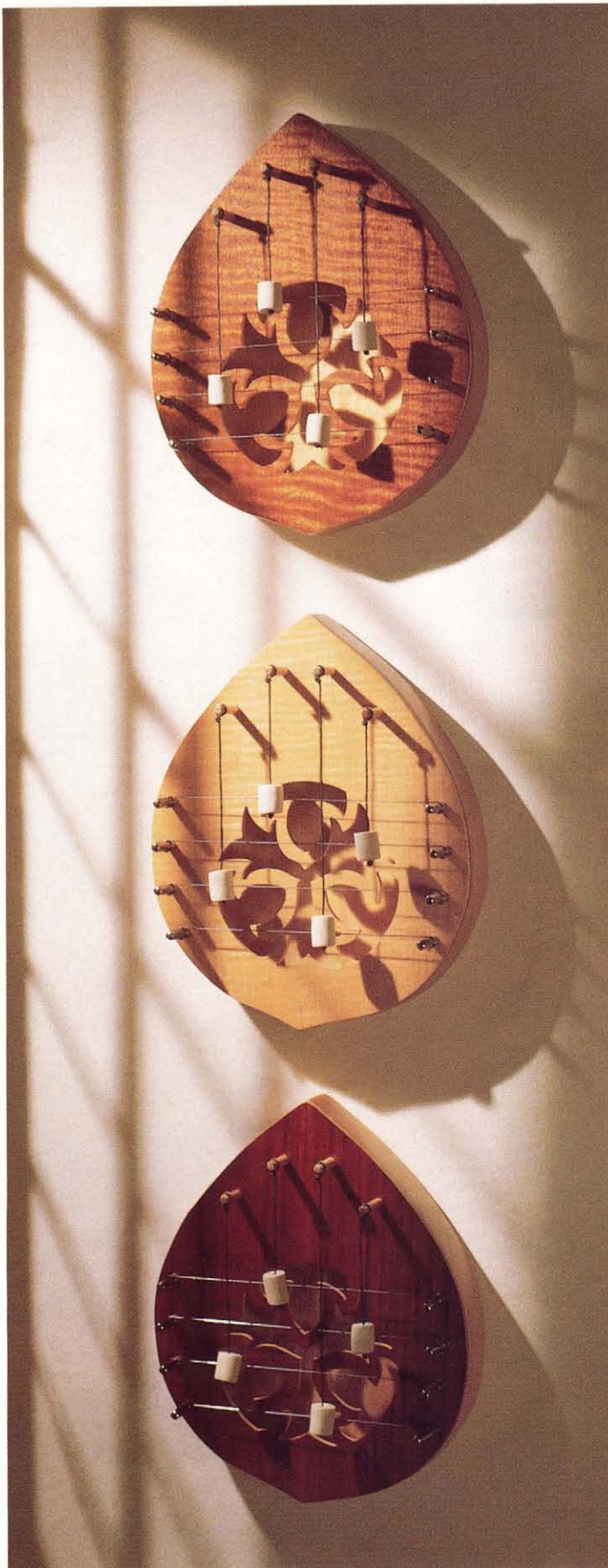
Although most woodworking supply catalogs offer several varieties of hardwood plywoods, for a more unique look, this is a good project to practice laying up your own veneer. Buy enough veneer (about 8 in. wide by 10 in. long) to cover the front of the door harp. Then glue up the veneer as described in the Woodworking Basics article (page 27). The photo shows door harps made with three different veneers: padauk, curly maple, and ribbon stripe mahogany. Apply the veneer over a $\frac{1}{8}$ in. thick luan mahogany plywood. For this size project, a smaller version of the veneer press shown in the Woodworking Basics article will work fine.

Once you have your veneer laid up, or once you've purchased your pre-veneered plywood, just follow our simple step-by-step instructions to make the door harp. Begin by cutting your stock to size (Step 1). You'll need one piece of $\frac{1}{8}$ in. plywood (with a face veneer) for the front, a second piece of $\frac{1}{8}$ in. plywood for the back, and a 1 in. thick board for the center section. Cut all three pieces to 7 in. wide by $8\frac{1}{2}$ in. long.

Now transfer the pattern to the front. If you plan on making a number of these door harps (they make great gifts), first make a template from some stiff cardboard. By saving the cardboard template, you'll be able to easily reproduce the design later on. Also transfer the outside profile, as shown in Step 2.

Next, lay out a 5 in. diameter circle as indicated. You could cut out this circle with the scroll saw, boring a starter hole first and then threading the blade through the hole before clamping the blade in the scroll saw. But in a production situation—where every extra step means added costs—Round Mountain Woodworks just makes the cutout with the band saw (Step 3). As we'll see, the entrance kerf is closed when the door harp is clamped up, later on. Be sure to make the entrance cut with the grain, as shown.

Using the scroll saw, now cut out the sound hole. As shown,



you'll need to make a starter hole for the blade for each of the four interior cuts (Step 4). Sand to clean up any fuzz remaining from the scroll saw cuts. Once your sound hole is complete, glue up the front and back around the center section. Add some glue in the entrance saw kerf of the center section, and be sure to employ clamp blocks to help distribute clamping pressure and so your C-clamps don't mar the plywood (Step 5). Also, apply some side-to-side clamping pressure on the end where the entrance cut was made, to close the kerf.

Once the assembly is out of clamps, but before you cut the outside profile, mount a keyhole bit in the router table and rout a keyhole slot in the back to hang the door harp. If you don't have a keyhole bit, just drill an angled hole so the door harp can be hung on a finishing nail. Then, using the band saw, cut the outside profile (Step 6). Sand carefully to clean up any irregularities from the band saw cut. Then apply a finish. Several coats of a clear spray lacquer are recommended.

Next, drill the peg and zither pin holes (Step 7). The hole locations should have been transferred at the same time that you transferred the pattern. Use a $\frac{3}{16}$ in. diameter bit and make the holes 1 in. deep. Glue the wooden pegs in place so they protrude about $\frac{3}{4}$ in.

Mounting the zither pins and the steel strings (Step 8) requires some care. As you'll note from the photo, the steel strings are wrapped around the zither pins so they carry across the tops of

the pins. This is needed to make the strings level. The zither pins have a very fine thread, and are screwed into place. Take the four left side pins and screw them in until they have just about bottomed out (the threads should be fully seated). Now screw the four right side zither pins in far enough so about $\frac{1}{4}$ in. of the threads is exposed. Thread the steel strings through the left side pins and turn the pins counterclockwise (unscrewing) the pins about three or four turns. This should wrap the string around the top of the zither pins. Next, thread the other end of the strings through the right side zither pins, and screw the pins in a clockwise motion (screwing in) about three or four turns. The clockwise motion should wrap the string around the top of the four right side zither pins, and both the left and right side pins should be left at about the same height.

Now mount the clappers to their strings, and tie those strings to the wooden pegs at a level that will allow the clappers to strike the steel strings squarely. A dab of epoxy will permanently bond the clapper strings to the wooden pegs. Fine-tune each of the zither pins to get a tone that pleases you, then mount the door harp to the inside of any door that gets regular use. 

Sources of Supply

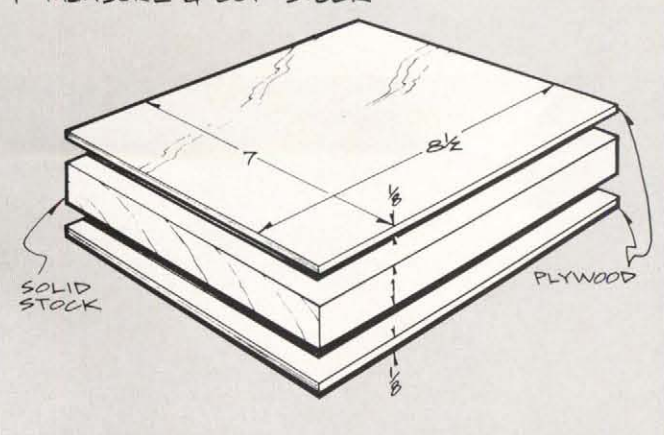
Round Mountain Woodworks
1480 Spiritwood Rd.
Victor, Montana 59875
Tel. (406) 961-4138

Hardware kit (includes eight zither pins, steel string, clapper string and four porcelain clappers). Specify Door Harp Hardware Kit, cost is \$10.95 postpaid (Visa/MC or check).

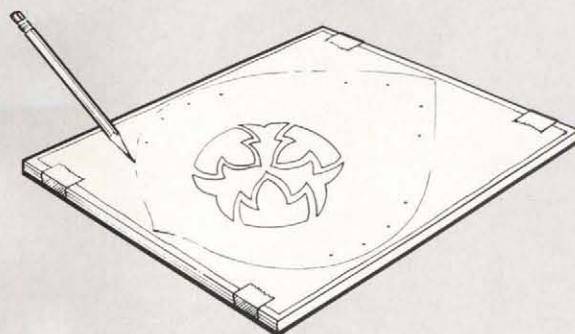
Constantine's
2050 Eastchester Rd.
Bronx, NY 10461
Tel. 1-800-223-8087

Veneers, $\frac{1}{8}$ in. thick hardwood plywood, $\frac{1}{8}$ in. thick hardwood plywood pre-veneered with first grade veneer face

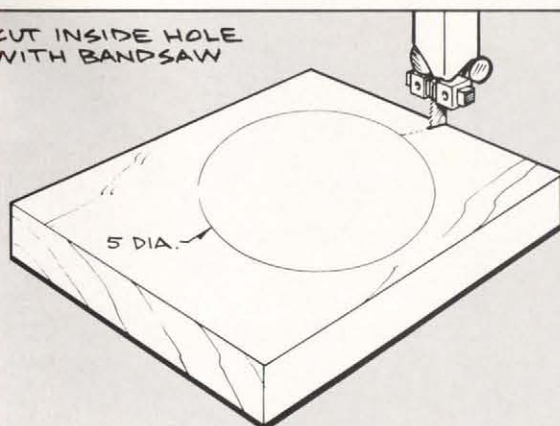
1- MEASURE & CUT STOCK



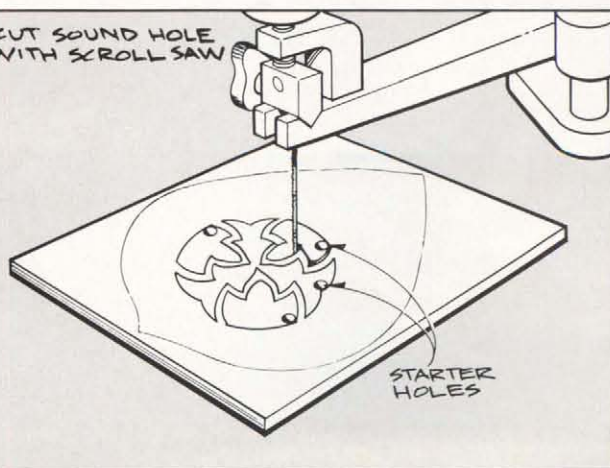
2- TRANSFER PATTERN TO STOCK

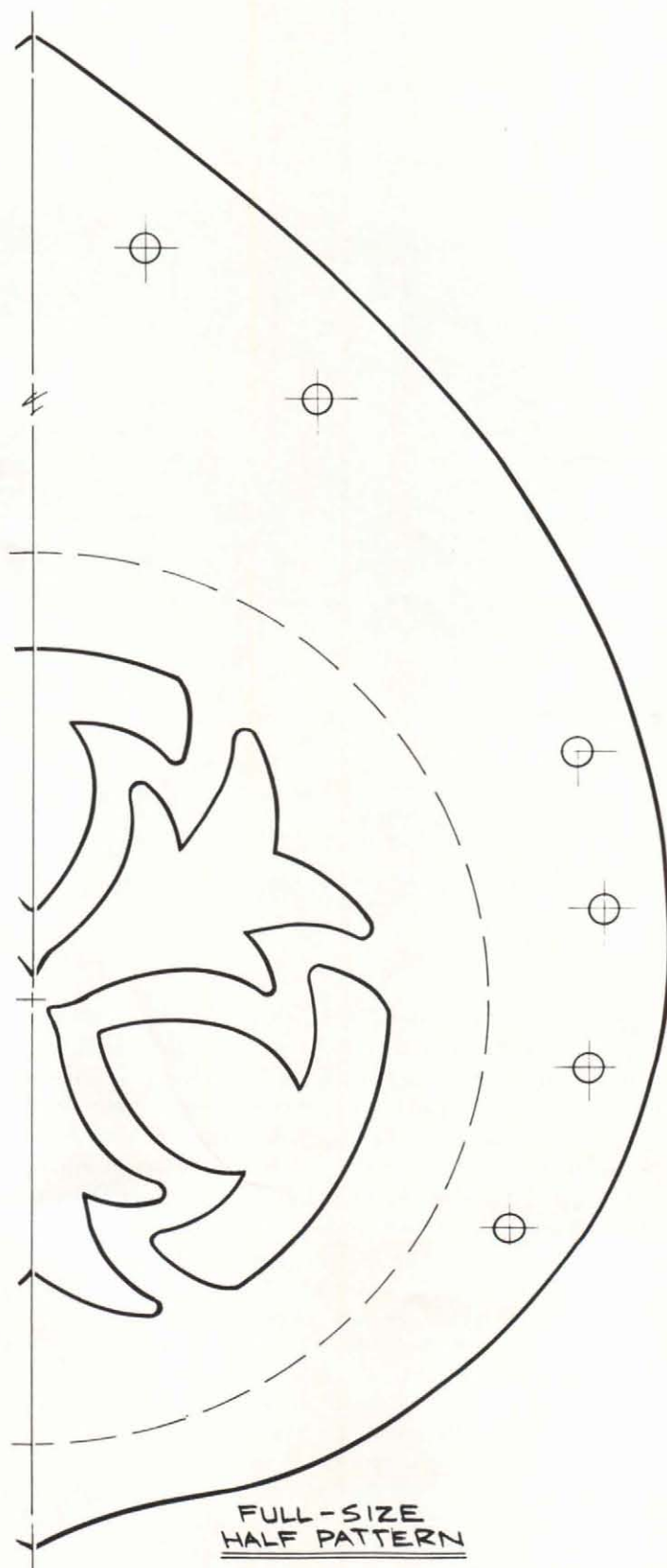
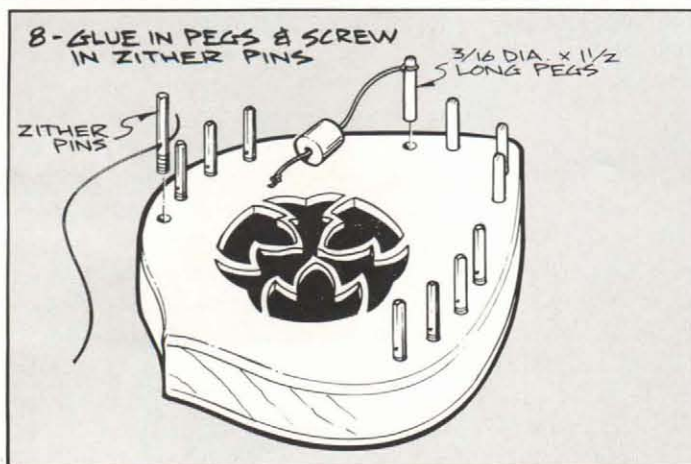
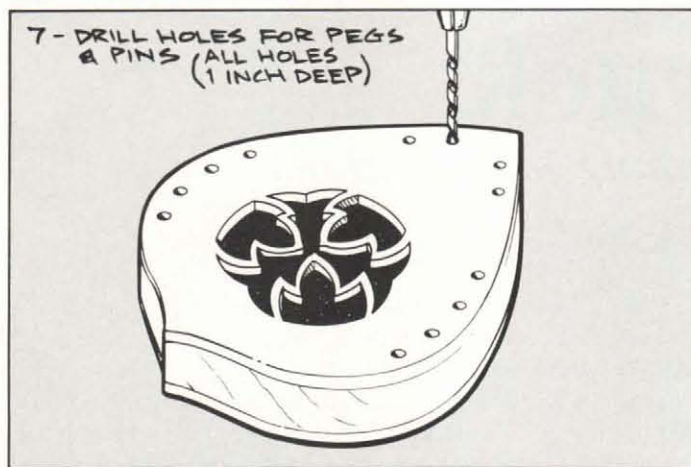
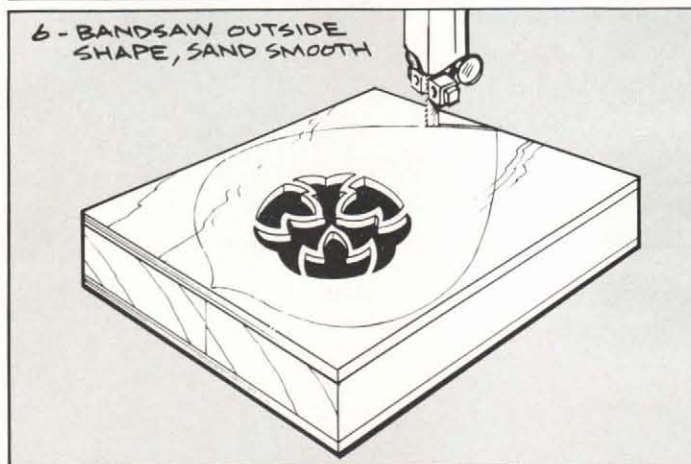
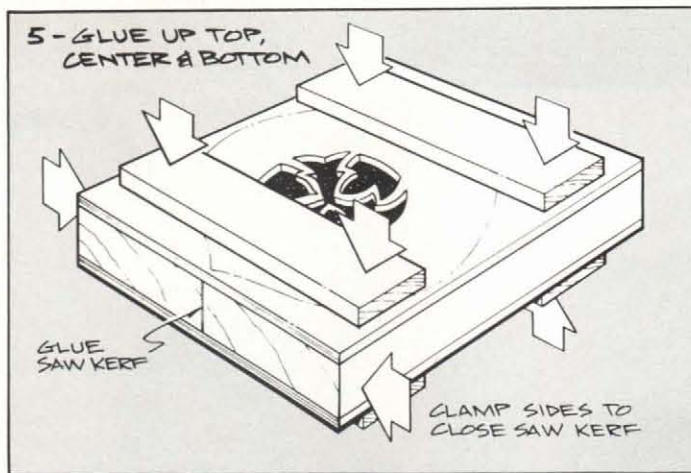


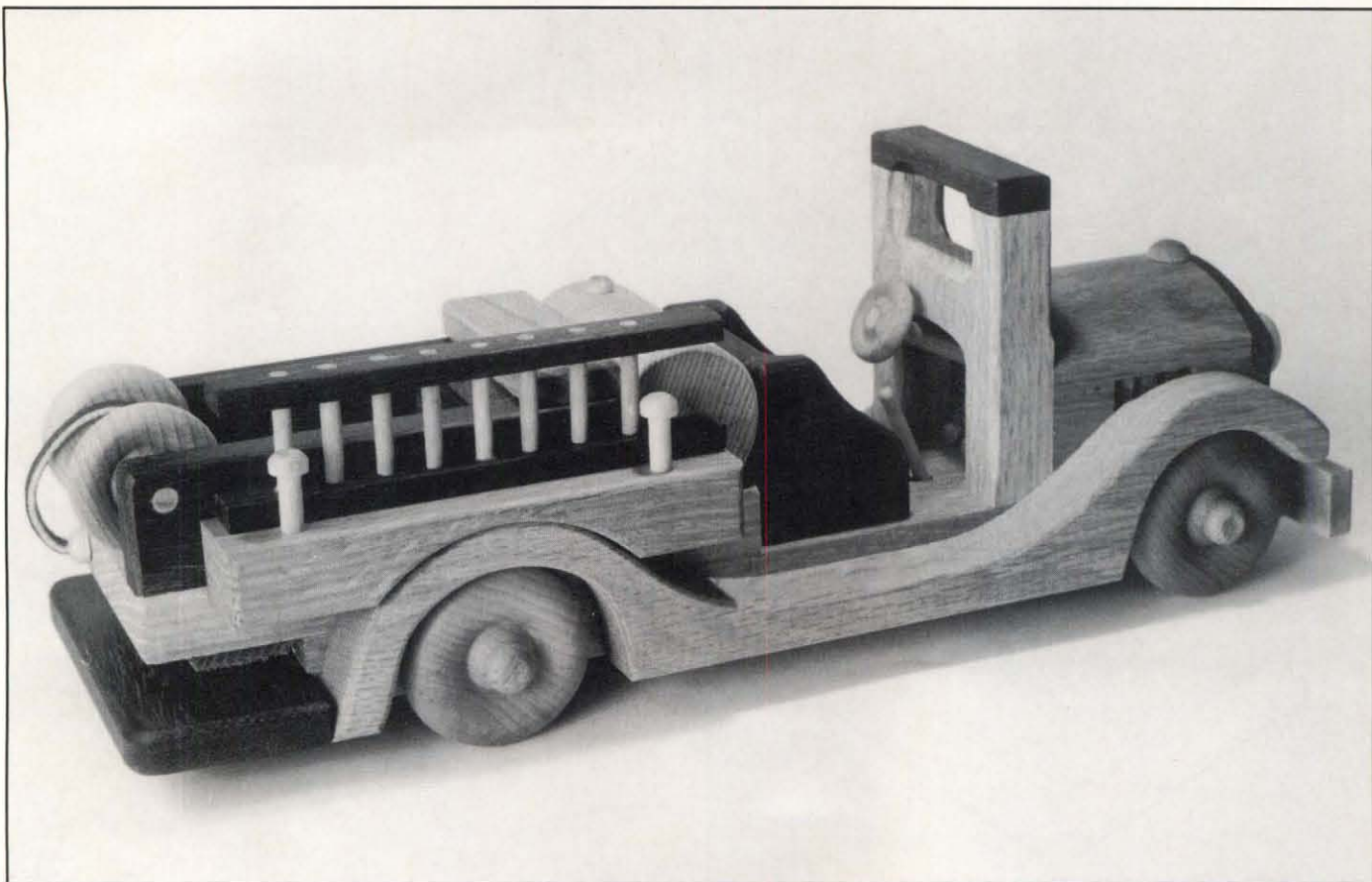
3- CUT INSIDE HOLE WITH BANDSAW



4- CUT SOUND HOLE WITH SCROLL SAW







Classic Firetruck

Old-fashioned pumper fires up young imaginations

There's something truly magical for kids about firetrucks and firefighters. Boys and girls alike, from the age of about 2½ years, develop an enduring fascination with this noble profession. Sure, our wooden truck won't have the blinking lights and shrill sirens of its battery-powered competition, but once their plastic fenders have cracked and the batteries have run down, much of their allure is lost. Our classic firetruck runs on a much more easily replenished fuel...imagination.

For those readers who write to encourage us to keep these classic wooden toys coming on a regular basis, this is another in the line of the fine wooden toys from the Kansas workshops of Fred Cairns and Kathy Dawson. It's similar in construction to the *Dump Truck* featured in our September/October 1991 issue.

To help make building the firetruck a little easier, we've asked Fred and Kathy's company, Lynes Unlimited, to offer a parts kit that will include all the wheels and pegs that you'll need.

The kit won't include any of the other parts, or the dowels, but it does include the leather thong for the firehose (see Parts Kit Ordering Information on page 65).

As shown, the firetruck is crafted mainly of oak, with some padauk accents. Start by cutting the chassis (A) and chassis extension (B) to size. Next, make the hood (C), lower hood (D) and grill (E). Use the table saw to cut the lower detail on the lower hood (see Lower Hood Detail), then add the hood and grill before laying out and cutting (with the band saw) the 2½ in. hood radius arc. The use of padauk for the grill

makes a nice contrasting accent to the other hood parts.

After the 2½ in. radius on the hood has been sanded smooth, use the 3/16 in. radius bearing-guided roundover bit in the router table to establish the stepped roundover detail around the top and sides of the grill, and on the top front end of the chassis. Mount the hood/lower hood/grill subassembly to the chassis, locating it flush with the step on the roundover at the chassis front. Then drill the holes for the various controls (steering wheel, gear shift, pedals).

Next make the cab front and cap (F, G). Cut out the windshield opening at the top, and the recess for the controls at the bottom of the cab front, then glue the cap in place. With the 3/16 in. radius roundover bit still in the router table, apply the stepped roundover around the

windshield opening (both sides). Then glue the cab front/cap assembly to the chassis.

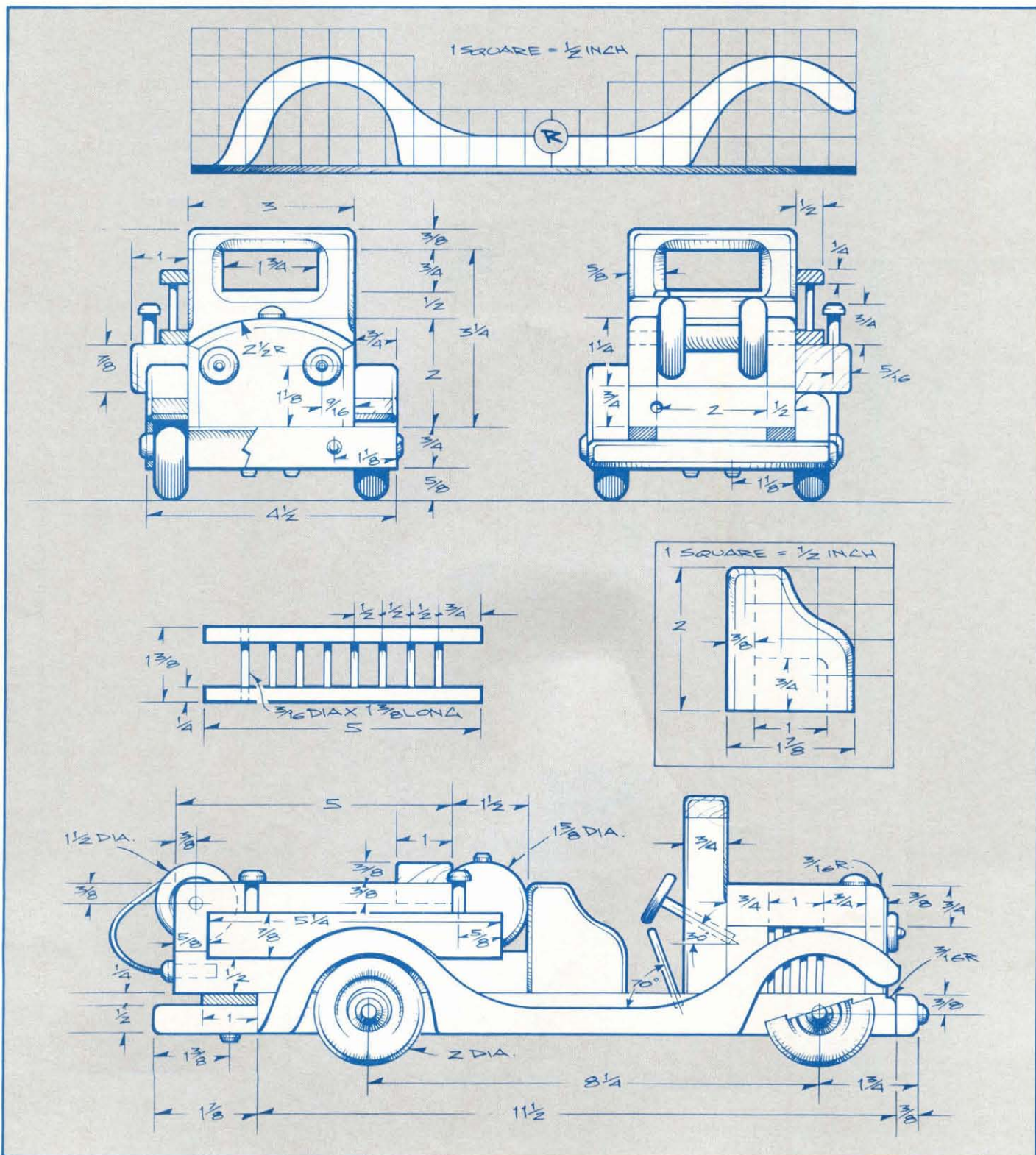
Make the seat (H), seat back (I) and seat sides (J), assemble these parts, and glue the seat assembly and the chassis extension in place. Then add the tank (K), the body sides (L) and the body divider (M). The tank is just a 3 in.

length of stair rail, available at any lumber or building supply yard. Sand the sides of the truck flush on a disk sander, as shown in the Sanding Detail. This is an important step, since the truck sides must be flush for the fenders to fit properly.

Now go to work on the fenders (R). Transfer the fender pattern from the grid

pattern to your stock, then cut the fenders out. For symmetry, use double-stick tape to join the two pieces of $\frac{3}{4}$ in. thick stock from which you'll cut the fenders, then cut and sand both fenders at the same time. Also, cut the compartment lid (N), back bumper (O), spacer (P) and front bumper (Q) to size.

Now, using either the drill press or a



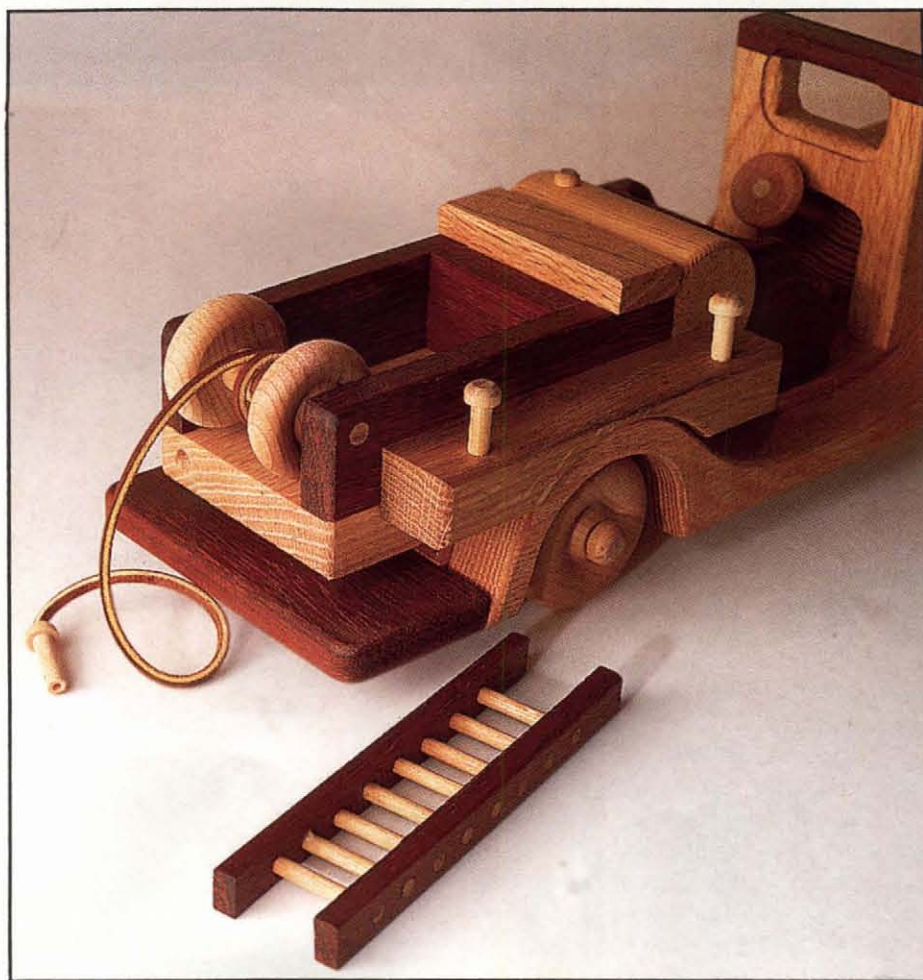
Bill of Materials

(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Chassis	3/4 x 3 x 11 1/2	1
B	Chassis Extension	3/4 x 3 x 6 1/2	1
C	Hood	3/4 x 3 x 2 1/2	1
D	Lower Hood	1 1/4 x 3 x 2 1/2	1
E	Grill	3/8 x 3 x 2	1
F	Cab Front	3/4 x 3 x 3 1/4	1
G	Cab Front Cap	3/8 x 3/4 x 3	1
H	Seat	3/4 x 1 x 2	1
I	Seat Back	3/8 x 2 x 2	1
J	Seat Side	3/8 x 2 x 1 7/8	2
K	Tank	1 5/8 dia. x 3 long	1
L	Body Side	1/2 x 1 1/4 x 5	2
M	Body Divider	1/2 x 1 1/4 x 2	1
N	Compartment Lid	3/4 x 1 x 3	1
O	Back Bumper	1/2 x 1 7/8 x 4 1/2	1
P	Spacer	1/4 x 1 x 2	1
Q	Front Bumper	3/8 x 3/4 x 4 1/2	1
R	Fender	see Grid Pattern	2
S	Ladder Support	7/8 x 1 x 5 1/4	1
T	Ladder Rail	1/4 x 1/2 x 5	2
U	Ladder Rung	3/16 dia. x 1 3/8 long	8
V	Hose Reel Center	1/2 dia. x 1 1/2 long	1
W	Hose Reel Axle	1/4 dia. x 3 long	1
X	Gear Shift	3/16 dia. x 1 1/2 long	1
Y	Steering Column	7/32 dia. x 1 3/4 long	1
Z	Steering Wheel*	1 dia. x 5/16 thick	1
AA	Wheel*	2 dia. x 5/8 thick	4
BB	Hose Reel End*	1 1/2 dia. x 1/2 thick	2
CC	Headlight*	3/4 dia. x 3/16 thick	2
DD	Axle/Radiator		
EE	Cap Peg*	see Peg Detail	5
FF	Bumper/Ladder Retainer/Hose Nozzle Peg*	see Peg Detail	7
GG	Pedal/Headlight/Tank Peg*	see Peg Detail	5
	Hose*	1/8 wide x 14 long leather	1

Parts Kit Ordering Information

Wheels, pegs, and leather hose are supplied as a kit, available from Lynes Unlimited, Route 2, Greenleaf, KS 66943; tel. (913) 747-2612. Specify Parts Kit for Fire Engine (cost is \$10.00 postpaid; checks or money orders but no credit cards). Please note that kit only includes those parts marked with asterisk ().



hand-held drill, make the holes for the axle pegs, radiator cap, headlight pegs, and the various other pegs and dowels. Note that the hose reel is an assembly of a 1/2 in. diameter center dowel (V), sandwiched between the two reel ends (BB), which is then drilled through so that it pivots around the hose reel axle (W). One end of the leather hose thong (GG) is glued into a small hole in the center dowel, the other end is glued into a small hole drilled into the head of a medium-sized peg (EE). An oversize hole in the end of the chassis extension then houses the peg shaft. The peg is not glued into this hole, it just serves as a place to rest the peg when the hose is coiled.

You'll note that the parts kit includes three sizes of pegs. Four of the five large axle pegs (DD) hold the four large wheels (AA) in place, the fifth peg is shortened and serves as the radiator cap. The medium sized pegs (EE) serve to hold the front and back bumpers in place (the two pegs for the back bumper are inserted from the bottom, through the back bumper and spacer and into the

chassis extension), as retainers for the ladder, and as the hose end. The small pegs (FF) serve as pedals, the tank filler cap, and to mount the headlights (CC).

All that's left is to mount the fenders, make and mount the ladder support (S) and the ladder (T, U), and finish off a few last details. The fenders are glued in place flush with the bottom of the chassis. Cut the ladder support to size, shape it to match the profile of the fender that it nests over, then locate and glue the ladder support in place. To make the ladder, cut the ladder rails, then drill through both rails at the same time for the rungs, spacing the holes about 1/2 in. apart. Cut the rungs to length, glue them in place, and sand the ends flush with the rails. Finally, glue the gear shift (X) steering column (Y) and steering wheel (Z) in place.

With your assembly complete, be sure to round all sharp edges. We don't generally recommend a finish for toys, but if you'd like a finish to bring up some of the natural beauty of the wood, try a food-safe finish like Preserve Non-Toxic Nut Oil.



Toucan-on-a-Branch

Some years ago, inspired by an article about intarsia artist Judy Gale Roberts, Berwyn, Illinois, woodworker Robert J. Hlavacek, Sr., decided to try his hand at this interesting form of woodworking. Not content to just reproduce existing designs, Hlavacek started designing his own plans. He also made some changes in the way the designs are created. Instead of choosing different woods, or different tones or shades of the same wood for his pictures (Roberts used mainly western red cedar), Hlavacek discovered that by using just one or two woods, and painting the wood with acrylic paints or a child's set of watercolors, he could create beautiful pictures at minimal cost.

The toucan project uses three different woods. The toucan itself is birch. Birch cuts and shapes easily, and accepts paint well. Also, the thin areas at the tip of the bill and at the top of the head are less likely to break than if a softer wood were used. Poplar is used for the leaves and vine; it has an attractive grain pattern that makes for a nice detail showing through a light coat of green paint. Occasionally you might even find a piece of poplar with a green enough tone so that painting is unnecessary. The tree trunk and branch are western red cedar, which cuts and sands easily, and has a rich natural color that's perfect for this project.

The Materials List gives the rough sizes of the pieces that this project requires. Take careful note of the grain direction arrows on the full-size pattern. Because some of the pieces are very narrow, it's important that you lay out each piece with respect to the indicated grain direction for strength.

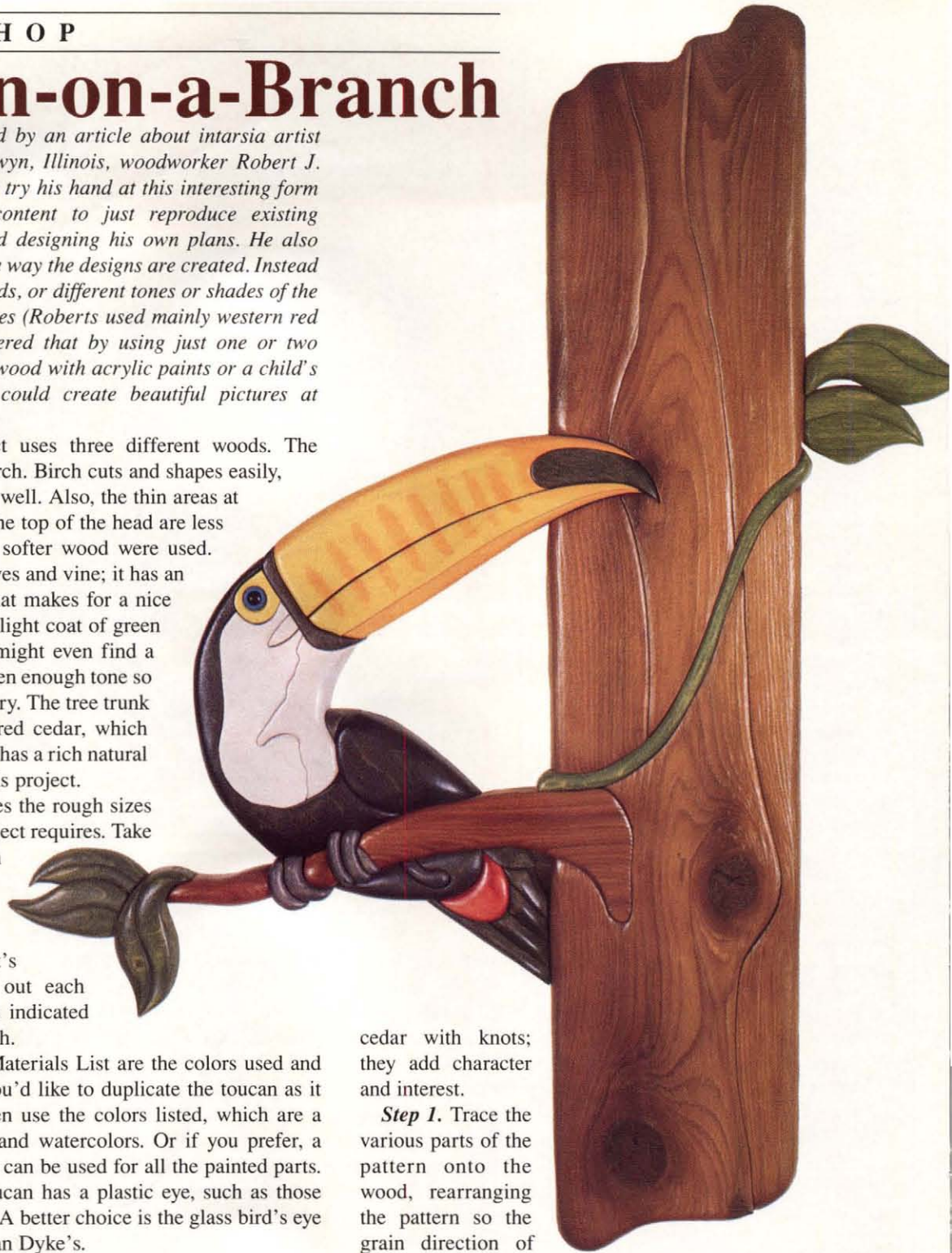
Also included in the Materials List are the colors used and the glass bird's eye. If you'd like to duplicate the toucan as it appears in the photo, then use the colors listed, which are a combination of acrylics and watercolors. Or if you prefer, a child's set of watercolors can be used for all the painted parts. As photographed, the toucan has a plastic eye, such as those sold at many craft stores. A better choice is the glass bird's eye available by mail from Van Dyke's.

We were unable to fit the complete full-size toucan-on-a-branch pattern on the page, though all the important elements are given full-size. The lines AA and BB are included to facilitate connecting the various full-size parts of the pattern. We haven't included patterns for the ends of the tree trunk. Just shape the ends of your tree trunk to suit your taste, and with respect to the board you choose. Use things like the naturally occurring knots and incorporate them into the pattern, as shown in the photo. Although it's not absolutely necessary to make the longitudinal cuts in the tree trunk, doing so helps lend continuity to the look of the piece. Shape those parts and then reassemble them. Note how the longitudinal cuts follow the grain pattern and curve around the knots. Try to find a piece of

cedar with knots; they add character and interest.

Step 1. Trace the various parts of the pattern onto the wood, rearranging the pattern so the grain direction of each piece is as indicated. Actually, this isn't quite as difficult as it may sound. For the toucan itself you'll need only two pieces of wood, one for the bill parts, and a second for the body parts. Now, using a band saw equipped with a $1/16$ in. blade and special plastic or phenolic guideblocks, cut out the individual parts (a scroll saw can also be used). The special guideblocks, which can't damage the teeth, are a must when using a narrow blade. A mail order source for the narrow blade and the guideblocks is provided in the Materials List.

You could use all the bill parts that you've just cut out, but because of the narrow nature of the parts at the end of the bill, and the fact that after the cuts are made you'll have a gap from the saw blade kerfs, it's better to make a separate new piece for



the bill tip—the part that's painted black. The new bill tip should be slightly larger than the bill tip that you were left with when cutting the bill parts. Use the first bill tip as a guide to trace the new bill tip, then cut just outside your pencil line. The slightly larger tip should eliminate the saw kerf gaps. Also, note how the slight change in the bill tip grain direction results in a tip that's less likely to break off, since there's less cross grain. Drill a 10 mm by $\frac{3}{32}$ in. deep hole for the eye. Then cut out each piece.

Also transfer the patterns and cut the branch, leaves, vine and trunk. You should now have all the parts, something like a jigsaw puzzle. The pieces won't have been shaped or colored yet, but they should fit together reasonably well.

Step 2. Cut out the backboard. The backboard, which is cut from $\frac{1}{4}$ in. thick plywood, serves as a base upon which the picture is assembled and glued down. However, this backboard is not meant to be visible. As the photo shows, the profile of the backboard should be cut so it is slightly smaller all around than the assembled pattern. On areas of the pattern that are particularly delicate, such as the branch end and leaves, sanding or shaping the edge of the plywood with a slight bevel will help make the plywood edge less obtrusive.

Once the plywood backboard has been cut out, test assemble the picture on it to make sure no plywood edges protrude.

Step 3. Use drum sanders to round edges and contour pieces. A $2\frac{1}{2}$ in. diameter drum sander works fine for most of the pieces, a $\frac{1}{2}$ in. diameter drum sander will help with the tighter curves and the smaller pieces. Refer to the photos for an idea of how the parts are shaped. Note how the ends of the leaves are undercut to lend them a raised look (see back view). Also, note that although the leaves and vine are cut from $\frac{3}{4}$ in. thick stock, several of the leaves are thinned to $\frac{1}{2}$ in. and $\frac{3}{8}$ in. thick.

The toucan's bill and body are all cut from $\frac{3}{4}$ in. thick stock, but after shaping, the little triangular piece between the neck and wing will end up about $\frac{5}{8}$ in. thick. Don't worry if every part doesn't end up looking exactly as shown in the photo. Part of the fun with intarsia is that every project will be a little different. Test assemble the pieces as you work, to get a feel for how the picture is coming along. That way you can make adjustments to any one piece that may not be just right.

Step 4. Before you start painting the shaped parts, it's a good idea to test the colors on the waste from the boards that you used to cut the toucan, leaves and vine. Remember, the idea is not to lay on a thick layer of paint, but rather to use a thin wash coat of paint that lets the wood grain telegraph through. By experimenting on the scrap you'll learn just what the right mix of paint is.

One trick to get the paint to spread evenly is to first brush the wood with clean water. Start with the bill. Put a little water on the colors you'll be using (yellow and orange) in the paint set. While that water is soaking in, brush clean water on the bill parts and on the part in which the eye will fit. Now brush the yellow on the eye section and over the two upper parts of the bill. Clean your brush and next apply the orange paint to the lower section of the bill, along the top of the bill, and in stripes that run vertically across the joint line of the two upper sections of the bill. You don't want a lot of orange paint on the brush for those sections where you are painting over the yellow.

Next, paint the remaining parts using the colors indicated in the Materials List. Keep in mind that you aren't looking for a

heavy coat of paint. Apply only a light wash coat, light enough so the wood grain shows through the paint.

One problem area when painting can be the tip of the bill. Because the parts are so narrow, there may be a tendency for these delicate pieces to warp as the paint dries. One way to avoid this problem is to secure the bill assembly with a C-clamp and clamp pads at the broad end, while nesting the narrow end in a scrap block of wood that's cut out to fit the end profile of the bill (see Clamping Detail). Allowing the bill parts to dry while clamped up like this insures that the relationship of the parts is maintained so there won't be any problem fitting them onto the backboard later on.

Once the paint has dried—usually overnight—smooth the grain lightly with a 3M Wood Finishing pad (their catalog no. 7415). This step will remove any fuzz. Just be careful not to remove the color. Now spray all the pieces with Krylon No.

Materials List

Wood

- 1 piece birch ($\frac{3}{4}$ in. x $3\frac{1}{2}$ in. x $7\frac{1}{2}$ in.) yields bill parts
- 1 piece birch ($\frac{3}{4}$ in. x 6 in. x 10 in.) yields bird parts
- 1 piece poplar ($\frac{3}{4}$ in. x 4 in. x 9 in.) yields vine and leaves
- 1 piece cedar ($\frac{5}{8}$ in. x 5 in. x 24 in.) yields tree trunk
- 1 piece cedar ($\frac{5}{8}$ in. x 3 in. x 9 in.) yields branch parts
- 1 piece plywood ($\frac{1}{4}$ in. x 16 in. x 17 in.) yields backboard

Hardware

- 1 glass eye (10mm blue), no wire *
- 1 sawtooth hanger

Paint/Finish

- 1 set of watercolors, used as follows:

Bird's tail accent = red
bird's bill = orange, yellow
bird's eye section = yellow

- Acrylic paints, used as follows:

bird's body and tip of bill = black, 02506 Ceramcoat by Delta **

bird's head and neck = white, 02505 Ceramcoat by Delta **

bird's feet and leg = midnight, 02114 Ceramcoat by Delta **

vine and leaves = pine needle green, 2445/3 by

Accent Country Colors ***

- Clear finish, used as follows:

all wood parts = Cherry Tree Toys Clear Matte Finish ****

Tools/Equipment

- $\frac{1}{16}$ in. wide band saw blade and phenolic guideblocks *****

* Available from Van Dyke's, 4th Ave. & 6th St., P.O. Box 278, Woonsocket, SD 57385; tel. (605) 796-4425.

** For a dealer near you, contact Delta Technical Coatings, 2550 Pellissier Place, Whittier, CA 90601. (213) 686-0678

*** For a dealer near you, contact Accent Country Colors, Accent Products Division, HPPG, Borden Inc., Columbus, OH 43215.

**** Available from Cherry Tree Toys, P.O. Box 369, Belmont, OH 43718; tel. (614) 484-4363.

***** Available from Garrett Wade, 161 Avenue of the Americas, New York, NY 10013; tel. 1-800-221-2942.

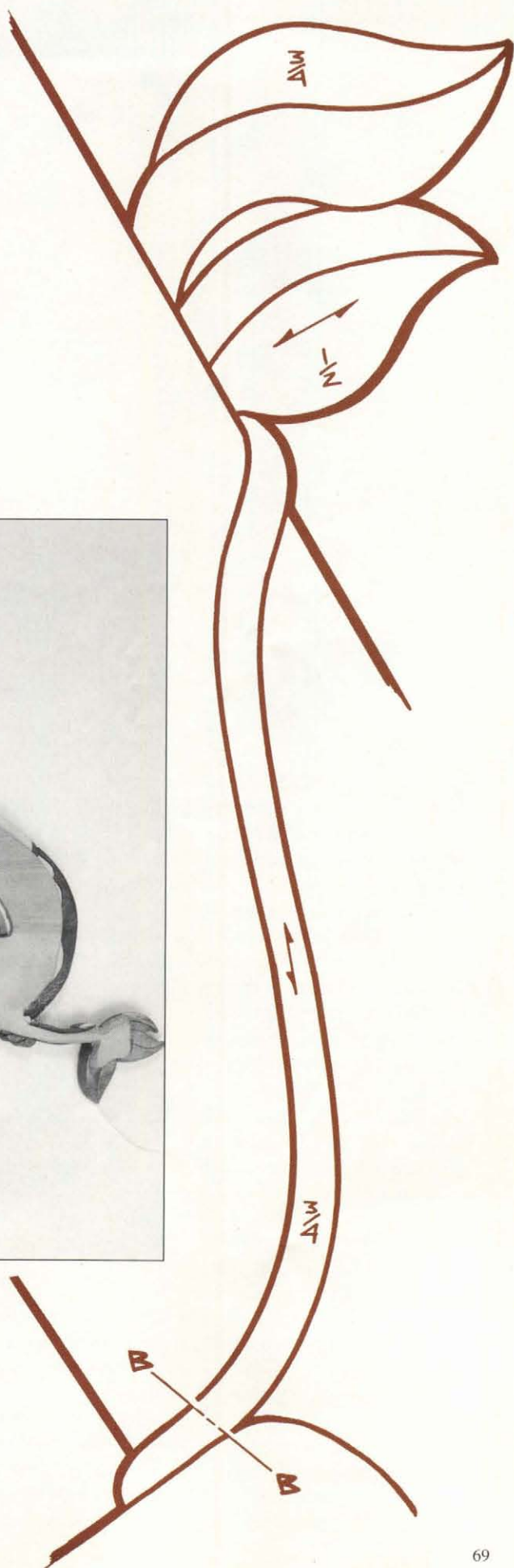
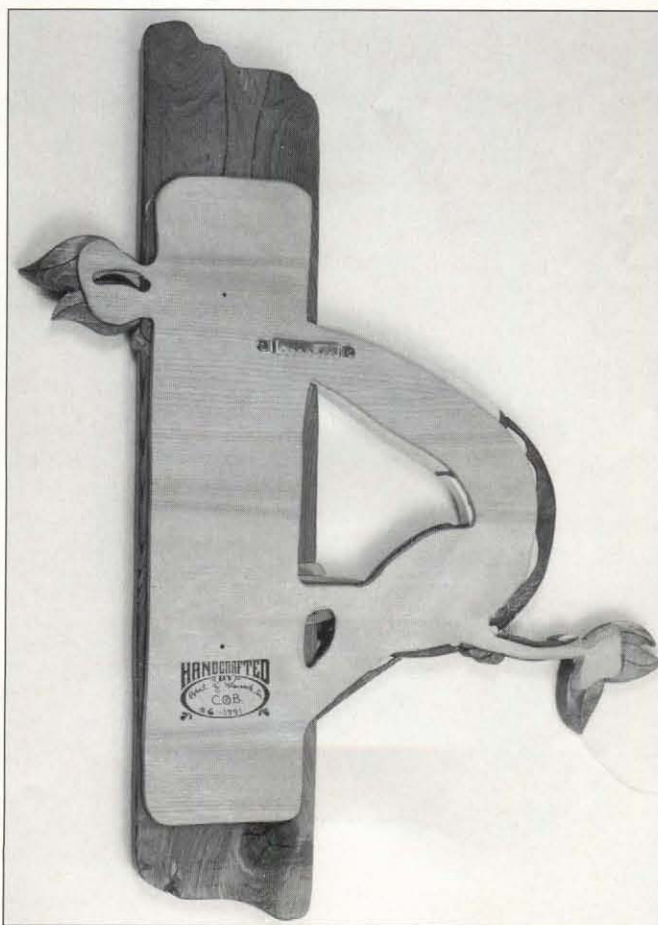
1311 Matte Finish or Cherry Tree Toys Matte Acrylic Finish. The clear finish seals the colors and protects the wood.

Step 5. If you look closely at the photo, you'll note that the cedar parts, unlike the hardwood parts, have a texture to the wood surface. Texturing the surface of the wood leaves the harder areas of the annular growth rings raised above the softer areas between the rings. This is a common antiquing technique, and yields a look that is something like a well-worn surface or a piece of driftwood. The easiest way to achieve this look is to abrade the surfaces with a wire wheel, such as on a bench grinder. The wire wheel tends to chew away the softer wood between the growth rings, leaving the harder wood standing slightly proud or raised. A light sanding after using the wire wheel will remove any fuzz. Then finish the branch and trunk using the same clear finish as for the other parts. At least three coats will be required to lend an even sheen.

Step 6. You are now ready to glue all the pieces down onto the backboard. Either regular aliphatic resin (yellow) wood-working glue or epoxy will be fine. But first, test assemble all the parts on the plywood backboard. If everything looks fine, glue down the tree trunk and the vine. These parts serve as a starting point to which the remaining parts can be added. Next, go to work gluing down the branch and bird pieces. As indicated on the full-size pattern, the leg section of the bird should be raised up about $\frac{1}{8}$ in. The easiest way to do this is to shim under the leg with a small $\frac{1}{8}$ in. thick scrap of wood, bedded in glue.

If all the parts were assembled in the exact relationship as when the various parts were first cut, a saw kerf would exist between the pieces. But you don't want to see any such kerfs in the final assembly. Instead, butt each piece up tight to the one before it. On the fragile areas such as along the branch and feet, the addition of a little glue or epoxy not only on the bottom of the pieces but also between the pieces will help solidify the entire assembly. You'll need to shim under the leaves to insure a tight fit while the glue dries. Epoxy the eye in place. As shown in the back view photo, the addition of a sawtooth hanger (available at hardware stores) provides a way to easily hang your Toucan-on-a-Branch on an available wall.

Editor's Note: If you liked this intarsia project, then you'll be happy to hear that we're also working on a second intarsia project from Robert Hlavacek, Sr.—a group of cute raccoon kits peering mischievously from a tree trunk. Appropriately called The Knothole Gang, this next intarsia project will be featured in the May/June 1992 issue.



Window Valance

This easy-to-make valance, with its distinctively country-look, will add a good measure of charm to just about any window. By simply adjusting the length of the top, front, molding and rod, it can be adapted to a variety of window sizes. The valance is made to fit snugly on the window trim molding, so it can be firmly secured by driving screws into the window molding through the top.

The top doubles as a shelf, providing added space for knickknacks and the like, while a pair of grooves will prove useful when you want to display your favorite plates. Ours is made from pine, a wood we think looks especially good with country-style pieces.

The rod is used if you have "tab" curtains (the kind that are hung from fabric loops) or curtains with a rod pocket. The rod supports allow the rod to be easily removed and replaced. However, before starting, it's a good idea to examine your curtains. You'll want to make sure the tabs or rod pockets are big enough to fit over the rod. Also, for some curtain styles, it may be necessary to make the front, sides and top of the valance a bit wider or longer than we show in the illustration.

Of course, if you plan to use the valance on a window that has existing curtains, you can eliminate the rod and simply size the project to fit over the top of the curtain.

The top (A) is made from $\frac{3}{4}$ in. thick by 7 in. wide stock. To determine the length, measure the length across the top of your

window trim molding and add $4\frac{1}{2}$ in.

Using the router equipped with a $\frac{1}{2}$ in. radius quarter-round bit, apply a $\frac{1}{2}$ in. radius to the lower edge of the ends and front of the top.

Next, cut the two plate grooves in the top using an edge-guide and a $\frac{3}{8}$ in. core-box bit. If you have one, this is an ideal spot to use a plunge router.

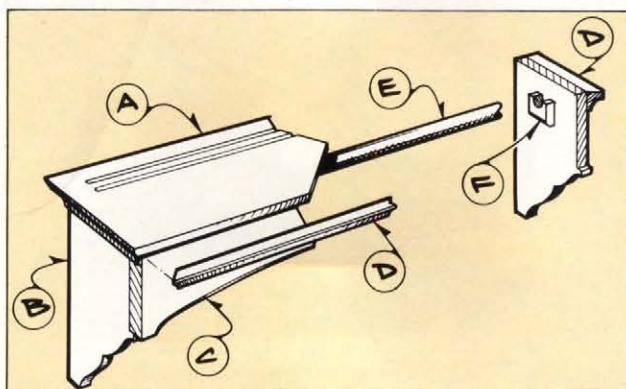
Each side (B) is made from stock that measures $\frac{3}{4}$ in. thick by $5\frac{1}{8}$ in. wide by 9 in. long. After marking the location of the $\frac{3}{8}$ in. deep by $4\frac{1}{4}$ in. long notch in the front edge of each one, use the table saw dado head along with the miter gauge to cut it out.

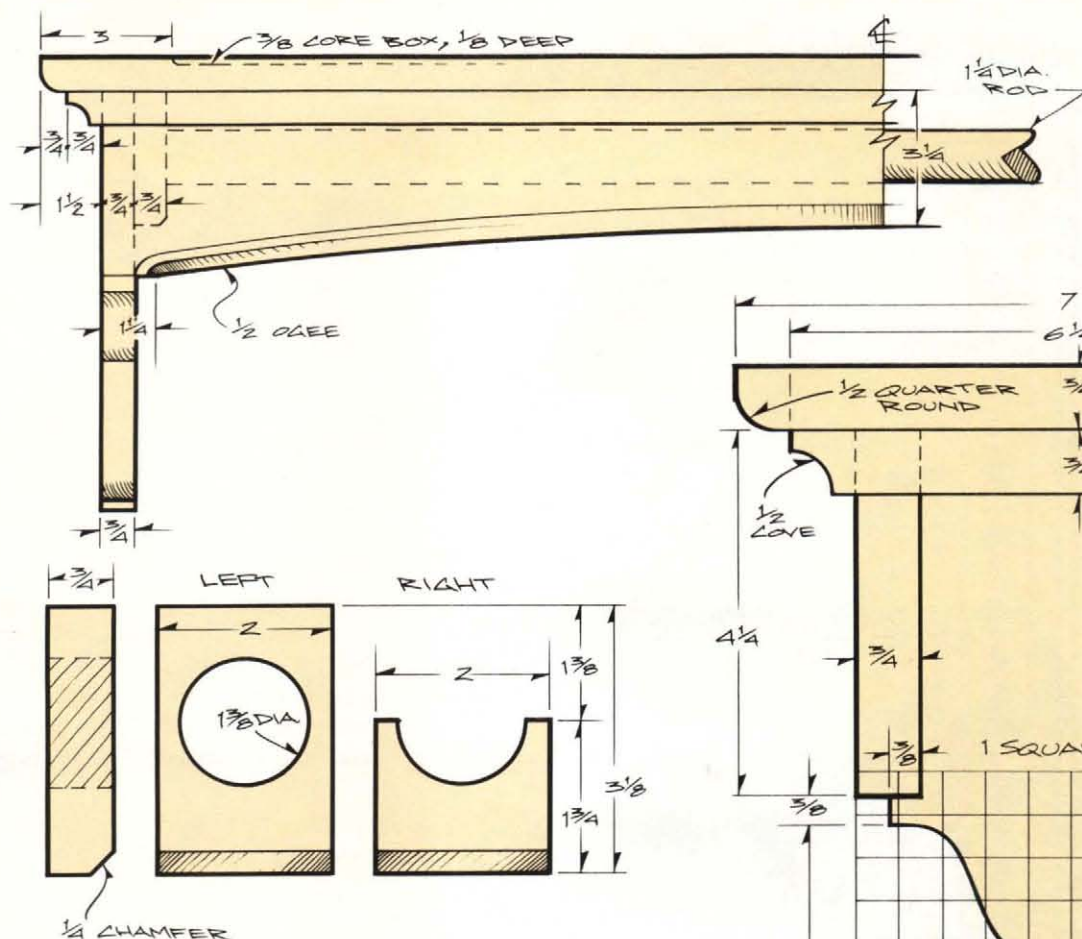
Transfer the grid pattern of the curve from the drawing to one of the sides, then cut it out using the band saw, scroll saw, or a hand held jigsaw. When cutting, stay just slightly on the waste side of the marked line, then use files and sandpaper to

smooth the edge exactly to the line. Use the completed side to trace the profile on the other side, and repeat the process.

The front (C) is made from $\frac{3}{4}$ in. thick by $4\frac{1}{4}$ in. wide stock. To get the needed length, measure the length across the top of your window molding and add $1\frac{1}{2}$ in.

The curve along the front can best be scribed using a $\frac{1}{8}$ in. thick by $\frac{3}{4}$ in. wide strip of clear pine. A thin piece like this can be easily bent into a gentle curve. The length of the strip should be more than the length of the front. Halfway across the length





of the front, mark a point $3\frac{1}{4}$ in. down from the top edge (see front view). Drive a brad at that point. Then, use a pencil to mark points on the bottom edge of the front, $1\frac{1}{4}$ in. from the ends. Now, bend the pine strip against the brad into a curve, ending it at the pencil marks. While holding it in place (it helps to have an extra pair of hands at this point), scribe the curved line across one-half the front.

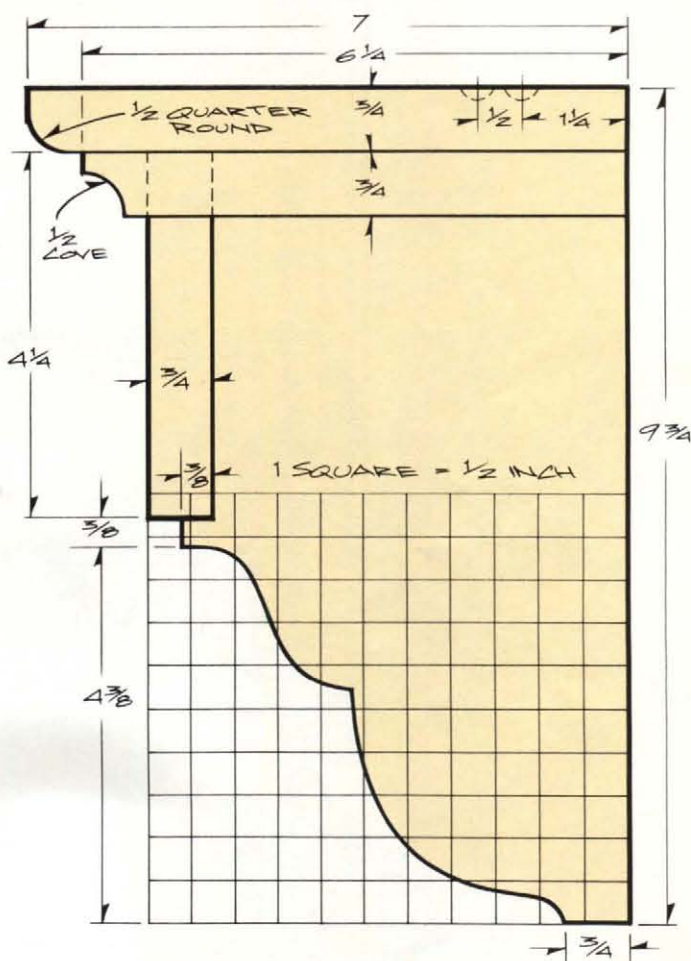
You could simply scribe the entire line to complete the curve, but we've found the strip never quite bends the same on both sides of the center point, so you're likely to end up with a curve that's not very symmetrical. We prefer to cut the first half of the curve with a band saw or saber saw, sand it smooth, and trace the profile on a piece of paper. The paper is then cut on the marked line and used to trace the other half.

Once the entire curve is cut and smoothed, use the router and a bearing guided $\frac{1}{2}$ in. Roman ogee bit to mold the edge as shown. Take care to stop the bit so that the cut will line up with the inside edge of the side.

The valance molding (D) is made from $\frac{3}{4}$ in. thick stock. The cove is cut using the router with an edge guide and a bearing-guided $\frac{1}{2}$ in. radius cove cutter. For safety's sake, it's best to cut the cove on stock that's at least 4 in. wide, then rip it to the final $\frac{3}{4}$ in. width on the table saw.

The curtain rod (E) is simply a length of closet pole. You can get closet pole in several diameters (we used $1\frac{1}{4}$ in.) at just about any lumberyard. As mentioned earlier, make sure it will fit your curtain.

The left and right rod supports (E) are made next. Cut them to the dimensions shown, then bore a hole in each one. Make the hole slightly larger than the rod diameter. We bored a $1\frac{3}{8}$



in. diameter hole for the $1\frac{1}{4}$ in. diameter rod. Once bored, the right hand support is cut in half as shown in the detail.

Before starting the assembly, you'll want to final sand all the parts, finishing with 220-grit. Join the front to the sides using glue and finishing nails, then countersink the nails and fill the holes with wood putty. Add the top the same way. The valance molding can then be mitered at the corners and glued in place.

Add the rod supports. Keep in mind that the exact location of the supports may vary depending on the curtain style. The rod will have to be removed on those occasions when the curtain is taken down, so make sure there is room for the rod to lift off and fit around the front or back of the support.

Our project is finished with two coats of Minwax's Puritan Pine stain followed by two coats of their Antique Oil. To install the valance, drive several screws through the top and into the top edge of the window molding. If your curtains are especially heavy, it would be a good idea to also add a few corner braces. Screw one leg of the brace to the valance top, then secure the other leg to the wall by driving a screw through the drywall and into the window header.

Tool Review

If you do much template routing, cutout work, slot mortising, blind dado cutting, signmaking, and the like, you may have already discovered the advantages of a plunge router. But, if you're still trying to do such operations with a conventional router, you're missing the boat. Why? Because plunge routers enable you to begin and end cuts in the middle of a workpiece—safely and without botching the job. In addition, you can also use a plunge router for edge routing operations and just about

anything else a conventional router does.

All of the major router manufacturers offer at least one plunge model. And, while plunge routers have been on the market for well over a decade, over a half dozen new models have appeared on the market within the last two years. So, those of you who are looking to upgrade your old plunge router or add one to your stable will find a healthy selection on today's market (Photos 1–5). And, if you want to convert your conventional fixed-base router to a

plunge type, you just might be able to do it with either the Sears or Porter Cable plunge attachment now available (see Router Retrofits, page 73).

How They Work

For the uninitiated, a plunge router works by means of a spring-loaded motor assembly that slides up and down on a pair of steel guide rods attached to the router base (See Anatomy of a Plunge Router, page 75). With the router base resting on the workpiece, you turn on the motor, release a locking lever and push down on the handles to plunge the spinning bit through the router base, vertically into the work. When the bit "bottoms out" at the preset depth (controlled by an adjustable depth-stop mechanism), you engage the plunge lock, do your routing, then release the lock and retract the bit back through the base by easing up on the handles. Most plunge routers have 3-position, turret-type depth stops, which enable you to preset three separate cutting depths before you start your work. The Metabo 0528 and Skil models 1823 and 1835 have a single depth-stop screw, the Porter Cable routers have turret-type stops with six positions (three fixed, three adjustable); the Bosch routers have turrets with eight fixed stops. Multiple stops come in handy when you're making deep cuts that require several passes, or for making separate cuts at different precise depths with the same bit. In effect, you don't have to lift the router off the workpiece between passes to reset the depth.

The one drawback plunge routers do have is that they're hard to plunge and adjust in an upside-down position, which means they're not especially convenient when mounted in a router table. Several plunge models do come with fine-height-adjustment knobs that facilitate use with a router table, although most conventional routers are better suited for table use.

How Much Router Do You Need?

Plunge routers fall into two distinct groups, based on the maximum shank diameter of the bits they'll accept: small,

Plunge Routers

We Put 20 Tools to the Test

by Jim Barrett



Plunge routers make neat, clean starts and stops within a board's surface. You can also use them for edge routing.

lightweight $\frac{1}{4}$ in. routers ($\frac{3}{4}$ to $1\frac{3}{4}$ horsepower), and larger, more powerful $\frac{1}{2}$ in. routers ($2\frac{1}{4}$ to 3 horsepower). The big $\frac{1}{2}$ in. guys are typically more versatile because they will also take $\frac{1}{4}$ in. shank bits with accessory collet sleeves or adapters. Also, when mounted in a router table, $\frac{1}{2}$ in. routers with 2-plus horsepower can do many of the tasks that a $\frac{1}{2}$ in. shaper will do.

For all routers, tool manufacturers express power ratings in terms of horsepower (hp), rather than amps, as they do with other portable power tools. As you probably know, amps are a more accurate indicator than hp of actual power output on tools with universal (brush-type) motors. And, while the hp rating appears in bold print on many models, you can also find the amp rating on the tool's nameplate. As indicated in the Specifications Chart on page 76, not all routers with the same horsepower rating have the same amp rating. So, when buying power, look at amps, not hp.

More Motor Stuff: Electronic variable speed (EVS) ranks high on my priority list. Most one-speed routers operate at top speeds of 20,000 to 25,000 rpm, which can be too fast for some applications. Variable speed enables you to select the optimum speed for the material, cutter diameter, and feed rate. EVS also acts as a governor to maintain a constant speed under varying loads. On small $\frac{1}{4}$ in. routers, variable speed enables you to slow down the cutter for greater control when doing intricate work, such as template routing or inlay work. On large $\frac{1}{2}$ in. routers, slow speeds are a must when using large-profile bits, such as 2 in. to 3 in. diameter raised panel cutters. With these bits, you need to slow down the tip speed to avoid damage to the bit and the work; the bit manufacturers usually recommend a maximum safe speed for their larger bits. (As an aside, these large "shaper-type" bits are designed for table routing because they're too hard to control free-hand.) In general, slower speeds help reduce scorch marks in softwoods and extend bit life when working with hardwoods and dense or abrasive materials. Unfortunately, only a few plunge

Little Guys



Photo 1: Left to right: AEG OFS 50, Elu 3304, Hitachi TR-8, Makita 3620.



Photo 2: Left to right: Metabo 0528, Ryobi R-50, Ryobi R-150K, Skil 1835.

Router Retrofits

Porter-Cable was the first company to introduce a separate plunge base for their conventional routers. The base fits Porter Cable/Rockwell models 100, 150, 350, 630, 670, 690, and 691. In fact, the Porter Cable model 693 is actually a 690 motor with this base attached (see Specifications Chart). The base also fits Bosch models 1601, 1602, 1603, 1604, and 1606, as well as the Black & Decker 2720. Suggested list is \$120.

Sears recently introduced their version: a plunge base that fits Craftsman router models 1756, 1749, 1743, 1757, 17477, and 27501. While the Sears base is not nearly as sophisticated as the Porter Cable base, it's certainly functional, and a good bargain at \$39.95.

Conversely, the $\frac{3}{4}$ hp motor on the Ryobi R-50 plunge router is also used on Ryobi's R-30 conventional router, TR-30U laminate trimmer, and R-70 tilt-base laminate trimmer; the bases are interchangeable, and can be purchased separately. Suggested list for the conventional router base is \$38.50; plunge base, \$42.26; laminate trimmer base, \$24.98, and tilt laminate trimmer base, \$44.50.



Big Guys



Photo 3: Elu 3338, Freud FT-2000, Hitachi TR-12, Hitachi M12V.



Photo 4: Makita 3612BR, Porter Cable 7538, Porter Cable 693, Ryobi R-501.



Photo 5: Ryobi R-600, Ryobi RE-600, Sears 275040, Skil 1870.

routers have electronic variable speed: the Bosch 1615 EVS, Elu 3304 and 3338, Ryobi RE 600, Sears 275040, and Skil 1875.

Another electronic feature common to the Bosch 1615 EVS, Elu 3304 and 3338, Ryobi RE-600 and Sears routers is a "soft-start" motor. When you turn on the router, it gradually accelerates up to full speed, rather than snapping on with a jerk like most routers do. With some larger routers, this sudden "reaction torque" can even jerk the tool out of your hands if you don't have a firm grip on the handles. For me, this is the scariest thing about using routers in

general (especially if the switch is turned on when you plug in the tool). Aside from extending motor, switch, and bearing life, soft-start makes a router safer and less intimidating to use.

Other Performance Features

Check The Plunge Action First: In terms of routing accuracy and overall ease of use, a plunge router is only as good as its plunge mechanism. The plunge action should be smooth, yet firm—not too sticky or hard to push, and not too sloppy. Check for side-slop between the guideposts and router body by having a buddy hold the base

securely on a flat surface while you grip the handles and rock the motor back and forth against the guideposts. Any side-play between the motor and posts will result in excess bit chatter or runout while routing.

All of the models I tried had a reasonably good plunge action. A few of the smaller ones were a bit sticky near the bottom of the plunge stroke, but I gave them the benefit of the doubt by lubricating the guideposts with light machine oil, after which they worked fine. The Porter Cable 7538 had one of the smoothest operating plunge mechanisms, even though the springs in the housing made a rasping noise reminiscent of an old-fashioned screen door being opened. Because the plunge action can vary between individual units of the

Three Plunge Lock Levers



Photo 6: Manual locking lever (AEG).

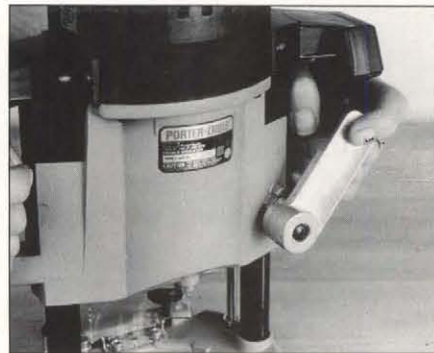
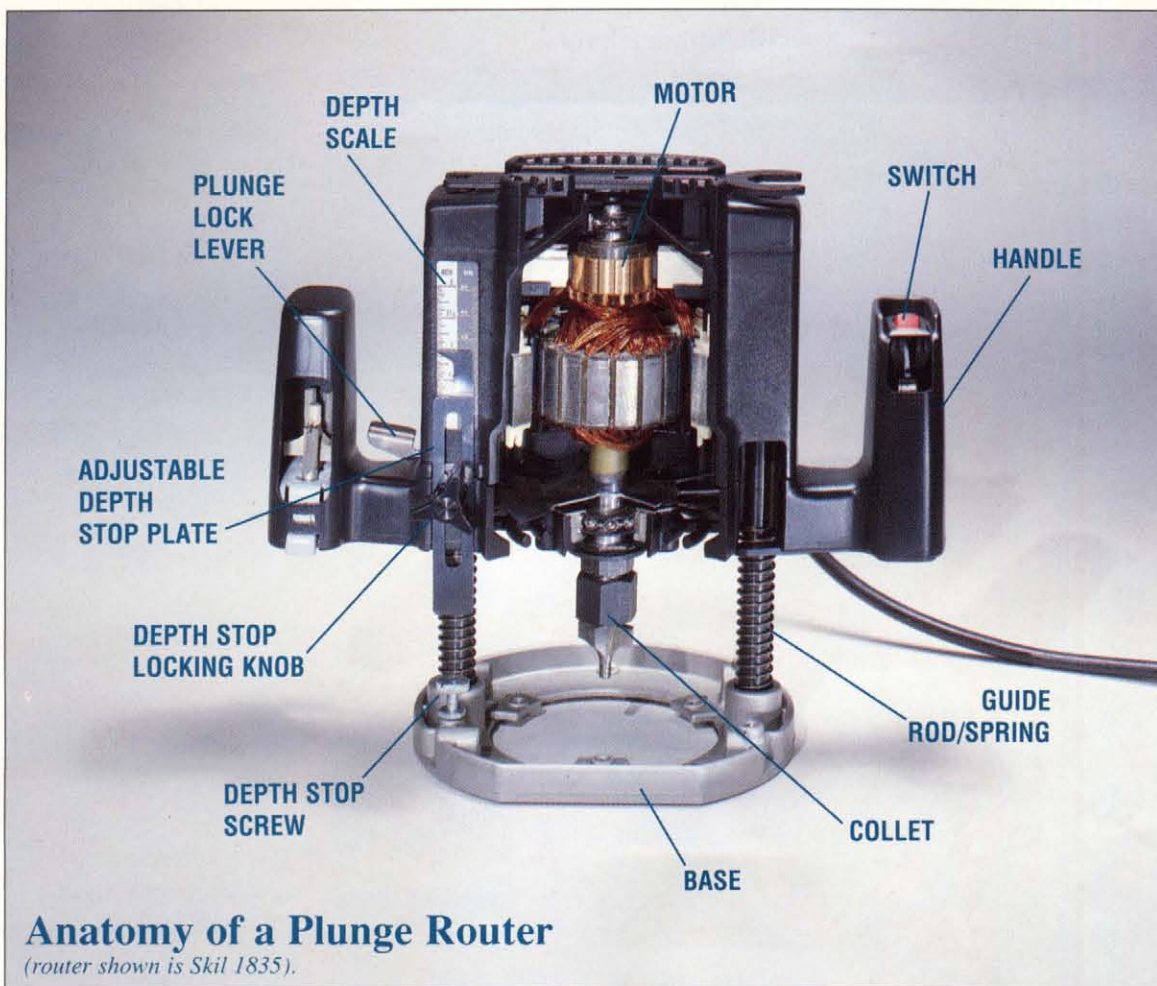


Photo 7: Spring-actuated self-locking lever (Porter Cable 7538).



Photo 8: Twist knob (Elu 3304).



same model, it's wise to check this out on the tool you're buying.

Plunge Stroke: Also called the maximum plunge depth, this refers to the maximum amount of motor travel on the guide rods, which in turn determines the maximum distance the bit will project below the router base. Provided the bit is long enough, a router with a 2 in. plunge stroke will make cuts up to 2 in. deep.

Changing Bits: How Easy? About half the routers I tested require two wrenches to change bits; the other half have spindle locks (see Specifications Chart). Spindle locks, of course, mean fewer barked knuckles and one less wrench to keep track of. The Skil routers not only have spindle locks, but on-board wrench storage for the one wrench you do need. On all models, I found it easiest to change bits when the motor was positioned at the top end of the guideposts.

Collets: When shopping for plunge routers, ask the dealer if you can insert a bit into the models you're looking at. The collet should hold the bit securely when tight, yet release it easily when

loosened. Deep collets with three or more segments usually hold bits more securely than shallow ones with one or two segments, and are less likely to bind. Deeper collets also minimize bit runout (wobbling).

Ergonomic Features

The ergonomic features of any tool translate into how easy it is to use. Overall weight and balance are two points to consider. Also check the handle size and shape, and accessibility to controls (switch, plunge lever, variable-speed control) from the handle-grip position. All knobs and adjustment screws should operate smoothly and fasten securely. The depth scale should be easy to set and to read. Here are some specific things to look at:

Plunge Locks: Plunge routers employ three basic types of plunge locks. Most have a manually operated lever (Photo 6), which you push down to lock and pull up to release. The Bosch, Elu 3338, and Porter Cable routers (Photo 7) have spring-actuated self-locking levers (push down to release, let go to lock); on the



Photo 9: Extension knob on some plunge routers enables you to make fine adjustments to bit height at top of plunge stroke; facilitates use with router table (Sears).

Elu 3304, Metabo, and Ryobi R-50, you lock and unlock the plunge mechanism by twisting one of the handles (Photo 8). I found the twist knobs to be convenient, but you can accidentally unlock the mechanism while operating the router or picking it up. The large, self-locking levers on the Porter Cable routers were

Specifications Chart

Manufacturer	Model	HP	Amps	No Load Speed (rpm) ¹	Collet Capacities	Plunge Stroke (in.) ²
AEG	OFS 50	1	6.25	25,000	1/4	1 ¹⁵ / ₁₆
Bosch ⁹	1615EVS	3 ¹ / ₄	15	12,000-19,000	1/4, 3/8, 1/2	3
Elu ¹⁰	3304	1	6.5	8,000-24,000	1/4	1 ¹⁵ / ₁₆
Elu ¹⁰	3338	2 ¹ / ₄	12	8,000-20,000	1/4, 3/8, 1/2	2 ⁷ / ₁₆
Freud	FT-2000	3 ¹ / ₄	15	22,000	1/4, 1/2	2 ⁵ / ₈
Hitachi	TR-8	1 ¹ / ₂	6.9	24,000	1/4	2
Hitachi	TR-12	3	12.2	22,000	1/4, 3/8, 1/2	2 ³ / ₄
Hitachi ¹⁰	M12V	3 ¹ / ₄	15	20,000	1/4, 1/2	2 ⁷ / ₁₆
Makita	3620	1 ¹ / ₄	7.8	24,000	1/4	1 ³ / ₈
Makita ¹¹	3612BR	3	14	23,000	1/4, 1/2	2 ¹ / ₂
Metabo	0528	3/4	5	27,000	1/4	2
Porter Cable ¹²	693	1 ¹ / ₂	10	23,000	1/4, 1/2	2 ¹ / ₂
Porter Cable	7538	3 ¹ / ₄	15	21,000	1/4, 1/2	3
Ryobi ¹²	R-50	3/4	3.8	29,000	1/4	2 ¹ / ₄
Ryobi ¹³	R-150K	1	6.5	24,000	1/4	2
Ryobi ¹⁴	R-501	2 ¹ / ₄	13.3	22,000	1/4, 3/8, 1/2	2 ³ / ₈
Ryobi ¹⁰	RE-600	3	15	10,000-22,000	1/4, 3/8, 1/2	2 ³ / ₈
Sears	275040	see Ryobi RE-600, above				
Skil ¹⁵	1823	1 ¹ / ₂	8.5	25,000	1/4, 3/8	2
Skil	1835	1 ³ / ₄	9	25,000	1/4, 3/8	2
Skil ¹⁶	1870	2 ¹ / ₄	12	23,000	1/4, 1/2	2 ¹ / ₂

¹ Two figures indicate variable-speed models.

² Plunge stroke = maximum routing (plunge) depth.

³ OD = outside base diameter; ID = inside base diameter (hole).

⁴ M = manual lock; S = spring-actuated self-locking; K = twist knob lock.

⁵ TR = trigger in handle; RH = rocker in handle; RB = rocker on body; SB = slide on body; TB = toggle on body.

⁶ S = standard; O = optional; N = none.

⁷ A = edge guide; B = template guide adaptor; C = template guide; D = dust pickup for vacuum; E = carrying case; F = 1/4 in. collet adaptor or assembly; G = 3/8 in. collet adaptor or assembly.

⁸ Price often discounted 10-40 percent at retailer.

the easiest to use. While running your own ergonomic tests, check to see how easy it is to operate the plunge lock while keeping a firm, two-handed grip on the router.

Bit Height/Depth Adjustments: The 1/2 in. plunge routers have two adjustments: a height adjustment and a depth adjustment (the 1/4 in. routers have a depth adjustment only). The height adjustment limits the amount of upward motor travel on the guide rods, by means of two adjustable nuts attached to one of the guideposts, or a separate threaded rod attached to the base. The Bosch, Freud, Ryobi R-501 and RE-600, and Sears come with fine-height adjustment knobs (Photo 9). These are simply long knobs that replace the height-adjustment

nuts, enabling you to fine tune the bit height in any position. While I couldn't see much use for this feature in most routing operations, the adjustment greatly simplifies adjusting the bit height when the tool is mounted upside-down in a router table.

The depth adjustment consists of an adjustable depth-stop rod or plate (see Anatomy of a Plunge Router, page 75) on the router body that butts against a depth-stop screw on the router base to limit the amount of downward travel of the plunge stroke. A depth scale on the router body or on the rod or plate itself indicates the plunge depth. Most routers use a screw-type locking knob to secure the depth stop rod or plate. The AEG, Elu 3338 and Hitachi M12V have

rack-and-pinion depth-stop rods for fine adjustments. The Makita 3612 BR has a threaded depth-stop rod with a quick-release button, which effectively combines fine-tuning with quick operation.

To set the plunge depth you mount the bit in the router, then plunge the router down and lock it so the bottom of the router bit is flush with the bottom of the sub base (or just a hair's breadth above the work surface). Then on the routers with height adjustment knobs (the 1/2 in. capacity routers), tighten down the stop nuts (or fine-adjustment knob on routers that have one) on the threaded height adjustment rod to prevent further upward travel. Note that all this does is allow you to limit the return travel of the motor assembly, which thereby shortens

OD	Base ³ ID	Depth Stop Positions	Plunge Lock ⁴	Switch Type ⁵	Fine Height Adj. ⁶	Spindle Lock (Y/N)	Net Weight (lbs.)	Accessories ⁷		Sugg. List ⁸
								Standard	Optional	
6 1/8	1 1/2	3	M	SB	N	Y	5.50	A	D,E	\$299.00
6 3/4	2 5/8	8	S	TR	S	Y	12.25	B,F	A,C,E,G	460.00
5 11/16	2 1/2	3	K	SB	O	N	6.00	A,B	C,D	292.00
6 11/16	2 5/8	3	S	SB	O	N	11.25	A,B	C,D,F,G	427.00
6 11/16	2 1/2	3	M	SB	S	Y	12.50	F	A,B,C	350.60
5 3/8	2	3	M	RB	N	N	6.40	A,B,C	—	215.00
7	2	3	M	RB	N	N	11.00	A,B,C	E,F,G	347.00
7 1/16	2	3	M	SB	N	Y	11.70	A,B,C	F	447.00
5 5/8	2 3/4	3	M	TR	N	Y	5.75	E	A,B,C	196.00
6 1/4	2 3/4	3	M	TB	N	Y	12.50	F	A,B,C	347.00
5 7/8	1 3/4	1	K	SB	N	Y	7.75	A,B,D	C	279.00
5 3/4	1 3/16	6	S	TB	N	N	11.50	F	A,B,C,E	295.00
7	1 13/16	6	S	RB/TR	N	N	17.25	—	A,B,C,E,F	410.00
5 1/4	1 15/16	3	K	TB	N	N	5.10	A	B,C	177.00
5 1/4	2	3	M	SB	N	N	6.25	A,E	B,C	201.00
6 1/2	1 5/16	3	M	TR	S	N	11.00	A,B,C,F,G	—	301.00
6 1/2	1 15/16	3	M	RB	S	Y	13.50	A,B,C,F,G	—	444.00
see Ryobi RE-600								A,B,C,F,G	—	224.99
6	2 3/4	1	M	RH	N	Y	7.00	—	A,C,D,E,G	97.60
6	2 3/4	1	M	RH	N	Y	7.00	B	A,C,D,E,G	116.95
6 1/2	2 3/4	3	M	TR	N	Y	9.50	B,F	A,C,D,E	270.50

⁹ Replaces 1611; see below: "Upgrade from Bosch."

¹⁰ Also available without variable speed; Ryobi model without variable speed is R-600 (shown in Photo 5 on page 74.)

¹¹ Also available with square base as 3612B.

¹² Plunge base also sold separately (see text).

¹³ K denotes kit; tool also available separately; R-151 is same router with trigger switch in handle.

¹⁴ Also available with toggle switch on body (R-500).

¹⁵ Not tested for article.

¹⁶ Variable speed model available (1875) @ \$319.

the plunge stroke. The Skil 1823 and 1835, the Ryobi R50, Makita 3620, Elu 3304, AEG OFS 50, and Metabo 0528 do not have this return travel adjustment feature. Next, drop the depth-stop rod down onto the depth-stop screw (on multi-position turret models, use the lowest screw), and note its position on the indicator scale. (At this point you can move the indicator to the nearest readable mark by adjusting the stop screw). You then raise the rod or plate up the desired distance on the scale to set the plunge depth, and lock it in position.

ON/OFF Switches: Switch types on plunge routers include handle-mounted trigger switches, rocker, slide, or toggle switches on the body, or, in the case of the Skil 1823 and 1835, a rocker switch

Upgrade from Bosch

It never seems to fail: Whenever I do a tool review of this nature, at least one company is on the verge of introducing a new or improved model. In this case, Bosch is replacing their old standbys, the 1611 and variable-speed 1611 EVS, with improved versions that will carry the model numbers 1615 (see photo) and 1615 EVS, respectively. The new units should be available by the time you read this. Chris Carlsen at Bosch says the new models have an improved plunge mechanism, increased power and speed, and a few other internal changes to increase performance. Specs for the 1615 EVS are listed in the chart.



Photo 10: Base shapes are a matter of personal preference; all plunge router bases accept template guide adaptors. I find screw-on base shoes more convenient than stick-on ones.

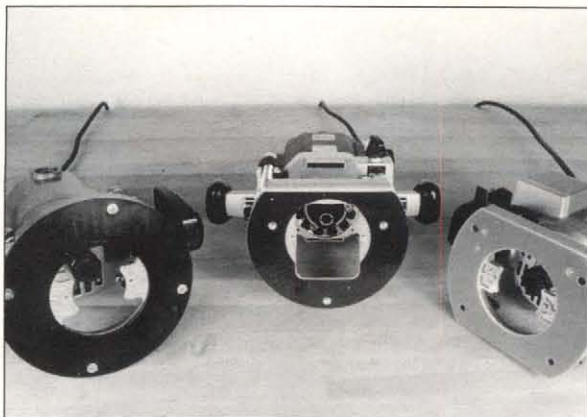
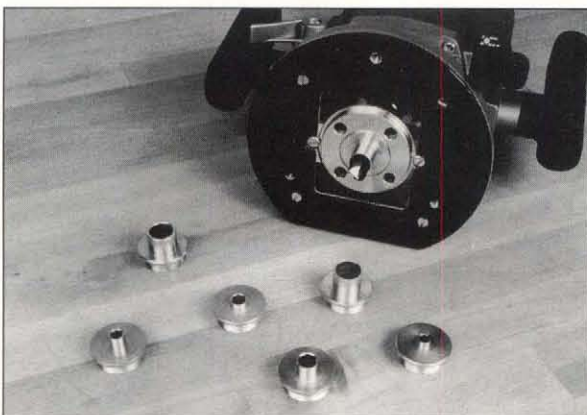


Photo 11: Most router manufacturers offer a variety of template guides. The Freud template guide kit (FT 2020) shown includes guide adaptor (attached to FT-2000 router) and six guide bushings from 1/4 in. to 5/8 in. I.D.



recessed into the top of the right handle. To me, switch type is not as important as switch size and proximity to the handle; you should be able to operate the switch easily while keeping a firm grip on both handles. On the Ryobi R-50 and Hitachi TR-12, you must release your grip on one handle to operate the switch. The handle-mounted rocker on the Skil is well-placed, but the switch's clear plastic dust boot interferes with its operation. On most routers (without trigger switches), the switch is either ON or OFF—if it's ON when you plug in the tool, you can do considerable damage. Momentary-ON switches with a locking feature help prevent this, but surprisingly, of the routers with rocker switches, only the Metabo 0528 has this type of switch.

I find trigger switches the easiest to use, but there's always the chance of actuating the switch when you pick up the router. To prevent this, the triggers on the Bosch routers and on the Ryobi R-501 have a separate locking button that must be depressed before the switch will operate. The Porter Cable 7538 also provides protection against accidental startup: in addition to a trigger switch in the handle, it has a rocker switch on the

body that must be turned ON before the trigger will work. This double-switching also prevents accidental startup when you plug in the tool—a nice feature, as long as you remember to turn OFF the rocker switch after using the router. Bear in mind that trigger switches are not the way to go if you plan on mounting the router in a router table. The trigger-switched Ryobi R-501 also comes in a toggle-switch version, the R-500.

Handles: For the most part, the best handle size and shape depends on the hand holding it. I prefer large handles, especially on the large 1/2 in. models. I've heard several complaints that the knobs on the Elu 3338 are undersized for the size of the tool; Elu plans on fitting larger handles on this model, and making retrofit handles available to owners of the small-handle version shown.

Other Considerations

Bases: Photo 10 shows three styles of bases—round, round with one flat, and round with two flats. While round bases enable you to keep the router base at a constant distance from a template or guide board no matter what position the router is in, a base with one or two flats enables you to make cuts closer to

vertical surfaces, such as a sink cutout closer to a backsplash. Generally, the size and shape of the base you choose is a matter of personal preference. If you do much edge routing, you'll want a base that provides enough stability to keep the router from tipping or rocking. Several manufacturers offer accessory base extension plates for this purpose. Bases with large-diameter holes generally provide less support than ones with small-diameter holes, but the former enable you to use larger-diameter bits (base inserts are available for most of these large-hole bases).

Base shoes, made of a slick phenolic material, are either stick-on or screw-on. With either type, make sure the base itself has screw holes in it if you plan on attaching accessory sub-bases to the router. On every plunge router I tested the inner edge of the base has projecting ears with screw holes for attaching template guide adaptors. The adaptors themselves are either standard or optional accessories, and manufacturers offer template guides of various sizes to fit them (see Specifications Chart). Freud offers a nice set for their FT-2000 (Photo 11).

Dust Busters: The AEG, Elu, Metabo, and Skil routers have optional vacuum attachments that fit a standard shop vacuum hose. At first, I thought



Photo 12: Clear-plastic dust pickup attachment for Skil 1835 fits standard 1 1/2 in. shop vacuum hoses, provides good bit visibility.

these contraptions would just get in the way while routing, but after creating mounds of sawdust while trying out the 20 routers featured in this article, I found it refreshing and convenient to use the vacuum attachment for the Skil 1835 (Photo 12). The see-through clear plastic attachment keeps dust off the work so you can see what you're doing, not to mention keeping your shop and lungs clean. I'm convinced that these attachments are well worth the extra cost. 

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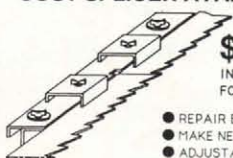
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WEEKEND PROJECTS for WOODWORKERS

52 great projects you can build in a day or two



from the Editors of *The Woodworker's Journal*

Weekend Projects For Woodworkers

This is the book for the craftsman long on enthusiasm and short on time. Selected from the 1986-87 issues of *The Woodworker's Journal*, all 52 projects are quick, easy and attractive. Each plan is presented clearly with fully detailed instructions and drawings. Whether scrambling for a break or enjoying lots of spare time, woodworkers of all skill levels will appreciate the satisfaction of seeing a project through to completion in just an evening or weekend.

101 Projects for Woodworkers

Complete Plans and Instructions for a Variety of Distinctive Furniture Designs, Toys, and Accessories



By the Editors of *The Woodworker's Journal*

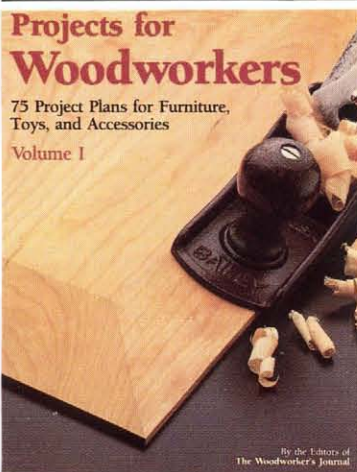
101 Projects For Woodworkers

For the amateur just starting out or the craftsman with a shop full of tools, **101 Projects For Woodworkers** features a variety of classic projects for everyone. Included in this collection of plans from the 1977-80 issues of *The Woodworker's Journal* magazine are a classic Rolltop Desk, an old-fashioned Porch Swing, traditional and contemporary furniture, clocks, mirrors, home accessories, toys and novelties. Complete instructions and illustrations.

Projects for Woodworkers

75 Project Plans for Furniture, Toys, and Accessories

Volume 1



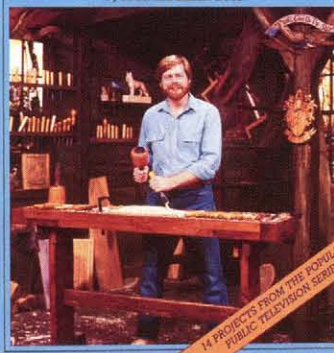
By the Editors of *The Woodworker's Journal*

Projects For Woodworkers, Volume 1

Beginning and advanced woodworkers alike will appreciate the full range of styles in furniture, accessories, lamps, clocks, toys and gifts. Of the 75 projects selected from the 1980-81 issues of *The Woodworker's Journal* magazine, plans include a Cabinetmaker's Workbench, Pine Shaker Cupboard, Old-time Icebox, a Cobbler's Bench Coffee Table and a Child's Victorian Sled. Fully detailed instructions, illustrations, and photos.

WOODCARVING WITH RICK BÜTZ

By RICK and ELLEN BÜTZ



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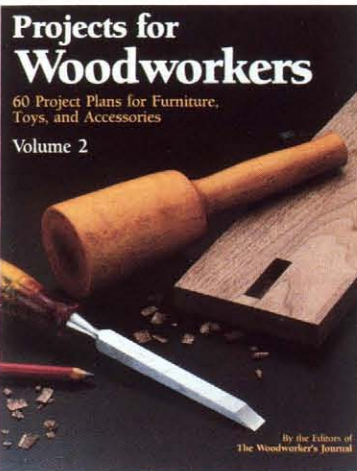
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Projects for Woodworkers

60 Project Plans for Furniture, Toys, and Accessories

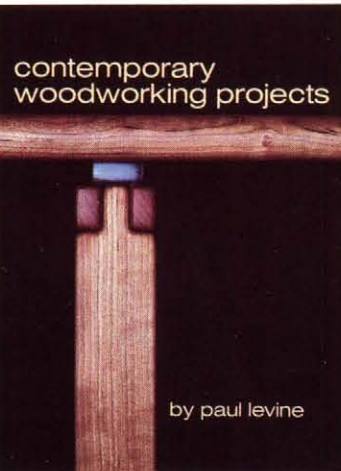
Volume 2



By the Editors of *The Woodworker's Journal*

Projects For Woodworkers, Volume 2

Originally published in the 1982 issues of *The Woodworker's Journal* magazine, all 60 projects were chosen with a variety of styles and skill levels in mind. Each project has complete instructions and illustrations. You'll find household accessories like the Desk Caddy, Casserole Dish Holder, and Breakfast Tray easy to build. And you're sure to enjoy completing more involved projects like the Tambour Desk, Old Danish Chest of Drawers and Swinging Cradle.



contemporary woodworking projects

by paul levine

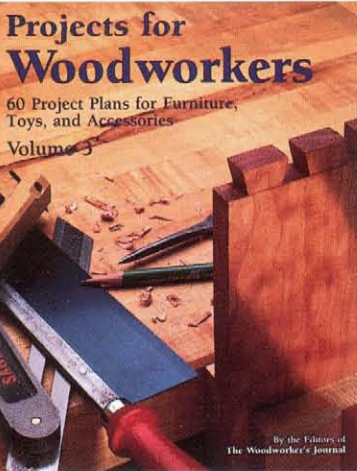
Contemporary Woodworking Projects

Paul Levine guides woodworkers of all skill levels through room-by-room chapters of coordinated furniture and accessories. The clean angles and sturdy joinery are made easy with step-by-step instructions and illustrations. Among the 40 handsome projects are a Love Seat, Chair and Ottoman set, an Oak Credenza, a Platform Bed, and a Japanese Shoji Lamp. Children will enjoy their own table and chair, puzzles and a great box of dominoes.

Projects for Woodworkers

60 Project Plans for Furniture, Toys, and Accessories

Volume 3



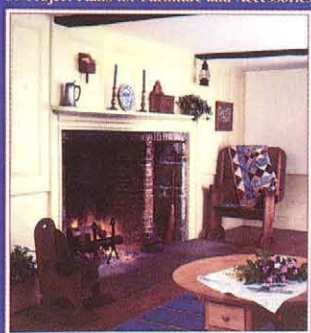
By the Editors of *The Woodworker's Journal*

Projects For Woodworkers, Volume 3

The best projects from the 1983 issues of *The Woodworker's Journal* magazine—toys, lamps, cupboards, chests, cabinets, tables, planters, mirrors, and much more. Clear illustrations and thorough written instructions make each project easy-to-understand and fun to build. A book you'll want to keep within easy reach of your workbench.

COUNTRY PROJECTS for WOODWORKERS

85 Project Plans for Furniture and Accessories



By the Editors of *The Woodworker's Journal*

Country Projects For Woodworkers

If building the simple, sturdy furniture of the old cabinet-makers appeals to you, then you'll want this collection of country projects from the 1980-84 issues of *The Woodworker's Journal*. 85 complete plans range from projects like Colonial Candlesticks and Fireplace Bellows to more challenging projects such as a Shaker Chest, a Stepped-Back Hutch, and an 18th Century Trestle Table. Some plans are also in *Projects for Woodworkers*, Volumes 1 and 2.

NEXT ISSUE . . .



. . . is loaded with great plans and articles to help you get more out of your woodworking hobby. There are **Deck Railing Planters** to brighten your deck, a classic **Sideboard Chest** for the living or dining room, a **Contemporary End Table** to showcase your fine woodworking skills, and an elegant little **Kalimba** (thumb piano) for making little music. Add to that a **Fishing Rod Rack**, some useful **Shopmade Handscrews**, three more projects, and four great articles—including a feature on cleaning rusty tools that you won't want to miss—and you'll have one of our best issues ever!

