- Build the Toddler's Tractor in One Easy Weekend
- Capture the Country Look with Our Classic TV Cabinet Design
- Follow Our Full-size Patterns to Make a Whimsical Fishing Mobile

Issue 17 ■ $3.95

TODAY'S WOODWORKER™

PROJECTS, TIPS AND TECHNIQUES

TODAY'S
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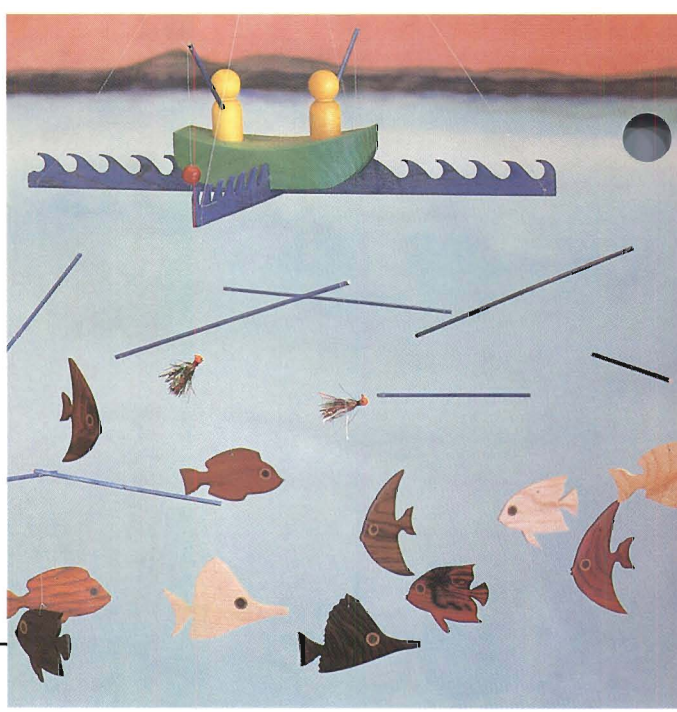

Safety First
Learning how to properly operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary safety guards have been removed from the equipment shown in some of the photos and illustrations in Today's Woodworker. We in no way recommend using this equipment without safety guards and urge readers to strictly follow manufacturer's instructions and safety precautions.

SEPTEMBER/OCTOBER 1991
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Your Opinion Counts

With the first signs of fall gathering on our yards, it's time to wrap up our summer chores and move back into the shop. The promise of another woodworking season lies ahead. We're planning an exciting group of projects for the coming months, and we're sure there will be something for everyone. I should add that your response to our July/August survey was loud and clear —we'll go easy on the contemporary projects in future issues.

Our project designer, Dan Jacobson, is looking through the many ideas you've sent in (samples below) and is busy preparing more traditional designs from a number of different styles. The Country TV/VCR cabinet in this issue is a good example. We'll be looking forward to your comments on this project as well as the others in this issue.

Generally, you'll see more toys and weekend projects, although many readers still want at least one furniture piece in each issue. We think this is a well rounded approach to woodworking and, judging by your survey responses, it's the direction you want us to take.

Larry N. Stoiaken

We like your magazine —the layout, the photos, the tips and your choices for features. ***We like variety.***

Michael and Debbie Martin
El Dorado, Arkansas

Of all the woodworking magazines I subscribe to, yours has to be my favorite. It contains ***practical projects****, and the illustrations and instructions are the best I've seen. Some of the other magazines are over my head.Your projects require skill but aren't frustratingly hard.*

Richard Critser
Greensburg, Indiana

We wanted to let you know that we appreciate Today's Woodworker. We like that you have been including ***one major project with several quickies****.*

Ed Baker
Boring, Oregon

I am writing to tell you that I think your magazine is great. I like your format and projects. I also like the fact that there are no advertisements in it. I think ***an old fashioned working wall telephone*** *would be a nice project.*

Robert P. Bumbarger
Boswell, Pennsylvania

You have a first rate magazine which I feel will be around for a long time. If you haven't already done one, how about ***a gun cabinet*** *project? I have a couple of hundred feet of nice walnut just waiting to become something. Thanks for the nice "tool" for my shop!*

Robert Reis
Bismarck, North Dakota

I enjoy ***no ads for tools*** *—I can get this out of a catalog. However, when a new tool comes available (like the new orbital sanders) a short review on it would be ok.*

Vern Baldus
Yuma, Arizona

I would like to see some ***nonsensical, whimsical items*** *to entertain while building and while using. Let's keep some humor in our work!*

E.J. Morris
Indialantic, Florida

I presently subscribe to three woodworking magazine. I usually don't build any of the projects, but ***I use your information to design projects that I want to build****. Consider taking advertising. I think you're second only to Fine Woodworking magazine.*

David Lunde
Shoreview, Minnesota

I like ***"real" woodworking challenges for different skill levels****. When completed you have a project to be proud of. Today's Woodworker and Woodsmith are both directed to serious woodworkers. Keep up the good work! Your art work and photography are excellent.*

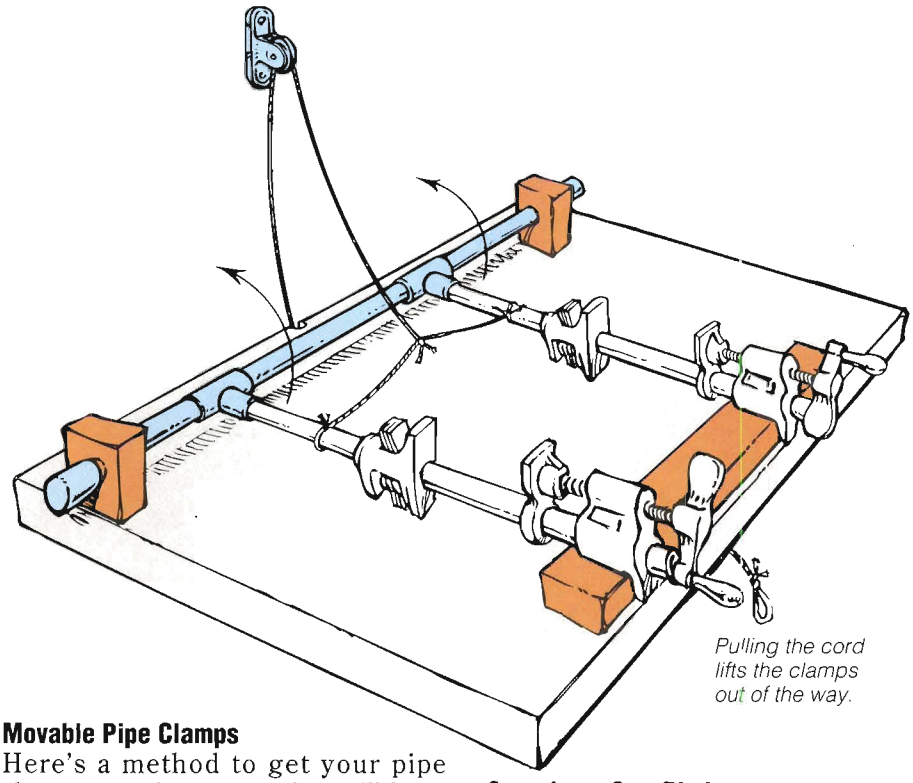
William B. Wescott
Pacifica, California

I started to subscribe about a year ago and would like to congratulate you on your fine magazine. Your organization and variety are stupendous. I really like the ***"Today's Wood"*** *section. My one suggestion would be to add more details to the text and more illustrations. I would like* ***more small, medium, and large projects****.*

Brian Adamski
Sleepy Hollow, Illinois

Correction: *We want to thank Mike Duffy, a reader in Delaware, for alerting us to an error in the fret layout in the dulcimer project (May/June 1991 issue). The eighth fret position should be located 10 1/16" from the bridge and the tenth fret should be 11 15/16" from the bridge. Thanks Mike.*

Sawing, Clamping, Sanding and Finishing



Pulling the cord lifts the clamps out of the way.

Movable Pipe Clamps

Here's a method to get your pipe clamps out of your way, but still keep them handy when they're needed. I use standard T-fittings to join one end of each pipe clamp to a common length of pipe. I then secure the ends of this common pipe in holes drilled in wood blocks so that the unit pivots. By tying a rope to the clamps and threading it through a pulley I can effortlessly lower the clamps from the wall down onto my workbench, and then raise them later when I'm done.

Bob Williams
Athens, Texas

Preparing Wood for Outdoor Use

On outdoor furniture, wood that contacts the ground must be treated to prevent decay. I pour an inch of linseed oil into a loaf pan or pie pan and soak the bottom end of table or chair legs for twenty-four hours. The wood drinks up all the oil it can hold and you get much better penetration than simply brushing on the oil. I place a small stone or nut beneath the leg to get the end grain off the bottom of the pan, thus exposing more end grain to drink up the oil.

Larry Bedaw
North Swanzey, New Hampshire

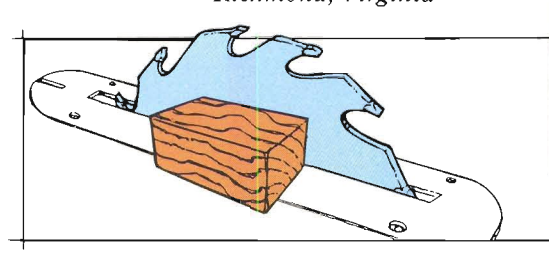
Squaring a Saw Blade

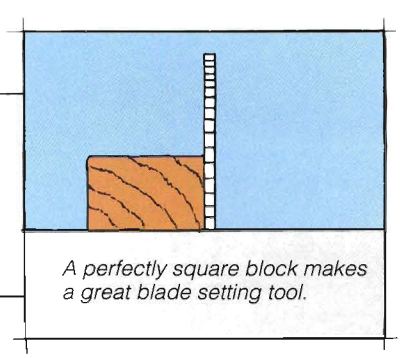
One common tool for squaring a blade with the table saw surface is a square. The trouble with this method is that one side of the square hits the teeth of the blade, making alignment difficult.

A simpler and cheaper method is to use a block of wood with its sides milled exactly 90° to each other. I use a block about 4" long.

Simply lay the block on the table and slide it against the saw blade (you must raise the blade so the block doesn't hit the teeth). Adjust the blade until it's perfectly flat against the block, then the blade is 90° to the table. You can also use this block to align the fence with the blade.

William B. Timberlake
Richmond, Virginia





A perfectly square block makes a great blade setting tool.

Back Up Pad For Sanding

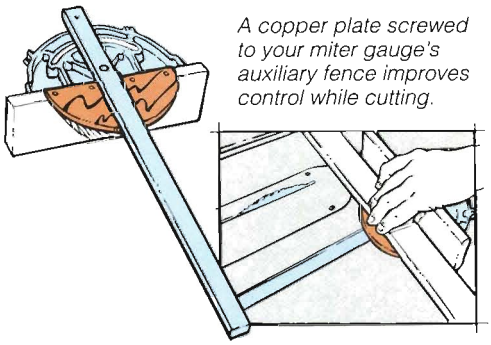
After trying everything from leather scraps to sponges as a back up pad for sanding on the lathe, I finally discovered the perfect alternative. Neoprene-type beer can holders work like a charm. They're inexpensive, thick enough to keep heat away from your fingers, and flexible enough to follow contours on the inside of a bowl. Also, they can easily be cut into any shape you need with a pair of scissors.

Craig Chappelow
Oak Ridge, North Carolina

Spur Center Safety Trap

A short section of PVC plastic plumbing pipe with an end cap glued to one end makes a perfect trap to catch a lathe spur center safely and easily. Too often, a spur center is damaged when it hits the lathe bed or falls to the concrete floor after being jarred loose from the headstock. Holding the spur center by hand runs the risk of injury, so I made this plastic trap to catch the center as it's released from the spindle

Richard H. Dorn
Oelwein, Iowa



A copper plate screwed to your miter gauge's auxiliary fence improves control while cutting.

Improved Miter Gauge for Table Saw

Do you ever cut wide boards on your table saw and find that the cuts aren't square? You may have a problem with the work sliding into the saw blade as you pass the work across the saw. On most blades the teeth are slightly wider than the blade body, which helps prevent binding but can lead to another problem. If the board slides into the blade body after it's past the leading teeth you may get an uneven second cut as the board passes the back edge of the blade.

To overcome this problem I added a half circle piece of shim copper to my miter gauge. Ordinary miter gauges make precious little contact with the workpiece. My shim metal piece is 5¾" wide, which furnishes almost 8 times more bearing surface to support the work piece than the miter gauge does alone. Using this device, I find that creeping of the work has become almost undetectable.

Attach the shim metal to an auxiliary wood fence, which is screwed to the face of the miter gauge. I relieve the bottom edge of the wood fence where the shim contacts it so the fence can still rest on the table surface. Use brass flat-head wood screws to fasten the shim, countersinking the screws below the surface slightly so they don't drag on the table top.

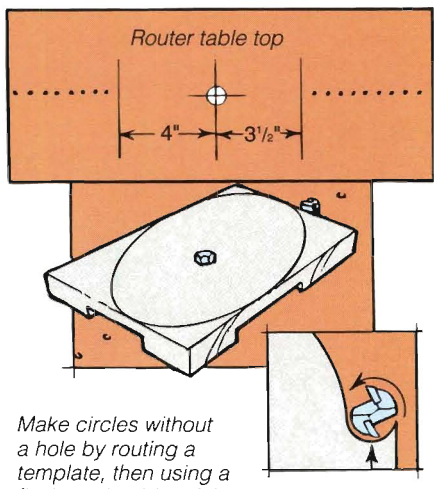
Roger W. Marsters
Lyndhurst, Ohio

Today's Woodworker *pays from $20.00 (for a short tip) to $100.00 (for an elaborate technique) for all Tricks of the Trade published. Send yours to Today's Woodworker, Dept. T/T, Rogers, MN 55374-0044.*

Cutting Plugs

I needed some wood plugs larger than the 3/8" plug cutter I own. The perfect solution, I found, was using a hole cutter in my drill press with the pilot bit removed. By carefully lowering the hole cutter into the clamped piece of wood, I was able to cut the plugs I needed. Because of the variety of hole cutters you can make most any size plug you need.

Milton Henke
Blue Earth, Minnesota



Make circles without a hole by routing a template, then using a flush cutting bit to follow the template while it's clamped to your new material.

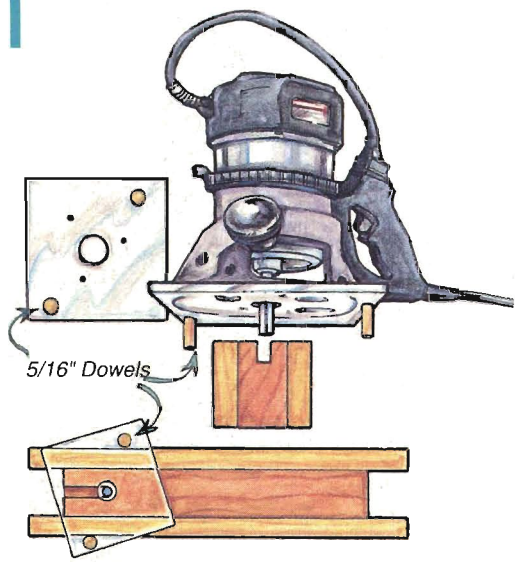
Router Table Circle Cutting

Whenever I need to cut precise circles I turn to my router table. I have drilled a series of 1/4" diameter holes one inch apart to the right and left of the center hole in my router table top. On the right, the first hole is drilled 3 1/2" from center. On the left, the hole is drilled 4" from center. This allows me to choose circle diameters in 1/2" increments.

To cut circles simply drill a 1/4" hole through the center of a wood blank and insert a machine screw through the blank and into the appropriate hole in the router table. Using a straight bit in the router, turn the workpiece against the rotation direction of the bit. Take shallow cuts, gradually raising the router until the bit cuts through the blank. This method also works well for cutting rings.

Jim Jensen
Yakima, Washington

TODAY'S WINNER



Mortising Jig For Plunge Router

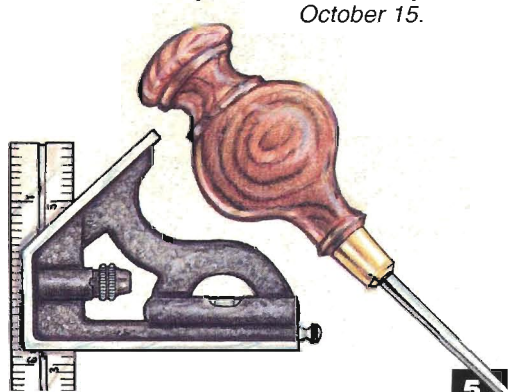
I have a jig that gives me perfectly centered mortises every time. I make a router base from 1/4" thick plexiglass and mount 5/16" by 1¼" long dowels to opposite corners of the base. I secure the dowels just off the diagonal center line using both a screw and epoxy.

Drill a center hole for the bit and mount the base to the plunge router. Clamp the workpiece between two auxiliary boards — make sure these boards are longer than the workpiece if the mortise location is near the stocks' end, otherwise the pins on the router base won't have anything to bear against. Now, set the router on the boards and turn it until the dowels touch the sides so the bit will rout the very center of your stock.

Paul L. Williams
Vermontville, Michigan

Next Issue's Prize

A package with three Japanese saws is on its way to Paul Williams for his winning trick. We'll be giving away the top quality layout tools shown below in the November/December issue. Be sure to submit your best tricks by October 15.



Making Thin Stock

By Jeff Greef

Occasionally a woodworker runs across a piece of wood with exceptional color or grain. The way to get the most mileage from a piece like this is to resaw it into thin stock. Resawing also saves you money over buying thin lumber. With practice, this technique can even be used to make thick veneer.

To get started all you need is a band saw or table saw. A planer is also helpful, although its services can be replaced by hand tool methods. Whenever you resaw, use flat stock with jointed edges. Stock that isn't flat will rock back and forth against the fence during the cut, causing burning, or, if using a table saw, the blade could bind and kick back the board.

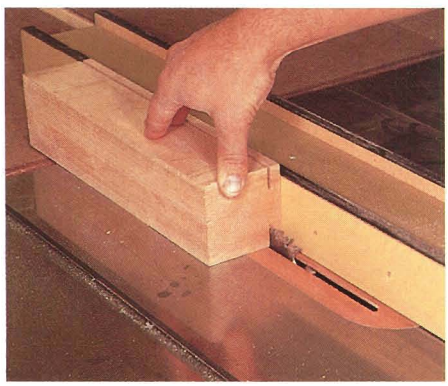


Figure 1: When resawing on a table saw make 1" deep passes into both edges of the stock, keeping the same face of the stock against the fence.

Figure 2: Continue with 1" deep cuts until the wood is split, using a push stick to keep the narrow resawn piece from kicking back.

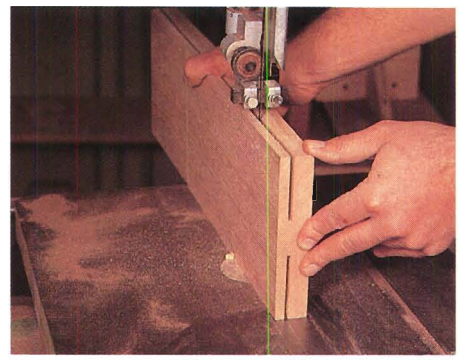


Figure 3: Wider stock can be efficiently resawn by first cutting a few inches into the material with a table saw and finishing with a band saw.

Resawing on the Table Saw

A 10" table saw blade can make a 3" deep cut. For resawing, you can work with material up to twice that size because you make cuts from each edge. I generally raise the blade 1" for each pass, first cutting one edge then flipping the the board over to cut the opposite edge. Keep the same face of the board against the fence for every cut, and use a push stick to move the piece through the blade.

Thin kerf blades offer the advantage of removing about 25% less stock than regular carbide tipped blades. This saves material and reduces the amount of resistance during the cut, making it easier to push wood through the blade. Of course, having a sharp blade is critical.

A powerful table saw cuts cleanly, but it strictly limits the stock size you can resaw. One alternative for resawing wider stock is to make your first cuts on the table saw, then finish the job on the band saw. In many circumstances this is the best way to go. With a thin kerf blade in the table saw, this method doesn't waste much material, leaves a clean surface, and the band saw will allow you to resaw wider stock than using a table saw alone.

Band Sawing Thin Stock

Resawing entirely on the band saw creates a smaller kerf than table saw blades, thereby wasting less material. However, band sawing does offer a couple of new challenges. Blade wander is a problem that definitely defeats the benefits of a narrow kerf and resawing is tough on lightly powered machines.

Before resawing, check all the guides on your band saw and make sure the blade runs at a right angle to the table. Install a blade at least 1/2" wide with 4 or 5 teeth per inch and add a little extra tension on the blade. A narrower blade is more likely to flex and wander during the cut. A finer blade is likely to burn the stock and won't clear dust from the kerf fast enough.

Two fence styles can be used for band saw resawing. A point location fence contacts the face of the stock in one small area, which allows you to make small adjustments during the cut to keep the blade on track. The second type of fence is flat and long, basically like a table saw rip fence. This rip fence keeps the stock very steady and moving in a single path. The point location fence works well with stock that isn't perfectly flat because it lets you follow the board's contours to cut it to a consistent thickness. If your stock is very flat and your band saw is running true, the rip fence works well. It's always a good idea to flatten the stock, even if you're using the point location fence. When setting up either fence, I always allow an extra 1/16" more than the thickness of the stock I need. This fudge factor permits some wavering during the cut and allows for sanding later.

Make a test cut in some scrap so you can work out any bugs that might ruin your expensive material. Cut 3 or 4 inches into the test piece, pushing the wood slowly so the blade can handle the cut. Turn off the machine and, when the blade stops, retract the piece (if you retract the wood while the saw is running you might pull the blade off). Examine the cut carefully to see that the blade is running square to the table and the workpiece. One way to gauge the saw's performance is to turn the piece on end and make sure you can easily see through the

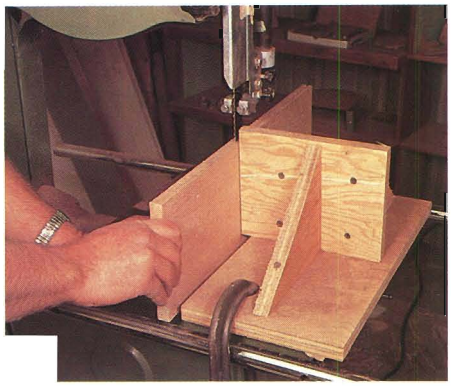


Figure 4: Resawing on a band saw requires flat material and a fence that allows you to make slight adjustments for any blade wander.

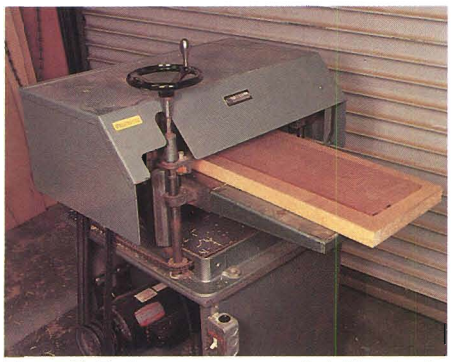


Figure 5: Taping your resawn material to a back up board enables your planer to cut very thin stock without having it chewed up by the blades.

cut. If you can't, the cut is curved, which means the blade is dull, not wide enough, not tight enough, or you were just pushing too hard.

Planing Your Resawn Stock

If the stock you chose to resaw was straight and evenly grained, planing isn't much of a problem. One limitation, however, is that most planers won't work with stock less than 1/4" thick. To plane stock thinner than your machine will go, place a support piece beneath the material. I recommend using double sided tape between the stock and the support piece to prevent of the thin board from curling up at the ends and being ruined in the planer.

Most woodworkers regularly need stock of various thicknesses. Knowing how to make thinner boards can save time and money, and it's a good way of getting the maximum amount of material from beautifully grained woods.

Jeff Greef is a woodworker and writer based in Soquel, California.

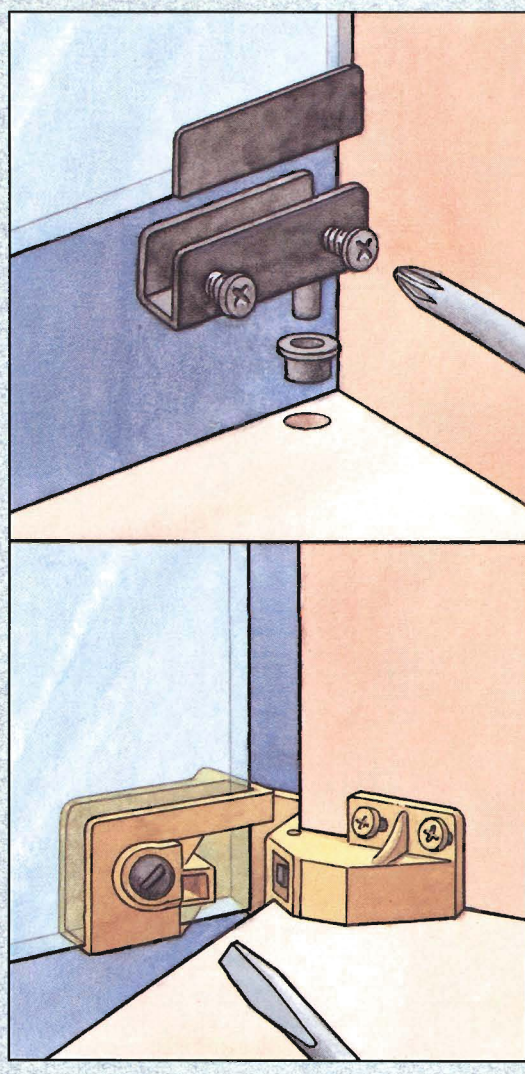
Glass Door Hardware

Certain projects really lend themselves to glass doors. Typically they're used on stereo cabinets and entertainment centers, but other applications include contemporary curio cupboards and book cases, and even on a very modern kitchen cupboard. There was a time when thinking about hinging glass doors caused panic among woodworking hobbyists. Anticipating the struggle of boring mounting holes in glass, and cracking the glass, kept everyone in a cold sweat. Fortunately, a lot of thought has gone into getting around this problem. Today, a wide assortment of hardware is specially designed for wrapping the glass and holding it in place with a padded pressure screw. No drilling required!

These user friendly hinges can be broken down into two major categories: snap closing and free swinging. All are generally available in chrome and brass finishes, and more recently, black finishes.

Among the free swinging hinges, some pivot in a hole drilled into the top and base of the cabinet, while others have mounting plates for screwing the hinge to the cabinet walls. The pivot hole type is designed for new construction, since the holes must be bored before the cabinet is assembled. No conventional drill can get close enough to the cabinet wall to bore the small pivot hole after the piece is put together. For cabinets that are already assembled, the hinge with a side wall mounting bracket works best. Both of these models are ideal for using with magnetic tutch latches and both are intended for inset doors. Using a tutch latch requires mounting a no bore strike plate to the door so the magnet has something to grab.

Snap closing hinges are available for inset or overlay situations. These hinges tend to be slightly bulkier looking than the free swinging variety, but still create a very sleek appearance. Snap closing hinges have side wall mounting brackets,



making them a good choice for retrofitting in existing cabinets. Because snap closing hinges have a positive stopping point they aren't appropriate for use with tutch latches. You do need to mount a pull on the door, which is also available in no-bore models.

In all cases, these hinges are sized for 1/4" thick glass doors and will handle door weights of at least 22 pounds, with the pivot free swinging type capable of supporting up to 28 pounds. If still heavier doors are needed, or if you want to get away from swinging doors, you might consider installing bypass tracks for sliding glass doors.

Toddler's Tractor

Make a toy that moves and kids will take notice. Make one they can ride and you have a guaranteed winner.

By Rick White

Built with lumberyard pine and cherry scraps, our pint size tractor features a turning steering wheel, movable gear shift and a rugged disposition.

Kids love moving toys, whether they be cars, airplanes or boats. The toy I remember most fondly from my own childhood was a wooden tractor modeled after an antique John Deere. With the holidays coming, I decided to try making a similar tractor for my youngest daughter.

There are many things to consider when designing toy projects. First and foremost is making them safe. Always round the corners and avoid adding any projecting parts that could injure a falling child. Make sure the toy is stable and won't tip over easily, and be careful to build the piece without areas that might trap little fingers.

For this toy I looked at pictures of antique tractors and incorporated some of their most prominent design elements, like the steering wheel shaft on top of the body, the bulging gas tanks, the detailed radiator and the see through area of the engine. For kids, interactive parts are important, so I fashioned a steering wheel that actually turns and a movable gear shifter so they can plow your carpets a little faster if they want.

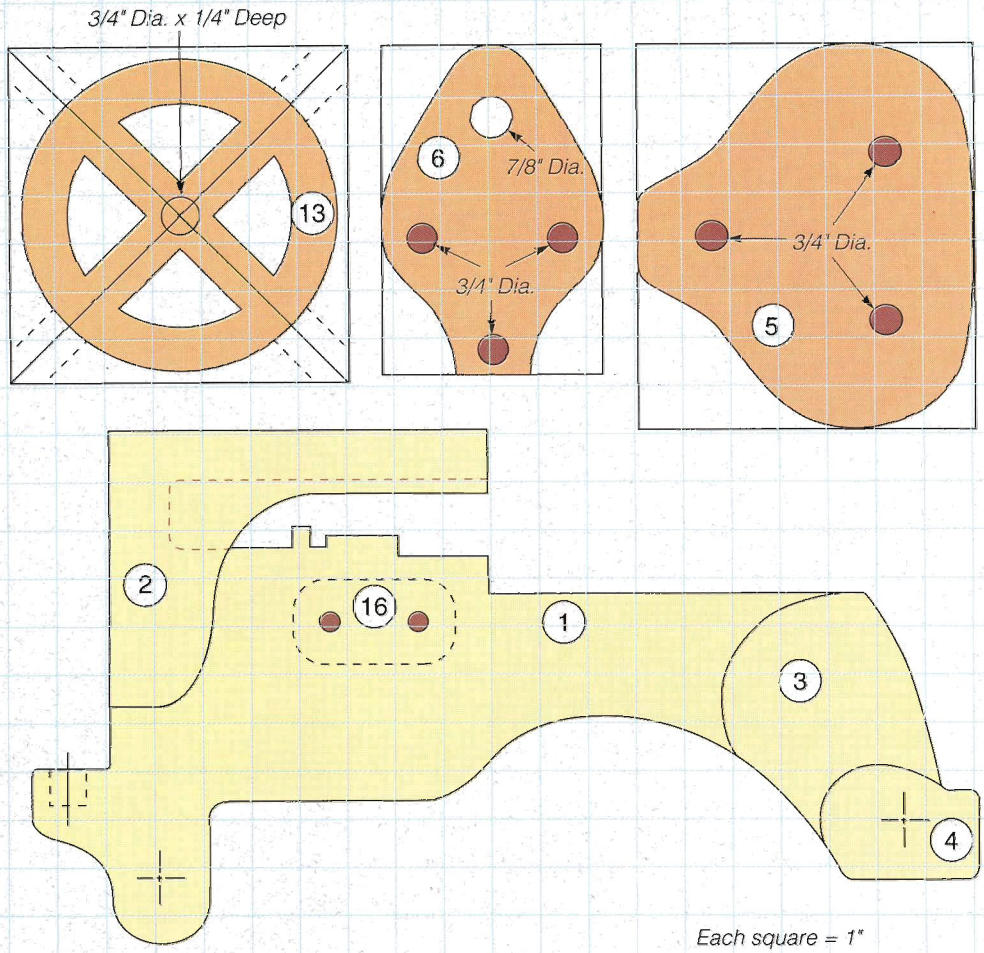
The basic body of the tractor and the gas tanks are made with lumberyard pine. The added details are made of cherry salvaged from my scrap bin, with the exception of the dowels for the steering shafts and a few walnut plugs, which were purchased at The Woodworkers' Store. I bought the wheels locally, and you should be able to find something comparable in your area. In all, I only spent $35.00 on the project (not counting anything for the cherry scrap pieces) and completed the project in a weekend.

Constructing the Body

The main structure of the tractor is the pine body (piece 1), which was cut from a fairly clear piece of 2 x 12. Try choosing a board with as few knots as possible, and make sure the knots that are there are very tight. Big, loose knots will most likely crack and eventually fall out. Scale drawings of the body parts are shown on the facing page. Enlarge the drawings and trace them onto the pine, then cut out the shapes with a band saw or saber saw.

Now trace the gas tank patterns (pieces 2) onto more pine stock and cut them out. Sand the curved edge of the tanks with a drum sander, then round the outside edges of the tanks with a large roundover bit (3/4" radius bits will leave the nicest edge). Next, glue the gas tanks to the body, making sure the top and front edges of all three pieces are perfectly aligned.

The other pine pieces that should be added now are the seat supports and wheel hubs (pieces 3 and 4). After tracing these shapes onto the pine and cutting them with a band saw, glue them together in pairs, then



The major parts of the tractor are laid out in 1/4 scale at left. Enlarge the drawings to full size and transfer these shapes onto your stock. The steering wheel, control panel and seat are made in cherry, while the body of the tractor, the gas tanks, seat supports and wheel hubs are made from pine. Cut the shapes out with a band saw or saber saw and smooth their edges with a drum sander. The pine pieces can be glued onto the body right away, always being careful to keep the outside edges of the pieces aligned. If the edges do misalign, sand them flush when the glue is dry.

glue these subassemblies to the tractor body as shown in the scale drawing. With the exception of the walnut plugs and buttons, all the remaining pieces on the tractor are cherry.

Adding the Cab

The cab is comprised of the seat (piece 5) and the control panel (piece 6). Both of these shapes are shown in the patterns above. Cut some 3/4" thick cherry to these shapes on the band saw and layout the centered steering shaft hole near the top of the control panel. Adjust your drill press to a 5° angle and bore the 7/8" diameter hole for holding the shaft.

Drill and counterbore the pilot holes in the control panel and the seat for securing them to the tractor body (see drawing above for hole sizes and locations). You'll notice the panel is just a bit larger than the tractor body. I did this to limit the need for absolute accuracy in matching the profiles of the various pieces. Sand the panel and the seat smooth, and roundover the top edges of the seat and the front and top edges of the control panel with a 1/2" radius bit. Stop the roundover on the back of the control panel where it meets the gas tanks.

Set the panel into position and extend the pilot holes into the tractor body and gas tanks. Screw the panel in place and cover the screws with 3/4" walnut screw hole plugs (pieces 7). Now set the seat on the body and extend the pilot holes. Secure the seat with screws and fill the holes with 3/4" walnut plugs (pieces 7). Wrap this stage of the project up by sanding the plugs flush with the seat and control panel.

The Radiator

The pattern for the cherry radiator (piece 8) is **shown on page 11**. Layout the shape and, once again, notice that I made the piece slightly larger than the tractor body to save me from the problem of precisely matching the various curves. Cut out the rectangular radiator and sand its edges smooth. Now take it to the router table and rout a 1/4" deep groove down the center of the stock with a 3/4" radius core box bit. Next, switch to a 1/4" radius core box bit and rout two grooves on both the left and right sides of the center groove. These are the radiator vents. For the first set of narrow grooves set the fence 1½" from the bit's center, and for the second set the fence should be 5/8" from the center of the bit.

Drill the two 3/4" counterbored pilot holes in the radiator and set the piece against the tractor body to test the fit. When it's right, extend the pilot holes into the pine, but before screwing the pieces together chuck a 3/4" bit in your portable drill and bore a 3/4" deep hole in the front of the tractor body to hold the bottom end of the front shaft (piece 11). If you don't take this step now, you won't be able to reach it later. Once this is done, you can screw the radiator to the body. Cover the screws with headlight buttons (pieces 9).

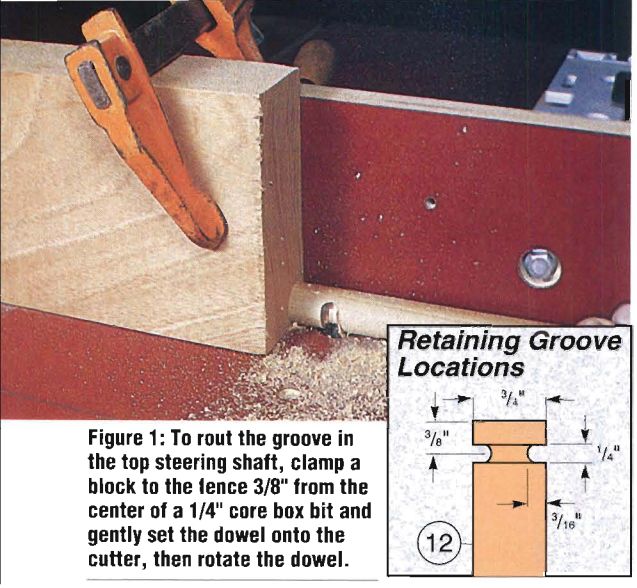


Figure 1: To rout the groove in the top steering shaft, clamp a block to the fence 3/8" from the center of a 1/4" core box bit and gently set the dowel onto the cutter, then rotate the dowel.

The Steering Mechanism

I designed the tractor for kids up to 3 years old, so I felt that having the front wheels turn wasn't necessary. In my experience kids this age just push the vehicle in the direction it's pointed, and most of the time they just like sitting on it more than actually moving anywhere. Consequently, the steering wheel turns freely, but has no effect on the wheels.

The first thing to do is make the steering block (piece 10) for the nose of the tractor. Cut the overall shape of the block to size, then mark the two 3/4" diameter holes for the steering shafts (pieces 11 and 12). The top steering shaft is mounted into the block at a 5° angle, so adjust your drill press and bore this hole 7/8" deep as measured at the middle of the hole. Now reset the drill press to 0° and bore the second hole for the front steering shaft 3/4" deep as shown at top of page 11.

The top steering wheel shaft is held in the block with a 1/4" retaining pin (piece 14). To hold this pin, drill a 1/4" hole into the top of the block at the point indicated in the elevation drawings on page 11. Complete the work on the steering block by drilling pilot holes with 1/2" counterbores for screwing this piece to the body, but hold off on its installation for the moment. Cut a cherry dowel to length and spread glue in this hole and in the mating hole in the steering block. Install the front shaft in the body, then slip the steering block onto the other end of the shaft and screw it to the top of the radiator. Cover the screws in the block with 1/2" walnut plugs.

In order to turn freely, the top steering shaft must be grooved near one end. The 1/4" core box bit should still be in the router table, so lower it to 3/16" in height. Clamp the fence 3/8" from the center of the bit and put a stop 3/8" past the center of the bit. Now, holding the end of the dowel against the stop block, gently set it onto the bit, then rotate the dowel to make the groove, as shown in **Figure 1**. Now, cut the dowel to a length of 9" to form the top steering shaft (piece 12).

The steering wheel (piece 13) is made with 3/4" thick cherry. First cut a 7" square piece and locate the center points on both of its faces. Next, drill a 3/4" diameter hole 1/4" deep at the center of the back face of the square.

Flip the steering wheel blank over and layout two circles with a compass, one 6½" in diameter and the other 5½". Now draw lines connecting the corners of the square stock, then draw parallel lines 1/2" to either side of the first lines **(see elevation drawing on page 9)**.

Drill holes into the four triangular waste areas so you can insert a fine cutting saber saw blade and remove this waste. Now, cut the outer circle on the band saw. Sand the edges of the wheel smooth, then use a small roundover bit on all the edges. You'll probably need to sand some more to blend the spokes and rim together, and once you're done, drill a pilot hole with a shallow 3/4" counterbore in the center of the wheel on its front face.

Mount the wheel on the shaft and extend the pilot hole into the dowel, then separate the two pieces to put glue in the steering wheel mounting hole. Remount the wheel and drive in the screw. Cover the screw with the horn button (piece 15).

Slip the steering shaft through the hole in the control panel and into the hole in the steering block. Now round one end on a 2" long, 1/4" diameter dowel (piece 14) and spread glue on it, but no closer than 1/4" from the rounded end. Put a little glue in the retaining pin hole in the steering block, then tap the dowel into the hole until it engages the groove in the steering shaft. Let the glue set for about five minutes, then turn the steering wheel to break any glue bond that might have occurred between the retaining pin and the shaft. Cut off any excess dowel sticking out of the steering block and sand it flush.

Manifold and Gearshift

The two manifolds (pieces 16) for the engine area are simple rectangular blocks positioned as shown on page 9. Go ahead and make these out of 1¾" thick cherry, drill pilot holes and 1/2" counterbores, and screw and glue them to the tractor body. Cover the screws with 1/2" walnut plugs to resemble spark plugs.

The gearshift assembly (pieces 17, 18 and 19) is shown in the elevation on page 11. Cut these parts from cherry and drill the 1/4" pivot hole in the gearshift so that it turns freely on the pin. Glue the pin into the bracket and drill pilot holes with 1/2" counterbores for screwing the assembly to the tractor body. Fill the counterbores with 1/2" walnut plugs and sand everything flush.

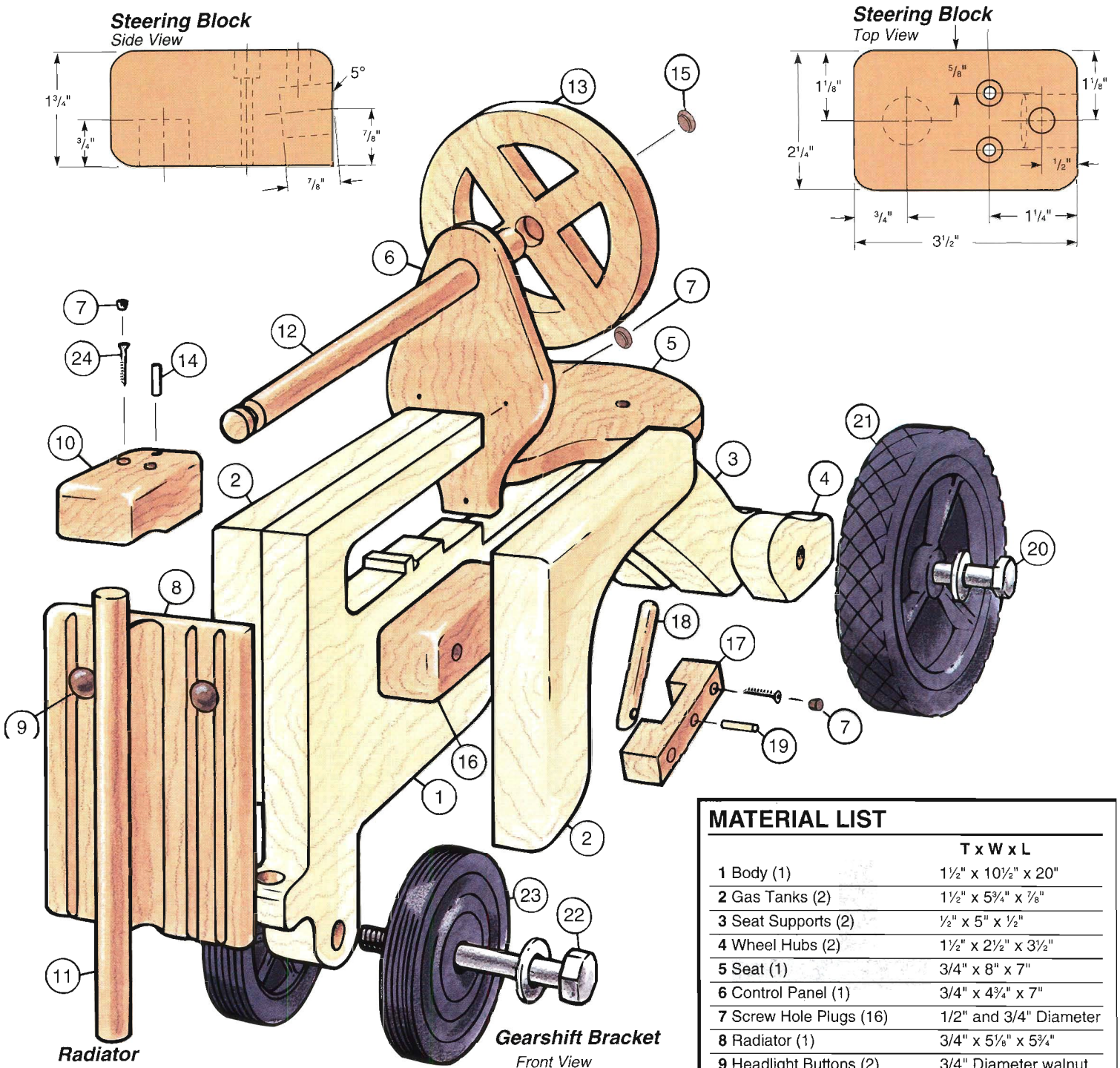
Get the Tractor Rolling

Everything should be ready now for adding the wheels. The rear wheels (pieces 21) are held to the wheel hubs with 1/2" x 2½" lag bolts (pieces 20). Drill 3/8" pilot holes to get a very snug fit, and drop some epoxy into the hole to prevent the axles from unscrewing. Mount the wheels, axles and washers following the sequence shown in the exploded view on the next page.

The front wheels (pieces 23) are attached to the tractor with a 3/8" by 4½" hex head bolt (piece 22). Drill a 3/8" hole through the front wheel hub and attach the wheels and axle. Put a few drops of epoxy on the threads of the hex nut to keep it from unscrewing as the wheel turns.

I finished the tractor with a couple of coats of polyurethane so it will stand up to heavy use, then reluctantly stowed it away until the holidays. I expect that when my daughter receives it her face will light up with surprise, and watching her play on the tractor will remind me of the toy I had when I was young.

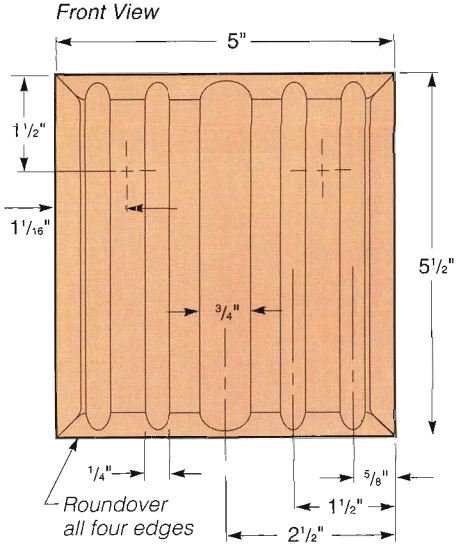
Rick White, a professional woodworker, serves on the editorial advisory board of Today's Woodworker.



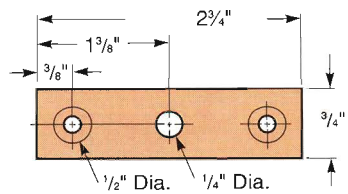
MATERIAL LIST

	T x W x L
1 Body (1)	1½" x 10½" x 20"
2 Gas Tanks (2)	1½" x 5¾" x ⅞"
3 Seat Supports (2)	½" x 5" x ½"
4 Wheel Hubs (2)	1½" x 2½" x 3½"
5 Seat (1)	3/4" x 8" x 7"
6 Control Panel (1)	3/4" x 4¾" x 7"
7 Screw Hole Plugs (16)	1/2" and 3/4" Diameter
8 Radiator (1)	3/4" x 5⅛" x 5¾"
9 Headlight Buttons (2)	3/4" Diameter walnut
10 Steering Block (1)	1¾" x 2¼" x 3½"
11 Front Steering Shaft (1)	3/4" x 7⅝"
12 Top Steering Shaft (1)	3/4" x 9"
13 Steering Wheel (1)	3/4" x 6¾" x 6¾"
14 Top Steering Shaft Pin (2)	1/4" x 1"
15 Horn Buttons (2)	3/4" Diameter walnut
16 Engine Manifolds (2)	1¾" x 1¾" x 3⅜"
17 Gearshift Bracket (1)	3/4" x 3/4" x 2¾"
18 Gearshift (1)	1/2" x 1/2" x 3½"
19 Gearshift Pin (1)	1/4" x 1"
20 Rear Axles (2)	1/2" x 5 " Lag bolts
21 Rear Wheels (2)	7¾" Diameter
22 Front Axle (1)	3/8" x 4½" hexhead bolt
23 Front Wheels (2)	5½" Diameter
24 Screws (16)	#8 - 1½" Flat head

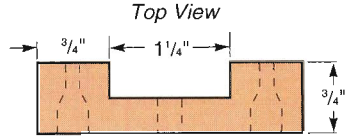
Radiator
Front View



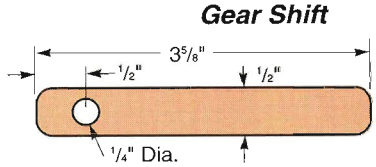
Gearshift Bracket
Front View



Top View



Gear Shift



Coming Home to Country

The enduring appeal of country furniture is its simplicity and charm, and this cabinet provides an excellent way of blending your TV with its more pleasant surroundings.

By Chris Inman

Furniture styles come and go, most enjoying just brief periods of popularity. However, one style stands out as an ageless favorite and can be found in almost every home. American country captures our imagination and ties us to our roots.

The cabinet Dan Jacobson designed for this issue is a traditional piece, but with a truly modern application. In keeping with its country heritage, this TV cabinet is simply built with an emphasis on practicality, and it shows off the qualities of pine to best advantage. The project requires eighteen 1 x 8 by 8 foot pine boards and takes about 30 hours to build. With the addition of hardware and other supplies, the total cost came to $225.00.

Selecting Lumber and Gluing Panels

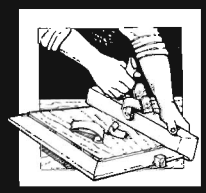
Some characteristics of pine make it a wonderful cabinetmaking wood. It's light and soft, cuts like butter, it's very easy to sand and quite forgiving when fitting joints. On the other hand you have to be careful not to dent the wood and to always observe pine's strength limitations.

Avoid using construction grade material for cabinet projects. Instead, ask for clear ponderosa pine, which will have a few tight knots and be kiln dried to higher standards. Better yet, you might be lucky enough to find true cabinet grade pines, such as southern longleaf heart pine (see Today's Wood on page 23). Check with a local hardwood supplier to see if they have a line on some furniture grade pine.

Ideally, the best material has nice grain, consistent color and tight, unchecked knots. On country furniture knots are common and add to a cabinet's charm. As you join boards into panels spread the knots around for a balanced effect.

For the sides (pieces 1), top (piece 2), shelves and bottom

Raised panels were once made by hand with panel raising planes. On these planes the sole was angled to produce the desired pitch on the panel and the iron was skewed so it could better cut the end grain areas. Panel raising planes were made by hand for individual woodworkers and never became a production item. During the industrial revolution, when shapers replaced much of the decorative handwork performed by moulding planes, raising panels by hand became obsolete.



(pieces 3) cut your boards a couple of inches longer than the finished panel sizes indicated in the material list. Arrange the boards into panels, alternating their endgrain patterns to limit cupping. Joint the stock and glue the boards together.

Once the glue has dried use a scraper and belt sander to flatten the surfaces of the panels. Keep in mind that tipping the belt sander will leave a deep scar. I recommend using 120 grit belts for cleaning and leveling the panels, then use an orbital sander to remove any belt sanding marks. When the sanding is complete, cut the panels to final size.

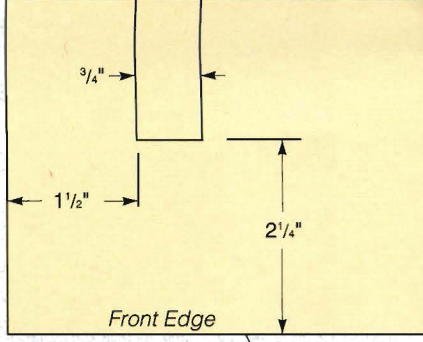
Before moving on, drill a 2" diameter hole 2" in from the back of the shelves and the bottom. These holes allow you to connect the wires for the TV and VCR and on to the outlet.

Joining the Carcase

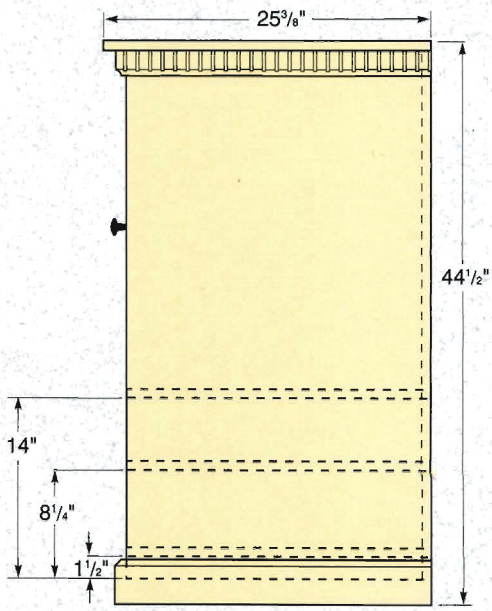
The carcase is joined together using dado joints. Layout the dadoes and rabbets in the sides and top **(see elevation drawings at right)**, and set up a 3/4" wide dado blade in your table saw to cut 3/8" deep. Get ready for cutting the rabbets first by clamping a long scrap of wood to your fence and drawing the fence right up to the side of the blade. Pass the inside back edge of each side panel over the blade. Next, adjust the fence and cut the dadoes in the sides for holding the bottom and shelves.

Now set your fence 1½" from the nearest edge of the blade for cutting the dadoes in the underside of the top. Since you must drop cut these dadoes to prevent going through the front edge of the panel, you need to indicate a stopping point for one cut and starting point for the other cut on the table saw fence. Draw a line on the fence at the peak of the blade's arc and, on the top of the panel, draw a line 2¼" from the front edge. Cut the first dado by pushing the panel through the blade until the mark on the panel is aligned with the mark on the fence. Stop the saw at this point and lift the panel away. For the second cut, align the mark on the panel with the line on the fence and carefully set the panel down onto the blade. Complete the cut by pushing the panel the rest of the way over the blade. You'll notice that the cuts actually go beyond the mark on the top. Don't worry, this will be covered by the face frame and dentil moulding.

The next step is assembling the shelves and bottom to the sides. Since the middle of the panels are impossible to reach with conventional clamps, the best way to draw the shell together is with crowned crossbearers. Cut six pieces of 2 x 4 to a length of 24" and layout a 1/4" crown on one edge of each piece **(See Figure 1)**. Band saw the curves and belt sand the edges smooth. When clamping these crossbearers, they will first put pressure in the



Dado Locations for Top (2)



Shelf Locations

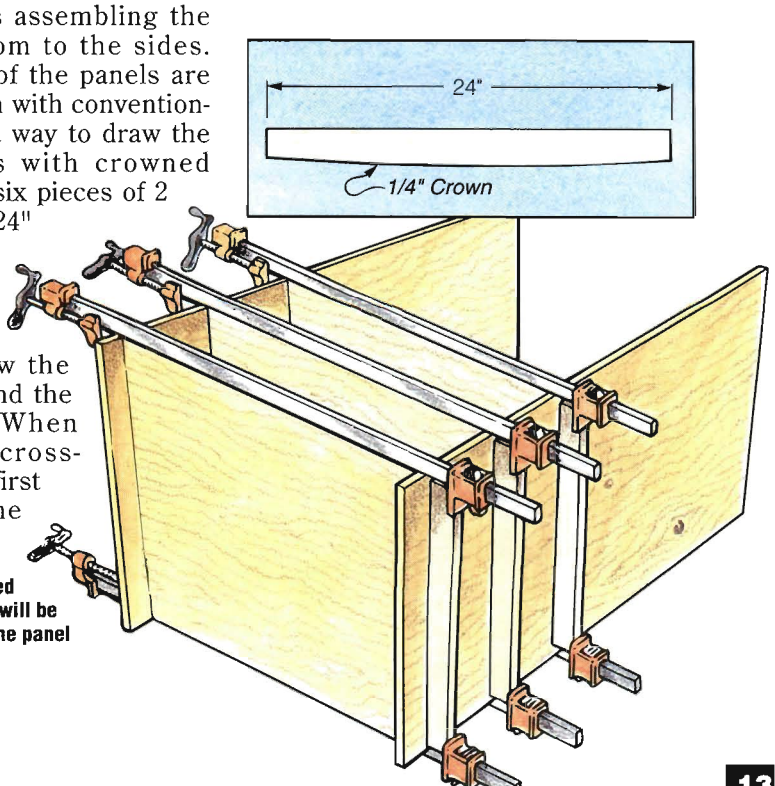


Figure 1: Make six crowned crossbearers so pressure will be applied at the middle of the panel joints when you clamp.

Figure 2: Cut the lap joints with a 1/2" dado blade raised to 3/8". Adjust the fence and set up block to align the shoulder on the face frame piece with the blade. Take a first pass to cut the shoulder, then take more passes to clear the waste.

middle, where the crown is highest, and as you tighten them further the pressure will spread across the entire width of the panel.

Once the crossbearers are made, spread glue in the side wall dadoes and clamp the shelves and bottom to the sides. Remember to line up the back edge of the shelves with the rabbet shoulder on the sides. Check for squareness before setting the assembly aside for the glue to dry.

Add the top by putting glue in its dadoes and slipping it onto the sides. The back edge of the top should align with the very back edge of the walls. Finish this step of the shell assembly by gluing the nailing strip (piece 11) to the underside of the top so that it's flush with the rabbet shoulders in the sides.

The Face Frame

The panel dado joints in this cabinet result in end grain to side grain gluing surfaces, which don't create much strength. The addition of a face frame gives the carcase its ability to withstand angular pressure. Country furnituremakers often used half lap joints for their speed and simplicity when making face frames, so I decided to use the same joint.

First rip about 45 lineal feet of stock to 1¾" in width for the face frame stiles (pieces 4) as well as the door frames (pieces 5, 6, 7 and 8). For the face frame's top rail (piece 9) rip a piece 2¾" wide, and for the bottom rail (piece 10) rip one 2¼" wide. Now cut all the frame material to the lengths shown in the material list, setting aside the door frame stock for later use.

To make the half-laps, mount a 1/2" wide dado blade in your table saw and raise it 3/8" **(See Figure 2)**. Clamp a set-up block to the fence and set the fence so the set up block is 1¾" from the far side of the dado blade. Now place a face frame rail in the saw's miter gauge and butt it up to the set-up block. Make the first pass over the blade to define the shoulder, then make several more passes to remove the rest of the waste. After you've cut away the waste on the rails, reset the fence so the set up block is 2¼" from the far side of the blade for cutting the half laps in the top end of the stiles. Cut the half laps at the bottom end of the stiles with the set up block 2¾" from the far side of the blade. Always remember that the stiles overlap the rails, so cut your half laps on the best side of the rails and on the poorest side of the stiles.

Spread glue on the half laps and assemble the face frame, holding the joints together with C-clamps. Once again, check the diagonal measurements to see that everything is square before the glue sets.

When the half lap joints are dry, sand the face frame joints flush. Spread glue on the top edge of the frame where it will join the top (piece 2) and on the front edge of the cabinet sides, and clamp the two units together. Later, when the glue has dried, sand the edges of the face frame flush with the cabinet sides.

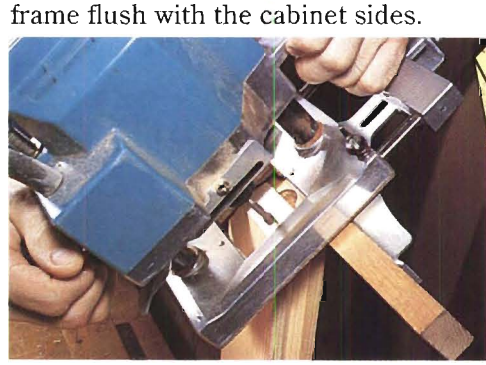


Figure 3: Use a plunge router with a fence to cut the spline grooves in the moulding's mitered ends. Clamping two pieces face to face gives a good surface for the fence to ride against.

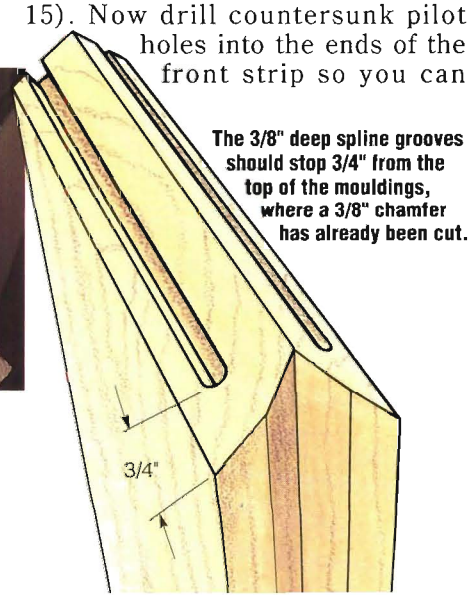
Base and Dentil Mouldings

The base is comprised of two frames, each with only three sides. First, the decorative base frame (pieces 12 and 13) is made, then a ledger frame (pieces 15) is made to go inside the moulding frame for additional strength and to support the carcase.

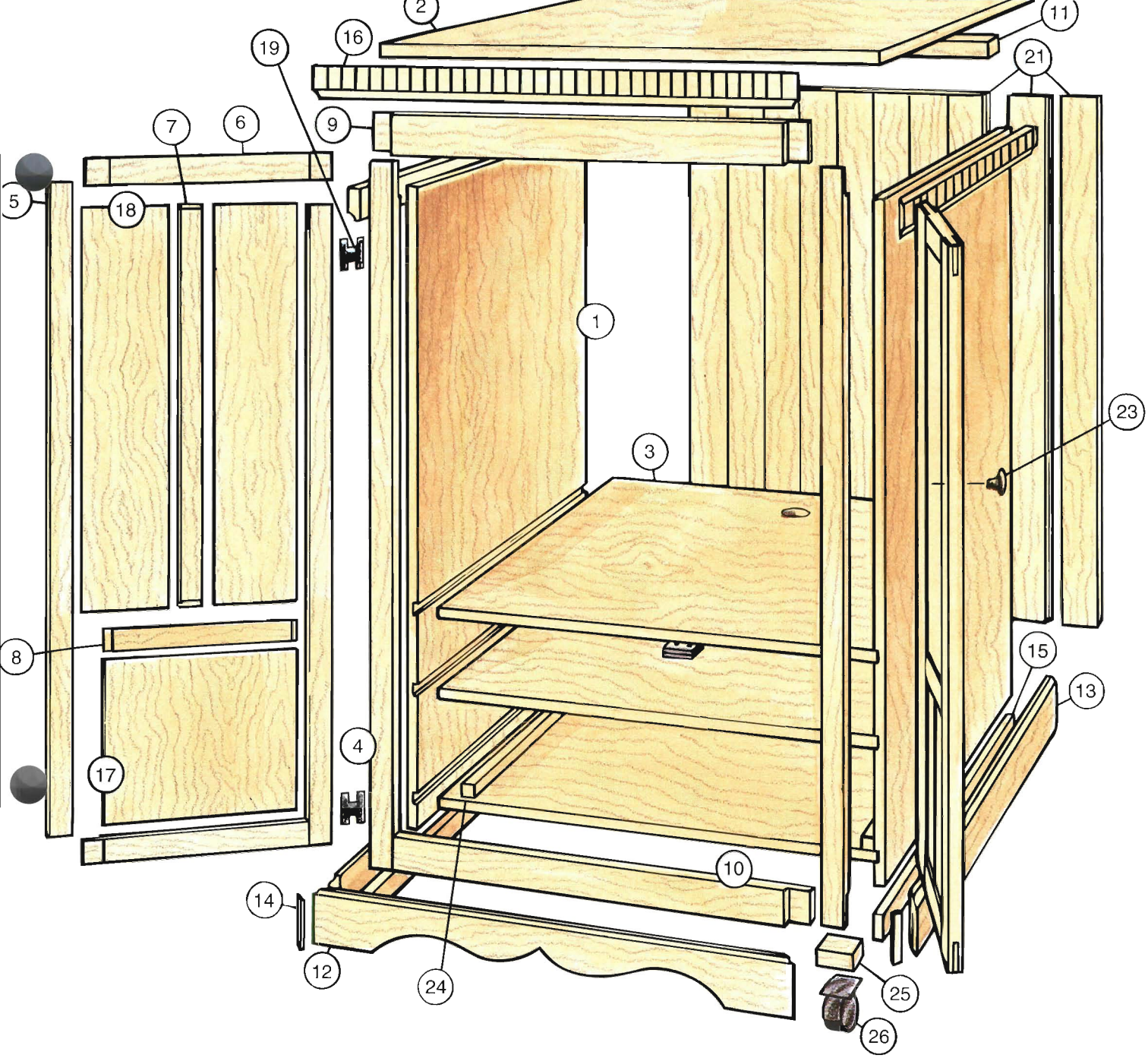
Rip lumber for the mouldings to 3½" in width and cut a 3/8" chamfer along its top edge. Next, cut the pieces of moulding to length —one piece for the front of the cabinet, and one for each side —mitering the ends that will be joining together.

Strengthen the miter joints by reinforcing them with 1/4" thick splines (pieces 14). Chuck a 1/4" bit in your router and set it to cut 3/8" deep. Use an edge guide to position the cut in the center of the miters **(See Figure 3)** and put a pencil mark 3/4" from the top edge of the mouldings so you know where to stop the grooves. Rout the grooves, then make two 1/4" thick splines with the grain running across their width. Glue the three sided moulding frame together with the splines inserted at each corner.

Inside the moulding frame is a three sided ledger strip frame, which actually supports the cabinet. Rip fourteen feet of pine to 2" in width and cut it to the lengths shown in the material list (pieces 15). Now drill countersunk pilot holes into the ends of the front strip so you can



The 3/8" deep spline grooves should stop 3/4" from the top of the mouldings, where a 3/8" chamfer has already been cut.



MATERIAL LIST

	T x W x L		T x W x L
1 Sides (2)	3/4" x 23⅛" x 42⅛"	**14** Base Splines (3)	1/4" x 5/8" x 2¾"
2 Top (1)	3/4" x 25⅜" x 34⅜"	**15** Ledger Strips (1)	3/4" x 2" x 84"
3 Shelves and Bottom (3)	6¾" x 22¼" x 30⅞"	**16** Dentil Moulding (1)	3/4" x 2" x 84"
4 Face Frame Stiles (2)	3/4" x 1¾" x 41¾"	**17** Lower Door Panels (2)	3/4" x 11½" x 11⅝"
5 Door Frame Stiles (4)	3/4" x 1¾" x 35⅝"	**18** Upper Door Panels (4)	3/4" x 5⅜" x 21⅝"
6 Door Frame Rails (4)	3/4" x 1¾" x 14⁷⁄₁₆"	**19** Hinges (2 pair)	3" Black wrought iron, H style
7 Center Stile (2)	3/4" x 1¾" x 21⅝"	**20** Magnetic Catch (1)	Low profile, double catch
8 Center Rails (2)	3/4" x 1¾" x 11½"	**21** Ship Lapped Boards (10)	3/4" x 3⅜" x 40¼"
9 Face Frame Top Rail (1)	3/4" x 2¾" x 31⅝"	**22** Turn Buttons (12)	Brass with screws
10 Face Frame Bottom Rail (1)	3/4" x 2¼" x 31⅝"	**23** Knobs (2)	1⅜" Diameter wrought iron
11 Nailing Strip (1)	3/4" x 1¼" x 30⅛"	**24** Bolster Strips (2)	1" x 1½" x 19"
12 Front Base Moulding (1)	3/4" x 3½" x 36"	**25** Caster Pads (4)	1" x 2½" x 2½"
13 Side Base Mouldings (2)	3/4" x 3½" x 24"	**26** Casters (1 set)	Soft twin wheel —plate type

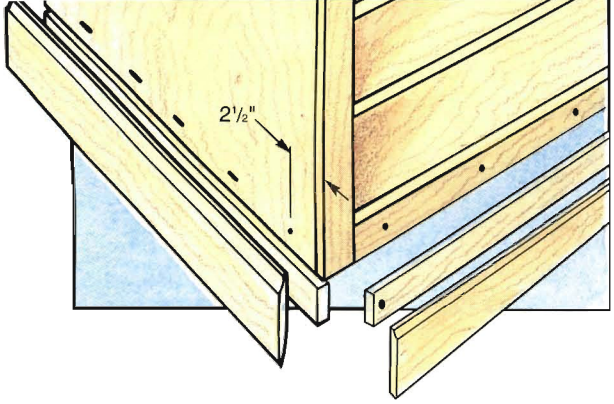
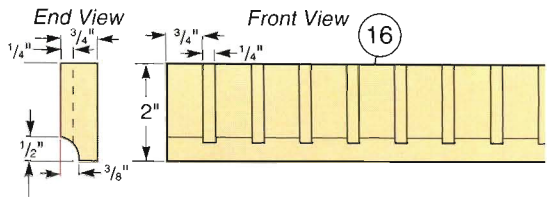


Figure 4: The elongated screw hole locations in the sides and the mounting holes in the bottom face frame rail are for securing the carcase to the base.



screw it to the side strips. Assemble the ledger frame, then spread glue on its sides and front and clamp it inside the moulding frame. Be sure to align all the bottom edges.

Prepare the cabinet for joining with the base assembly by routing a series of elongated holes near the bottom edge of both sides. Chuck a 1/4" bit in your router and set your straight edge guide so the bit is 3/4" from the bottom edge. Rout four slots along each side, and drill one positioning hole 2½" in from the front of the cabinet. You should also drill five 1/8" diameter holes in the bottom face frame rail to attach it to the front base moulding **(See Figure 4)**.

Turn the cabinet over and set the base assembly in place. Join the two assemblies with #10-1¼" screws, using washers to keep the screws from pulling into the elongated holes. Now cut the decorative curves on the front base moulding (going right through the ledger strip) with a saber saw **(See Figure 5 below)** and smooth the cut with a palm sander.

The dentil moulding (piece 16) is easily made with a 1/4" dado blade mounted in the table saw. First rip 2" wide stock, then install the dado blade and raise it 1/4". Place a strip of masking tape on the table saw surface 1/2" from the right side of the blade **(See Figure 6)**. For the first pass, align the end of the stock with the edge of the tape, and for each succeeding cut move the stock over until the shoulder of the most recently cut dado aligns with the edge of the tape.

Rout a cove along the bottom edge of the moulding as shown in the end view drawing above, then cut the pieces to length. Glue the entire length of the front moulding to the face frame and hold it in place with a few brads. For the side pieces, spread glue on just the first few inches and use brads along their entire length.

Making Raised Panel Doors

Earlier you sized stock for the door frames. Now it's time to cut grooves in the edge of this stock for holding the door panels. Set up your table saw with a 1/4" dado blade raised 1/2". Clamp the fence 5/16" away from the right edge of the blade and mark the front face of all the stock with an "X". Make sure that you always keep the marked faces of the stock against the fence. Cut your grooves in one edge of the stiles and rails (pieces 5 and 6), and in both edges of the center rails and stiles (pieces 7 and 8).

As is typical of country furniture, I made bridle joints to hold the door frames together. These are fully exposed mortises and tenons. To cut the mortises in the stiles, make a jig like the one shown in **Figure 7 on the next page.** Stand the stiles (pieces 5) on end and place them, one at a time, in the jig to push over a 1/4" dado blade. The mortises must align with the panel grooves, and you'll need to take several passes to reach the full 1¼" depth.

Cut tenons on the rails (pieces 6) by clamping a set up block to the table saw fence and moving the fence so the set up block is 1¾" from the far side of a 1/2" dado blade. Cut the cheeks on the front face of the rails with the blade raised 5/16". Use a miter gauge and butt the end of the stock against the set up block. Make the first pass to define the shoulder, then take several passes to remove the rest of the waste. Now lower the blade to 3/16" and remove the back cheeks.

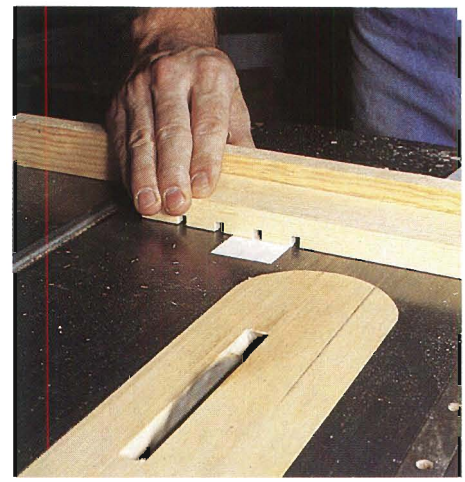


Figure 6: To make the dentil moulding place a piece of tape 1/2" from the right edge of a 1/4" dado blade, align the end of the board with the tape and make the first cut. Next line up the shoulder of the first cut on the tape to make the second cut, and so on.

The tenons on the center stiles and rails are only 1/2" long. Follow the same procedure for cutting these tenons as you just did on the other rails, with the set up block touching the teeth of the 1/2" dado.

Join boards to make the lower door panels (pieces 17) and rip one piece of stock for each upper door panel (pieces 18). When the glue is dry on the lower panels, sand them and cut them to size. Next, cut a 3/16" deep by 1/2" wide rabbet around the perimeter on the back side of all six panels, which will enable them to sit flush with the frames when the doors are assembled.

Byrom Manufacturing has developed a line of vertical cutting panel raising router bits that are exceptionally safe for the home shop (available from The Woodworkers' Store). I chose the simple angle style cutter for this cabinet. Since the panels stand on end during the routing process, you must attach an extra tall board to your router table fence to provide greater stability

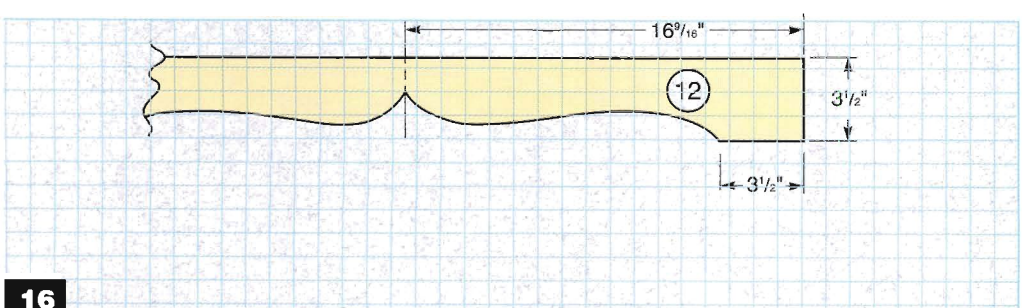


Figure 5: Enlarge the scale drawing at left (each square equals one inch) and transfer it to the front base moulding piece. Now use a saber saw to cut the decorative profile.

(See Figure 8). I recommend taking several shallow passes to reach the full depth of cut. Raise the bit to a height of 1¼" and move the fence back a little with each pass until you're left with a 1/4" thick edge around the panels. Rout the end grain edges of the panels first, then the side grain edges. After routing, sand the panels thoroughly.

Dry assemble the doors to make sure everything fits properly, then take them apart to spread glue in the frame mortises and on the tenons. Remember to put glue in the grooves only where the center rails and stiles join the door frames. If glue is spread in the grooves elsewhere, the panels will not float and will eventually split. Now assemble the doors permanently, and drive a brad into the back of each rail so it pins the panels in the frames. This secures the panels in the doors while still allowing them to expand.

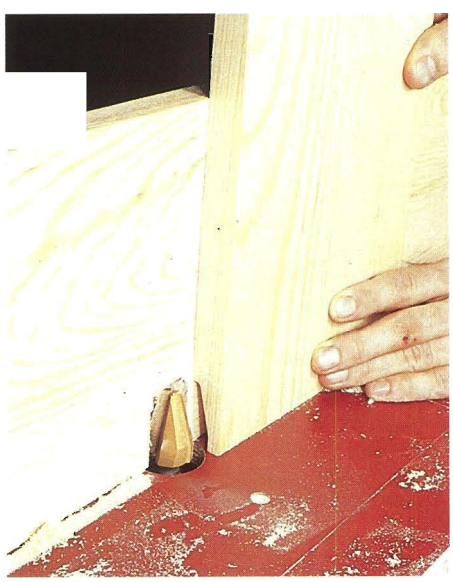


Figure 8: The new panel raising bits from Byrom Manufacturing are very safe for the home shop woodworker. Be sure to use a tall fence to gain greater stability while routing large panels.

Remove the doors from the clamps and sand them thoroughly. Next, set the doors in place in the cabinet. You'll probably need to take a few passes with a plane to get them to fit just right, slanting the edges of the doors back a few degrees to prevent them from binding against the face frame. As soon as the doors fit, set the wrought iron "H" hinges (pieces 19 —*available from Renovator's Supply, PB99 Renovator's Old Mill Rd, Millers Falls, MA 01349, 413-659-2211*) into position so one end is in line with the inside edge of a door rail, and drill their pilot holes. Install the hinges and make any final passes with your plane to get a good fit.

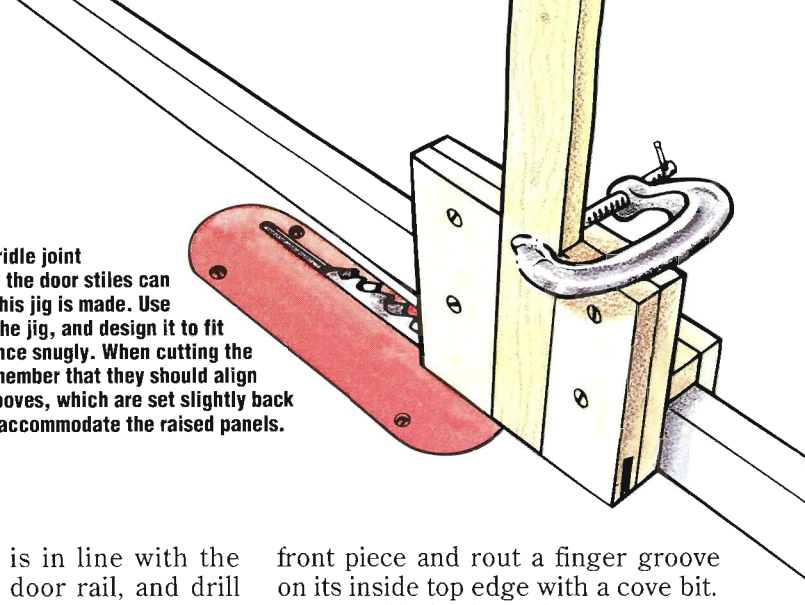


Figure 7: Cutting the bridle joint mortises in the ends of the door stiles can be done quickly once this jig is made. Use 3/4" plywood to make the jig, and design it to fit your table saw's rip fence snugly. When cutting the 1¼" deep mortises, remember that they should align with the door panel grooves, which are set slightly back on the frame edges to accommodate the raised panels.

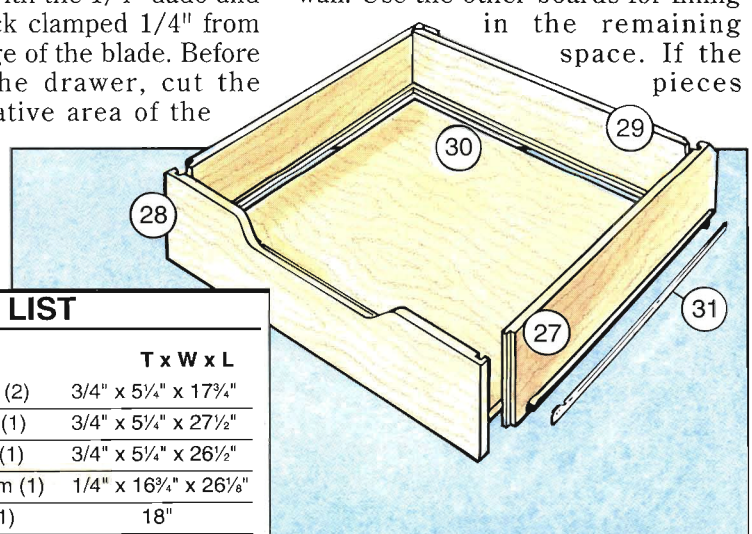
The Drawer and Back

The drawer is made very simply as it doesn't need to carry much weight. I dadoed the sides (pieces 27) into the front (piece 28), and dadoed the back (piece 29) into the sides **(see exploded view drawing below)**. All the dadoes and tenons were made on the table saw using a 1/4" dado blade and a set up block on the fence. For the dadoes in the front, raise the blade 3/8" and set the fence so the set up block is 3/4" from the nearest edge of the blade. The dadoes in the sides are cut with the set up block 1/2" from the nearest edge of the blade. All the tenons were made with the set up block clamped 1/8" from the nearest side of the blade and with the blade lowered to 1/4". The grooves for holding the bottom panel (piece 30) are, yet again, cut with the 1/4" dado and the set up block clamped 1/4" from the nearest edge of the blade. Before assembling the drawer, cut the curved decorative area of the front piece and rout a finger groove on its inside top edge with a cove bit.

I installed Blum drawer slides (pieces 31) and video tape organizers (pieces 32), both available from The Woodworkers' Store. The drawer slides must be installed away from the cabinet sides to allow the drawer to pass through the face frame opening. Make two bolster strips (pieces 24) and rout slots in them as you did earlier in the cabinet sides. After finishing, install these in the drawer cavity and screw the drawer slides to them following the manufacturer's directions.

The back of the cabinet is covered with ship lapped boards (pieces 21), which I made from the remaining pine in my supply **(See Figure 9 on page 18)**. Cut the boards to size, then install a 3/8" dado blade in your table saw and raise it to 3/8". Cut rabbets on opposite edges of six boards and on one edge of the last four.

Use the boards with one rabbet for the pieces meeting the cabinet sides and for the center strips in the back wall. Use the other boards for filling in the remaining space. If the pieces



MATERIAL LIST

		T x W x L
27	Drawer Sides (2)	3/4" x 5¼" x 17¾"
28	Drawer Front (1)	3/4" x 5¼" x 27½"
29	Drawer Back (1)	3/4" x 5¼" x 26½"
30	Drawer Bottom (1)	1/4" x 16¾" x 26⅛"
31	Blum Slides (1)	18"
32	Video Casette Holders`	2 Sets

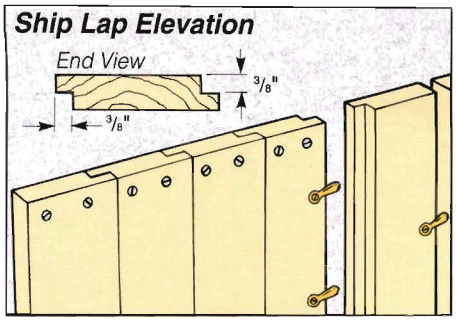


Figure 9: Make removable ship lapped boards for easy access to the wire connections.

don't fit exactly, trim the edges of the center boards. I fastened all but the center boards to the cabinet with #6-1¼" flat head screws. The center two pieces are held in place with turn buttons (pieces 22), which allows you to remove them to work on the wire connections.

The casters (pieces 26) are too short to reach the floor if they are just attached to the bottom of the cabinet. To raise the cabinet 1/4" off the floor, make four 1" thick pads (pieces 25) and glue one near each corner on the underside of the cabinet, then screw the casters to the pads. If you have carpeting you should make the pads thicker.

Sand the entire cabinet to 150 grit and ease all the sharp corners. Country furniture often has a mellow honey colored patina, a color that ponderosa pine never really achieves on its own. To get this color I first applied a stain controller, which helps to even out the color absorption in the pine, followed immediately by Minwax Golden Oak oil stain. Topping the cabinet off with two coats of McCloskey's Heirloom varnish provides a tough, durable finish.

Wrap up your project by attaching the back, the doors and the drawer, and add the knobs (pieces 23) and the magnetic catch (piece 20).

Whether country is the predominant style in your home or you're using it as an accent, finding a comfortable spot for your new cabinet shouldn't be difficult. With a little time, and a few dings and dents, the pine will take on the look of an original —something your grandparents might have had in their house.

Chris Inman is the associate editor of Today's Woodworker magazine, and a professional woodworker.

FINISHING THOUGHTS

Painting the Country Look

By Jerry TerHark

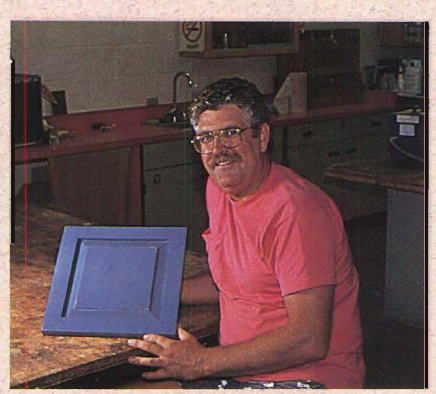
Painting country furniture has been popular for many generations. Often, this was a practical response to uniformly covering the variety of woods used in a single piece of furniture. Good examples are Windsor chairs, which utilize different woods for various chair parts. Another reason for painting was simply good old American thrift —using up what was left in the paint can.

Some woods take paint better than others, depending on the look you're after. Basswood, birch, pine and alder all cover very smoothly, whereas more distinctively grained woods like oak, ash and mahogany first require a grain filler to get a smooth finish. However, some people like more grain showing through. If this is the case for you, these deeply grained woods are ideal for your painted project.

Any type of enamel paint will work for finishing wood projects, although the resulting surface texture will vary between lacquer, oil and latex products. What you must keep in mind is the importance of using compatible products for each step of the finish. If you want to apply an oil based paint, then use an oil based sanding sealer and varnish for the other stages of the finish I'm about to describe. Oil and latex finishes are commonly available at paint stores. Ready mixed lacquer paints can be found at automotive finishing supply outlets.

After the project is well sanded, many folks make the mistake of applying a coat of paint directly to the raw wood. Always apply sanding sealer first. This dries quickly, fills the pores and will prevent subsequent coats of paint from soaking into the wood. With the sanding sealer on, if you should ever want to refinish the piece, you could stain and varnish it without worrying about paint stuck in the wood pores.

Before topping the sealer with paint, decide how much of the grain you want showing through, and thin the paint accordingly. Many of the



country pieces you see today have a distinct grain pattern showing from underneath the paint. Another technique that's popular is using a first coat of one color followed by a second coat of a sharply contrasting color, say black and red. As the piece wears, the first color will show through, creating a dramatic antique appearance.

Once the paint is dry you can give the furniture an older appearance by lightly sanding areas where use and time would normally wear down the finish. Typically this includes door corners, edges and handle areas. I use 600 grit wet or dry paper for this operation. This is also a good technique to expose the lower color on a two tone project.

You now have the look and color you're after, so the only remaining step is applying a final topcoat of clear lacquer or varnish. A gloss topcoat is the toughest and most durable, and gives the best protection for your piece. If you don't want such a high sheen, buff the gloss finish with fine steel wool to reduce its luster, but be careful not to rub too hard —you might go right through the finish.

Painted finishes aren't difficult to apply, and if done properly, will help create the look of a one hundred year old original.

Jerry TerHark lectures nationwide on finishing and heads Dakota County Technical Institute's wood finishing program in Rosemount, Minnesota.

Make a Simple Bureau Caddy in One Day

Here's the perfect dovetail project for beginners.

By Bill Johnson

Laying out dovetails can be an intimidating and time consuming process. In fact, many woodworkers agree that the tricky work is actually completed by the time you're ready to cut the joint. The beauty of this bureau caddy is that each corner is joined with just one dovetail, making the joint layout very simple and ideally suited for cutting on the table saw. Once the fence and blade are adjusted for each step, the cut can be repeated for all four corners, or more if you have a small production run in mind. The key to success is patience and sample cutting—getting a good fitting joint requires minute adjustments of the table saw's rip fence.

My bureau caddy was made from a piece of beautiful cocobolo that I'd been saving for just such an occasion. I used 3/8" thick stock, but 1/2" will work equally well if you cut your bottom groove 1/8" deeper to compensate for the extra thickness. Begin by ripping enough for the sides (pieces 1), the front (piece 2) and the back (piece 3), and cut the pieces to length.

The Pins

It's best to cut the pins first, then fit the tails into the pin gaps later. Layout one set of pins on a side piece and head over to the table saw. Attach a strip of wood to the miter gauge so it reaches a little beyond the blade and clamp a set up block to the fence. Angle the miter gauge 10° in a clockwise direction **(See Figure 1)** and move the fence so that when the side piece is butted against the set up block the pin layout line is even with the blade. The back side of the stock should face the blade during this cut.

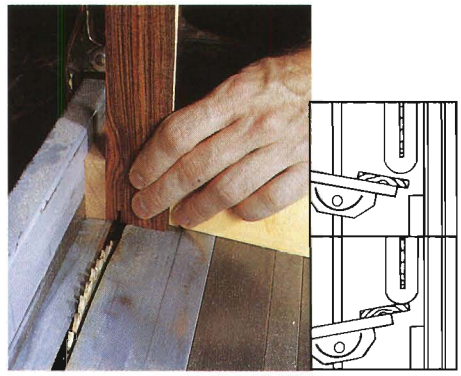


Figure 1: The first pins are cut with the miter gauge turned clockwise 10° and the backside of the stock facing the blade. For the next set of pins turn the miter gauge counterclockwise 10° and present the front face to the blade.

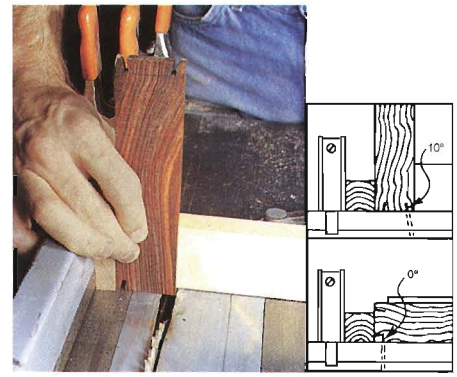


Figure 2: Tilt the blade 10° and square the miter gauge to cut the the four tails on both pieces. Remove the tail shoulders by setting the blade to 0° and lowering it to 5/16", then adjust the fence so the layout line aligns with the blade.

Set the blade height at 3/8" and make a test cut with a piece of 3/8" thick scrap. Adjust the fence until you get a perfect test cut, then set the side piece in place with its back facing the blade. Make the first cut, then flip the stock end for end to cut the diagonally opposite corner. Repeat this procedure for the second side piece.

Make the second set of pin cuts by angling the miter gauge 10° in the counterclockwise direction and resetting the fence to align the layout lines. Make test cuts until you're satisfied with the fence setting, then, with the front of the sides facing the blade this time, follow the same cutting procedure you used just a moment ago.

Reset the miter gauge to 0° and push the fence out of the way. Now take multiple passes over the blade to remove the waste in the pin gaps. Clean up the rough edge of each gap with a sharp chisel.

The Tails

Cutting the tails is very similar to the pin cutting procedure, except the blade is now angled to 10° and the miter gauge is kept at 0°. Adjust the fence and set up block to align the tail layout lines with the blade. For

The dramatic effect that results when two pieces are joined along a sapwood streak makes the top of this small box exceptionally appealing. Given its uncluttered lines and simple corner joints, the bureau caddy's design allows the natural beauty of the wood to become the focal point.

Figure 3: Mark a line on the fence to show the center of the 3/16" bit and line up one shoulder of each side with it. Gently set the side onto the bit and rout until the shoulder at the other end of the piece reaches the fence line. Square the rounded ends of the grooves with a chisel.

the tails, you want to cut outside the layout lines. Make sure the blade is raised 3/8" and test cut some scrap until everything is perfect. You can make all four tail cuts with this set up.

Straighten the blade and lower it slightly, then adjust the fence to remove the shoulder waste. You'll need to clean up the inside corner of the tail with a chisel.

The Bottom

Rout a groove near the bottom edge of the sides, front and back for holding the bottom panel (piece 4). The important thing to remember here is to avoid routing completely through the ends of the stock, which would show in the assembled joints. Chuck a 3/16" straight bit in your router table and raise it 3/16". Set your fence 3/16" from the edge of the bit. Now draw a line on the face of the fence to indicate the center of the bit. For each of the four pieces, align the joint shoulder of one end with the fence line and rout until the opposite end's shoulder reaches the fence line **(See Figure 3)**. Square the rounded ends of the grooves with a chisel.

Cut the plywood bottom to size and mix a small batch of two part epoxy (cocobolo does not bond well with yellow glue, so epoxy is necessary). Spread epoxy on the joints and in the grooves for the bottom and assemble the box. Clean up as much resin as possible now, then later you can chisel off what remains.

The Top

While your epoxy is still workable, join the pieces for the top (piece 5). When the resin is dry, sand or scrape the top's surfaces flush and cut it to size. Layout the cutaway portions along the front edge (as shown below) and remove them with a narrow, fine cutting band saw blade. Sand the edges smoooth, then rout a chamfer on the top's side and front edges.

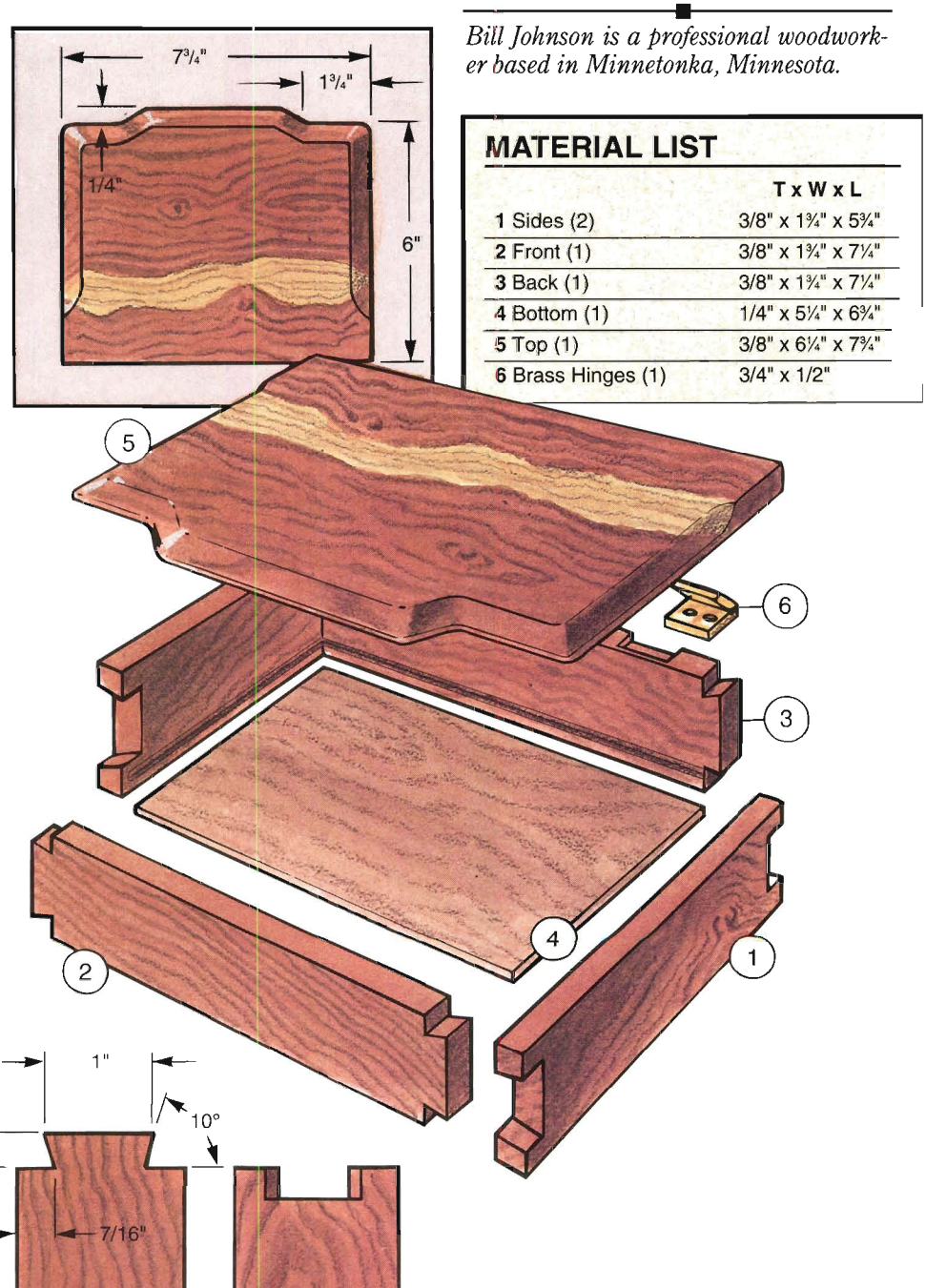
Brusso jewelry box hinges (piece 6 —*available from The Woodworkers' Store*) are perfect for this box as they keep the top open at 90°. However, the hinge comes with 1/2" long screws, which are fine for securing it to the back wall, but are too long for going into the top. Substitute #2-1/4" brass flathead screws for securing the hinge to the top.

Layout the hinge locations and cut the mortise outlines with a knife. Taking small, shallow passes, chise out the waste in the mortises. Now drill the hinge pilot holes and screw on the hinges. Make sure the top lays flat on the walls, and scrape any high spots. Do this on the bottom edges too so the box isn't tippy.

Finishing Up

Remove the hinges and sand the box through the 220 grit stage, then apply a few coats of a tung oil finish. Cocobolo, if well sanded, finishes to a deeply polished sheen, and the oil brings out its warmth and unusual grain characteristics.

Bill Johnson is a professional woodworker based in Minnetonka, Minnesota.



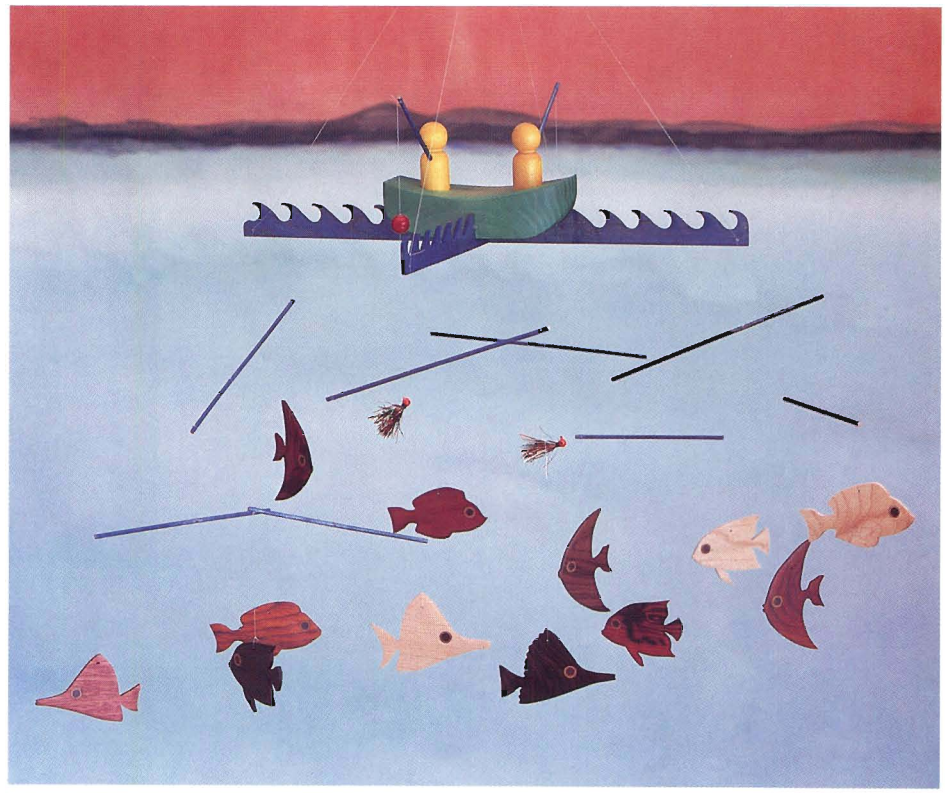
MATERIAL LIST

	T x W x L
1 Sides (2)	3/8" x 1¾" x 5¾"
2 Front (1)	3/8" x 1¾" x 7¼"
3 Back (1)	3/8" x 1¾" x 7¼"
4 Bottom (1)	1/4" x 5¼" x 6¾"
5 Top (1)	3/8" x 6¼" x 7¾"
6 Brass Hinges (1)	3/4" x 1/2"

A Fisherman's Lament

The fishermen in this mobile will always come home empty-handed, but our full-size patterns make this school of fish an easy catch for any woodworker.

By Jeff Jacobson



Just like in real life, the anglers in this mobile seem to always drop their lines where the fish never go. And it seems equally appropriate that as the boat in the mobile turns with the wind, the fish continue to stay a safe distance from the lures.

Getting Started

The four fish in this mobile are pictured on the following pages. The best way to transfer these shapes is to photocopy them, then temporarily glue the patterns directly to the wood with a product like 3M's "Spray Mount."

As with every woodworking tool, your scroll saw should be well tuned before you get started. Make sure the tension is properly adjusted and the blade is running square to the table. A good rule of thumb for choosing blades is to use one with at least three teeth touching the wood at any given time while cutting. For the 1/8" thick waves and fish in this project a 20 teeth per inch blade works well.

The boat is band sawn from a knot free piece of poplar. Start by cutting two crisscrossing kerfs in the bottom face of a 2" x 3" x 6" block of wood. A good carbide tipped saw blade leaves an 1/8" wide kerf, which will accept the wave pieces perfectly. Cut the kerfs 3/4" deep, centering the first cut on the width of the block and the second on the length.

Now drill two holes for holding the anglers. Chuck a 7/8" brad point bit in your drill press and adjust the machine to bore 7/8" deep into the top of the boat block. The hole positions are shown in the boat elevation drawing on the next page.

To shape the boat, first cut its top and bottom profiles on the band saw, then cut the sides. As you can see in the elevation drawings, the very bottom of the boat is flat. This keeps the boat stable as you cut the side profiles and makes it easier to join the boat with the waves. Once you've cut the boat out of the block, file and sand it to final shape.

Making Waves

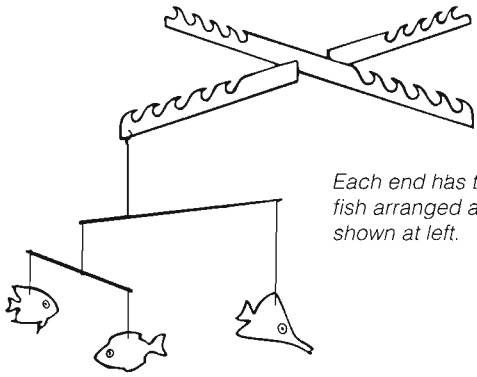
The 1/8" thick waves are made from two pieces of 1" x 16" long maple, using the half size pattern on page 22. Make four enlarged photocopies, cut out the patterns and carefully attach them to the wood with a light coating of Spray Mount adhesive. To get the arching look of the waves, I drilled 1/2" holes every inch and then removed the rest of the waste with the scroll saw. Remember to leave a flat section in the middle of each wave to fit the kerfs in the bottom of the boat. In addition, I recommend shaping the last wave in each segment to match the curve of the boat hull where the pieces meet. The last step is to drill 1/32" holes at the ends of each wave and then cut one of them in half.

Cutting Your Fish

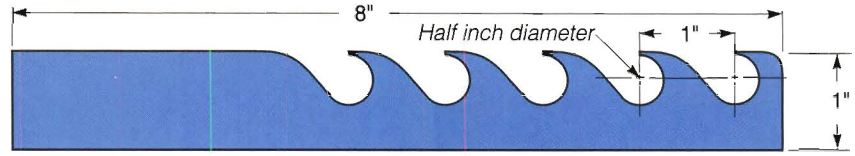
In my collection of wood I have scraps from a number of exotics as well as many uniquely colored domestics. These are ideal for the fish in the mobile. Typically, I choose brightly colored woods like padauk, cocobolo, purpleheart, walnut and mahogany. Cherry and maple also work well to add some contrast.

Once you've transferred the patterns to the 1/8" thick wood, cut three of each with the scroll saw. Next, drill a 1/4" hole for the eyes and the 1/32" hole for the fishing line. Make sure to position the smaller hole so the fish will be balanced when suspended on the line. I did this by attaching some tape to the end of the line and carefully moving it until the fish hung straight. Then I used an awl to mark my drilling locations.

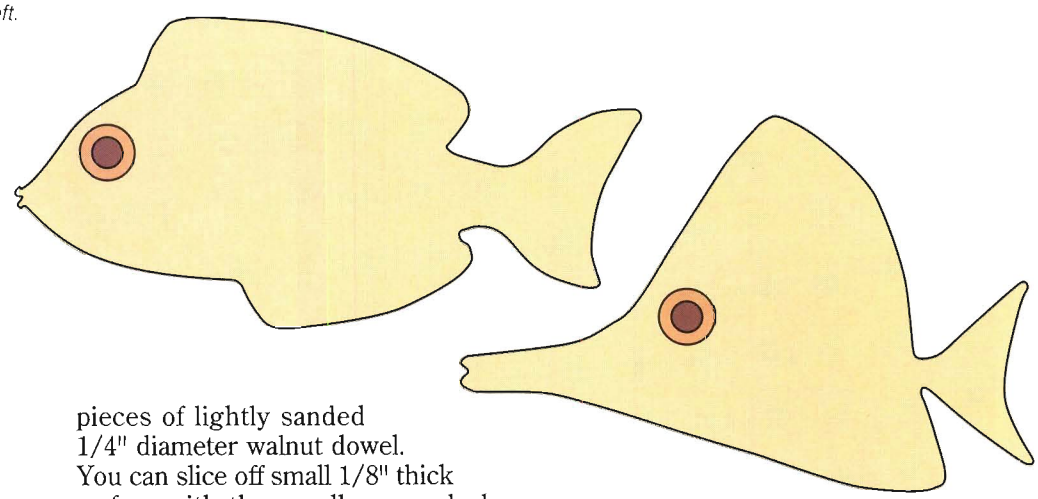
Making the fish eyes is a lot easier than you might think. Begin by drilling a 3/8" diameter by 1" deep hole into a piece of scrap that's clamped to your drill press table. Now slip a 2" long piece of 3/8" birch dowel into the hole. Switch to a 1/4" bit and hold the dowel with pliers while you drill entirely through its center. Make several pieces of dowel so you have plenty of material. Squirt some glue into the hole in the dowels and insert



Each end has three fish arranged as shown at left.

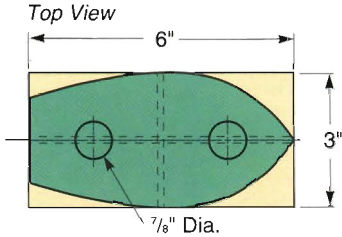


Half Size

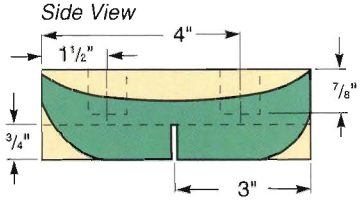


Boat Elevations

Top View



Side View



pieces of lightly sanded 1/4" diameter walnut dowel. You can slice off small 1/8" thick wafers with the scroll saw and glue them into the eye holes.

Finishing The Pieces

I used Deft's new line of primary color dye-stains on the upper parts of the mobile. The powder stains mix with water and are applied with a brush. The waves and small dowels are blue and the boat is stained green. I used yellow on the fishermen (available from hobby and craft suppliers) to make them look like they're dressed in rain slickers.

The next step is to drill holes in the two figures for their 1/8" dowel fishing poles. Clamp the figures lightly in a vise and drill the 1/4" deep holes at a downward angle. Stain the rods blue and glue them in place.

Complete the finishing by spraying all the parts with two coats of Deft clear finish. This leaves a shiny surface and brightens the mobile. When the finish dries, use epoxy to glue the three wave sections and the two figures to the boat.

Assembling the Mobile

Because the fish are made from different woods and are different sizes, balancing the mobile is a trial and error process. As you can see from the photo on the preceding page, each of the four wave segments holds three fish, two on the short 1/8" dowel and one on the longer dowel. It's not really critical to have a perfectly balanced mobile, but you don't want things to get too crooked.

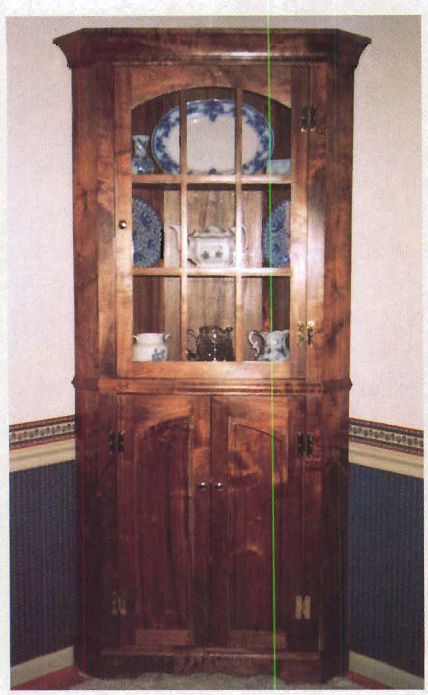
Get started by cutting the fish line to the lengths you want and securing

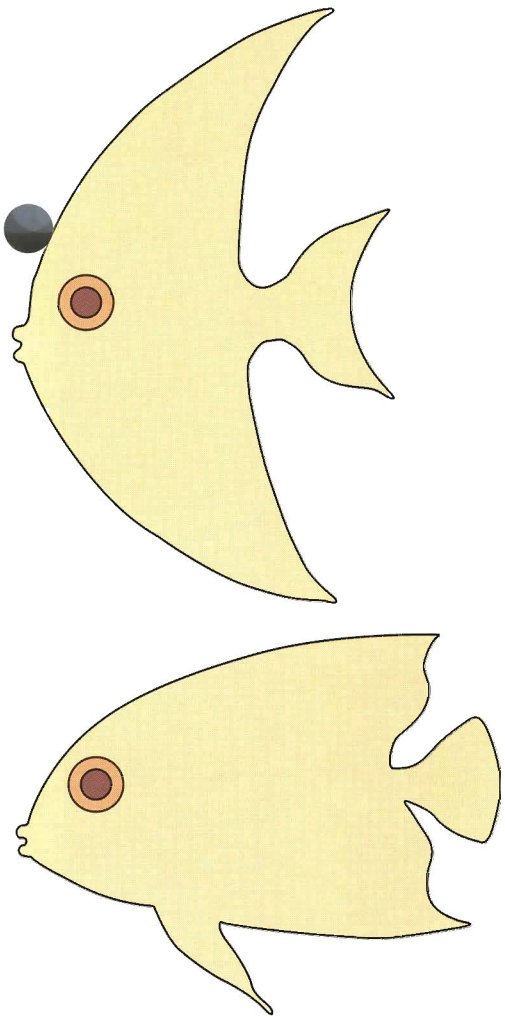
READERS GALLERY

Traveling Walnut

You've heard about well seasoned hardwood, but how about Ian Dunbar's well travelled walnut? Back in 1986 Ian's in-laws had a black walnut tree felled in their yard and sawn into lumber at a local sawmill. As part of the deal for receiving the lumber, Ian promised to make a piece of walnut furniture for his mother-in-law. Well, five years later, after moving back and forth across the country three times, hauling the prized walnut each time, the deal was finally consumated.

After hinting that a corner cupboard would look great in her dining room, Ian's mother-in-law sent him a gift subscription to Today's Woodworker. When he received his first issue (July/August 1990), there on the cover was our cherry corner cupboard —inspiration for his next project. Ian's craftsmanship is certainly worthy of the beautiful wood, and we suspect his mother-in-law feels the same way. For all his efforts we're sending Ian our $100.00 gift certificate. To have your project considered for our next issue, submit your photo and story by October 1.





them to the fish. Begin temporarily tying them to the rods (the four larger rods are 7" long and the four smaller ones are 5½" long), using the photo on page 21 as a guide. A second set of hands really helps here as you tie on your fish and move them in and out until they're balanced. Once they're level, mark the spots and drill 1/32" holes to secure the fish to the rods. Now tie each of the four subassemblies to the ends of the wave segments.

Finish up by tying a line from the corner of one wave segment, through a fish line swivel, and then tie it to the end of the opposite wave segment. Do the same on the other wave segments, looping through the swivel one extra time to help keep the first line from slipping, and then adjust the swivel until the mobile is hanging straight. Attach a fishing leader to the swivel and rig the angler's lines with the most brightly colored jig you can find after clipping off the hooks. Try to place your mobile in a breezy area of the house, out of reach of little fingers.

Jeff Jacobson is a technical illustrator with Today's Woodworker and an avid woodworking hobbyist.

Pine (Pinus Spp.)

By Gordon Hanson

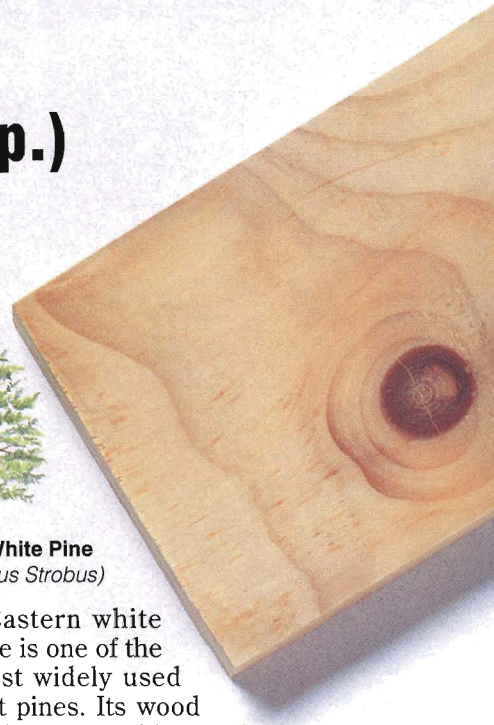
Christopher Columbus described the pines of the New World as "trees stretching to the stars with leaves that never shed." What a spectacular sight it must have been to see seemingly limitless forests reaching beyond the horizon.

In her book, *Red Oaks & Black Birches,* Rebecca Rupp claims that those virgin North American forests of eastern white pine that so impressed Columbus held 750 billion board feet of wood. Being so plentiful, pine became one of the woods that early settlers depended on most for furniture and house building.

Our tremendous demand on pine resources has led to a serious shortage in the supply. Fortunately measures ranging from replanting programs to finding new uses for lower grades of stock are ensuring trees for the future. As an example, using knotty pine paneling was initially encouraged by wood suppliers who wanted to sell their lower grades.

Another relatively new method of maintaining our supply of high quality pine is recycling material. A number of firms, like The Joinery Company of Tarboro, North Carolina, are salvaging southern yellow pine from old buildings about to be razed. Beams, joists, and other timbers are taken, and then remilled into trim, moulding, flooring, and cabinet stock. The Joinery Company recycles an estimated two million board feet annually for customers as far away as Japan and Saudi Arabia.

All pines are considered softwoods, meaning they are coniferous trees. However, there are hard and soft categories, and this gets even more complicated when you discover that a few pines are actually harder than some wood from deciduous trees. To distinguish hard pines from soft pines, look at their needle formations. On hard pines the needles are usually grouped two or three in a bunch, while soft pines have bundles of five.



E. White Pine
(Pinus Strobus)

Eastern white pine is one of the most widely used soft pines. Its wood is characterized by a uniform texture, straight grain, good stability, light weight and excellent bonding properties. However, it is relatively low in strength and shock resistance.

Southern yellow pine is a term used to describe several hard pine species sharing similar characteristics. The wood from these species —which include such common names as shortleaf, slash and loblolly —is relatively heavy, hard, strong, stiff and shock resistant, making them excellent choices for structurally critical assemblies. Southern yellow pines shrink quite a bit while drying, but are stable once seasoned.

Red Oaks and Black Birches, by Rebecca Rupp, is published by Storey Communications, Inc., Pownal Vt.

Longleaf Pine
(Pinus Palustris)

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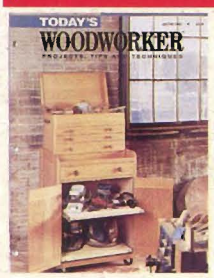

A rolling tool cabinet, rotating end table, wall mounted shelf, tips for buying used tools and more.
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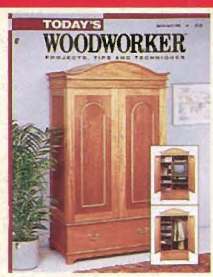

An armoire, curio shelf, wedge tenon magazine rack and installing European hinges.
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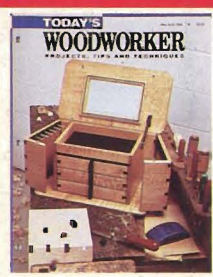

Jewelry box, turning figured wood, a folding Adirondack chair, drawer slide options plus more.
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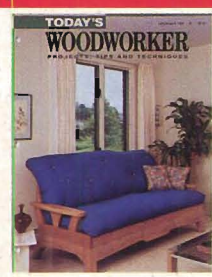

A futon sofa bed, cedar-lined blanket chest, antiquing techniques and using knock down fittings.
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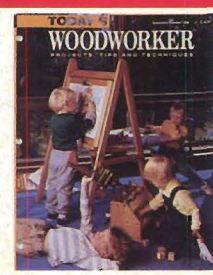

An easel, children's activity center, folding footrest, model airplane and framing with inlay.
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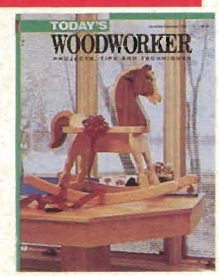

Modern pedestal table, a classic rocking horse, holiday ornaments and mixing your own finishes.
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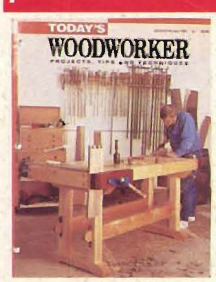

A European style workbench, turned stamp holders, heart-shaped bandsaw box and a breakfast tray.
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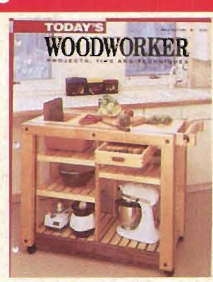

The kitchen work station, Shaker candlestand table, baker's rolling pin, a step stool and more.
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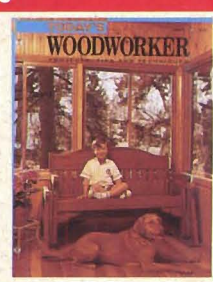

A porch glider for two, continuous grain box, Chippendale mirror frame, shellac repairs and spoon carving.
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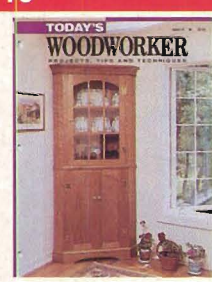

Classic corner cabinet, a bent lamination fishing net, a white oak trivet using a scrollsaw and more.
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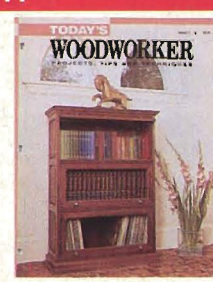

A stately barrister's bookcase, spinning string tops, a kid's step stool and an inlay banded desk tray.
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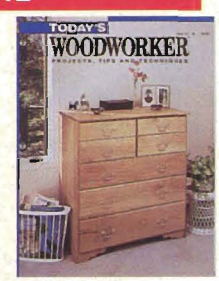

Uncomplicated butternut bureau, a Shaker inspired swivel mirror, and deep-reach hand screw clamps.
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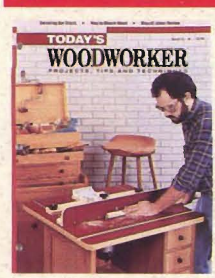

A precision router table, building a set of swiveling bar stools and tips on buying a new biscuit joiner.
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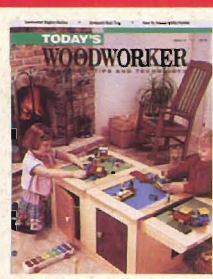

Building a craftsman style rocking chair, a brightly colored toybox, and a nifty compact disc holder.
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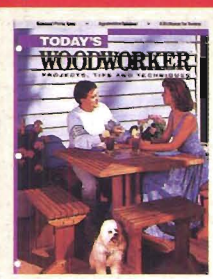

A picnic table for four, a birdhouse project for turners, making a simple dulcimer and a stylish joiner's mallet.
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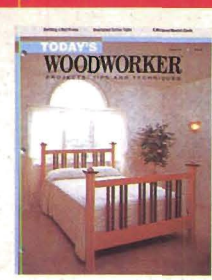

Crafting a maple bedframe, a dovetailed coffee table and a contemporary mantel clock.
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NEXT ISSUE:

The November/December 1991 issue will feature a traditional bunk bed and a pair of last minute gift ideas. Don't forget, we want to share your best work, so send us your Reader's Gallery photos and Tricks of the Trade.

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