

# The Woodworker's Journal

Vol. 12, No. 1 \$3.00



*Early  
American  
Pierced Tin  
Cabinet*

**Included in this issue: Shaker Wall Clock • Stereo Cabinet and Speakers  
Cookbook Holder • Country Occasional Table • Wooden Jewelry  
Drill Press Jig • Contemporary Coffee Table • Child's Duck Puzzle**

January/February 1988

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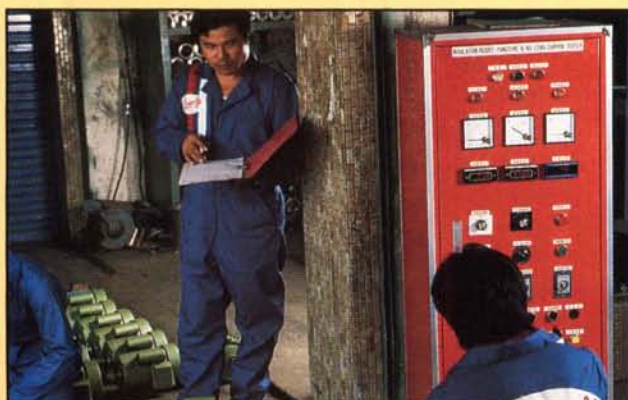
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# The Woodworker's Journal

JANUARY/FEBRUARY 1988 VOLUME 12, NUMBER 1

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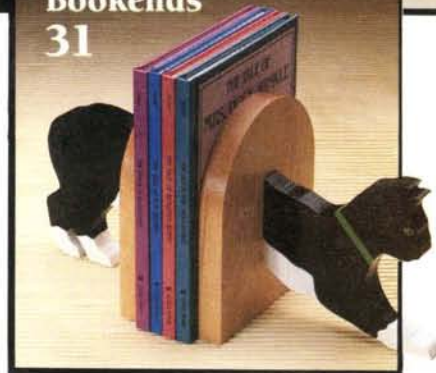
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*Contributions:* We welcome contributions in the form of manuscripts, drawings and photographs and will be glad to consider such for possible publication. Contributors should include a stamped, self-addressed envelope of suitable size with each submission. While we cannot assume responsibility for loss or damage, all materials will be treated with care while in our possession. Payment for the use of unsolicited material will be made upon acceptance. Address all contributions to: Editor, The Woodworker's Journal, P.O. Box 1629, New Milford, CT 06776.

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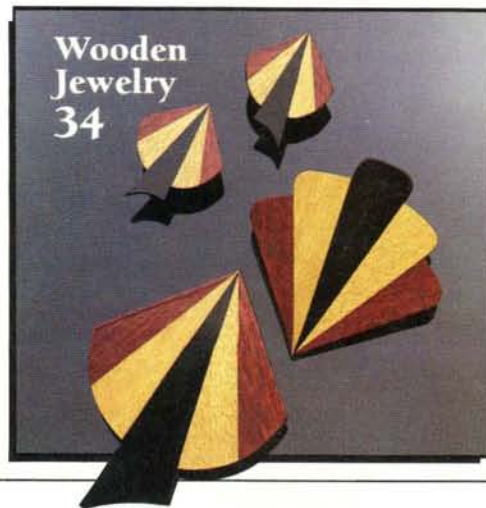
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# Shoptalk

## Scrollwork

Woodworking magazines of the 1930's and 40's were full of what were once called "novelty" projects that often required use of the scroll saw, or jigsaw, as it was referred to then. For some reason, scrollwork seemed to wane in popularity after the 1940's; maybe World War II wiped out our collective sense of the whimsical. But happily, with the introduction of some excellent machines to the market in recent years, this form of woodworking is making a comeback.

We've got two simple scroll saw projects this issue: the jigsaw puzzle and the cat bookends. We hope to introduce more advanced scroll saw projects, particularly those that use scrollwork as a decorative option.

## Sawblade Cleaners

A few years ago, woodworking students at the Rochester Institute of Technology in Rochester, New York, started using a product that the janitors were using for cleaning floors. The students found it cleaned gummed and burned circular sawblades better than the oven cleaners they had been using — and without noxious fumes. We compared it with oven cleaner and Formula 409, another cleaning product, and found that it works best in removing burned-on pitch with little or no scrubbing. Just spray it on, let it sit for a few minutes and rinse with water.

It's called TroubleShooter, and it's made by 3M. Although it's not available at supermarkets, you can get it

from most industrial cleaning supply firms listed in the Yellow Pages. A 23-ounce spray can costs about \$6.00 and should last for a couple of years.

## Warning Bells

At times I get the feeling that whenever I learn something new about woodworking, I simultaneously forget something else learned in the past. Like a gallon jug, my memory seems to spill out the excess when more is added. But some things are too important to forget . . . like stopping an operation when I get the feeling that it's too risky.

I'm sure you know what that feeling is like. You've turned on the table saw and started to feed the workpiece, but you've got to use a pushstick and maybe another stick to hold the work down and somehow the whole setup seems a bit on the shaky side. That's when the warning bells should start going off in your mind. The feeling is apprehension and it doesn't belong in woodworking.

I may forget about certain clever jigs and fixtures or the best way to perform a tricky operation, but I've never forgotten to stop and think when an operation seems doubtful. If a ripping cut is involved, I'll try to figure out the most secure way to feed the workpiece. Sometimes a simple fixture can convert a shaky rip fence cut into a safe crosscut utilizing the miter gauge. STOP AND THINK . . . and let's all make this shiny new year a safe and productive one.

*Jim McQuillan*

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# Letters

I'm building the Pine Medicine Cabinet project featured in your May/June 1987 issue, but I'm having difficulty locating the  $\frac{3}{8}$  in. offset hinges for the door. I've been able to locate several variations of this hinge, but not the one shown in the plan. Can you help?

Carl Feltham  
St. John's, Newfoundland

*The hinge we used can be ordered from The Woodworkers' Store, 21801 Industrial Boulevard, Rogers, MN 55374. It's their part no. D2541, and the cost is \$2.95 per pair.*

There is an error in the plans for the Rolling Toy project in your November/December 1987 issue. The drawing shows a  $\frac{3}{4}$  in. dimension from the end of pivoting dowels (B) to the centerpoint of the  $\frac{3}{8}$  in. hole. The  $\frac{3}{4}$  in. dimension should be  $\frac{5}{8}$  in., otherwise the pivoting dowel will extend beyond

the edge of the wheels (A) and the toy won't roll.

Jacob G. Schroeder  
Fort Collins, Colo.

I've been making door harps since 1979, but I no longer have a source of supply for the auto harp pins. Do you know where they can be ordered?

Allan Fulkerson  
Chicago, Ill.

*Auto harp pins, also called zither tuning pins, can be ordered from the company Folkcraft Instruments, Box 807, Winsted, CT 06098. Write for their current catalog.*

As the former Glue Blending Manager of the now defunct glue manufacturer, the Peter Cooper Corporation, I must take exception to the portion of your article "On Glues and Gluing" (November/December 1987 issue, page 12) that deals with animal glue.

Animal (hide) glues are made from the hides and connective tissue of animals, not hooves, as stated in the article.

Also, in the column headed "Work Assembly Time, Temperature," you indicate a pot life of about one week for animal glue. The standard procedure used by industry for centuries has been to only prepare enough glue for the job at hand. While the glue may be held at lower temperatures, say 130 degrees between operations, and warmed to 140 degrees when needed, any glue remaining in the pot at the end of the day must be thrown out. Animal glue is pure protein and, even though preservatives are added during manufacture, it is prone to bacterial growth. This bacterial growth not only imparts an offensive odor to the glue, it breaks down the long amino acid chains that are the bonding power of animal glue.

John M. Eberhardy  
Milwaukee, Wis.



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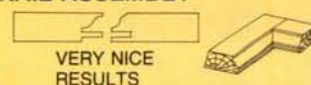
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Each school year for the past seven years, my 60-70 woodworking students have used *The Woodworker's Journal* as a continuing source for reference and ideas. Roughly one-third to one-half of our project ideas are taken from your magazine. Keep up the good work.

S. Chant  
Wyalusing Valley High School  
Wyalusing, Penn.

I recently purchased two hardwood tabletops. Where can I get legs for them?

Les Chaffin, Columbus, Miss.

Various hardwood table legs are available from the company Old Virginia Masters, P.O. Box 1144, Bedford, VA 24523.

Can you tell me where I can order a small quantity of tiger maple?

Brian Horan, Plano, Tex.

*Tiger maple, sometimes called curly or fiddleback maple, can be purchased from the Berea Hardwoods Company, 125 Jacqueline Drive, Berea, OH 44017.*

I am building the tambour desk project from your September/October 1986 issue, and all parts are completed except for the tambour top. I have been unable to find the "melt-type hide glue" called out in the article. Can you tell me where I can get it?

William B. Kyle, Boise, Idaho

*This glue is available from Constantine, 2050 Eastchester Road, Bronx, NY 10461. It's their "Cabinet Flake Glue," and a one-pound container (part no. 28FG5) is \$4.35 plus shipping (they have a minimum order requirement of \$10.00). A glue pot is necessary because the flakes are heated until they melt, then the glue is applied hot.*

I need a 24 in wide by 16 in. tall tambour for a kitchen cabinet. Do you know of a source for ready-made tambours?

Herbert Ahrent, Corning, Ark.

*Craftsman Wood Service Company, 1735 West Cortland Court, Addison, IL 60101 sells solid maple and oak tambours in two styles — flat and half-round. They come in 24 in. by 48 in. sheets, with a cost per sheet of \$99.50 for the flat style, \$119.95 for the half-round style.*

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Bill McCann, Cleveland, Ohio

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C.M. Smeigh  
Ft. Worth, TX

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A. Mortenson  
New Milford, CT

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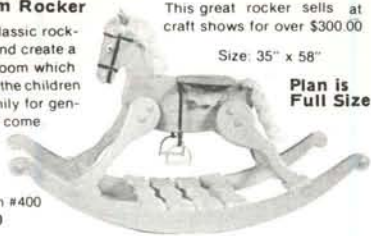
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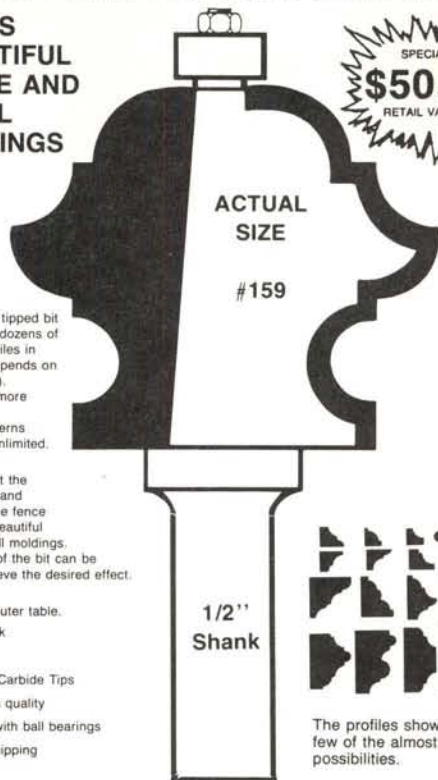
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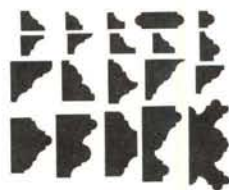


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Chicago	May 13-14-15	Pheasant Run Expo Hall, St. Charles	
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# Readers' Information Exchange

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 hopefully one of our readers will have an answer for you. Due to space limitations, we will be unable to list all requests, but we will include as many as we can.

In a recent Trend-Lines catalog, there is a drawing for a chest of drawers, plan no. PL122. However, on checking with the company, I find it is no longer available. Could anyone help me in locating this set of drawings?

David H. Eberle  
107 N. Pittsburgh St.  
Zelienople, PA 16063

I've had a Craftsman 12¼ in. wheel band saw, model no. 103.0103 sitting in my basement for the past five years. I tried to change the blade long ago and

I've had nothing but trouble since. The blade keeps flying off. I've put new rubber on the wheels, but I can't figure out how the knob that angles the wheel works. I bought the band saw second hand and it's done all kinds of work for me, but now I can't use it. Does anyone have an owner's manual for this saw?

Donald M. Supina  
5628 West Ave., Ashtabula, OH 44004

My grandfather left me his tools, but unfortunately I don't have any owner's manuals. I need manuals for a Craftsman floor model drill press, model no. 103.23141; a Craftsman lathe, model no. 113.23881; and a Craftsman 6 in. three-blade jointer, model no. 103.23900.

Bill Browning  
Box 1692, Natchez, MS 39120

Due to a fire loss, I need an owner's manual and parts list for a Craftsman jigsaw, model no. 103.23151.

L.E. Kuhn  
99 Hudson St., Port Jervis, NY 12771

I need an owner's manual and parts list for a Craftsman jigsaw, model no. 103.23390.

John L. Addison  
3016 W. Bloomfield  
Phoenix, AZ 85029

I'm looking for an owner's manual and parts list for my Craftsman wood lathe, model no. 103.23070.

W.C. Stuckey  
1002 Thornton Circle  
Hendersonville, NC 28739

I'm seeking an owner's manual and parts list for any old Sears tilting table saw. Mine is model no. 103.0214.

J.W. Harrison  
2931 N. Edison St.  
Arlington, VA 22207

I purchased a planer at a great savings, but in the process did not receive a book of instructions or a parts list. The machine is a Menards auto-planer, 15 in., model no. 240-2842, 2 hp-150.

Lester E. Workman  
493 Pine Box 421, Canton, IL 61520

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# Events

*We will be glad to list as many events of interest to woodworkers as space permits. Listings are free and may include shows, fairs, competitions, workshops and demonstrations. The issue closing date is the 1st of the 2nd month preceding the cover date (3/1 for May/June; 5/1 for July/August). Please address announcements to the Events Department.*

## New England:

Among the winter weekend workshops offered by the Brookfield Craft Center are: European Cabinetmaking; Turned & Carved Bowls and Plates; Design for Woodworkers & Woodturners; 18th Century Chairmaking; Decoy Carving; Developing a Marketing Plan for Your Art; Self-Promotion & Communication Skills. For information, call or write to The Brookfield Craft Center, P.O. Box 122, Brookfield, CT 06804; (203) 775-4526.

The Guilford Handcrafts Center's application deadline for their 31st National Juried Crafts Exposition, to be held in July, is March 11, 1988. For application, write to: 31st Annual Guilford Handcrafts Expo, P.O. Box 589, Guilford, CT 06437.

## Middle Atlantic:

The American Concern for Artistry and Craftsmanship has announced a Jan. 29 application deadline for two juried shows to be held at Lincoln Center, New York City: The 12th Annual American Crafts Festival (July 1988); and the 5th Annual Autumn Crafts Festival (August 1988). For information, contact: Brenda Brigham, American Concern for Artistry and Craftsmanship, P.O. Box 650, Montclair, NJ 07042; (201) 746-0091.

## East North Central:

Woodworking seminars by Earl Richards will run through March, 1988. For information, write to Richards' Cabinetry & Mill Co., 410 W. Harrison St., Lewisburg, OH 45338.

Woodcarvers are invited to participate in the Great Lakes Woodcarving Exhibit, sponsored by the Parma Woodcarvers Guild, to be held at the Brooklyn Recreational Center, Cleveland, Ohio. The exhibition, competition and sale will be held May 21-22, 1988. Awards will be presented for different categories. For exhibition information, contact: Ed Katzenmeyer, 116 Goodhue Drive, Akron, OH 44313; (216) 864-0784.

## South Atlantic:

Woodworking World — The Washington DC Show, Feb. 13-15, The DC Armory, Washington, DC.

ACC Craft Fair, open to the trade Feb. 16-18, open to the public Feb. 19-21, Baltimore Convention Center, Baltimore, Md.

Woodworking World — The Virginia Show, Jan. 8-10, Norfolk Scope, Norfolk, Va.

## East South Central:

The Arrowmont School of Arts and Crafts will hold one-week classes during the month of March. Wood workshops include: Bowl and Plate Turning and Carving (Technique & Design); Woodturning (Intermediate to Advanced); Woodturning (Advanced); Woodturning and Design (Beginning to Advanced). For more information and a Spring catalog, write to the Arrowmont School of Arts and Crafts, P.O. Box 567, Gatlinburg, TN 37738; (615) 436-5860.

## West South Central:

Application deadline for the 15th Annual "FestForAll," held in Baton Rouge in May, is Jan. 31, 1988. Send SASE to River City Festivals Assoc., 427 Laurel St., Baton Rouge, LA 70801.

## Pacific:

Registration deadline for The Oregon School of Arts and Crafts' winter term is Jan. 4. Among the course offerings are: Beginning Woodworking I; Beginning Woodworking II; Beginning Woodworking III; Advanced/Intermediate Woodworking; Individualized Study Program in Woodworking. For information, call or write to the school at 8245 S.W. Barnes Rd., Portland, OR 97225; (503) 297-5544.

## Canada:

Woodworking World — The Toronto Show, Jan. 15-17, The Skyline Hotel, Toronto (Rexdale), Ontario.

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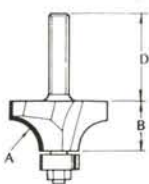
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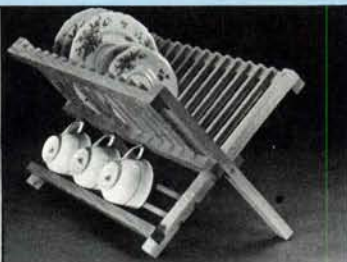
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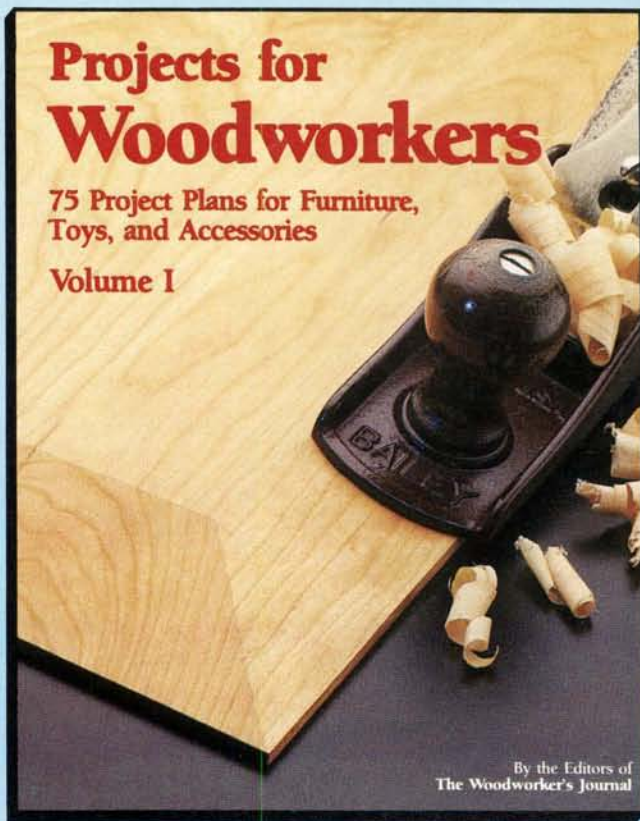
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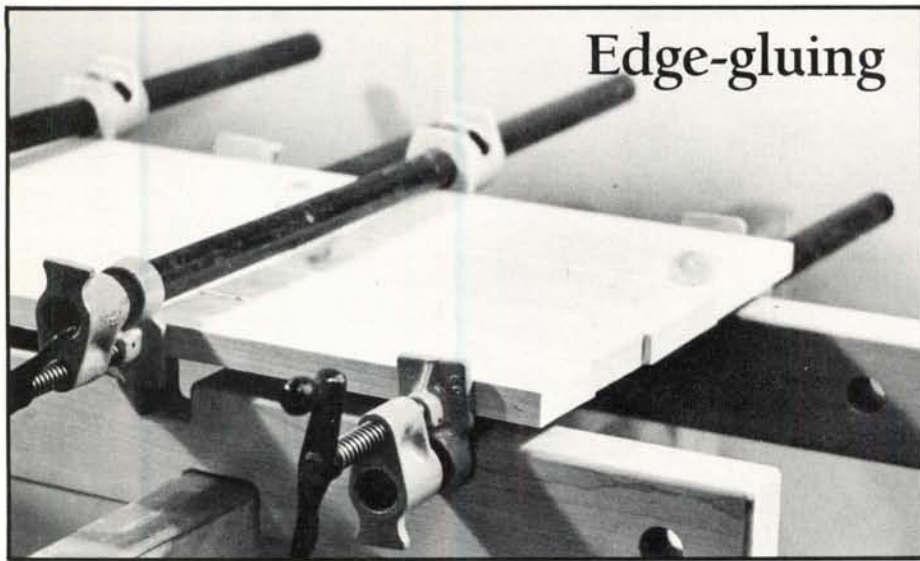
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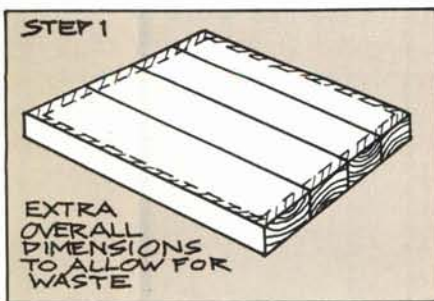
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# Woodworking Basics



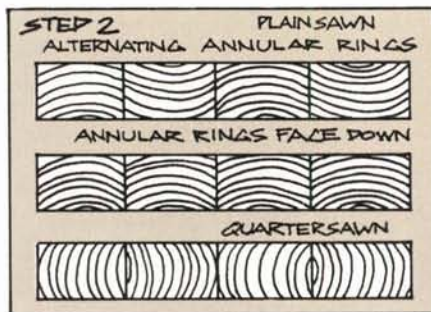
One of the fundamental woodworking techniques is the creation of wide stock by combining or "edge-gluing" two or more narrower pieces. Many of the projects in *The Woodworker's Journal* require that material be edge-glued. While a single wide board is usually aesthetically preferable to edge-glued stock, wide boards, if indeed they can be found, are usually very costly. For these reasons, most woodworkers resort to edge-gluing narrow material to obtain the required width. When properly executed, an edge-glued joint can be very nearly invisible.

Although dowels or splines were once commonly used in edge-glued stock, with modern adhesives a good long grain-to-long grain joint will always be stronger than the wood itself, eliminating the need for any mechanical fastener. If you do use dowels for the purpose of alignment, no glue is necessary on the dowels.



Step 1: Cut the material to rough overall dimensions. Allow several in-

ches extra in length. Width of the pieces should add up to the desired final width plus extra for trimming and jointing. Dress the stock flat. Note that this step is not necessary if you are starting with surfaced material. Always try to select the flattest material, since it is difficult to work with stock that is cupped or warped.

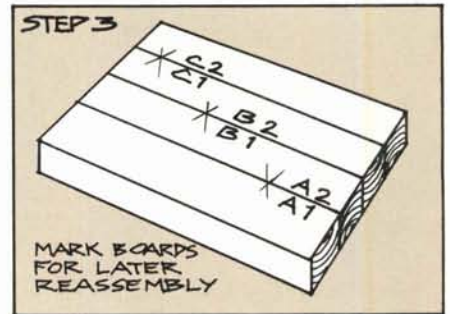


Step 2: Lay out the boards on a flat surface and arrange them with respect to grain, color, and annular rings. Where material of the same species is being joined, try to lay out the boards so there are no sharp color contrasts, such as between heartwood and sapwood.

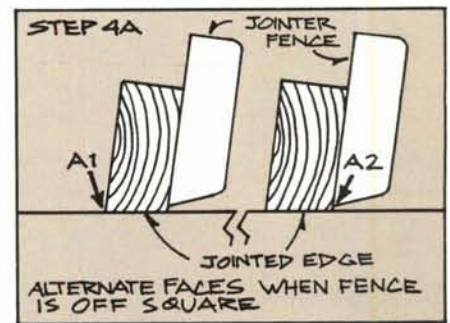
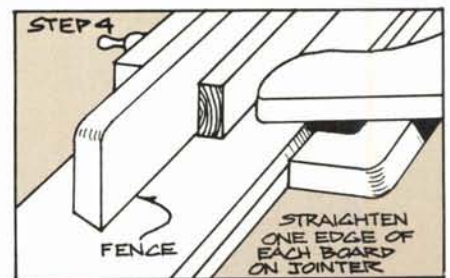
When edge-jointing plain sawn material, we usually alternate the annular rings, as shown. However, when edge-jointing material for a supported tabletop, we prefer to align the boards with the annular rings facing down. With this arrangement, the tendency of the glued-up surface to cup can be utilized to good advantage by screwing up into it through the table frame. The

screws pull the surface down flat, and the cupping tendency keeps both sides down tight.

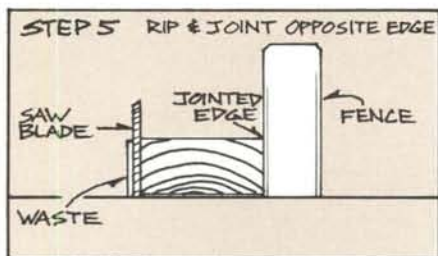
Quartersawn stock should be edge-glued with heartwood-to-heartwood and sapwood-to-sapwood, as shown, to eliminate movement problems and to create a harmonious blending of grain and color.



Step 3: Mark all boards for later reassembly.



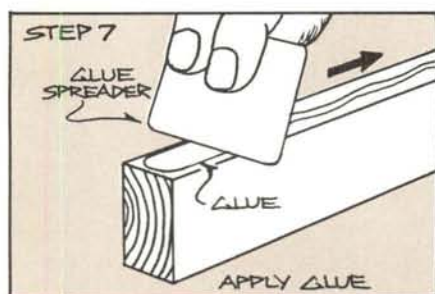
Step 4: On the jointer, straighten one edge of each board. Note: We always square the jointer fence to the table before this operation. Some woodworkers recommend simply alternating board faces against the fence, as illustrated, so that any off-squareness of the fence would not affect the joint. When the jointed material is laid up, the off-square edges complement each other perfectly.



**Step 5:** On the table saw, rip the opposite edge parallel to the jointed edge, removing as little stock as possible. Then joint the just ripped edges. (Same as Step 4).



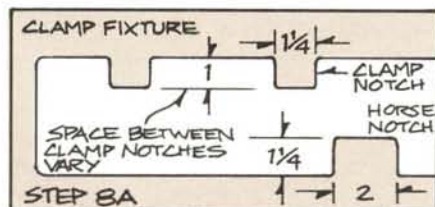
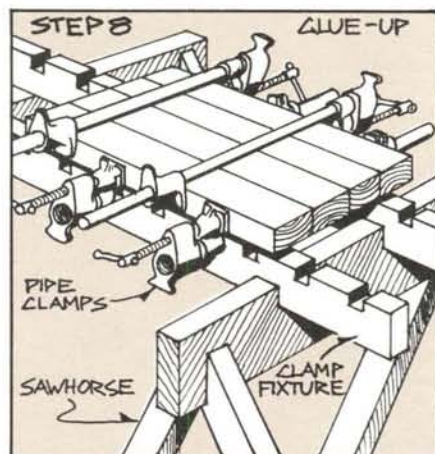
**Step 6:** Test fit the pieces. *Note:* You may need an additional pass on the jointer for one or more of the edges in order to obtain a close tolerance, no-gap joint. (Refer to our jointer article in the May/June 1987 issue for a how-to on setting up the jointer properly.)



**Step 7:** Apply glue to those edges of the boards that will be joined. We use either a plastic glue spreader or a small roller. Adhesive must be applied to both surfaces. We usually use yellow glue unless the project is to be exposed to moisture, in which case we prefer either plastic resin or resorcinol.

**Step 8:** Clamp the boards. We have found that the best clamping system is a homemade fixture built from standard 2 x 4 stock. Alternate the clamps as shown, one up and the next down.

Start applying the clamps at one end and work toward the opposite end. Don't overtighten the clamps, though. If you apply too much pressure, most of the glue will squeeze out of the joint and it won't have maximum strength.

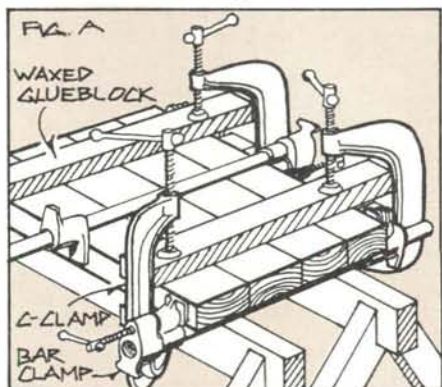


Make certain that as each clamp is applied, the surfaces being edge-glued remain flush. We often employ waxed clamp blocks to keep these surfaces even. The waxed clamp blocks are usually required when working with mill-surfaced stock, where there is little allowance for surfacing to flatten any irregularities along the glued up edges. When working with rough sawn stock that we dress ourselves, we typically allow an extra  $\frac{1}{16}$  in. of thickness so the material can be final surfaced after it has been edge-glued. Naturally, the width of material that can be surfaced after it has been edge-glued will be determined by your planer's capacity. With material that is too wide for the planer, the waxed clamp blocks are a necessity. Note that when waxed clamp blocks are employed (Fig. A), you cannot utilize the notched clamping fixture. Clamp pressure should always be applied at the center, as shown in Fig. B.

After the glue has dried and the clamps are removed, the surface can be

cut to final length and width, and molded, shaped, or treated in whatever way the project requires.

*Note:* When edge-gluing a large number of smaller pieces to obtain a



very wide surface, we prefer to divide the work into two or more sections. We then edge-glue and clamp these sections together to obtain the final desired width. If necessary, the sections can be dressed on the planer before they are edge-glued. This system has several advantages. Primarily, it affords you greater control, since it is much easier to work with a few pieces at one time, as opposed to six or eight pieces at a time. Gluing and clamping six or more pieces at one time is quite a challenge, even for the most experienced craftsman. When planing edge-glued stock, be sure to clean excess glue off all exposed surfaces before sending material through the planer. Dried glue is rough on jointer and planer knives, wearing and often chipping them.

If you do not have access to a power planer, wide surfaces can be sanded smooth with a belt or hand-held disk sander. Hand planing is also an option, but alternating grain tends to create problems with chip- or tear-out. If you need to use the hand planer, try working across the surface on a slight diagonal to minimize the tear-out. W&J

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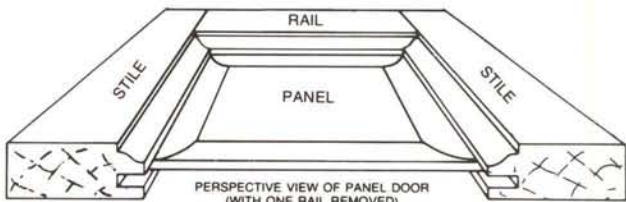
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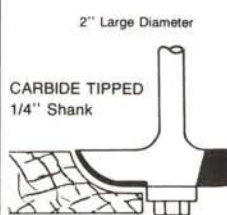
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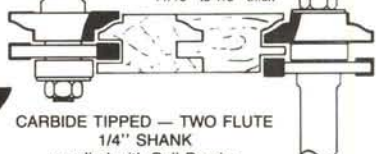


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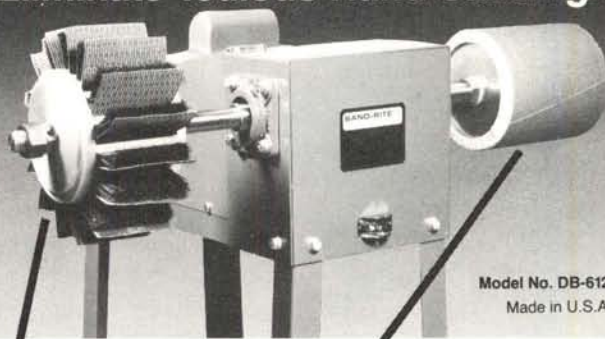
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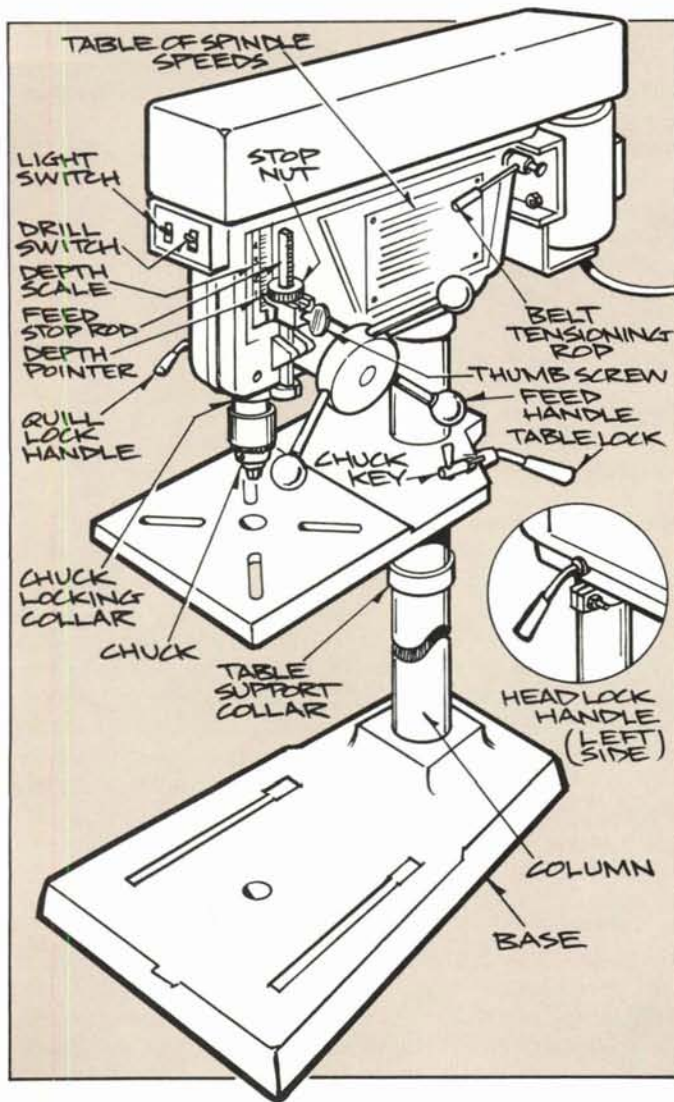
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# In The Shop



## The Drill Press

The drill press is one of the more essential shop tools. It performs a variety of functions not possible with hand-held drills, and results in a greater degree of accuracy with other functions that could be accomplished using hand-held drills, but are better left to a stationary power tool.

There are two basic types of drill presses: floor models and benchtop models. Where shop space is available, a floor type drill press is preferable to a benchtop unit, since it can remain in one spot. Benchtop units are slightly less costly than comparable floor models, but as they usurp valuable bench space, they must often be moved out of the way and then back again.

The size designation of the drill press represents the maximum size that can be center drilled. The distance from the chuck to the column is one-half the size listed. Therefore, a

14 in. drill press will measure 7 in. from the center point of the chuck to the column. Most drill presses follow a configuration similar to the one shown in the illustrations, with the motor mounted to a bracket at the rear of the head assembly and step pulleys used to vary speeds.

### What It Can Do

The most common function of the drill press is to drill a hole to a prescribed depth. There are two methods of setting this depth. In the first, the point of the drill is brought even with a mark on the side of the stock indicating maximum depth, at which point the quill is locked in place, and the depth stop and stop nut are positioned at the bottom of the feed stop rod and locked in place. With the second method, the point of the drill is "zeroed" at the surface of the stock, and the depth pointer and depth scale are used to set the limit of the hole to be drilled. While this method works fine if the depth scale readings are accurate and result in close tolerance work, many woodworkers prefer to use the first method, since it results in a precise hole depth regardless of any irregularities in the scale or pointer.

In addition to boring holes, drill press operations include countersinking and counterboring, plug cutting, drum sanding, drilling large holes with a hole saw or Forstner bit, flycutting, and mortising with a special mortising attachment (see illustrations).

Among the more common boring requirements are boring to depth, boring holes in round stock (use V-blocks to support the stock), boring holes longer than the bit (bore from one end, then reverse the stock, locate it with a pin through the first hole, and bore the second hole to meet the first), boring holes involving either simple or compound angles (for simple angles tilt the drill press table; for compound angles tilt the table and use an auxiliary jig as needed), and boring pocket holes (cut a guide block equal to the desired angle of the pocket hole, and clamp the guide block in position so the bit will exit at the stock center). Many jobs, including drilling for dowels and boring holes in a series, are best accomplished when stop pins are used in conjunction with an auxiliary fence. This results in accurate hole spacing, an important point for repetitive work.

### What It Can't (Or Shouldn't) Do

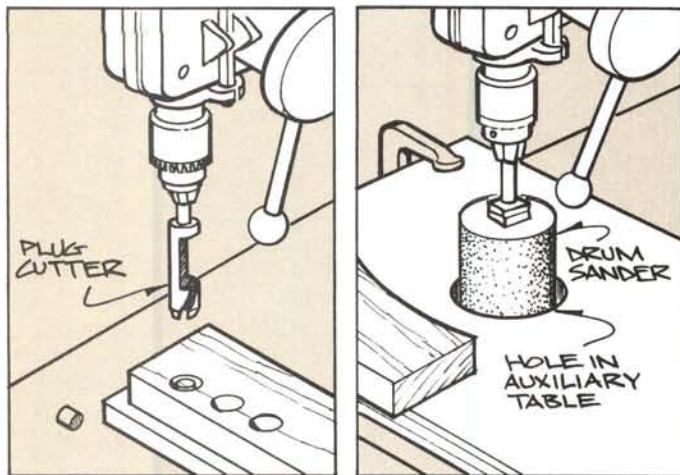
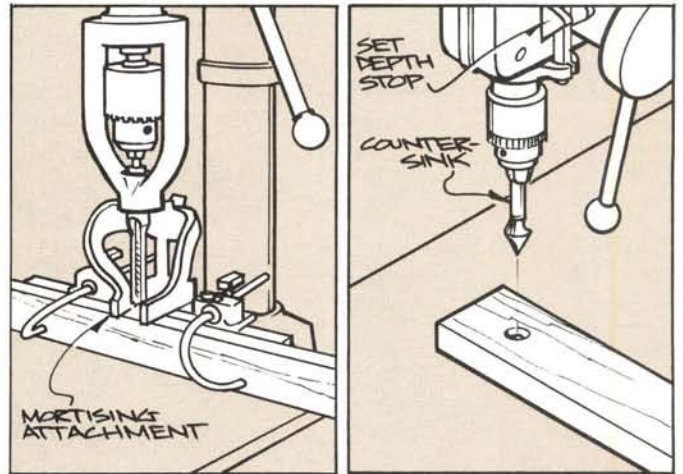
While many "special purpose" tools are marketed with the purpose of expanding the function of the drill press to include functions such as shaping, milling, surface planing, surface sanding, routing, and rasping, we do not recommend that you try these operations on the drill press. Our experience has shown that these operations are not practical and result in poor quality work. Also, drill presses are designed for vertical load, and excessive force perpendicular to the shaft will both stress the machine and result in play or deflection in the shaft, possibly lessening the useful life of the drill press. Using sanding drums does require a load perpendicular to the shaft, but pressure is kept to a minimum.

(continued on next page)

## Rules Of Thumb

Drill presses come in so many different models and from so many different manufacturers, that it is difficult to make specific recommendations as to speed and bit size. We've seen models with a maximum speed of 2000 RPM (revolutions per minute) and others with a maximum of 8000 RPM. Also, horsepower ratings vary widely, depending on the size and cost of the unit.

If there is one primary rule of thumb for drill press operation, it is that the larger the diameter of the bit being used, the slower the speed that should be selected. Hand in hand with this is the rule that harder woods also require slightly slower speeds. We've included a very general speed/bit size chart, but keep in mind that this chart will probably not be perfect for your particular model. While most manufacturers provide a speed/bit size selection chart, these charts are based on constant feed rates, which are only attainable



with an automatic boring machine. We feel that the speed charts provided with most drill presses recommend excessive speed. In our shop we generally use the slowest possible effective speed. Our chart is based on the use of the 15½ in. press in our shop. Other presses may not offer enough speed ranges to cover the spectrum of the chart, or may not correspond closely with the chart, in which case you should once again try to stay on the low end where possible. We do not switch speeds for every drill bit change, but we do always switch to slower speeds for boring large holes using the Forstner bits, plug cutters, hole saw, fly cutters, etc.

To understand the reasons why a ¼ in. diameter twist drill bit might turn up to 3000 RPM, while a large Forstner bit should not be used above 500 RPM, we must understand two principles. The first is that given a constant speed over an equal time period, a small drill bit will have less cutting surface area exposed to the wood than a larger diameter bit. This measurement, the rate at which the cutting edge moves through the material, is referred to as the "surface feet per minute." Ideally, the speed of the drill press must be adjusted to maintain a constant surface-feet-per-minute rate. For example, if you have a ⅛ in. twist drill bit in the press, and then switch to a ½ in. twist drill, the drill speed must be

### Brad-Point and Twist Drills

1/16 - 3/16 in.	1,000 - 3,000 RPM
3/16 - 1/8 in.	800 - 1,500
5/16 - 7/16 in.	600 - 1,000
7/16 - 9/16 in.	400 - 800
Over 9/16 in.	500 or Less

### Forstner Bits

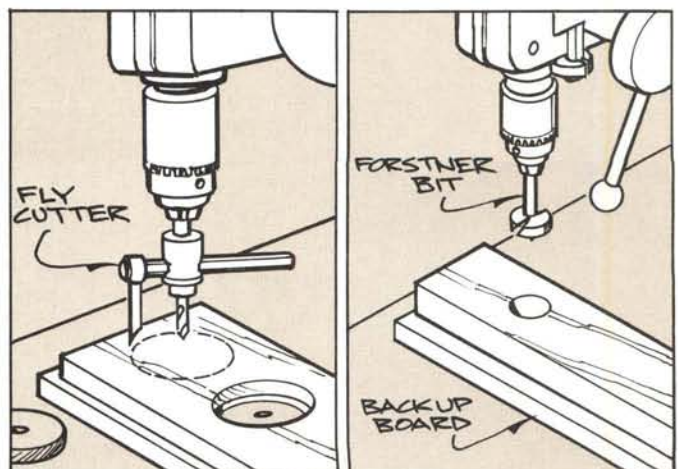
1/4 - 3/4 in.	350 - 750 RPM
7/8 - 2 in.	300 - 500

### Hole Saws and Fly Cutters

Always operate at lowest available speed.

### Drum Sanders

Do not use above 2000 RPM's.



decreased to maintain the optimum surface-feet-per-minute rate. This principle applies mainly to drill bits that place only a small overall surface area in contact with the wood (twist and brad-point bits).

The second principle applies mainly to cutters such as hole saws and Forstner bits, which place a great deal of metal surface area in contact with the wood, and therefore generate more heat. The idea is that smaller bits, with less surface area, generate less heat and can therefore turn faster. Since these bits do not rely on the speed of the cutting edge for a clean cut, they can be slowed down to speeds low enough to not generate heat, and still cut clean holes. The main considerations when selecting a drill bit are the type of bit and the material being machined.






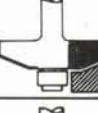

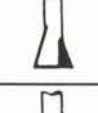



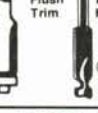

### Operation/Safety Checklist

As with all power tools, let the machine do the cutting. Never force the tool, since this will only burn the work and dull the cutter, and could result in the bit snapping. Even if you are successful, forcing the cutter will typically result in a very rough hole. With deep holes, back out several times to clear the chips.

The following operational guide should serve as a reminder for safe operation. You may want to photocopy this list, and post it on a wall near the drill press.

1. All work should be clamped securely (when possible) to the drill press table. The larger the diameter being cut, the greater the force that is applied, and the greater the need for securing the work.
2. Always use a piece of backup material under the stock or workpiece being machined.
3. Wear safety glasses. While wood chips are usually not a problem, a snapped bit could send metal fragments flying.
4. Always set drill speed before chucking the cutter.
5. Tighten the chuck securely, and make certain that the cutter is centered in the jaws of the chuck.
6. Never walk away from the drill press with the chuck key in the chuck.
7. Advance the feed handles with a controlled, slow, steady pressure, with rate of feed determined by the type of cutter and the material being machined.
8. If the cutter makes unusual noises (chirping, squeaking), stop and turn the drill off immediately. Such sounds are indications of improper drill speed. Set the speed at a slower rate and try a more gradual rate of feed.
9. Always maintain control of the handle while allowing the quill to return to the up position.
10. Do not remove the work from the table or mounting fixture until the drill press has stopped.
11. Inspect the machine regularly, maintain it as directed by the manufacturer, and always keep it clean. ☺

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	#37	1/2" V Groove 90°		1/2"	1/2"	11.00
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# Special Techniques

## Pierced Tin

**T**in piercing is a centuries-old art form, practiced in the Middle Ages, and brought to the colonies by the early settlers. Pierced tin foot warmers, lanterns, and other decorated tinware were common household items in Colonial and Early

American homes.

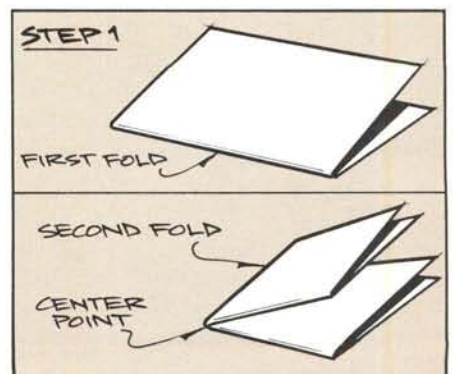
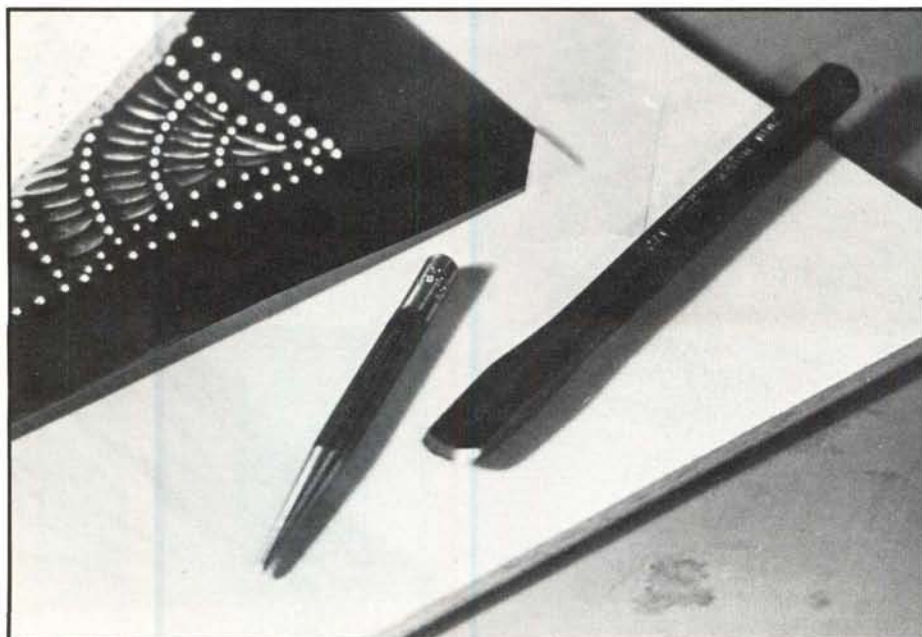
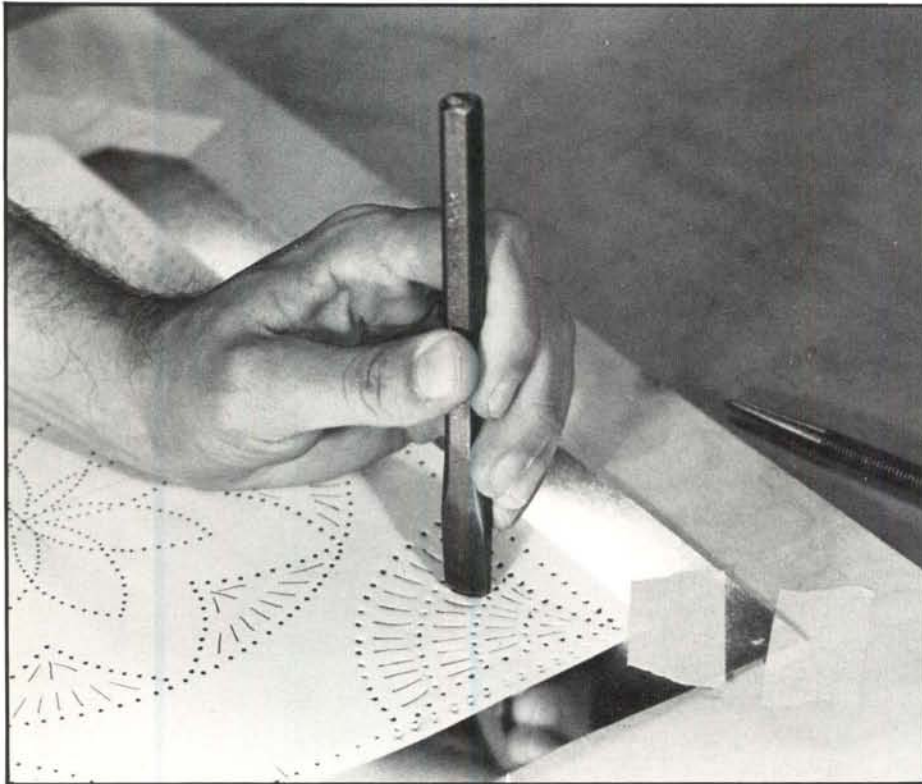
The pierced tin panels most often associated with woodworking were used primarily in cabinets and pie safes. The perforations that created patterns on the tin panels served the dual purpose of allowing air to cir-

culate to baked goods, while keeping flies and mice out.

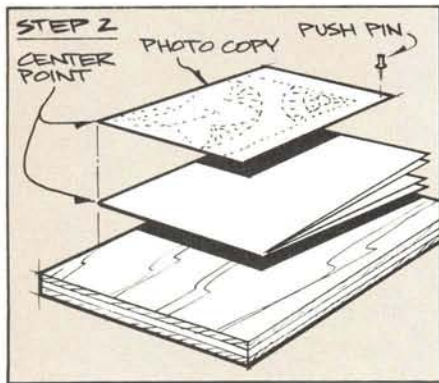
There are many types of tin sold today for the purposes of decorative piercing. Among the most popular are antiqued tin, pitted and rusty tin, old-look tin, pewter-tone tin, and bright tin. We used bright tin because it was the least costly and most attractive for our project.

In addition to the tin panel, you will need tools for piercing. (See editor's note at the end of this article.) We used only two punches, an all-purpose point punch and a 1/2 in. lampmaker's chisel. While a nail set and an old chisel could be used instead, the professional punches result in a higher quality, more consistent look, and are therefore recommended.

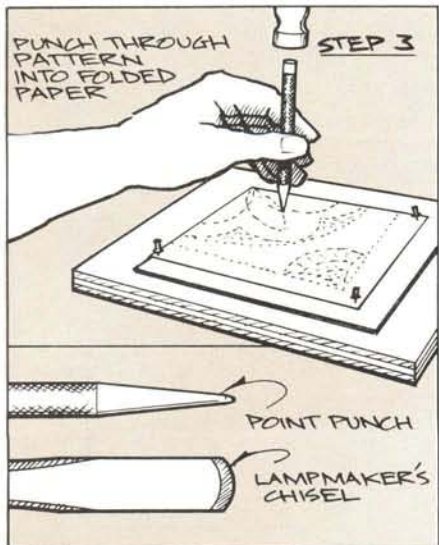
Rounding out your materials for punching will be a firm work surface, an 8- or 12-ounce ball peen hammer, a 2 ft. by 2 ft. by 3/4 in. thick sheet of smooth plywood or particleboard, a rawhide mallet, a straightedge, some paper, pushpins, tape, and a can of spray lacquer or polyurethane. It's usually best to transfer the pattern directly to the tin, and if you were doing so, you would need a felt-tip pen or grease pencil and a compass. However, with the full-size one-quarter pattern provided, we've worked out a method where no drawing is necessary. Our method involves taping the pattern to the tin, although there is always some danger of the paper slipping out of alignment, which could result in an uneven pierced tin pattern. We urge you to check the paper alignment periodically while punching to insure that no movement has occurred.



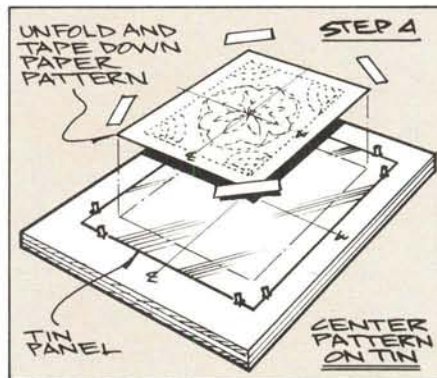
**Step 1:** In order to make a full pattern from the one-quarter section provided, first take a piece of paper about 11 in. by 14 in. and fold it in half, top to bottom, and in half again, side to side. Mark the inside corner (this will be the pattern center point when the paper is unfolded). Make a copy of our one-quarter pattern on a photocopier, or by using carbon paper and a blank sheet of paper. You could simply use the pattern on the page, but since you will be piercing through, you would end up with a perforated page.



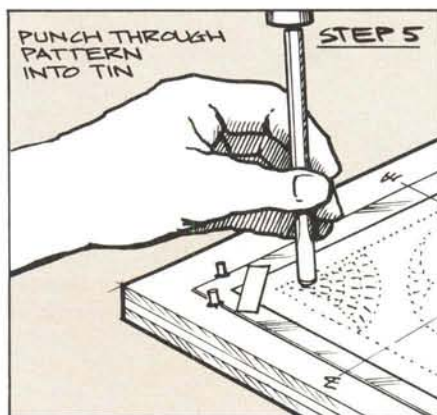
**Step 2:** Trim the copy of the one-quarter pattern along the center lines as shown, then position the folded paper under the pattern with the 3/4 in. thick plywood below. Note the center point of the paper in relation to the pattern. Anchor the pattern and paper to the plywood with push pins as shown.



**Step 3:** Pierce through the paper. The point punch is used for the round holes, and the lampmaker's chisel for the elongated perforations. Remove the pushpins and unfold the paper.



**Step 4:** Position the pierced paper pattern so that it is centered over the tin panel, and tape it in place. Use pushpins at the four corners to anchor the tin panel to the plywood backing. Take extra care when handling the tin, both from a safety standpoint and to avoid smudging it. A pair of light cotton gloves will prevent finger smudges (which "etch" some tin) and cuts from the tin's sharp edges. You can also wrap the edges of the tin with masking tape to prevent accidental cuts while handling.



**Step 5:** Pierce through the pattern paper and tin, using the same punches as before. If you have a scrap of tin or an extra practice piece, try working out a small section of the pattern first to gain experience before committing your project stock. It is best to get a feel for using the punches since the velocity and weight of the hammer can

have a varying effect and result in irregularly sized holes which tend to look rather sloppy.

**Step 6:** Remove the tacks, flip the pierced tin panel over, and use the rawhide mallet to gently flatten out the dents. Seal the tin with a spray lacquer or polyurethane. This is important since it will preserve the appearance of the tin, preventing it from rusting or oxidizing, and it will make for easy cleanup. A satin, matte, or gloss finish will do, depending on personal taste. Three or four light applications are always better than one or two heavy coats. Remember to use an even sweeping motion when spraying, and to let each coat dry thoroughly before applying the succeeding coat.

Pierced tin panels that have been sprayed with a protective lacquer or polyurethane are simple to keep clean, requiring only a minimally damp cloth to wipe down occasionally. Do not use abrasive cleansers or rub the panels with oil. While oil was once used to prevent oxidation, it is a magnet for dust and unnecessary with modern lacquer and polyurethane finishes.

Old-look tin can be purchased ready to use, or you can dull the look of the bright tin yourself by rubbing out the surface with a fine Scotch pad or 0000 steel wool, and brushing on a coat of naval jelly. The longer the naval jelly remains on the tin before it is washed off, the duller the resulting look. W&J

*Editor's Note: Our thanks to Jim and Marie Palotas of Country Accents for their help with this article and for the use of the pattern presented here. Country Accents offers a complete line of tin, copper and brass panels, a wide variety of punching tools, and hundreds of different patterns. The 11 in. by 14 in. bright tin required for our cabinet can be purchased from them for \$2.00 each. The point punch (part no. T-0359, \$3.50) the 1/2 in. lampmaker's chisel (part no. T-0259, \$5.45), the rawhide mallet and the ball peen hammer are also available. For more information or to order, write to: Country Accents, P.O. Box 437, Montoursville, PA 17754. Telephone: (717) 478-4127.*

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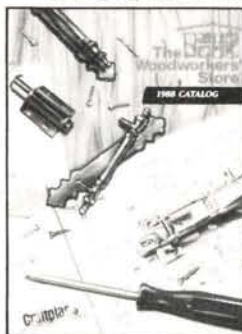
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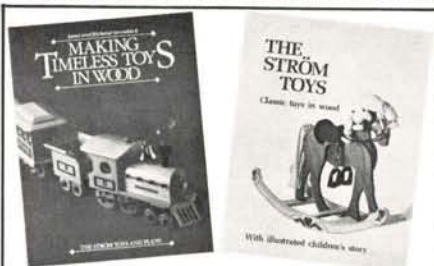
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# Finishing

## Four Shopmade Finishes

There's no question that the easiest finishes to use are those that come ready to apply; no preparation required. Yet for many woodworkers, the real fun in woodworking is the time spent creating. To offer an analogy, one might consider the difference between building a project from a kit and crafting the project from scratch using rough board material. In the same manner that most woodworkers prefer working from scratch with project stock, many also take pride in making up their own finishes.

Among the various shop-concocted finishes, the most popular are the venerable varnish and oil and penetrating oil mixtures, which provide the cabinetmaker with an attractive, reliable and durable finish that requires a minimum of effort to apply. Varnish and oil mixtures have a rich historical background, with many cabinetmakers taking their secret recipes to the grave.

### The Recipe

Among the recipes we know of are a mixture of equal parts satin varnish, boiled linseed oil, and turpentine; a mixture of two parts turpentine with one part spar varnish and one part boiled linseed oil; a mixture of penetrating oil and linseed oil; and a mixture of tung oil, linseed oil, and either Watco or Minwax oils in equal or varying amounts. These mixtures can be experimented with and adjusted as needed to suit the requirements of a particular wood or project.

For example, in her Shaker wall clock (page 38), Massachusetts craftswoman Barbara Coperine used a mixture of equal parts satin varnish, boiled linseed oil, and turpentine. On his work, Connecticut craftsman Dennis Preston uses either the penetrating and linseed oil mixture, or the tung oil, linseed oil, and Watco or Minwax oil mixture, rather than a varnish and oil mix. Without the varnish, the finish appears very natural. The use of a varnish and oil mixture will result in a higher profile finish, with either a very soft satin patina, or a slightly more polished or glossy patina, depending on the type of varnish used. Final appearance will depend on the extent of surface preparation and the number of coats of finish that are applied. More coats will result in a deeper, richer, more attractive finish.

### Surface Preparation

Oil and varnish mixtures work equally well on open- and close-grained woods, though for an open-grained wood (oak, walnut, mahogany), you may want to add a little more varnish to better fill the pores. Penetrating oils also work well on all woods. For a super-smooth finish, use a paste filler first. Stain (if used) should also be applied before the finish.

Sand thoroughly, at least through 220-grit. If necessary,

raise the grain with a damp sponge, and sand again with 360 wet-or-dry. Preston recommends that the surface be cleaned with alcohol prior to the application of the finish.

### Sealer Coat

Some woodworkers start with a sealer coat of 50 percent spar varnish and 50 percent turpentine wiped on with a rag. When dry, sand with 360 wet-or-dry. Coperine's and Preston's methods do not require sealer coats.

### The Technique

All the following techniques utilize a clean rag to apply the mixture. With the first method, the mixture is wiped on and worked in quickly, one surface at a time. Wipe off with a clean, dust free cloth before the surface tacks up, and let dry for at least 48 hours or until there is no remaining odor of turpentine. Buff with 00 steel wool to eliminate bumps, and repeat this procedure with two, three, or four subsequent coats. After the final coat, buff with 0000 steel wool or 600 wet-or-dry, and wax with a furniture quality paste wax.

Instead of a sealer coat, Ms. Coperine saturates the surface with a heavy first coat, working the mixture into the wood for about 20 minutes. If the surface starts to stick, add more mixture as needed to keep it workable. Let sit for ½ to 1 hour, then wipe the surface with a clean, dry cloth. If the surface has become too tacky, add more mixture to loosen before wiping. Wait 24 hours, then rub out with 600 wet-or-dry, and apply a second coat. Wait only 20 minutes before wiping, since less time is needed for penetration. Subsequent coats are applied as needed, after which an application of butcher's wax completes the finish.

Preston follows the same basic procedure, but he first warms the mixture to about 100 degrees Fahrenheit. It results in better penetration, eliminating the problem of surface tension where oil seems to stand on the surface, but does not penetrate. He explains that heating the oil lowers its viscosity, which enables it to penetrate deeper and more effectively into the wood pores. Heating the Minwax finishing paste wax that he uses also helps to increase flow and penetration.

With oil and varnish mixtures, the finish may be brought to relatively high luster simply by adding successive coats, sanding with 600 wet-or-dry, rubbing with 0000 steel wool, and then waxing. With penetrating oil mixtures, a level sheen is soon achieved that really cannot be substantially improved even with multiple additional coats.

By experimenting with the four recipes provided, you should be able to come up with a range of finishes ideal for most projects, from a prized antique reproduction or an elegant contemporary piece to a simple Early American or Colonial pine project.

Wwj



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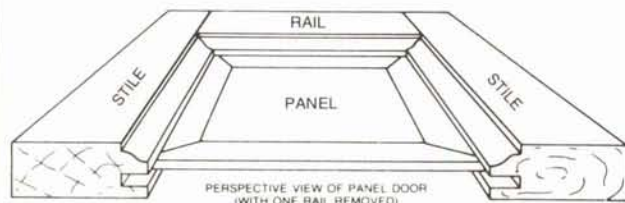
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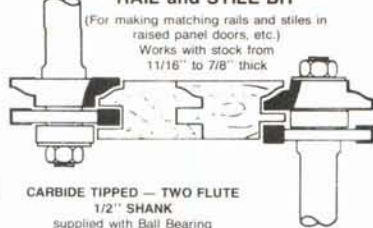
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# Pierced Tin Cabinet

Way back in our March/April 1982 issue, we featured plans for a two-door, two-drawer pierced tin cabinet finished with an antique red paint. It was based on an authentic 18th-century design and the project proved to be popular with many of our readers. With that in mind, we felt that a one-door, one-drawer version of the same cabinet would also enjoy considerable appeal, so we set about redesigning the original piece. We are pleased with the results and hope you will be too.

To minimize the chance of wood movement problems we used  $\frac{1}{4}$  in. thick birch plywood for the back (J). If you don't plan to paint the cabinet, though, knotty pine plywood would be a better choice.

All other parts are made from solid pine. Try to select stock with a minimum of knots as they reduce strength. Also, unless the knots are treated with a wash coat of shellac, their resin may bleed into a painted surface.

The two sides (A) can be made first. Cut  $\frac{3}{4}$  in. thick stock to  $6\frac{1}{2}$  in. wide by  $22\frac{3}{4}$  in. long, taking care to insure that each end is cut square. The  $\frac{3}{4}$  in. wide by  $\frac{1}{4}$  in. deep dado that will accept the bottom (C), and the  $\frac{3}{4}$  in. wide by  $\frac{1}{4}$  in. deep rabbet that will accept the top (D), can be cut using the dado-head cutter in conjunction with the table saw and a miter gauge. Once the rabbets and dados are cut, lay out and mark the location of the  $\frac{1}{4}$  in. diameter by  $\frac{1}{2}$  in. deep dowel holes, then use a drill press to bore them out.

To make the base (B), cut  $\frac{3}{4}$  in. thick stock to  $7\frac{1}{2}$  in. wide by  $16\frac{3}{4}$  in. long, again making sure that the ends are square. Next, lay out and mark the location of the  $\frac{3}{4}$  in. wide by  $\frac{1}{4}$  in. deep stopped dado as shown. To cut the dado you'll need a router equipped with an edge-guide and a  $\frac{3}{4}$  in. diameter straight bit. For a smooth cut — and to minimize strain on the router — it's best to cut the  $\frac{1}{4}$  in. depth in two passes, each pass removing  $\frac{1}{8}$  in. of stock. If your router bit collection does not include a  $\frac{3}{4}$  in. straight bit, readjust the guidefence to get the  $\frac{3}{4}$  in. dado width. Keep in mind that the router bit will leave rounded corners at the stopped ends, so once the dados have been cut, you'll need to use a chisel to square the corners.

Note that the base has a bead cut on each end and on the front edge. This can be cut using a router and a  $\frac{1}{2}$  in. bearing-guided beading bit. Set the bit to a depth that will create the  $\frac{1}{8}$  in. step, then cut the bead on each end of the base. Once the ends have been routed, cut the bead along the front edge. Routing the front edge last will clean up any splintering that may have occurred when the ends were cut.

Next, from  $\frac{3}{4}$  in. thick stock, cut the bottom (C) to  $6\frac{1}{4}$  in. wide by  $13\frac{3}{4}$  in. long and cut the top (D) to  $6\frac{1}{2}$  in. wide by  $13\frac{3}{4}$  in. long. As with the other parts, check the ends for squareness.

Now final sand the sides, base, bottom and top. Start with



80-grit sandpaper, then follow with 100-, 150-, and 220-grit to complete the sanding. When sanding the ends of the bottom, keep in mind that if too much material is removed you'll no longer have a snug fit in the side dados. Try to maintain a snug fit to get maximum strength from the joint.

The sides, base, bottom, and top can now be assembled. Apply glue to all mating surfaces, then clamp firmly and check for squareness. Allow to dry thoroughly.

When dry, drill counterbored holes for  $1\frac{1}{2}$  in. by no. 8 flathead wood screws as shown. Drive the screws, then plug the holes with short lengths of dowel stock. Cut the dowels a bit long so that after they are glued in place they can be sanded flush with the surface.

The  $\frac{3}{8}$  in. wide by  $\frac{1}{4}$  in. deep rabbet for the back can now be cut using a router equipped with a  $\frac{3}{8}$  in. bearing-guided rabbeting bit. Set the bit to make a  $\frac{1}{4}$  in. deep cut, then with the base of the router against the back edge of the case, rout the rabbet all around as shown. Since the bit will leave rounded corners, you'll want to use a chisel to square them.

Next, cut the  $\frac{1}{4}$  in. thick plywood back to fit, then attach it to the case with glue and  $\frac{1}{2}$  in. by no. 4 flathead wood screws. Since the cabinet will be hung by driving screws through the back, be sure the back is well secured to the cabinet.

(continued on next page)

**Bill of Materials**  
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Side	$\frac{3}{4} \times 6\frac{1}{2} \times 22\frac{3}{4}$	2
B	Base	$\frac{3}{4} \times 7\frac{1}{2} \times 16\frac{3}{4}$	1
C	Bottom	$\frac{3}{4} \times 6\frac{1}{4} \times 13\frac{3}{4}$	1
D	Top	$\frac{3}{4} \times 6\frac{1}{2} \times 13\frac{3}{4}$	1
E	Filler	$\frac{3}{4} \times 2 \times 13\frac{3}{4}$	1
F	Adjustable Shelf	$\frac{3}{4} \times 5\frac{1}{2} \times 13\frac{3}{8}$	1
G	Side Molding	see detail	as req'd.
H	Front Molding	see detail	as req'd.
I	Cleat	$\frac{1}{4} \times 1\frac{1}{8} \times 6\frac{1}{2}$	2
J	Back	$\frac{1}{4} \times 14 \times 22\frac{1}{2}$	1
K	Turnbutton	$\frac{1}{4} \times \frac{3}{4} \times 1$	1
L	Door Rail*	$\frac{3}{4} \times 1\frac{1}{2} \times 13\frac{3}{4}$	2
M	Door Stile	$\frac{3}{4} \times 1\frac{1}{2} \times 16\frac{1}{4}$	2
N	Tin	28 Ga. $\times 11$ $\times 14$	1
O	Keeper Strip	$\frac{1}{4}$ round	as req'd.
P	Drawer Front	$\frac{3}{4} \times 4 \times 13\frac{3}{4}$	1
Q	Drawer Side	$\frac{1}{2} \times 4 \times 6$	2
R	Drawer Back	$\frac{1}{2} \times 3\frac{1}{2} \times 12\frac{3}{4}$	1
S	Drawer Bottom	$\frac{1}{4} \times 5\frac{3}{4} \times 12\frac{3}{4}$	1
T	Drawer/Door Knob	$\frac{3}{4}$ dia. (porcelain)	2
U	Hinges	$1\frac{1}{2} \times 1\frac{1}{2}$	1 pair

\*Includes tenons.

Make the door next. Cut the rails (L) and stiles (M) to overall length and width from  $\frac{3}{4}$  in. thick stock. We used a tenon jig to cut the tenons on each end of the rails and the through-mortises on each end of the stiles. Once the joints are cut, apply glue to the mating surfaces and clamp firmly. Check for squareness before setting aside to dry. When dry, use the router and a  $\frac{3}{8}$  in. bearing-guided bit to rout the  $\frac{3}{8}$  in. by  $\frac{3}{8}$  in. rabbet all around the inside edge as shown. Once cut, use a chisel to square the rounded corners.

Prepare the tin panel (N) as described in the Special Techniques column on page 20 of this issue. It's held in place with  $\frac{1}{4}$  in. quarter-round molding (O) tacked in place with small brads. The molding may tend to split when the brad is driven. To prevent this, it's a good idea to first bore a small pilot hole for each brad.

The drawer is made as shown. Note that the drawer front (P) has a  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in. rabbet while the drawer sides (Q) have  $\frac{1}{4}$  in. by  $\frac{1}{2}$  in. dados. The bottom (S) can be made from the same  $\frac{1}{4}$  in. thick plywood used for the cabinet back.

You can get the crown and cove molding (see sectional detail) for parts G and H at most lumberyards and building supply centers. To eliminate any movement problems between parts A and parts G (parts A will expand and contract, front to back, with changes in humidity while parts G will not), we've worked out a method of joinery that allows the inevitable movement, yet securely attaches the side moldings. The groove for the cleat (I) is cut on the table saw (see detail), then the cleat is cut to size and glued in place. At the front, about 1 in. from the miter, bore a  $\frac{1}{32}$  in. diameter hole (not shown on drawing). Following this, cut a pair of  $\frac{3}{32}$  in. wide by  $\frac{3}{8}$  in. long slotted holes, one in the middle and one

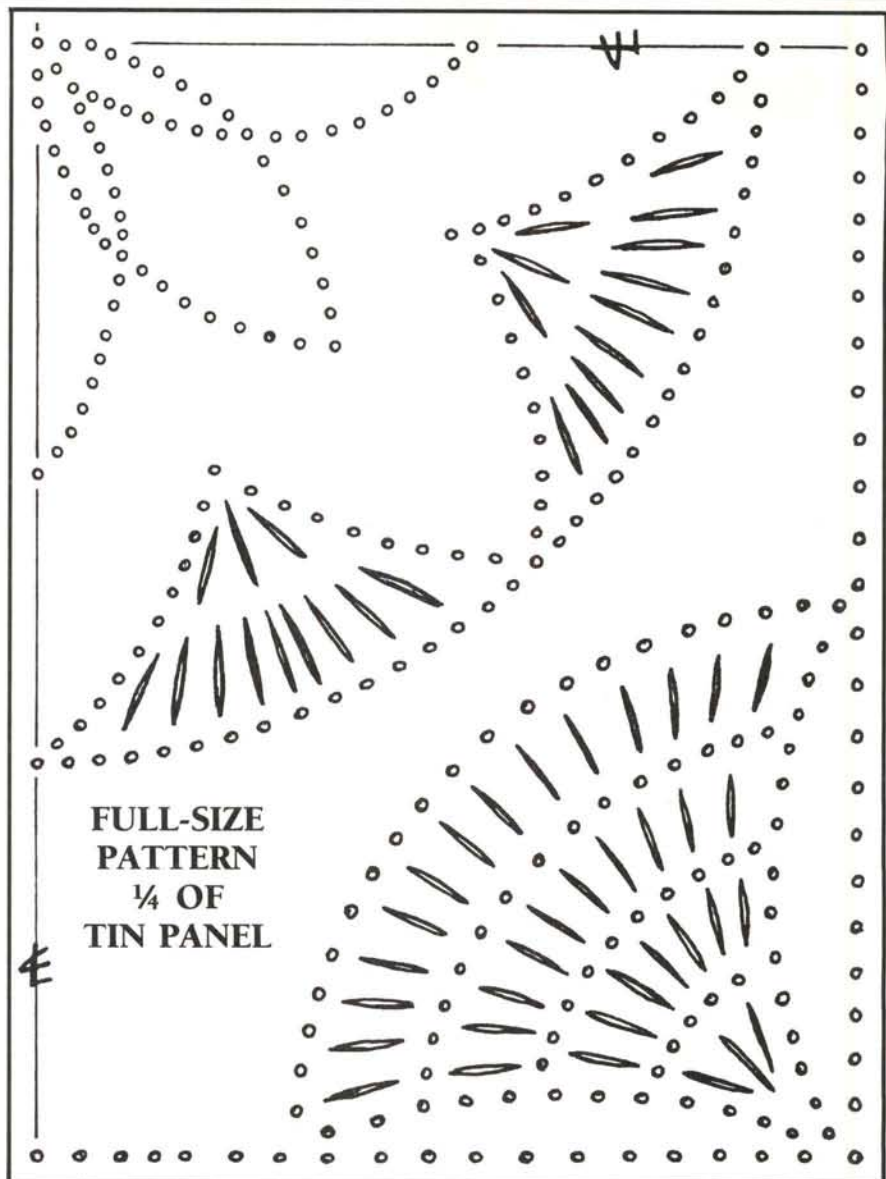
about  $\frac{3}{4}$  in. from the back end (see exploded view).

To attach each side molding, drive  $\frac{3}{4}$  in. by no. 6 flathead woodscrews through the three cleat holes and into the top edge of the side. Do not use any glue here as the side must be free to expand and contract.

Since the grain of the front molding (H) runs in the same direction as the top, there is no need to add a cleat. It can simply be glued in place and secured with countersunk and filled finishing nails.

Next, the filler (E) can be cut to size and glued in place. Use clamps to secure it while the glue dries. When clamping, make sure that the front edge of the filler is flush with the front edge of the top.

The cabinet will look good simply stained and finished with a varnish or penetrating oil. However, since a good many Early American pieces were painted, we felt that a milk paint finish would add authenticity. Milk paint can be ordered from The Old Fashioned Milk Paint Company, Box 222, Groton, MA 01450 (telephone: (617) 448-6336). We used their "Soldier Blue," although several other antique colors are also available. The addition of the porcelain knobs (T) and the hinges (U) will complete the project. Wwj







## Contemporary Glass-top Table

**A** narrow band of red dyed veneer on each leg adds a striking detail to this handsome glass-top table. Maple, with its naturally light color, contrasts nicely with the veneer, so we used it for all wood parts. You'll need  $1\frac{3}{4}$  in. thick stock for the legs (A) and  $\frac{3}{4}$  in. thick stock for the end stretchers (B) and front and back stretchers (C).

Begin by cross-cutting stock for the legs and stretchers to approximate length, allowing about 1 in. extra for each part. Next, rip each of the parts to approximate width, adding an extra  $\frac{1}{4}$  in. or so for each cut.

Use the jointer to plane (joint) one of the ripped edges of each part. Make the jointer cuts in at least two passes, with the final pass removing no more than about  $\frac{1}{32}$  in. of stock. A light cut like this produces a smooth finish that requires little sanding later on.

The stock can now be ripped to final width. To get a smooth finish on the final cut, we like to set the rip fence to allow an extra  $\frac{1}{32}$  in. on the width.

After ripping, the jointer is used to remove the added  $\frac{1}{32}$  in.

Now, crosscut the stretchers to final length. The cuts must be square here, so it's a good idea to first check your table saw setup.

The fixtures (Fig. 4) will help to insure accuracy when shaping the stretchers. They also eliminate much of the tedious sanding of the curves. However, if you prefer not to make the fixtures, just lay out the stretcher profile on each part and cut it out with the band saw, then sand the edges smooth.

To make the fixtures, cut the plywood to size and mark the center points of the  $\frac{1}{2}$  in. radius curves, then use a 1 in. dia. bit to bore each hole. With the table saw blade set to a height of  $\frac{3}{4}$  in., use the miter gauge to pass the plywood through the blade to establish cuts no. 1, 2, 3, and 4 as shown in Fig. 1 on page 30. Note that the cuts are made tangent to the 1 in. diameters. Now, mark the location of cuts no. 5, 6, and 7, again making sure that the cut

lines are tangent. Use the band saw to make these cuts, taking care to stay about  $\frac{1}{16}$  in. on the waste side of the line. A sanding block is used to sand the band saw cuts to the marked lines.

To complete the fixtures, cut  $\frac{3}{4}$  in. square by  $2\frac{1}{4}$  in. long blocks. Screw them in place (first bore pilot holes) as shown in Fig. 4, then drive a pair of  $1\frac{1}{2}$  in. by no. 8 screws through each end block. The screws hold the stock in place when the trim cuts are made later.

The fixtures can now be used to trim the stretchers to final shape. Begin by placing the top face (the face without the blocks) of the short (15 in.) fixture on one of the end stretchers, making sure that all four edges of both parts are flush. Use a sharp pencil to scribe each curve, then cut them out with the band saw. When making the band saw cuts, it's important to stay about  $\frac{1}{16}$  in. on the waste side of the marked line.

Place the end stretcher into the fixture and tighten the two end screws. Equip the router table with a laminate

flush trim bit that has a flute length of at least 1 in. and, as shown in Fig. 2, set the bit to a height that allows the ball-bearing to run against the edge of the fixture. Trim each of the band saw cuts as shown, taking care to keep your hands a safe distance away from the bit. This same procedure is followed for the remaining stretchers.

Now lay out and mark the location of the mortises on the stretchers and legs and cut them out with a sharp chisel. Since the legs were originally cut with 1 in. added to the length, you need to locate these mortises 1/2 in. down from the top end. Later, when each leg is cut to final length, the end will be trimmed so that the mortise location is 3/16 in. below the top.

Make the four splines from solid stock. For maximum strength, the grain direction must run as shown in the exploded view.

Next, cut the 1/2 in. radius coves in each leg. We used the router table and a 1/2 in. radius bearing-guided cove bit to do the work. To get a smooth cut with a minimum of strain on the motor, it's best to make each cut in four passes. For the first pass, set the bit to make a 1/8 in. deep cut, then raise the bit 1/8 in. for each of the remaining three passes.

Now that the leg coves have been cut, the dyed veneer (D) can be applied. We used the 1/40 in. thick Cherry Red dyed veneer sold by Constantine, 2050 Eastchester Road, Bronx, NY

10461. It's their part no. DV307 and it comes in 36 in. long sheets that run 6 in. to 10 in. wide. The current price is \$1.05 per square foot, with a minimum order requirement of three square feet.

Use a razor knife to cut four strips of the veneer, each strip measuring 1 in. wide and at least 16 1/2 in. long. This provides more than enough material and the excess will be trimmed later.

To support the leg during glue-up of the veneer, we made a V-groove base and five V-groove clamp blocks (Fig. 3). Also, as shown, we planed a flat

Bill of Materials (all dimensions actual)			
Part	Description	Size	No. Req'd.
A	Leg	1 3/4 x 1 3/4 x 15 1/2	4
B	End Stretcher	3/4 x 2 x 13 1/2	2
C	Front/Back Stretcher	3/4 x 2 x 41 1/2	2
D	Veneer	1/40 in. thick	as req'd.
E	Glass Top	3/8 x 18 x 46	1
F	Glide	7/8 dia.	4

edge on two pieces of 1 in. diameter dowel stock. The dowel is used to press the veneer in place, and the flat edge provides a good bearing surface for the clamp. A coat of paste wax added to the dowel prevents it from sticking to the veneer.

Working with one leg at a time, apply a thin coat of white or yellow glue to both coves and to the veneer. Now use the dowel stock to press the veneer into the cove, then add the five clamps,

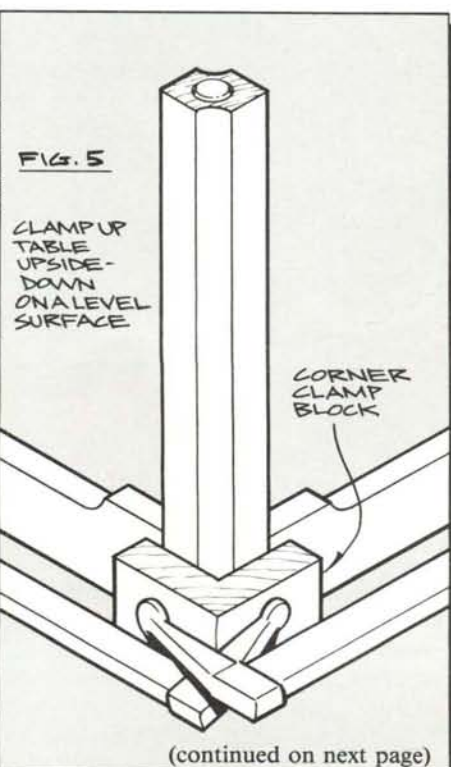
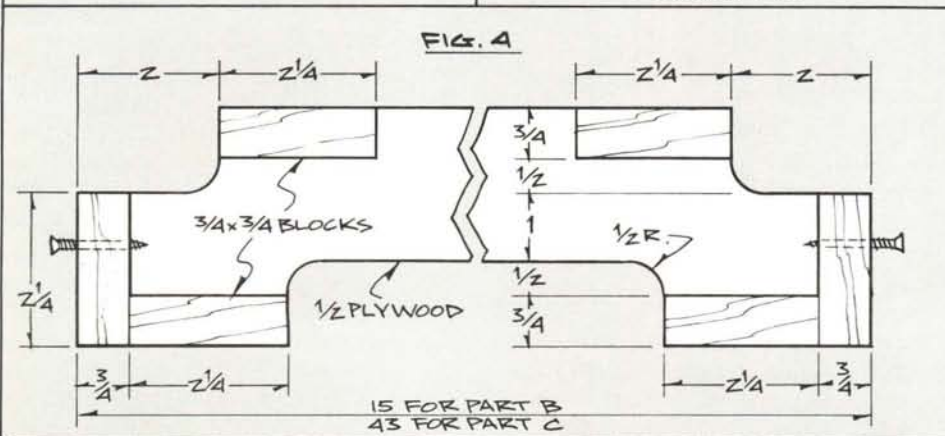
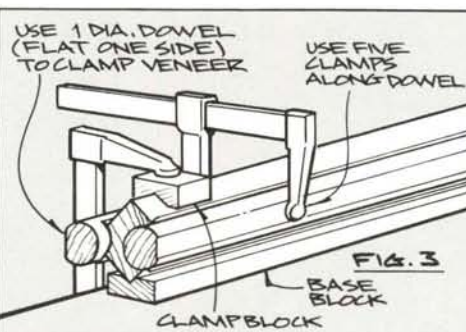
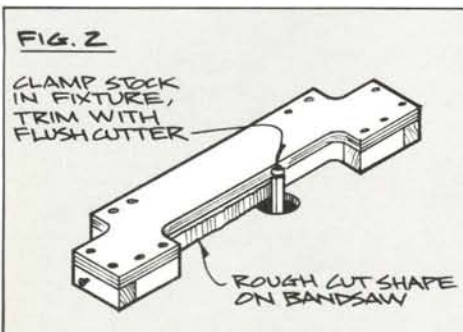
evenly spaced, to apply pressure. Allow the glue to dry thoroughly.

After the veneer has been applied to all four legs, use a razor knife to trim the excess veneer along the length of each piece. However, don't trim it perfectly flush with the surface of the leg. It's best to allow about 1/16 in. to remain and then use a sanding block to sand it flush. Any excess glue can be cleaned up as you sand.

Next, crosscut the legs to final length. Cut the top of the leg first, establishing the 3/16 in. distance to the mortises, then measure the 15 1/2 in. overall length and make the bottom cut. To complete work on the legs, drill and counterbore the bottom end (Fig. 6) for the glides (F) which will be added later on.

Final sand all parts finishing with 220 grit paper. At this point, dry assemble all the legs and stretchers to check for proper fit-up. If everything looks okay, add a thin coat of paste wax to the areas around the joints where glue squeeze-out is likely to occur. Since the glue won't stick to the wax, it makes clean-up much easier later on.

The table can now be assembled. First, though, make four corner clamp blocks (Fig. 5) to protect the legs from clamp damage. Apply glue to each of the mortises and splines, then assemble all eight parts and clamp firmly. To make sure the top surface of the table is perfectly flat, it's important to assemble the table upside-down on a flat surface. We used the top of our table saw. If this





# The Gift Shop • Easy-To-Make Gift Projects

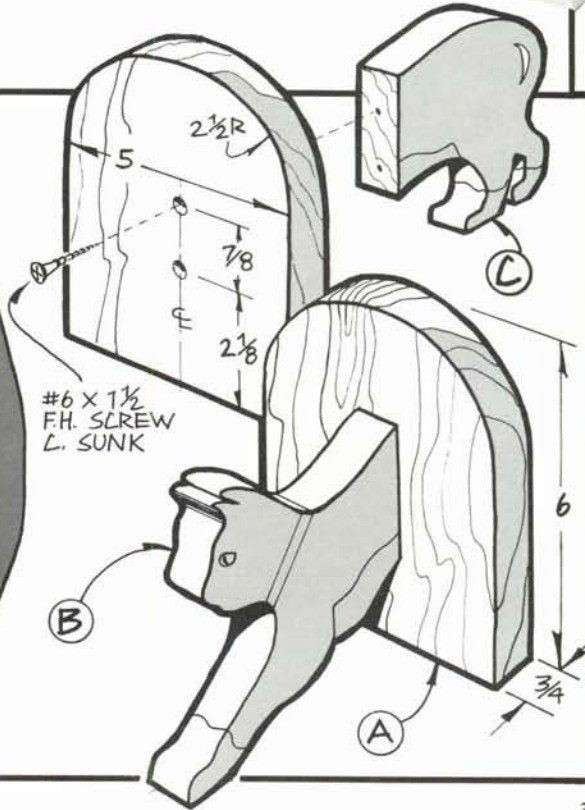
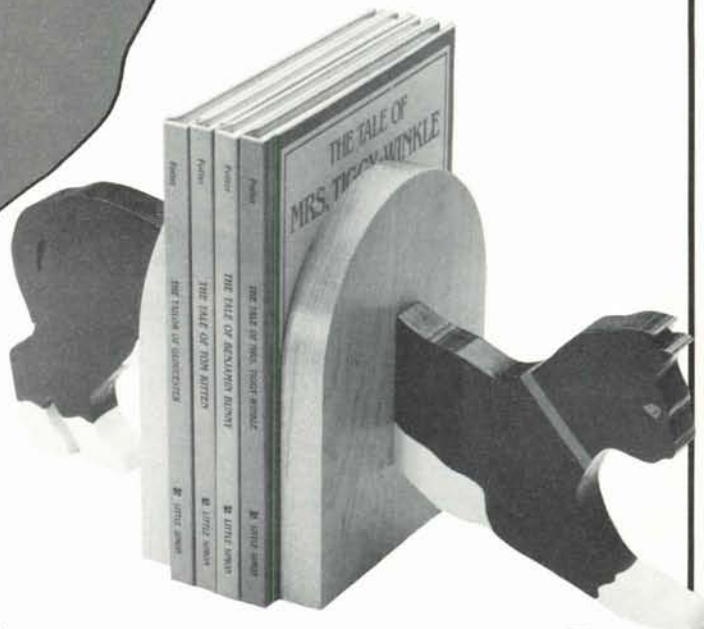
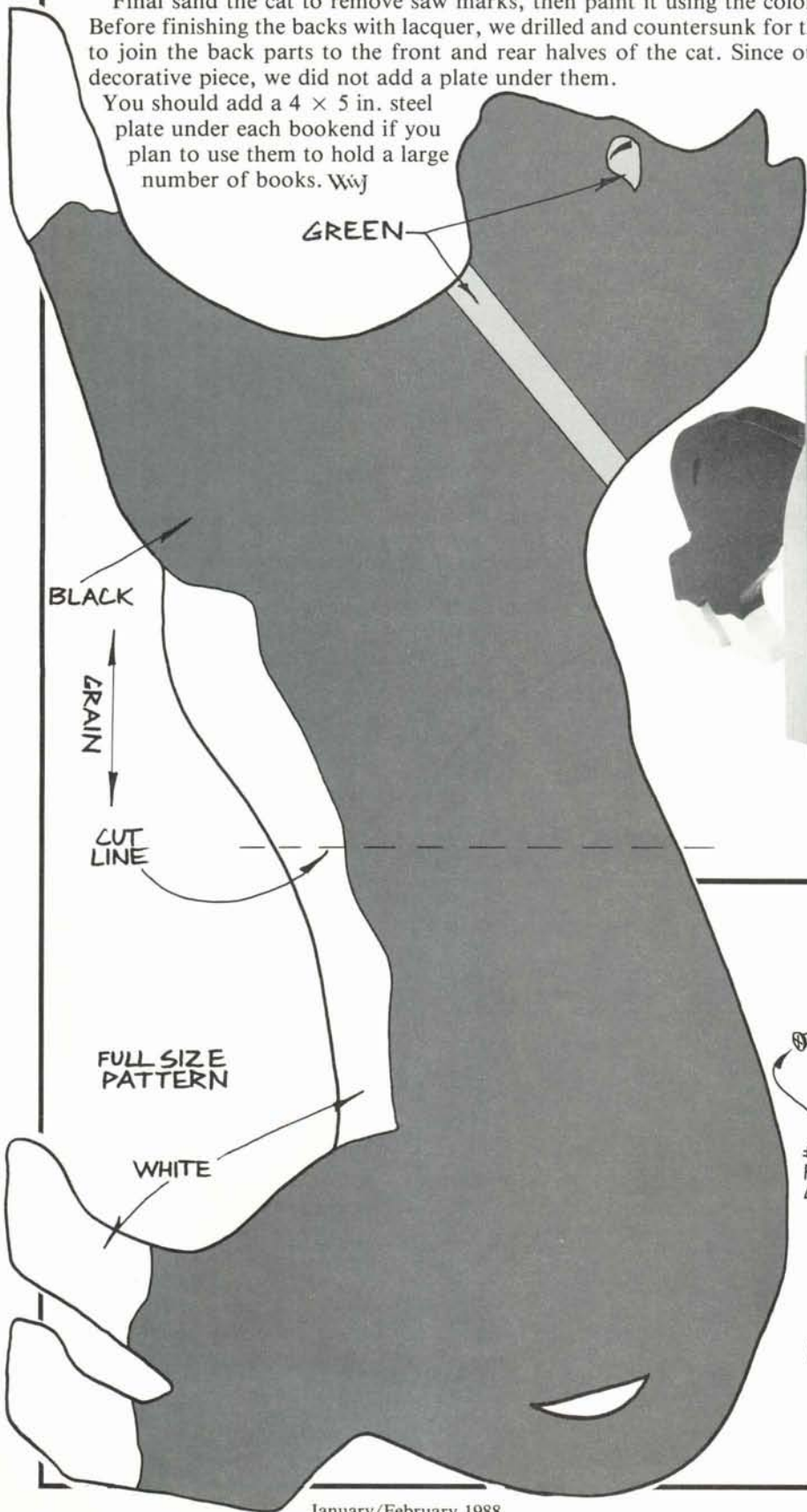
Our cat bookends are the perfect afternoon project; simple to make and a sure attention grabber. To make one set, you'll need a  $\frac{3}{4}$  in. by  $5\frac{1}{2}$  in. by 30 in. long pine or hardwood board, 4 screws, and white, black, and green enamel.

Use the full-size pattern with a sheet of carbon paper to lay out the cat profile on one end of the board. Also lay out the two backs (A). With the table or radial-arm saw, crosscut the cat profile at the cut line (see full-size pattern), then use a jigsaw or saber saw to cut all the parts out.

Final sand the cat to remove saw marks, then paint it using the color scheme indicated on the full-size pattern. Before finishing the backs with lacquer, we drilled and countersunk for the flathead brass wood screws that are used to join the back parts to the front and rear halves of the cat. Since our bookends were intended as a light-duty decorative piece, we did not add a plate under them.

You should add a  $4 \times 5$  in. steel plate under each bookend if you plan to use them to hold a large number of books. *W&J*

## Puss'n Books



# Adjustable Cookbook Holder

by Donald McLean



## The Gift Shop

**T**his handy kitchen item keeps a cookbook open to the proper page while holding it at an angle that makes for easier countertop reading. And when you are finished, it folds flat to fit in a drawer or, if you prefer, it can be hung nearby where it will double as a wall decoration. The one shown is made from pine, but maple, ash, or oak also come to mind as good choices.

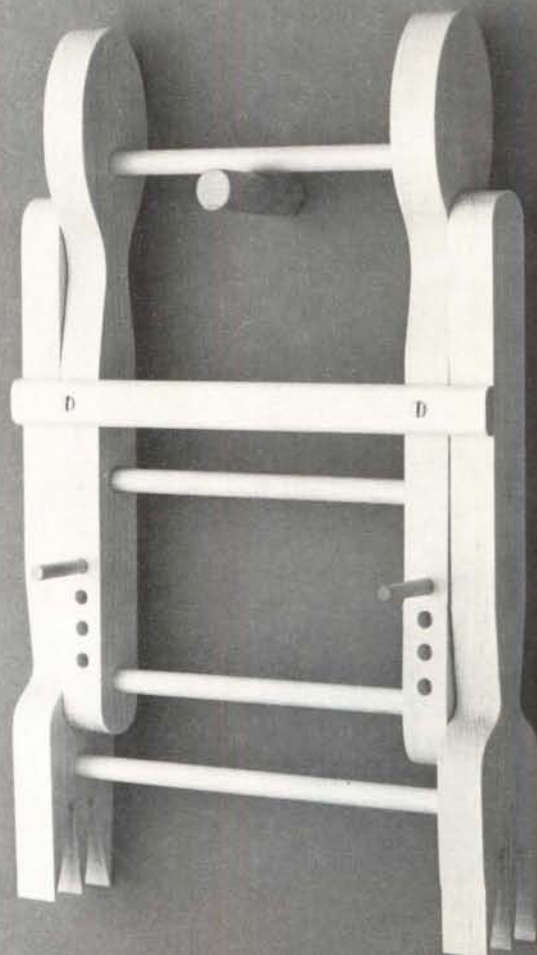
To make the forks (A) and spoons (B) you'll need four pieces of  $\frac{3}{4}$  in. thick stock, each measuring 2 in. wide by 12 in. long. Referring to the grid pattern on the drawing, transfer the profiles to the stock. At the same time, mark the location of the  $\frac{1}{16}$  in. diameter holes in the fork tines. Bore the holes, then use the band saw to cut out the profiles. When making the band saw cuts, stay about  $\frac{1}{16}$  in. on the waste side of the stock. After the cuts are completed, use a file and sandpaper to smooth the edges exactly to the marked lines.

Next, lay out and bore the  $\frac{3}{8}$  in. diameter holes for the two fork stretchers (D) and the two spoon stretchers (E). Also bore the  $\frac{1}{4}$  in. diameter holes for the pegs (F).

After cutting the stop (C) to size, the project is ready for final assembly. First, though, give all parts a thorough sanding, finishing with 220-grit paper. Apply glue to the ends of the two spoon stretchers, then add the spoons and clamp firmly. When dry, glue the stop in place using  $\frac{1}{2}$  in. long by no. 6 oval-head wood screws to reinforce the joint.

Glue one end of each fork stretcher into one of the forks. Allow to dry, then assemble the spoon frame (parts B, C, and E) and add the second fork. When dry, final sand all parts and finish with two coats of penetrating oil.

W&J







## Wooden Jewelry

**W**ith Valentine's Day just around the corner, this jewelry might make the perfect gift for someone special.

We chose ebony, satinwood and bloodwood for our jewelry, but you may want to experiment with other woods. A broad variety of hardwoods, including those we used, are available from: The Berea Hardwoods Co., 125 Jacqueline Drive, Berea, OH 44017.

To start, cut the five wedges that comprise the block from which the pin and earrings are resawed. Make the cutting fixture shown in Step 1 to hold the 1 in. thick blocks of each wood. We used five wedges at 18 degrees each to make up the 90 degrees; you could use any other number of wedges, so long as the total adds up to 90 degrees and all the wedges are equal. The notch in the cutting fixture must be cut equal to the wedge angle — 18 degrees in our case.

To make the jewelry exactly as we have, you will need one block each of ebony, satinwood and bloodwood, cut to the dimensions shown in Step 2. After cutting the first wedge, reverse the stock in the jig to get the second wedge out of the satinwood and bloodwood blocks. As shown in Step 3, the cleat anchors the stock securely. Set the fence so the blade just kisses the edge


of the fixture. Raise the blade to a 1 1/4 in. height, and keep your hand well away from the blade while cutting.

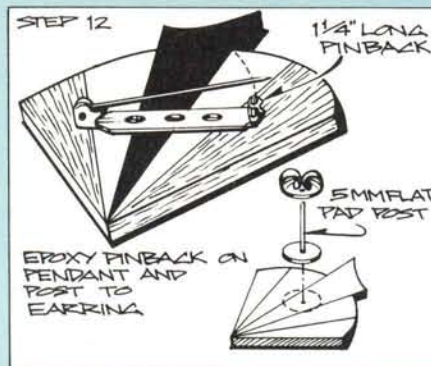
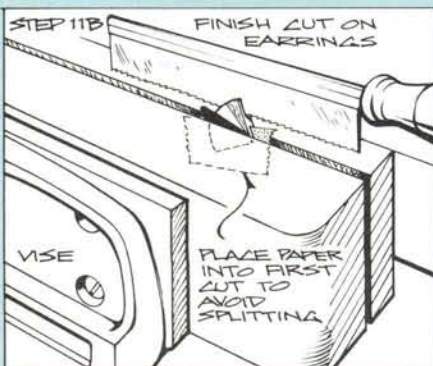
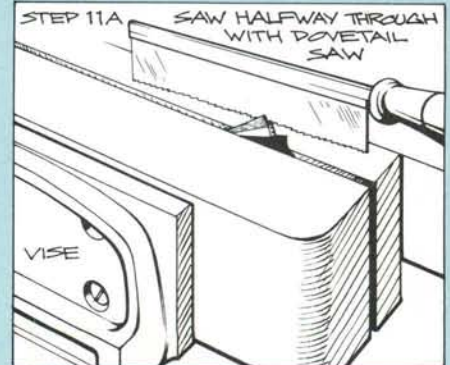
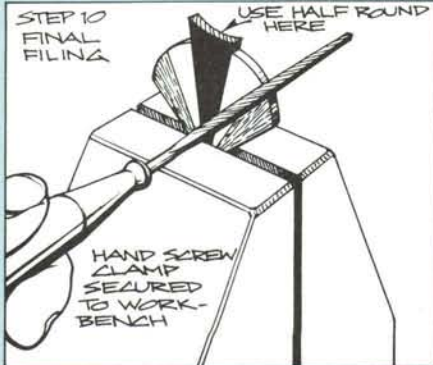
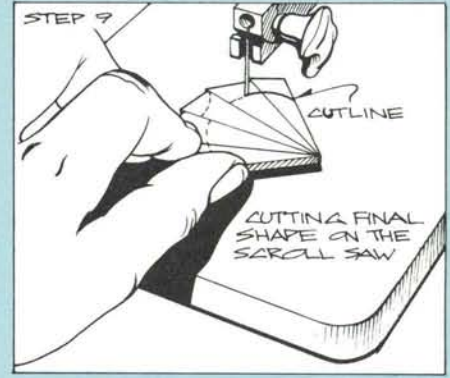
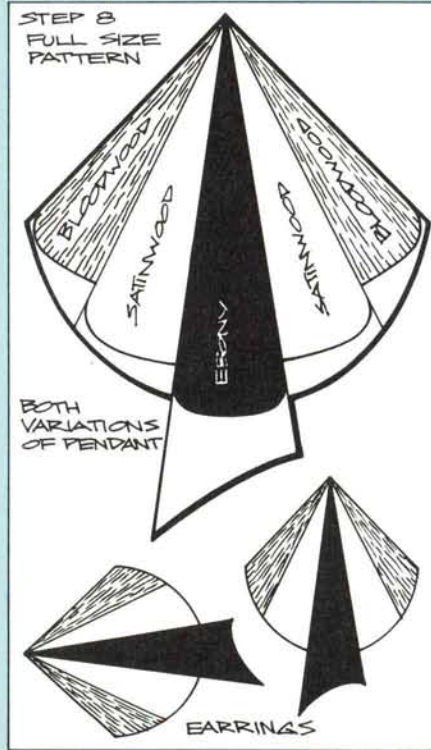
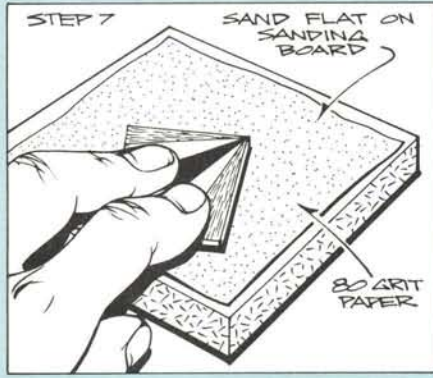
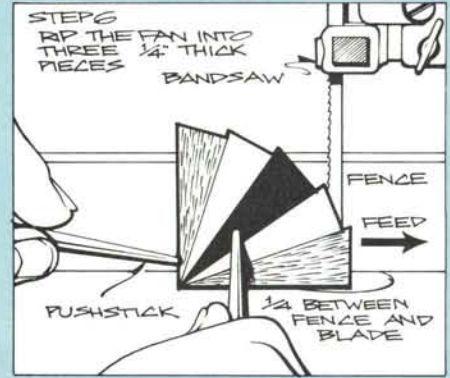
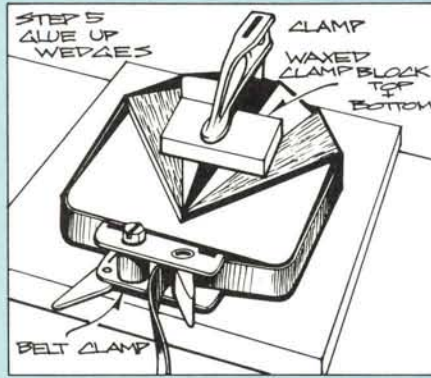
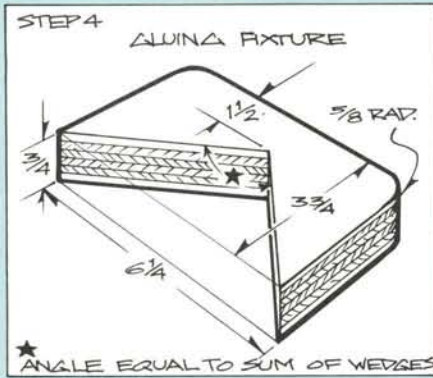
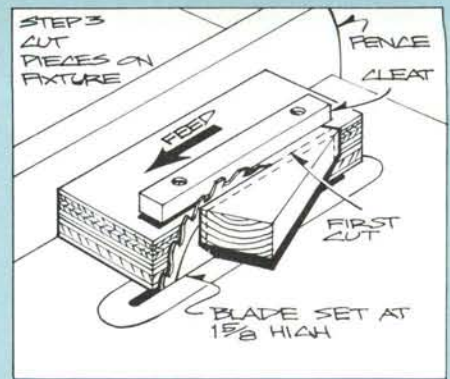
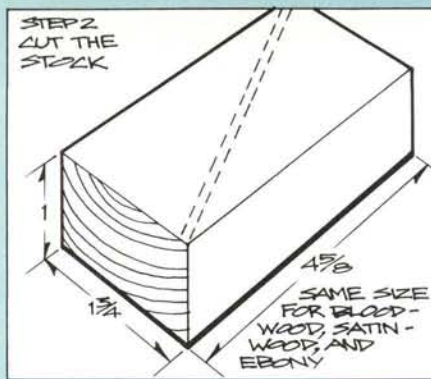
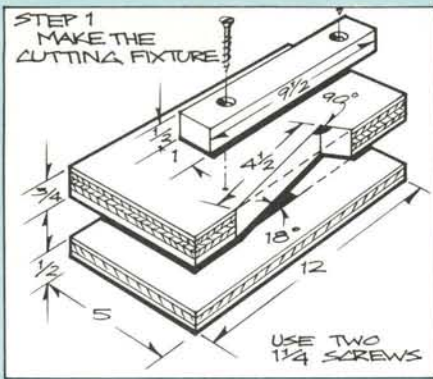
To glue up your five 18-degree wedges, you'll need to make a simple fixture to hold them in the proper alignment. As noted in Step 4, the angle of the fixture should be exactly equal to the total of your wedges. Position the wedges on the fixture block and mark the outside edges to get the proper angle. Although a 90-degree angle should work, the sum of the wedges will probably be a little off, since it is difficult to achieve a perfect 18-degree cut.

Arrange the wedges as shown in Step 8 with respect to the order of the different types of wood, apply glue, and use a band or belt clamp to apply pressure. A C-clamp, with waxed clamp blocks top and bottom, will keep the wedges flush as the belt clamp is tightened (Step 5).

When dry, resaw the glued-up block into three 1/4 in. thick sections, using the band saw as shown in Step 6. Hand

sand (Step 7), and then lay out the pin and earring profiles on the 1/4 in. thick sections. The earrings are laid out on one section, the pin on another, and the alternate pin profile on the third. You could also use the third block to make an extra set of earrings or some other article of jewelry.

Next, cut out the profiles (Step 9) with a scroll saw, or by hand with a coping or jeweler's saw. To resaw the earrings, use a dovetail saw, first cutting halfway through (Step 11A), then inserting a slip of paper in the kerf to complete the cut (Step 11B). Use a half-round and a flat file to smooth the edges before final sanding. Mount the earring posts and pinback with epoxy glue (Step 12) before finishing with four light coats of a gloss or semi-gloss aerosol spray lacquer. The 1 1/4 in. long pinbacks and surgical stainless steel 5mm flat pad earring posts are available at most craft supply stores, or they may be ordered from the National Aircraft Co., 23456 Mercantile Road, Beachwood, OH 44122. 



## Child's Duck Puzzle

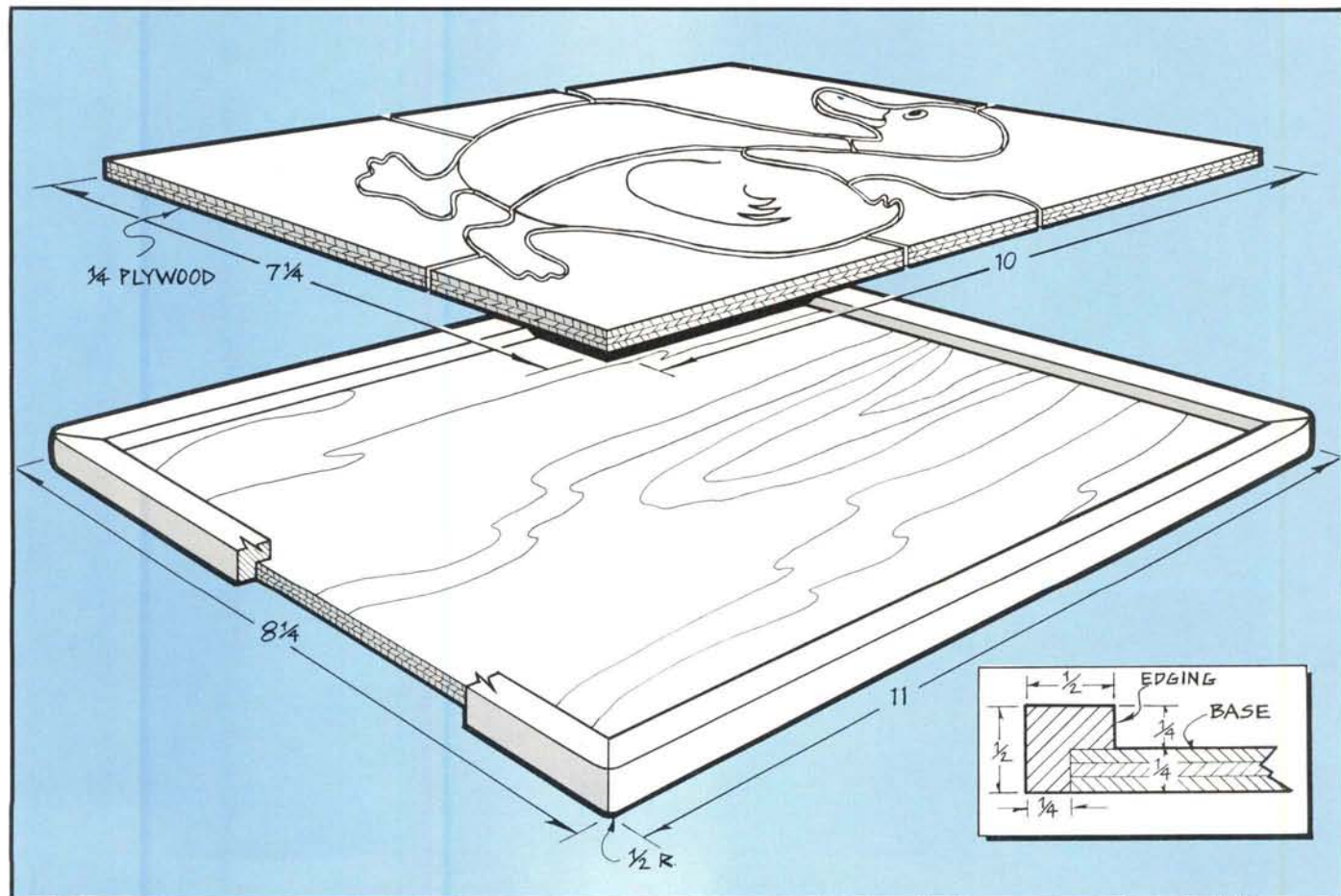
Children always seem to enjoy the challenge of a puzzle, and we think this one, designed for two- to four-year olds, should be no exception. The base and the puzzle parts are made from  $\frac{1}{4}$  in. thick birch plywood, while the edging is  $\frac{1}{2}$  in. thick solid maple. Since small parts present a choking hazard to young children, we designed the puzzle making sure that all parts are big enough to be safe.

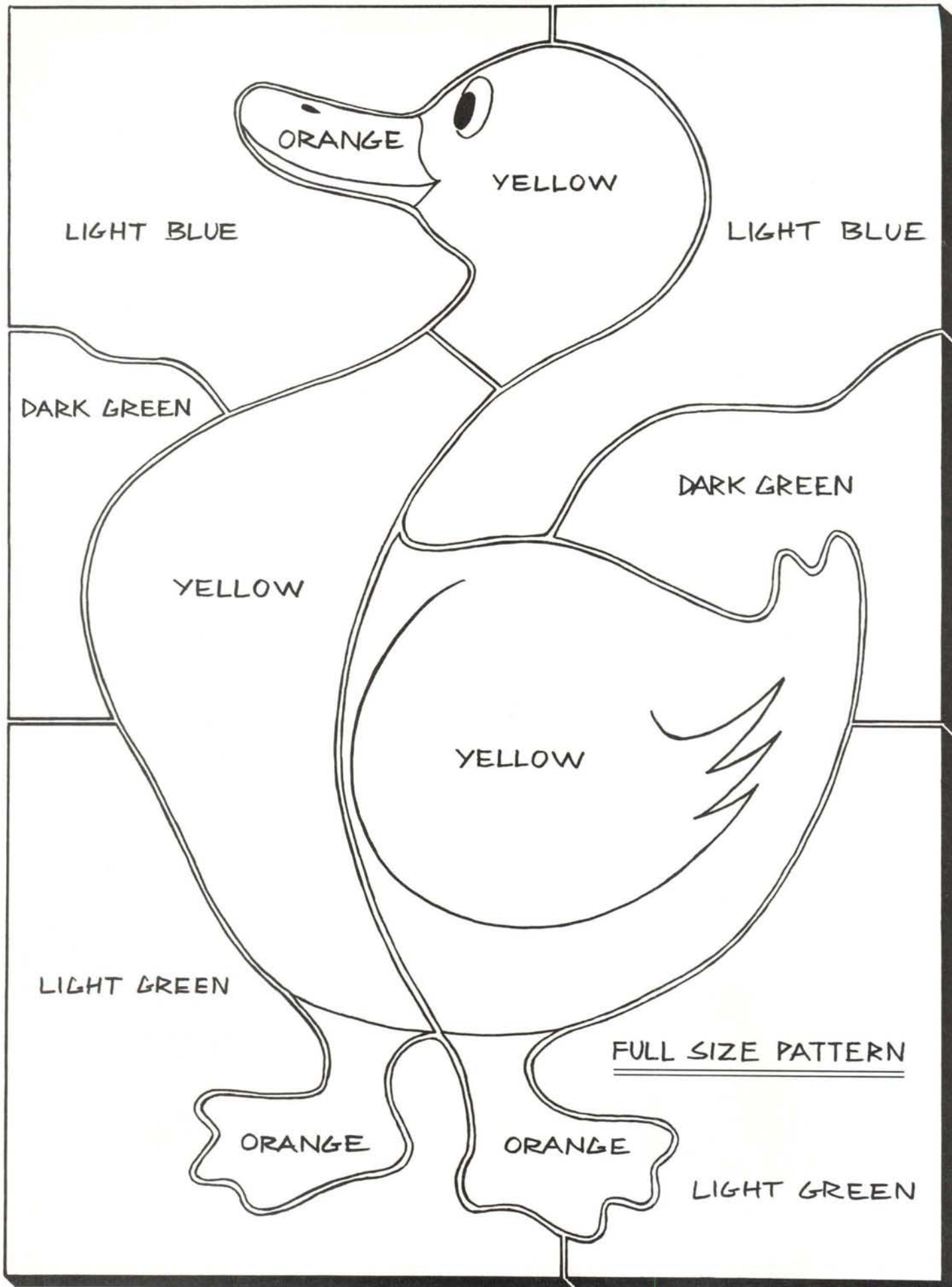
Start by cutting the plywood to  $7\frac{1}{4}$  wide by 10 in. long, then transfer the full-size duck pattern shown. Note that the double line represents the cutting line for each of the puzzle parts. Use either a band saw equipped with a  $\frac{1}{8}$  in. blade or a scroll saw to make the cuts.

Now paint the puzzle parts. Keep in mind, though, that young children sometimes chew on toys, so it's important to use paints that are non-toxic. If not available locally, the company Cherry Tree Toys, P.O. Box 369, Belmont, OH 43718 sells non-toxic, semi-gloss enamel paint in a variety of colors. You'll need five: red, blue, green, yellow and white. Orange is a mixture of three parts yellow and one part red, light blue has three parts white and one part blue, and light green consists of three parts yellow and one part green.

Next, cut the plywood base and edging, then assemble as shown. Final sand, taking care to remove any sharp edges. No final finish is needed.

Wwj





ORANGE

YELLOW

LIGHT BLUE

LIGHT BLUE

DARK GREEN

DARK GREEN

YELLOW

YELLOW

LIGHT GREEN

FULL SIZE PATTERN

ORANGE

ORANGE

LIGHT GREEN

## SHAKER

# WALL CLOCK

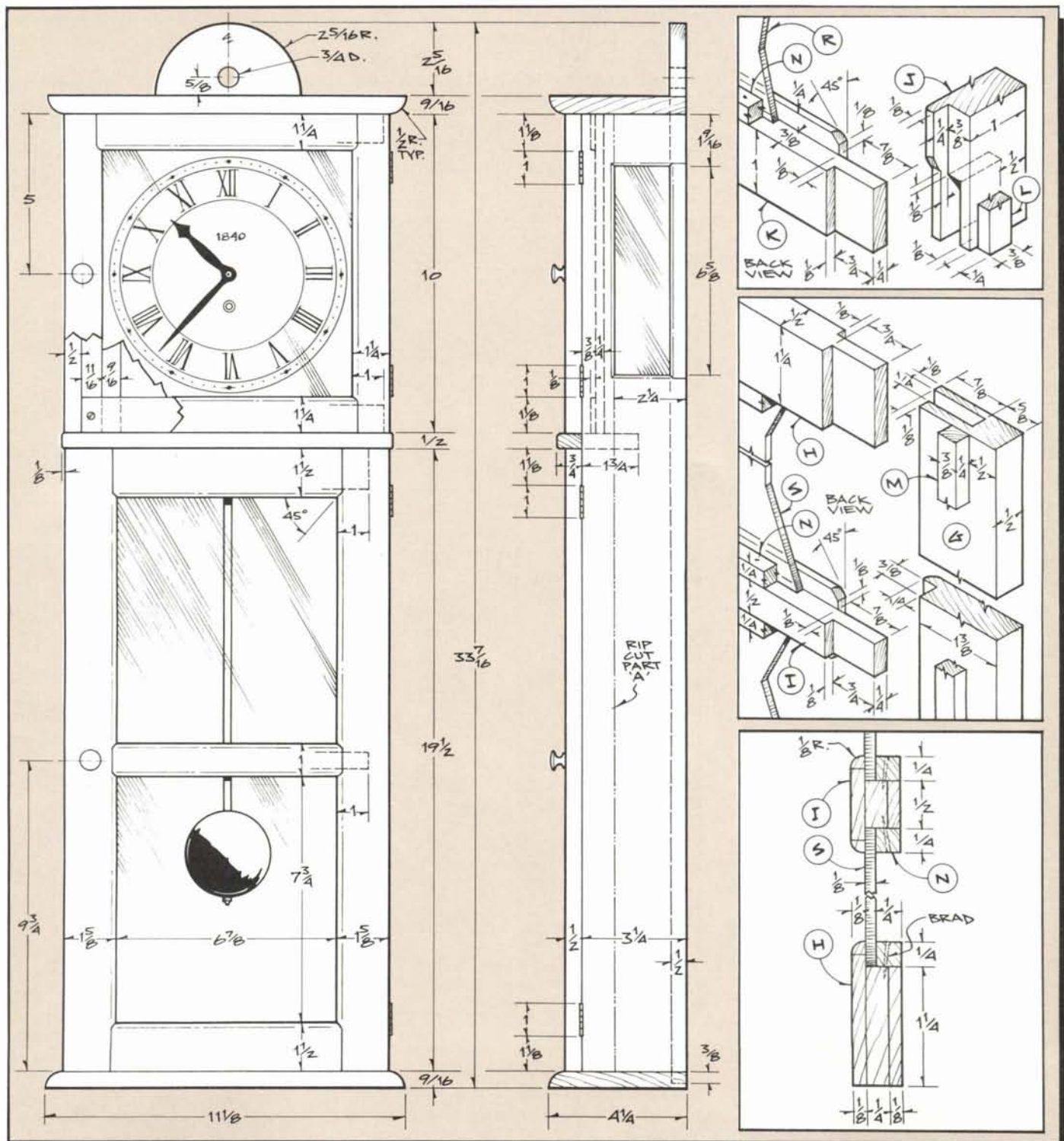
**T**his handsome Shaker wall clock, built by Massachusetts crafts-woman Barbara Coperine, is based on original designs by Isaac Newton Young in the collection of Hancock Shaker Village, Hancock, Massachusetts. Coperine's clock appeared in the juried show at Hancock, titled "Shaker Workmanship 1987." Featuring "a cross-section of contemporary craftspeople who are inspired by the spirit of Shaker design," the show included replicas and interpretations of traditional Shaker designs in addition to entirely new pieces that suggest how Shaker design might have developed in the late 20th century.

Coperine writes that Hancock Shaker Village owns three of the sixteen classic wall clocks of this style, built by noted 19th century Shaker craftsman Isaac Newton Young. She explains, "Two have a solid panel lower door, and one has the two panel glass door, as this clock has." She added, "The original clocks have hand-built wooden movements (weight driven), so this reproduction is only of the clock case." Coperine selected butternut for the clock case, and pine for the back.

While the clock shown in the photos is Coperine's, for the purposes of simplifying the construction, we have made several minor changes that are reflected in the artwork. Where the stiles and rails on the original clock had slightly different dimensions, we have tried to make sizes and joinery as consistent as possible. Also, where original Shaker construction made little if any allowance for wood movement, we have tried to make the piece more resistant to self-destruction. On the back, for example, we show slotted holes, with the back screwed toward the center, but not at the sides, as was the case with the original. This does not suggest that the Shakers were ignorant of this woodworking principle, but that without home insulation and central heating systems, wood movement was not the problem then that it is today.

In her general notes on building the





clock, Coperine writes, "In terms of construction, I used cut brads for nails and spring steel for the latches. The hinges are modern brass butt hinges, as are the screws. Everything is pretty straightforward, except cutting for the window glass, which is removable. To

solve the problem of cutting the groove to receive the glass, I decided to carefully rip the sides along the front edge of the opening for the glass, rip the groove and shape the edge on the top, bottom, and front pieces, and then re-glue the top and bottom pieces

to the front." This seems like a good deal of fussing for two little panes of glass, but there will be fewer problems if the glass ever requires replacing. The construction of the clock carcase could be simplified by eliminating the  
(continued on next page)

# SHAKER WALL CLOCK

window glass and going with solid sides instead.

Coperine used a West German 8-day "time only" movement, purchased from Mason and Sullivan, 586 Higgins Crowell Rd., West Yarmouth, Cape Cod, MA 02673. (Part no. 3336X, 18½ in. pendulum with 7 in. swing; cost \$29.95). The Shaker style hands (specify part no. 4970X) are included with the movement at no extra charge.

For authenticity, Coperine says, "I reproduced the original dial by drawing it to scale and having a silk-screen made up. I then hand silk-screened the dial pattern onto copper sheets that had been painted a grayish off-white to match the originals as closely as possible." Readers who are striving for authenticity can obtain one of these hand silk-screened copper dials by writing to The Museum Shop, attention: Manager, Hancock Shaker Village, P.O. Box 898, Pittsfield, MA 01202. The cost per dial is \$20.

The materials cost for the clock could be reduced substantially by substituting a battery-driven quartz pendulum movement for the West German key-wind model, and a paper dial for the silk-screened reproduction. Both these substitutes are available from Mason and Sullivan. If you do opt for the paper dial, specify a 7 in. time ring, and ask for their part no. 2820P; cost \$2.95. It must be backed up with a stiff surface, preferably ¼ in. thick plywood. To accommodate the plywood, make part E ½ in. thick, as opposed to the ¼ in. thickness indicated, and then cut a ¼ in. deep rabbet to accept the ¼ in. thick plywood. When ordering a quartz pendulum movement to mount on the plywood backed paper dial, you will need to specify a movement which will have a handshaft more than ¼ in. long. *Editor's Note:* In trying to locate a battery-driven quartz pendulum movement for this clock, we found that the maximum pendulum shaft length available was 17¼ in. This is Mason and Sullivan's part no. 3733, cost \$6.95. The pendulum length with this model will be slightly less than with the key-wind German movement, but should still look fine.

The clock case is easy to build. Cut the parts to the required dimensions, machine as needed (round over base

and top, jigsaw circle top back, rabbet parts A, B, and E, notch parts C and D, and slot holes in back), and then assemble with cut brads. If you decide to make the side window grooves, start with wider stock for parts A to allow for waste when jointing and ripping. Part P can be made later to fit.

Bill of Materials (all dimensions actual)			
Part	Description	Size	No. Req'd.
A	Side	½ × 3¼ × 30	2
B	Base	9/16 × 4¼ × 11½	1
C	Top	9/16 × 4¼ × 11½	1
D	Shelf	½ × 2½ × 10%	1
E	Dial Support	¼ × 1¼ × 10	2
F	Back	½ × 9½ × 33¼	1
G	Lower Door Stile	½ × 1½ × 19½	2
H	Lower Door Rail	½ × 1½ × 8¾	2
I	Lower Door Center Rail	½ × 1 × 8¾	1
J	Upper Door Stile	½ × 1¼ × 10	2
K	Upper Door Rail	½ × 1¼ × 9¾	2
L	Upper Door Cleat	¼ × ¾ × 10	2
M	Lower Door Cleat	¼ × ¾ × 19½	2
N	Keeper Strip	¼ × ¼ stock About 100 in.	
O	Dial Retainer	⅛ × 1½ × 9¾	2
P	Window Retainer	¼ × ½ × 7%	2
Q	Window Glass	2 × 7¼	2
R	Upper Door Glass	8 × 8¾	1
S	Lower Door Glass	7¾ × 8¼	2
T	Knob	see detail	2
U	Dial Face	7¼ × 10*	1
V	Movement	8-day Pendulum**	1
W	Hands	supplied with movement**	1 pr.
X	Hinge	½ × 1 in. brass butt	2 pr.

\* Available from Hancock Shaker Village (see text).  
\*\* Available from Mason & Sullivan (see text for prices, part nos. and substitutions).

The upper and lower door frame assemblies require the most work in this project. As shown in the front elevation, these door frames feature a mitered, rounded detail around the glass perimeters. The procedure for creating this mitered detail requires that all mortises and tenons be cut first, after which the ⅛ in. radius is applied. Next, using either the router table or the table saw, cut the rabbet that will accept the glass. Take great

care here as only a ⅛ in. thick by ¼ in. wide lip will remain, which can be easily broken off. *Editor's Note:* Coperine cut a ⅛ in. deep rabbet for the glass, leaving a ⅛ in. wide lip. However, this method required a very thin (⅛ in. × ¼ in.) keeper strip, that could be a problem to cut on the table saw. By increasing the rabbet depth, we were able to use a ¼ in. × ¼ in. keeper strip (N).

The miters on the various door frame parts can be cut either with the table saw, or by hand using a chisel and the jig shown in the mitering detail. The hand method is recommended from a safety standpoint. As shown on the elevation, the material on the lower door stiles between the miters where the center rail (I) meets them must be removed. A detailed explanation of cutting mitered molded mortise and tenon frames is provided in the Special Techniques article in our November/December 1986 issue. While that feature illustrates the technique used in a frame and panel application, the glass-in-rabbet application that our clock features is very similar.

The door frames are assembled as shown, and cleat strips (L, M) are glued in place. The purpose of the cleat strips is to provide the doors with added rigidity, and to serve as a mount for the spring steel bent catch. To make this catch, bend a short length of spring steel into a "U" shape, drill for and epoxy the ends of the "U" into the cleat, and mount a screw in the clock side (one screw for each catch) as a lip for the catch to spring over to hold the door closed. The spring steel catch can be adjusted as needed to get the proper operation. A bullet catch could also be substituted, if you prefer.

After final sanding, the cabinet is finished with a homemade varnish and oil mixture, made of equal parts satin varnish, boiled linseed oil, and turpentine. More on varnish and oil mixtures is available in our *Finishing* article on page 23. The top half-circle of the pine back is stained brown to match the butternut, and the inside of the back (visible through the glass door panel) is painted with yellow oil paint. To obtain a good fit for the glass, it's a good idea to bring the door frames into the glazier and let him cut the glass to fit.

Wwj





## Stereo Cabinet & Speakers

**F**or audiophiles, this combination speaker and cabinet set offers the ultimate woodworking project. Both the cabinet and the speakers reflect the same contemporary styling, with an inner box of oak laminate surrounded by an outer frame of walnut laminate. While you could simply make the speakers and cabinet with the inner box and eliminate the exterior supporting frame, the dynamic styling of the project really depends on the contrast between the oak and walnut laminates and the theme of the angled supporting frames.

We have worked out a specific component package that includes all the drivers, connectors, gasket and damping material, grill snaps, mounting screws, and the wiring harness required for one set of speakers. The \$150 component kit price is very reasonable for

the quality materials provided, and we do not recommend substituting lesser quality components. More information on component specifications and the mail-order source is provided in the Bill of Materials on page 45.

In addition to the component package, you will need one sheet (4 × 8) of ¼ in. thick veneer core walnut plywood, two sheets (4 × 8) of ¼ in. thick white oak medium density fiber-core board, and one sheet (4 × 8) of ¼ in. thick white oak veneer plywood. All laminates must be “good both sides.” If your local hardwood or building supply center does not have these items in stock, they can be special ordered, although you must allow time for delivery. You will also need sufficient oak and walnut edgbanding (we used an iron-on type), some hardwood for the speaker grill frames, speaker

grill cloth (available from Radio Shack stores), and brass tubing and rod for the cabinet shelf support system (see cabinet Bill of Materials for source). The total materials cost for the cabinet and two speakers, including the component package, all hardware, laminate stock, edgbanding, and other miscellaneous items should not exceed \$400, a reasonable cost considering that a good pair of speakers alone might cost at least \$300.

The cutting and assembly methods for both the speakers and the cabinet are nearly identical; however, for simplicity we have parted each out separately. Keep in mind, when dealing with large surfaces of plywood or laminate that are to be joined in carcass construction with mitered corners, accuracy of all your cuts is critical. If your table saw is not set up for

crosscutting and ripping sheet stock, you will need to construct an auxiliary rip fence and table extensions.

For the first time, we are presenting a project that is constructed with "plate" or "biscuit" joinery. The decision to purchase and use a plate joining device for the stereo cabinet and speakers was based on the fact that there is no better, faster, or more accurate way to put together plywood carcasses in a home shop. We estimated that using the plate joiner cut the joining time in half for this project.

The plate joiner is extremely easy to use, guaranteeing nearly perfect joints every time, so long as crosscuts and rips are accurate. A general how-to for the plate joiner is presented on page 48, but you should refer to instructions for the model you purchase since there may be minor variations.

If you prefer, however, splines could be substituted for the plate joinery shown with no sacrifice in strength and no change in construction.

Begin by laying out all plywood parts, both for the speakers and the cabinet, as illustrated in the cutting diagrams. Note that all the speaker and cabinet frame parts are obtained from the single sheet of  $\frac{3}{4}$  in. thick walnut plywood, while the remaining box parts are obtained from the two sheets of white oak medium density fibercore. You should not substitute a veneer core plywood for the fibercore, because the speakers operate with the least distortion (technically called sympathetic vibration) when they are constructed from the extremely dense fibercore product.

We provide final dimensions in the Bill of Materials, although when rough cutting the stock from the sheet material, be sure to allow additional length for all pieces that must later be mitered. Keep the best side of the plywood out, making sure that the grain on the carcasses is continuous, and maintain a common fence setting when cutting common sized parts for accuracy of fit later on. We cannot stress enough that cuts must be exact.

## Speakers

Miter the ends of the top/bottom (A), and sides (B), and cut the plate joints. Then dado the top, bottom and

sides as shown to accept the front and back panels (C). Rabbet the front and back panels, and test-fit with the rest of the box at this point.

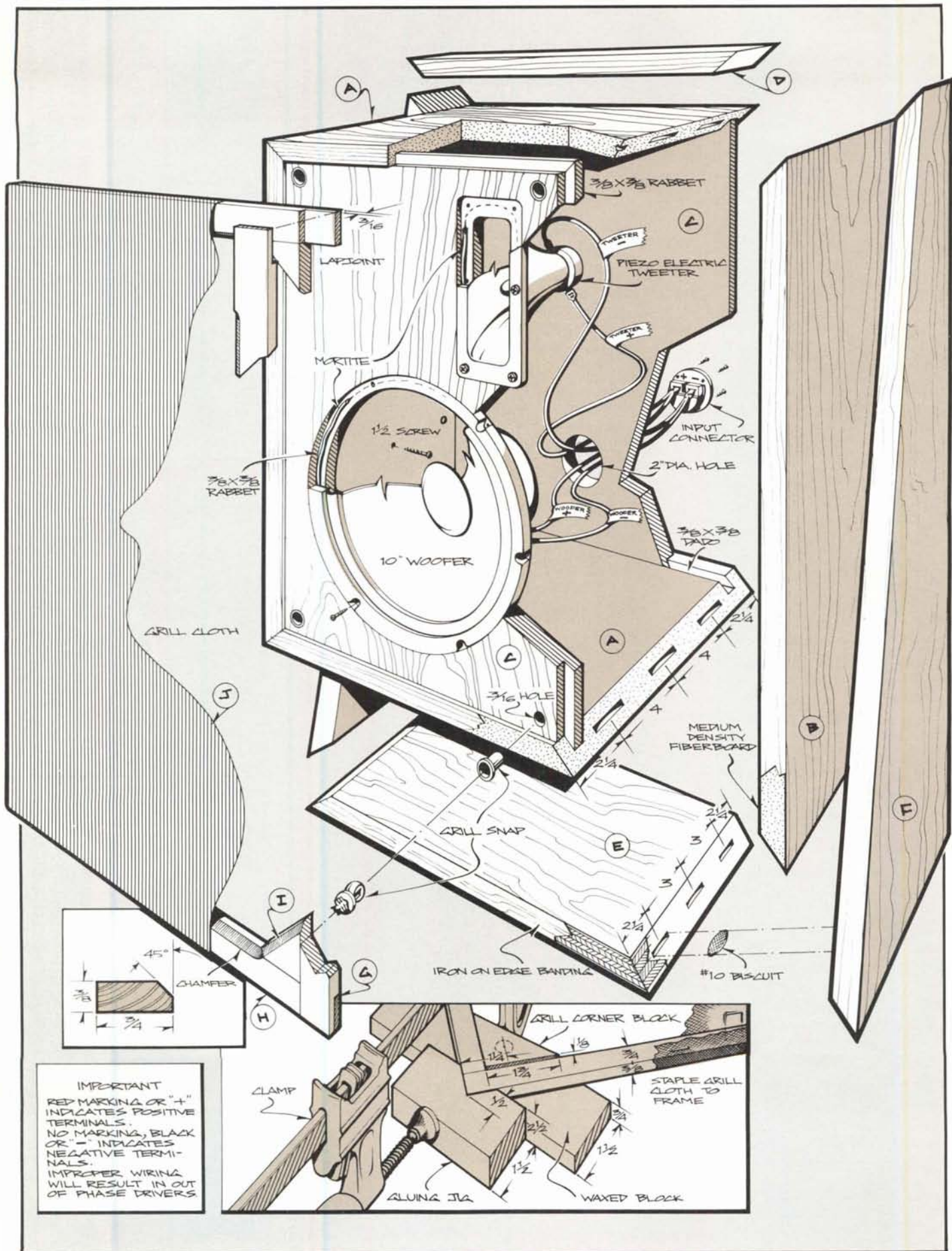
Next, cut out the holes to accept the drivers and input connectors. A router template should be used for cutting the shoulder for the tweeter to insure accuracy. Rabbet the woofer hole with a  $\frac{3}{8}$  in. rabbeting bit, and drill the holes as indicated for the grill snaps.

Now edge-band the box top/bottom and sides, using the iron-on 1 in. wide oak edgebanding. We followed up the iron with a block of wood, pressing hard as we slid the block along behind the iron, to insure that the edgebanding had a tight fit and would not begin to creep up, as it is prone to do until the glue cools. The edgebanding will

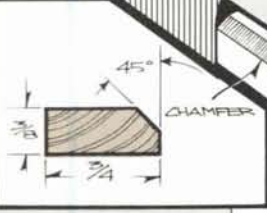
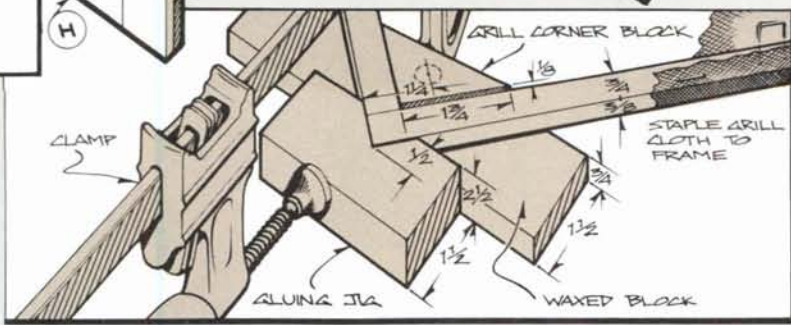
overhang on the sides and ends, and is trimmed flush and mitered with a sharp razor knife. A 220-grit sandpaper can be used to remove any "fuzz" remaining on the edgebanding ends or edges.

Now drill all holes for the screws that are used to mount the frame sides, and pre-sand the front and back panels. Pre-sanding is important for any parts where clear access for sanding will not be available after assembly. Finally, glue up the boxes, with the plates in place (note that we used a no. 10 sized plate for all the joinery in this project). Use band clamps and corner blocks, as illustrated, to clamp. The corner blocks are a must to protect the delicate corners and to distribute  
(continued on next page)





**IMPORTANT**  
 RED MARKING OR "+"  
 INDICATES POSITIVE  
 TERMINALS.  
 NO MARKING, BLACK  
 OR "-" INDICATES  
 NEGATIVE TERMINALS.  
 IMPROPER WIRING  
 WILL RESULT IN OUT  
 OF PHASE DRIVERS



clamp pressure during assembly.

You can now miter the frame sides (F), and then cut the taper. We rough cut the taper on the band saw, and then jointed the cut smooth. Since plywood is rough on jointer knives, an alternate method is to use a straightedge as a fence after making the rough taper, and clean up the cut with a flush trimming bit and router.

Temporarily clamp the frame sides in place around the speaker box, and then miter the frame top (D) and frame bottom (E) parts to fit. Also rip the angle on the front edge of the top frame and the angle on the front edge of the bottom frame to match the taper of the sides. Plate joints are cut on one side only, at the lower end, and on the corresponding end of the bottom piece. The joint here is strictly an assembly aid. There is no joint where the sides meet the top, since there is insufficient space across the width of the parts at this point to allow for a plate. The plate joint on the opposite end of the bottom had to be eliminated, since the bottom (which is added last) could not have been mounted if plates were used on both ends. While the plate joint does add strength, in this situa-

tion the absence of the joint is not critical, since veneer core plywoods result in a reasonably strong mitered joint.

Now edge-band the frame parts, following the same procedure as for the previous edge-banding. Also, pre-sand the box exteriors and the frame part interiors.

To assemble the frame parts, first glue the frame top in place and let dry. Then attach the frame sides with screws through the box, and glue. Lastly, glue and assemble the frame bottom. Web clamps and corner blocks should be used for the assembly to protect the corners. When dry, sand the remaining exterior surfaces.

The speaker grill frames are made from  $\frac{3}{8}$  in. thick hardwood stock with half-lapped corners. Glue corner blocks (I) in the four grill corners (see illustration). Then apply a 45-degree chamfer around the grill inner perimeter, and staple the speaker cloth in place (see illustration). The speaker cloth has considerable stretch and should look good without too much effort. Both cloth grills can be cut from a single roll of material.

(continued on next page)

### Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd.
<b>Speakers</b>			
A	Top/Bottom	$\frac{3}{4} \times 12\frac{1}{2} \times 14\frac{1}{2}$	4
B	Side	$\frac{3}{4} \times 12\frac{1}{2} \times 22$	4
C	Front/Back	$\frac{3}{4} \times 13\frac{3}{4} \times 21\frac{1}{4}$	4
D	Frame Top	$\frac{3}{4} \times 2\frac{1}{4} \times 16$	2
E	Frame Bottom	$\frac{3}{4} \times 10\frac{1}{2} \times 16$	2
F	Frame Side	$\frac{3}{4} \times 10\frac{1}{2} \times 28\frac{3}{4}$	4
G	Grill Stile	$\frac{3}{8} \times \frac{3}{4} \times 22$	4
H	Grill Rail	$\frac{3}{8} \times \frac{3}{4} \times 14\frac{1}{2}$	4
I	Grill Corner Block	$\frac{1}{2} \times 1\frac{3}{4} \times 1\frac{3}{4}$	8
J	Grill Cloth (brown)*	16 x 24	2
K	Oak Edge-banding**	1 in. x 8 ft. roll	4
L	Walnut Edge-banding**	1 in. x 8 ft. roll	4

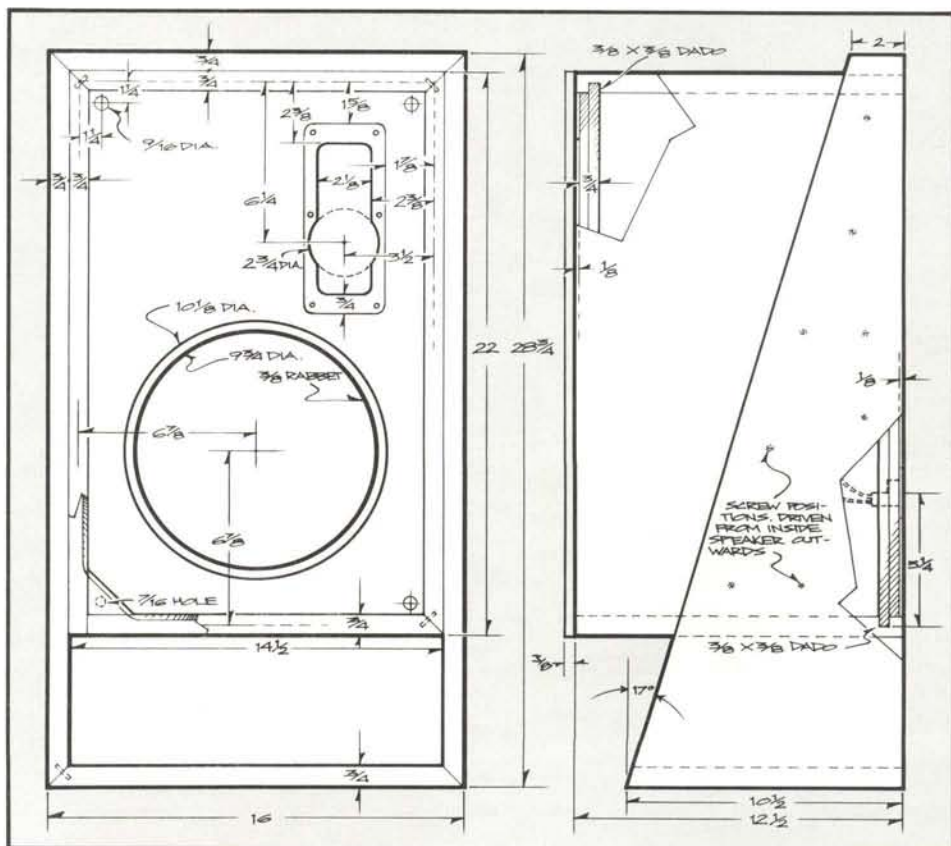
\*Available at Radio Shack Stores (32 in. x 36 in. roll, about \$7.00).

\*\*Available from: Constantine's, 2050 Eastchester Rd., Bronx, NY 10461. Order part no. WE61 (white oak), part no. WE71 (walnut); \$2.50 each.

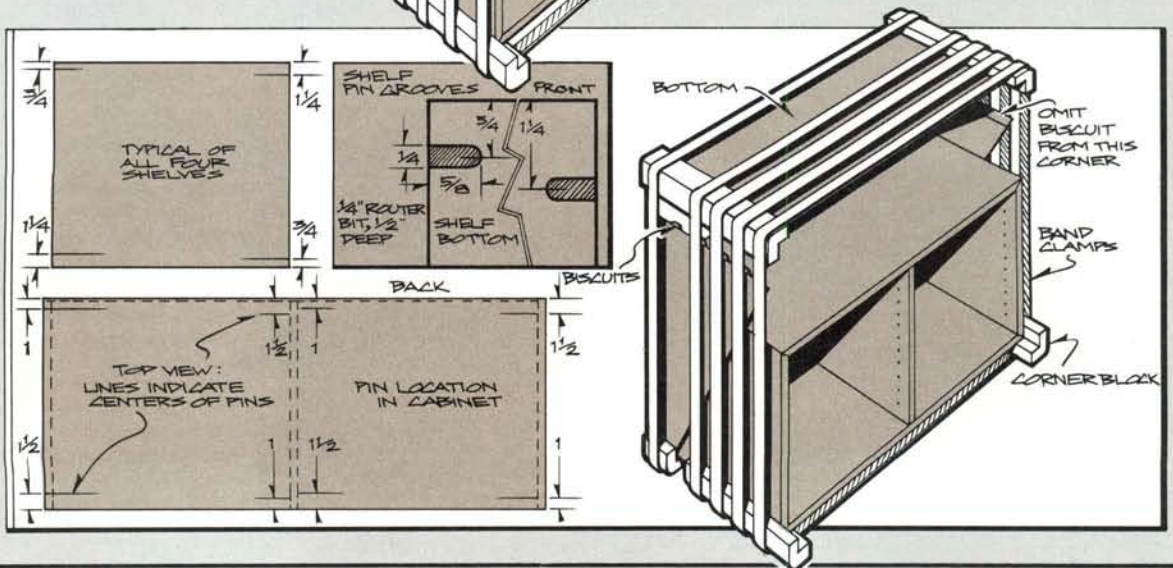
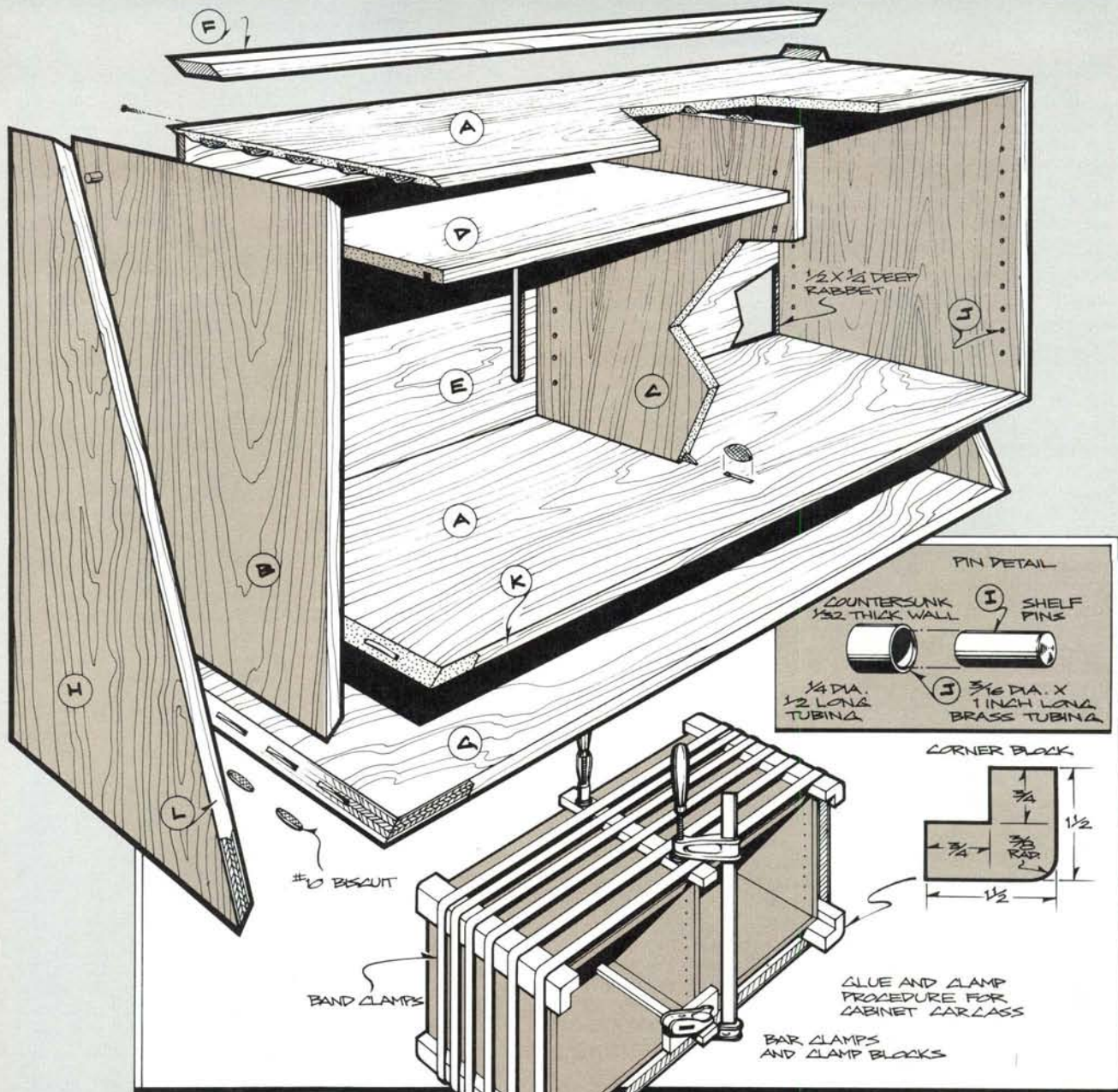
### Hardware and Electronic Components\*\*\*

M	MTX Polypropylene Woofer	10 in. dia.	2
N	Motorola Piezo Electric Horn Tweeter		2
O	Damping Material		2 Bags
P	Mortite Gasket Material		as needed
Q	Red/Black Input Connectors		2
R	Grill Snaps		8
S	Black Screws	Sm. for input connectors; lg. for drivers	36

\*\*\*All hardware and electronic components are included in a kit (\$150 per pair of speakers). Order from: The Speaker Place, 3047 West Henrietta Rd., Rochester, NY 14623; (716) 424-3680. Specify for *The Woodworker's Journal* project. Technical note: All input connectors and quick connectors are pre-soldered to the wires. Speakers are 8 ohm with maximum input of 100 watts (RMS). A paper cone woofer speaker system with 60 watts (RMS) input may be substituted at a reduced kit price of \$130.







pattern, maintaining even pressure all around so as to not distort or crack the driver.

### Cabinet

The cabinet assembly procedure is nearly identical to the speaker assembly. The primary differences are that there are no dados and only a simple rabbet to accept the plywood back (E). Also, dowels are used to locate the frame sides (H) to the cabinet box. Note that the cabinet sides (B) and divider (C) have a series of shelf mounting pin sleeves (J). As shown in the top view of the cabinet, the spacing of the shelf pins in the cabinet sides and divider is staggered. This staggered arrangement was

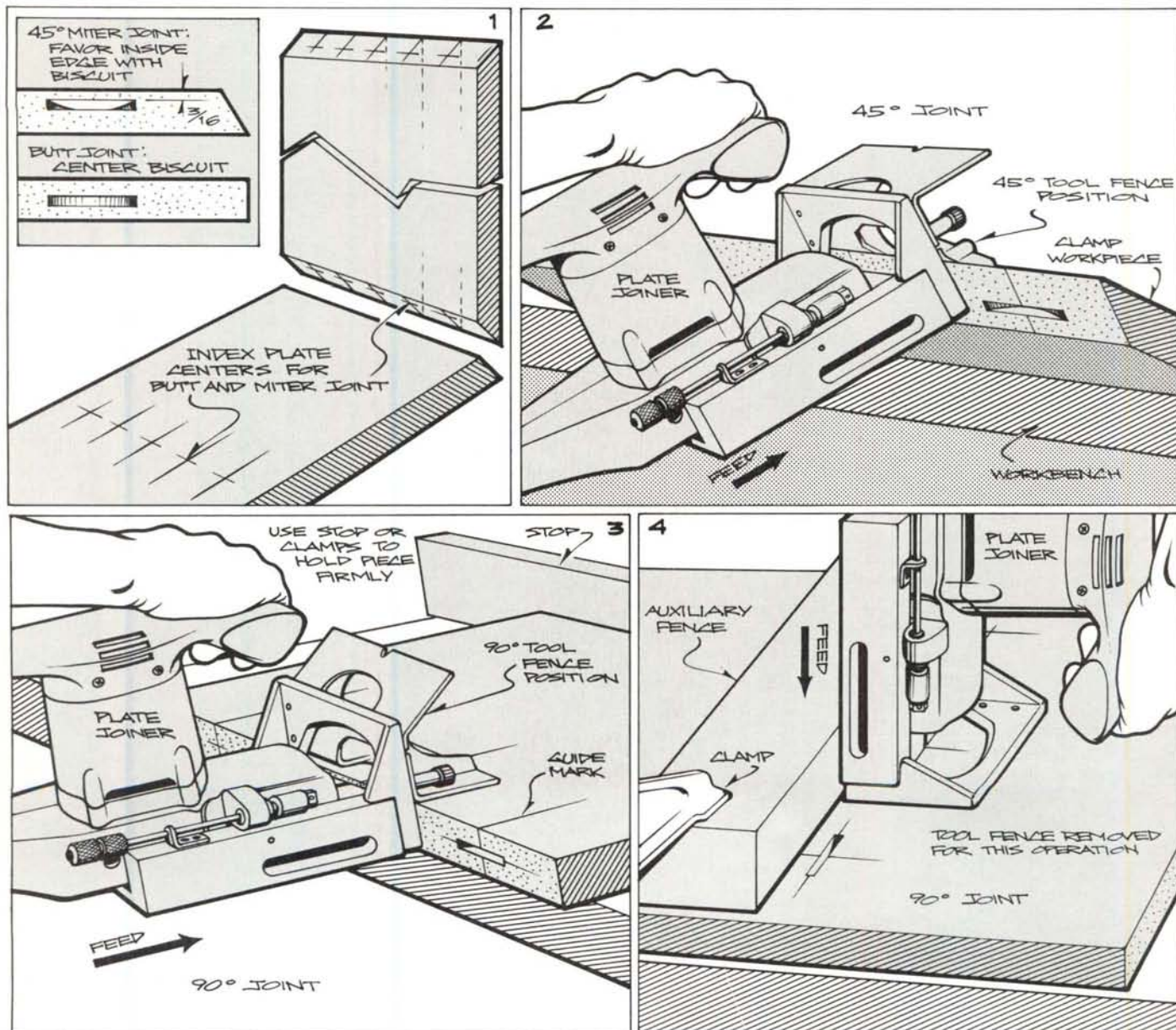
necessary to avoid the center divider pins lining up, which would have required the sleeves to be shortened, weakening their resistance to tear-out under load. The notches in the shelf bottoms to accept the shelf pins must also be staggered, as illustrated in the details, to work properly. These sleeves are epoxied in place, and a countersink is used to apply a slight chamfer around the inner perimeter to ease the entry of the brass shelf pins (I). We did not edge-band the shelf sides, since they are not visible. The back is slotted to accept wiring for the electronic components you put in the cabinet (wiring grommets could be used in lieu of the slots, if you prefer, to fit your specific system). As with the speakers, the plate

joint had to be omitted from one lower corner of the cabinet's outer frame to facilitate assembly.

**Materials Note:** Medium density fibercore board (MDF) is a composite material that offers good stability, and machines easily and with great accuracy. While in most cases a hardwood plywood can be interchanged with MDF, we do not recommend interchanging for the speakers, since even the best hardwood plywood can have small voids that detract from the speakers' overall tone and resonant qualities.

*Editor's Note:* Special thanks for technical assistance to Dave Selwyn, Manager of Sounds Incredible in Brookfield, Connecticut.

## Plate Joiner Operations



We've always liked basic pine projects that can be constructed with standard  $\frac{3}{4}$  in. thick pine boards using everyday workshop tools.

This small table is one of the nicest "occasional table" designs that we've seen in sometime. While you could edge-glue narrower material to obtain the wide stock required, mill-finished, glued-up wide pine is also available at most lumber yards. If you choose to edge-glue your own, turn to our Woodworking Basics article on page 14 for step-by-step instructions.

There are only five major parts to the table: the two sides (A), the stretcher (B), the shelf (C), and the top (D). Although the bill of materials provides the *final* overall dimensions for all parts, it is usually best to rough cut your material slightly oversize. In the case of the sides and shelf, this extra material is especially important since the final crosscuts establishing the length of these parts are at an angle.

**Bill of Materials**  
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Side	$\frac{3}{4}$ x 11 x $21\frac{3}{8}$	2
B	Stretcher	$\frac{3}{4}$ x 3 x $18\frac{1}{4}$	1
C	Shelf	$\frac{3}{4}$ x 8 x 15	1
D	Top	$\frac{3}{4}$ x 14 x 22	1

To make the sides, first rip material to the approximate overall width, and with the table saw blade inclined at 5 degrees, crosscut both ends to obtain the final length. Then use a tapering fixture to establish the tapers on both sides. While the notch to accept the stretcher tenon can be cut by standing the sides on end and using the dado head, we made the notch by hand using a guide block and chisel, as illustrated in the detail. Lay out and saber saw the 11 in. radius curves along both leg tapers, and lay out and cut the bottom end arch and heart profiles using the 1 in. square grid patterns as a guide.

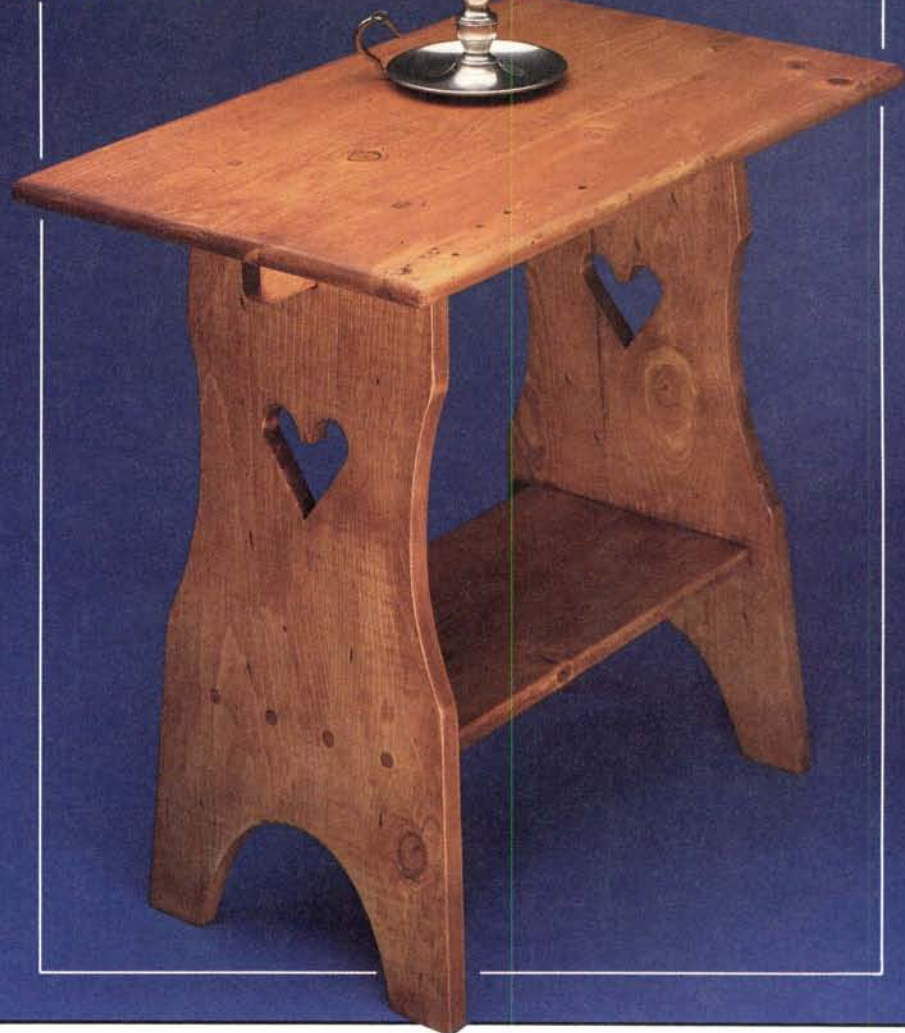
The stretcher can be made next. Note that the lower ends that butt to the sides must reflect the 5-degree angle of the sides. As shown, the  $\frac{1}{2}$  in. diameter dowel holes are slightly offset to tension the sides when the dowels are inserted.

The shelf ends must also reflect the 5-degree angle of the sides, and are crosscut on the table saw with the blade set at 5 degrees.

The top is simply cut to size, and radiused on the top and bottom edges as shown.

The top is fastened to the sides and

# Country Occasional Table



the sides joined to the shelf with  $\frac{3}{8}$  in. dowel pins as illustrated in the exploded view. You could make special jigs to drill these holes, although a small hand held drill and a good eye should be sufficiently accurate. The dowels are drilled for an approximate 10-degree angle to provide some additional mechanical strength.

Because of the 5-degree side angle, you may find that it is difficult to keep the shelf from slipping out of place when bar clamps are applied across the two sides. You could clamp stopblocks in place to prevent such movement, but we prefer to insert several small brads in the shelf ends and then nip the heads so that about  $\frac{1}{8}$  in. remains. The brads prevent any slippage. If you are using pre-glued wide pine stock, note that this material typically measures only

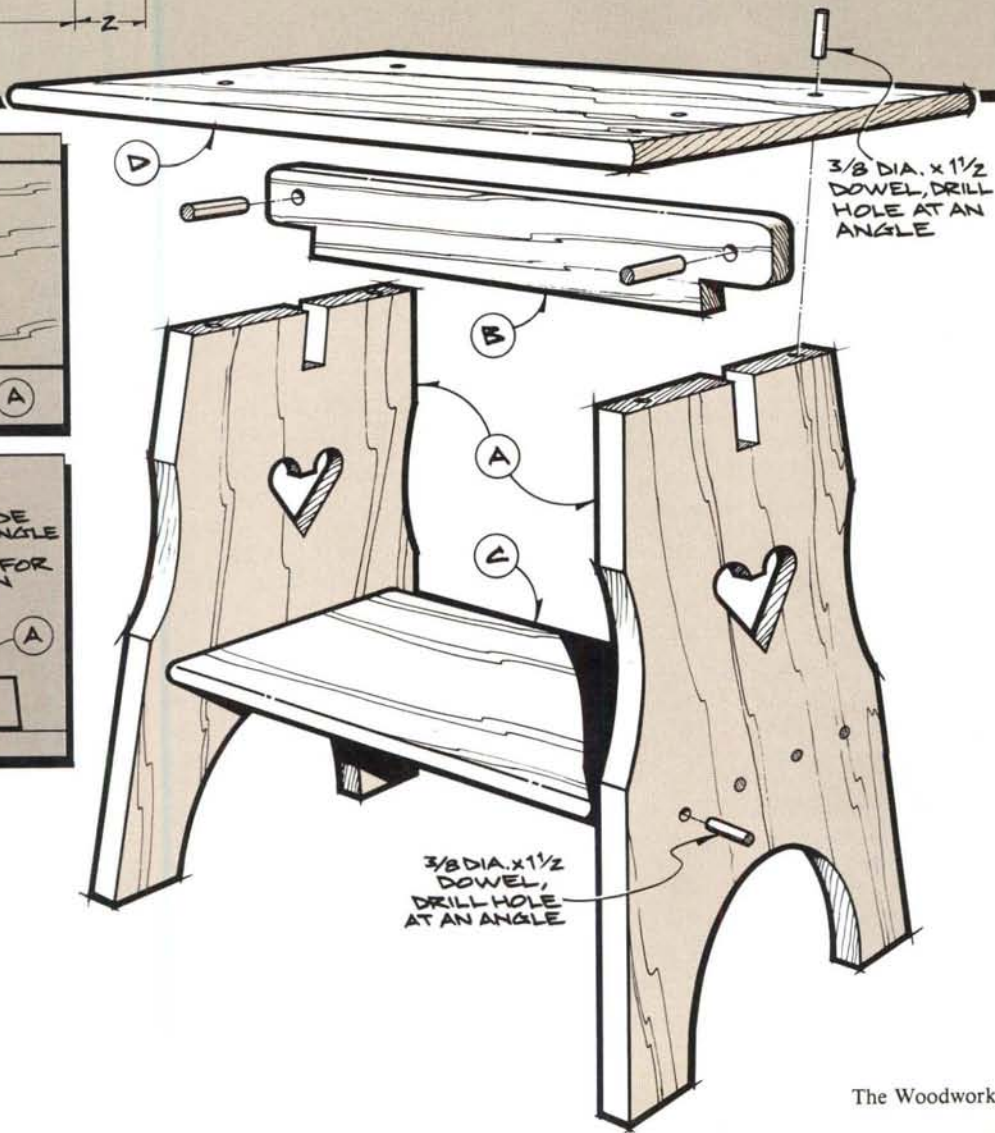
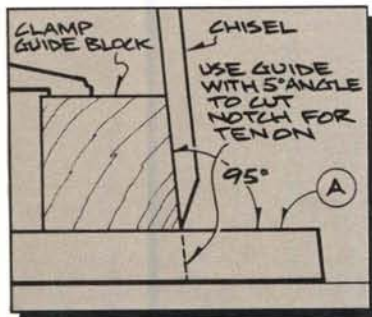
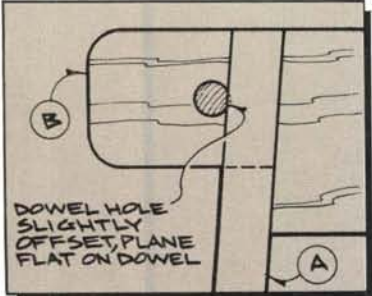
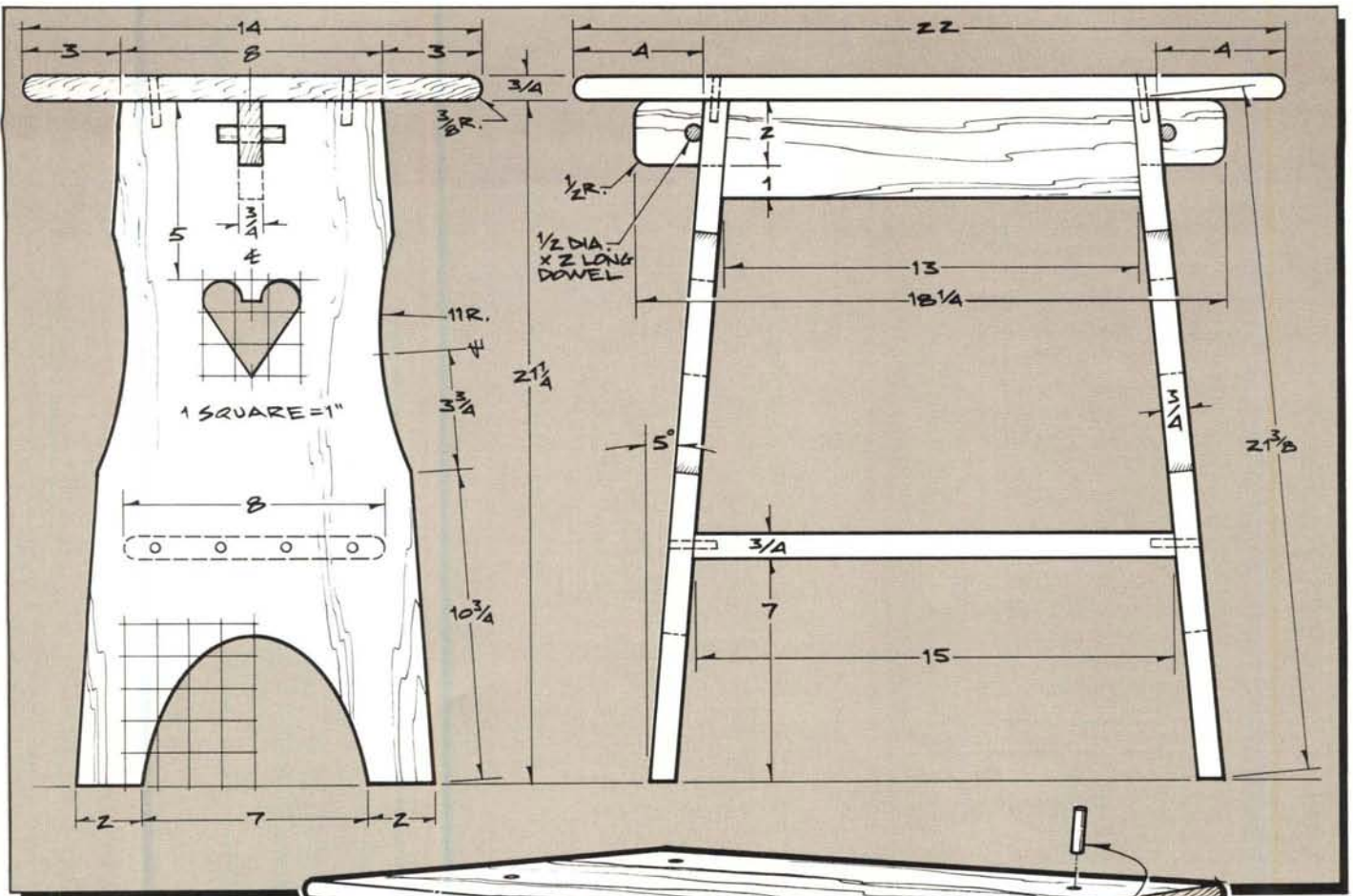
$\frac{1}{16}$  in. thick. Substitute  $\frac{3}{16}$  in. diameter dowels for the  $\frac{3}{8}$  in. diameter dowels to avoid splitting out the  $\frac{1}{16}$  in. material. If you use brads in the shelf ends, be sure to keep them clear of the dowel locations.

If everything in this project doesn't turn out perfectly, don't worry. With a piece that is going to be distressed, a little rough work adds to the look of authenticity.

We distressed our table by gouging it with a chisel. The key when distressing is to know when to stop. Not enough distress marks, and they look like defects; too many and the piece becomes busy. After distressing, we sanded, stained and then oiled the table with a good quality penetrating oil.

Wwj

(continued on next page)



Our shop-built angle fixture for the drill press is a must for any well-equipped workshop. In theory a drill angle fixture is only necessary if your drill press does not include a tilting table feature, but in practice it is usually best to leave the table set at 90 degrees to the drill, since achieving a perfect setting often requires a good deal of fussing.

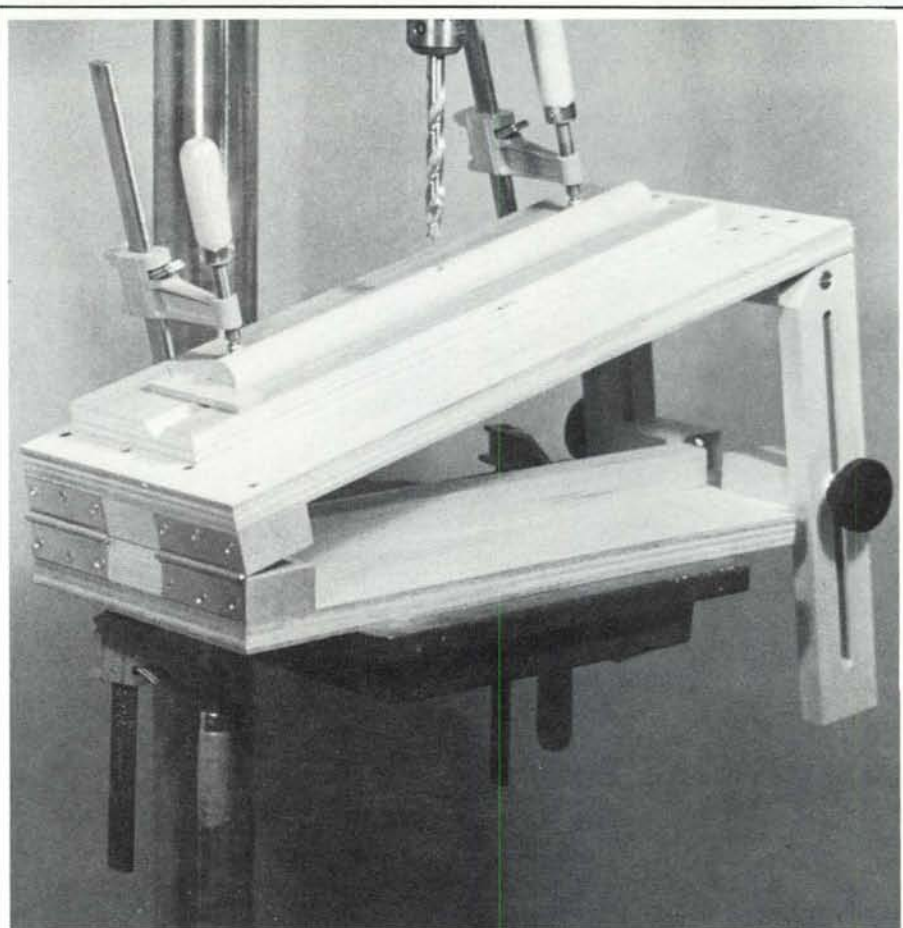
Our fixture is very easy to build, requiring only some scrap hardwood,  $\frac{3}{4}$  in. thick plywood, and the necessary hardware. Although we used a  $\frac{3}{4}$  in. thick hardwood plywood for appearance, any  $\frac{3}{4}$  in. thick plywood can be used.

Begin by cutting the plywood base (A) and table (B) to length and width. Note that these parts are identical except for the notches cut into the base corners for the arm clearance. Next, cut the hardwood blocks (parts C and D) and the cleats (E) to size. To make the arms (F), cut  $\frac{3}{4}$  in. thick stock to 2 in. wide and 12 in. long, then use the router table, a  $\frac{3}{8}$  in. diameter straight bit, and several stopblocks to establish the slot in the arms for the carriage bolts. You will need to make at least three passes to get the full  $\frac{3}{4}$  in. slot depth. Nip the upper corner of each arm as shown at 35 degrees to provide clearance for the arm to pivot once it is mounted.

Pre-drill the arms and blocks as shown for the stove and carriage bolts. Note also that the various assembly screw holes, and the stove bolt holes in the arms, are countersunk. The hinges (H) and all the bolts, screws, and washers should be available at your local hardware store. As indicated, the two carriage bolts are epoxied in place. Be sure to epoxy them into the blocks before the blocks are mounted, since there is no room to insert the carriage bolts after the blocks are located. You could substitute a wing nut for the plastic knobs (G) we show, although the knobs are much easier to operate and lend the fixture a professional look. The source and price of the knobs are provided in the Bill of Materials.

While there are many uses for an angle fixture, the three most common uses are for drilling pocket holes, drilling angled holes in round stock with a V-block, and making guide blocks for drilling angled holes (see photos).

No matter what the application, keep in mind that the fixture base must be clamped securely to the drill press table, and the piece being drilled must be clamped securely to the fixture



## Drill Press Fixture

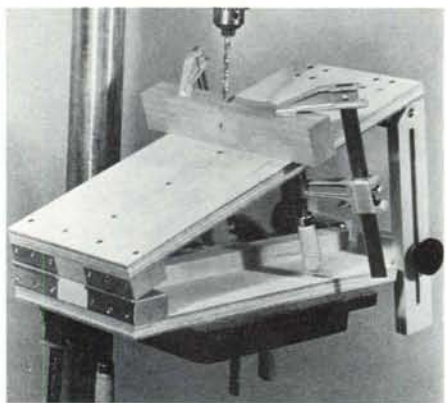
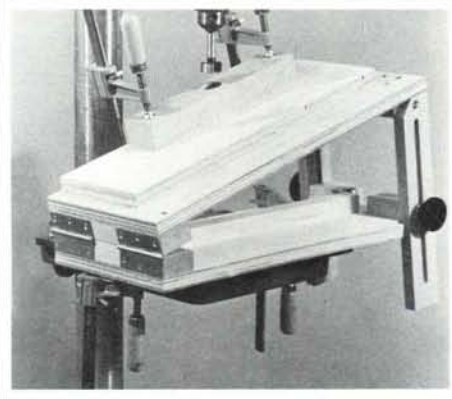


table. Our fixture has the capacity for tilting up to about 28 degrees. While greater tilt capacity could be achieved by increasing the length of the arms, we found that at steeper angles even the best brad point and Forstner bits tend to skew off slightly unless an auxiliary block is clamped in place at 90 degrees to the drill bit where the bit enters the stock.

W&J

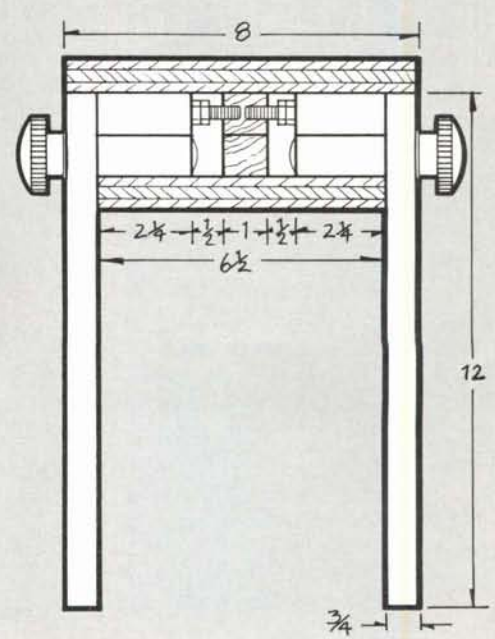
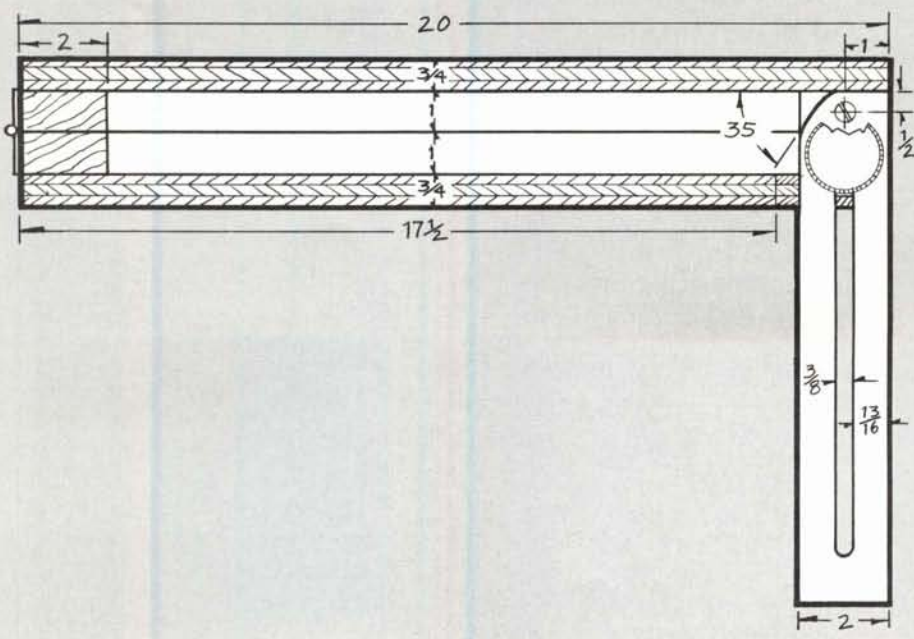
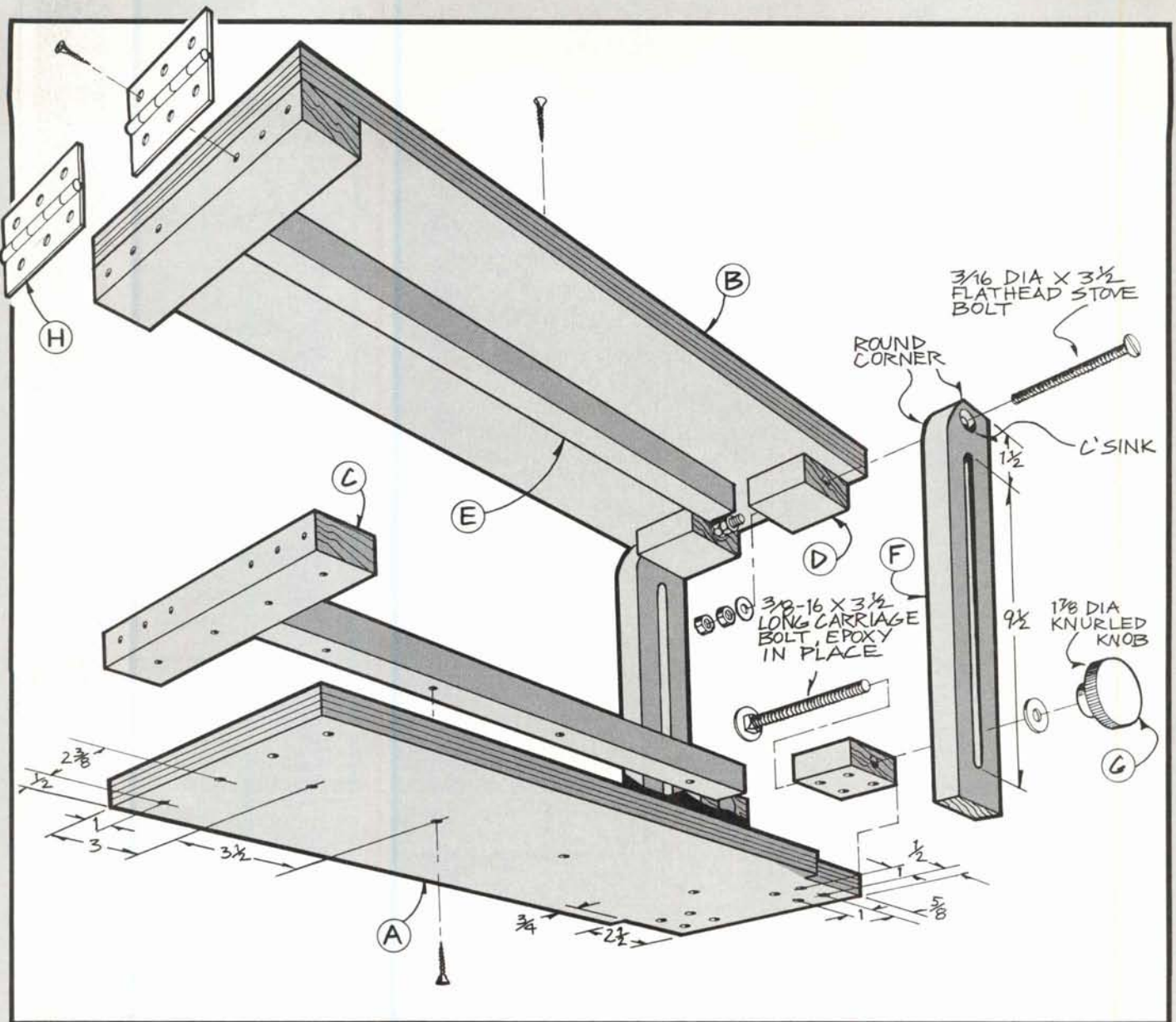
(continued on next page)

### Bill of Materials

(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Base	$\frac{3}{4}$ x 8 x 20	1
B	Table	$\frac{3}{4}$ x 8 x 20	1
C	Hinge Block	1 x 2 x 8	2
D	Arm Block	1 x 2 x 2 $\frac{1}{4}$	4
E	Cleat	1 x 1 x 16	2
F	Arm	$\frac{3}{4}$ x 2 x 12	2
G	Knob	1 $\frac{7}{8}$ diam.*	2
H	Hinge	2 x 3	2

\* Available from: United States Plastic Corp., 1390 Neubrecht Rd., Lima, OH 45801. Telephone: 1-800-537-9724 (Ohio 1-800-821-0349). Order part no. 83-85219, cost is \$1.04 each. Minimum billing \$5.00; \$2.00 service charge on orders under \$20.00.



# Shop Tips

Here's how I transfer grid patterns to wood. First I use a photocopy machine at a local printer to enlarge the pattern to full size. Next, I use lacquer thinner to thoroughly wet the backside of the paper, then I place the paper, pattern side down, on the stock and rub hard with a rag. All the details will transfer to the wood.

Dan Ida, Reedsburg, Wisconsin

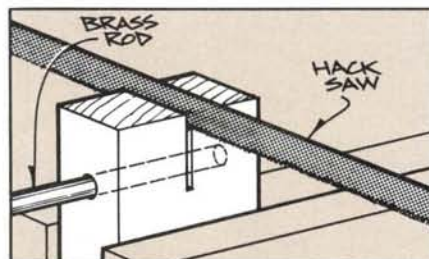
Generally we like to use a coat of paste wax in areas where glue squeeze-out can be tough to clean up. Some open-pored woods like oak and ash, though, tend to soak up the wax and it



becomes hard to clean from the surface, even using acetone. Excess wax does not present a problem with penetrating oil finishes, but when lacquer is applied, it takes on a milky blush from the wax. So for projects

that use a lacquer finish on an open-pored wood, we add a strip of masking tape, allowing about a 1/32 in. gap as shown. The wax is only applied to the 1/32 in. gap. After assembly, the tape is lifted off and any glue squeeze-out is removed. The thin wax line is cleaned up with acetone. After applying the lacquer, the little blushing that occurs is not apparent.

A project required that I hacksaw 14 pieces of 1/8 in. diameter by 1/2 in. long brass rod, and the thought of sore fingers and inaccurate lengths was

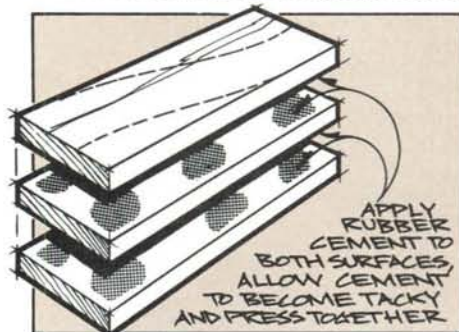


somewhat discouraging. My solution was a piece of 1 1/8 in. thick by 1 1/2 in. long scrap pine with a 1/4 in. deep hacksaw kerf and a 1/8 in. diameter hole bored at a right angle. Placed in a vise, this fixture held the rod snugly and the rod was cut easily and accurately.

Duane C. Hawk, Rush, New York

Sometimes a band saw project requires cutting a number of identical pieces. Time can be saved if several of the pieces are stacked one upon another, but the question arises as to

how best to hold the pieces together. I've found that rubber cement, sold in any office supply store, works effectively. Apply a few spots of cement to the first piece of wood, then quickly add a second piece for just an instant to transfer the pattern of the spots. Add a



bit more cement to the second piece where the spot patterns are, and let both pieces dry. When pressed together, the bond is instant. After making the band saw cuts, the pieces are pulled apart and the cement is peeled off.

Don C. Schroeder, Worcester, Mass.

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

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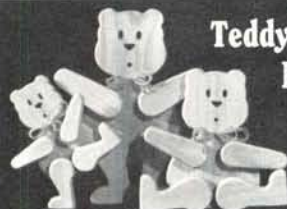
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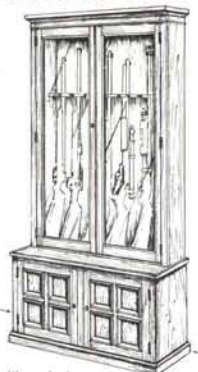
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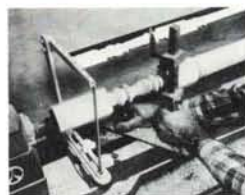
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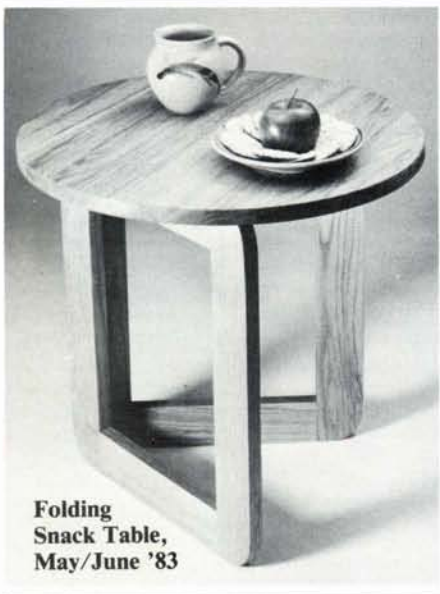
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by paul levine

#### Contemporary Woodworking Projects

is a collection of 40 complete project plans featuring the clean, handsome lines of contemporary design. Projects include furniture and accessories coordinated for each room in the home. Clearly written and thoroughly illustrated plans make construction easy for all woodworkers.

### 101 Projects for Woodworkers

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



By the Editors of  
*The Woodworker's Journal*

#### 101 Projects for Woodworkers

has long been the craftsman's favorite source for project plans and ideas. Beginning and advanced woodworkers appreciate the full range of styles in furniture, accessories, lamps, clocks, toys, and gifts. Projects range from those that can be built with a minimum of time, tools, and skill to some that challenge even the experienced woodworkers.

Contemporary  
Box

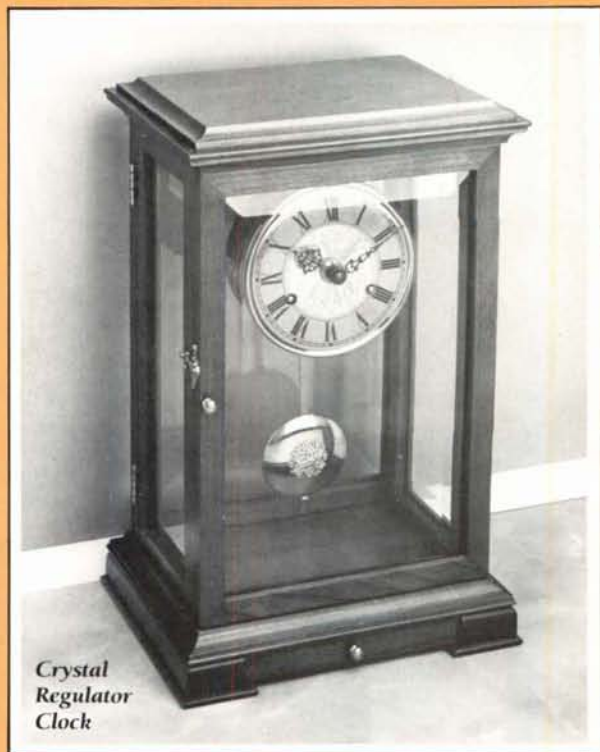


## In our next issue . . .

. . . you'll find complete plans for building these projects: a unique turned Contemporary Box, a dovetailed Shaker Carrier, and this elegant Crystal Regulator Clock.



Shaker  
Carrier



Crystal  
Regulator  
Clock