

pg 46
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The Woodworker's Journal

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The Woodworker's Journal

JANUARY/FEBRUARY 1994 VOLUME 18, NUMBER 1

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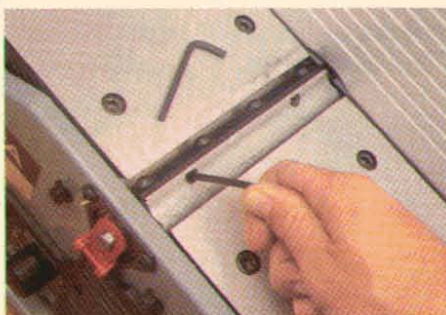
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COMPREHENSIVE PROJECT INDEX

Reference to all available projects and articles since 1978 in both *The Woodworker's Journal* magazine and our project books.



66 Benchtop Jointers



Shoptalk

Ancient Treasure

One of the real joys in woodworking is the sharing of knowledge with other woodworkers, and if we are lucky, the passing on of our skills to children and grandchildren. Occasionally, though, that camaraderie stretches across much more than generations.

The little Heart Box in this issue is a copy of a box recently discovered in an ancient shipwreck off the coast of Israel. Incredibly, after 2400 years under water, the little olive-wood box, and a pair of violin-shaped boxes found with it, were still in remarkable shape. Also found in the wreck were a basket of woodworking tools, including cutting, carving and boring tools, a whetstone, a square, and fresh wood chips from whatever was being worked on.

The discovery of the Ma'agan Micha'el ship (so named for a kibbutz near the site), was detailed in an article in Biblical Archaeology Review. The article noted that the Ma'agan Micha'el is only one of a variety of recent finds, made possible by shifting sands and changing fault lines along the Israeli coast, that are shedding much-needed light on long ago times. Along with the basket of tools (probably owned by the ship's carpenter), the site yielded cooking utensils, pottery, olive, fig and grape seeds and various pollens, all of which help archaeologists determine the ship's origin, business, and even its likely destination.

The Ma'agan Micha'el ship, thought to be on her maiden voyage, was in such a remarkable state of preservation that divers disassembling the wreck were forced to slice through the oak tenons joining the pine planks together. But most surprisingly, even after so long a submersion, the planks still emitted a faint odor of pine resin. It is indeed a wonderful material—this wood that we all so fondly work.

A Resolution Kept

An oft-heard New Year's resolution among woodworkers is "This year I'll clean up my shop's dust problem." In this issue you'll find several devices that may finally help you keep that resolution. The Super Sanding Center on the cover is the culmination of months of testing and development here in our shop. Powered by just about any standard dust collector, it eliminates one of the primary sources of dust—that generated by sanding. And, for finer, airborne dust particles, don't miss our Shop Test of Penn State's new Air Cleaner. Finally, here are a pair of affordable solutions to that perennial dust problem.

New Index

We heard you! In response to your requests for a more comprehensive index, for the first time, our index includes not only all projects still available in back issues, but also every project available in our 9 books. The index is bound into the center of this issue, so it is easy to remove and tack up on your workshop bulletin board.

Jim McQuillan

The Woodworker's Journal

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The Woodworker's Journal

HOW TO FIND YOUR WAY THROUGH THE WOODS.

In woodworking, every project is an adventure. You explore the wood, studying its grain, searching for something hidden within.

Your goal is to emerge, weeks later, with a proud souvenir. A planter. A Shaker chair. Or perhaps a rustic chest of drawers.

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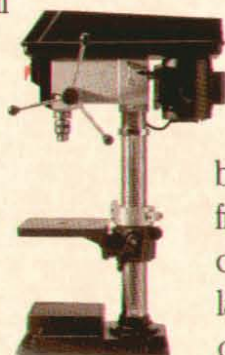


of the way. Confidently enter the thickest woods with the new HD 3640 10" benchtop band saw. Its powerful induction motor makes small work of resawing stock up to 7 inches wide. And afterward, navigate intricate curves on the large, tilting table that adjusts from -6° to 50°.

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Letters

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

In your November/December 1993 issue, I must conclude that the intelligent person who wrote the "Your safety is important to us..." material in the green box on page 10 was not available to review the article "How To Rip And Crosscut on the Table Saw" on page 24.

As a woodworking instructor, I completely agree with the "green box" where it says "... you should always use blade guards and other safety devices on power tools that are equipped with them." Unfortunately, this good advice conflicts with the implied recommendation in the article that table saw blade guards are clumsy, annoying and distracting, and that a table saw can be safely used without them. If the author

feels this way, he should keep his feelings to himself when writing for a publication that is directed to a wide range of woodworkers. Less experienced woodworkers might take his advice seriously and actually discard the blade guards that came with their saw. There is no excuse for advice like this in your magazine.

Also, the "simple but effective" push stick shown in photo G is dangerous. The sharp corners on the end held by the hand can easily damage the hand if there is a kickback while using the push stick. I was using a stick almost identical to this one for resawing, when the stick touched the saw blade. The kickback only affected the push stick, not the workpiece, but it did inflict an "L" shaped wound in the heel of my right hand. The emergency room fees were over \$400 and the reconstructive surgeon's fees were over \$300. Luckily, my hand completely healed. Now, all of my push sticks have fully rounded edges on

the handholds.

One final point: I liked the "Table Saw Safety" sidebar on page 30. Unfortunately the author did not follow the item that stated "Stand to the side of the blade, not directly in line with it..." when the photos were taken.

Warren Walters, Walnut Creek, Calif.

In your November/December 1993 issue, page 37, you listed the National Carvers Museum in Monument, Colorado, as a source of general woodcarving information. They closed several years ago.

Collise Brown

Green Mountain Wood Carvers
Waterville, Vt.

I recently purchased a 1/16 in. by 80 in. blade for my Sears 12 in. band saw, but I can't get it to track properly. Suggestions from some pretty knowledgeable local woodworkers, and even a

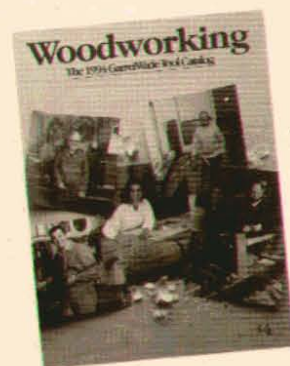
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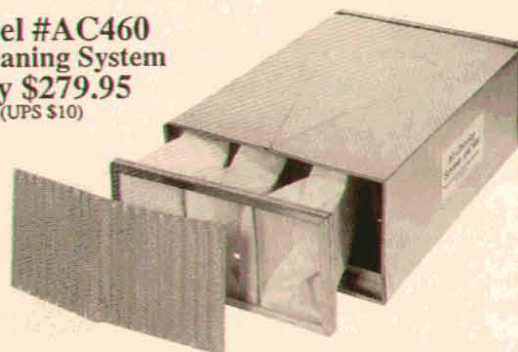


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Sears technician, haven't solved the problem. Any ideas?

Raymond J. Pershing, Evanston, Ill

We asked woodworker and author, Dick Burrows, to handle this one: The blade problem you describe can be very frustrating. I've occasionally encountered a blade that acted as if it were cursed and wouldn't run properly. Usually I've managed to get good performance by carefully aligning and balancing the band saw wheels, cleaning the tires and adjusting the blade guides. However, the 1/16 in. blades I've used on Sears band saws did require more careful tuning and tensioning than did the wider blades. I'm working on an article for an upcoming issue that will address blade characteristics and ways to obtain optimum performance. I haven't used the blade you mentioned, but will try one out as I work on the article.

In the Letters section of your November/December 1993 issue, a reader asked that you offer more Queen Anne and fine early American furniture designs, and that you keep Shaker projects, which he described as bland, to a minimum.

Certainly, Queen Anne and fine early American designs are beautiful and challenging, but Shaker pieces have a subtle, quiet beauty that is rooted in their functionality. They are every bit as classic and traditional as other styles, and their simplicity captures the spirit in which they were made. I hope you'll offer more in the future.

Mark A. Lagorio, Victor, Calif.

In the Letters section of our September/October 1993 issue, a reader requested that we feature a St. Nicholas carving each year, and make it a Christmas tradition. We said we would—if enough readers wanted it.

Well, our mail tells us that readers clearly like the idea, so Santa will be back in our November/December 1994 issue.

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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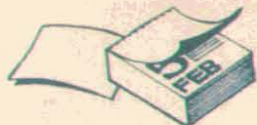
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Events

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—February 10 for the May/June 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.

Connecticut: Classes at the Brookfield Craft Center include Woodworking by Hand, weekly starting Jan. 17; Basic Router Technology, Tool Sharpening, Jan. 15–16; Veneering, Feb. 5–6; Woodturning, Feb. 12–13; Adirondack Chairs, Mar. 5–6. For info on classes, contact the center at P.O. Box 122, Brookfield, CT; tel. (203) 775-4526.

Florida: "Fine Handcrafted Furniture Show" at the Florida State Fair, Brandon, Feb. 4–20. For information call (813) 621-7821.

"Global Carving Challenge—Aquatic Life 1994," March 25–27 at Holiday Inn Airport Marina, Sarasota. Contact Wood Carvers Supply, Inc., P.O. Box 7500, Englewood, FL 34295; tel. (813) 698-0123.

Massachusetts: "First National Exhibition of the American Association Of Woodturners" opens in Feb. at the Fitchburg Art Museum, Fitchburg. For exact dates and times call Thomas Kamila at (508) 827-4314.

New York: Northeastern Woodworkers Association presents "EXPO 94" at Shenendehowa High School in Clifton Park, Mar. 19–20. Contact EXPO 94, P.O. Box 94, Rexford, NY 12148-0094; tel. (518) 393-8804.

North Carolina: Country Workshops tutorials feature Ladderback Chairmaking, Jan. 10–14; Windsor Chairmaking, Jan. 24–28; Advanced Windsor Chairmaking, Feb. 7–11; Swiss Cooperage, March 7–11; Swedish Woodenware, April 4–8. Contact Country Workshops, 90 Mill Creek Rd., Marshall, NC 28753-9321; tel. (704) 656-2280.

Charlotte Woodworking Show, Jan. 14–16, Merchandise Mart, Freedom Hall, Charlotte; tel. (301) 477-8521.

Texas: Marquetry Workshop with Spider Johnson & Laura Hunt, Feb. 4–5. For info contact Bob Herman P.O. Box 892, Wolfforth, TX; tel. (806) 866-4758.

Santa Fe Furniture Expo, Jan. 8–13, in Dallas at the Dallas Winter Furniture Market, World Trade Center, Dallas TX. Contact The Mayfair Group, 369 Montezuma, Suite 338, Santa Fe NM 87501; tel. (505) 984-7080

Virginia: Colonial Williamsburg exhibition, "Tools: Working Wood In 18th Century America" opens Jan. 14. Contact Colonial Williamsburg, P.O. Box 1776, Williamsburg, VA 23187-1776; tel. 1-800-HISTORY.

Wisconsin: Greater Milwaukee Woodworking Show, Feb. 4–6, Wisconsin State Fair Park, Trade Mart Building, Milwaukee; tel. (310) 477-8521.

Northeastern Wisconsin Woodworkers' Guild "11th Annual Spring Show," at Port Plaza in downtown Green Bay, Feb. 19–20. Contact Curt Anderson, 2942 Jack Pine Lane, Green Bay, WI 54313; tel. (414) 434-1288.

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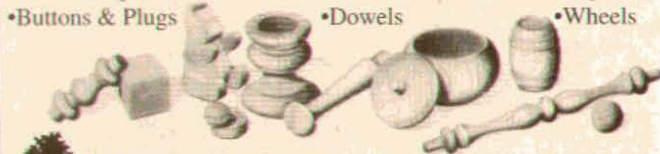
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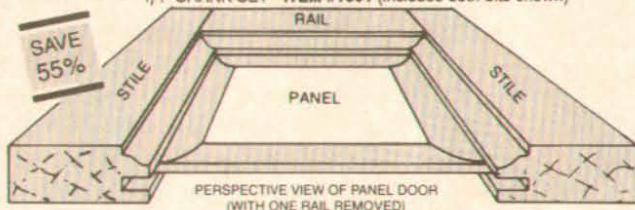
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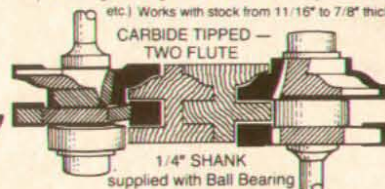
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#1308	CLASSICAL - 3/16" Radius — 5/8" Cutting Length	1/2"	\$22.50		#1339	FLUSH TRIM - 1/2" Diameter — 1-3/16" Cut Length	1/2"	\$ 8.00
#1309	45° CHAMFER - 3/8" Cutting Length	1/4"	\$13.00		#1340	PATTERN / FLUSH TRIM - 1/2" Diameter	1/4"	\$15.00
#1310	45° CHAMFER - 5/8" Cutting Length NEW !	1/4"	\$15.00		#1341	PATTERN / FLUSH TRIM - 3/4" Diameter NEW !	1/4"	\$17.00
#1311	45° CHAMFER - 5/8" Cutting Length	1/2"	\$17.00		#1342	PATTERN / FLUSH TRIM - 3/4" Diameter	1/2"	\$19.00
#1312	THUMBNAIL - 1- 3/16" Large Diameter	1/4"	\$18.50		#1343	KEYHOLE CUTTER - 3/8" (bit not shown)	1/4"	\$ 8.50
#1313	THUMBNAIL - 2-1/2" Large Diameter	1/2"	\$35.00		#1344	KEYHOLE CUTTER - 1/2" shown	1/4"	\$ 9.00
#1314	ROUND OVER - 1/8" Radius	1/4"	\$11.00		#1345	DOVETAIL (HSS) - 1/4" Diameter — 7-1/2"	1/4"	\$ 6.50
#1315	ROUND OVER - 3/16" Radius	1/4"	\$11.00		#1346	DOVETAIL - 1/2" Diameter — 14° NEW !	1/4"	\$ 6.00
#1316	ROUND OVER - 5/16" Radius	1/4"	\$14.00		#1347	DOVETAIL - 1/2" Diameter — 14°	1/2"	\$ 6.50
#1317	ROUND OVER - 1/4" Radius NEW !	1/2"	\$12.00		#1348	BEADING - 1/4" Radius	1/4"	\$13.00
#1318	ROUND OVER - 3/8" Radius	1/2"	\$15.50		#1349	BEADING - 3/8" Radius	1/4"	\$15.50
#1319	ROUND OVER - 1/2" Radius	1/2"	\$17.00		#1350	BEADING - 1/2" Radius	1/4"	\$17.00
#1320	ROUND OVER - 3/4" Radius	1/2"	\$21.00		#1351	LOCKMITRE - 7/8" Cutting Length NEW !	1/4"	\$32.00
#1321	MULTIFORM MOULDING - 15/16" Carbide Height	1/4"	\$40.00		#1352	LOCKMITRE - 1-1/8" Cutting Length	1/2"	\$45.00
#1322	MULTIFORM MOULDING - 2" Carbide Height	1/2"	\$40.00		#1353	OGEE RAISED PANEL - 2" Large Diameter	1/4"	\$28.00
#1323	SLOT CUTTER - 3/8" Deep	1/4"	\$14.00		#1354	OGEE RAISED PANEL - 2-3/4" Large Diameter	1/2"	\$32.95
#1324	RABBETING - 1/4" Deep NEW !	1/4"	\$15.00		#1355	EDGE BEADING - 3/16" Diameter of Circle	1/4"	\$15.00
#1325	RABBETING - 3/8" Deep	1/4"	\$13.00		#1356	EDGE BEADING - 5/16" Diameter of Circle	1/4"	\$15.50
#1326	RABBETING - 3/8" Deep	1/2"	\$13.00		#1357	SPIRAL UPCUT - 1/8" Diameter (solid carbide)	1/4"	\$ 9.00
#1327	CORE BOX - 3/8" Large Diameter	1/4"	\$11.00		#1358	SPIRAL UPCUT - 1/4" Diameter (solid carbide)	1/4"	\$12.00
#1328	CORE BOX - 1/2" Large Diameter	1/4"	\$13.00		#1359	SPIRAL UPCUT - 1/4" Diameter (solid carbide)	1/2"	\$12.00
#1329	CORE BOX - 3/4" Large Diameter	1/4"	\$15.00		#1360	SPIRAL UPCUT - 3/8" Diameter (solid carbide)	1/2"	\$24.00
#1330	BULL NOSE - 1/2" Diameter of Circle	1/4"	\$16.00		#1361	SPIRAL UPCUT - 1/2" Diameter (solid carbide)	1/2"	\$29.00
#1331	BULL NOSE - 3/4" Diameter of Circle	1/4"	\$21.00		MOULDING PLANES			
#1332	BULL NOSE - 3/4" Diameter of Circle	1/2"	\$21.00		#1362	1" C.L.	1/4"	\$24.95
#1333	TONGUE & GROOVE - Straight	1/4"	\$29.00		#1363	1-5/8" C.L.	1/2"	\$29.95
#1334	TONGUE & GROOVE - Straight	1/2"	\$29.00		#1364	1-5/8" C.L.	1/2"	\$31.95
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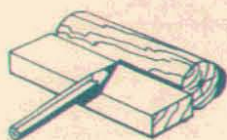
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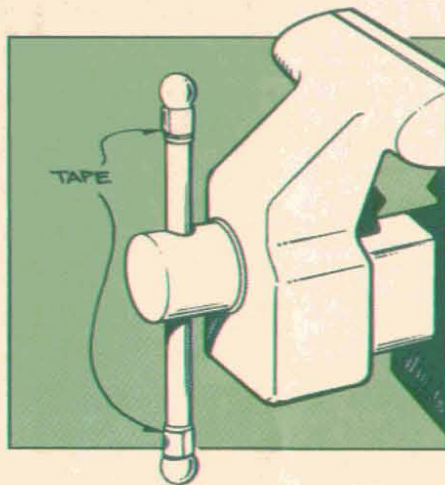
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Shop Tips

Rx For A Pinching Vise

I have a large machinist's vise in my workshop that comes in handy on many woodworking projects. Sometimes, however, the vise handle stops in the vertical



position. When that happens, the handle will free fall as soon as I let go of it, stopping only when the metal knob whacks against the vise. This wouldn't be a problem except that, on too many occasions, my unsuspecting fingers have gotten in the way, and each time the knob administered a nasty pinch.

To help solve this painful problem, I wrapped a piece of tape, several times around, at a point just under the knob of each handle. Now when the handle slides down on a finger, the tape cushions the blow considerably.

Howard E. Moody, Upper Jay, N.Y.

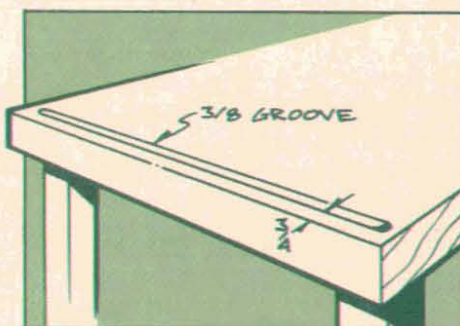
Wandering Chuck Key

When using an electric drill, it's helpful to have the key chuck within easy reach. Like most woodworkers, I attach the key chuck to the drill's power cord using the rubber "tie" that most manufactures provide. The problem with most of these ties, though, is that they don't fit tight enough, so the key slides around on the cord, usually to a point that's out of reach. I've found however, that it's easy to keep the key in place—just sandwich the tie between a couple of tightly wrapped rubber bands.

Robert DiTucci, Wayne, N.J.

Groovy

I've found that a groove cut across the front of a workbench helps keep small parts and tools from rolling off the edge.

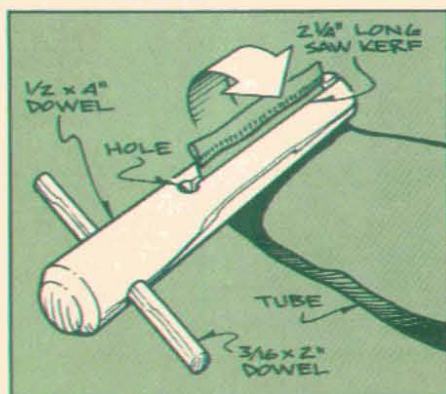


The groove can be cut using the router and an edge-guide, along with a $\frac{3}{8}$ in. core box bit. Locate the groove about $\frac{3}{4}$ in. from the front edge of the bench, and cut it about $\frac{1}{4}$ in. deep.

Howard E. Moody, Upper Jay, N.Y.

Tube Wringer

A number of items in my woodshop are packaged in tubes—glue, acrylic paint, hand cleaner, and the like. Since this stuff usually isn't cheap, I want to squeeze every bit of product out of each tube. To make the job easier, I made a little gadget I like to call a tube wringer.



You can make your own in just a few minutes from a couple of lengths of dowel—one measuring $\frac{1}{2}$ in. diameter by 4 in. long for the wringer and one measuring $\frac{3}{16}$ in. diameter by 2 in. long for the handle. The $\frac{1}{8}$ in. hole at the end of the band saw cut helps keep the wood from splitting. To use it, simply slip the end of your tube into the band saw cut, then roll up the wringer as you use the product.

E. Gilbert Mathews, Guilford, Conn.

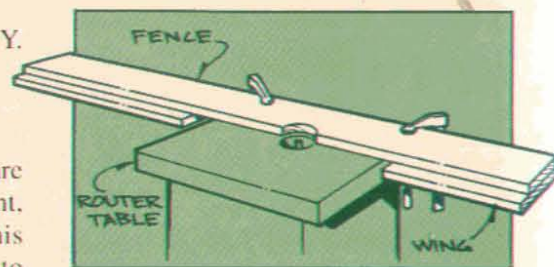
Stick No More

Here's an idea that will help next time you have a cabinet door that sticks, and you are not exactly sure where to plane it in order to get a better fit. Place a piece of carbon paper between the edge of the door and the door opening, with the ink side facing the part that will be easiest to plane. Carefully close the door, then open it. The carbon paper ink will mark any areas where the fit is tight.

C.M. Wegner, Minneapolis, Minn.

Winged Router Table

I have a router table that is only 18 in. long. That's fine for most of my work, but on occasion I need to rout fairly long stock, and the 18 in. table just doesn't



provide enough support.

I've solved the problem by making what amounts to a fence along with a pair of attached wings. Sizes can vary to suit your work, but my fence measures $1\frac{1}{8}$ in. thick by 4 in. wide, and it overhangs the router table by 18 in. on each end. The two wings, which are screwed to the underside of the fence, are $\frac{3}{4}$ in. thick by 6 in. wide. The center cutout in the fence, which has a 1 in. radius, is big enough to accept most router bits. With the fence clamped securely to the router table, the wings provide plenty of support for long workpieces.

W. Bruce Wright, Charlotte, N.C.

The Woodworker's Journal pays \$25—\$100 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.

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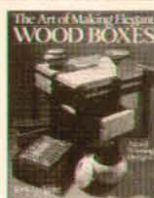
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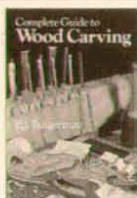
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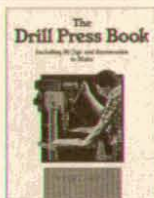
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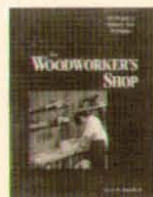
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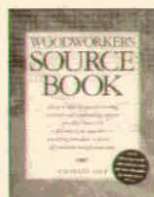
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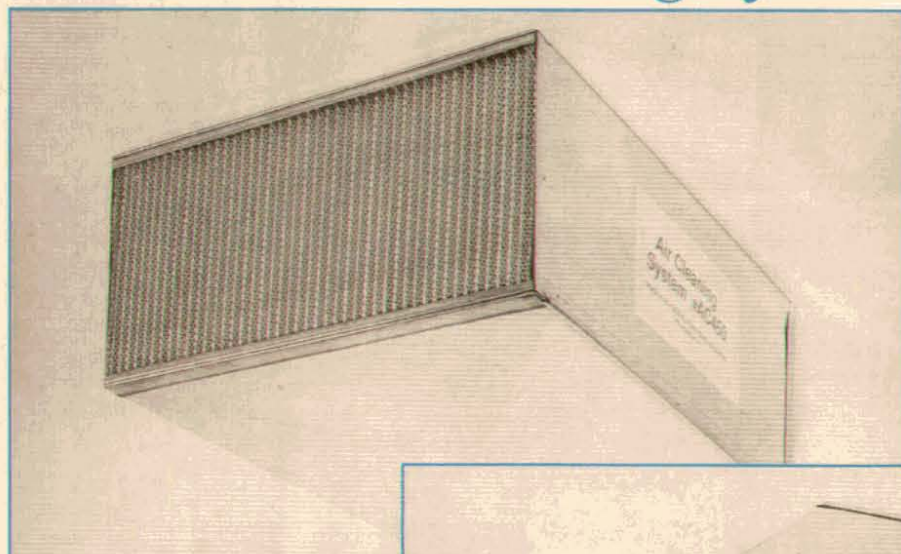
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Penn State Air Cleaning System



by Dennis Preston

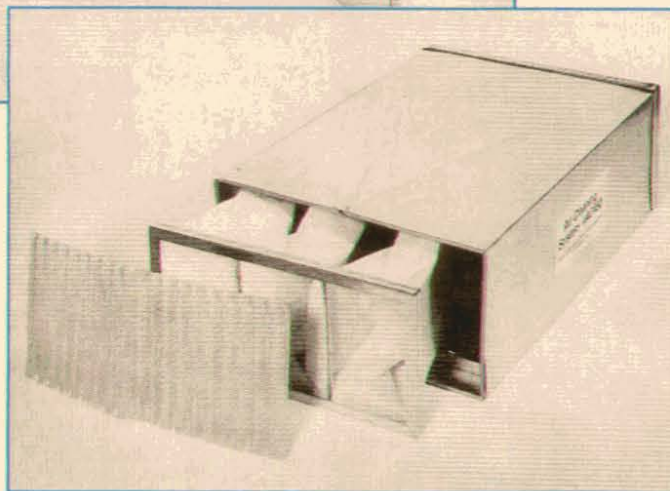
Breathing wood dust was once accepted by woodworkers as something they had no choice but to tolerate. Little thought was given to any health implications. Fortunately, times have changed and today most of us are aware of the respiratory problems associated with breathing dust laden air.

The battle against dust is fought on many fronts. It's always best to collect as much dust as possible directly at the source (usually either through stationary tool hookups to a central dust collection system, or through dust bags on smaller tools), but what about all that free-floating dust that inevitably escapes our best dust collection efforts?

Enter the air cleaner, a unit designed to collect and trap airborne dust.

Air Cleaning System No. 460

Penn State's Air Cleaning System No. 460 is a blower and two stage filtration system, housed within a 12 in. x 24 in. x 30 in. sheet metal box. A squirrel cage blower rated at 460 CFM (cubic feet per minute) draws shop air through a pre-filter and then a finer filter bag before exhausting the cleansed air back into the room. It weighs about 40 pounds.



Location and Use

The system can be used in a central location (usually mounted near the ceiling), or as a portable unit that is located close to the dust source. In the fixed location just turn on the air cleaner and let it run. The blower is relatively quiet, and with

Dust particle diameter is usually measured in microns. One micron is 0.001 millimeters or about 40 millionths of an inch. To give some points of reference, the naked eye can see individual particles as small as 10 microns. Particles between 10 microns and 0.1 microns are seen as clouds, haze or smoke. Your nose and mouth will typically filter particles down to 15 microns. Particles smaller than 15 microns are respirable, meaning that they are drawn into the lungs. Tobacco smoke, for example is about 0.3 microns.

its 460 CFM rating, it will make one air change every 10 minutes in a 4600 cubic foot shop (such as a 24 ft. x 24 ft. garage with an 8 ft. ceiling).

As a portable unit, try to locate the filter grill as close to the dust source.

I tested the air cleaner with a smoke generator, and found that working within 20 in. of the grill resulted in most of the dust being collected. As I started the test, I noticed that some haze was coming through the system, but after the unit was running for a short while (allowing the filter bag to accumulate a lining of dust), the haze stopped. It takes this internal lining of dust for the filter to work its

best. The standard filter bag is rated to stop particles as small as 8 to 10 microns. A high filtration bag is available for particles down to 1 micron.

Cleaning

The pre-filter should be cleaned periodically, which is easy to do using warm water and a mild detergent. The filter bag should be removed and shaken out when the air flow slows noticeably or when filtration is not satisfactory. Penn State cautions that the filter bag itself should not

be washed. And, keep in mind that the pre-filter should be completely dry before it is reinstalled, since any remaining water will result in dust caking to the filter material, thereby reducing efficiency.

The filter bag is a standard triple-pleat material, and is available either from Penn State or your local heating, ventilation and air conditioning supply house.

Summary

As stated earlier, the air cleaner is not a replacement for a saw dust or chip collector. Its mission is to trap fine suspended particles and this it does quite well. The Penn State Air Cleaning System will help to keep your shop environment pleasant and healthy.

Penn State Industries, Dept. J, 2850 Comley Road, Philadelphia, PA 19154; tel. 1-800-377-7297. Air cleaner sells for about \$279.95 plus \$10 shipping. 



Readers' Information Exchange

Looking for an owner's manual for an old band saw? Need a bearing for a hand-me-down table saw? Can't find a source of supply for an odd piece of hardware? Maybe our readers can help. Send along your request and we'll try to list it here—and perhaps one of our readers will have an answer for you. We'll include as many requests as space permits.

I would really appreciate an owners manual and parts list for a Sears Roebuck 24 in. jigsaw, model no. 103.23440.

Tom Baker, 1155 N. Wrangler
Rathdrum, ID 83858

Does anyone know where Art Cooper, dba Toy Designs, P.O. Box 441, Newton, IA, is? Phone disconnected, letter returned.

Bob Boxley, 208 N. William
Columbia, MO 65201

I need a manual for a 16 in. Walker-Turner band saw (no model number). I am interested in their recommended tire changing and adjustment procedure. Also, does anyone know who bought out Walker-Turner?

Ken Root
1213 Center Road, Kendall, NY 14476

I need an owner's manual and parts list for a Durra James table saw, made in Waterbury, Conn. It has no. 118 stamped on the name plate. I believe it's 12 in.

Mark Lockburner
RD 1 Box 314C, Unadilla, NY 13849

I have a Simpson's Model 103.23390, 24 in. scroll saw, with a tag on the front reading "Supremacy." It has a cast iron table and frame, a light in the upper arm and a 6 in. pulley on the drive spindle, but no motor.

I need an owner's manual and info on size/speed of motor, direction of revolution, lubrication, blade changing/ tensioning, and parts.

Ken Pleasance, 1219 Maple Rd
Sidney, B.C., Canada V8L 5P7

I'm looking for the mortising chisels and bits, shaper adapters collars and cutters for the Shopsmith 10ER model.

Michael R. Shafer
130 Fayette St.
Palmyra, NY 14522

I need hardware for the kind of sewing box that fans out to expose all the shelves simultaneously.

Leonard Vener
6 Key Pl. Tappan
NY 10983-1011

I have an old Craftsman jointer, made by King Seeley Corp., model no. 103.23340. I need a fence and guard for it. Any help would be great.

Leo Norton
R.R. 6 Box 294A
Harlingen, TX 77552

I'm looking for an owner's manual for a Craftsman 10 in. radial arm saw "Radial 100," manufactured in the mid 60's.

G. Logsdon
51383 Dorstan Dr.,
Oakhurst, CA 93644

I need plans for a small picnic table made from a single sheet of plywood. The table fits together with no fasteners. Any help would be appreciated.

Bruce K. Ware, 1104 Elkader Ct. S.
Antioch, TN 37013

I need an owner's manual for my Felder BF4/31 combination machine.

Mike Wood
24031 Shin Oak
Huffman, TX 77336

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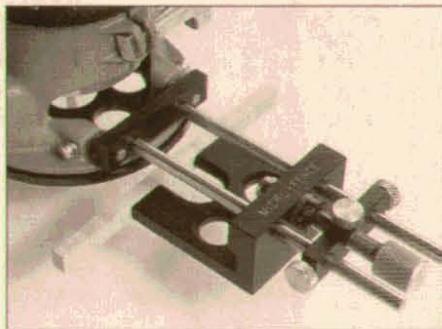
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Product News

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*.

New Micro-Fence Router Fence

Micro-Fence is the first true micrometer-adjusted router edge-guide system, en-

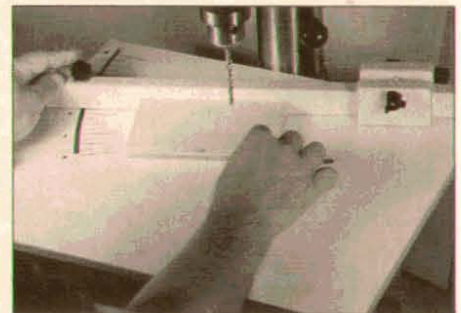


abling .001 readout accuracy with compatible hand-held routers. Suitable for all edge-guide work (both straight and radiused), Micro-Fence insures dead-accurate dadoing, veining, slotting, rabbeting and a host of other common operations. The built-in micrometer adjustment knob and dial allows perfect repeatability, and

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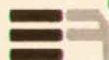
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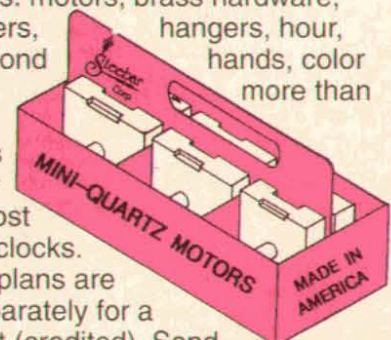
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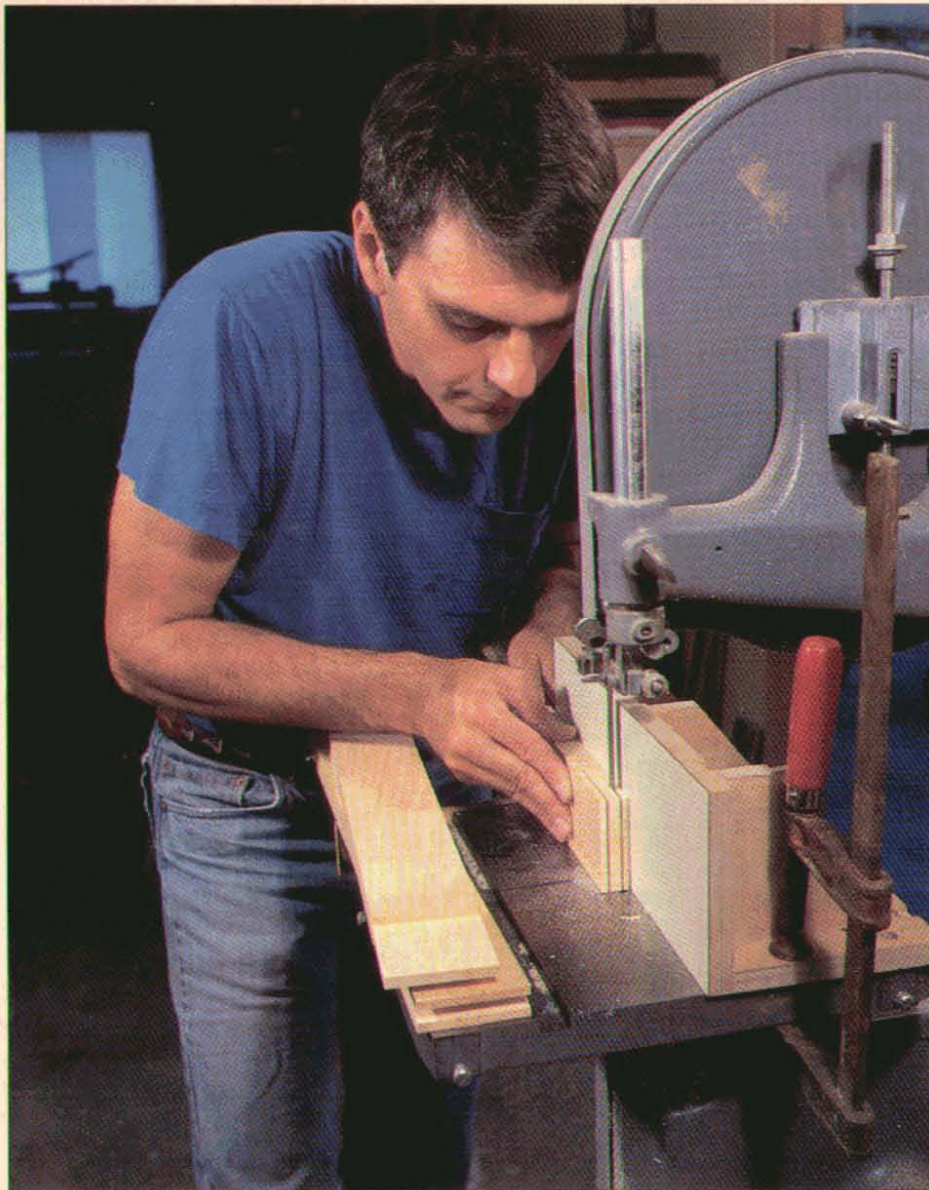
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Bandsawn Bridle Joints

A speedy alternative to the standard mortise-and-tenon

by Roger Holmes



In our age of technological miracles, I find it reassuring that the best method of assembling a wooden frame is still, for us as for the ancient Greeks, the mortise-and-tenon joint. From delicate picture frames to massive post-and-beam buildings, assembled without glue, draw-bored and pinned, or bound by the latest concoction of the adhesive chemist, the mortise-and-tenon is

still unsurpassed for strength and longevity.

Fond as I am of this paragon of folk engineering, I occasionally find myself willing to trade a bit of strength for something a little speedier to manufacture. The answer is frequently a bridle joint or, as it is also called, an open-mortise joint, where the tenon slips into a slot open on three sides, rather than into

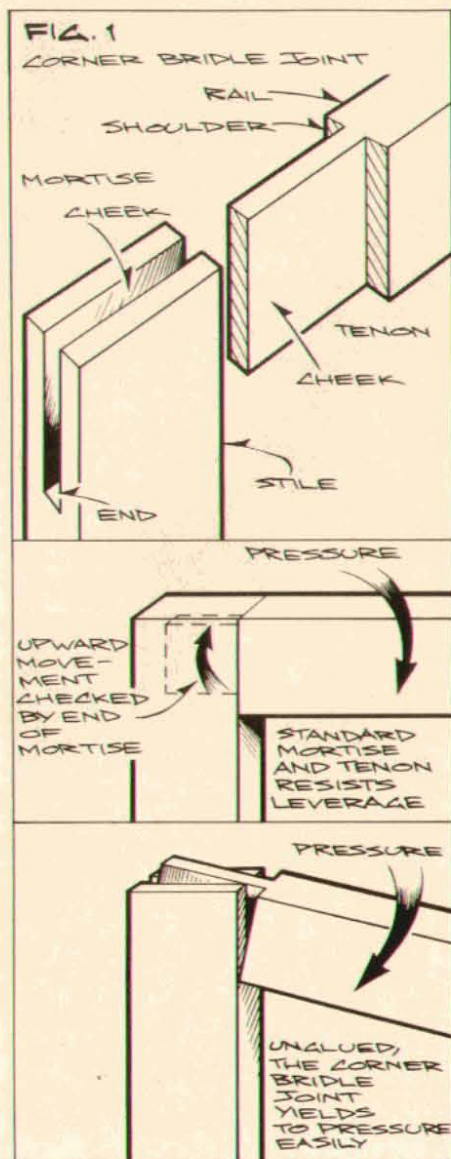
a four-sided mortise (Fig. 1). Cutting an open mortise with a backsaw is much quicker than clearing the waste from a standard mortise with an auger bit and chisels, or even with a drill-press-mounted hollow-chisel mortiser. But the joint can be cut fastest, both mortise and tenon, by employing a band saw, a method I'll describe in this article.

Ease and speed in the making of this bridle joint comes at a price. Trapped on all sides by the mortise's encompassing walls, a "standard" mortise-and-tenon joint has considerable mechanical strength. It resists levering actions and, even when secured only by a wooden pin, it is almost impossible to pull apart.

The bridle joint, on the other hand, has no mechanical advantage against levering, as the sketch shows (Fig. 1). Even when pinned, its strength depends heavily upon the glue bonding the cheeks of the tenon to those of the mortise. Fortunately, contemporary glues are up to the task, making the joint a viable option. In theory, you can substitute a bridle joint for any "enclosed" mortise-and-tenon at the corner of a frame. Several examples that I've used are shown in Fig. 2.

I use another form of bridle joint less frequently, but it comes in handy for frames where a rail and stile form a "T", or for tables, where an intermediate leg joins an apron rail, as shown in Fig. 3. You'll notice that such joints have regained their mechanical advantage against levering or racking forces—shoulders of the "tenoned" member confine the edges of the slotted member. (You can also think of the joint as an "inside-out" mortise-and-tenon: the mortise has been halved, and each half moved to the outside face of the piece, separated by a bridge of wood. Likewise, the "tenon" is also halved, moved to the outside faces and separated by a slot.)

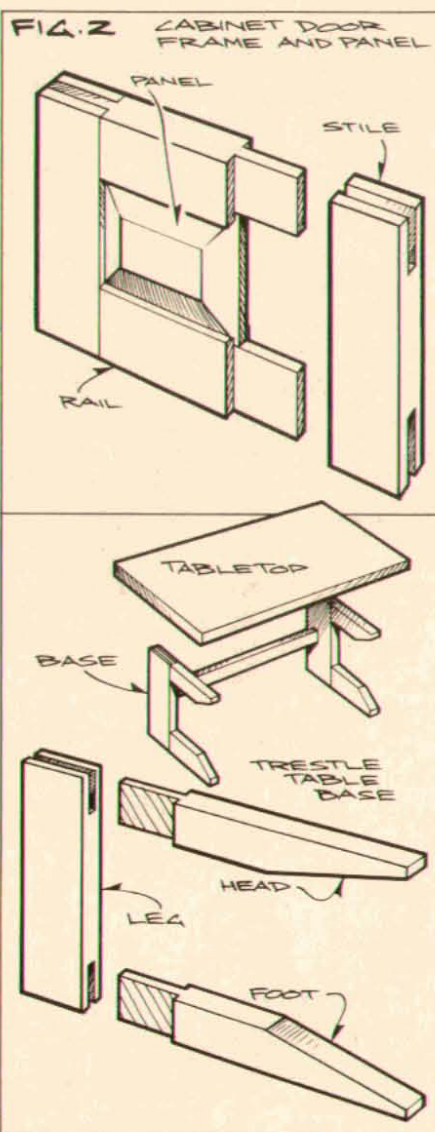
As I've said, the main attraction of these joints is the ease and speed with which they can be cut. If you can make standard mortise and tenons, you'll have no trouble with bridle joints. The process I'll walk through here, using a band saw for much of the work, is particularly useful where several identical joints are



required, on a framed cabinet door, for instance. Once the machine is accurately set up, it takes only minutes to make cuts on numerous parts. If you don't have a band saw, take heart—the work isn't all that much slower when done with a backsaw. I'll talk about the basic corner joint first, then a basic intermediate joint, and then comment on a few variations.

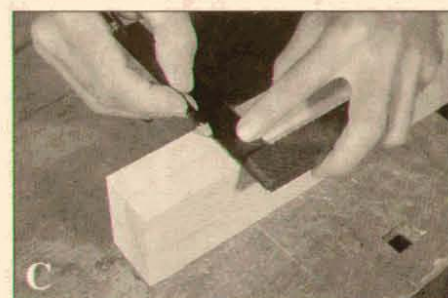
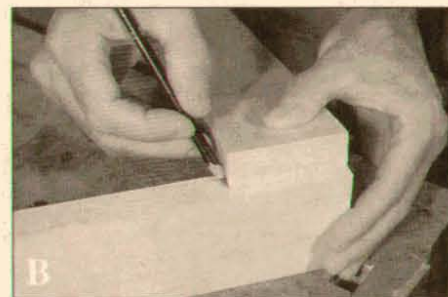
Laying Out the Joints

I lay out bridle joints almost exactly as I do standard mortise-and-tenons. In general, the tenon is slightly more than one-third the thickness of the rail and it extends across the rail's full width. (Sometimes I cut a small shoulder on the rail's inside edge, to cover any bruises or chip-outs incurred when chiseling out



the end of the mortise.) As with most joinery, success depends on starting with flat, square stock. Make sure to mill several pieces of scrap to the same width and thickness as the rails and stiles—you'll need them to test machine setups.

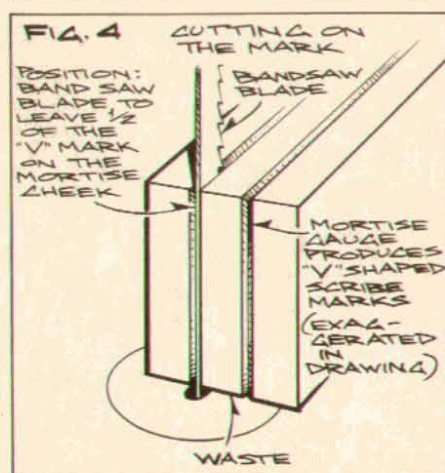
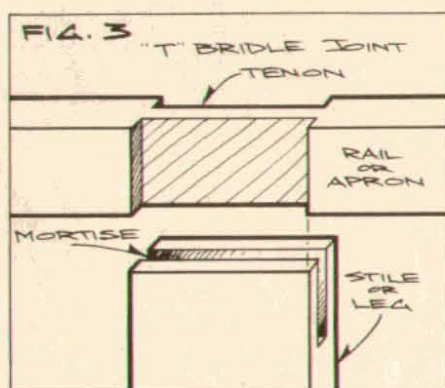
I start the layout by knifing the tenon shoulders, as shown in photos A through D, making the tenon slightly longer than the width of the stile. Next, knife or pencil the width of the tenon on the edges of the stile. Then incise the cheek lines for both mortise and tenon with a mortise gauge. (If you use an ordinary marking gauge, remember to gauge from the working face of each piece for both lines.) Gauge the cheeks on your scrap test pieces, too, to use when setting up the band saw.



Photos A, B, C and D: Lay out a corner bridle joint by knifing the tenon shoulders on the faces of the rails (A) and the width of the mortise on the edges of the stiles (B); after marking the edge, square the line across. Mark the second of each pair of rails and stiles from the first (C). Then scribe the cheeks on rails and stiles with a mortise gauge (D).

At the Band Saw

Before doing anything else, make sure your band saw is in good running order—drive belts tensioned, wheels aligned, blade tensioned and tracking



properly, guides adjusted. There are few things in woodworking more frustrating than struggling with an out-of-whack tool.

Choice of saw blade depends on your machine and your personal preference. All other considerations being equal, I prefer to use a wider blade, which is less likely to wander due to the stiffness the extra width provides. However, I have made satisfactory cheek cuts in fairly wide stock with blades ranging from an ordinary 1/4 in., 4 tooth-per-inch hardware-store blade to a 2 in. wide, carbide-tipped blade that cost a fortune (it was on someone else's saw). Experiment to find what works best for you and for the material you're working. Whatever size you choose, make sure the blade is sharp, preferably very sharp, and that it is aligned at exactly 90 degrees to the machine's table.

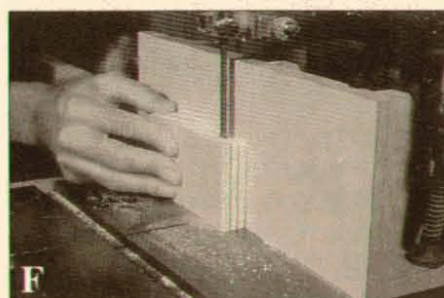
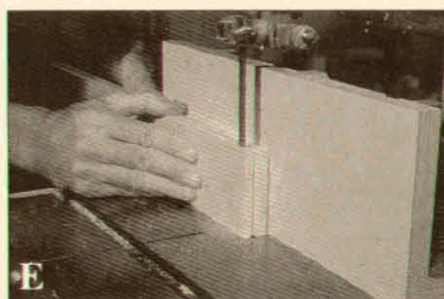
Cutting the Mortise

I cut the mortises first, because it's easier to trim tenons to fit. Using a test piece, set the rip fence to cut the cheek farthest

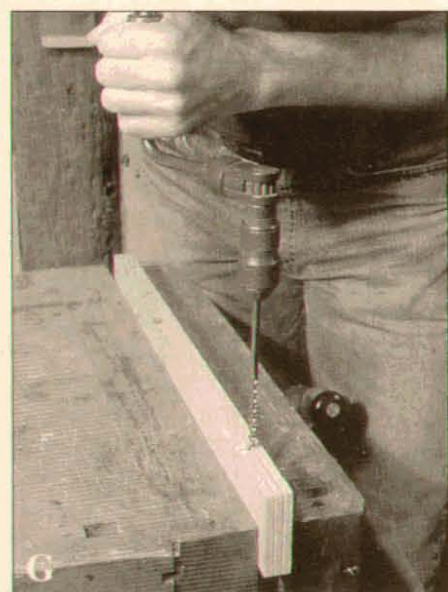
from the fence, positioning the fence so that the blade will slice the gauged line in half—that is, half of the scribed line remains visible on the edge of the stile, the other half is gobbled up by the blade in the waste (Fig. 4). This isn't easy to do, but the closer you come to it, the better. If your band saw lacks a rip fence, square up a piece of scrap wood about 2 in. by 4 in. in cross section and clamp it to the table. It takes a bit of fiddling to adjust the position, but these sturdy fences work just fine.

For all cuts (test and real), feed the piece slowly and evenly and keep it snug against the rip fence (Photo E). If the blade wanders from the line you'll need to do a little detective work. The fault may indicate a dull blade; the rip fence may not be parallel to the face of the blade; the blade may be insufficiently tensioned; or it may be running too loosely between its guideblocks.

When you've cut each outside mortise cheek, reset the fence and cut the inside cheeks (Photo F). It's risky to flip the piece over to cut the second cheek, even when a mortise or tenon is centered. Small differences that are inevitable in the thicknesses of the rails and stiles will produce mortises and tenons of varying



Photos E and F: With the rip fence set to cut the scribed line in half, cut the outside mortise cheek (E), then reset the fence and cut the inside cheek (F).



Photos G and H: Clear the mortise waste with a drill, then with a sharp chisel pare down to the layout lines marking the end of the mortise.

size, resulting in sloppy fitting joints or a lot of work trimming the parts to fit.

You can clear the waste quickly with a drill bit. It's easiest to do so on a drill press, but a brace and bit works fine (Photo G). Bore in from both edges to ensure accuracy and avoid tearout as the bit exits the hole. (The saw kerf can interfere with the bit, so you may want to bore the hole before band sawing the cheeks.) Pare down to the layout lines at the end of the mortise with a sharp chisel (Photo H); I make this surface slightly concave, so there are no gaps on either edge of the stile.

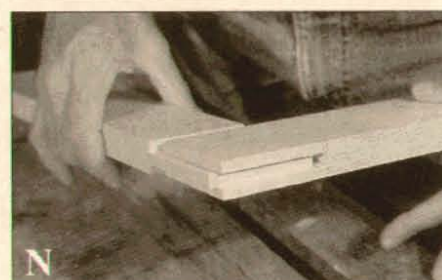
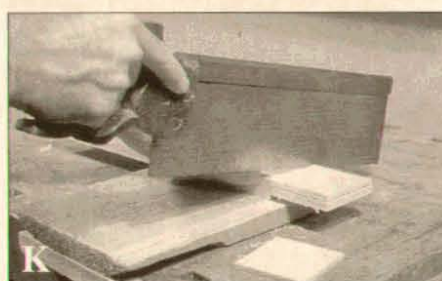
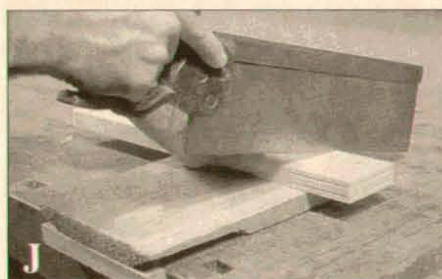
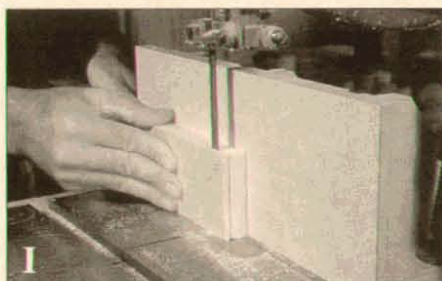
Cutting the Tenon

The tenon cheeks are cut in exactly the same way as the mortise cheeks. Using another scribed scrap test piece, set the fence for the outside cheek, positioned to leave half the scribe line on the tenon. If you have to make any adjustments to the fence, make sure to cut a test piece at the final setting—you'll need it to set up for the second cheek cut.

Setting the fence accurately for the second cheek is crucial—it will determine how much fitting you will do later. In theory, if you leave half the scribe line on this cut, too, each tenon should fit its mortise snugly. Here's where the test piece (or pieces) in which you've made the first cheek cut is invaluable. I set the fence, cut into the test piece about 1/2 in., then saw off the waste on both cheeks to produce a 1/2 in. long stub that I try in the mortise. If an adjustment to the fence is needed, I saw in another 1/2 in. on the inside cheek of the test piece, cut off the cheek waste and try again. (If you've made the first cheek cut in several test pieces, you can use a fresh piece for each setting.) A couple of tries is usually enough to get the right setting. My final settings are seldom perfect, and I prefer to err slightly thicker—it's easier to remove material from a fat tenon cheek than to add it to one that is too thin.

After all the cheek cuts are complete, remove the waste and trim the cheeks and shoulders as necessary to ensure a snug fit, as shown in the photo I-J-K-L-M sequence. These mortises are less rigid than closed ones, and a thick tenon can force the mortise cheeks apart. Take care when fitting, and aim for an easy

Photos I, J, K, L, M, N: Cut the tenon cheeks just as you did those of the mortises (I). Remove the waste by sawing to the scribed shoulder lines on the table saw, radial-arm saw, or as shown here, with a bench hook and backsaw (J, K). If the tenon is too thick, trim the cheeks as necessary with a shoulder plane (L). Finally, trim the shoulders with the same plane to fit snugly to the edge of the stile (M). The joint should slip together easily, but not loosely (N).



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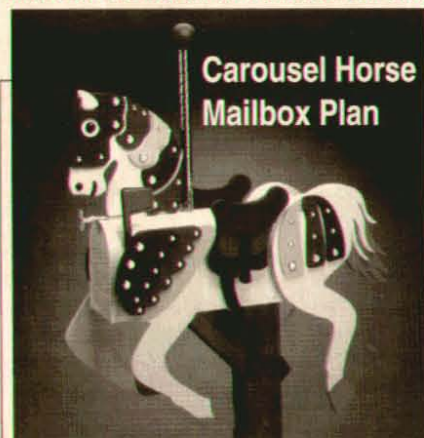
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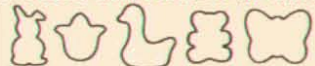
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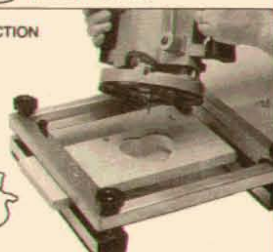
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Woodworking Basics

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but snug sliding fit (Photo N), with the tenon and mortise cheeks in contact over their entire surfaces, particularly along the top and outside edge, which will be visible in the assembled joint.

Assembly

Although bridle joints are easier to cut than standard mortise-and-tenons, they are more trouble to assemble. While a standard joint requires a clamp in only one direction (to pull the tenon into the mortise), a corner bridle joint may require clamps in three directions, as shown in Photo O.

After brushing glue evenly on both the tenon and mortise cheeks and pushing the joint (or complete frame) together, I place a pipe clamp parallel to the rail to pull the tenon shoulders tight. Another pipe clamp parallel to the stile pulls the tenon against the end of the mortise. Finally, a "C" clamp or quick-action clamp perpendicular to the cheeks draws the broad surfaces together to ensure the best glue bond and eliminate gaps along the

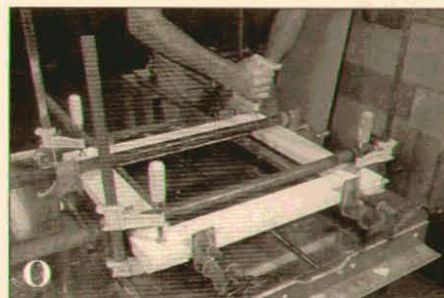


Photo O: A bridle-jointed frame may require a scaffolding of clamps when gluing up, so assemble the frame dry to plan the placement of the clamps. You can remove the pipe clamps after the cheek clamps are in place, although you may want to keep the shoulders drawn tight with pipe clamps until the glue sets.

visible outer edges. Cut wooden clamp pads the same size as the cheeks to distribute the pressure of the quick-action clamps. (The waste pieces from the tenon cheeks and mortise work fine.) Sometimes the pipe clamps can be removed after the cheek clamps are in place, but check to see that the shoulders don't open slightly when pressure is relieved.

A Simple "T" Bridle

This is a useful joint for frames with intermediate rails—those in which one member joins another along its length, rather than at its ends. (For convenience and consistency, I'll call the tenoned member the rail and the mortised one the stile.) Here, the "tenon" has four shoulders instead of two, and is formed by removing material on both faces of the rail. Layout is almost the same as for the corner joint. I usually mark the shoulders on the rail directly from the stile, as shown in photos P and Q. Scribe the tenon and mortise cheeks as before with a mortise gauge bearing on the working faces to ensure alignment at assembly.

You can cut the mortise with a band saw, bit and chisel as described previously. There are a number of ways to cut the tenon—on the table saw or radial-arm saw, with a router, or backsaw and

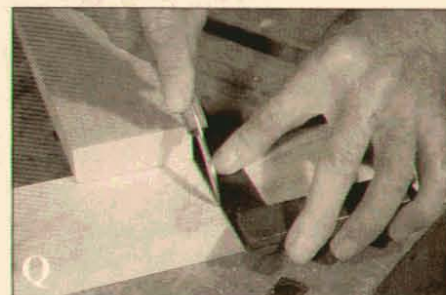
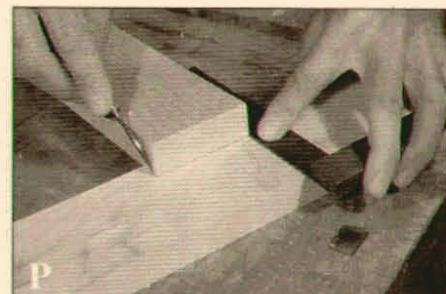


Photo P, Q: You can layout the shoulders for a "T" bridle directly from the stile, as shown here. Position the stile against the rail, placing a square firmly against one edge. Mark the position of the edge away from the square (P), then remove the stile and scribe the first shoulder against the square with the knife (Q), then align the square with the nick and scribe the second shoulder. Carry the scribed lines across an edge to the stile's other face and knife the shoulder lines there.

chisels. I think the simplest method is with the table saw. (I don't own one, but a radial-arm saw has one advantage for this process, which I'll mention below.)

Scribe the cheeks on a piece of scrap and use it to set the blade to the proper height. Against an accurately set miter gauge, cut along the scribed shoulder lines first, then remove the waste with a series of passes over the blade (Photo R). If you want to speed things up, mount a dado blade for this task.

Because the work is face down, you can't see the scribe lines to which you're cutting, so you need to extend those lines onto the edge of the stile to enable you to position the blade. (The radial-arm saw's advantage is obvious here—you can see the lines.) I don't trust my ability to cut to the center of a tiny knife line that I can't see, so I position the blade a very slight but safe distance from my edge marks and later trim to the knife line with a chisel (Photo S). If the tenon is too thick, trim its faces with a shoulder plane, as for the corner joint.

Assembly is straightforward. Push the joint tightly together (Photo T); use a pipe clamp if necessary. Then add clamp pads and a quick-action or "C" clamp to ensure a good cheek-to-cheek glue joint.

A Few Useful—or Interesting—Variations

As with other woodworking joints, bridle joints can be elaborated upon. The Fig. 5 drawing shows a few possibilities. These joints aren't necessarily easier or faster to make than their "standard" counterparts, but they may offer just the practical or aesthetic quality you're seeking. Try them out for fun, or think up your own variations. I can't cover how to make them in detail, but will offer a few comments on each.

The main reason for cutting a cant-shouldered bridle joint (A) is to eliminate one of the clamps required for assembly. When you apply pressure parallel to the length of the rail, the sloped shoulders seat the tenon firmly against the end of the mortise, so no clamp is necessary to do that job. The simplest way to cut the canted shoulders on both mortise and tenon is with a

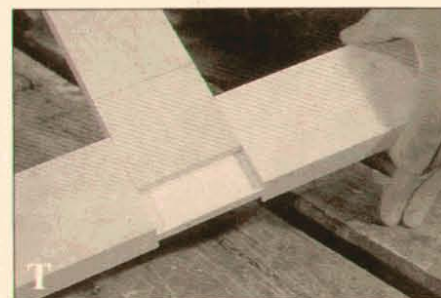
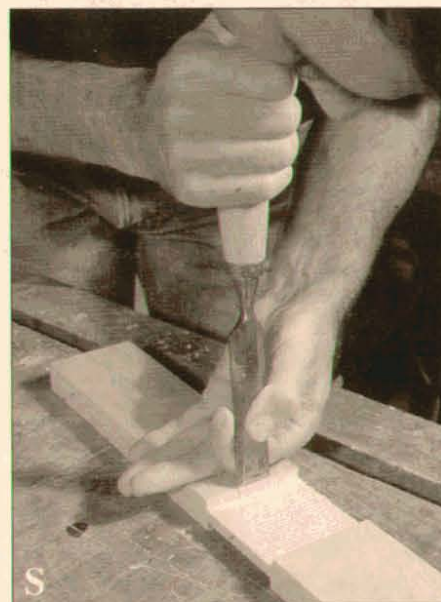
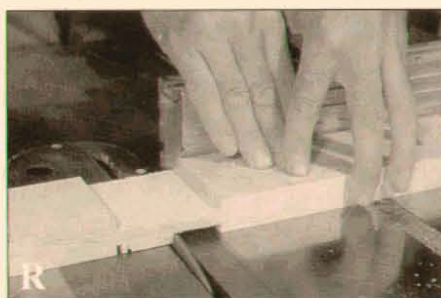


Photo R, S, T: To form a "T" bridle tenon, cut to the shoulder lines on the table saw, then clear the waste in between with repeated passes over the blade (R). It's not a bad idea to play safe on the shoulders, cutting slightly in from the line, then trimming to it with a sharp chisel (S). The completed joint should slip together with no gaps (T).

backsaw, trimming to fit with a shoulder plane (tenon) and chisels (mortise).

A dovetailed bridle joint (B) is handsome and strong—it resists levering reasonably well. Like its canted cousin, it doesn't require a clamp to pull the tenon

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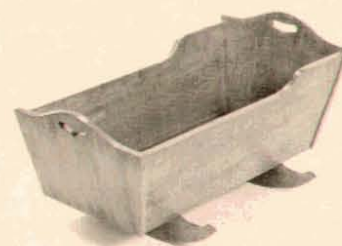


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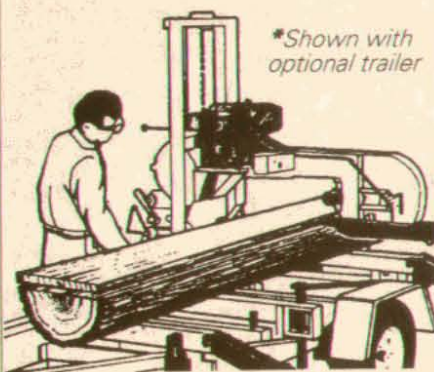
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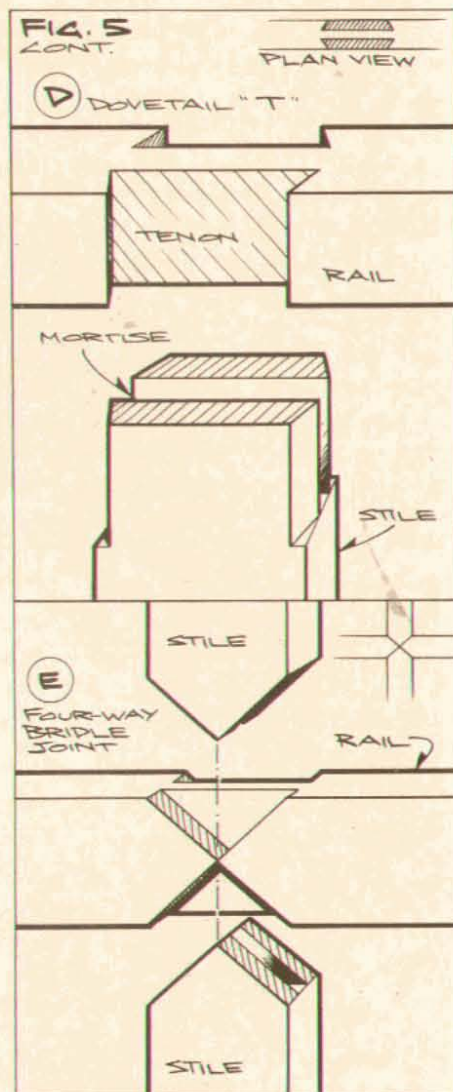
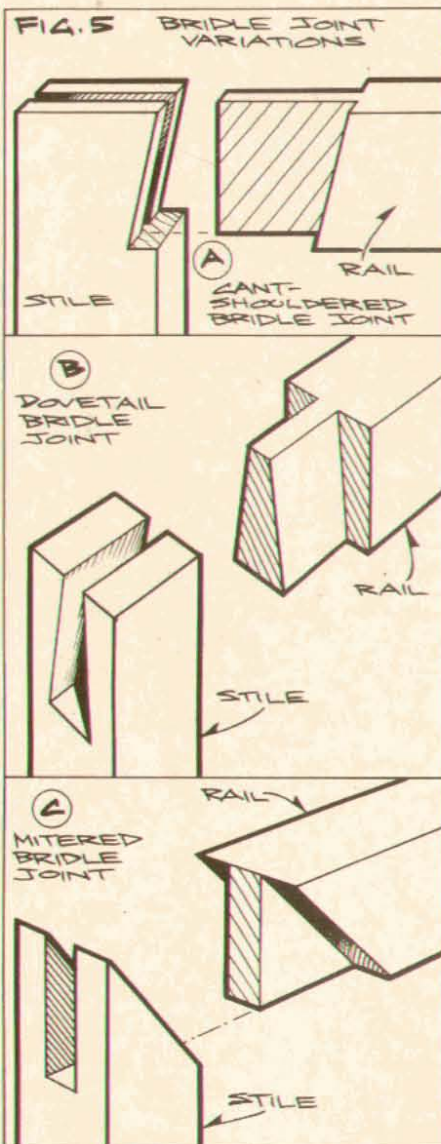
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Woodworking Basics

Continued



hard against the end of the mortise. (A frame of well-cut dovetail bridle joints may not require any more clamps than one made of standard mortise-and-tenons.) Cutting both mortise and tenon by hand with a backsaw and chisels is straightforward, though not necessarily easy; you can also jig up a table saw or band saw to do the job.

The mitered bridle (C) is an excellent choice for mitered frames requiring strong corner joints—cabinet doors, large picture frames and so on. You can band saw the mortise as described earlier in the article, but you'll need to cut the tenon and the miters by hand or on the table saw or radial-arm saw. Like most miters, this joint can be a bit fussy to glue up—you'll probably need three

clamps at all corners, as described for the basic corner bridle. If you want to get real fancy, dovetail the mortise and tenon and eliminate a clamp or two.

The dovetail "T" (D) shouldn't require a clamp across the cheeks, but it can be frustrating to cut and fit. Don't make the dovetail angles too sharp or you'll get a troublesome feather edge on the shoulders cut in the stile.

I think the four-way bridle joint (E) looks much nicer than both the half-lap and stub mortise-and-tenon alternatives. You can cut the mortises on the stiles with a band saw. The rail "tenon" can be chiseled into shape or, with a little jiggling you can clear most of the waste with a router, then chisel to form the angled shoulders.





In The Shop

Ask any woodturner how he or she sharpens a particular turning tool, and you'll likely get a different answer from each turner.

The sharpening techniques I detail here are the ones that I, as a production turner, have found work best for me. I use a grinder almost exclusively, since it enables me to sharpen frequently, with the least possible time away from the lathe. Although employing slipstones and hand sharpening techniques might marginally improve the sharpness of my tools, the extra time and effort required just don't yield any real benefit.

I find that the most important element to successful turning is sharp tools, and the easiest way to insure that your tools are sharp is to touch them up frequently. As I'm working at the lathe, I stop every 15 minutes or so, swing over to the grinder, and tune up the edge on the tool I'm using. Needless to say, 5 minutes of fussing with slipstones each time would hardly lead to a productive day.

Although sharpening can be very subjective, there are a few constants that you'll need to consider, and we'll discuss these first. Specifically, they are types of steel, grinders and grinding wheels.

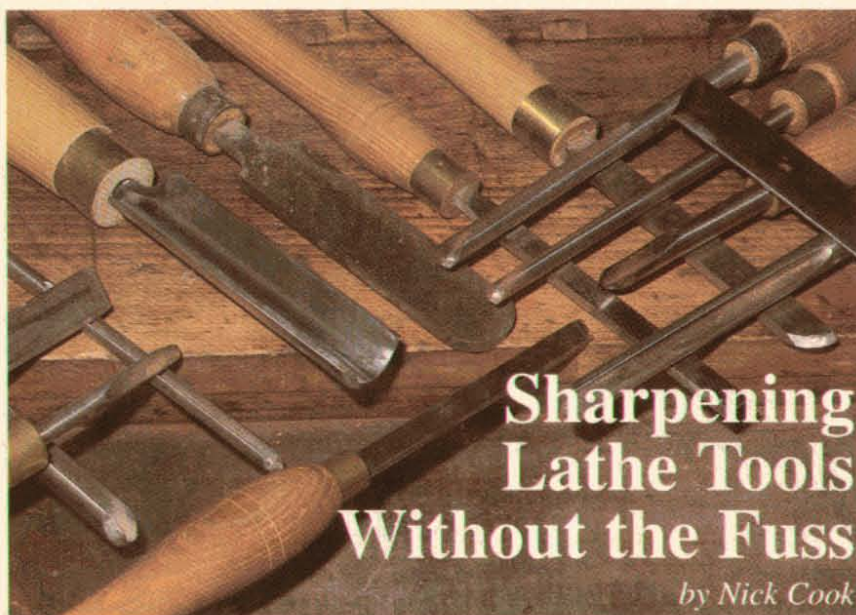
Steel

High speed steel (HSS) is the best choice for woodturning tools. It holds an edge



High speed bench grinder.

much longer and is less likely to be damaged by heat buildup during normal grinding than carbon steel. However, if you already own a selection of carbon steel tools, don't think it is absolutely necessary to replace them. Add or replace tools in your collection one at a time. Since the price of HSS is considerably higher than carbon steel, I'd recommend starting with the bowl gouges because they tend to take the most abuse. A



Sharpening Lathe Tools Without the Fuss

by Nick Cook

large roughing gouge is a good second choice. Skews, spindle gouges and parting tools are used with less aggression, and carbon steel is fine until you can afford better. Because of their ability to raise a burr on the cutting edge, I prefer carbon steel over HSS scrapers.

Grinders

The problem with most grinders on the market today is speed. Inexpensive grinders (see photo), turning between 3,450 and 3,600 rpm, have a tendency to be too aggressive, causing excessive heat and removal of too much steel. With so high a speed, it's difficult to create a fine edge on the tool. On the other hand, whetstone grinders that turn at too low a speed are also frustrating, given the length of time it takes to sharpen tools. These ultra-slow speed grinders are suitable for plane irons and chisels but not for turning tools. Given a choice, a grinder with a maximum speed of 1,800 rpm is ideal. But if you have a higher or lower speed grinder, you can still use it for sharpening your turning tools by being patient and working carefully.

Your grinder should be equipped with movable tool rests, spark deflectors and protective eye shields. A light over the grinder helps you see what you're doing. Always wear eye protection when operating your grinder.

When you're setting up to sharpen your turning tools, the position of your grinder is an important consideration. A standard table top or workbench surface is much too low for any degree of comfort. The grinder should be approximately chest height to avoid an aching back, and to enable you to see what you're doing. You might mount it on a separate pedestal base, a shelf or build the stand described in our July/August



Gray carborundum wheel on left; white aluminum oxide wheel on right.

1992 issue. (This stand allows you to mount the grinder on existing columns in your basement or garage.) Location of the grinder is critical. Place it close to the lathe so you'll be encouraged to use it frequently.

There are a number of grinding jigs and fixtures available which can be used with your grinder to give you better control and a more consistent grind. Most of these fixtures are an added cost and just

another gadget to adjust. The only device I've found to be really helpful is one recently introduced by Glaser Engineering (see sidebar). It produces a very consistent bevel on a bowl gouge. Moreover, since it does not attach to your grinder, it is not in the way when you need to sharpen other tools.

Grinding Wheels

Most of the bench grinders available commercially will be equipped with a pair of general purpose, Carborundum grinding wheels, typically 36 and 60 grit. These hard gray wheels (see photo) can be used for tool grinding, but the individual abrasive particles tend to lose their sharpness, becoming clogged and glazed with the material you are removing from your tools. This causes the wheel to generate excessive heat without removing steel, which could damage your tools. Carbon steel tools are especially prone to this type of damage.

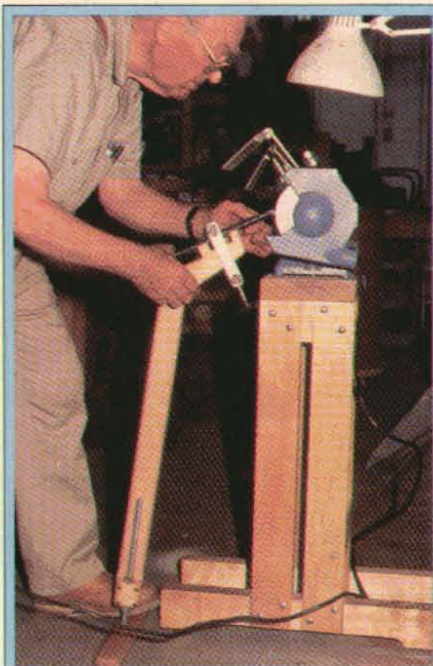
A better choice for sharpening HSS are white or pink aluminum oxide wheels. These fast-cutting, cool-running wheels require less frequent dressing to keep sharp. This is due to the makeup of the wheel itself, where a softer bond al-



Left to right: Wheel dressers; Star-wheel; Silicon carbide dresser; Single-point diamond dresser; Diamond Jim dresser.

lows the individual abrasive particles to fracture and chip away, continuously exposing fresh sharp cutting edges.

If you already have a bench grinder, for starters, replace the 36-grit with a 100-grit white aluminum oxide wheel, and later replace the 60-grit gray wheel with a 60-grit aluminum oxide wheel. The coarser wheel will be used to change the shape of your tools and the 100-grit wheel to refine the edge and keep it



SOMETHING NEW

The Glaser Sharpening Jig consists of a vertical maple fixture with a height adjustment and clamping device for holding the tool. A maple plate is provided to locate on the floor in front of the grinder. Place the end of the vertical fixture in the dimple of the maple floor plate, and fix the tool in the clamping device. A simple motion of rotating the fixture in the plate with the tool held against the grinding wheel produces a consistent bevel each and every time. Setup takes a little time, but the results are worth it.

sharp. Together, these two wheels will handle nearly all your turning tool sharpening needs.

Dressing the Wheels

Grinding wheels are made up of ceramic-like materials that have been bonded together in a furnace. As a ceramic-type product, the wheel will tend to be slightly out of round when you first get it. This will cause your tool to bounce around on the wheel and make it very difficult to get a good clean grind. A new wheel must be trued to the arbor of your grinder. Regular dressing of the wheel is also necessary to true the surface and bring up fresh, sharp abrasive particles. This helps reduce tool bounce and vibration and eliminates any con-

cave surface formed while grinding. You may also dress the wheel to a special shape for grinding specialty tools.

There are several types of wheel dressers. Silicon carbide dressing stones, star-wheels, and diamond dressers are the most common (see photo). All the dressers are fairly inexpensive, usually \$10 to \$30.

The star-wheel is usually the easiest to locate. You may have to find an industrial supply house to purchase the other types. The star-wheel is also the most aggressive, and tends to remove material quickly and wear down your wheels faster. The diamond dresser is a single point or a cluster of diamonds bonded together. The single point diamond requires a fixture or a very steady hand to avoid leaving grooves. The cluster type or readily available "Diamond Jim" dresser has a larger surface area, leaving a smooth, flat surface without removing too much abrasive material. This gives



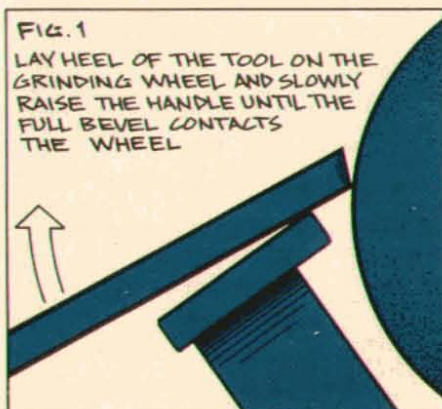
Diamond Jim being used to dress white aluminum oxide wheel on Baldor slow speed (1,800 rpm) bench grinder.

your grinding wheels longer life. The silicon carbide dressing stone is very much like the wheel itself, only harder. It is the least satisfactory.

To use a dresser, simply place it on the tool rest and bring it into contact with the wheel (see photo). Then, with one smooth motion, move the dresser across the face of the wheel. Use very light pressure and keep the dresser moving. Several passes should do the job. In addition to eye protection, be sure to wear a dust respirator when dressing the wheels.

Sharpening Your Tools

Now that you know more than you ever wanted to know about grinders and grinding wheels, it's time you put your

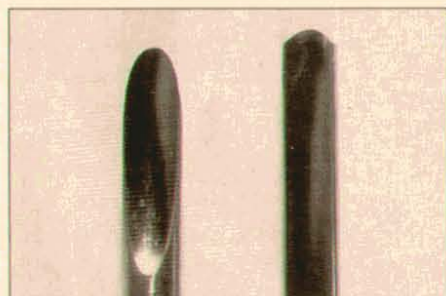


knowledge to use. But, before you take those \$50 and \$75 bowl gouges to the grinder, find a length or two of scrap steel to practice with. This will help remove the intimidation you may feel at the prospect of touching your costly tools to that spinning abrasive wheel.

Always approach the grinding wheel in the same manner you would approach of block of wood spinning on the lathe. With the tool between your fingers, and your fingers on the tool rest, place the heel of the tool against the wheel first. Now, gradually roll the handle upward to bring the full bevel in contact with the wheel (Fig. 1). You should see sparks coming over the tip of the tool as it starts to take shape.

This will create a hollow grind. Use light pressure and move the tool smoothly, and constantly on the wheel, lifting it off the wheel at the end of the grind. Stopping the tool on the wheel will create a flat and require reshaping. Check your progress frequently and cool the tool in water, to avoid burning your fingers or overheating the tool.

Except for the skew, all of the tools described will be ground to a hollow grind. This enables you to touch up your



Left to right: $\frac{1}{2}$ in. spindle gouge with fingernail grind; new $\frac{1}{2}$ in. spindle gouge.

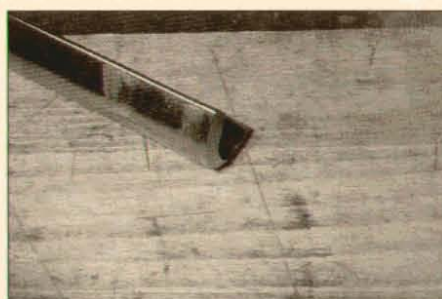
tools with a slipstone or diamond hone (I don't use these, but a more casual turner might), to extend the life of the tool.

Spindle Gouges

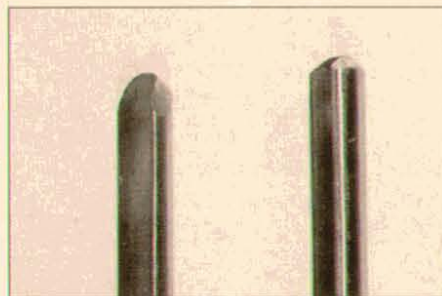
First, determine how you want your tool shaped. You may want to draw the shape on the tool for reference, before you proceed with grinding. A spindle gouge (see photo) typically comes with a very short bevel (about 45-50 degrees). The end is ground to about half-round. A much better shape for general turning is a long bevel (about 20-25 degrees). As you are grinding, reshape the end to a point similar to the bow of a boat, as in the photo. This will allow you to use the gouge as it was intended. This shape works on all sizes of spindle gouges, and is referred to as a fingernail grind.

Roughing Gouges

Roughing gouges can be left square across the end. This allows you to easily work long straight cylinders. I prefer a fairly short bevel, usually between 60-70 degrees (see photo). This leaves more steel under the cutting edge for better support, which enables the tool to remove material faster.



Roughing gouge, $1\frac{1}{4}$ in. 60-70 degree bevel.

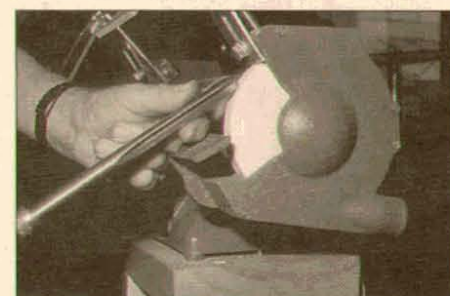
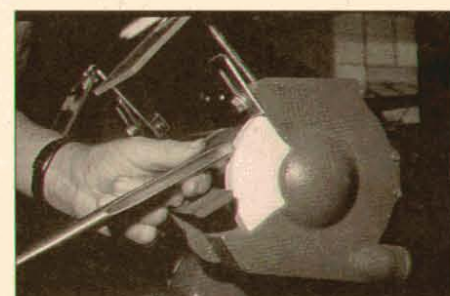
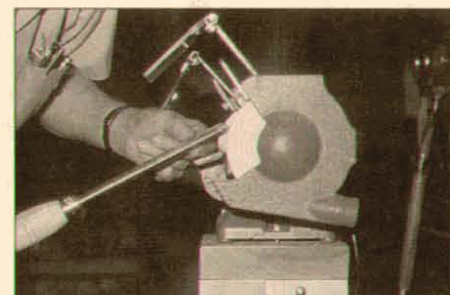


Left to right: $\frac{3}{8}$ in. deep fluted bowl gouge with ears removed; new $\frac{3}{8}$ in. deep fluted bowl gouge.

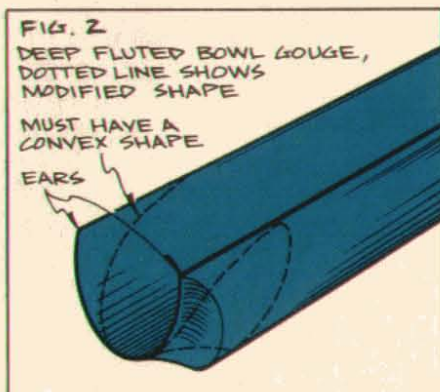
Bowl Gouges

As for the bowl gouges, you may wish to reshape them from time to time as you become more familiar with the many uses of the tool. Just as with the spindle gouges, the bowl gouges are usually ground to about 45-50 degrees and are slightly rounded. But, they also come with those nasty "ears" on either side that tend to grab on the inside of bowls and cause disasters (see photo). You will want to remove these ears as you grind the tool to the new shape. The bevel on the very end can remain the same, but, as you start grinding, continue to bring the bevel around the sides. You must maintain a convex shape around the end of the tool as you remove the ears.

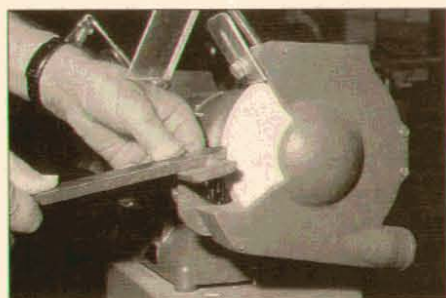
With your grinder at a comfortable height, place the first two fingers of your left hand (presuming you are right



The series of the three photos shows how the bowl gouge is shaped, bringing the tool into contact with the wheel, then rotating the tool and pushing it higher on the wheel to continue the bevel around the sides, and remove the "ears."



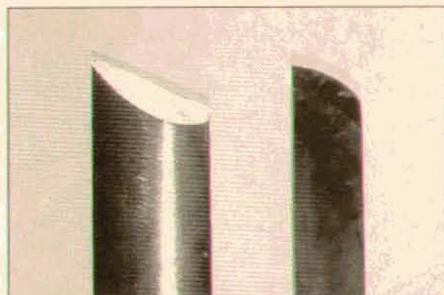
handed) on the tool rest of the grinder. Lay the tool on your fingers and use your thumb to steady it. Use extreme care here to avoid touching your fingers to the wheel. Then, with your right hand, grasp the handle of the tool. Position the tool so that the heel of the bevel comes in contact with the grinding wheel first. As the series of photos shows, first touch the bevel to the wheel, then start pushing the tool higher on the wheel as you continue to rotate it. This will remove the ears and bring the bevel around the sides. For a steeper bevel on the sides, you may also swing the handle to the right and left. The Fig. 2 illustration shows how the bowl gouge looks initially, with a dotted line indicating how the shape will be modified.



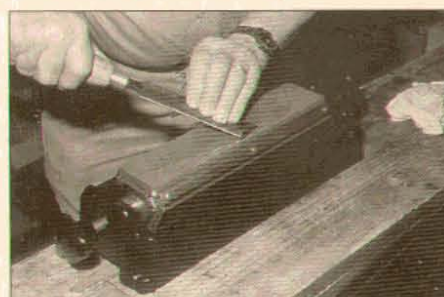
Sharpening large dome scraper on Baldor grinder with flat on toolrest.

Scrapers

Scrapers come in an infinite variety of shapes. Many are ground to meet specific needs. They are usually fairly heavy in proportion to other tools and have a rather short bevel. There are really only two shapes I use on a regular basis. These are a 1/2 in. square nose, and a full dome about 2 in. across. To sharpen the square nose, set the tool rest at about 30 degrees. Lay the tool flat on the rest and move it smoothly across the wheel using very light pressure. For the dome shape, use the same setup and technique, but swing the tool handle from side-to-side, creating a fully rounded dome (see photo). This technique will develop a burr or wire edge (Fig. 3) on the tool, but don't attempt to remove this burr. The burr is the cutting edge when the scraper is in use.



(left to right): 1 1/4 in. oval skew with long bevel; Richard Raffan skew.



Using oil stone to sharpen skew.

Skews

Just as with all the other tools, everyone has their own way of sharpening the skew. Australian woodturner, Richard Raffan, uses a unique skew with a curved cutting edge (see photo). It is ground to about 30 degrees on each side.

I prefer an oval skew with a much longer bevel, about 20 degrees on each side. Rather than using a grinder, I use an oilstone to shape and sharpen my skew (see photo). This creates a flat bevel,

Sources

American Association of Woodturners

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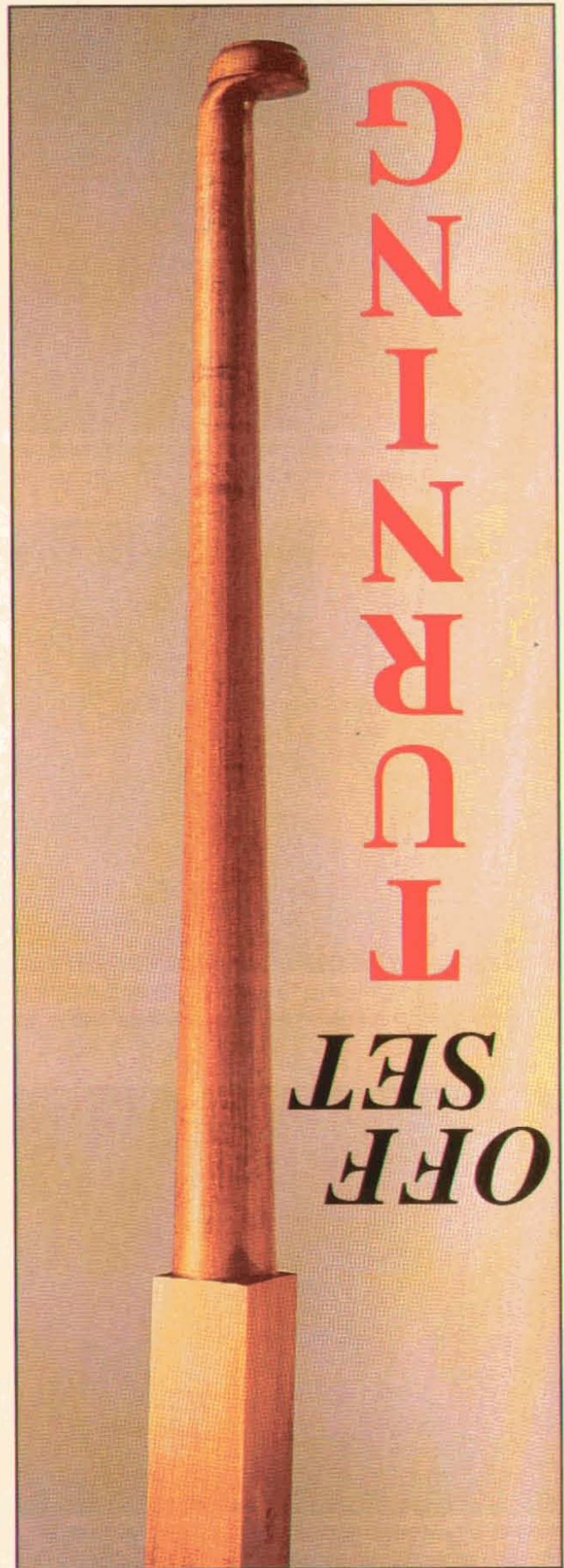
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which I prefer over a hollow grind. I start with a coarse stone, follow with a medium, and then finish with a fine India stone. The stones stay submerged in oil when not in use to keep them from clogging up with metal filings. The skew is the only tool I sharpen with stones. All the others go directly from the grinder to the lathe. I do not use a slipstone or burr-nish any of the other tools.

Overview

The sharpening system that I have detailed here is the culmination of my many years at the lathe. It's not something you learn overnight but, once mastered, it will make your turning a lot more enjoyable and productive. Once you are thoroughly comfortable and confident in both your turning and sharpening skills, working at the lathe becomes very much like a well-choreographed dance, where you'll swing alternately back and forth between the grinder and lathe, always maintaining an edge on your cutting tools sharp enough to effortlessly peel smooth shavings from your stock. Good luck and happy turning.





Although there are any number of ways to turn legs with pad feet, where the leg is offset relative to the foot—often called country cabriole legs—we think the method used here in our shop is as foolproof as any. The dimensions and instructions detailed here apply specifically to the leg and foot on the Porringer Top Tea Table (page 31). As with any technique that you haven't tried before, it's a good idea to practice first on a length of scrap before going to work on your project stock.

Layout Details

First up is preparing your four leg blanks, each measuring $1\frac{3}{4}$ in. by $1\frac{3}{4}$ in. by $27\frac{3}{4}$ in. long. Take note that the $27\frac{3}{4}$ in. length given here is $1\frac{3}{4}$ in. longer than the final length, with $\frac{7}{8}$ in. extra being allowed at both ends.

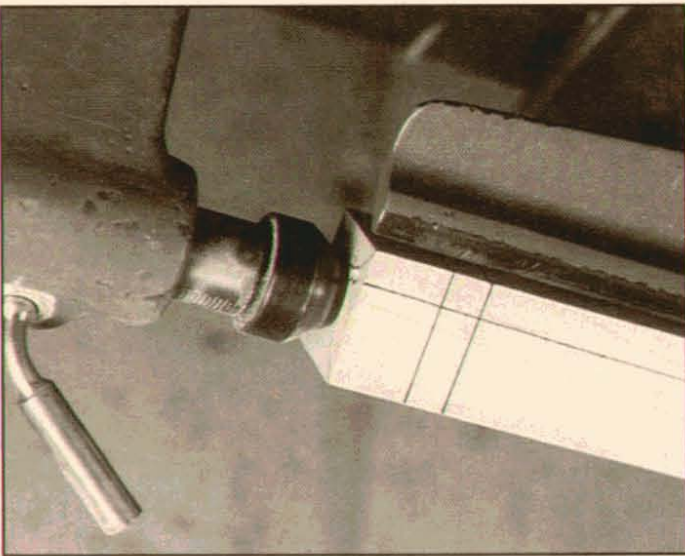
Next, you'll need to lay out several important points—the center points at the ends of the blanks, the top and bottom of the foot, and the point where the turned section of the leg terminates. These are all shown in the Layout Detail.

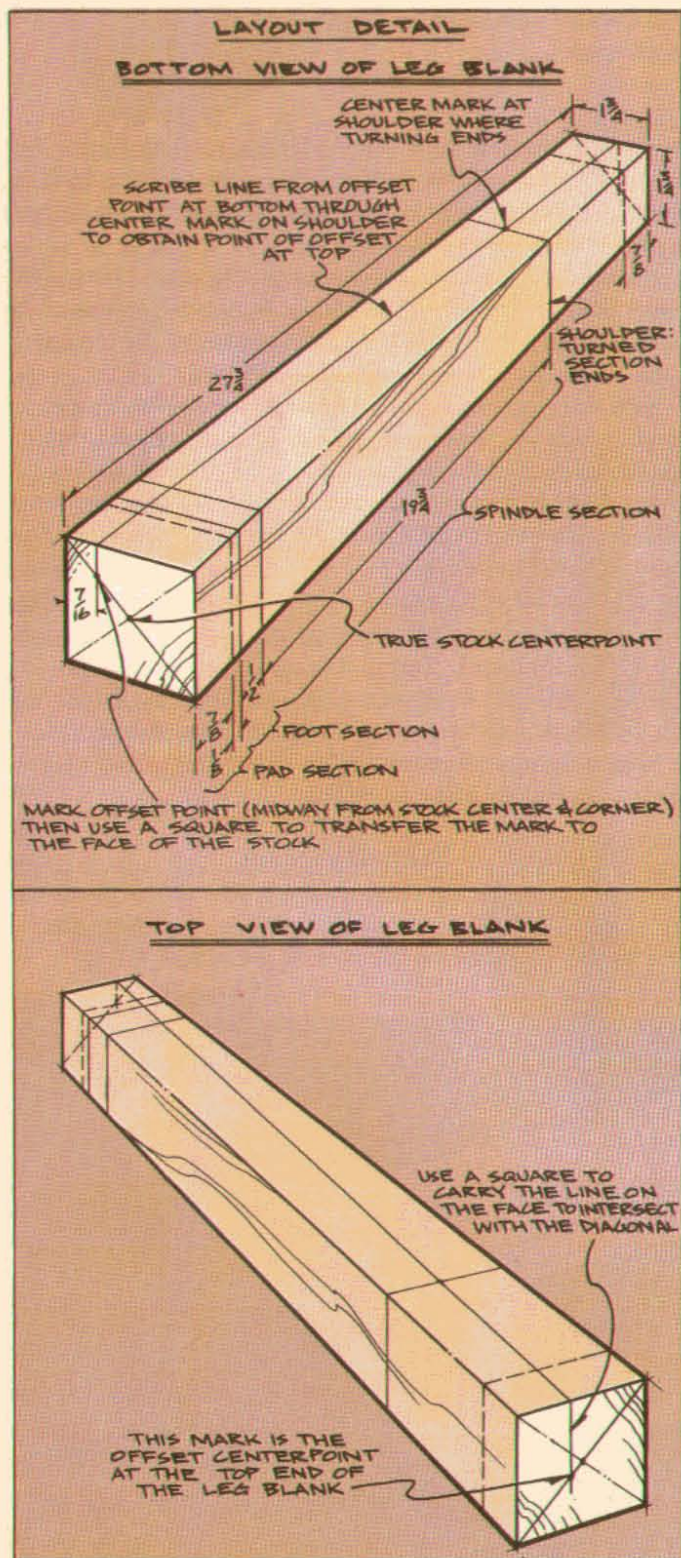
Next up is locating the offset center points at both ends of the blank, which you'll use when mounting in the lathe to turn the spindle portion of the leg. As shown, the offset at the bottom end is midway between the stock center point and the corner. Transfer that point to the face of the blank. To locate the offset at the top end, scribe a line along the face, intersecting through the center point of the shoulder line where the spindle turning ends. Then, as shown, transfer that line to the diagonal on the top end of the blank. Take note that these center points are specifically for the leg shown. If you are turning a similar leg, but the length is different, then the points are no longer valid.

Repeat this layout procedure on all four legs. You are now ready to mount the blank in the lathe.

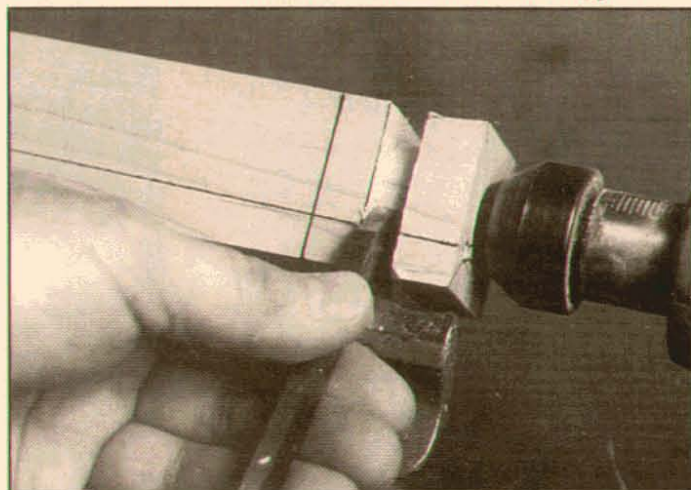
Step-By-Step

1 First up, mount the blank using the true center points (instead of the offset center points) on each end. Note that the foot section is toward the tail stock of the lathe.

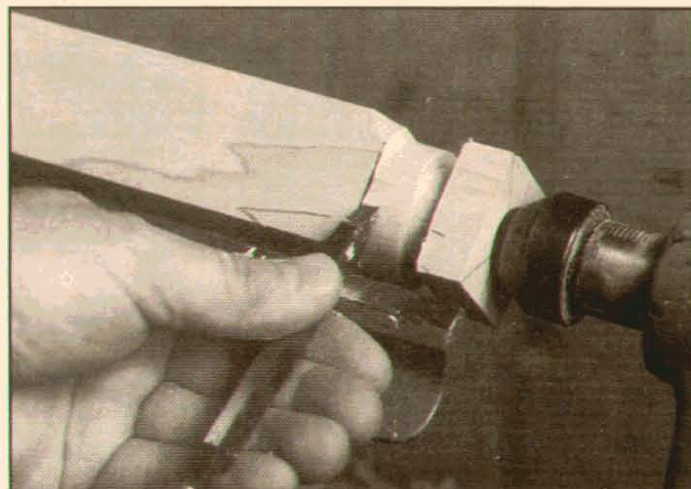




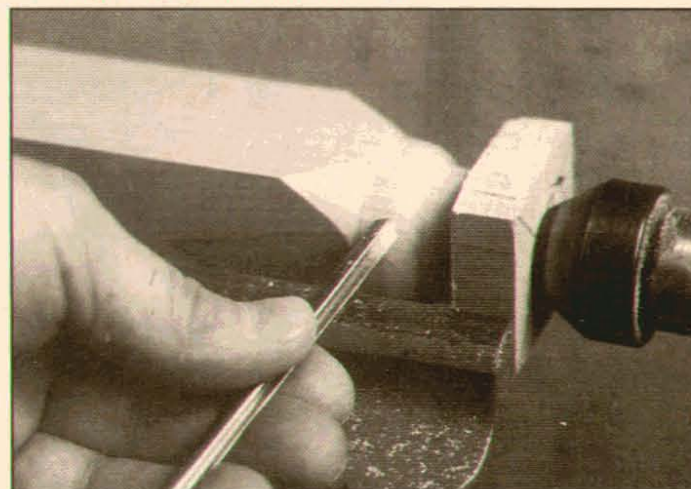
- 2 Using a parting tool, establish the pad portion of the foot. Cut down to $1\frac{1}{4}$ in. diameter, and check with calipers.



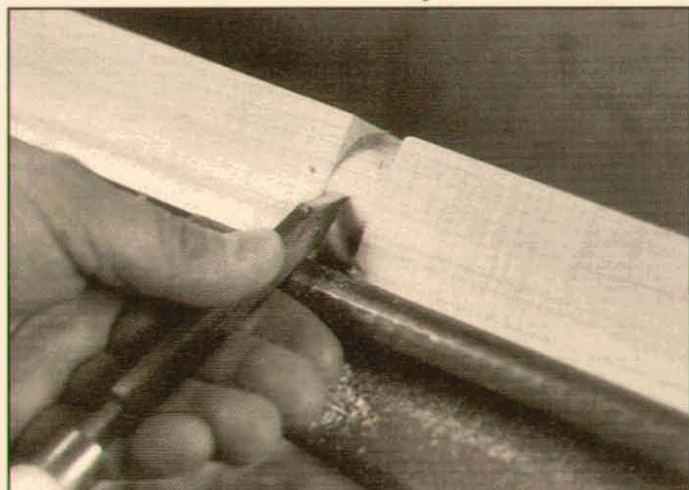
- 3 Again using the parting tool, turn the foot section round, to about $1\frac{3}{4}$ in. diameter.



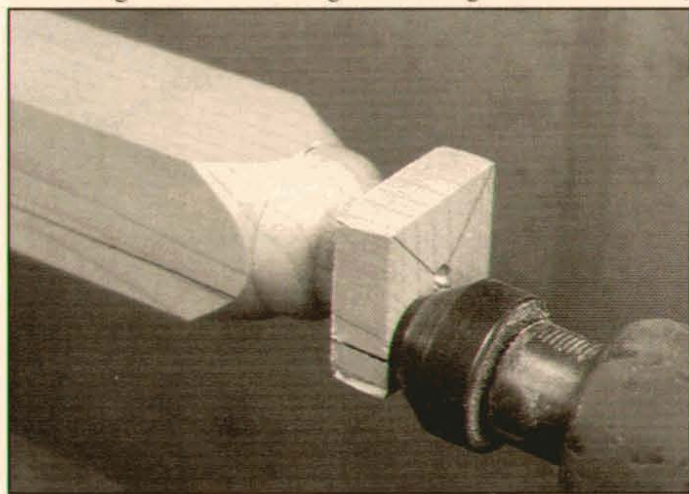
- 4 Using small gouges, or whatever other tool you are comfortable with, round over the foot.



- 5** Using your parting tool once more, establish the $1\frac{3}{4}$ in. diameter at the shoulder where the spindle section ends.



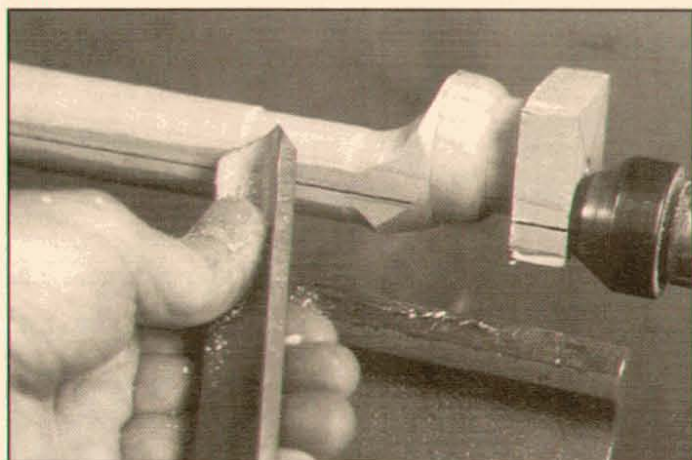
- 6** Remount the blank, using the offset center points. Move the tool rest well out of the way, turn on the lathe, and check that the leg blank is in no danger of coming loose.



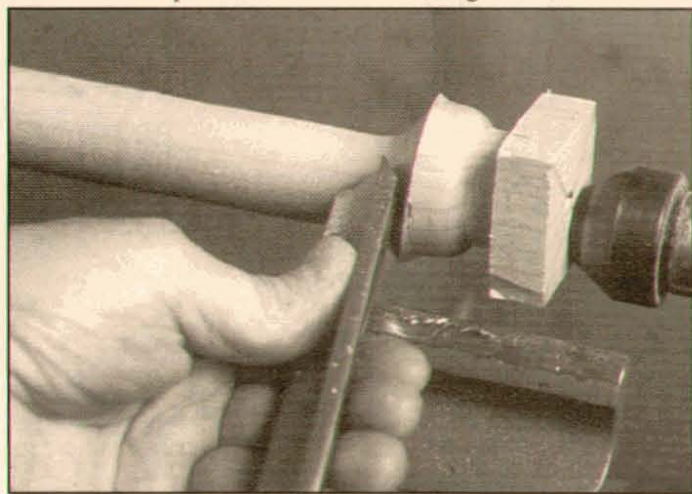
- 7** Using gouges, round the spindle section of the leg. Start at the shoulder, where the diameter is about $1\frac{3}{4}$ in.



- 8** As shown in the pattern, the leg will taper from the $1\frac{3}{4}$ in. diameter at the top of the spindle section to about $\frac{7}{8}$ in. diameter at the bottom end where it terminates, just above the foot.

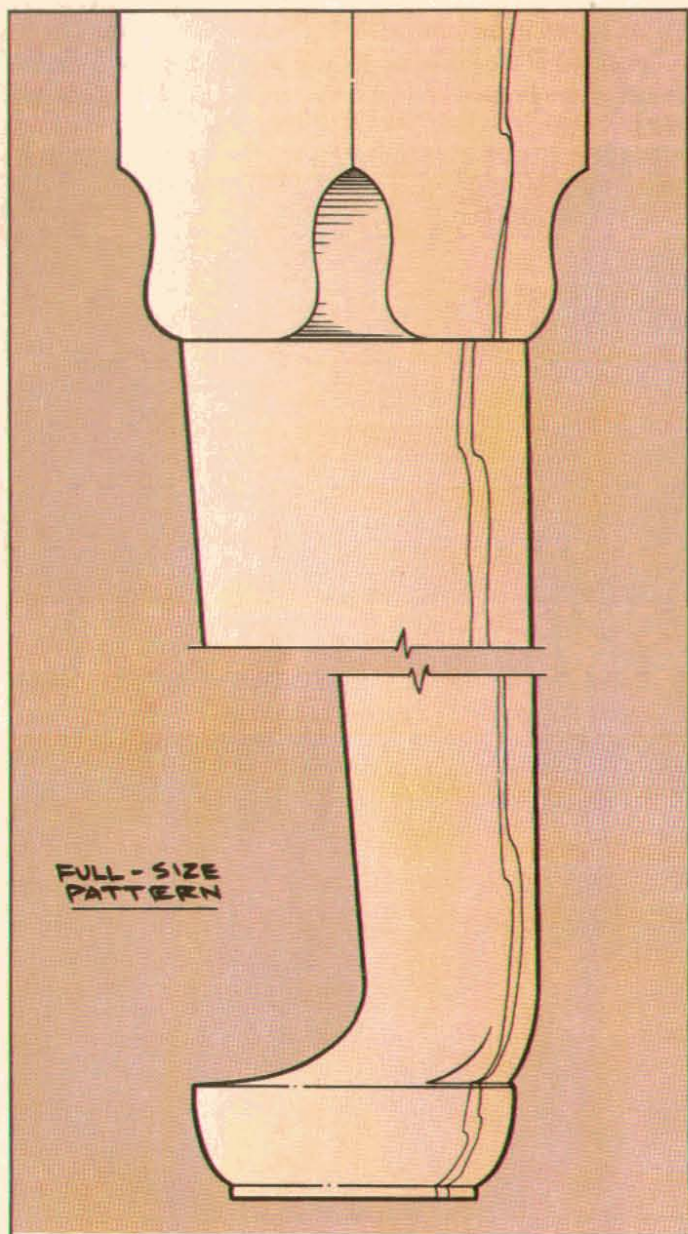


- 9** Using gouges, carefully fair in the top of the foot, where it meets the spindle section of the turning.

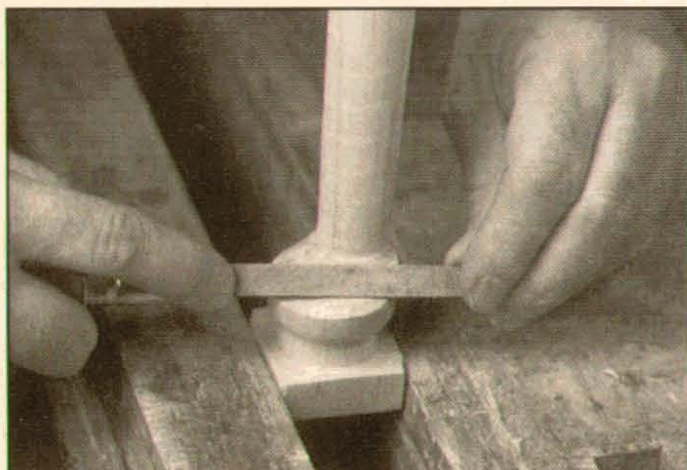


- 10** Stop the lathe, then use a sharp chisel to gently round the back of the leg where it meets the foot. The profile is best shown in the Full-size pattern on page 30.

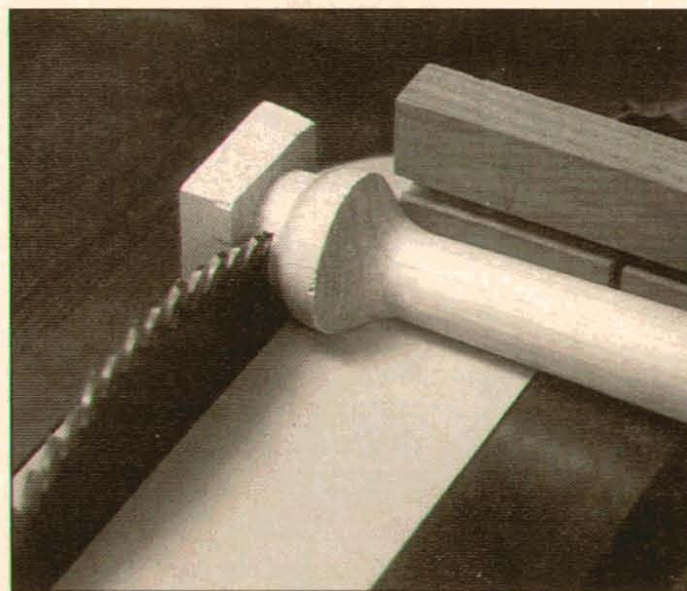
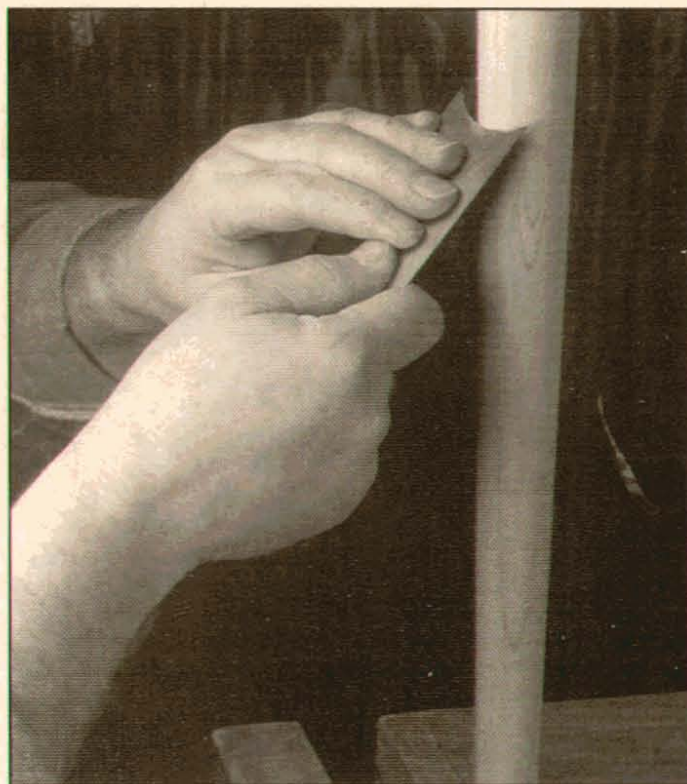




11 Mount the bottom end of the leg in your bench vise, then use files to final adjust the foot shape.



12 We used a concave cabinet scraper to smooth the tool marks from the spindle part of the turning. This can also be done with sandpaper while the leg is still in the lathe.



13 Use the table saw to cut off the excess at both the top and bottom ends. As the full-size pattern shows, trim $\frac{7}{8}$ in. from the bottom end to leave a $\frac{1}{8}$ in. high pad on the foot. Then trim the top end to establish the overall 26 in. final leg length.

Your turning is complete, and you are now ready to cut the apron mortises.



It's a challenge to strike the perfect balance between our readers' need for crafty, clever, weekend-type projects, and more serious, classic work. Too often, the gap between the two genres of projects seems immense—with classic projects being long, involved, and costly affairs, requiring complex skills.

However, in this elegant Porringer Top Tea Table, we've found the ideal "classic" piece, easy enough to make in a weekend, and employing a unique—but very manageable—offset turning technique. The legs on the Porringer Table were designer craftsman Mark Ziobro's first attempt at offset turning, but we think you'll agree the result is a smashing success.

By the way, if you're wondering just what a "Porringer" table is, the best explanation we've heard is that the name is loosely derived from the corner shape on the table's top, which resembles porringers (bowls) that were popular in the 18th century.

Select Stock

A table such as this can be made of most any wood, but we'd stick with something that turns easily—given the fact that a good deal of the work centers around the leg turning technique. Our stock choice was maple, with a little bird's-eye used for the top, and a touch of curly for the aprons.

Prepare Top & Leg Blanks

Start by cutting, edge-jointing, and gluing up enough boards to yield the 23 in. width required for the top (A). While the top is in clamps and drying, prepare the turning blanks for the four legs (B). As noted in the Bill of Materials, the leg blanks allow an extra $7/8$ in. at each end, for trimming once the turning work is complete.

At this point, refer to our Offset Turning Special Technique (page 27), for step-by-step instructions on how to lay out and turn the legs. Once your turning work is finished, use a sharp chisel to cut the lamb's tongues on the three outside corners, and the $1/2$ in. wide by $23/4$ in. long chamfer on the inside corners of each leg. Then lay out and cut the apron

mortises, as indicated. Take note that these mortises are not centered on the leg thickness, but rather start $1/4$ in. from the outside edges.

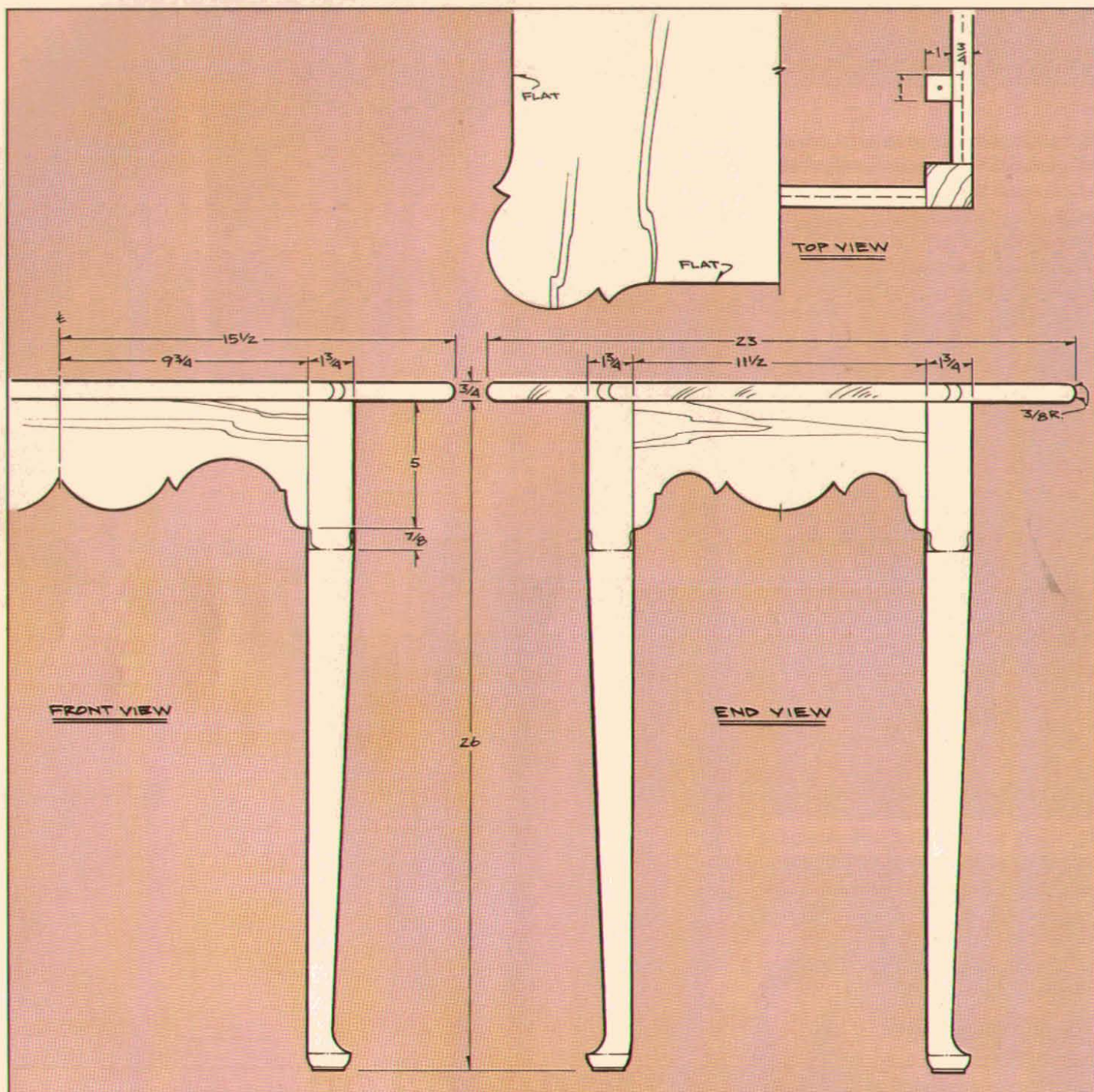
Make The Aprons

Once you've prepared your stock for the end and side aprons (C, D), make full-size templates on thin cardboard of the

apron profiles. These templates should be easy to make, by simply tracing the patterns directly from the full-size half-patterns on page 34, with carbon paper, to your cardboard. Fold the cardboard in half, cut the half pattern out, and voila—you have a full-length template. Then use your cardboard templates to trace the apron profiles directly to the stock. Take



Porringer Top Tea Table



care to locate the templates on your apron stock so as to allow at least $\frac{3}{4}$ in. of stock on each end for the tenons.

Use a band saw, or a hand-held jig saw to cut the apron profiles. Sand your just-cut profile, then use the router table, with a ball-bearing guided chamfering bit, to cut a $\frac{1}{2}$ in. deep chamfer on the inside edge of the apron profiles. This chamfer lends the aprons a lighter look at the edge—a nice detail. Use your table saw and dado head to establish the $\frac{3}{8}$ in. deep by $\frac{3}{8}$ in. wide groove in the aprons for the cleats that secure the top, and lastly, cut the tenons on the ends to fit the

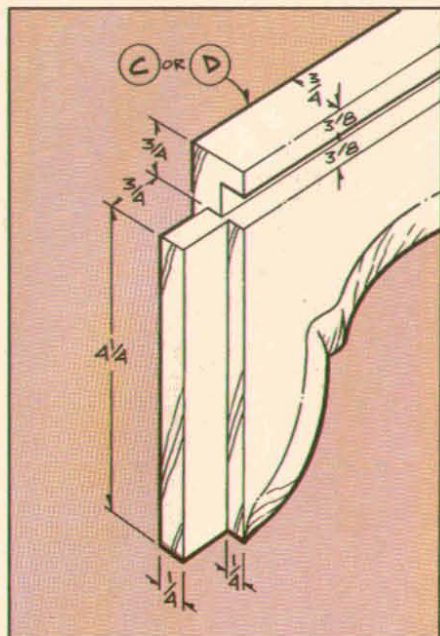
corresponding mortises in the legs.

Shape Top

Referring once more to the full-size pattern page, make a cardboard template of the corner profile of the top. Lay out the top profile on the four corners of your top blank, use a straightedge to connect the flats from the corners, then cut out with the band saw or hand-held jig saw. Sand smooth, then mount a $\frac{3}{8}$ in. radius round over bit in the router table (but set the bit height so it's a little under full height) and establish the $\frac{3}{8}$ in. radius roundover on first one side and then the

other. It's important to set the bit height a little under the full $\frac{3}{8}$ in. radius, or you won't have enough of a flat area remaining on the edge for the bearing to ride on when you make the cut on the opposite side. The bearing won't get into the corners of the top profile, so you'll need to rely on files and sandpaper to continue the radius to establish the sharp points on the top.

While you are working on the top, take a moment to make the six cleats (E) that are used to secure the top to the aprons. The cleats are just $\frac{3}{4}$ in. thick by 1 in. wide by $1\frac{3}{8}$ in. long blocks, with a



Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd
A	Top	3/4 x 23 x 31	1
B	Leg	1 3/4 x 1 3/4 x 26*	4
C	End Apron	3/4 x 5 x 13**	2
D	Side Apron	3/4 x 5 x 21**	2
E	Cleat	3/4 x 1 x 1 3/8	6

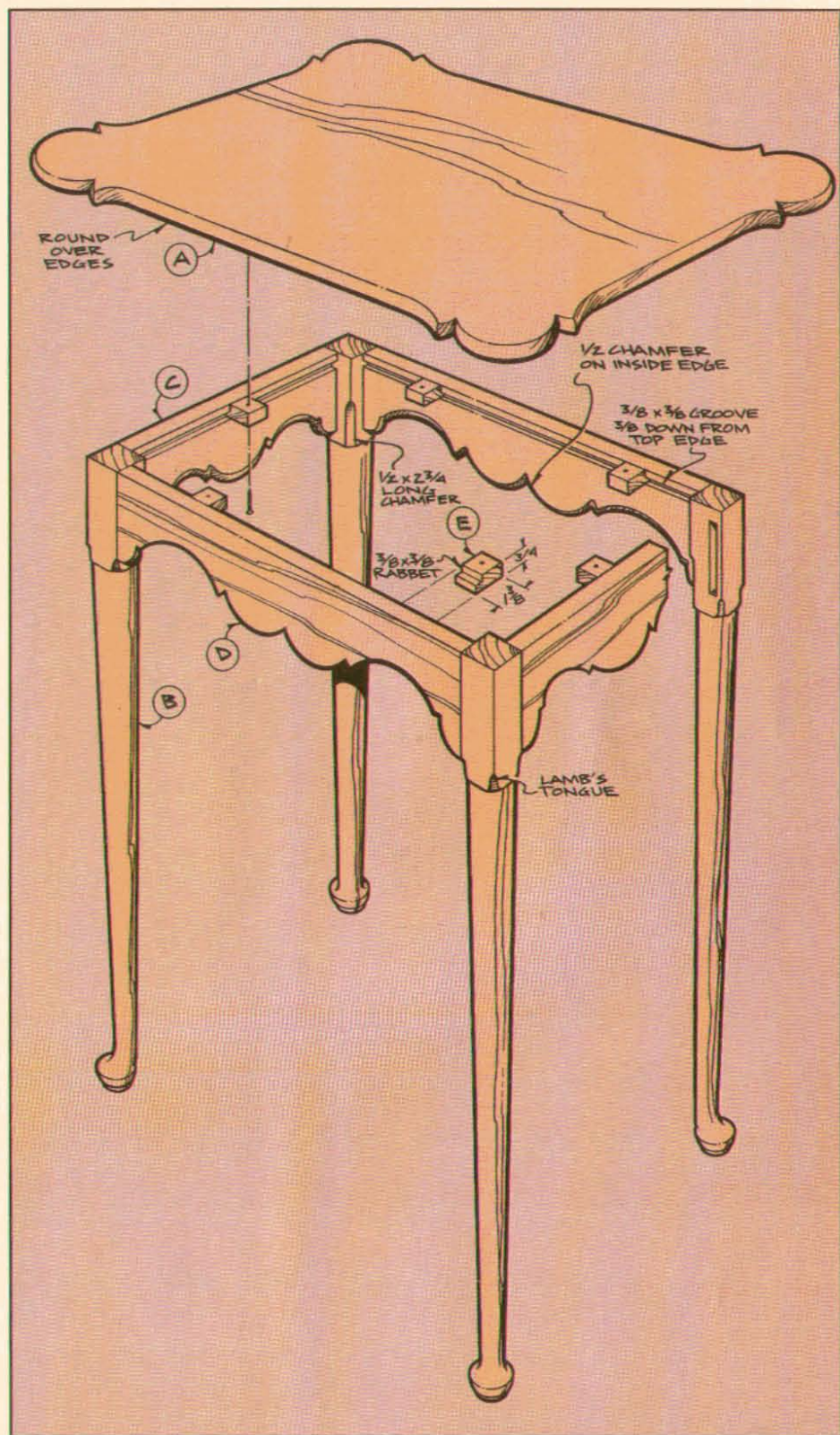
* Note that starting length of leg blank is 27 3/4 in. After turning, trim 7/8 in. from each end of leg blank to yield final 26 in. length.

** Length includes tenons.

3/8 in. square rabbet cut on one end, and a hole drilled through for a screw.

Assembly

Start by making two subassemblies, each consisting of a pair of legs joined by an end apron. When dry, add the two side aprons to connect the pair of leg subassemblies. Finally, mount the top by locating the cleats in their respective apron



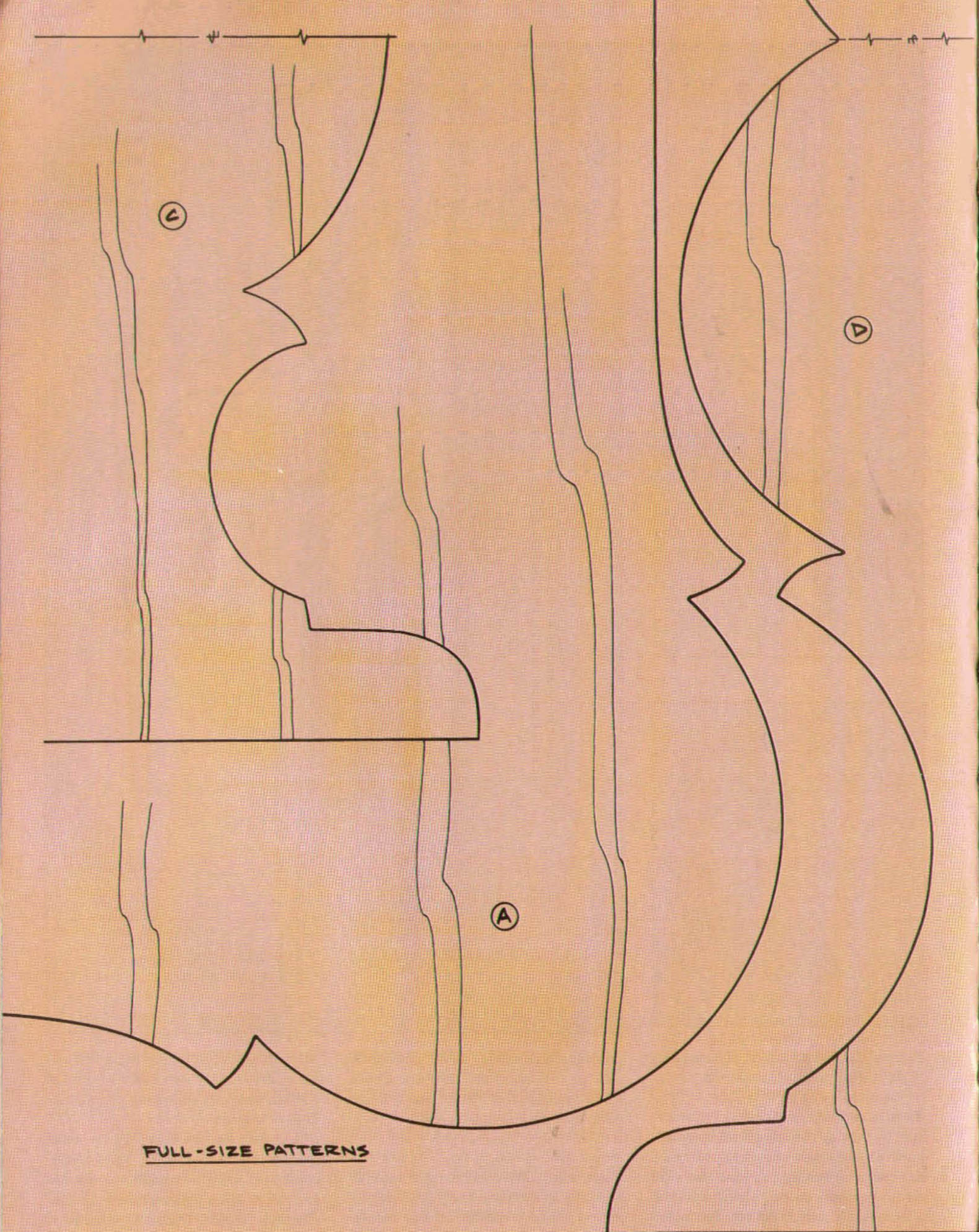
grooves, and screwing up into the underside of the top. Take care not to use screws longer than 1 1/4 in., lest a screw point protrude through the top.

The Finish

Since we wanted our Porringer table to look like an authentic antique, we used a period finish—old-fashioned orange shellac. Start by applying a coat of

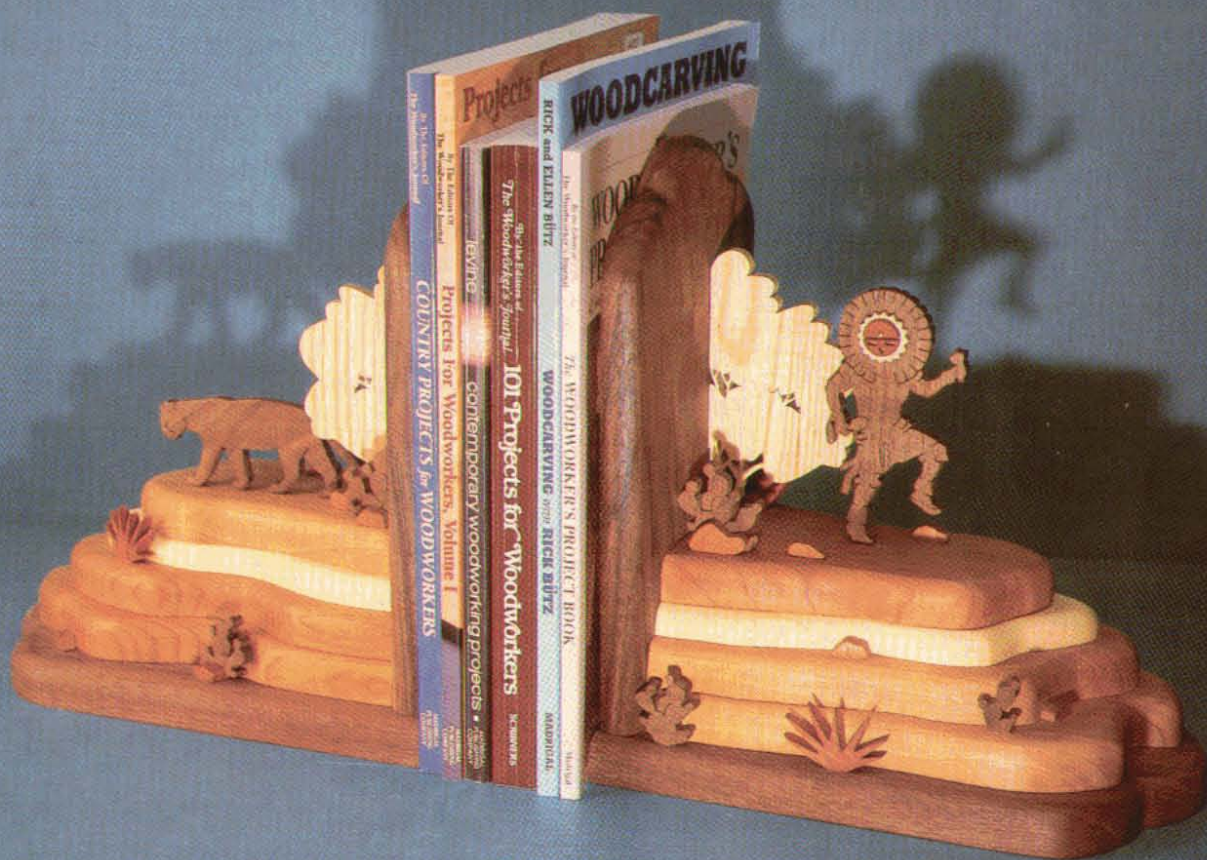
Minwax Colonial Maple Stain, then—when dry—apply two coats of orange shellac, carefully following the instructions on the can.

A shellac finish yields a lovely warm golden color to the wood, but it is susceptible to being marred by wet glasses and spills. For a tougher finish we recommend a modern finish such as lacquer, which stands up better to abuse. 



FULL-SIZE PATTERNS

Scroll Saw Project



KATCHINA DANCER BOOKENDS

Des Moines, Iowa, scroll saw artisan Bill Zaun's classic designs have excited woodworkers around the country. When we recently featured his Sunset Rider Desk Set (September/October 1993), several readers remarked that they wanted more of Bill's designs.

The Katchina Dancer Bookends are a Southwest-style version of Bill's popular

stacked bookend design. Like most work of this type, the bookends are the perfect opportunity to make use of those choice cutoffs that are too short for most projects, but too pretty to throw away. For those woodworkers who may not have a scrap box with the woods specified—or with the thin stock that's required for the scroll-sawn decorative elements—there's a stock kit available that includes

all the wood you'll need, thickened to the specified dimensions (see Kit Source).

Transfer Patterns

To make the bookends as easy-to-make as possible, a full-size pattern is provided for every part. Start with the base, back and stacking sections. Transfer the profiles to your stock, then cut out two

each of the $\frac{3}{4}$ in. thick walnut base and back, and two each of the cherry and maple stacked sections. Note that the cherry sections are $\frac{3}{4}$ in. thick, and the maple section is $\frac{1}{2}$ in. thick. These parts can all be cut with the scroll saw, but if you have a band saw, the work will go a little quicker.

Round-over Edges

Once the profiles are all cut and sanded, use a $\frac{1}{4}$ in. radius ball-bearing guided round-over bit in the router table to apply a gentle radius to the profiled edges. The advantage of using a router bit for this rounding over is that you get a nice con-

sistent look, although you could also just sand to establish the radius.

Assemble Base, Back and Stacking Sections

Assemble the base, back and the stacking sections as indicated. Don't use too much glue—you don't want to have to clean up a lot of messy squeeze-out. When assembling these parts, take note not to confuse the base and back parts (the back is the narrower of the two parts).

Make Decorative Elements

You'll need $\frac{1}{4}$ in. thick stock for most of the decorative elements. But note that the facial features on the dancer are $\frac{1}{8}$ in. thick stock. Also, be sure to make two of each of the facial parts, since they are applied to both sides of the dancer's head (this way the bookends look good from either side).

As indicated in the illustrations, the decorative elements are cut from a variety of woods, with ash being used for the large bush, walnut for the dancer, puma and cacti, padauk for the aloe plants and facial mask, cherry for the rocks, and maple for the facial sunburst.

When cutting the decorative elements, take note that every line on the pattern indicates a cut line. Also, there are a number of inside cuts, where you'll need to first drill a starter hole, and then re-mount the scroll saw blade inside the starter hole (such as the eye of the puma).

Assemble Scene

Although our full-size pattern indicates a specific number of decorative elements, and the photos suggest a placement of these elements, feel free to exercise a little creative license. Try different arrangements than the one shown, make an extra puma or dancer, and create your own scene.

Once you have settled on an arrangement, final sand all parts. Then start the





FULL-SIZE PATTERNS

assembly by gluing the facial elements to the dancer. Most of the decorative elements are simply glued in place, but you should add 1/8 in. diameter reinforcing dowels for the dancer, puma, cacti and aloe plants, to give these parts a little extra protection against being accidentally dislodged.

Apply Finish

Beautiful woods such as the ones used for this project usually look best with a natural finish. We simply flooded on several coats of a good penetrating oil, wiping off the excess after each application and letting dry. A Q-tip type cotton swab comes in handy for soaking up excess finish in tight spots. Although we didn't use one, you may want to add a felt bottom to your bookends.



KIT SOURCE

A stock kit that includes all the wood (pre-thickened to the required dimensions) you'll need to build this project, exactly as shown in the photograph, is available from:

Heritage Building Specialties
205 N. Cascade St.
Fergus Falls, MN 56537
tel. 1-800-524-4184

Order stock kit No. WJ1941. Cost is \$34.95 postpaid.

ALL ROCKS
ARE CHERRY,
MAKE 3 OF EACH

MAKE 2 OF EACH
PROFILE

FULL-SIZE
PATTERN

ALL PARTS ARE
3/4" STOCK, EXCEPT
FOR 1/2" MAPLE

A BIT OF HISTORY

The origins of the oft-copied motif of the Katchina dancer are in the Hopi Indians, who live in the Four-Corners Region of Arizona. The Katchina dancer shown, wearing a sun mask, was one of hundreds of fanciful costumes the Hopi wore, representing elements of nature that were important to their everyday life. The dancers would dress up in an abstract costume representing one of the nature spirits, and "honor" the particular spirit with a dance. Honoring these spirits insured harmony with nature, prosperity, and successful harvests.

The Hopi, a peace-loving people, believed that their dances helped maintain the natural balance, the cycles of the seasons, and their way of life. Today, the Katchina dancer motif is used extensively in Southwest-style crafts, from painted furniture to jewelry.

BASE →

BACK →

Dust Control Dynamo



SANDING CENTER

Airborne dust is a real problem in most workshops. It gets all over, and into everything, including your lungs. And, you don't need to specialize in pulmonary medicine to know that breathing wood dust is not doing you any good.

This project helps attack the problem at the source – right where you are sanding. Use it when working with your power finishing tools, such as a belt sander, or even when hand sanding.

It also serves double-duty as an air cleaning system. When the table saw (or any other shop equipment) is churning

out lots of dust, turn on the Sanding Center and it will help filter the shop air.

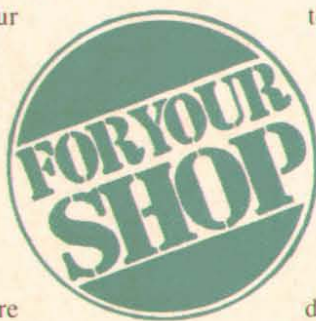
Our Sanding Center will adapt to just about any of the dust collectors currently on the market – as long as the dust collector draws about 600 cubic feet per minute at 1 in. static pressure. It works pretty simply: When the dust collector is started, air is drawn through the holes in the Peg-Board top and right into the collection bag. It won't work with shop vacuums as they are not powerful enough to do much good.

Even when using a heavy-duty belt sander, we found very little dust escaping the pull of the Sanding Center.

Sanding Center shown with optional worksurface covering the Peg-board top. Worksurface creates added bench-space when the Center is not used for sanding.

However, it's not 100 percent efficient, so always wear a dust mask. And if your sanding tool has a dust bag, it's a good idea to use it.

The sanding center has two large full-extension pull-out end drawers with adjustable shelves. The drawers have a nice feature—they are open on both sides to allow easy access to power sanding tools. The adjustable shelves are handy, especially since power sanding tools come in a variety of shapes and sizes. Also, to make it easier to tear sheets of sandpaper, we added an optional sand-



paper tear-off fixture to the top of one end drawer.

The six center drawers are perfect for storing sandpaper, sanding belts and sanding drums. And, thanks to four heavy-duty casters, the entire Sanding Center moves easily around the shop.

We also designed an optional work-surface to fit on top of the Sanding Center. When you are not using the unit for sanding, simply drop the work-surface in place and you quickly have extra bench space. It hangs on a wall for easy storage.

Finally, if your shop doesn't have room for the entire Sanding Center, consider making only the sanding box. The box unit can be hung on your shop wall until it's time to sand, then you need only clamp it to a pair of saw horses and connect the hose from your dust collector (see photo). The sanding box can be made in little time (and at minimum cost) and it works just as well at removing dust.

MATERIALS: The case sides, dividers, bottom and panel are made from $\frac{3}{4}$ in. thick birch plywood. The case back and sanding box base are made from $\frac{1}{2}$ in. thick birch plywood. So, too, are the end drawer fronts, backs, tops, bottoms, and adjustable shelves, along with the center drawer bottoms. The top of the sanding box is $\frac{1}{4}$ in. thick perforated hardboard (Peg-Board), while the

worksurface top and the end drawer panels are $\frac{1}{4}$ in. thick birch plywood. The remaining parts are made from poplar. All exposed plywood edges are covered with a $\frac{1}{4}$ in. thick poplar edging.

Three hardware kit options are available—one for those making just the sanding box, and a pair of choices for those making the entire Sanding Center (see Kit Options).

MAKE THE SANDING BOX

MAKE THE FRAME: Start by making the front/back (A) and the sides (B). Cut the parts to the dimensions shown in the Bill of Materials, then use the table saw and dado head, along with the miter gauge, to cut the $\frac{1}{2}$ in. deep by $\frac{3}{4}$ in. wide rabbet on the ends of each side. Once the rabbets are cut, use the dado head, in conjunction with the rip fence, to cut the $\frac{1}{2}$ in. wide by $\frac{1}{2}$ in. deep rabbet along the inside bottom edge of the four parts.

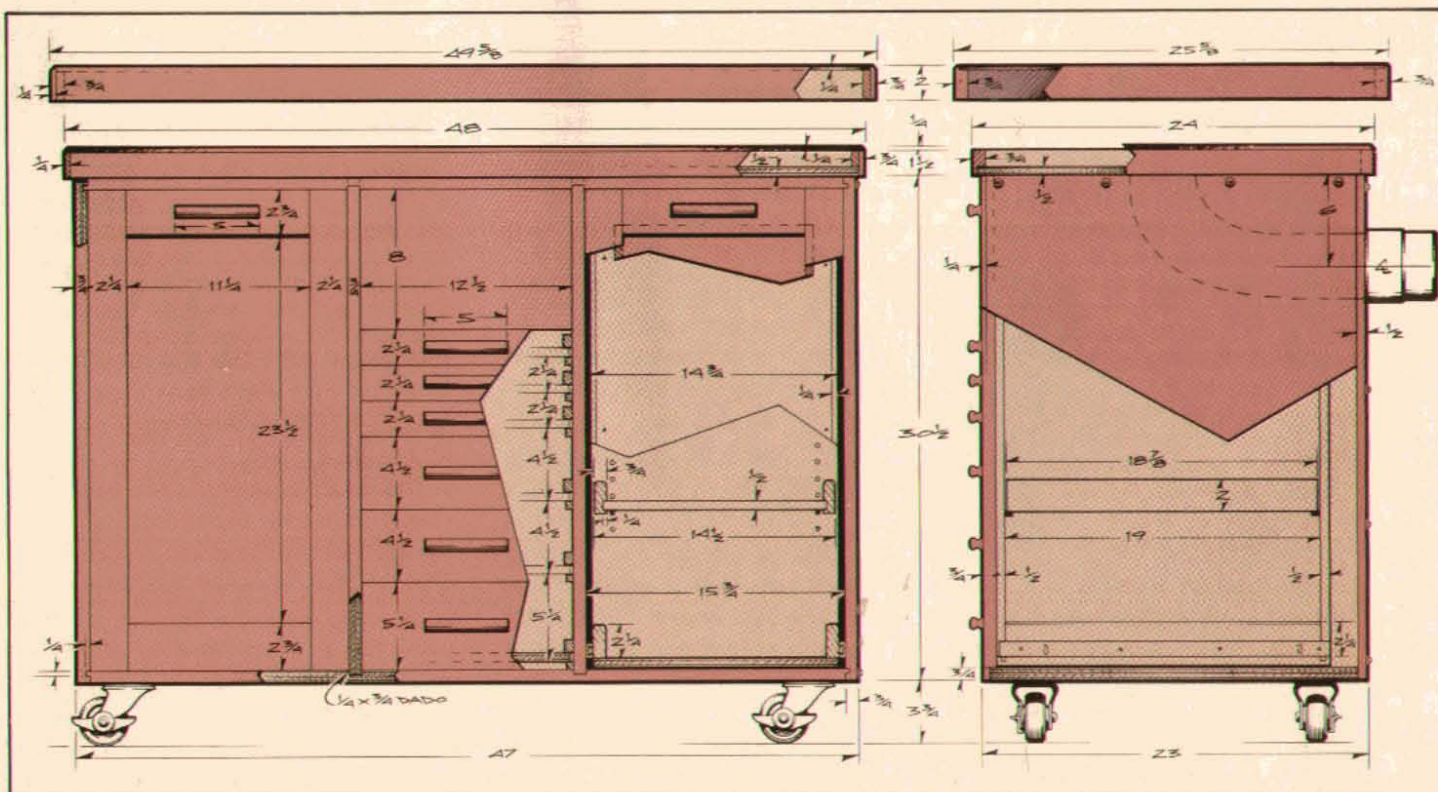
Next, add glue to the ends of the front and back, and also to the rabbets on the ends of the sides, then assemble the four parts to make a frame. A couple of finishing nails through the sides and into the ends of the front and back will hold everything securely while the glue dries. Before setting it aside to dry, make sure the frame is both square and flat.

ADD THE BASE: Now, measure the opening for the base (C) and cut it to size. Then, in the center of the base, lay out the 10 in. square cutout for the exhaust hood. After boring a starter hole, use the jigsaw to make the cutout. Assemble the base to the frame using glue and finishing nails.

MAKE THE TOP: Measure the outside of the frame and cut the $\frac{1}{4}$ in. thick perforated hardboard top (D) to fit. This material is sold under various trade-names, the most common is Peg-Board. Just be sure that it has $\frac{1}{4}$ in. diameter holes and that it has at least one tempered (smooth) side, which will serve as the top surface. An untempered surface is rough and tends to catch dust particles.

Attach the top to the frame with the $1\frac{1}{4}$ in. long by no. 6 sheetrock screws (FF). We used 20 screws - 6 along each front and back edge and 4 along each side. Drive the screws through the $\frac{1}{4}$ in. diameter perforated holes and stop them flush with the surface. Don't glue the top in place, as you may need to occasionally remove it in order to clean out the box. (Readers who plan to make the entire Sanding Center should not mount the top at this point. Later in the construction, the sanding box is mounted to the case by driving screws through the sanding box base.)

ADD THE EXHAUST HOOD: Next, mount the exhaust hood (DD) to the un-





Center Drawers are ideal for storing sandpaper sheets, sanding belts and sanding drums. Note optional tear-off fixture on the top end drawer.



If workshop space is limited, make only the sanding box and use it clamped to a pair of sawhorses. When the sanding job is done, hang it on the wall out of your way.

derside of the base, securing it in place with the eight hood mounting screws (EE). When installed, it should completely cover the cutout made earlier.

GIVE IT A TRY: To use the sanding box as is, just clamp it to a pair of supports (most saw horses will do just fine) then attach your dust collector hose to the exhaust hood port using the hose clamp (GG).

MAKE THE CASE

CUT THE WIDE CASE PARTS: Readers who want to build the entire sanding center can now set aside the sanding box and start on the case. Begin by cutting the two sides (E), the two dividers (F) and the bottom (G) to the dimensions shown in the Bill of Materials. Note that all these parts are 22 1/4 in. wide. Once ripped to width, a table saw cutoff table, if you have one, will come in handy for crosscutting this stock to length.

ADD THE EDGING: The wide edging (AA) can now be attached to the front edges of the sides, dividers and bottom. The 13/16 in. edging width allows for a little overhang on each face of the plywood. Cut the edging slightly long, then glue and clamp it to the plywood. When dry, trim it flush on the ends, then use the router and a bearing-guided laminate trimmer bit to flush-trim the overhang on each side.

CUT DADOES, RABBETS AND NOTCHES: Next, lay out and mark the locations of the 1/4 in. wide by 1/4 in. deep dados in each side that will accept the bottom and the upper frame. Clamp a straightedge across the side, making sure it's square, then use a router and a 1/4 in. diameter straight bit to cut the dado across the entire width.

Use the same straightedge technique to cut the pair of 3/4 in. wide by 1/4 in. deep dados across the bottom (for the dividers), and also the 1/4 in. by 1/2 in. rabbet on the ends of the bottom (for the sides).

Finally, use a band saw to cut the 1/2 in. by 2 in. notches on the upper front edges of each divider.

ADD THE RUNNERS AND GUIDES: Although you won't be adding drawers until much later in the construction, now is a good time to attach the drawer runners (Y) and guides (Z). Once the case is together, restricted space will make these parts harder to access.

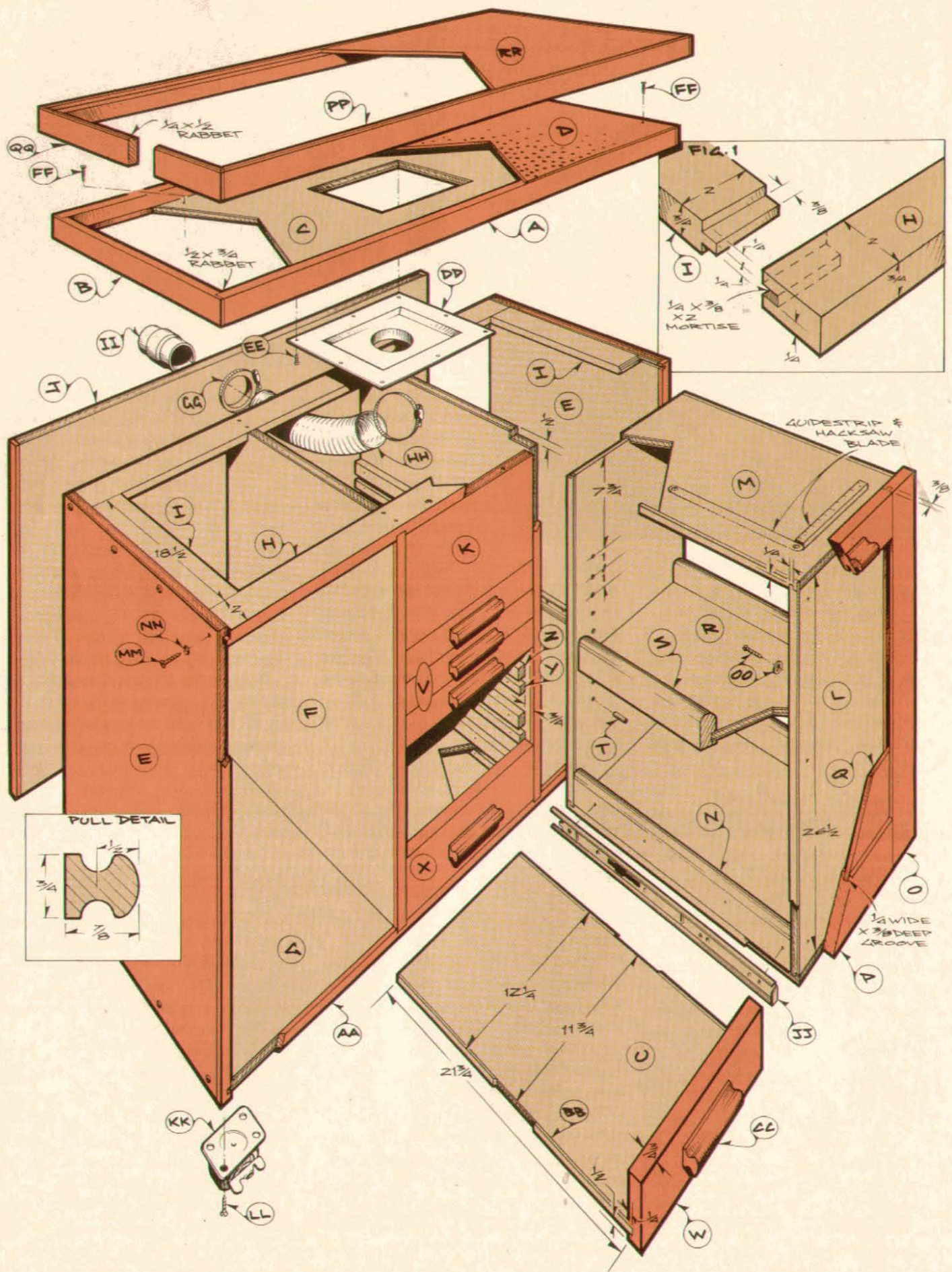
Do the runners first, cutting all 12 of them to the dimensions shown in the Bill of Materials. Start by attaching the bottom runner on each divider, using glue and brads to secure them in place. (To help properly locate these first two runners, we temporarily added the dividers in the bottom dados.) And, keep in mind, as shown in the exploded view,

that the front end of the runners is located 3/4 in. from the front edge of the divider. This dimension is important because, later on, the front edge of the runners will serve as a stop for the drawers.

Remove the dividers from the bottom dados and, referring to the Front View, lay out and mark the location of each remaining runner. Once marked, scribe a front-to-back guideline (a framing square will come in handy here). Use glue and brads to secure the runners in place.

The guides, which serve to keep the drawers from tipping, can now be cut to the dimensions shown in the Bill of Materials. To get the proper distance between each runner and guide, cut a spacer block that measures about 1/2 in. wide by 18 in. long and rip it to a thickness that is equal to the center drawer bottom thickness plus 1/16 in. (this should be about 9/16 in.) To add a guide, place a spacer on the bottom runner, then place the guide on the spacer. Glue and tack the guide in place, then remove the spacer. Repeat the process for all remaining guides.

MAKE THE UPPER FRAME: The upper frame consists of the front and back (H) and the two ends (I). Cut the parts to size, then use the router table to cut the 1/4 in. wide by 3/8 in. deep by 2 in. long mortise in each front and back.



Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd	Part	Description	Size	No. Req'd
Sanding Box				Center Drawers, cont'd			
A	Front/Back	3/4 x 11/2 x 47 1/2	2	Y	Runner	1/2 x 1/2 x 21 1/2	12
B	Side	3/4 x 11/2 x 24	2	Z	Guide	3/4 x 3/4 x 21 1/2	12
C	Base	1/2 x 23 1/2 x 47 1/2	1	Miscellaneous			
D	Top	1/4 x 24 x 48	1	AA	Wide Edging	1/4 x 13/16 **	15 ft.
Case				BB	Narrow Edging	1/4 x 9/16 **	60 ft.
E	Side	3/4 x 22 1/4 x 30 1/2	2	CC	Drawer Pull	3/4 x 7/8 x 5 ***	8
F	Divider	3/4 x 22 1/4 x 30	2	Hardware ****			
G	Bottom	3/4 x 22 1/4 x 46	1	DD	Exhaust Hood	12 1/4 x 12 1/4	1
H	Upper Frame Front/Back	3/4 x 2 x 46*	2	EE	Hood Screw	1/2 in. long x no. 6	8
I	Upper Frame End	3/4 x 2 x 19 1/4 *	2	FF	Mounting Screw	1 1/4 in. long x no. 6	60
J	Back	1/2 x 30 1/2 x 46 1/2	1	GG	Hose Clamp	4 in. dia.	2
K	Panel	3/4 x 8 x 12 1/2	1	HH	Flexible Hose Connector	4 in. dia. x 24 in. long	1
End Drawers				II	Splice	4 in. dia.	1
L	Front/Back	1/2 x 14 1/4 x 27*	4	JJ	Drawer Slide	20 in. (full extension)	4
M	Top/Bottom	1/2 x 14 1/4 x 20	4	KK	Caster	3 in. dia.	4
N	Side	3/4 x 21 1/4 x 19	4	LL	Caster Mounting Screw	3/4 in. long x no. 14	16
O	Face Stile	3/4 x 21 1/4 x 29	4	MM	Oval Head Screw	1 1/2 in. long x no. 8	42
P	Face Rail	3/4 x 2 3/4 x 12*	4	NN	Decorative Washer	1/2 in. dia.	42
Q	Face Panel	1/4 x 12 x 24 1/4	2	OO	R. H. Screw w/ washer	1 in. long x no. 8	8
R	Adjustable Shelf	1/2 x 13 1/2 x 18 7/8	2	Worksurface			
S	Adj. Shelf Sides	3/4 x 2 x 18 7/8	4	PP	Front/Back	3/4 x 2 x 49 1/8	2
T	Adj. Shelf Pins	1/4 dia. x 5/8 long	8	QQ	Sides	3/4 x 2 x 25 5/8	2
Center Drawers				RR	Top	1/4 x 25 1/8 x 49 1/8	1
U	Bottom	1/2 x 11 3/4 x 21 3/4	6	*	Length includes tenons or tongues		
V	Narrow Front	3/4 x 21 1/4 x 12 1/2	3	**	Width dimensions allow for later trimming		
W	Medium Front	3/4 x 4 1/2 x 12 1/2	2	***	See Pull Detail		
X	Wide Front	3/4 x 5 1/4 x 12 1/2	1	****	See Kit Options		

Kit Options

KIT NO. 1 (For Sanding Box Only): Includes the exhaust hood (DD), 8 hood screws (EE), 20 mounting screws (FF) and a hose clamp (GG). Order the "Sanding Center Kit, No. 1." Price is \$34.95 postpaid (Canadian orders \$36.95, U.S. Funds).

KIT NO. 2 (For Sanding Box and Case, but without casters): Includes all the hardware parts (DD through OO, less casters KK). Order the "Sanding Center Kit, No. 2." Price is \$89.95 postpaid (Canadian orders \$95, U.S. Funds).

KIT NO. 3 (Same as Kit No. 2, but casters included): Order "Sanding Center Kit, No. 3." Price is \$119.95 postpaid (Canadian orders \$125, U.S. Funds).

The kits are available from: Aspen Kits, 6 Hilltop Drive, Old Saybrook, CT 06475; tel. (203) 388-6179, (check or money orders only, please). Kits do not contain any of the wood parts.

Also, cut the 1/4 in. thick by 2 in. wide by 3/8 in. long tenons on the frame ends (Fig. 1).

Add glue to the frame mortises and tenons, then assemble and clamp. Check to make sure it looks square and flat before setting it aside to dry.

When dry, use the router and a 1/4 in. bearing-guided rabbeting bit to cut the 1/4 in. wide by 1/2 in. deep rabbet across each end of the frame. Make several light cuts to avoid burning the wood.

To complete the upper frame, use the router to cut the 1/4 in. deep by 3/4 in.

wide divider dados in the front and back parts.

ASSEMBLE THE CASE: Begin assembly of the case by using glue and 1 1/4 in. long by no. 6 sheetrock screws (FF) to join the upper frame, dividers and bottom. Then, attach the left side using glue and 1 1/2 in. long by no. 8 oval head screws (MM) and decorative washers (NN). (We used screws here to eliminate the need for clamps, as few of us have pipe clamps long enough to span the case. And, we figured, since screws were needed, they might as well look

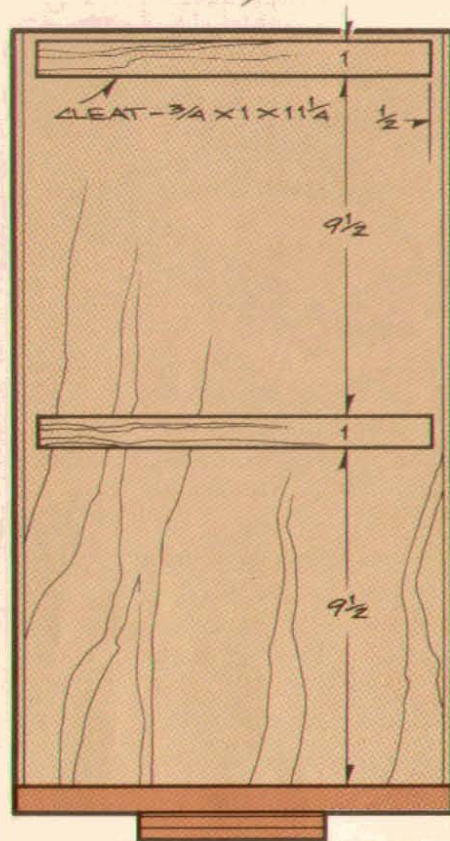
good, hence the oval head screws and decorative washers.) Now, add the right side in the same manner. Check the case for squareness and set it aside to dry.

Measure the back of the case and cut the back (J) to size from 1/2 in. plywood. (When measuring, remember to allow for the 1/4 in. thick edging.) Make sure the back is cut square, as it will serve to help square the case when it is attached.

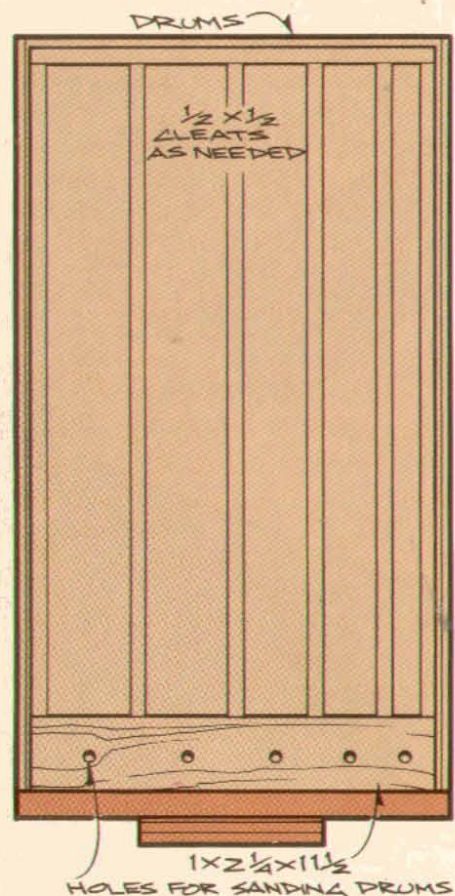
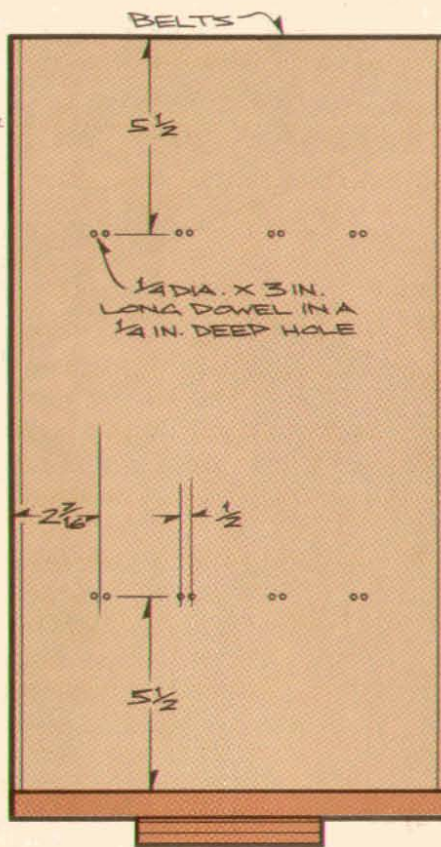
Lay out the centerpoint of the hole (see Side View) to be cut for the splice (II), then use the splice as a template to scribe the hole diameter. Bore a starter

FIG. 2

NARROW CENTER DRAWER (FOR 9X11 SANDPAPER SHEETS)



WIDE CENTER DRAWER (FOR SANDING BELTS OR DRUMS)



hole before using a jigsaw to cut out the splice hole.

Add the narrow edging (BB) to each end, then attach the back to the case with the oval head screws and decorative washers.

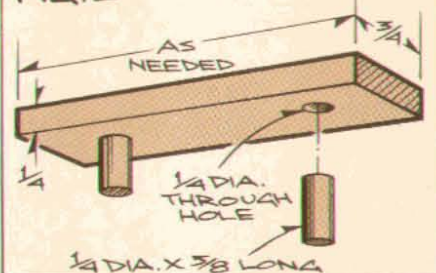
To make it easier to move the case around the shop, we added the four casters (KK) at this point in the construction, using the caster mounting screws (LL) to secure them in place.

THE END DRAWERS

MEASURE THE OPENING: Begin by measuring the distance between the sides and the divider. Take these measurements carefully, because you'll want the finished drawer to be 1 in. less than the measured distance. That allows 1/2 in. on each side of the drawer for the full-extension drawer slides that come in the kit. If you are using another drawer slide, check to find out if the required spacing differs—if it does, make the adjustment when you cut the drawers.

MAKE THE DRAWER BOX: Cut the

FIG. 3



front and back (L) and the top and bottom (M) to size. Add the edging and trim it flush all around. Note that no edging is used on the ends. Use the table saw and dado head, or the router, to cut the 1/4 in. by 1/4 in. dados in the top and bottom. Also cut the 1/4 in. by 1/4 in. rabbets on the ends of the front and back.

Lay out and mark the locations of the 1/4 in. diameter by 1/4 in. deep holes for the adjustable shelf pins (T). Once marked, bore them out on the drill press.

Assemble the parts with glue, then apply clamps. Make sure both drawers

are square before letting them dry.

When dry, cut the sides (N) to size. Apply a generous radius to the top edges, then attach them by driving the 1 1/4 in. long by no. 6 sheetrock screws through the front and back and into the ends of the sides.

MOUNT THE SLIDES: The kit includes four 20 in. full-extension drawer slides (JJ), 100 pound capacity, manufactured by Accuride. Complete mounting instructions are included with the slides. All screws are also provided.

MAKE THE DRAWER FACE FRAME: Work on the drawer face frames begins by cutting the stiles (O) and rails (P) to size. Use the table saw and dado head to cut the 1/4 in. wide by 3/8 in. groove along the entire inside edge of each part. Then, again use the table saw and dado head, along with the miter gauge, to cut the 1/4 in. thick by 3/8 in. long tenons on the ends of the rails.

Now, cut the 1/4 in. thick plywood panel (Q) to size, then dry assemble all the frame parts and check for a good fit.

If all looks okay, the parts can be glued and clamped. By the way, since plywood doesn't expand and contract with changes in humidity (unlike solid stock), it's okay to glue it in place here. It's an easy way to add strength to the entire frame.

The frame can now be attached to the drawer box by driving 1 in. long by no. 8 round head wood screws with washers (OO) through the inside of the front and into the stiles and rails. It's best not to use glue here, as you may want to adjust the frame a little to provide for a good fit all around the case opening. To do this, we find it helpful to bore oversized holes (about 1/4 in. diameter) through the front. That, along with the washers, helps build a little adjustment into the drawer face frame.

Now, measure the opening and cut 1/2 in. plywood for the adjustable shelves (R). Also, cut the adjustable shelf sides (S) and plough the 1/4 in. deep by 1/2 in. wide groove. Assemble with glue, clamp firmly, and set aside to dry. Cut the 5/8 in. long adjustable shelf pins (T) from 1/4 in. diameter dowel stock.

THE CENTER DRAWERS

The six center drawers incorporate a very easy-to-make design, one that is perfect for light-duty service. Each drawer is simply a 1/2 in. thick bottom that's rabbeted into a 3/4 in. thick front. Where we felt dividers (or pegs) were needed, we simply glued them to the bottom (Fig 2).

CUT ALL THE PARTS: Cut the bottoms (U) to size and add the narrow edgings along the sides. Now, cut the narrow (V), medium (W) and wide (X) drawer fronts to size, then use the table saw and dado head to cut the 1/2 in. wide by 1/4 in. deep groove in the back side of each one. Locate the groove 1/2 in. from the bottom edge of the drawer fronts. Glue the bottoms to the fronts and set them aside to dry.

ASSEMBLE AND TRIM: Once dry, check the drawers in the runners for a smooth sliding fit. You'll likely find it necessary to trim a little on the top and bottom edges of the fronts in order to allow 1/16 in. to 1/8 in. space in between each drawer. A sharp hand plane will trim them in short order.

ADD THE PANEL: Cut the panel (K) to fit the opening between the dividers.

Attach it with glue and 1 1/4 in. long by no. 6 sheetrock screws driven through the divider and into the ends of the panel. Also, drive two or three screws through the upper frame front and into the top edge of the panel.

MAKE THE PULLS: You'll need 3/4 in. thick stock measuring about 2 1/4 in. wide and 22 in. long to make the eight drawer pulls (CC). Round each of the edges using the router table and a half-radius bull nose router bit. If you don't have this bit, it can be ordered from Eagle America, P.O. Box 1099, Chardon, OH 44024; tel. 1-800-872-2511. Order part no. 161-1205 (it has a 1/2 in. diameter shank); current price is \$39.99 plus \$5.75 shipping and handling. Of course, you can also round the edges by doing some work with a hand plane, a file, and some sandpaper.

Next, use the router table and a 3/8 in. core box bit to plough a 1/4 in. deep groove 1/2 in. from each edge. Sand the sharp edges, then use the table saw to rip the stock to a pair of 7/8 in. widths. Finally, crosscut the stock to 5 in. lengths. Use glue and clamps to attach the pulls to the drawers.

THE WORKSURFACE

The worksurface is an option, but we like it because it transforms the Sanding Center into a workbench surface when the sanding chores are over. That's a nice feature, especially if, like most of us, you have limited space in your workshop. The worksurface is made slightly bigger than the sanding center top, so it just drops in place. It can hang on the wall, out of the way, when not in use.

Measure the sanding box, then cut the front and back (PP) and the sides (QQ) to fit. A 1/2 in. deep by 3/4 in. wide rabbet is cut on the ends of the sides and a 1/2 in. wide by 1/4 in. deep rabbet is cut along the top edge of all four parts.

Assemble the frame with glue and a few finishing nails. When dry, measure the opening for the top (RR) and cut it to fit in the rabbet. Use glue and clamps to secure the top to the frame.

FINISH UP

Final sand the parts through 220-grit. Vacuum all the surfaces to clean up the heavy dust, and use a tack rag to remove what remains. For a finish, we applied two coats of a clear water-based

polyurethane.

When the finish dries, attach the sanding box to the case by driving the 1 1/4 in. by no. 6 sheetrock mounting screws through the Sanding Box base and into the upper frame. Now, use epoxy glue to secure the splice (II) to the back, then attach the flexible hose connector (HH), joining one end to the splice and one end to the exhaust hood. As shown, you'll need to bend the hose to a 90 degree angle. Use the clamps (GG) to secure the hose ends.

The optional sandpaper tear-off fixture, attached to the top of an end drawer, comes in handy when you need to cut a sheet of sandpaper to a smaller size. (We attached it to the top of the left-side end drawer, although on our exploded view it's shown on the right-side drawer—it's your choice.) The fixture only has two parts — a guidestrip made from a piece of hardwood measuring 1/4 in. thick by 3/4 in. wide by 11 in. long, and a hacksaw blade. Mount the blade to the top of the drawer with a pair of screws and washers, then tack the guidestrip to the top at right angles to the blade. The washers raise the hacksaw blade a bit, so it's easier to slide the sandpaper under it. We found it useful to add inch marks to the guidestrip.

To use the fixture, butt the edge of your sandpaper up to the guidestrip, slide the sandpaper under the hacksaw blade as needed, then press down on the blade and pull-up on the sandpaper. You'll get a nice, clean, square cut.

FINAL THOUGHTS

We used a dust collector made by AMT, their model no. 4710, which sells for \$239.50 plus shipping. The 4 in. diameter hose that connects from the collector to the splice is not included, but a 4 in. diameter clothes drier hose will work fine. For more information write to AMT, Fourth Avenue and Spring Street, Royersford, PA 19468-2519; tel. 1-800-435-3279. By the way, we tried using a shop vacuum, but found it didn't have enough power to do an effective job.

Before starting the Sanding Center, lock the casters in place and secure the workpiece to the Peg-Board top. A couple of 1/4 in. diameter by 1/2 in. long pegs glued to a cleat (Fig. 3) make a nice stop for the workpiece when belt sanding.





This little puzzle, sent to us several years back by puzzle master Stewart T. Coffin, of Lincoln, Massachusetts, never fails to challenge and delight visitors to our offices. Although there's not a great deal of woodworking required to make it, it's one of those genre of projects that are just so much fun, we've decided it was time to share it with our readers.

The Project

As shown, the puzzle is nothing more than a rosewood stick, a pair of rosewood beads, and a length of leather thong (a leather shoelace works fine). The sizes of the various parts, and the hole sizes and locations are given in the illustration. The $\frac{3}{4}$ in. square beads are sanded to roughly round after the holes are drilled through. Of course, any wood can be used, and string or cord can be substituted for the leather thong.

Once your parts are cut to size, sanded, drilled and finished (we just rubbed in an oil finish), assemble as shown, and knot the two thong ends.

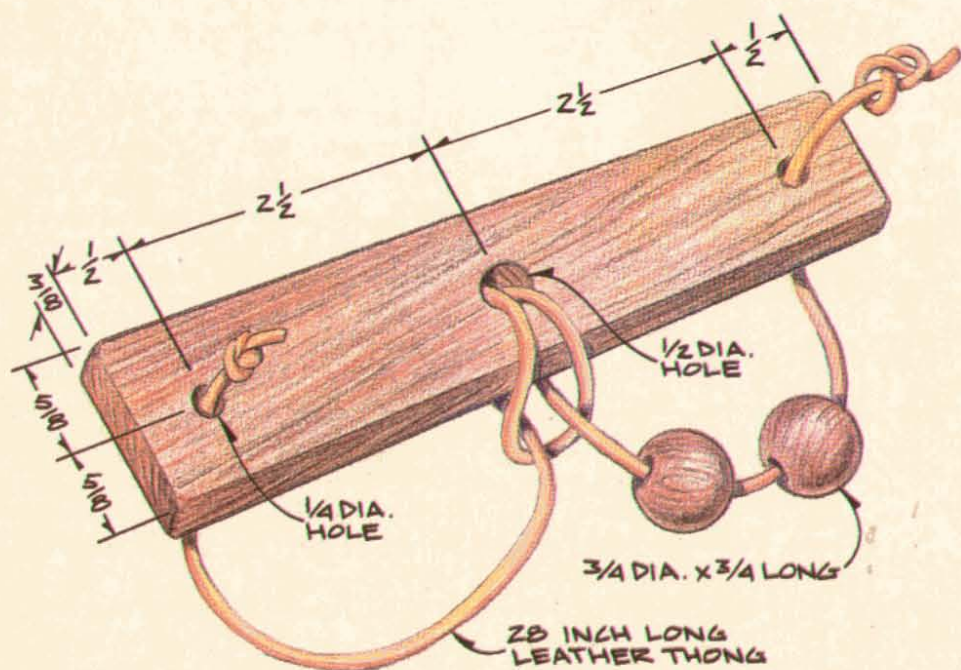
The Challenge

The challenge of this type of puzzle—usually called a moving bead puzzle—is to move the bead or beads from one loop to the other. The puzzle shown can be worked several ways, with the object being either to separate the two beads, getting one on each loop, or to move both beads from one loop to the other. This is a very old puzzle, and some variations are made with a single bead. Although you might at first try to pass the beads through the center hole to solve the puzzle, they just won't fit. And, of course, you are not allowed to untie the knots on the thong! The solution—we think you'll agree—is diabolically simple (see next page.)

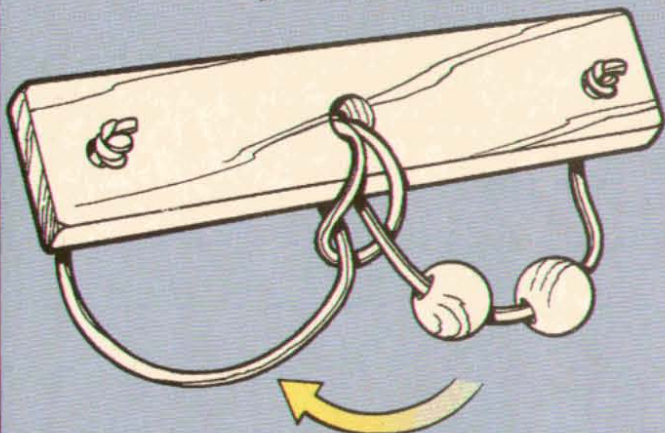


Just for Fun

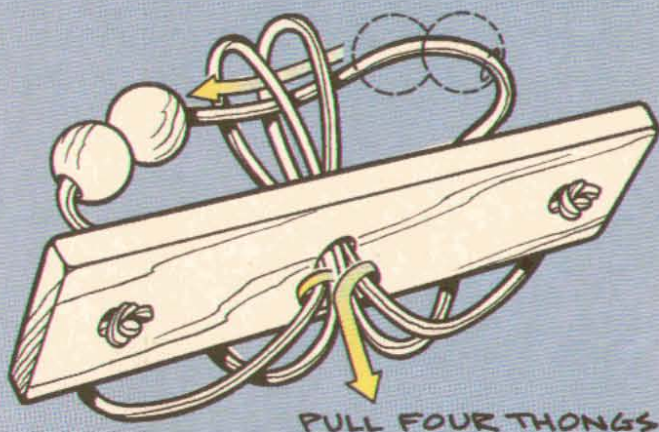
Moving Bead Puzzle



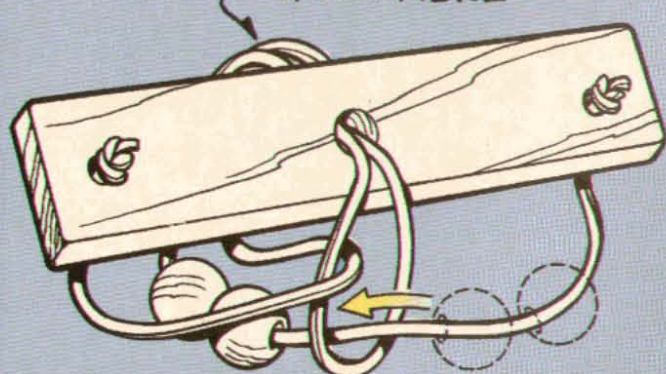
SOLUTION 1 THE OBJECT IS TO MOVE
TWO BEADS FROM
LOOP TO LOOP



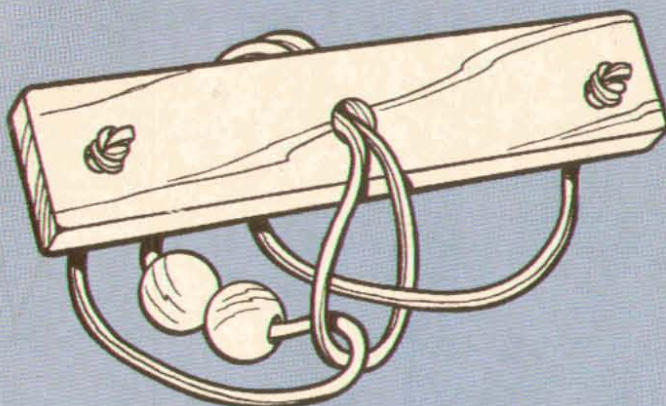
4- PASS THE TWO BEADS THROUGH
THE LOOPS, THEN PULL THE
FOUR THONGS TO THE FRONT



PULL HERE

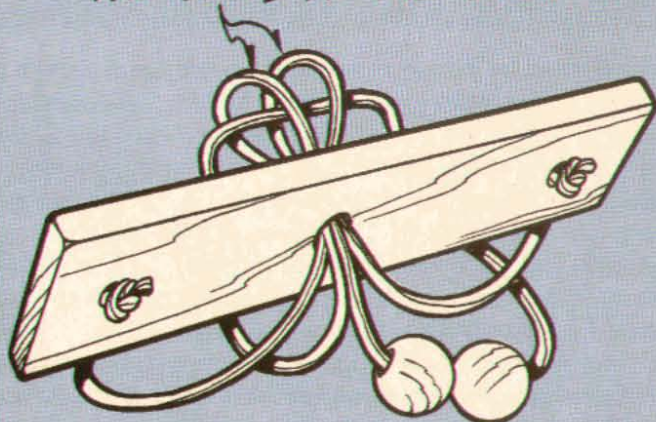


2- PASS THE TWO BEADS THROUGH
THE CENTER LOOP, THEN PULL
THE TWO THONGS IN BACK

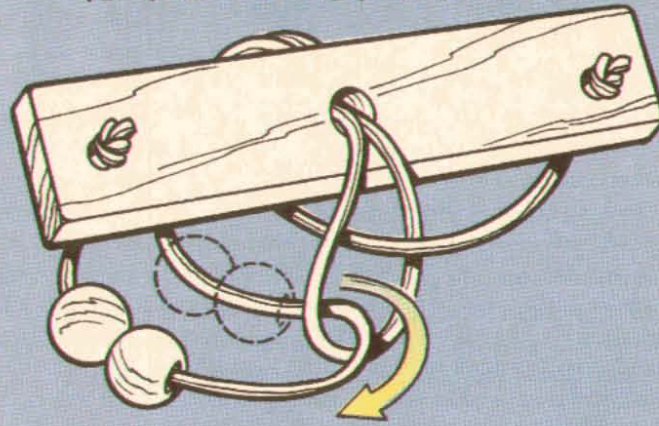


5- RETURNING THE LOOP TO
THE POSITION SHOWN
IN STEP 2

3- THIS PULLS THE CENTER LOOP
THROUGH THE HOLE, CREATING
TWO LOOPS AT THE BACK



6- PASS THE TWO BEADS THROUGH
THE CENTER LOOP TO GET THEM
TO THE DESIRED POSITION...



... AND YOU'VE DONE IT!

We don't have any scientific proof, but judging from the project request letters that regularly cross our desks, rock & ride toys are near the top of most kids' wish lists.

This impressive Riding Biplane, from the "Timeless Treasure" line of master toy builders Barrels Of Fun, is sure to please just about any youngster old enough to climb aboard. But perhaps best of all, since it's made from inexpensive materials available at your local lumberyard, putting the Riding Biplane together won't require the bank account of the Red Baron.

What You'll Need

The easiest way to figure your material requirements is to glance at our pattern and stock layout illustrations, pages 51, 52 and 53. As shown, the wings (A, B), seat (C), horizontal stabilizer (D), disk, (E), exhaust trim (F) and accent pieces (G) are all cut from a single 2 ft. by 4 ft. section of $\frac{3}{4}$ in. medium density fiberboard (MDF) or plywood. The plane in the photo uses MDF for these parts because it is cheaper than plywood, takes paint better, and doesn't have the splintering problem that plywoods usually have. But if your lumberyard doesn't sell MDF, plywood is an adequate substitute.

Although we show suggested layouts on 2 x 10 by 8 ft. long, and 2 x 8 by 6 ft. long construction-grade lumber for the fuselage parts (H, I), vertical stabilizer (J) and rockers (K), feel free to use whatever stock you may already have on hand. Just keep in mind that the actual thickness of these parts is $1\frac{1}{2}$ in.

A $\frac{3}{4}$ in. thick length of pine measuring at least 5 in. wide by 6 ft. long will yield the propeller (L) and the three platform sections (M).

The remaining parts—the front supports (N), back support (O), wing connectors (P), propeller shaft (Q) and cap (R) are just lengths of various size dowels. If you can't find the exact sizes we show, feel free to substitute dowels in similar sizes. Closet rod (either $1\frac{1}{4}$ in. or $1\frac{1}{2}$ in. diameter) can be used for the $1\frac{1}{2}$ in. diameter back support specified.

As for the hardware parts, keep in mind that the screw sizes specified are merely suggestions. You may want to substitute hardware you have on hand.

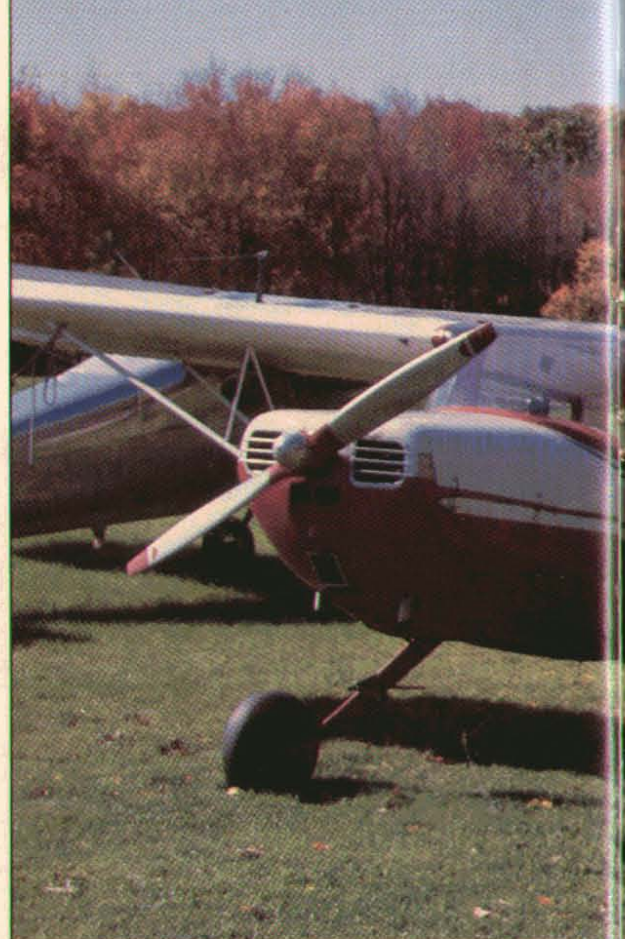
Transfer Patterns

Although everyone seems to love full-size patterns, if you know how to work with grid patterns, an actual full-size pattern really isn't needed.

There are two options to follow when using grid patterns. If you have access to a photocopy machine with the ability to enlarge, simply enlarge copies of the grid patterned parts until the size of the grid squares is 1 in. You'll need to do this to each section of the pattern, and then cut and paste to make an actual full-size pattern from the smaller pieces of paper. Or, lay out a 1 in. grid pattern directly onto your stock, then transfer the pattern by looking at our original grid pattern and copying the profile to your full-size grid. With a project such as the biplane, it isn't important to copy our pattern precisely. In fact, feel free to "customize" some of the shapes to your own taste. Important: When transferring patterns, be sure to accurately transfer all screw hole and dowel locations.

Cut Parts

Once you've transferred the profiles for parts A through L to your stock, cut them out. The band saw is probably the best



Kid's Choice Riding Biplane

choice for cutting out most of the parts, but if you don't own a band saw, a hand-held jigsaw will also be fine. You'll need the jigsaw for cutting the pair of hand holds in the top wing. Rip and crosscut to yield the three platform parts. Once your parts are all shaped, use a drum sander to clean up the profile cuts and remove the saw marks.

As you'll note from the photo, all exposed edges are radiused. With a $\frac{1}{4}$ in. radius ball bearing guided round-over bit, mounted in either the router table or in a hand-held router, apply a $\frac{1}{4}$ in. round over to both edges of the wings, seat, horizontal stabilizer, disk and propeller, and to the outside edge of the accents. But don't try to radius the outside edges of the exhaust trim on the router table, using your hands to guide the stock. Handling small pieces like this is an invitation to an accident.



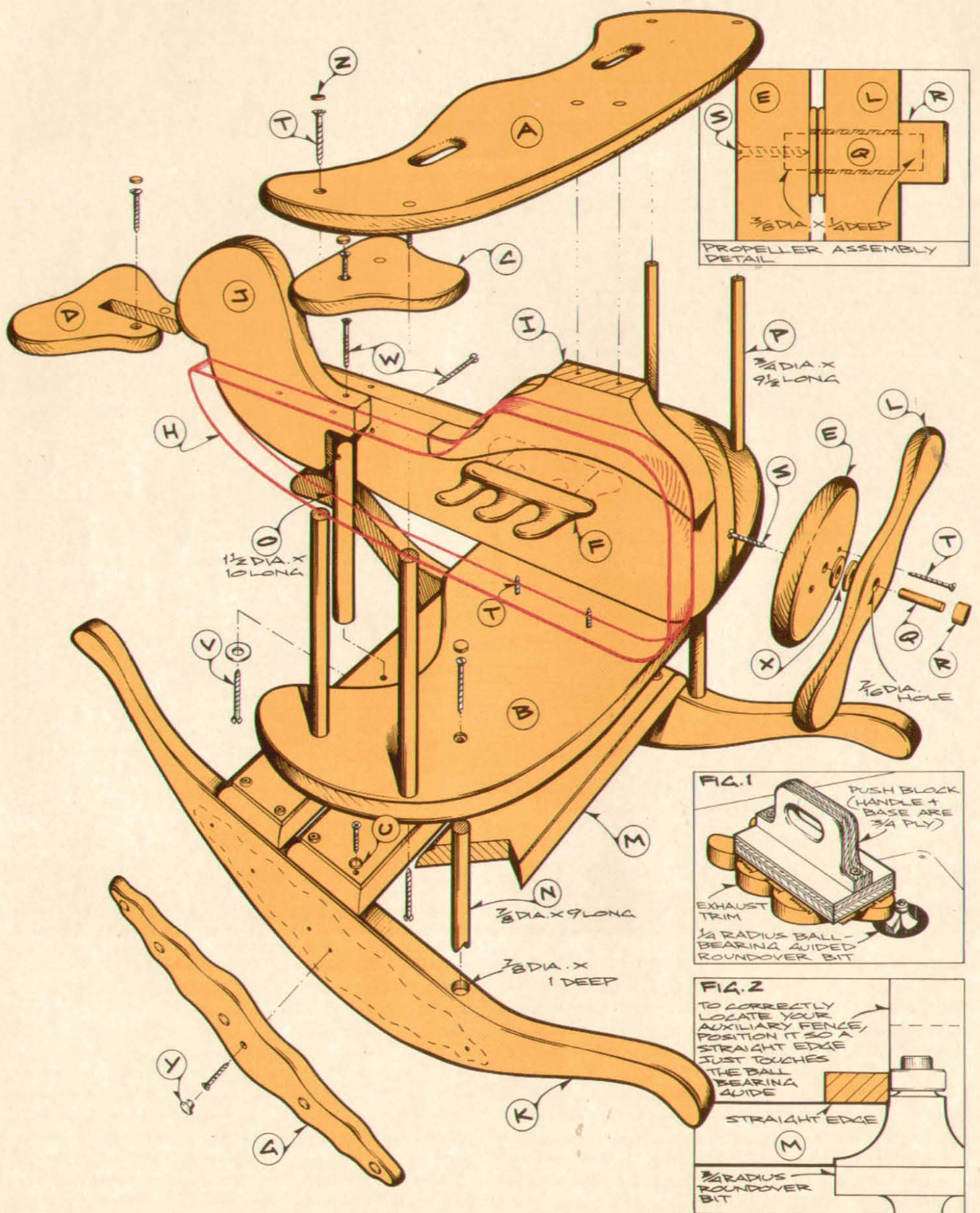
should your hand slip or the bit catch and jerk the workpiece—perhaps drawing your hand into the bit. Instead, use doublestick tape to temporarily fasten a push block to the exhaust trim, as shown in Fig. 1. Make several of these push blocks, with handles fastened to them for ease of control, and keep them near the router table for handling small parts.

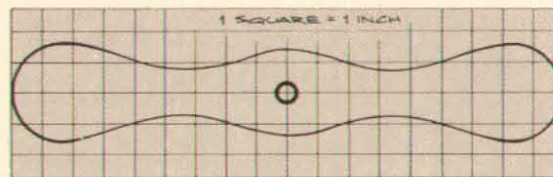
Switch to a $1/2$ in. radius round over bit and radius both edges of the rockers, then move up to a $3/4$ in. radius round over bit and radius both edges of the vertical stabilizer and the outside edges of the fuselage sides. As shown in Fig. 2, use the same $3/4$ in. radius round over bit (mounted in the router table, with all but the cutting edge of the bit buried in the fence), to mold the edges of the three platform boards. Set your fence by holding a straightedge so it just touches the ball-bearing guide on the

router bit. Note, that the bit height must be set as indicated to establish the small shoulder on the round over. This profile is called a stepped roundover.

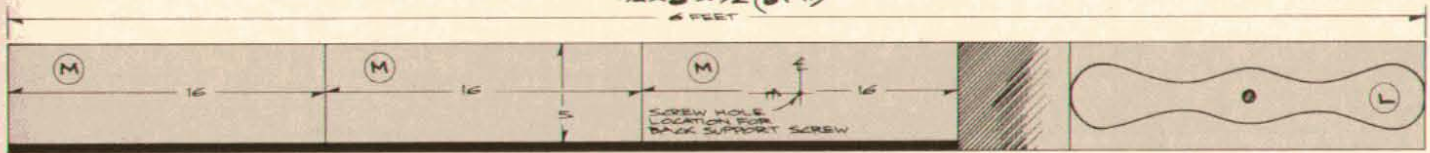
Pre-drill Holes

Once your parts are shaped, go to work drilling the various screw and dowel holes. Note that no. 8 by $1 1/2$ in. long assembly screws (T) are used to join most of the parts. Counter-bore for those screws that are covered either by decorative screw buttons (Y) or plugs (Z). The buttons are used only on the 12 screws used to mount the accent pieces to the rockers, and the plugs are used only on the screws that are visible. There is no need to plug those screws that are on the underside of the plane. A $7/8$ in. diameter by 1 in. deep hole is drilled into the





3/4 x 6 x 72 (6 FT)
6 FEET



rockers for the two front support dowels (N), but all the remaining large dowel parts—the back support (O) and wing connectors (P)—are screwed in place. Note that decorative washers (U) are used on the 12 screws that mount the three platform boards. Pre-drill these screw holes, to avoid splitting the stock.

Propeller Subassembly

As the detail on page 50 shows, the propeller mounting system consists of a shaft (Q) and cap (R). Drill a 1/4 in. deep hole in the cap for the 3/8 in. diameter shaft, then glue the shaft into the cap. Drill a 7/16 in. hole through the propeller for the shaft, and drill a 3/8 in. diameter by 1/4 in. deep hole into the front center of the disk, also for the shaft. Pre-drill through the disk for the propeller mounting screw (S) and for the pair of assembly screws that mounts the disk (and the propeller subassembly) to the biplane. Do not complete the propeller subassembly at this time.

Paint & Finish Parts

All parts are finished before assembly. You may use our color scheme—red for the wings, stabilizers and propeller shaft/cap, blue for the rockers, yellow for the seat, green for the disk, black for the propeller and exhaust trim, white for the accents, and natural for the remaining parts—or develop your own color scheme. When painting the various parts, don't neglect to also paint the screw hole buttons and plugs. But don't get any paint or finish on the areas where the sides, center and vertical stabilizer are glued together. For ease of application and cleanup, we recommend that you use water-based acrylic finishes. The smooth, seamless appearance of the finish on our biplane was the product of a spray application, but if you don't have a spray outfit, brushes are fine.

Assembly

FUSELAGE: Once your finish has dried on the various parts,

Bill of Materials (all dimensions actual)				
Part	Description	Size	No.	Req'd
3/4 in. Medium-Density Fiberboard (or 3/4 in. plywood) parts				
A	Top Wing	See Pattern	1	
B	Bottom Wing	See Pattern	1	
C	Seat	See Pattern	1	
D	Horiz. Stabilizer	See Pattern	1	
E	Disk	See Pattern	1	
F	Exhaust Trim	See Pattern	2	
G	Accent	See Pattern	2	
"Two-by" Construction Lumber Parts				
H	Fuselage Side	See Pattern	2	
I	Fuselage Center	See Pattern	1	
J	Vertical Stabilizer	See Pattern	1	
K	Rocker	See Pattern	2	
3/4 in. Pine Parts				
L	Propeller	See Pattern	1	
M	Platform	3/4 x 5 x 16	3	
Dowel Stock Parts				
N	Front Support	7/8 dia. x 9	2	
O	Back Support	1 1/2 dia. x 10	1	
P	Wing Connector	3/4 dia. x 9 1/2	4	
Q	Propeller Shaft	3/8 dia. x 1 1/2	1	
R	Cap	5/8 dia. x 1/2	1	
Hardware Parts				
S	Propeller Screw	No. 6 x 3/4 RH	1	
T	Assembly Screw	No. 8 x 1 1/2 FH	46	
U	Dec. Washer for No. 8 FH screw		12	
V	Back Support Screw & Washer	No. 12 x 2 RH 1 ea.		
W	Anchor Screw	No. 12 x 3 1/2 FH	2	
X	Washer	7/8 dia.	2	
Y	Screw Hole Button	1/2 dia.	12	
Z	Plug	3/8 dia.	13	

you're ready for the final assembly. Start by gluing up the fuselage sides around the fuselage center and vertical stabilizer. Screw the horizontal stabilizer in place—this helps to properly locate the vertical stabilizer. Use a pair of long anchor screws (W)—one down through the vertical stabilizer, the other in through the fuselage side—to mount the back support dowel. Then add the seat and the exhaust trim (the trim is simply glued in place).

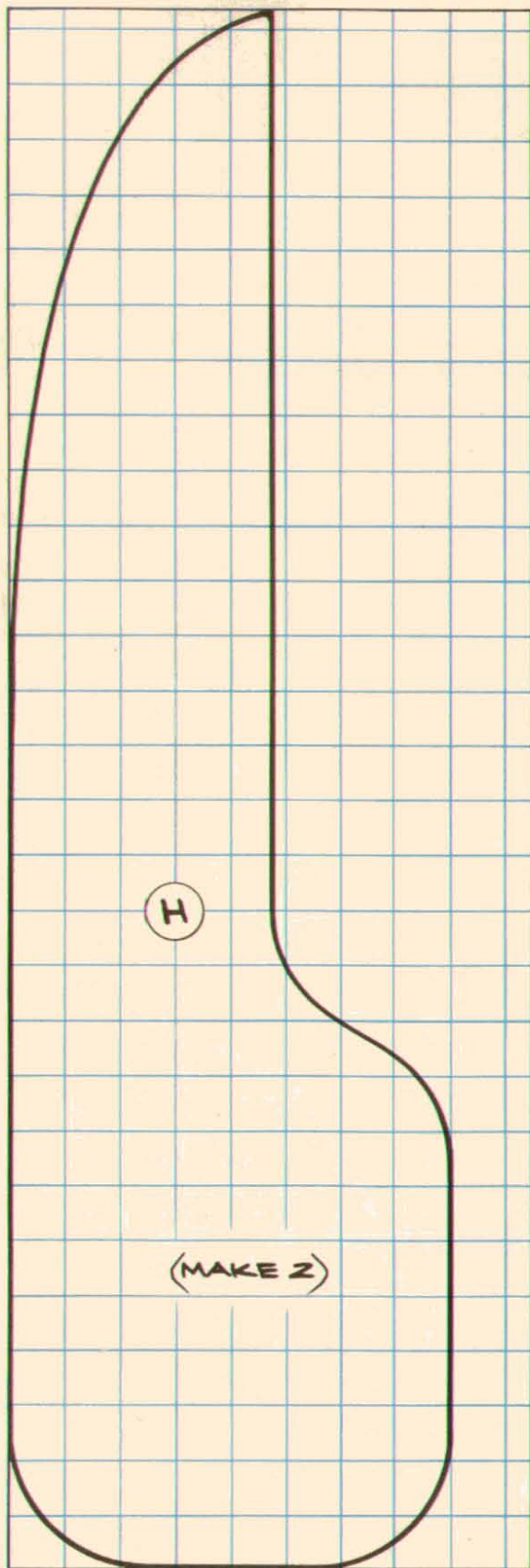
WINGS: Next up is mounting the wings. First, screw the top and bottom wings together with the wing connector dowels, then mount the wing assembly to the fuselage with six assembly screws, two through the top wing into the fuselage center, and four through the bottom wing into the fuselage sides. Mount the pair of front supports, then fill all visible screw hole countersinks with painted plugs, which are glued in place.

PROPELLER: Mount the propeller by first sliding the shaft into place, adding the pair of washers (X), then gluing the shaft into the hole in the disk and anchoring the shaft with the propeller screw. Then, mount the propeller assembly by screwing the disk into the front of the fuselage sides.

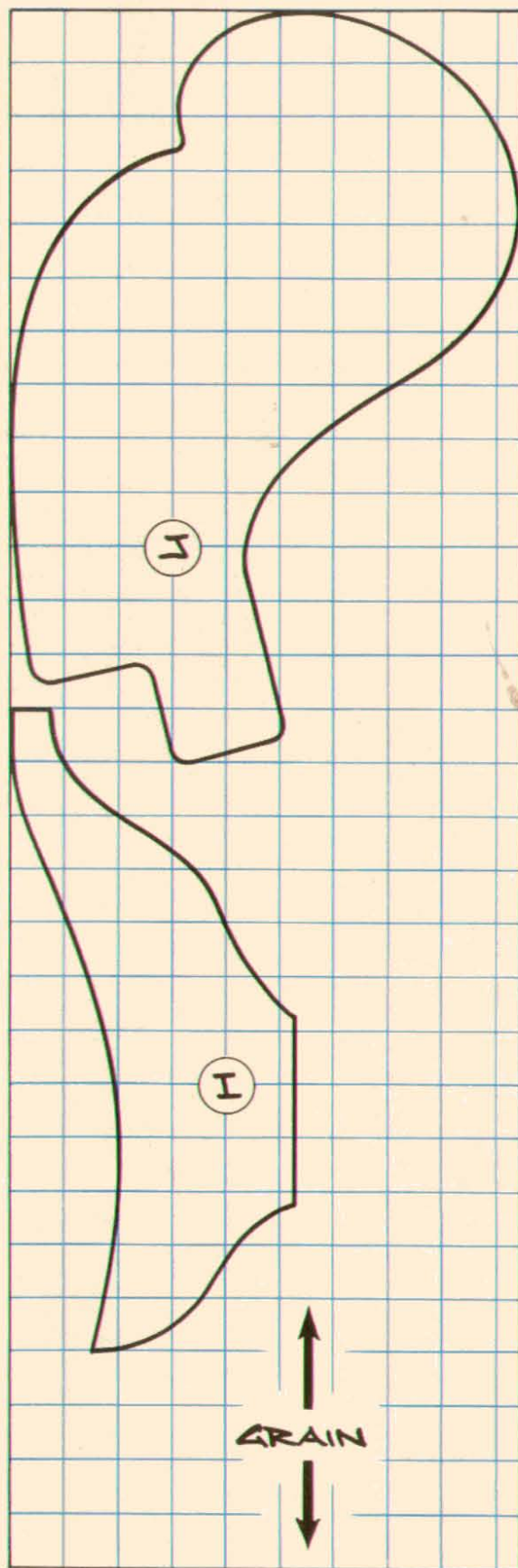
BASE: Start the base assembly by screwing the accent pieces to the rockers, using the assembly screws. Fill the screw hole countersinks with the screw hole buttons, which should have been painted white—to match the accent color. Now join the pair of rockers with the three platform pieces, using assembly

screws and the decorative washers.

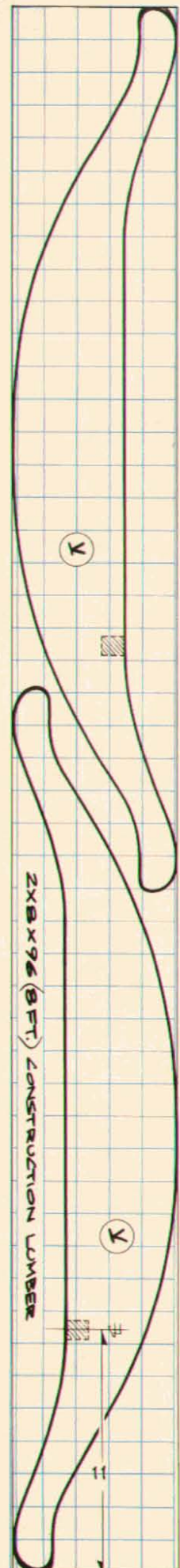
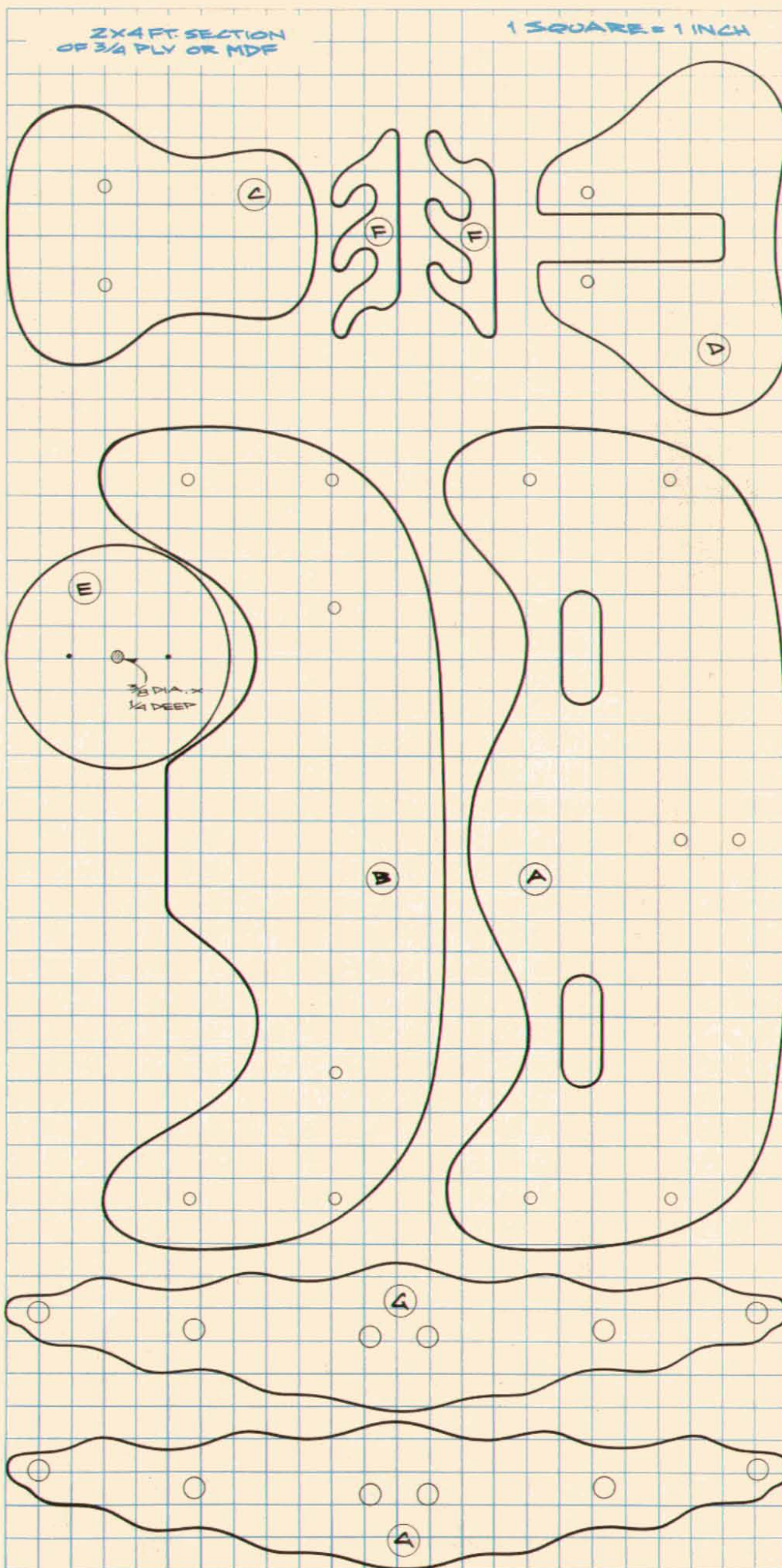
FINAL ASSEMBLY: Join the biplane to the rocker subassembly by gluing the front support dowels into their respective holes in the rockers, and by screwing up through the back platform board and into the bottom of the back support dowel, using the heavy-duty back support screw and washer (V). Your Riding Biplane should be ready for take-off!



1 SQUARE = 1 INCH



2X10 X 96 (8 FT.)
CONSTRUCTION
LUMBER





Treasure from Beneath the Sea *4th Century B.C.* **Heart-shaped Box**

The original box from which our Heart Box was copied was recently discovered in a 2400 year old shipwreck off the coast of Israel. For more on the box, and the fascinating shipwreck that yielded it, don't miss Shoptalk, on page 4.

Kit Source

All the wood (thicknessed to the specified dimensions) you'll need to build the heart box in walnut, plus the $\frac{3}{8}$ and $\frac{1}{8}$ in. dowel stock, is available in a stock kit from:

Heritage Building Specialties
205 N. Cascade,

Fergus Falls, MN 56537
Tel. 1-800-524-4184

Ask for Project-Pak kit No. WJ1942.
Cost is \$8.95 postpaid.

Step-By-Step

1 We used walnut for our heart box, since olive wood is something many woodworkers may not have easy access to. Size two $4\frac{1}{2}$ in. square pieces, one $\frac{3}{8}$ in. thick for the lid, a second 1 in. thick for the box. Transfer the full-size pattern to the lid.

2 With your table saw blade set to $\frac{7}{16}$ in. high, establish the $\frac{3}{16}$ in. wide key notch.

3 Use doublestick tape to hold the lid and box together, then drill a $\frac{3}{8}$ in. diameter by $1\frac{1}{8}$ in. deep hole through the lid and into the box for the pivot pin.

4 Using a narrow band saw blade, cut the heart profile. Note that the lid and box are still joined with the doublestick tape.

5 Using a sharp pencil, or a knife, scribe the notch profile from the lid to the box.

6 Remove the lid, transfer the compartment hole location from the full-size pattern to the box then use a $1\frac{1}{2}$ in. diameter Forstner bit, in the drill press, to drill the three $\frac{3}{4}$ in. deep compartment holes.

7 Get out a 2 in. length of $\frac{3}{8}$ in. diameter dowel for the pivot pin, some $\frac{1}{8}$ in. dowel stock for the locking pins and a piece of $\frac{3}{16}$ in. thick walnut for the key. Transfer the key profile to the stock, and cut it out. Don't worry if you can't find walnut dowel stock for the pivot pin and locking pin parts. A little walnut stain will transform these parts later.

8 Mount the pivot pin in your drill press, turn the drill press on, then hold a file against the pivot pin to establish a $\frac{1}{8}$ in. deep notch. Be sure to lock the drill press quill so the notch will be cut at a point $\frac{1}{4}$ in. from the pin bottom.

9 Using a $\frac{1}{8}$ in. wide chisel, carefully cut the key pocket. Don't make the

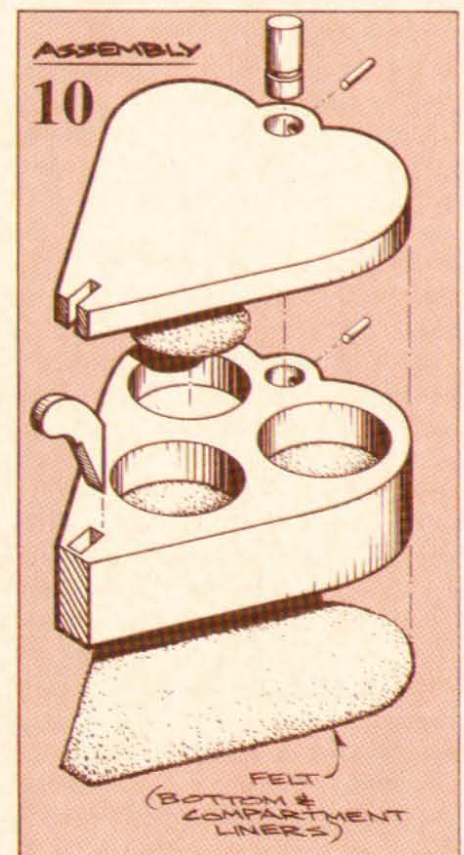
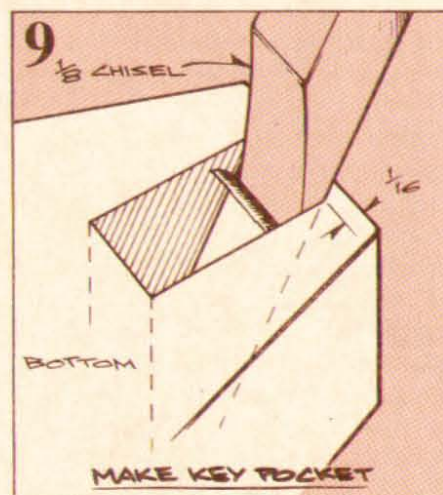
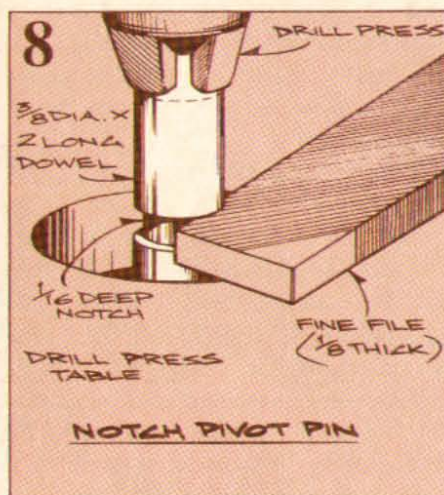
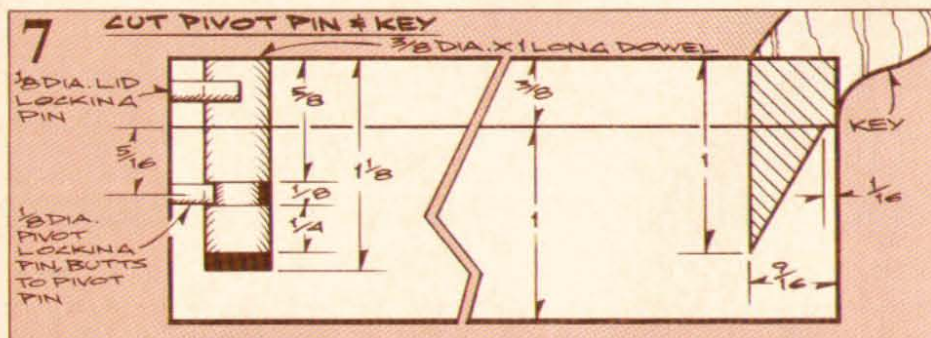
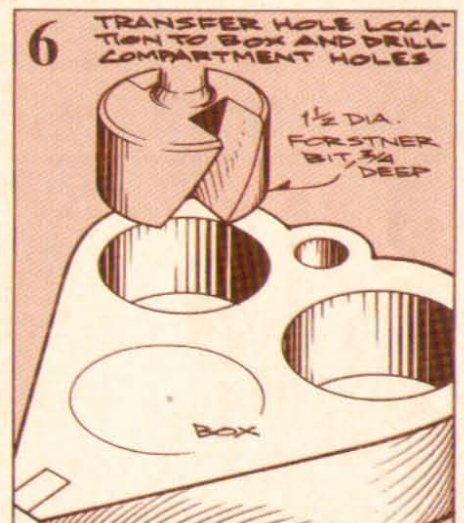
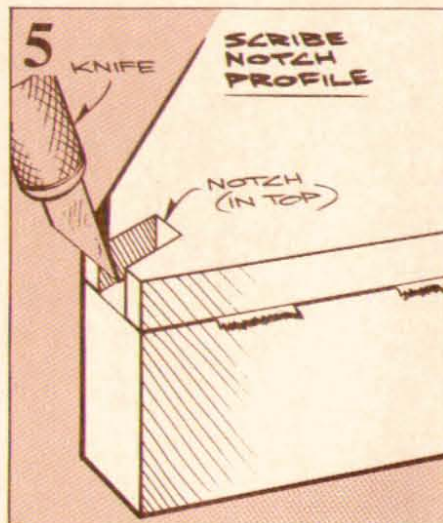
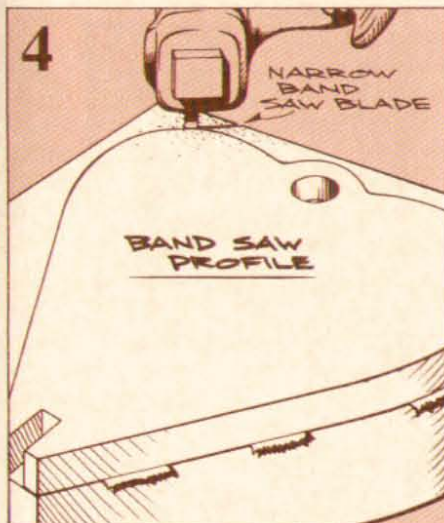
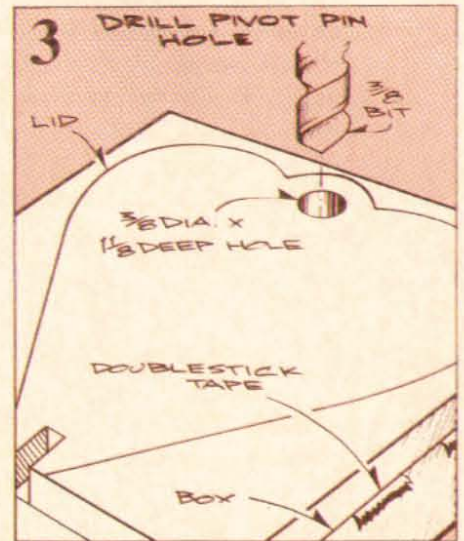
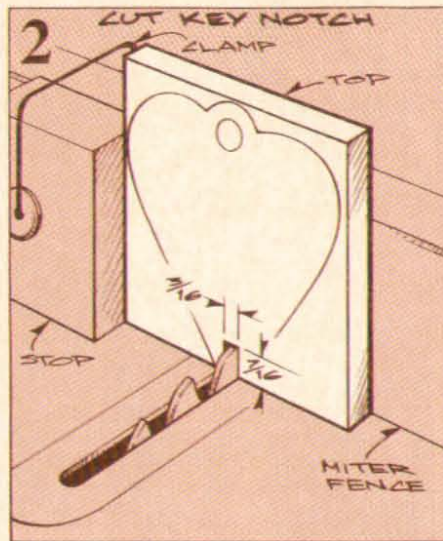
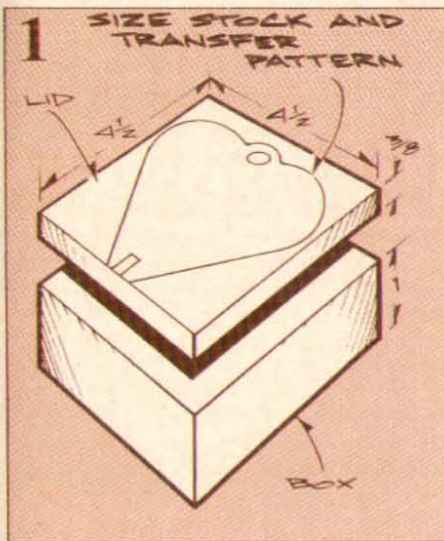
pocket too wide. The key must be a snug fit in the pocket so it won't easily fall out, should the box be turned upside-down. Note that the pocket starts $\frac{1}{16}$ in. from the front edge of the box.

10 To assemble the box, first drill a $\frac{1}{8}$ in. diameter hole through the back of the box and into the pivot pin hole. This locking pin hole should be on-center $\frac{5}{16}$ in. down from the top edge of the box. Insert the pivot pin and check that the locking pin engages the notch in the pivot pin, preventing the pivot pin from being withdrawn. If this tests out properly, place a little glue on the outside end of the locking pin, and insert it into position, with the pivot pin in place. Check that the pivot pin rotates freely, but cannot be withdrawn.

Next, slide the lid down over the pivot pin (tight to the box), drill a $\frac{1}{8}$ in. diameter hole through the back of the lid and into the pivot pin, add glue and insert the lid locking pin. When dry, trim the excess locking pin lengths, final sand the box, and apply a penetrating oil finish. To complete our box, we added a layer of felt to the three compartments and the box bottom.



**TINTED AREAS ARE
FULL-SIZE PATTERNS
OF BOX AND KEY**



The warmth and old-time charm of country furniture is very much evident in this lovely piece. You'll likely find it can be used in almost any room in the house, but it would be especially appealing in a kitchen or dining room.

Except for the back, which is plywood, all the wooden parts are made from solid pine. The top looks just like a slab of marble, but it's really a piece of pine that we "marbleized" using a commercial faux finish. However, if you find the marble a bit hard on your eyes, the project will also look terrific with a stained pine top.

The pierced tin panels add considerably to the country look of this piece, and we think you'll find it's easy to punch the pattern. A mail-order source for the tin is listed at the end of the article (see Sources). For those who would prefer not to punch the tin, it can be purchased pre-pierced.

Edge-glue Wide Stock

Begin by edge-gluing stock for all the wide parts—the two sides (A), the bottom (B), the top (G) and the adjustable shelf (K). When edge gluing, cut the boards so that the glued-up stock will be slightly longer and wider than necessary. After gluing, the parts are trimmed to final length and width.

To edge-glue, add a thin coat of glue to the mating edges of each board, then use bar or pipe clamps, spaced 12 in. to 18 in. apart, to apply pressure. However, don't overtighten the clamps. You need only apply enough pressure to make sure the surfaces are in good contact. Too much clamp pressure will squeeze out most of the glue, resulting in a weak joint.

Keep in mind that dowels, splines or biscuits won't add strength here, as an edge-joint matches long-grain to long-grain, a joint that is as strong as the wood itself. Some woodworkers like to use dowels, splines or biscuits, not for strength, but as a means to keep the boards from sliding out of alignment. That's okay, but we generally prefer to simply clamp a few waxed hardwood cleats (Fig. 1) across the boards, spacing them about 18 in. apart. The cleats keep the boards flush, and the wax keeps the cleats from sticking to the glue. For this project, we used cleats that measured 1 1/4 in. square and about 20 in. long.

Pierced Tin Country-Pine Cabinet



Make the Sides

Now that all the wide stock is glued-up, cut the two sides (A) to 17 1/4 in. wide by 33 1/4 in. long. Most table saws can't easily crosscut stock this wide, so a cutoff table, if you have one, can be put to good use here. Another option is to build a cutoff jig for your circular saw, like the one shown in Fig. 2.

With the sides cut to size, use the router along with an edge-guide and a straight bit to cut the 1/4 in. deep by 3/8 in. wide rabbet along the inside back edge of each one. Note, as shown in the Side View, that the rabbet stops 35/8 in. from the bottom edge of the side. Once cut, use a chisel to square the corner at the stopped end.

Next, lay out and mark the locations

of the 3/4 in. wide by 1/4 in. deep dados for the bottom. As shown in the side view, the top of the dado is 4 in. from the bottom edge of the side. Clamp a straightedge across the side, making sure it's square, then use a router and a straight bit to cut the dado across the entire width.

Now, relocate the straightedge and, again using the router, cut the 3/8 in. wide by 1/4 in. deep by 2 1/4 in. long mortises for the stretchers (C) on the front and back of each side. The router bit leaves a rounded corner, so you'll need to square each one with a chisel.

Referring to the exploded view, lay out and mark the locations of the 1/4 in. diameter by 3/8 in. deep holes in each side for the adjustable shelf. Use the drill

press to bore them out.

To complete work on the sides, transfer the full-size pattern of the bottom curve to each one, then cut them out on the band saw. A drum sander, if you have one, will make it easier to sand the sawn edges smooth.

Make the Bottom and Stretchers

Cut the bottom (B) to the same width as the sides, then crosscut it to 32 in. long. Make sure all the cuts are square. Once the bottom is cut to size, use the router and a straight bit, or the table saw and dado head, to cut a $\frac{1}{4}$ in. by $\frac{3}{8}$ in. rabbet along the back edge as shown in the Side View.

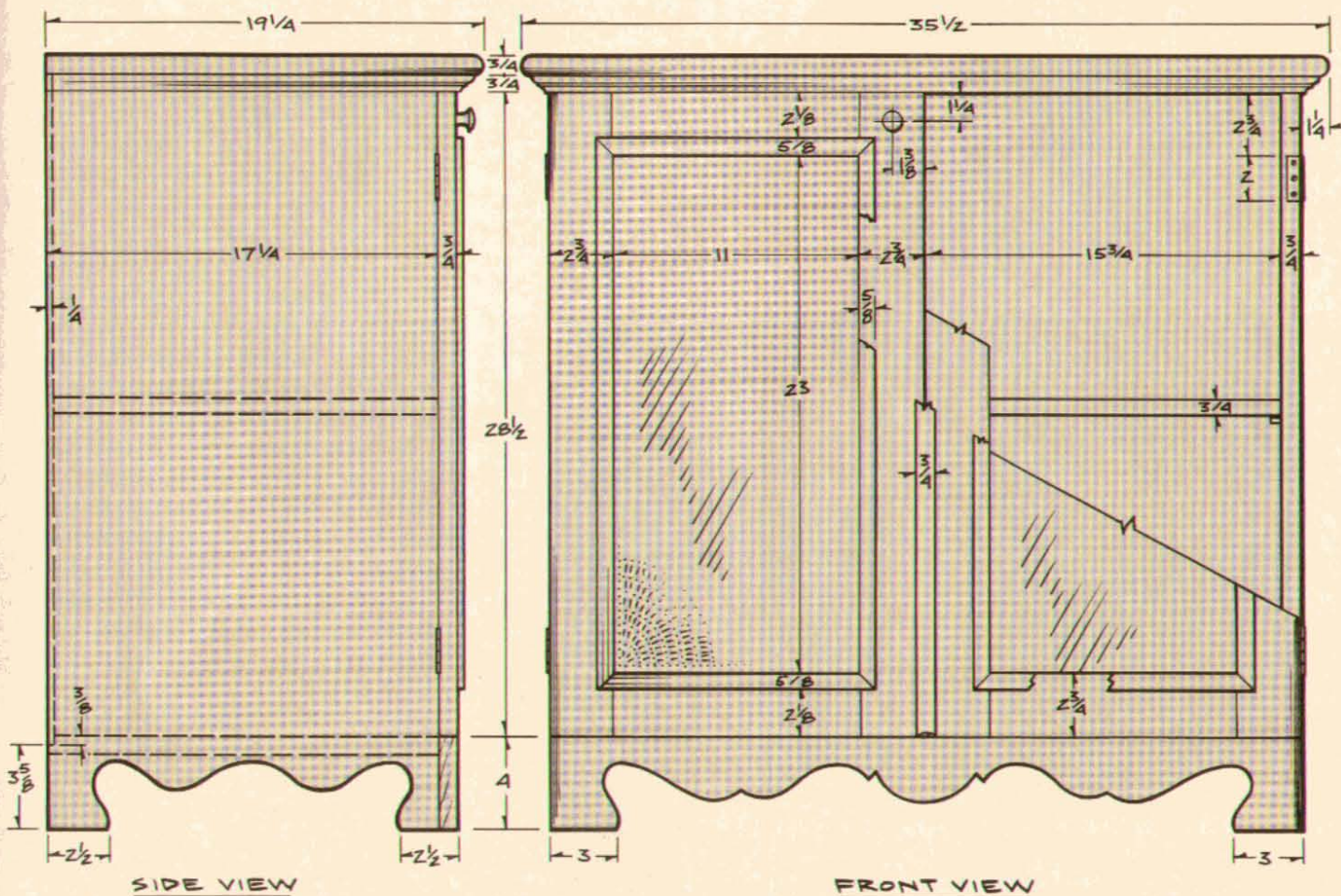
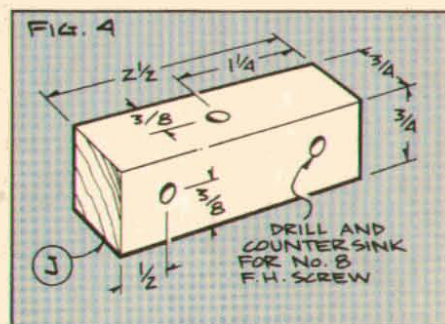
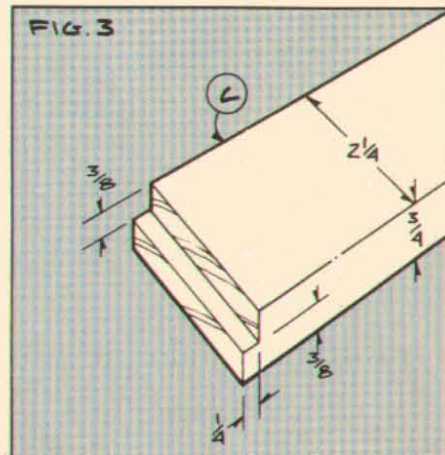
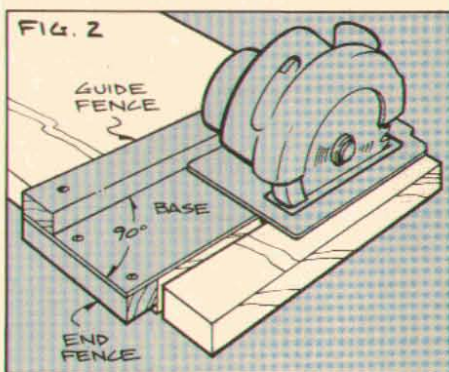
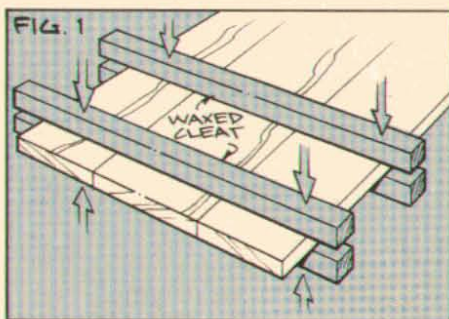
Now, cut the two stretchers (C) to size, making sure they are exactly the same length as the bottom. Use the table saw and dado head to cut the $\frac{3}{8}$ in. by $\frac{1}{4}$ in. rabbet on each end (Fig. 3). Check the rabbets for a good fit in the mortises in the sides.

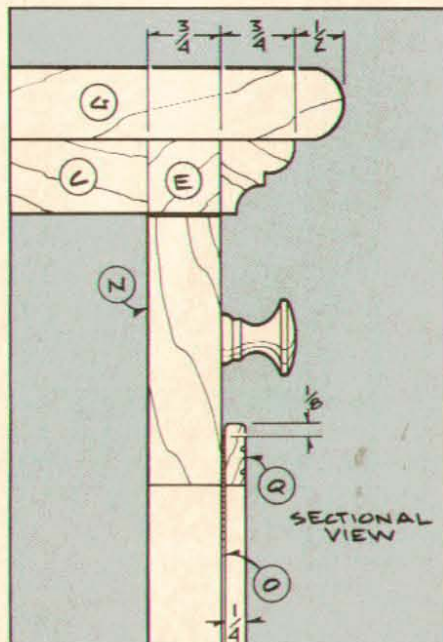
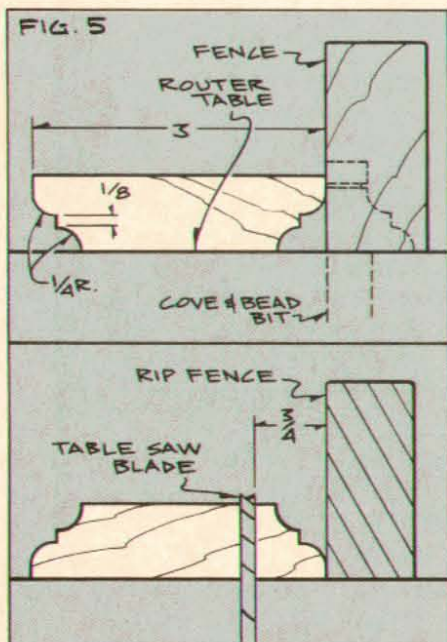
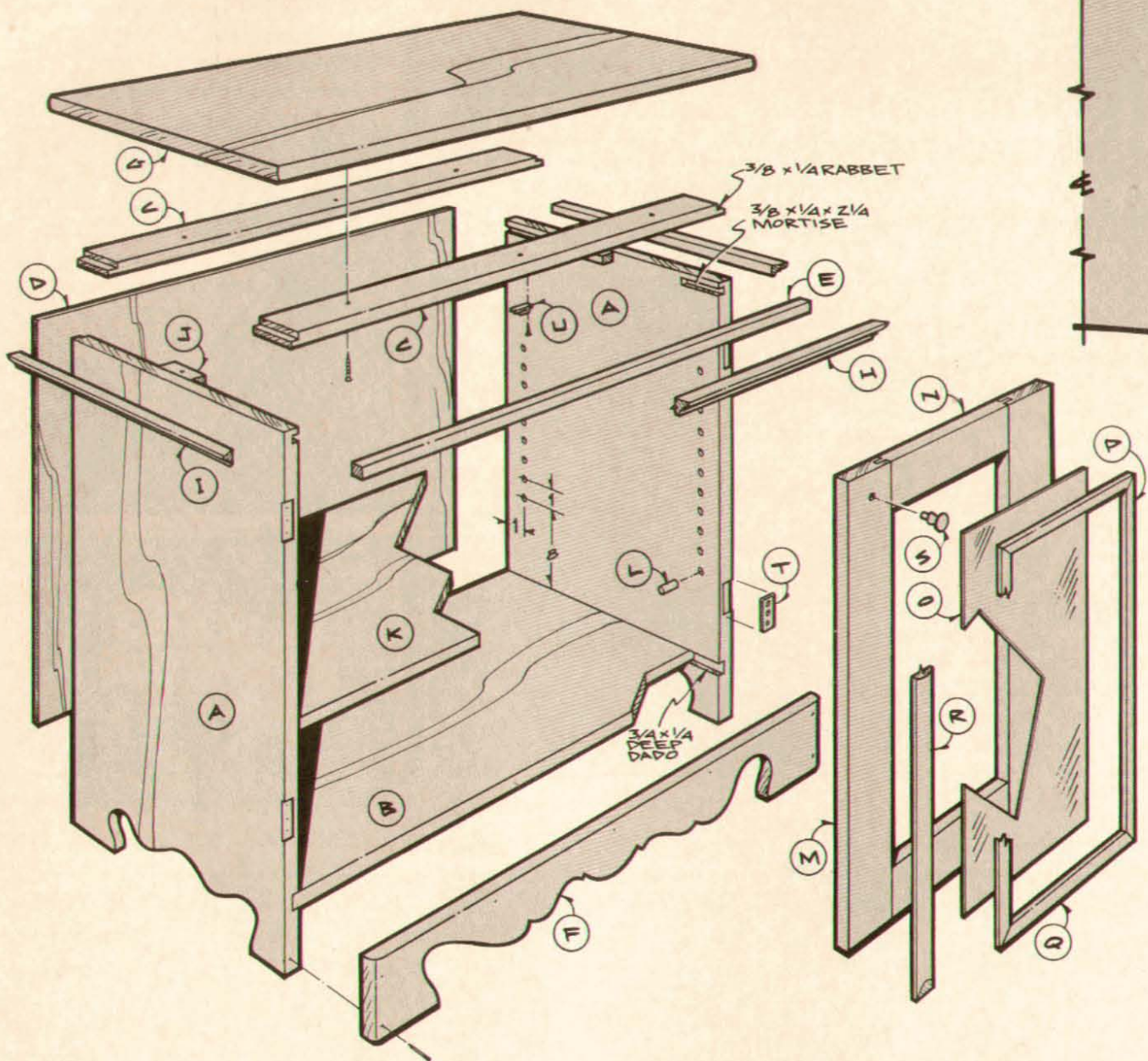
Lay out and mark the location of the three holes in each stretcher. Later, you'll drive $1\frac{1}{4}$ in. long by no. 8 roundhead wood screws through these holes to help secure the top.

Assemble the Case

Give the sides, bottom and stretchers a thorough sanding, finishing with 220-grit. Once sanded, add a coat of glue to the dados for the bottom, the mortises

for the stretchers, and also the ends of the bottom and the stretcher tenons. Assemble the parts and apply clamp pressure with bar or pipe clamps. Keep in





mind that the back stretcher should fit flush with the rabbet that was cut in the back edge of the sides.

To help strengthen the two dado joints, we added a half-dozen old-fashioned cut nails (see Sources) to each joint, first drilling a pilot hole through the side for each nail. There is no need to countersink these nails, as they add to the antique look of the project. As an option, you can use hardware-store variety finish nails, but they should be countersunk and filled. With the case now assembled, check it for squareness, then set it aside to dry.

Next, measure the opening for the plywood back (D) and cut it to fit. Sand the front and back surfaces, then use glue and brads to secure it in place.



Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd
Case			
A	Side	3/4 x 17 1/4 x 33 1/4	2
B	Bottom	3/4 x 17 1/4 x 32	1
C	Stretcher	3/4 x 2 1/4 x 32 *	2
D	Back	1/4 x 32 1/4 x 29 5/8	1
E	Filler	3/4 x 3/4 x 33	1
F	Base	3/4 x 4 x 33	1
G	Top	3/4 x 19 1/4 x 35 1/2	1
H	Front Molding	3/4 x 3/4 x 34 1/2	1
I	End Molding	3/4 x 3/4 x 18 3/4	2
J	Cleat	3/4 x 3/4 x 2 1/2	2
K	Adj. Shelf	3/4 x 16 7/8 x 31 3/8	1
L	Adj. Shelf Pins	1/4 dia. by 7/8 long	4
Doors			
M	Stile	3/4 x 23/4 x 28 1/2	4
N	Rail	3/4 x 23/4 x 12 *	4
O	Tin Panel	12 x 24 **	2
P	Stile Molding	1/4 x 5/8 x 24 1/4	4
Q	Rail Molding	1/4 x 5/8 x 12 1/4	4
R	Slat	1/4 x 3/4 x 28 1/2	1
S	Knob	3/4 dia.	2
T	Hinge	1 3/8 x 2	4
U	Mag. Catch	9/16 x 1 3/16 x 2	2

* Length includes tenons.

** See Sources

Add the Filler and Apron

After removing the clamps, cut the filler (E) to fit across the top edge of the case. Secure it with glue and finishing nails.

Now, cut the base (F) to size. You'll want the base ends to fit flush with the sides of the case. Also, the top edge of

the base should be flush with the case bottom.

With the base cut to size, transfer the full-size pattern of the curve and cut it out with the band saw. Sand the base before attaching it to the case with glue and the old-fashioned cut nails (or countersunk and filled finishing nails).

At this point you can also make the two cleats (J), which will serve to secure the top at the center (Fig. 4). Cut them to size and bore the holes, then glue and screw them to the sides.

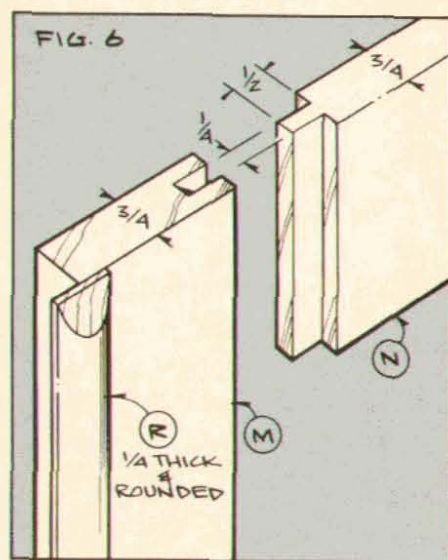
Make the Top

From the stock you edge-glued earlier, cut the top (G) to final length and width. We used the router table and a half-radius bull nose router bit (see Sources) to round the two ends and the front. To minimize splintering problems, first rout the ends, then the front edge.

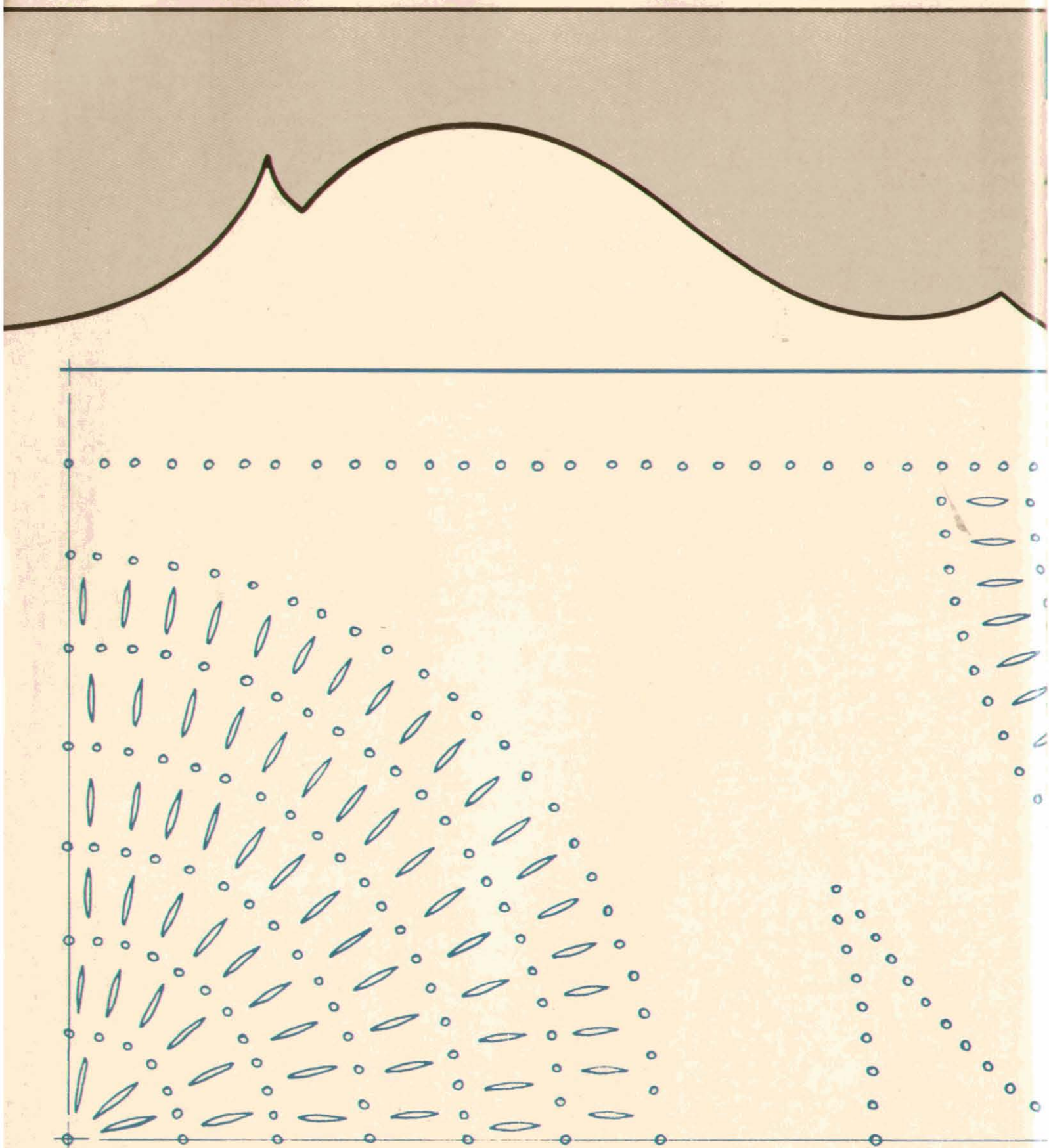
While you have the bull nose bit set up, this is a good time to make the door slat (R), which has the same rounded edge. For safety's sake, start with a 3/4 in. thick board that's at least 3 in. wide and 30 in. long. Apply the bull nose to one edge, then use the table saw to rip the slat to a 1/4 in. thickness. Set the slat aside until later on when you work on the doors.

Make the Case Moldings

It's a good idea to have the top tem-



porarily in place when attaching the front and end moldings, as it serves to help locate the moldings flush with the top end of the case. To attach the top, drive 1 1/4 in. long by no. 8 roundhead woodscrews (add a flat washer to each screw) through the holes in the stretchers and cleats. Be sure to bore a pilot hole in the top for each screw. When attached, the top should overhang the front and sides by



1 1/4 in., and be flush with the back.

The front and end moldings (parts H and I) can now be made. We used a router bit (see Sources) that cuts the cove and bead in one step. Start with a 3/4 in. thick board measuring at least 3 in. wide

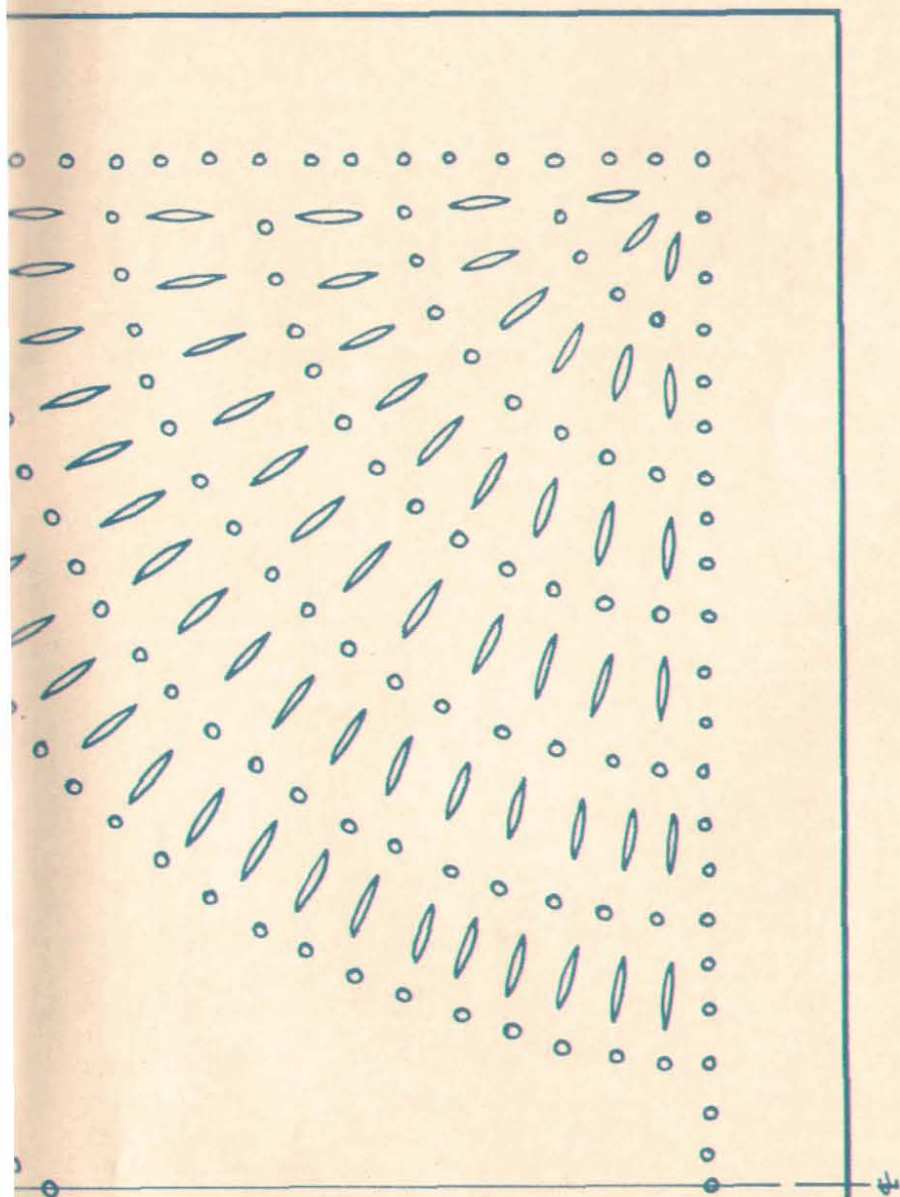
and 40 in. long. Using the router table, cut the cove and bead profile along both edges of the board, then use the table saw to rip each molded edge to 3/4 in. wide (Fig. 5). The 3 in. board width is more than you'll need, but it provides an

extra measure of safety when cutting on the router table.

Attach the Case Moldings

The front and end moldings can now be attached. Start with the front molding,

F



mitering one end to 45 degrees, then measure the length across the case and cut the second miter to fit. Add glue to the front edge of the filler and secure the front molding with a half-dozen or so old-fashioned nails. As mentioned earlier, if finishing nails are used instead,

you'll want to countersink them and fill the holes. Be careful to avoid getting glue on the underside of top—you'll need to remove the top later on.

Next, add the end moldings, first mitering the front ends, then cutting the back ends square to the back of the case.

Since the sides must be able to expand and contract with seasonal changes in moisture content, the side moldings are attached a little differently than the front molding. Rather than glue them along their entire length (in time, the seasonal movement of the sides would likely fracture the glue joint), apply glue only to the first two or three inches of the front end, then use old-fashioned or finishing nails (same as you did for the front) to secure the rest of the side molding. Nails are a good choice here, since they tend to flex a little. That allows the sides to move, yet the molding stays securely attached.

The Doors

Measure the opening of your case to determine the actual size of the two doors. Once the size is determined, cut the stiles (M) and rails (N) to length from stock measuring $\frac{3}{4}$ in. thick by $2\frac{3}{4}$ in. wide. Use the router table to cut the $\frac{1}{4}$ in. wide by $\frac{1}{2}$ in. deep by $2\frac{3}{4}$ in. long mortise in each stile. Then, use the table saw and dado head to cut the $\frac{1}{4}$ in. wide by $\frac{1}{2}$ in. long tenon on each end of the rails (Fig. 6).

Check the tenons for a good fit in the mortises and, if all looks okay, sand the parts through 220-grit. Add glue to the mortises and tenons, then assemble using bar or pipe clamps to apply pressure to

the joints. Make sure the panels are square and flat before setting aside to dry.

Cut the door hinge mortises, then add the door hinges (T) and temporarily hang the two doors. If all fits to your satisfaction, trim the door slat stock to length (remember the slat was made earlier) and glue it to the right side door (Fig. 6). Use a chisel to bevel each end as shown.

Although the slat isn't mandatory, we added it because old-time cabinets like this often incorporated them to cover the space between the doors. While it probably was used to discourage insects and the like, we suspect it also served at times to cover up any unevenness along the edges where the doors met. If you add the slat, though, keep in mind that the right door must be opened before you can open the left one.

Make the Adjustable Shelf

From the stock that was glued-up earlier, cut the adjustable shelf (K) to fit inside the case, allowing a little space (about 1/16 in.) on each end. Also, cut the adjustable shelf pins (L) to 7/8 in. lengths using 1/4 in. diameter dowel stock.

Marbleize the Top

The top, which had been temporarily added to the case, can now be removed. Give the top a thorough sanding, finishing with 220-grit.

Complete instructions for marbleizing come with the Plaid kit (see Sources), so we won't cover the procedure here. Everything you need to do the job is included—sponge, veining feather, sponge brush, various colors and solutions, and an instruction booklet. You'll be able to cover about 12 square feet.

We found it rather easy to do, although the last step (applying the "veins" using the feather) was a bit tricky. We didn't like the way the veins looked, so we started over again and were much happier the second time around. (We neglected to follow the advice we faithfully give our readers: When working with an unfamiliar finish, first apply it to a small test piece to get a feel for the process, and to preview the final look.)

Although the kit contains enough colors to do both the upper and lower surfaces of the top, we chose to do only the exposed surfaces—the entire upper surface, the four edges, and about 2 in. around the lower surface. When finished

Sources

Marbleizing Kit

We used a marbleizing kit sold by Plaid Enterprises, P.O. Box 7600, Norcross, GA 30091-7600; tel. (404) 923-8200. It's their Faux Finish Marbleizing Kit, Serpentine Collection, in the color ivory. Write or call Plaid for the name of their nearest retailer.

Tin

The pewter-tone tin panels we used for this project are available from Country Accents, P.O. Box 437, Montoursville, PA 17754; tel. (717) 478-4127. Three options are available:

1. Two 12 in. by 24 in. blank panels, an 8 in. by 10 in. practice piece, and a full-size pattern for \$14.20 postpaid.

2. Two 12 in. by 24 in. blank panels, an 8 in. by 10 in. practice piece, a point punch (to make the round holes), a 7/16 in. chisel punch (to make the elongated holes) and a full-size pattern for \$29.45 postpaid.

3. Two 12 in. by 24 in. panels pre-punched to the pattern shown for \$59.80 postpaid.

Old-Fashioned Nails

Decorative 1 in. long (2d) clout nails can be ordered from the Tremont Nail Company, P.O. Box 111, Wareham, MA 02571; tel. (508) 295-0038. Order their part number "CT-2". Current price for one pound (approximately 346 nails) is \$11.75 postpaid.

Router Bits

Both the half-radius bull nose bit, and the cove and bead bit are available from Eagle America, P.O. Box 1099, Chardon, OH 44024; tel. 1-800-872-2511. For the bullnose bit (1/2 in. diameter shank) order part no. 161-1205; current price \$39.99 each. For the cove and bead bit (1/2 in. diameter shank) order part no. 171-2605; current price \$32.99 each. Orders under \$100, add \$5.75 for shipping and handling.

marbleizing, set the top aside to dry

Finish The Case and Door Frames

Final sand all the case parts (except the marbleized top) and also the two door frames. Sand through 220-grit. Once sanded, we applied two coats of Minwax Puritan Pine Wood Finish. When dry, two coats of orange shellac were added. Also, at this time, add a couple of coats of a gloss water-based polyurethane finish to the marbleized top.

Punch the Tin

Before you can start punching the tin panels (O), you'll need to make a paper template of the entire pattern. (As noted

in Sources, a full-size paper template is included if you purchase the blank panels.) Most any paper will do—as long as it's at least as long and wide as the tin. Should you not have any large sheets of paper, simply tape together a few sheets of 8 1/2 in. by 11 in. typing paper. Now, using the full-size quarter-section provided, transfer the entire pattern to the paper template.

Tape the template to the tin blank, then place the blank on a backing board and clamp it to your workbench. Any sort of scrap wood will do as a backing board. If you choose not to purchase the punching tools, we found that a 16 penny nail works pretty well for punching the 1/16 in. diameter round holes. An old chisel or screwdriver that's ground to shape can punch the elongated holes.

Once the two panels are punched, tack them to the front of the door frames by driving a small brad in each corner. Before driving the brads, though, bore a pilot hole for each one.

Add the Door Molding

The stile molding (P) and rail molding (Q) are a commercial molding sold by most lumberyards. It is generally referred to as "screen" or "screen door" molding, and most lumberyards will order it for you if it's not a stock item.

Cut the molding to length, mitering the ends. As shown in the Sectional View, the molding should overlap the tin by about 1/8 in. all around.

We painted the molding black, as we felt that color looked good with the pewter-tone tin. If you opt to paint the molding, now is the time to do it, as it gets a bit fussy after it's attached.

Once painted, the molding is simply tacked in place over the tin panels. To reduce chances of splitting the molding, be sure to bore pilot holes before driving the tacks. A daub of black paint will cover the nail head.

Final Details

The door knobs (S) we used are of a Shaker style, but just about any hardware-store variety 3/4 in. diameter wooden knob will do. We applied black paint to the knobs before attaching them to the doors.

Remount the doors and the top, and add the two magnetic catches (U). Install the shelf pins and the adjustable shelf to complete the project.



Oak Dentil Molding

PICTURE FRAME

A weekend in the shop is probably all you'll need to build this handsome oak picture frame. It also makes a classy-looking mirror—just replace the clear glass shown with a piece of mirror glass. The dentil molding, which helps give the piece its distinctive look, can be made with little fuss. Our thanks to Gary Graziani, from nearby Torrington, Connecticut, for providing us with the design.

CUT THE FRAME STOCK—The frame, consisting of the two stiles (A) and two rails (B), is made first. Rip $\frac{3}{4}$ in. thick stock to 2 in. wide, then crosscut the parts to length— $17\frac{1}{2}$ in. for the stiles and 12 in. for the rails.

CUT THE STILE MORTISES—Next, lay out and mark the location of the $\frac{1}{4}$ in. wide by $\frac{3}{4}$ in. deep by $1\frac{3}{8}$ in. long mortises in each stile. You can chop the mortises by hand, but you'll save time if you remove most of the waste stock by boring a series of holes with a $\frac{1}{4}$ in. diameter drill bit, then use the chisel to clean up what remains.

CUT THE STILE GROOVES—As shown in the front view, each stile has three $\frac{1}{4}$ in. wide by $\frac{1}{4}$ in. deep grooves—two that are $\frac{1}{2}$ in. from the edges and one right down the middle. These grooves are best cut using the router table and a $\frac{1}{4}$ in. core box bit. Note that the grooves are stopped $\frac{7}{8}$ in. from each end. By the way, rather than cut a full $\frac{1}{4}$ in. deep groove in one pass, it's best to make a couple of $\frac{1}{8}$ in. deep cuts. With light cuts, the bit is less likely to burn the wood.

CUT THE RAIL TENONS—Use



the table saw and dado head, along with the miter gauge, to cut the $\frac{1}{4}$ in. wide by $\frac{3}{4}$ in. long by $1\frac{3}{8}$ in. wide tenon on the end of each rail. Once cut, check them for a good fit in the stile mortises.

ASSEMBLE THE FRAME—Add a thin coat of glue to the stile mortises and rail tenons, then assemble the parts and clamp firmly. Check to make sure the frame is square and flat. If all looks okay, set the frame aside to dry.

When dry, remove the clamps and clean up any glue squeeze-out with a sharp chisel or scraper. Next, using the router and a $\frac{1}{4}$ in. rabbeting bit, cut the $\frac{1}{4}$ in. wide by $\frac{1}{2}$ in. deep rabbet that will accept your picture. The router bit

won't square the corners—you'll need a chisel to do that.

MAKE THE PLINTHS—Next, make the four plinths (C), cutting each one to 2 in. square from $\frac{3}{4}$ in. thick stock. Once cut, set up the router table with a 45-degree chamfering bit and cut a $\frac{3}{8}$ in. chamfer on each edge. When working with small pieces like these, it's especially important to keep your fingers away from the router bit. Clamping the workpiece in a handscrew (Fig. 1) makes the job much safer.

The plinths can now be glued to the frame. Before adding the glue, though, it's a good idea to first drive three or four brads into the back of each plinth, then

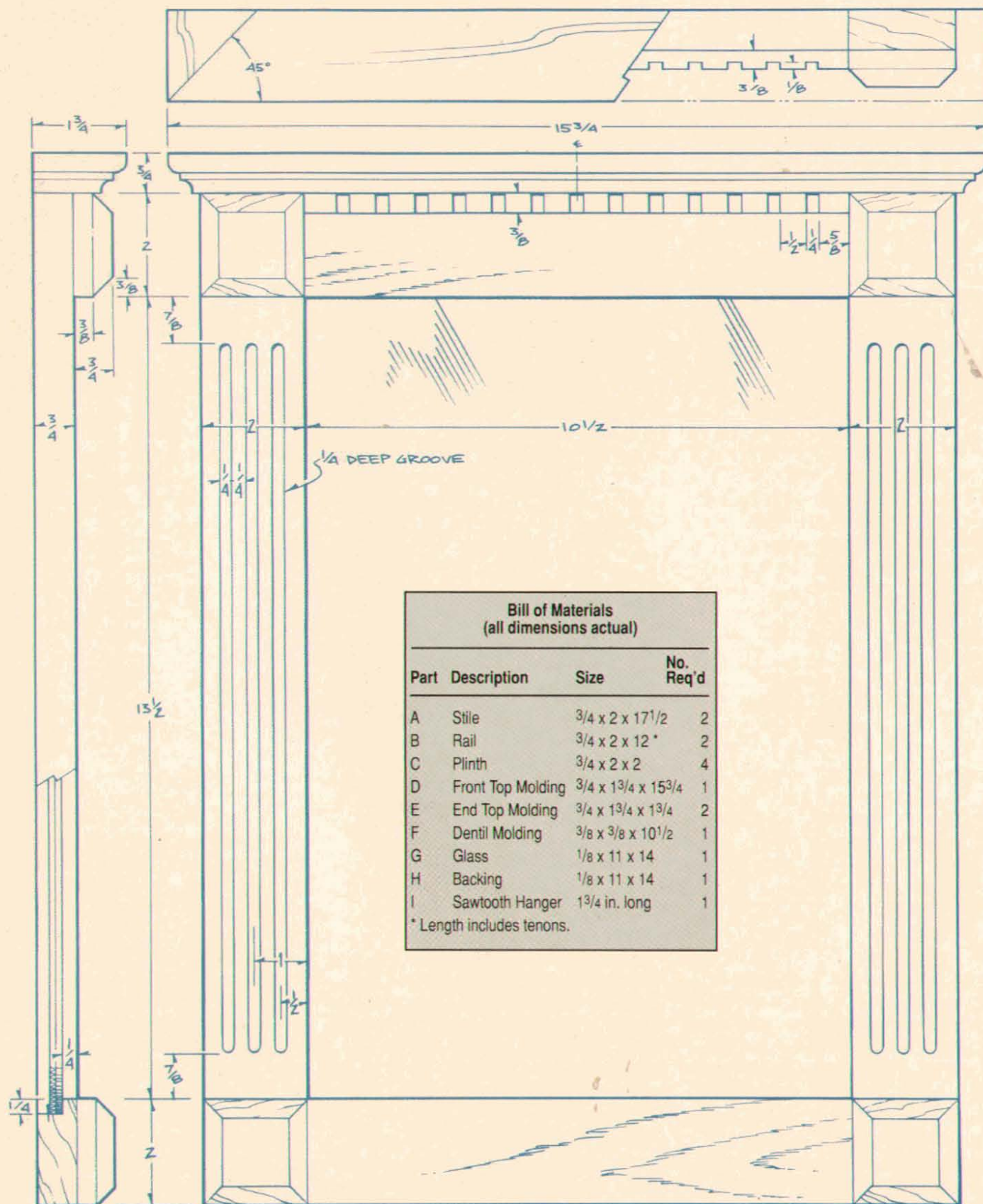
cut the heads off so that about 1/8 in. is exposed. The brads will help keep the plinths from sliding out of position when clamp pressure is applied.

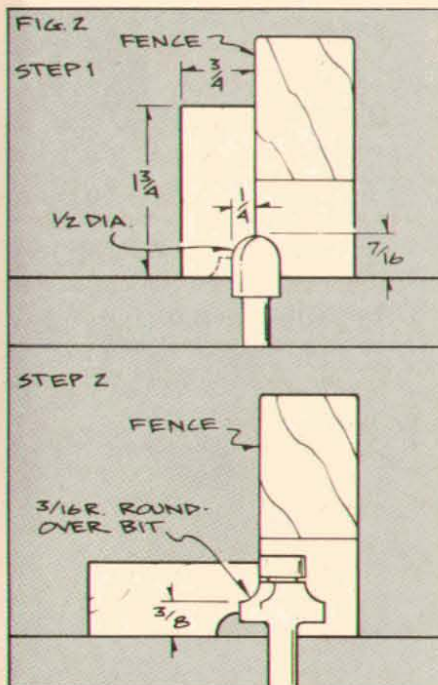
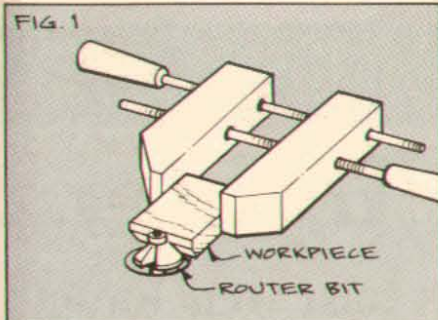
MAKE THE FRONT AND END TOP MOLDING—You'll need at least a 24 in. length of 3/4 in. thick by 1 3/4 in.

wide stock to make the Front Top Molding (D) and the two End Top Moldings (E). As shown in Fig. 2, the cove and bead shapes are cut in two steps using the router table. In Step 1, a 1/2 in. diameter core box bit is used to create the cove. The bead is shaped in Step 2, using

a 3/16 in. roundover bit. Keep in mind that you don't want to make the entire cut in one pass—instead make several light cuts.

If you want to save some setup time, the molding profile can be cut using a single cutter, called a classical ogee bit.





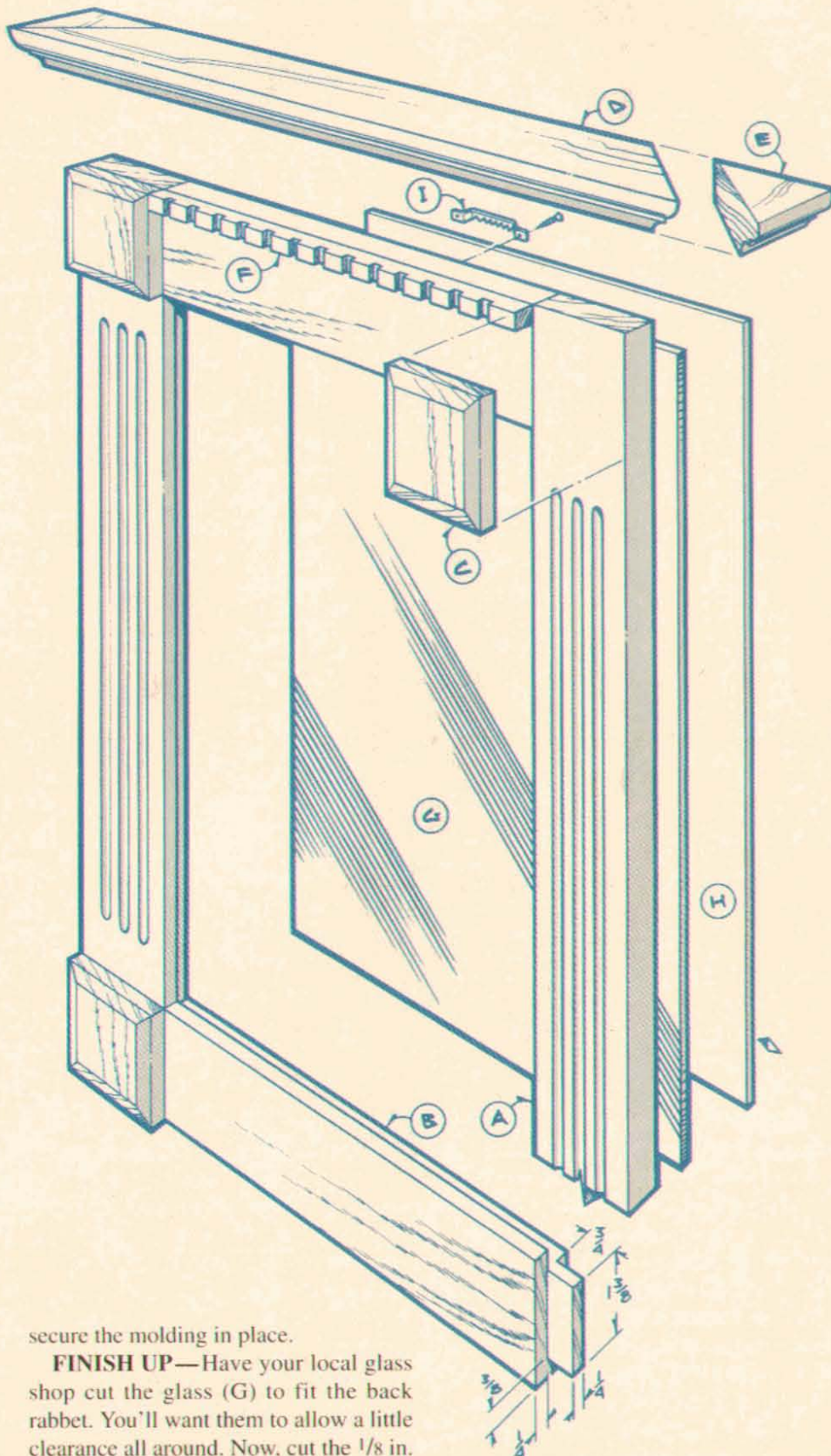
A number of companies offer this bit, including Freud (p/n 38-614).

Now, cut the Front Top Molding to length, cutting a 45-degree miter on each end. Glue it to the top of the frame, using a few countersunk and filled finishing nails to secure it in place. Then, cut the two End Top Moldings and attach them in the same manner.

MAKE THE DENTIL MOLDING—

The dentil molding (F) is made from a length of stock that measures $\frac{3}{8}$ in. square. Measure the distance between the two upper plinths, then cut the stock to fit snugly in between.

We used the table saw and a dado head cutter (set to a $\frac{1}{4}$ in. width) to cut the $\frac{1}{4}$ in. wide by $\frac{1}{8}$ in. deep notches along the length of the molding. Lay out and mark the location of the notches, raise the dado head to $\frac{1}{8}$ in. above the saw table, then use the miter gauge to support the stock as it's passed over the blade. To minimize splintering when making the cuts, it's best to attach a length of scrap to the miter gauge to serve as a backup board. Once the notches are cut, use glue and clamps to



secure the molding in place.

FINISH UP—Have your local glass shop cut the glass (G) to fit the back rabbet. You'll want them to allow a little clearance all around. Now, cut the $\frac{1}{8}$ in. thick hardboard (Masonite) backing (H) to the same size as the glass.

Final sand the frame through 220-grit. Remove all the dust before applying a couple of coats of polyurethane to both the frame and the backing. When the finish dries, install the sawtooth hanger (I) to the back of the upper rail as shown. You'll find these hangers at just about

any hardware store.

Assemble the glass, then add the photo or artwork, followed by the backing. A pair of glazier's points or brads, driven into each edge of the back rabbet, will hold the backing in place. Glazier's points can be found at most glass shops.



Tool Review

If you're used to using a hand plane for smoothing the edges and faces of boards for your projects, you might not have much use for a jointer. However, if you want to smooth a lot of wood in a hurry, you can't beat the jointer's speed and efficiency. Not only can you use a jointer to smooth, straighten, and square rough stock, but also to cut chamfers, bevels, and tapers. Many of the larger floor models also enable you to cut rabbets and tenons, although none of the benchtop units reviewed for this article have that capacity.

While most jointers on the market are large, heavy stationary machines, replete with integral stands or leg sets, the six compact models reviewed here fall into the benchtop category. That is, they're designed to mount directly to a workbench or other stable surface. They're also light enough so that you can take them to a job site or easily lift them on and off the bench for occasional use. To make the machine portable, you simply mount it on a $\frac{3}{4}$ in. plywood base, which in turn, you clamp to the bench or across a pair of sawhorses. AMT, Delta and Ryobi sell optional metal work stands that fit their benchtop jointers.

Jointer Basics

Unlike a hand plane, which cuts long, continuous shavings, a jointer has two or more revolving knives mounted in a cutterhead, which leave a slightly rippled surface on the wood. The size or visibility of the "mill marks" left by the knives depend on the cutterhead speed, feed rate, and knife adjustment, as I'll discuss later. All of the jointers I tested have two knives; larger models may have three or even four knives mounted in the cutterhead.

The illustration shows the basic components of a typical jointer. These include the infeed and outfeed tables (both of which make up the jointer bed), an adjustable fence, cutterhead, cutterhead guard, motor (not shown), ON-OFF switch, infeed table and adjustable fence knobs, and base. The units I reviewed use a belt-and-pulley system—either a V-belt or a toothed timing belt—to drive the cutterhead. The belt on the Delta 37-070 is readily accessible from the outside

Benchtop Jointers

6 machines that won't bust your budget

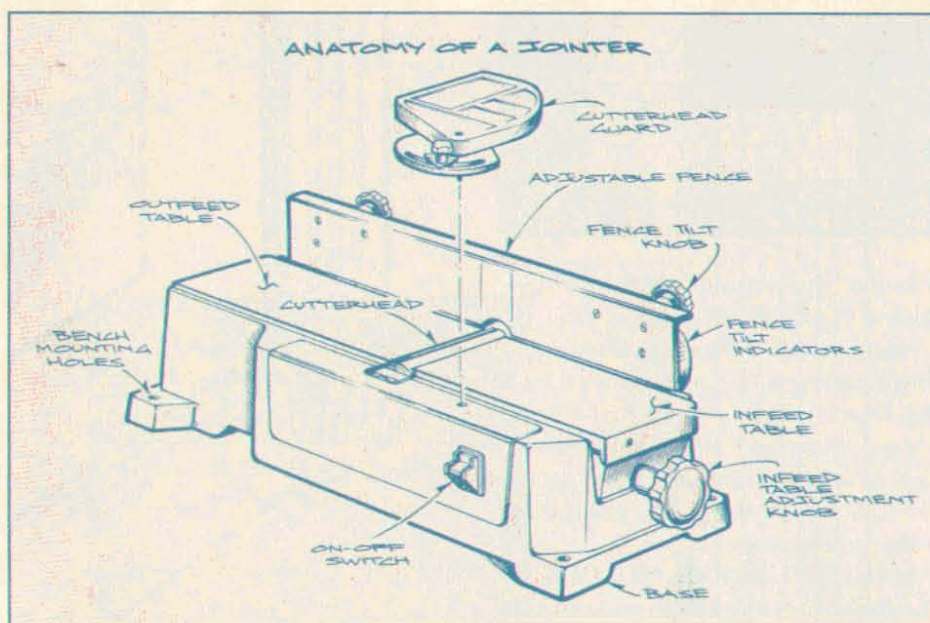
by Jim Barrett

of the machine (see photo).

To plane a surface on the jointer, first set the infeed table from $\frac{1}{32}$ in. to $\frac{1}{8}$ in. below the cutterhead knives to provide the desired depth of cut. On the models I tested, you adjust cutting depth by twisting the infeed table adjustment knob located under the infeed table on the right-hand end of the machine. You then pass the workpiece over the revolving cutterhead, holding it securely against

ness planers for planing stock to a precise thickness. On the other hand, it's easier to flatten a cupped, warped, or twisted board on the jointer.

For this reason, most woodworkers use jointers primarily for edge-planing operations. If the boards are narrow enough for face planing, you can also use the jointer to true boards—that is, create four smooth surfaces that are exactly 90 degrees to each other. To do this,



the fence. The cutterhead guard automatically retracts as you feed the stock through the machine, then springs back once the wood has passed through. The fence can be tilted up to 45 degrees for bevel and chamfer cuts (see photo).

Several manufacturers refer to their machines as jointer-planers, typically because the operation of smoothing the edge of a board is called jointing, while smoothing the face of the board is called planing. However, the width of boards a jointer can "plane" is limited to about 6 in. on most machines (as opposed to 10 in. or more on a thickness planer). Also, jointers aren't nearly as good as thick-

run one edge of the stock through the jointer to make it straight and smooth; then place this edge against the jointer fence, and plane one adjacent face of the board. Next, square the opposite edge of the board by running the board through the table saw, with the jointed edge against the fence and the planed face flat against the saw table. This makes the opposite edge parallel to the first. From there, you can remove the saw marks by running the cut edge through the jointer, then plane the opposite face of the board by running it through a thickness planer (surfacer), to achieve a uniform thickness. My explanation of the procedure is



AMT 4800 (left)



Delta 37-070 (right)



Reliant DD394 (left)



Ryobi JP155 (right)



Sears 23622 (left)



Sears 23632 (right)

somewhat simplified—there are some tricks to using a jointer safely and correctly. For details, see Roger Holmes' article *How to Flatten Rough Stock* in the September/October 1993 issue of *The Woodworker's Journal*.

Cutting Capacity

On jointers, the two main determiners of cutting capacity are maximum cutting width and maximum depth of cut. Jointers are generally "sized" by their maximum cutting width or the widest board they can plane. This, in turn, is determined by knife length, which is generally equal to, or slightly less than, the width of the jointer bed. The units I tested have maximum cutting widths from 4 $\frac{1}{8}$ in. (Sears 23622 and Reliant DD394) to 6 $\frac{1}{8}$ in. (Delta 37-070, Ryobi JP 155). See the Chart on page 69.

Maximum cutting depth is determined by the maximum distance you can set the infeed table below the cutterhead. Most machines have a maximum depth of $\frac{1}{8}$ in. I might add here that you usually get better results if you take several light

cuts, rather than one deep one. While all of the machines I tested had enough power to take full-depth cuts in the widest stock I could feed through them, I found that I had to slow the feed rate way down, to avoid several problems: First, the motors on most jointers (not just the benchtop variety) will slow down appreciably if you force them to take heavy cuts—this not only shortens motor life, but also results in a rougher cut (see *Variable Speed*). Second, it's rough on the knives. Third, it usually doesn't take any longer to take two or three shallow cuts at a fast feed rate than it does to take one deep cut at a slow rate. Taking shallower cuts also minimizes wood tearout. I found that a $\frac{1}{16}$ in. cutting depth is a good average for most woods.

As mentioned, you adjust the infeed



Benchtop jointers use a short belt-and-pulley drive system to power the cutterhead. The one on the Delta is easily accessible from the outside of the machine.

table by means of a twist knob on the right-hand side of the machine (see photo). The Delta also has a table lock knob on the front of the machine to hold the desired setting. The Delta and Ryobi both have depth indicator scales—I



All jointers have adjustable fences, which enable you to make bevel and chamfer cuts.

found the large English/metric scale on the Delta more accurate and easier to read than the scale on the Ryobi. On the other jointers, setting an accurate depth is done by guess and by golly.

Another factor relating to cutting capacity is bed length. Technically, the longest board you can effectively flatten in one continuous pass must be equal to the length of the infeed table; in other words, if the board is bowed, both ends should rest on the infeed table. However, once you become experienced, you can “finesse” cuts in boards up to 5 or 6 feet long, no matter what length the table. There is no specific formula regarding bed length versus board length, although longer beds provide better support for the workpiece, lessening the chance of the board being accidentally tilted or lifted off the cutterhead while planing. Ryobi offers optional extension rollers that fit into each end of the jointer, to make long stock easier to handle (see photo).

Smoothness of Cut

As mentioned, hand planes take long, smooth shavings from wood, while jointer knives take small, overlapping dished cuts. These cuts are often referred to as “mill marks”, when they’re visible to the naked eye. On a jointer, the more cuts per inch, the smoother the surface. Cuts per inch is determined both by cuts per minute (cutterhead speed in rpm x number of knives) and the rate at which you feed the stock over the cutterhead. More efficient jointers provide more cuts per minute, which enables you to get the

same number of cuts per inch at a faster feed rate.

All of the benchtop jointers I tested have two knives; some larger jointers have three or even four knives. To figure cuts per minute on a two-knife jointer, you simply multiply the cutterhead speed (rpm) by two. For example, if the maximum cutterhead speed is 8,000 rpm, the cuts per minute will be 16,000. For a three-knife jointer, you multiply cutterhead speed by three, and so-on. As a rule of thumb, about 50 cuts per inch provides a smooth finish surface in which the “mill marks” are virtually invisible,



A twist knob adjusts the height of the infeed table. A removable ON/OFF switch lock prevents unauthorized use.



Auxiliary rollers attach to table ends on Ryobi to accommodate long stock.

and the surface feels smooth to the touch. Compare this to surfaced framing lumber that you buy at the lumberyard, which is run through large automated jointing machines at about 5 cuts per inch. To achieve 50 cuts per inch on a jointer operating at 16,000 cuts per minute (or 8,000 rpm), the feed rate would be approximately $5\frac{1}{3}$ in. per second, which is an efficient, yet comfortable rate when hand-feeding stock.

As mentioned earlier, if you try to take too deep a cut in one pass, the motor will start to bog down, reducing the cuts per minute; you must then compensate by slowing down the feed rate. If you feed the stock too slowly, especially if the knives are dull, you run the risk of



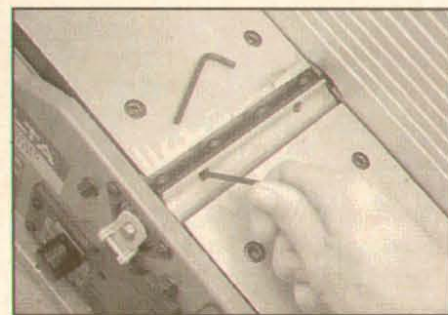
The Delta (shown) and Ryobi feature variable speed control. Both jointers have a speed selection chart attached to the machine for easy reference.

causing burn marks in the wood.

In my tests, all of the jointers made acceptably smooth cuts; the Ryobi and Delta were a bit smoother than the rest.

Variable Speed

While higher speeds generally produce smoother cuts, it's sometimes an advantage to slow down the speed. For example, when jointing narrow stock, you can reduce the speed to decrease machine noise, without sacrificing smoothness of cut. Also, slower speeds lessen the chance of glazing or burn marks on softer woods such as pine. Slower speeds also come in handy when cutting soft plastics and acrylics, which tend to melt at higher cutting speeds. Of the six join-



On all the jointers I tested (Delta shown), blade height adjustment is made easy by two lifting screws inset into the cutterhead. The four screws at top fasten the blade into the blade clamp.

ters reviewed, only the Delta and Ryobi have variable speed control (6,000–11,000 rpm on the Delta; 8,000–16,000 rpm on the Ryobi). Both units have speed selection charts attached to the body of the machine, making it easy to dial in the optimum speed for the size and type of material you're planing. The speed control and chart for the Delta are shown in the photo.

Specifications Chart

Make	Model	Motor Amps	Cutterhead Speed (RPM) ¹	Max. Cutting Width (in.)	Max. Cutting Depth (in.)	Bed Size W x L (in.)	Fence Size H x L (in.)	Materials ²				Fence Tilt ³	Dust Hose Dia. (in.) ⁴	Net Wt. (lbs.)	Price ⁵
								Bed	Fence	Base					
AMT	4800	5.6	8,000	5 1/8	1/8	55/8 x 26 3/4	3 1/4 x 24	C	S	C		45° O, I	2 1/2, 1 1/4	45	\$199
Delta	37-070	10.0	6,000–11,000	6 1/8	1/8	6 3/16 x 30	4 1/4 x 19 3/4	A	A	S		45° O	4	35	\$299
Reliant	DD394	4.6	14,000	4 1/8	1/8	45/16 x 21 1/4	3 1/8 x 19	C	S	C		45° O, 15° I	2 1/2	42	\$130
Ryobi	JP155	10.5	8,000–16,000	6 1/8	3/32	6 1/8 x 28 1/4	2 11/16 x 28	A	A	P		45° O	2 1/2	26.8	\$298
Sears	23622	5.6	8,000	4 1/8	1/8	4 1/4 x 21 1/4	2 7/8 x 19 1/2	C	S	C		45° O, I	2 1/2, 1 1/4	39	\$140
Sears	23632	5.6	8,000	5 1/8	1/8	55/8 x 26 3/4	3 1/4 x 24	C	S	C		45° O, I	2 1/2, 1 1/4	45	\$185

¹ Multiply cutterhead speed by 2 to get cuts per minute; Delta and Ryobi have variable speeds.

² C = cast iron; A = aluminum; S = steel; P = plastic

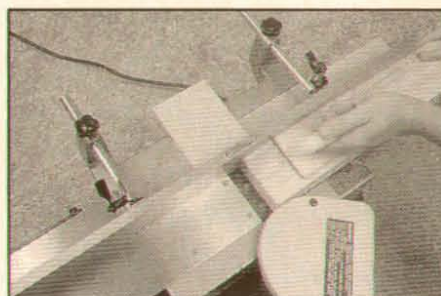
³ O = outward; I = inward

⁴ Hose connection diameter on chip ejection port; hoses not included.

⁵ Average selling price through stores and mail-order catalogs (Delta, Ryobi) or actual catalog price (AMT, Sears, Reliant)

Setting and Adjusting Knives

Smoothness and overall quality of cut also depends on proper knife adjustment: Both knives must be set to exactly the same height, and level across the width of the table. This was the first thing I checked when I called in the machines. Fortunately for me, the knives on all of them were razor sharp and accurately adjusted at the factory. Even so, I went through the routine to see how easy it was to adjust the knives on the various units. Typically you set the knives so the cutting edge is even with the surface of the outfeed table (or for optimum results about .003 in. above it—about the thickness of a piece of paper). On the machines I tested, the knives attach to the cutterhead by means of a clamp held by three or four screws. In addition, you'll find two allen-head lifting screws recessed into the cutterhead, used to "fine tune" the knife height (some larger jointers don't have this feature). To adjust the knife height, you loosen the clamp screws (see photo), adjust the two lifting screws, then retighten the clamp screws. While this sounds simple enough, I found the process easier to do on some jointers than others. It's much easier if you can keep the cutterhead stationary



Twin-rod fence assembly on Ryobi requires separate locking knobs and levers, but also offers across-the-table fence positioning. Note rear cutter guard behind fence. Speed selection chart is to right of front cutter guard.



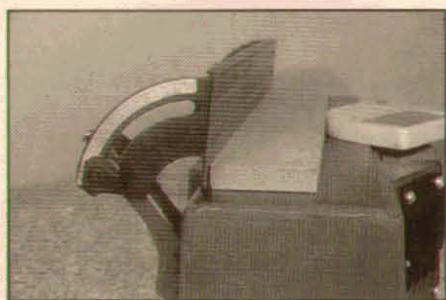
Fence on Delta has single-lever controls for tilt and across-table adjustment; fence tilts up to 45 degrees outward.

with the knives positioned at top dead center while you adjust the knife height to the outfeed table. Delta and Ryobi have thoughtfully provided a cutterhead lock to facilitate the process. All of the jointers come with the required blade adjustment wrenches. The Ryobi also comes with a plastic knife-setting gauge, although any good straightedge can be used to check the knife height.

A word about sharpening knives: When knives do need sharpening or replacement, you should sharpen or replace them both at once, as a set. Sharpening or replacing one and not the other can throw the cutterhead off balance, resulting in excessive vibration and poor cutting performance. When you buy a jointer, pick up a second set of knives so you can use the machine while you're having the first set sharpened.

Fences

On all of the jointers, the adjustable fences tilt 45 degrees outward from the bed for making bevel and chamfer cuts. The fences on the AMT and Sears can also be adjusted up to 45 degrees inward toward the table; the Reliant fence adjusts 15 degrees inward. This inward fence adjustment provides much better



Reliant has simple tilt adjustment mounted at each end of the machine. You can set it for outward tilt to 45 degrees; inward tilt to 15 degrees.



Fence on AMT and Sears can be tilted inward up to 45 degrees for better support of narrow stock.

support for narrow stock, while the outward fence adjustment enables you to bevel wider workpieces.

While the Delta and Ryobi fences won't tilt inward, they are adjustable across the width of the table. This feature enables you to reposition the fence over "sharp" portions of the blade when jointing narrow stock, so the knives wear evenly.

The AMT, Sears, and Reliant machines have light-gauge steel fences; the Delta and Ryobi have cast aluminum fences, which I felt were more rigid and stable than the steel fences. I found the center-mounted fence on the Delta the easiest to adjust: One lever to lock the fence, the other to lock the fence location on the bed. The center mounted support design also assures that the fence locks exactly parallel to the jointer bed when you tighten the levers. The Ryobi uses a somewhat more clumsy sliding-rod fence mount, with two knobs and two levers, which you need to adjust separately to assure a perfectly aligned fence. Next to the Delta, the AMT and Sears fences ran a close second in ease of adjustment. All four machines have nearly identical fence mounting and adjustment systems, but the one on the Sears 23632

has positive stops at 0, 22½, 30, and 45 degrees, both inward and outward. (The Delta has adjustable positive stops at 0 and 45 degrees). The end-mounted fence on the Reliant appeared to be somewhat flimsy and harder to adjust, compared to the AMT and Sears.

Beds And Bases

Most jointers, including the AMT, Reliant and Sears machines in this review, have sturdy cast iron beds and bases. While cast iron construction provides excellent stability and reduces vibration, it also adds considerable weight to the machine. Delta and Ryobi have beds made of lightweight extruded aluminum. The Ryobi also has a replaceable stainless steel plate on the outfeed table to protect the planed surface of the stock from metal marks (take a piece of wood and rub it on an aluminum surface to see what I mean here.) The Delta has a sheet steel base cabinet; the Ryobi, a heavy-gauge plastic base cabinet. All this is to reduce weight, without sacrificing stability, which both machines have successfully accomplished.

When looking at any jointer, check the bed with an accurate straightedge, if possible, to make sure it isn't warped. Also check for cracked or damaged castings on the bed and base. All of the units I tested had perfectly flat beds, free of flaws; however, if you notice these defects, return or exchange the jointer.

Safety Features

The main safety feature on any jointer is the cutterhead guard: Before you use any jointer, make sure the cutterhead guard moves freely and has a firm spring return. The guard should be mounted close to the bed, but not rubbing against it. While all of the guards worked well on the machines tested, the guard return springs will lose their tension over a period of time, causing the guard to stay in the open position, or snap back slowly after you run the stock through the jointer. By all means, if the guard isn't working correctly, don't use the jointer until it is.

Better jointers usually have heavier return springs in the guards, which can be adjusted as they lose tension. I noticed this feature on the Delta. When I saw that the guard wasn't closing as fast as I thought it should, I simply moved one end of the spring to the next adjustment

hole on the guard's mounting bracket to correct the problem.

Also, because the Delta and Ryobi have fences that slide across the table, they both have rear cutter guards to cover the exposed blade behind the fence. A feature I liked on the AMT and Sears jointers: The guard has an adjustable stop that allows it to open only as far as the width of the stock being planed. While some woodworkers might consider it a nuisance to continually set



A set of push blocks is standard safety equipment on all the jointers tested. Using items such as these is one reason I still have all 10 of my fingers.

the stop for different-width boards, this feature eliminates the chance of accidentally pushing the guard open farther if your hand slips alongside the board while planing. It also enables you to lock the guard in the closed position to prevent the curious from opening the guard to see what's underneath. Even when the knives aren't moving, they're deceptively sharp and can give you a nasty cut.

Other safety features that come with all the jointers are the required "remove to lock" ON/OFF switches which are found on most other stationary machines, and a set of two push blocks. As the owner's manuals tell you, use the blocks (instead of your hands) to feed the stock when jointing wood narrower than 3 in. or planing wood thinner than 3 in. (see photo).

Dust Control

All of the jointers except the Delta have a rear chip discharge port that accepts standard 2½ in. shop vacuum hoses. The AMT and Sears jointers also come with a hose adapter fitting for 1¼ in. hose connections (see photo). The Delta



In addition to the standard 2 1/2 in. discharge, the AMT and Sears jointers come with a dust-port adapter to fit 1 1/4 in. vacuum hoses—a bit small for the amount of chips generated by these machines.

has its chip discharge on the left side of the machine, with an optional adaptor fitting for a 4 in. dust collector hose. During my tests, all the jointers generated mountains of chips and sawdust when facing boards over 2 in. wide. In my opinion, a 1 1/4 in. hose would clog

fairly quickly under these conditions, especially if connected to smaller shop vacuums, like the one I used on the AMT and Sears machines. I'd guess that some of the larger shop vacuums with 2 1/2 in. hoses could probably handle these machines. The dust collector hookup on the Delta makes the most sense, plus I liked the chip chute location, which blows the chips off the side of the bench, rather than behind it.

Editor's Choice

Of all the jointers I tested, the Delta has the best combination of features, not the least of which are an easily adjustable fence, easy-to-read depth-of-cut scale, and variable speed. All controls operated smoothly and accurately, making it a joy to use. However, the Delta is also the most expensive of the lot (unless you happen to find a good deal through one of the woodworking catalogs). If you're on a budget and don't need the full 6 in. capacity, I'd recommend the 4 1/8 in. Sears (model 23622). It's a sturdy little machine with a fully adjustable fence that makes sense (the same fence adjustment system found on the larger Sears and AMT machines).



Sources

AMT

Fourth Ave. & Spring St.
P.O. Box 70
Royersford, PA 19468
tel. 1-800-435-8665

Delta International

246 Alpha Drive
Pittsburgh, PA 15238
tel. (412) 963-2425

Reliant

Trendlines

375 Beacham St.
Chelsea, MA 02150
tel. 1-800-767-9999

Ryobi America Corp.

1424 Pearman Dairy Rd.
Anderson, SC 29625
tel. 1-800-323-4615

Sears

Sears Tower

Chicago, IL 60684
tel. 1-800-366-3000

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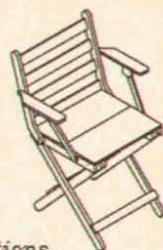


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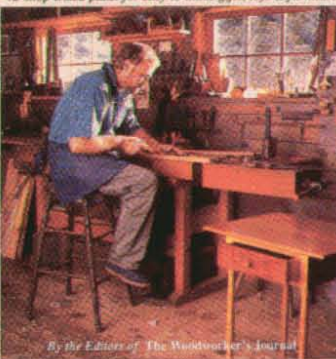
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101 Projects for Woodworkers



By the Editors of
The Woodworker's Journal

101 Projects for Woodworkers

For the eager amateur just starting out or the craftsman with a shop full of tools, 101 Projects For Woodworkers features an unparalleled 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

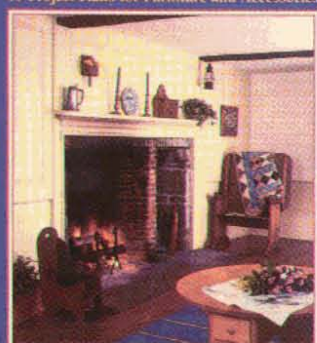


Projects for Woodworkers, Volume 1

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.

COUNTRY PROJECTS for WOODWORKERS

83 Project Plans for Furniture and Accessories



By the Editors of The Woodworker's Journal

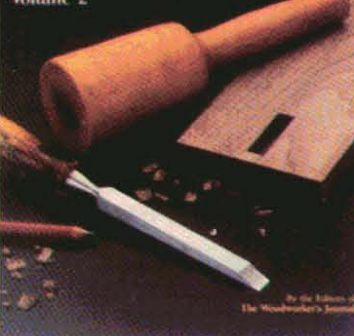
Country Projects for Woodworkers

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

Projects for Woodworkers

60 Project Plans for Furniture,
Toys, and Accessories

Volume 2

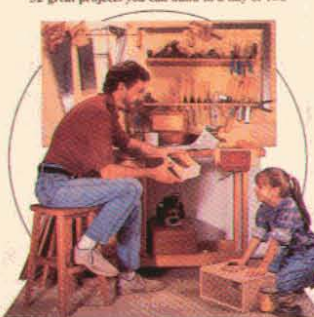


Projects for Woodworkers, Volume 2

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

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.

Projects for Woodworkers

60 Project Plans for Furniture,
Toys, and Accessories

Volume 3

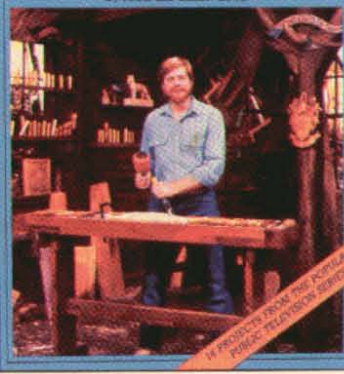


Projects for Woodworkers, Volume 3

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.

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By RICK and ELLEN BÜTZ



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Next issue . . .

Looking for a project that's a cut above the rest? Well, chances are you'll find one in our big upcoming March/April issue—an issue that's packed with projects you won't find anywhere else.

Leading off this very special issue is our **Ultimate Router Table**. Loaded with all the most desirable features, this oversize router table adds one more "extra" that really makes it valuable—it hangs up out of the way on the wall when you're done using it.

We've also lined up a sweet-sounding **Bowed Psaltery**, a handsome scroll-sawed **Seascope Clock**, and a super-handly **Recycling Center**. Add to all this several more great projects, plus our helpful articles—including the must-read feature "**Getting The Most From Your Portable Planer**"—and you'll know why we're so excited about the March/April issue.

Something extra! In the March/April issue, we'll introduce a great new feature—a **Bonus Full-Size Clip-n-Save™ Plan**. Don't miss this great issue!



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The 1994 index lists all projects and articles available in our back issues or books. Each project is listed alphabetically within categories. Some projects are listed more than once if they fit in more than one category.

Each project includes the title, volume and issue number or book code. The Back Issue Chart serves as a guide between volume/issue and year/month. The Book chart provides the codes we used for each book title in the index.

Please use the order form and envelope found in the center of this issue, or write directly to **The Woodworker's Journal**, P.O. Box 1629, New Milford, CT 06776. Include your street address for UPS shipping and allow 4 - 6 weeks for delivery.

BACK ISSUES							BOOKS	
	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec	Code	Book title
1985	N/A	N/A	9-3	N/A	N/A	9-6	A	Projects for Woodworkers, Vol. 1
1986	10-1	N/A	10-3	10-4	10-5	N/A	B	Projects for Woodworkers, Vol. 2
1987	N/A	11-2	11-3	11-4	11-5	11-6	C	Projects for Woodworkers, Vol. 3
1988	12-1	12-2	12-3	12-4	12-5	12-6	D	Woodworker's Project Book
1989	13-1	13-2	13-3	13-4	13-5	13-6	E	Country Projects for Woodworkers
1990	14-1	14-2	14-3	14-4	14-5	N/A	F	101 Projects for Woodworkers
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1992	16-1	N/A	16-3	16-4	16-5	16-6	H	Heirloom Projects for Woodworkers
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(Wall hung)	
Mug Rack	A
Plate Rack, Oak	14-4
Plate Shelves	10-1
Quilt Crane	17-5
Wall Shelf, Deacon's	A, E
Wall Shelf, Early American	A, E
Wall Shelf, 20" wtdh	C, E
Wall Shelf, Old-Time Sled	G
Wall Shelf, Pine	F
Wall Shelves, 18th C, 3-tier	A, E
Wall Unit, Early American	C, E
1-Tier Wall Shelf w/ Pegs	11-6
2-Tier Wall Shelf w/ Towel Rack	13-3
2-Tier Wall Shelf, 2-Drawer	G, 11-2
Collector's Plate Stand	C
Curio Shelves, 3-tier wall hung	A, E

Wall Desk, Ash	15-1
Wall Shelf w/ 3 Mirrored Panels	11-2
Wall Shelf, Victorian	H, 14-3
Wall Shelf, Victorian	17-6

Boxes & Baskets

Basket, Canada Goose	G, 10-3
Basket, Clamdigger's	G, 10-4
Basket, Collapsible	17-3
Basket, Country (Apple)	G, 11-4
Basket, Harvest (Pumpkin)	D, 12-5
Bowl, Turned	D, 12-4
Bowl, Turned, Laminated	C
Box, Bandsawn	C
Box, Contemporary, small	D, 12-2
Box, Flip-Top, Laminated	B
Box, w/ Marquetry Top	15-1
Boxes, Band Sawn	B, E
Boxes, Mitered (4 x 4 x 2")	D, 12-4
Bricklaid Bowls	17-6
Candle Box	F
Candle Box	B, E
Canister Set w/ Dovetail-keys	11-3
Card Box	9-3
Carrier, Shaker (Basket)	D, 12-2
Chest, Miniature Empire	A
Coal Scuttle	C, E
Country Bucket Basket	G, 10-4
Heart Box, Bandsawn	16-1
Jewelry Box	G
Jewelry Box w/ Sliding Tray	17-6
Jewelry Box, Musical	A
Jewelry Box, Heirloom	16-6
Jewelry Box, Musical	15-6
Jewelry Box, Laminated	13-6
Jewelry Chest	17-3
Jewelry Chest, 3-Drawer	G, 11-6
Jewelry Chest, Chippendale	H, 13-3
Key Cabinet (11")	D, 12-2
Letterbox w/ Relief Carving	17-4
Mailbox, Lidded, Wall-hung	C, E
Matchbox	A, E
Mitten Box	C, E
Pencil Box, Laminated	13-5
Pipe Box	D, 12-3
Pipe Box, Colonial	E
Pipe Cabinet	F
Portable Chest, Shaker	F
Radio Case, Old-Time	B
Rake, Cranberry	10-5
Salt Box	D, 12-3
Slipcase, Magazine	17-5
Small Chest, Pennsylvania	H
Spool Chest, Inlaid	F
Tray, Antique, Knife & Fork	12-3
Tray, Antique, Knife & Fork	A, E
Treasure Chest	F
Valentine Box	10-1
Vanity Case	G, 10-5
Wall Box, Colonial	F
Wall Box, Early American	G
Wall Box, Pine	E
Wall Box, 3-Drawer	
Country (17" hgt.)	D, 12-2
Woodbox, Shaker	E
Woodbox, w/ Drawer	G, 11-5
Woodbox, Shaker	14-5

Cabinets & Cupboards

Armoire, Pine	13-2
Armoire, Tabletop	14-3
Cabinet 2-door 2-drawer Shaker	17-3
Cabinet, Contemporary	A
Cabinet, Country Kitchen	B, E
Cabinet, Gun/Bookcase/Curio	15-5
Cabinet, Multipurpose	A
Cabinet, Pierced Tin w/ 2-doors	B, E



Shop
Work-
center
Jan/Feb
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Cabinet, Pierced Tin,	
(25" hgt) w/ 1 Drawer	D, 12-1
Cabinet w/ Louvered	
Doors, Wall-hung	15-5
Cabinet w/ Punched Tin Doors	14-5
Cabinet, Pine	C, E
Chest/Cupboard, Side-by-side	16-4
Curio Cabinet, Floorstanding	11-6
Curio Cabinet	H, 11-6
Corner Cupboard (28" hgt)	11-6
Corner Cupboard	17-4
Corner Cupboard, Pine	C, E
Cupboard, Country	F
Cupboard, Country (flatback)	D, 12-4
Cupboard, Pine, Shaker	A, E
Cupboard/Hutch, Early American	F
Cupboard, Slant-back	14-4
Dry Sink, Early American	12-3
Dry Sink, Colonial	F
Dry Sink, Early American	F
File Cabinet, Oak	B
Gun Cabinet	F
High Chest, Shaker	12-6
Hutch, Early American	16-5
Hutch-Cupboard, Pine	10-3
Ice Box, Old-Time	A
Pie Safe, w/ Pierced Tin Panels	13-4
Pie Safe, Pierced tin w/	
2-doors & 2-drawers	17-3
Pier Cabinet, Collector's	F
Pipe Cabinet	F
Record/Tape Cabinet	C
Sewing Cabinet w/ Tambour doors	A
Spice Cabinet, Punched Tin	C, E
Stepped-Back Hutch	B, E
Stereo Cabinet and Speakers	12-1
TV/VCR Cabinet w/	
Pocket Doors	14-5
TV/VCR Cabinet, Swivel w/	
Casters and Tape Rack	11-4
Vegetable Bin w/	
Carved Doors	G, 11-3
Vegetable Bin w/	
Pierced Tin Doors	D, 12-6
Vegetable Bin, Country	E
Water Bench, 18th Cent	F
Woodbox, Pine w/ Drawer	11-5

Cabinets (wall-hung)

Cabinet w/ Recessed Finger Pulls	9-3
Cabinet, Shaker, Peg-hung	13-1
Cabinet w/ Drawer &	
Tinsel Art Panel (20")	13-4
Cabinet w/ Louvered door	F
Cabinet w/ Louvered Doors	15-5
Corner Cupboard, Early Amer	B, E
Corner Shelf, 18th -Cent	B, E

Display Cabinet	10-4
Key Cabinet (11" hgt)	12-2
Medicine Cabinet w/ Towel Rack	G, 11-3
Wall Cabinet, Pierced Tin	E
Wall Cabinet w/ Reverse	
Glass Stencil	C, E
Wall Cabinet, Router-built	16-6
Wall Shelf, Victorian	H, 14-3

Carving Projects

Alvah Dunning & Hound, Whittling	J
Cardinal, Wildlife	J
Driftwood Troll, Relief	J
Decoy, Merganser Duck	J, 13-1
Duck Decoys (2)	F
Eagle	C
Father Christmas Carving	15-6
Hamper/Trash Container	
w/ Carving	11-4
Incised Carving, How-to	11-4
Incised Lettering	17-4
Loon Carving	D, 12-3
Love Spoon, Chip Carving	J
Lynx, Wildlife	J
Mountain Scene, Relief	17-4
Pineapple	J, 14-5
Quilt Rack, Floorstanding,	
w/ Chip Carving	J
Russian Dancing Bears, Whittling	J
Salt Box, Chip Carving	J
St. Nicholas Carving	J, 13-6
Santa Carving, Butz Collection	17-6
Spice Rack, 3-Shelf	
w/ Chip Carving	11-5
Swedish Folk-Art Doll House,	J
Thoroughbred Horse, Relief	J
Tobaccoist's Indian, Relief	J
Vegetable Bin w/ Incised Carving	11-3

Chairs, Stools & Benches

Adirondack Chair	G, 10-4
Adirondack Lawn Chair	F
Adirondack Settee	13-2
Bench, Colonial (footstool)	15-5
Bench, Country	10-1
Bench, Early American	G, 10-3
Bench, Provincial w/ Slip Seat	15-1
Bench, Santa Fe	14-2
Buckboard Seat	B, E
Chair, Moravian (Side Chair)	9-6
Chair, Santa Fe (Arm Chair)	15-1
Chair & Table Set, Child's	13-1
Chair, Pine	F

Chair-Table, 18th Cent	A, E
Footstool, Dovetailed	B, E
Footstool, Empire	B
Footstool, Pine	B
Garden Bench & Table, English	11-2
Garden Chair & Table, Teak	14-3
Glider, Lawn, w/ Canopy	16-4
Gossip Bench	F
Gossip Bench, Country	17-4
Library Stool	A
Long Bench, Shaker	13-4
Love Seat, Contemporary	11-5
Patio Settee, Divided	F
Rocker Footrest	A
Side Chair, Shaker Slat-back	10-4
Sleigh-Seat, 18th Cent	A, E
Step-Chair, 19th Cent	B, E
Step Stool/Chair, Convertible	16-5
Step Stool, Shaker	F
Stool, Queen Anne	F
Stool, Shaker, 2-Step	G, 11-5
Stool, Heart, 1-Step	D, 12-4
Stool, High	G, 10-5
Stool, Joint (Jacobean)	9-3

Chests

Apothecary Chest	F
Apothecary Chest, 7-Drawer	G, 11-4
Bachelor's Chest, Chippendale	10-1
Blanket Chest w/ Drawer, Colonial	10-5
Blanket Chest w/	
Inset Boxes, Shaker	11-1
Blanket Chest	F
Blanket Toy Chest	B, E
Blockfront Chest	17-5
Chest, Early American	B
Chest, Spanish	F
Chest, Small, Chippendale	H, 13-5
Chest, Toy or Blanket	15-6
Chest of Drawers, Weaver's	14-1
Chest of Drawers, Danish	B, E
Chest of Drawers, Shaker	C, E
Chest/Cupboard, Side-by-side	16-4
Dry Sink, Early American	D, 12-3
Highboy	H
High Chest, Shaker	12-6
Icebox, Old-Time	17-6
Ice Chest w/ Faux-Marble Top	13-5
Lingerie Chest, (7-drawer)	H, 16-3
Pennsylvania Small Chest	H
Portable Chest, Shaker	F
Spool Chest, Inlaid	F
Storage Seats (Toy Boxes)	13-3
Treasure Chest	F

Children's Furniture

Bookends, Puss'n Books	12-1
Carousel Lamp, Child's	12-6
Cart, Toddler's	14-2
Chair & Table Set, Child's	13-1
Chest, Toy	15-6
Cradle, Swinging, Spindled	B
Cradle, Swinging,	
Contemporary	12-6
Cradle, Swinging, Slatted	9-3
Cupboard, Stepped-back	
(child size)	14-3
Desk & Bench, Little Folks'	15-6
Kitchen Playcenter	16-5
Platform Bed, Twin w/ Drawers	11-5
Rocker, Child's	A, E
Settee Bench, Child's	10-1
Step Stool, Child's	A
Storage Seats (Toy Boxes)	13-3
Table & Chair Set, Child's	13-1
Toy/Blanket Chest	B, E
Windsor Chair, Child's	16-5

Clocks

Black Forest Clock	A
Cedar Clock, Rough-sawn	B, E
Clock, Contemporary	C
Captain's Clock (9" dia.)	12-5
Country Curio Clock	16-3
Crystal Regulator Clock	12-2
Desk Clock	17-1
Desk Clock, Oak	B
Disc Clock	G, 10-4
Grandfather Clock, Chippendale	H
Hourglass	14-2
Hutch Clock	B, E
Kitchen Clock, 19th Cent	E
Lyre Clock	B
Mantle Clock, 17th Cent	A
Steambent Clock, Desktop	10-3
Tall Clock, Early Amer. (82" hgt)	9-6
Tall Clock, Shaker	14-3
Tile Clock	A
Vienna Regulator Clock (40")	H, 11-3
Wall Clock	F
Wall Clock w/ Dyed Veneer	9-3
Wall Clock, Book Match Veneer	9-6
Wall Clock, Pine (20" hgt)	13-1
Wall Clock, Shaker	E
Wall Clock, Shaker (33" hgt)	12-1

Decorative & Ornamental

Aeolian Wind Harp	16-4
Arrow Wall Decoration	12-2
Bud Vase	A
Bud Vase	D, 12-3
Christmas Ornament, Treetop	12-6
Country Village	
Doorway Ornament	13-2
Cow, Folk Art	13-2
Door Harp	G
Door Stop, Rooster, Folk Art	11-2
Door Stop, Apple	13-5
Flower Cart, Miniature	13-4
Globe Stand, Floorstanding	13-5
Grain Scoop	A, E
Intarsia Eagle	17-5
Intarsia Raccoons	16-3

Nativity Scene, Scroll-sawn	16-6
Noah's Ark & 33 Animals	17-6
Picture Frames, 4 Easy	15-4
Picture Frame Primer	F
Quilt Crane	17-5
Silhouette, Whale, Folk Art	G, 10-5
Silhouette, Gabriel, Folk Art	G, 11-6
Silhouette, Tulip, Folk Art	D, 12-3
Silhouette, Rooster, Folk Art	D, 12-5
Spoon Rack, Early American	C, E
Thermometer, Anchor	A
Tree Ornaments	B
Treetop Christmas Ornament	D, 12-6
Vessels, Faux-turned, Four	15-6
Wall Key, Decorative	13-3
Wall Sconce, Colonial	12-6
Weather Forecaster, Old World	C
Weather Station	A
Weather Station, Ship's Wheel	B
Weather Vane, Arrow	F
Weather Vane, Codfish	F
Weather Vane, Horse	F
Weather Vane, Sailing Ship	B, E
Weather Vane, Snake	F
Whirligig, Kicking Donkey	G
Windmill, Catboat	F
Window Valance	16-1

Desks

Bookcase Desk, Contemporary	12-5
Desk on Frame, Tambour Top	H, 10-5
Desk, Countinghouse	F
Desk, Rolltop	F
Desk, Shaker	C, E
Lap Desk, Shaker	10-3
Lap Desk	F
Lap Desk, Pine	F
Little Folks' Desk & Bench	15-6
Oak Writing Desk	A
Schoolhouse Desk, Pine	A, E
Secretary Desk w/ Paneled Doors	H, 13-6
Sewing Desk, Shaker	11-2
Shaker Slant-top Desk	9-3
Slant-front Desk, Gov. Winthrop	H, 16-6
Tambour Desk	B
Tambour (Rolltop) Desk	10-5
Wall Desk, Ash	15-1
Wall Secretary, Early Amer	C, E
Writing Desk	E
Writing Desk, Contemporary	B
Writing Desk, Country Pine	15-6

Desktop

Bank, Walnut	A
Bookends, Puss 'n' Books	D, 12-1
Bookrack, Lamin'd	A
Calculator Stand	A
Desk Caddy	B
Desk Calendar w/ Pen & Pencil Holders	11-4
Desktop Bookcase	17-4

Desktop Organizer	9-6
Desk Trays, Stacking	13-5
Dictionary Stand, Tabletop	G, 10-4
Key Cabinet (11" hgt.)	12-2
Letter Opener	C
Message Cube	A
Note Caddy	A
Pencil Box w/ lid	13-5

Piggy Bank	D, 12-4
Stamp/Clip Box, Contemporary	12-2
Sunset Rider Desk Set	17-5
Tape Dispenser	10-1

Household

Audio/Video Remote Rack	16-4
Basket, Canada Goose	10-3
Basket, Clamdigger's	10-4
Basket, Country (Apple)	11-4
Basket, Harvest (Pumpkin)	12-5
Bellows, Fireplace	A, E
Bowl, Turned	12-4
Breadbox, Butternut	16-3
Butcher Block Cart, Kitchen	9-3
Canister Set, Key Dovetails	11-3
Card Box	9-3
Coaster Set, Marquetry	13-5
Coffee Mill	G, 10-4
Collector's Plate Frame	B
Condiment Holder	10-3
Cranberry Rack	G, 10-5
Firewood Rack	B, E
Flower Cart, Miniature	13-4
Globe Stand, Floorstanding	13-5
Gumball Machine	15-4
Hourglass	14-2
Ironing Board, Wall Hung	14-1
Key Cabinet (11" hgt.)	12-2
Key Holder	C, E
Knife & Fork Tray	D, 12-3
Lamp, Hurricane	15-6
Letter Rack	A
Magazine Rack, Floorstanding	12-4
Mortar & Pestle	G, 10-5
Mug Rack	A
Napkin Holder, Pineapple	11-3
Napkin Holder w/ leather	16-3
Picture Frames, 4 Easy	15-4
Pipe Box, Old-Time	12-3
Plastic Bag Handle	16-5
Plastic Bag Recycler	15-6
Quilt Rack	A, E
Quilting Frame	F
Serving Cart, Contemporary	11-3
Serving Tray, Oriental	10-1
Sewing Desk, Shaker	11-2
Spoon Rack	A, E
Spoon Rack, Colonial	F
Step Stool	15-1
Tape Dispenser	10-1
Tissue Box Cover	14-1
Towel Bar w/ Glass Shelf	9-3
Towel Racks (2)	G, 11-6
Towel Rack w/ Swinging Arms	13-6
Tray, Bed & Breakfast	13-6
Trivets, Routed	11-5
Trivets, Slatted Half-lap	13-2
Vases & Vessels, Faux-turned	15-6
Wall Sconce, Colonial	9-3
Wall Sconce w/ Chimney	12-6
Window Valance	16-1
Wine Glass Holder	A
Wine Rack	C
Wine Racks, Stacking	G, 11-6
Woodbox w/ Drawer	11-5
Woodbox, Shaker	14-5

Jigs

Drill Press Angle Fixture	12-1
Doweling Jigs	17-3
Jig, Key Spline	D
Lathe Spigot Chuck	15-4
Leg Tapering Jig	11-6
Miter Clamping Jig	9-3
Miter Cutting Jig	12-5
Super Box Joint Jig	17-5

Table Saw Cross Cut Box	12-6
Table Saw Jigs	15-5
Tenon Jig, Fence-mounted	10-4

Kitchen

Apothecary Chest, 7-dwr	11-4
Bowl Slicer	A
Bowl, Turned	12-4
Breakfast Tray w/ Marquetry, Adjustable	13-6
Butcher Block Cart	9-3
Canister Set	11-3
Canning Jar Storage Shelves	C, E
Casserole Dish Holder	B
Coaster Set, Marquetry	13-5
Coffee Mill	G, 10-4
Condiment Holder (Miniature Picnic Table)	G, 10-3
Cookbook Holder	D, 12-1
Cookie Jar Holder	14-2
Cooling Rack	15-5
Cutlery Tray, English	H, 14-5
Cutting Board, Cheese	B
Cutting Board, Onion	F
Cutting Boards	A
Cutting Boards, Decorative	D, 12-4
Cutting Boards (landscape design)	9-6
Cutting Boards, Laminated	12-4
Dish Rack, Kitchen	A, E
Dish Towel Holder	B
Knife Rack, Butcher-Block	B
Knife Tray, Antique w/ Drawer	10-1
Knife Tray, Antique	12-3
Message Center	17-1
Mortar & Pestle	10-5
Napkin Holder, Bandsawn	14-1
Napkin Holder, Pineapple	G, 11-3
Napkin Holder, Prancing Pony	15-4
Napkin Holder, Pussycat	17-4
Napkin Holder	16-3
Paper Towel Holder	F
Pie Safe w/ 8 Pierced Tin Panels	13-4
Plastic Bag Recycler	15-6
Plate Rack, Oak	14-4
Recipe Box	15-5
Salad Tongs	15-5
Serving Board	15-5
Serving Cart, Contemporary	11-3
Spaghetti Measure	B
Spice Rack w/ Chip Carving	11-5
Sushi Set	14-5
Tongs, Kitchen	13-4
Trash Container/Hamper	11-4
Trivets, Slatted w/ Half-lap Joints	13-2
Trivets, Routed	11-5
Trivet, Woodpile	B, E
Utensils, Kitchen	A
Vegetable Bin w/ Chip Carving	11-3
Vegetable Bin w/ Pierced Tin Doors	12-6

Lamps & Lighting

Candle Holders	16-4
5-Candle Holder	14-2
Candle Holder	B, E
Candle Lantern, Contemporary	F
Candle Sconce	F
Candlestick, Colonial	A, E
Candlesticks, Contemporary	13-1
Candlesticks, Turned, Early American (6" hgt)	D, 12-2
Carousel Lamp, Child's	D, 12-6
Cider Press Lamp	B, E
Geodesic Light Fixture, Hanging	B
Hurricane Lamp	15-6
Lamp w/ Floating Panels	
Contemporary	10-3



Old-Time Icebox Nov/Dec '93

Intarsia Toucan-on-a-Branch	16-1
Intarsia Whale	17-3
Jewelry, Pin & Earrings	12-1
Lamp, Hurricane	15-6
Longhorn Steer	A
Mobile, Canada Goose	G
Mobile, Scroll-sawn	17-1
Name Sign, Folk Art	13-4

Lamp, 4-Drawer, Traditional	D, 12-4
Light Fixture, Oak, Hanging	B
Ratchet Table Lamp	A, E
Table Lamp, End Grain	C
Table Lamp, Nautical	C, E
Table Lamp, Shaker	F
Table Lamp, Turned	C
Wall Sconce, Colonial	9-3
Wall Sconce, w/ Chimney	D, 12-6

Mirrors

Cheval Mirror	C
Early American Mirror, small	14-2
Contemporary Wall Mirror	13-3
Country Pine Mirror	16-1
Dressing Mirror, Cherry	F



Linenfold Carving Nov/Dec '92

Hall Mirror, Oriental	13-2
Hand Mirror	A
Hand Mirror, w/carving	C, E
Infinity Mirror	B
Medicine Cabinet w/ Towel Rack	11-3
Mirror Frame, Pine	F
Mirror w/Shelf, Pine	C, E
Mirror, 18th Cent	F
Mirror, Chippendale	C
Mirror, Early American	E
Mortise & Tenon Mirror	14-1
Sunburst Mirror	14-4
Tinsel Art Mirror	C
Vanity, 18th, Tabletop	A, C
Vanity Case w/Mirror	10-5
Vanity Mirror, Tabletop	9-3
Vanity Mirror w/Drawer (9" hgt)	G, 11-4
Mirrored Wall Shelf, 3-Panel	G, 11-2
Windowpane Mirrors	17-6

Musical Instruments & Accessories

Aeolian Harp	F
Aeolian Wind Harp	16-4

Audio/Video Remote Rack	16-4
Box Drum	13-6
Cassette Tape Holder	G
CD Carousel	17-1
Compact Disc Holder	14-1
Door Harp, Swedish	F
Dulcimer	9-6
Dulcimer, Mountain	15-4
Dulcimer	17-1
Folk Fiddle	14-2
Folk Harp, Flemish	12-2
Record and Tape Cabinet	C
Record & Tape Cabinet	F
Stereo Cabinet & Speakers	12-1
Stereo/End Table	F

Outdoor

Adirondack Chair	10-4
Adirondack Settee	13-2
Barbecue Tray	14-4
Bike Rack	A
Birdhouse, Tudor	F
Birdhouse, Greek Revival	13-2
Bobsled, Child's	13-6
Deck Table, Folding	14-4
Garden Bench & Table, English	11-2
Garden Chair, Table & Planter	14-3
Lawn Glider, Canopied	16-4
Loon Carving	12-3
Name Sign, Colonial	14-4
Table, Garden, w/ Bench	11-2
Porch Swing	17-3
Sled, Victorian	A, E
Sun Seat, Folding	A
Swing, Porch	F
Swing, Porch	C
Table, Picnic	16-3
Whirligig, Fisherman	15-4
Whirligig, Wood Sawyer	11-2

Personal Accessories

Back Massager	C
Back Massager, Rolling	13-3
Belt Buckle & Bolt Set, Western style	16-4
Belt Rack	A
Bootjack	C, E
Earrings and Pin	D, 12-1
Jewelry Box, Heirloom	16-6
Jewelry Box, Laminated	13-6
Jewelry Box, Musical	15-6
Jewelry Chest, 3-drawer	11-6
Jewelry Chest, Chippendale	13-3
Pin and Earrings, Jewelry	12-1
Shoehorn, Laminated	B
Vanity Mirror	9-3
Vanity Mirror w/Drawer	11-4
Valentine Box	10-1
Wooden Combs	A

Planters

Bud Vase	12-3
Flower Cart, Miniature	13-4
Plant Stand	B, E
Plant Stand	14-2
Planter, Fret-Sawn	C
Planter, Latticework	G, 10-4
Planter, Octagonal	B
Planter, Pulley	F
Planter, Salt Box	C, E
Planter Box, Teak	14-3
Vases & Vessels, Faux-turned	15-6

Wall Planter, Lighted	C
Wheelbarrow Planter	G, 11-3

Tables, Trays, Stands & Carts

Bake-room Table, Country	13-5
Bench, Colonial	15-5
Breakfast Tray, Adjustable	13-6
Breakfast Tray, Folding	B
Butcher Block Cart, Kitchen	9-3
Butler's Tray Table	F
Butler's Tray Table	C
Chess Table	B
Child's Table & Chairs	13-1
Cobbler's Bench Coffee Table	A, E
Coffee Table	F
Coffee Table, Contemporary	F
Coffee Table	10-5
Coffee Table, Country, w/ Drawer	D, 12-5
Coffee Table, Glass-top Contemporary	12-1
Cube Table	F
Curio Table	F
Dining Table	9-6
Display Pedestal	G, 11-3
Display Pedestal	C
Drop-leaf Dining Table	16-1
Drop-leaf Table (double) w/ Drawers, Shaker	10-1
Drop-leaf Table (single) w/ Drawer, Shaker	10-5
Drop-leaf Table, Shaker	15-4
End Table	17-1
End Table, Contemporary	F
End Table, Doughboy	E
End Table, Early American	G
End Table, Shaker	D, 12-4
End Table, Veneered	B
End Table, Zebrawood Veneer	G
Extension Table, Dining, Oval	13-3
Farm Table	17-5
Garden Table & Bench, English	11-2
Garden Table & Chair, Teak	14-3
Gate-leg Table	H
Half-Round Table	A, E
Half-Round Table, 18th Cent	F
Hall Table	E
Hall Table, Contemporary	11-2
Harvest Table, Early American	F
Harvest Table	14-4
Hunt Table	D, 12-3
Hutch Chair/Table	F
Nesting Tables	C
Nightstand, Pencil Post	D, 12-5
Occasional Table, Cherry	13-1
Occasional Table, Shaker	12-4
Occasional Table w/Shelf, Country	D, 12-1
Oriental Table	C
Parson's Table	F
Parsons Table	10-3
Pedestal Table, Oak	C
Picnic Table w/Attached Benches	16-3
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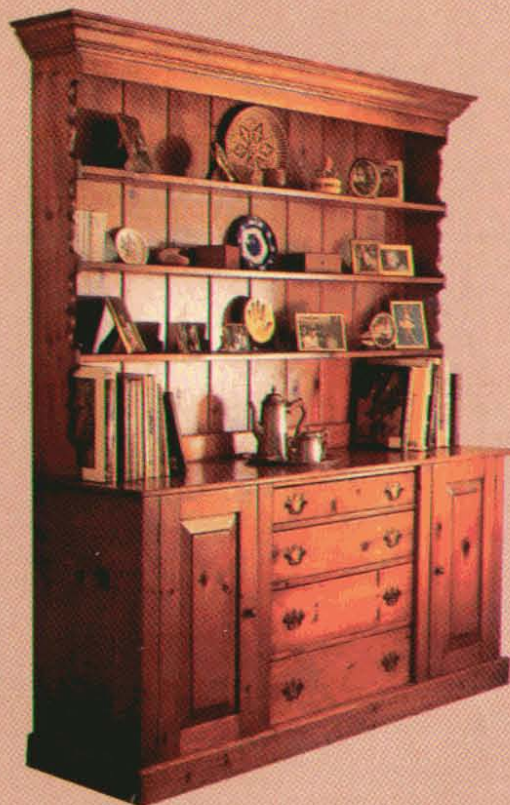
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Wall Cabinet w/Recessed Finger Pulls, Shaker Desk, Kitchen Cart, Contemporary Wall Clock, Colonial Wall Sconce, Card Box, Towel Bar w/ Glass Shelf, Marble Race Toy, Cradle, Vanity Mirror, Miter Clamping Jig, Jacobean Joint Stool; *Articles:* Product Liability: Part I; Restoring an Antique Frame; Coping w/Wood Movement; Making Recessed Finger Pulls.

Vol. 9 No. 6 Nov-Dec '85

Dulcimer, Dining Table, Shaker Washstand, Marking Gauge, Veneered Wall Clock, 4 x 4 Off-Roader, Teddy Bear Puzzle, Duck Pull-Toy, Landscape Cutting Boards, Early Amer. Tall Clock, Desk Organizer, Moravian Chair; *Articles:* Weaving a Rush Seat, Part I; Table Saw Ripping Problems/ Solutions; 4-Piece Book Match Veneering; Running a Profitable Business.

Vol. 10 No. 1 Jan-Feb '86

Chippendale Bachelor's Chest, Oriental Serving Tray, Country Bench, Antique Knife Tray, Tape Dispenser, Valentine Box, Toy Tow Truck & Car, Shaker Drop-leaf Table, Shop-made Bow Saw, Child's Settle Bench, Plate Shelves, Freestanding Shelf System; *Articles:* Getting Paid for Your Work; Weaving a Fiber Rush Seat, Part II; Table Saw Crosscutting; Router-Lathe Fluting

Vol. 10 No. 3 May-June '86

Contemporary Lamp, Early Amer. Bench, Steam-bent Clock, Pine Hutch, Goose Basket, Toy Crane, Condiment Holder, Shop Workstation, Parson's Table, Shaker Lap Desk, Victorian Whatnot Shelf; *Articles:* Toymaker Clare Maginley; Flattening Warped Boards; Choosing a Router; Supported Steam Bending.

Vol. 10 No. 4 July-Aug '86

Wall-Hung Display Cabinet, Latticework Planter, Country Bucket Bench, Adirondack Chair, Coffee Mill, Clamdigger's Basket, Box of Shapes Toy, Disk Clock, Tenon Jig, Dictionary Stand, Shaker Slat-Back Side Chair; *Articles:* Selecting a Production Project; More About Warped Boards; About Router Bits; Sliding Dovetail Joints.

Vol. 10 No. 5 Sept-Oct '86

Vanity Case, Stool, Coffee Table, Blanket Chest, Mortar and Pestle, Whale Folk Art Silhouette, Toy Wagon, Cranberry Rake, Router Bit Box, Shaker Drop-Leaf Table, Desk with Tambour Top; *Articles:* Are Your Prices Competitive?; Restoring a Rosewood Chair; Basic Router Operations; Making Tambour Doors.

Vol. 11 No. 2 Mar-Apr '87

Garden Bench & Table, Mirrored Wall Shelf, Rhombohedron Puzzle, Wood Sawyer Whirligig, Folk Art Doorstop, Kangaroo Pull Toy, Colonial Wall Shelf, Contemp. Hall Table, Shaker Sewing Desk; *Articles:* Direct Mail Promotion; Finishes; The Mortise & Tenon, Part II; Bevel-Edged Drawer Bottoms.

Vol. 11 No. 3 May-June '87

Kitchen Canister Set, Riding Biplane, Contemporary Serving Cart, Napkin Holder, Decorative Planter, Country Vegetable Bin, Medicine Cabinet, Drum Sander, Vienna Regulator Clock, Display Pedestal; *Articles:* Penetrating Oils; The Jointer; Veneer, Part I; Dovetail Key Butt-Miter.

Vol. 11 No. 4 July-Aug '87

Early American Bookcase, Trash Container, Low-Cost Workbench, Country Basket, Desk Calendar with Pen & Pencil, Butterfly Pull Toy, Vanity Mirror with Drawer, Apothecary Chest, TV/VCR Cabinet; *Articles:* Shellac; The Hand Plane; Veneer, Part II; Incised Carving.

Vol. 11 No. 5 Sept-Oct '87

Contemporary Love Seat, Two-Drawer Platform Bed, Snail Pull Toy, Routed Trivets, Spice Rack with Chip Carving, Joiner's Tool Chest, Shaker-style Step Stool, Turned Shop Mallets, Woodbox; *Articles:* French Polishing Made Easy; Plane Iron Sharpening; Making a Splayed Leg Drill Guideblock; Traditional Chip Carving; Shop-Tested: 12 Jigsaws; Making the Knuckle Joint.

Vol. 11 No. 6 Nov-Dec '87

Rocking Horse, 3-Drawer Jewelry Chest, Tapering Jig, Rolling Toy, Folk Art Silhouette, Two Towel Racks, Early American Wall Shelf, Corner Cupboard, Stacking Wine Racks, Curio Cabinet; *Articles:* Glues & Gluing; Band Saw Setup; Making the Continuous Bracket Foot; Step-by-Step to a Flawless Finish.

Vol. 12 No. 1 Jan-Feb '88

Contemporary Coffee Table, Puss 'n Books Bookends, Cookbook Holder, Wooden Jewelry, Child's Duck Puzzle, Shaker Wall Clock, Stereo Cabinet & Speakers, Country Occasional Table, Drill Press Jig, Pierced Tin Cabinet; *Articles:* Edge Gluing; The Drill Press; Pierced Tin; Four Shopmade Finishes.

Vol. 12 No. 2 Mar-Apr '88

Oak & Glass Tier Table, Crystal Regulator Clock, Early American Candlesticks, Arrow Wall Decoration, Three-Drawer Country Wall Box, Key Cabinet, Contemporary Box, Shaker Carrier, Folk Harp; *Articles:* Use and Sharpening of the Hand Scraper; The Lathe: Basic Setup; Quartered Turnings; Lacquer.

Vol. 12 No. 3 May-June '88

Loon Carving, Early American Dry Sink, Contemporary Dresser, Old-Time Pipe Box, Antique Knife & Fork Tray, Dutch Tulip Folk Art Silhouette, Colonial Salt Box, Bud Vase, Miter Gauge Stop, Hunt Table; *Articles:* Spindle Turning; Selecting and Sharpening Lathe Tools; Recessed Finger Pull Step-by-Step; Coloring Wood: An Overview.



Collapsible Basket May/June '93

Vol. 12 No. 4 July-Aug '88

Magazine Rack, Occasional Table, Mitered-Corner Box, Heart Stool, Decorative Cutting Boards, Piggy Bank, Turned Bowl, Country Cupboard, 4-Drawer Lamp; *Articles:* Faceplate Turning; Workshop Layout; Dovetails on the Table Saw; Staining Basics.

Vol. 12 No. 5 Sept-Oct '88

Miter Cutting Jig, Captain's Clock, Country Coffee Table, Rooster Folk-Art Silhouette, Harvest Basket, Bird Push Toy, 18th-Century Pencil Post Bed and Nightstand, Bookcase Desk; *Articles:* Wood Movement; Joining Ring Segments; Drill Bits; Filling Open-Grained Woods.

Vol. 12 No. 6 Nov-Dec '88

Shaker High Chest, Table Saw Crosscut Box, Country Vegetable Bin, Whale Pull Toy, Colonial Wall Sconce,



TV/VCR Cabinet Jul/Aug '87

Treetop Christmas Ornament, Classic Pickup Truck, Contemporary Cradle, Child's Carousel Lamp; *Articles:* Flattening Wide Surfaces w/the Hand Plane; Making a Cove-Edged Raised Panel: Core-Box Bit Method; Polyurethane; Sander for Large Surfaces.

Vol. 13 No. 1 Jan-Feb '89

Shop-built Disk Sander, Cherry Table, Wall Clock, Rock & Roll Toy, Contemporary Candlesticks, Merganser Decoy, Child's Table & Chairs, Shaker Wall Cabinet; *Articles:* Buying Hardwood Lumber; The Thickness Planer; Breadboard Ends; Ebonizing.

Vol. 13 No. 2 Mar-Apr '89

Adirondack Settee, Country Village, 18th-Century Tilt-Top Table, Toy Fishing Trawler, Two Trivets, Folk-Art Cow, Greek Revival Birdhouse, Pine Armoire, Oriental Mirror; *Articles:* Transferring and Enlarging Patterns; Making Tripod Legs; Three Easy Finishes for Pine; The Portable Circular Saw.

Vol. 13 No. 3 May-June '89

Storage Seats, Table Saw Gauge, Oval Extension Table, Nessler Pull Toy, Back Massager, Decorative Wall Key, Country Wall Shelf, Contemporary Mirror, Jewelry Chest; *Articles:* Panel Retainer Disk System; Circular Saw Blades; Cutting Box Joints; Non-Toxic Finishes; Interview: Paula Garbarino.

Vol. 13 No. 4 July-Aug '89

Shaker Long Bench, Folk-Art Sign, Toy Farm Tractor and Wagon, Miniature Flower Cart, Kitchen Tongs, Wall Cabinet with Tinsel Art, Stacking Bookshelves, Country Pie Safe; *Articles:* Dealing with Uneven Wood; Tinsel Art; Coping with Your Radial-Arm Saw; Brushing Lacquer; A Visit to a Woodworking Show.

Vol. 13 No. 5 Sept-Oct '89

Country Bake-Room Table, Chippendale Small Chest, Stacking Desk Trays, Pencil Box, Apple Doorstop, Space Shuttle Toy, Marquetry Coasters, Ice Chest with Marbleized Top, Globe Stand; *Articles*: Table Saw Basics; Cutting Full-Blind Dovetails; Marquetry: The Pad Method; Marbleizing; Mount Lebanon Shaker Village: A Museum in the Making; Tool Review: Four Portable Planers.

Vol. 13 No. 6 Nov-Dec '89

Mission Style Trestle Table, Jewelry Box, Kids' Bobsled, St. Nicklaus Carving, Carousel Toy, Box Drum, Dancing Man Folk Toy, Towel Rack, Secretary Desk, Bed Tray; *Articles*: Mortising Butt Hinges; Dado Heads; Marquetry: The Empty Window Method; Aniline Dyes; Lynes Unlimited: Making Toys in a Kansas Chicken Coop.

Vol. 14 No. 1 Jan-Feb '90

Mortise & Tenon Mirror, Weaver's Chest of Drawers, Tissue Box Cover, Band-Sawn Napkin Holder, Grasshopper Pull Toy, Compact Disc Holder, Shop-Built Spindle Sander, Wall-Hung Ironing Board, Tavern Table; *Articles*: Clamps: One Shop Tool You Can't Do Without; How to Hang Wall Cabinets; Marquetry: The Direct Method; A Guide to Wax and Polish; Special Section: Back Issue Index.

Vol. 14 No. 2 Mar-Apr '90

Small Early American Mirror, Shop-Built Sanding Blocks, Cookie Jar Holder, Hourglass, Candle Holder, Toddler Cart, Folk Fiddle, Plant Stand, Santa Fe Bench; *Articles*: Making Drawers; Using Router Bits in the Drill Press; Finishing Outdoor Projects; Making Curved Instrument Sides; A Conversation with the Westovers.

Vol. 14 No. 3 May-June '90

Garden Table & Chair, Planter Box, Stackable Shoe Rack, Victorian Wall Shelf, Child's Stepped-Back Cupboard, Cat Push Toy, Tabletop Armoire, Shaker Tall Clock; *Articles*: Japanese Saws; Giving Oily Woods; Tung Oil; Make a Tombstone Frame & Panel Door; Woodworking and Rain Forests.

Vol. 14 No. 4 July-Aug '90

Slant-Back Cupboard, Folding Deck Table, Two Toy Dragsters, Colonial Sign, Barbecue Tray, Workbench Helper, Harvest Table, Plate Rack, Sunburst Mirror; *Articles*: Rasps; Safety: Workshop Finishes Pose Risks; Making the Dovetailed Wedge; Knock-Down Hardware.

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