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TODAY'S

Issue 50

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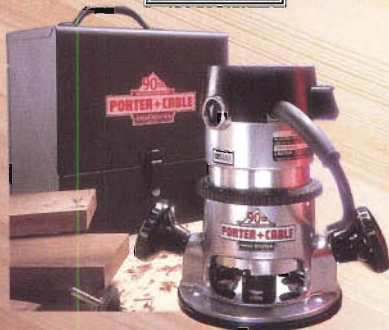
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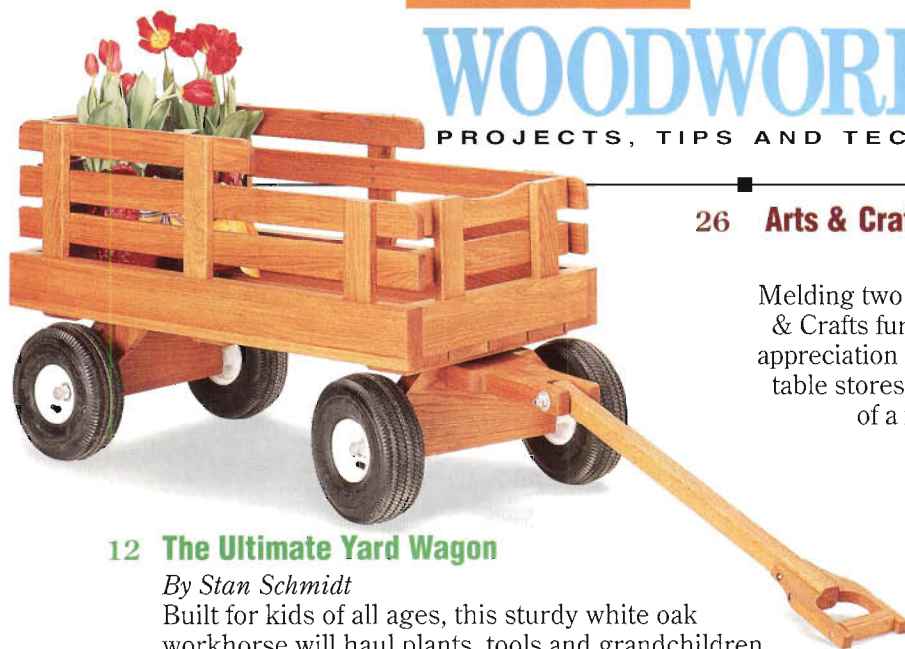
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TODAY'S

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PROJECTS, TIPS AND TECHNIQUES



12 The Ultimate Yard Wagon

By Stan Schmidt

Built for kids of all ages, this sturdy white oak workhorse will haul plants, tools and grandchildren ...all at the same time!

26 Arts & Crafts Wine Rack

By John English

Melding two traditions - Arts & Crafts furniture and wine appreciation - this handsome table stores up to 14 bottles of a favored vintage.



DEPARTMENTS

5 On The Level

Our 50th issue gives us pause to look back at our roots.

6 Tricks of the Trade

A slide-out router table; stopping tool vibrations; and drying off veneer treatment.

7 Shop Stumpers

The shelf life of woodworking glues and plain-sawn versus quartersawn lumber.

8 What's In Store

DeWalt returns to stationary tool market; new tools from Milwaukee, Bosch and Sears.

25 Techniques

Michigan woodworker Larry Heinonen shares his technique for cutting dentil molding with a router.

30 End Grain

An Iowa reader takes the production route with our famous steamer trunk.



18 Entertainment Center III

By Rick White

Adorned with dentil moldings and disappearing doors, this cherry classic brings new meaning to the phrase "a place for everything and everything in its place."

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 manufacturers' instructions and safety precautions.

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ON THE LEVEL

WE'RE

50

Seems like just yesterday...

Back in the fall of 1989, what eventually became the *Today's Woodworker* staff sat down to toss around the idea of starting up a new magazine for woodworkers. Rick White, shop foreman and number one project builder, was there, along with just about everybody on the masthead at left. Why start up a new magazine in an already crowded field? Because we knew there was room, but more importantly, considerable demand.

How did we know? Woodworkers told us, that's how. Now that might seem like a strange thing for a magazine still on the drawing board to say, but then that was exactly the point of my very first "On the Level" column, way back in Issue #1 (above).

Remember, our parent company, The Woodworkers' Store, had been talking with and serving woodworkers for close to 40 years when we published our first issue. In fact, when Nordy Rockler started his company (specializing in veneer and wood parts), there were no wood-

working magazines. When a woodworker had a question back then, there was a better than even chance that Nordy, or one of his trusty crew, would provide the answer. Today, Nordy and his crew can still be found on our masthead, directly over the "editorial advisors" line.

A little higher up in the masthead you'll find Ann Rockler Jackson, Nordy's daughter and our publisher. It was Ann's survey of The Woodworkers' Store's customers that first revealed the possibilities for *Today's Woodworker*. Of course we still had to create the magazine you outlined for us in those surveys, but from your first flurry of letters we knew that we were on

the right track. Today, with well over 100,000 readers and some 200 projects completed (And they're all still available!), we feel a strong sense of pride in our accomplishments.

So, with all this history under our belt, what should we choose as the cover project for our 50th anniversary issue? No contest. Every other survey we read provides a version of the answer. "Could you have Rick tackle another entertainment center?" As any good Minnesotan would say, "Why sure, you betcha!" Enjoy!

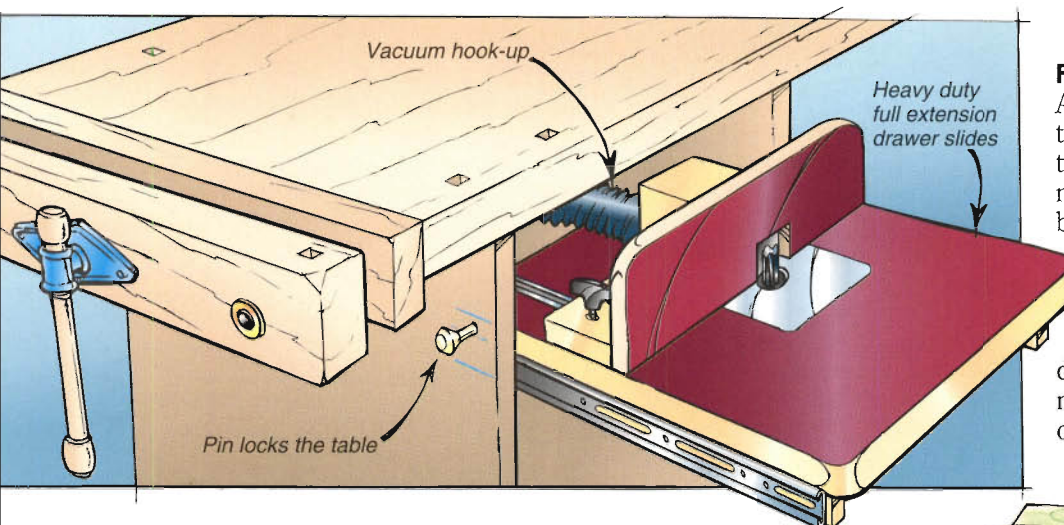
Larry N. Stoiaken



Rick White's two earlier versions of the entertainment center proved so popular that we invited him to build a third, updated version to help us celebrate our 50th issue. His cherry masterpiece begins on page 18.



Well Heeled Vibration Dampers & Shop Clay



Pull-out Router Table

If you have limited space in your shop, my pull-out router table might help create a little extra room for you. The tabletop and fence system can be made as desired - in fact I have two tops that I made from a scrap piece of formica countertop. The fence on the first table is adjustable front to back while the one on the second is preset to make scribe molding only. I used full extension, heavy-duty slides and added a locking pin to keep the table from moving during operation. This unit slides right under the bench when not in use and easily accommodates a dust collection system.

*Thomas Pratley
Oxnard, California*

Veneer Quick Dry

If you moisten your veneer with water and glycerin in order to flatten it, here's a great way to dry the material. Simply place it between sheets of corrugated packing material. The corrugations permit air movement and the sheet and the material will withstand a terrific amount of weight. A fan can be placed next to the drying stack to force air through the stack and speed drying.

*Michael Burton
Ogden, Utah*

Finger Protectors

Any time I need to sand small items that bring my hands in close proximity to my disc/belt sander, I protect my fingers by slipping on those flexible, rubber fingertip covers sold in office supply stores (about \$2.00 a dozen). Not only do they protect my skin and fingernails from abrasion should I bump the whirling disc or belt, they provide a good, non-slip grip for holding small pieces of wood firmly while sanding them.

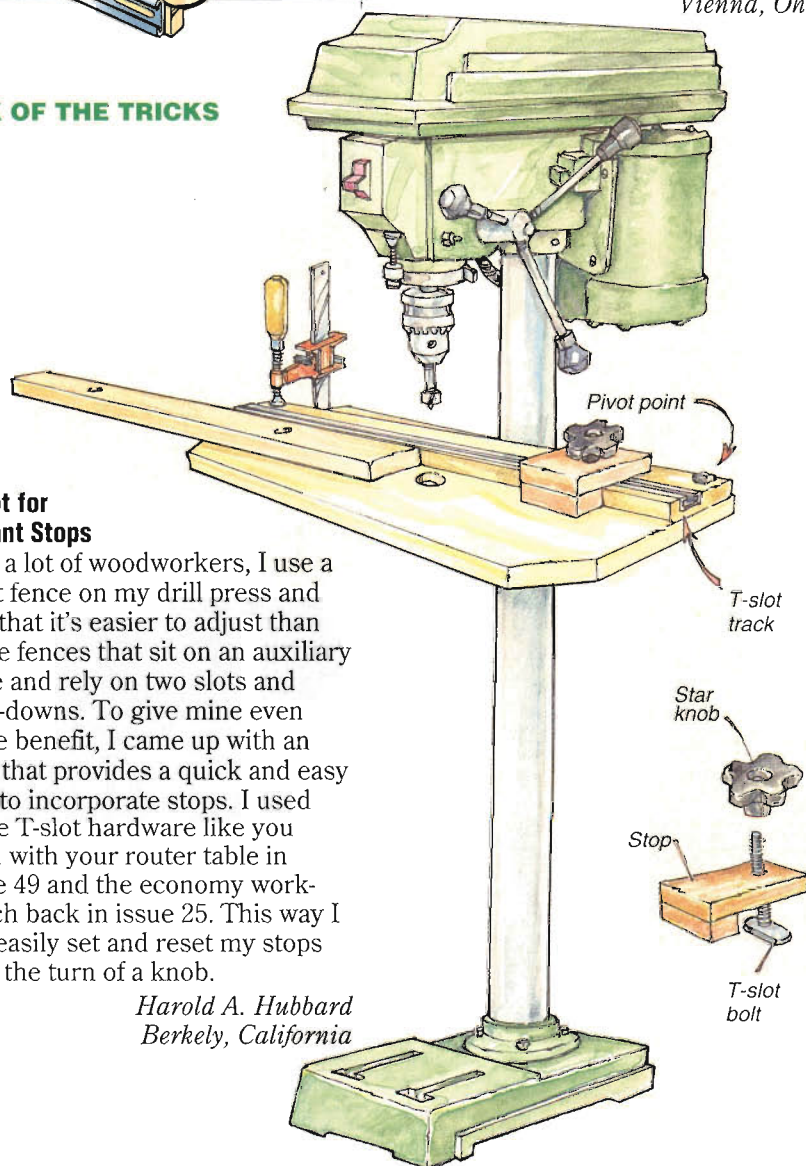
*R.B. Himes
Vienna, Ohio*

PICK OF THE TRICKS

T-slot for Instant Stops

Like a lot of woodworkers, I use a pivot fence on my drill press and find that it's easier to adjust than those fences that sit on an auxiliary table and rely on two slots and hold-downs. To give mine even more benefit, I came up with an idea that provides a quick and easy way to incorporate stops. I used some T-slot hardware like you used with your router table in issue 49 and the economy workbench back in issue 25. This way I can easily set and reset my stops with the turn of a knob.

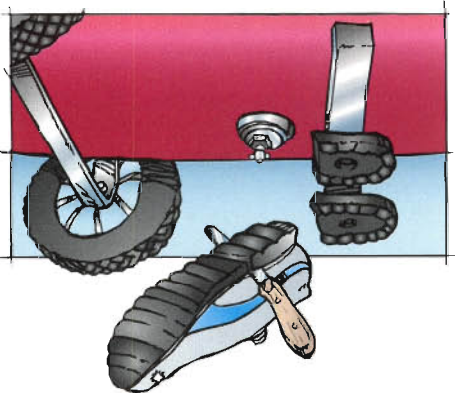
*Harold A. Hubbard
Berkely, California*



Clay Is Handy in the Shop

I often need to paint small items of hardware (nail heads, screw eyes, etc.) for use on some of my woodworking projects. I have found that a 1-pound box of modeling clay is very handy for these jobs. The clay is non-hardening yet firm enough to hold assorted small parts as they are inserted for painting. It also works well for holding various small items during glue up.

*Howard E. Moody
Upper Jay, New York*



Vibration Dampers or Rubber Feet

The heels from a tired pair of running sneakers generally have enough rubber type material to make excellent vibration dampers or rubber feet on shop tools and tables. Custom shaped cuts can be readily made with a bread knife. A Forstner drill bit is used to recess a washer and mounting bolt or screws.

*Joseph Fetchko
Ocean City, Maryland*

Today's Woodworker pays from \$40.00 (for a short tip) to \$150.00 (for Pick of the Tricks) for all Tricks of the Trade published. Send yours to Today's Woodworker, Dept. T/T, P.O. Box 261, Medina, MN 55340. E-mail: editor@todayswoodworker.com.

When Does Glue Go Bad?

Q It's cheaper to buy wood glue in bulk and transfer it to smaller containers like mustard squeeze bottles. A gallon of yellow glue lasts me a couple of years, but how long will it hold its strength?

*John Laugesen
Elk Grove Village, Illinois*

A We talked with Dale Zimmerman, technical specialist with Franklin International of Columbus, Ohio. His company's glue, Titebond, has a shelf life of two years, typical of yellow aliphatic resin glues. Weatherproof Titebond II, on the other hand, has a four-year shelf life. If you're not sure how long you've had your glue, test it. If it tends to roll up in a little ball or is rubbery, Zimmerman says it's time to buy.

Franklin doesn't put expiration dates on its products, but you can determine the adhesive's age by translating the code on each bottle. The length of the code varies, but the first digit signifies the year of manufacture (6 means 1996, 7 means 1997). That's followed by a letter signifying the month (A is January, B is February, etc., but skip I). The rest of the code allows Franklin to identify the sample.

Titebond and Titebond II, by the way, should survive at least five freeze cycles in an Illinois winter. Its consistency may change, but not the functionality. Thick glue can be stirred, or you can add up to 5% water without affecting the bonding strength.

Franklin's toll-free technical service number is 1-800-347-GLUE.

Send your Shop Stumpers to Today's Woodworker, P.O. Box 261, Medina, MN 55340. Or e-mail: editor@todayswoodworker.com

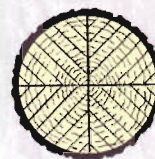
Q I want to build the Stickley plant stand featured in issue 41. What's the difference between the way quarter-sawn and plain-sawn lumber expand and contract?

*Mike Stevenson
Detroit, Michigan*

A TW editorial advisor Rick White explains that in quarter-sawn lumber, the annual rings are at right angles to the wide face, so the grain pattern is straight and tight. Quarter-sawn boards, therefore, react to changes in moisture content by moving more in thickness than in width.



Plain-sawn



Quarter-sawn

Plain-sawn (also known as tangent-sawn) lumber is simply cut from the log in parallel slices. This means that the grain patterns at the edges of a board can be close together (and in effect, quarter-sawn), but the pattern through most of the board will show wide spaces between the annual rings, and these boards will move about twice as much in width as they do in thickness. By the way, neither cut moves much in length.



DeWalt Returns to Stationary Tool Market

By Stan Schmidt



DeWalt's new line of benchtop tools will debut this summer. The table saw, scroll saw and planer are expected to sell for less than \$500 each. The double bevel sliding compound miter saw (not shown) should retail for below \$700.

DeWalt, once a name synonymous with heavy-duty radial arm saws, is jumping back into the stationary tool market, unveiling four industrial-grade machines: a 12½" thickness planer, a 10" table saw, a 20" scroll saw and a 12" double bevel sliding compound miter saw.

Black & Decker revitalized DeWalt seven years ago with a marketing strategy focused primarily on the residential contractor. But these new tools, according to Bill Taylor, director of new product development, will allow DeWalt to take direct aim at professional and advanced amateur alike.

A User-friendly Planer

The DW733 planer (75 pounds) is designed to minimize snipe with 12" infeed and outfeed tables. Each 360° turn of the folding handwheel lowers or raises the cutterhead 1/16", and a 15 amp motor handles stock at 26-27 feet per minute.

One unique feature of this planer is a turret depth stop similar to those common on plunge routers, with preset stops at 1/4", 1/2" and 3/4". Planing capacity is 6" with a 1/8" maximum cutting depth.

Table Saw with Telescoping Fence

The portable DW744 table saw weighs only 64 pounds. It utilizes a rack and pinion fence that moves along telescoping rails and boasts a 24½" rip capacity. The fence is removable and can be placed on the left-hand side for ripping up to 16". The universal motor has a direct-drive gear mechanism and is controlled by a paddle switch large enough to shut the saw down with your knee.

Seen on the World Wide Web

<http://www.web.net/goodwood>

The Northwest chapter of the Good Wood Alliance is producing the Good Wood Show May 8-31 at the Contemporary Crafts Gallery in Portland, Oregon; contact 1-503-223-2654.

<http://www.metro.mnscu.edu/DakotaTC/>

Dakota County Technical College (Rosemount, Minnesota) is offering four summer workshops by Mitch Kohanek: color matching, wood finishing, furniture refinishing and spot repair. Call 1-612-423-8472 or e-mail: BCHAR@dak.tec.mn.us.

New Scroll and Miter Saws

The DW788 scroll saw was developed with Sommerville Design (the Canadian manufacturer of the Excalibur saw), which has decided to share Excalibur's virtually vibration-free, double parallel link arm design.

The DeWalt saw has a tool-free blade changing system and a large cast iron table that tilts 45° in either direction. The upper arm lifts up so the workpiece can slide over the blade, and the saw comes with a dust blower and a speed range of 300-1,750 strokes per minute. And all the controls, including the tensioning lever and electronic variable speed switch, are up front and handy.

The DW708 miter saw, weighing 57 pounds, has a 12" crosscut capacity and an adjustable depth of cut (maximum 5¼"). The dual rail design can bevel left or right up to 48°, and miter 50° to the left and 60° to the right. The saw also features positive stops at 11 common miter cutting positions, and a cam action miter locking system.

Milwaukee's New Cordless Saws

Milwaukee Electric Tool Corporation has unveiled two new cordless saws, a 12-volt jigsaw and an 18-volt Sawzall®, both with keyless Quick-Lok™ blade changing systems.



The battery pack for Milwaukee's new cordless 12-volt jigsaw is interchangeable with several of their cordless drill models.

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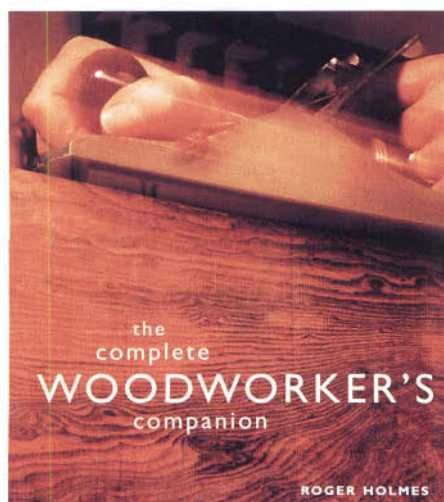
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The jigsaw (street price \$300 with battery and charger) is equipped with an anti-splintering device, a very ergonomic barrel grip, and a battery pack that's interchangeable with some of the company's drills. It cuts at 1,700 strokes per minute and uses T-shank blades. Milwaukee claims it can cut 35 feet of particle board on a single charge! This jigsaw's blade changing system was patented by Milwaukee's sister company, AEG of Germany, three or four years ago. It's extremely easy to operate: Just pull a lever and insert a blade.

The cordless Sawzall (street price \$270 with battery, charger and case) accepts standard 1/2" shank blades, cuts at variable speeds up to 2,000 spm, and has a 1" blade stroke.

A Woodworker's Companion

Roger Holmes received his hands-on instruction from English craftsman Alan Peters, and now plies his craft in Lincoln, Nebraska. Holmes' new book, "The Complete Woodworker's Companion", addresses tools, materials, wood preparation and joinery. He also introduces several basic finishing methods, and illustrates his techniques with some 400 full-color photos (including many shots of work by contemporary craftsmen).



Holmes' approach offers a comprehensive overview of woodworking, complete with examples of finished pieces and excellent instruction in building techniques. Some of the projects included are: A simple trestle table, an apron-rail table, a frame-and-panel chest, a simple bookcase, a dovetailed table, hanging cabinet and a small chest of drawers. This 192-page hardcover book is published by Watson-Guptill Publications at \$29.95.



Sears' new Craftsman multi-function drill press is a bench-mounted unit with built-in dust collection and oscillation (for drum sanding).

Craftsman's Oscillating Drill Press

If you need a new drill press and you've always wanted an oscillating spindle sander, you're in luck. Now you can get both in one machine - the \$159 Craftsman 8 1/2" benchtop drill press.

This five-speed tool features a 1/2" keyed chuck and a 1/3hp motor. It also has a 2" spindle travel and a 4 1/4" throat that's big enough for most woodworking tasks. The built-in dust port makes for clean working conditions. Safety was an issue for the designers, too: A micro-switch shuts off the machine when the pulley guard lid is opened.



Despite its powerful 14.4 volt motor, the latest cordless drill from Bosch was designed specifically for one-hand operation.

Switching from drilling to oscillating is easy: Open the pulley guard lid and stretch an O-ring from the front pulley to the oscillator. It accepts sanding sleeves up to 2" in diameter, and has a 1/2" stroke.

Combining the oscillator with the drill press offers a couple of advantages: It's easy to move the table up to compensate for sanding drum wear, and you can add even more function by using the oscillator to file, rasp, grind or mill with the appropriate attachments.

Bosch Introduces 14.4-volt Drill

Bosch Power Tools has introduced a 14.4-volt cordless drill/driver featuring a 3/8" single-sleeve chuck that tightens with one hand. It retails for \$184 with two batteries, a one-hour charger and case.

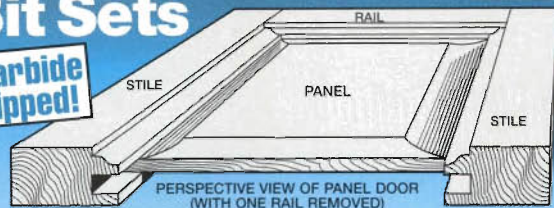
"The entire drill was designed specifically for one-handed use," explained Dave Noggle, senior product manager. Bosch and Jacobs Chuck designed the chuck together so that the spindle locks when the trigger is released, making for true one-handed use.

"Weight was a major concern for the 14.4," continued Noggle. "Our goal was to be under 4.5 pounds. We got to 4.1, so it's significantly lighter than anything else on the market."

WHAT'S IN STORE HOTLINE: If you know of new tools, hardware, books or World Wide Web sites, contact Stan Schmidt at Today's Woodworker, P.O. Box 261, Medina, MN 55340. E-mail: editor@todayswoodworker.com

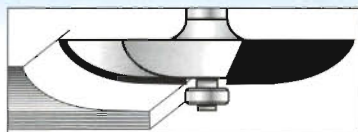
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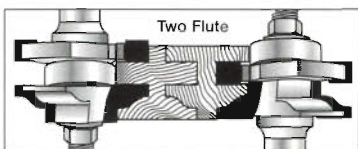


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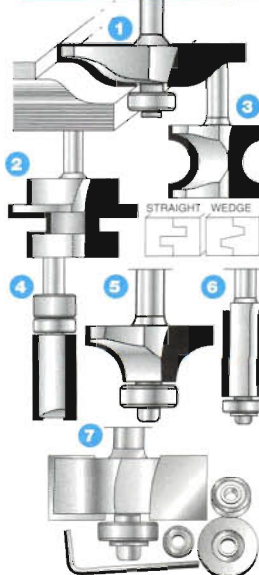
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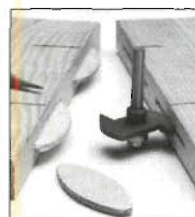
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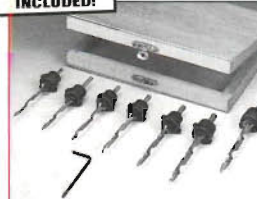
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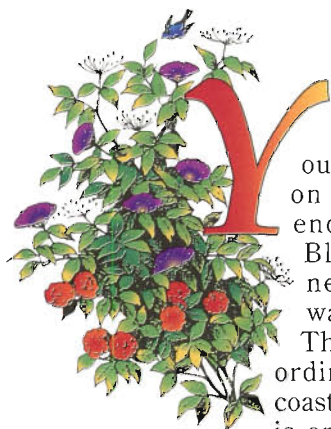


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The Ultimate Yard Wagon

This heavy hauler comes equipped with pneumatic tires and isn't afraid of a little rough terrain.

By Stan Schmidt



Young Paul Bunyon had his legendary ox, Big Blue, but he never had a wagon like this. This isn't your ordinary little red coaster wagon. This is an easy-to-pull, easy-to-steer, wide wheelbase heavy hauler. Equipped with steel axles and four pneumatic tires, it's not afraid of a little rough terrain. It can easily handle big loads like two kids and their toys or crates of spring flower bulbs and garden tools.

I decided to use white oak for this project because it resists the elements better than most common species and has strength to spare. The glue is waterproof, the screws are made for exterior use and it's all wrapped in two coats of General Finishes' Outdoor Oil just in case it's left outside overnight.

The 10" diameter pneumatic tires are 4" wide and they're mounted on roller bearing steel wheels, each of which has a load rating of 260 pounds.

Before you get rolling, purchase your tires and all the hardware. If you need to make adjustments to the dimensions, it's easier to do it before you start milling the white oak.

I found my tires at Minnesota-based Northern for \$15.99 each (<http://www.northern-online.com> or 1-800-533-5545). The exterior-grade screws came from The Woodworkers' Store (1-800-279-4441), and all the rest of the hardware, including the 3/4" axles, the 1/2" carriage bolts and the locking nuts, I found at my local hardware store.

Working with White Oak

Once you have all your wheels and hardware in hand, cut all the pieces to the dimensions listed in the Material List on page 14.

If you've never used white oak before, you'll quickly discover that it has a tendency to burn easily, even if you use a high quality saw blade fresh out of the box. You can take a month of Sundays to sand off the burn marks, but I solve this problem by ripping the stock 1/32" oversize and then running each edge across the jointer. I rip and joint a couple of



Don't tell the Hinderaker girls, Mollie and Rachel, that they're working. As long as they're in control of the yard wagon, Mom will have plenty of help with those tulips!

test pieces to make sure I've got the jointer set precisely at $1/64$ " (after jointing the two edges, the finished board is then $1/32$ " smaller than when it was ripped).

Building the Bed Frame

The bed sides and ends (pieces 1 and 2) are made from $3/4$ " thick boards face glued after dadoes have been cut for the stake pockets. This is the same split mortise technique that John English and Greg Wood demonstrated in issue 49. I found this method much faster than hand-



Figure 1: To make the through mortises in the bed sides, cut half of each mortise into $3/4$ " thick stock on your table saw.



Figure 2: Then glue the two halves together to form the $1\frac{1}{2}$ " thick sides. I used waxed spacers to line everything up.

cutting $3\frac{1}{2}$ " deep mortises. You can cut these dadoes on a table saw (see **Figure 1**) or radial arm saw equipped with a stack dado set, following the dimensions in the **Pinup Shop Drawings** between pages 16 and 17. Notice that the dadoes are slightly wider than the stakes so that the racks can be removed easily.

Before gluing and clamping the halves together, cut some scraps to the exact widths of the dadoes and give them a liberal coat of wax (see **Figure 2**). These will be used as spacers to keep the mating pieces from sliding around during the gluing and clamping process (see **Figure 2**), and they'll also help control glue squeeze out. Since the wagon will battle the elements, it's a good idea to use water-resistant glue such as Titebond II or a waterproof polyurethane such as PL Premium Wood Glue.

When everything's dry, glue and screw the sides to the ends with No. 8 screws (pieces 3), after first drilling a pilot hole to prevent the stock from splitting - a danger even with stock this thick. I used 3" long square-drive exterior screws, which I covered with $3/8$ " diameter flat screw hole plugs (pieces 4). I then softened the four corners of the frame with a $3/8$ " roundover bit in my router. With that done, you can turn your attention to the five floorboards (pieces 5).

Installing the Floorboards

With the boards already cut to size, start milling them by drilling a $1\frac{1}{2}$ " hole in the middle floorboard for the

steering pin, and a series of $1/2$ " drainage holes where the floorboards cover the stake pockets (see the **Pinup Shop Drawings** for all of these locations). Before you screw the boards in place, however, take time to soften the sharp edges of each with sandpaper.

Use $1/4$ " thick scraps to maintain consistent spacing between the boards as you install them, a process which takes place with the bed frame upside down. Glue and screw the floorboards to the sides and ends, using No. 8 x $1\frac{1}{4}$ " exterior screws (pieces 6). Since these screws are all hidden underneath the wagon, I opted not to cover them with plugs, but I did countersink them to protect small hands.

Keeping those little hands in mind, I also used my sliding compound miter saw to mill a 45° chamfer on each end of the three crossbraces (pieces 7), as shown in the **Pinup Shop Drawings**. Then I glued and screwed the front and middle crossbraces to the floorboards. I also continued the $1\frac{1}{2}$ " steering pin hole through the front crossbrace. The third crossbrace isn't attached until the rear axle carriage is assembled.

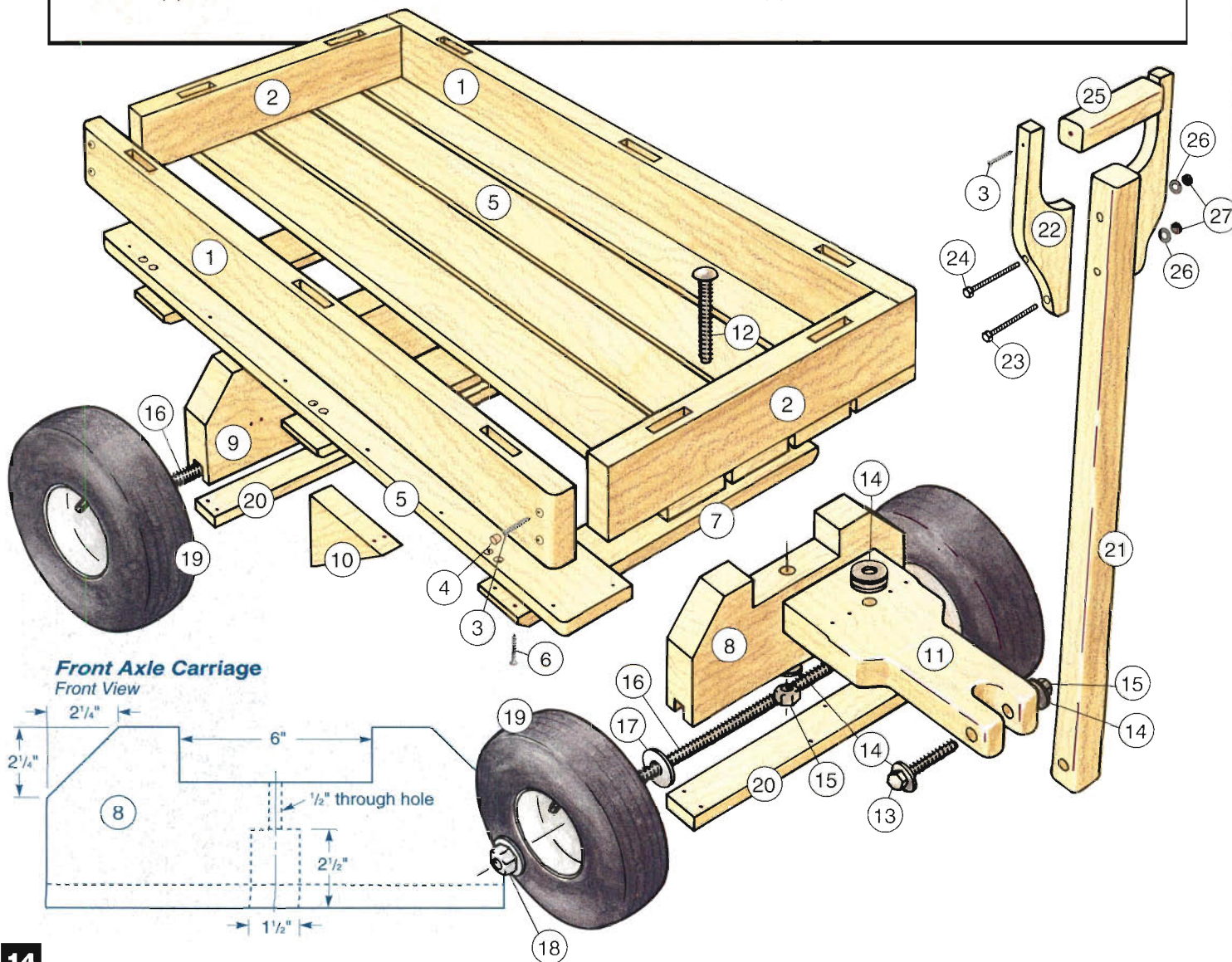
The Axle Carriages

The first step in creating the front and rear axle carriages (pieces 8 and 9) is to bore holes in the front carriage for the steering pin while the workpiece is still rectangular. To do this, install a $1\frac{1}{2}$ " diameter Forstner or spade bit in your drill press and bore a $2\frac{1}{2}$ " deep hole in the bottom of



MATERIAL LIST

	T x W x L		T x W x L
1 Bed Sides (2)	1½" x 3½" x 42"	17 Axle Washers (8)	3/4" ID
2 Bed Ends (2)	1½" x 3½" x 19¼"	18 Axle Caps (4)	3/4" Locking Nuts
3 Long Screws (30)	#8 x 2½" Flathead Exterior	19 Tires (4)	10" x 4" Pneumatic
4 Screw Hole Plugs (8)	3/8" Diameter	20 Axle Retainers (2)	3/4" x 1¾" x 14¼"
5 Floorboards (5)	3/4" x 4¼" x 42"	21 Handle Shaft (1)	1½" x 1½" x 28"
6 Short Screws (108)	#8 x 1¼" Flathead Exterior	22 Handle Sides (2)	3/4" x 2" x 8"
7 Crossbraces (3)	3/4" x 3½" x 19½"	23 Handle Bolt, Short (1)	1/4" x 2½"
8 Front Axle Carriage (1)	1¾" x 5¾" x 14¼"	24 Handle Bolt, Long (1)	1/4" x 4"
9 Rear Axle Carriage (1)	1¾" x 6" x 14¼"	25 Handle (1)	1½" x 1½" x 4"
10 Rear Axle Braces (3)	1¾" x 4" x 8½"	26 Handle Washers (2)	1/4" ID
11 Yoke (1)	1¾" x 6" x 15"	27 Handle Bolt Caps (2)	1/4" Locking Nuts
12 Steering Pin (1)	1/2" x 6" Carriage Bolt	28 Side Rails, Long (4)	3/4" x 2½" x 42"
13 Handle Pin (1)	1/2" x 4" Bolt	29 Side Rails, Short (2)	3/4" x 2½" x 26"
14 Pin Washers (5)	1/2" ID	30 Stakes, Long (6)	3/4" x 2½" x 14"
15 Pin Nuts (2)	1/2" Locking Nut	31 Stakes, Short (4)	3/4" x 2½" x 10½"
16 Axles (2)	3/4" x 21" Threaded Rod	32 End Rails (5)	3/4" x 2½" x 18"



the front axle carriage. Then switch to a 1/2" bit and bore through the rest of the carriage.

Mount a dado set in your table saw to cut the 3/4" wide grooves that are centered in the bottom of each axle carriage. With the dado still in your table saw, notch the top of the front axle carriage to accommodate the yoke (see the **Pinup Shop Drawings** for dimensions). Then finish milling the axle carriages by lopping off the top corners - I used my miter saw set at 45° - and sand smooth.

Installing the Rear Axle Carriage

Attach the rear axle carriage to the third crossbrace (the one you haven't installed yet) using 3" flat-head screws. Then secure the crossbrace to the floorboards with 1 1/4" screws. The carriage is reinforced with three braces (pieces 10), but before you secure them to the carriage and the floorboards, make sure the grain is running in the correct direction, parallel to the longest side of the triangle. Bore pilot holes through the braces on your drill press (see the **Pinup Shop Drawings** for locations) and counterbore (see **Figure 3**) for the screw heads. Glue and screw the braces in place, and move on to the yoke and handle assembly.

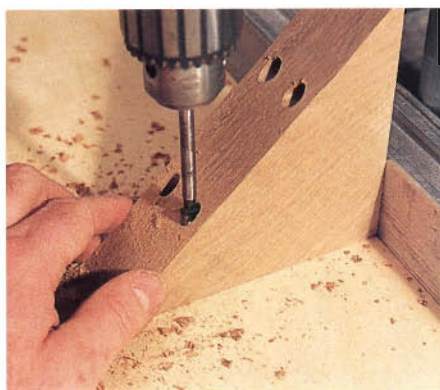
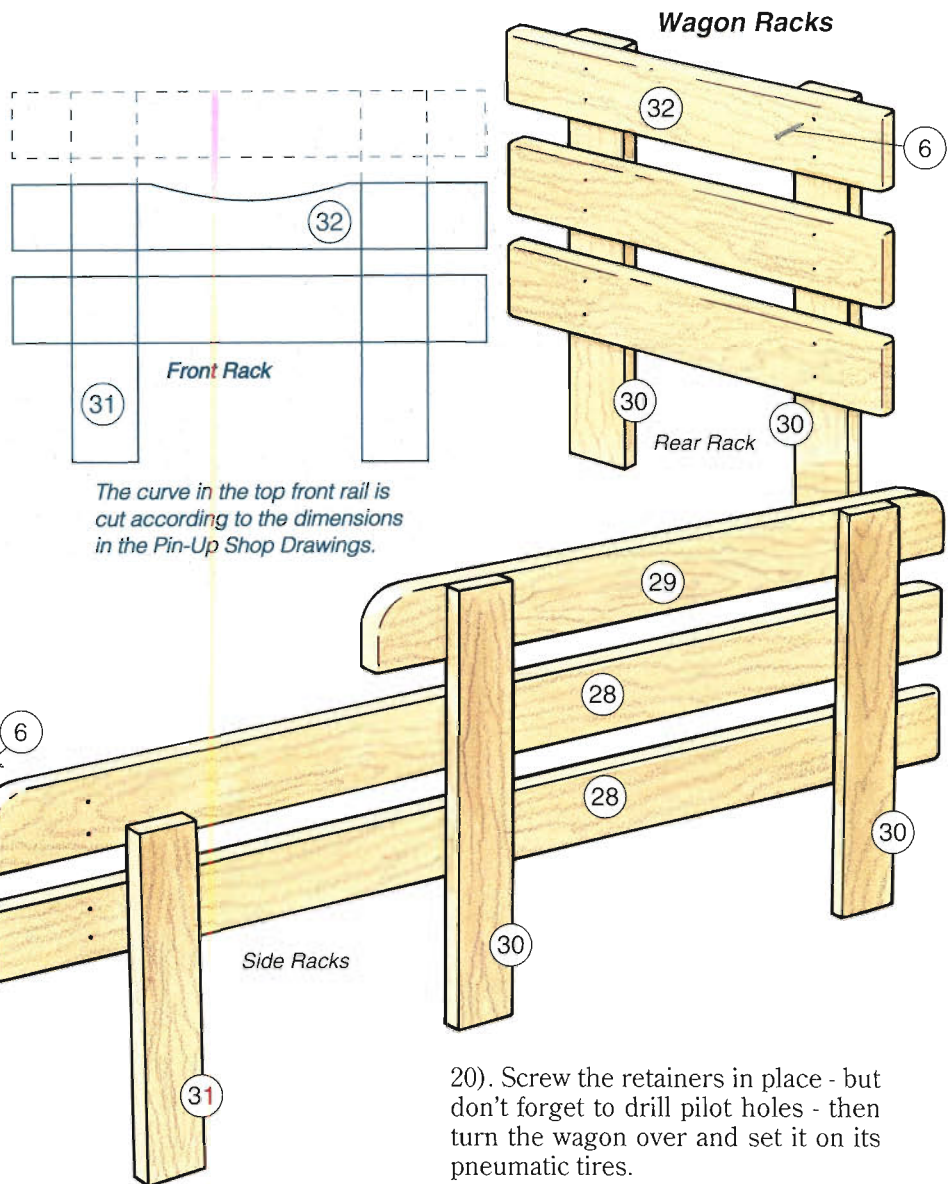


Figure 3: The grain pattern in the rear axle braces reduces the chance of them splitting. Drill pilot holes & counterbore for screw heads.



The Yoke and Handle

The front axle assembly is connected to the handle assembly by a yoke (piece 11). Holes are drilled through the yoke - for the steering and handle pins (pieces 12 and 13) before the yoke is cut to shape on the band saw (see the **Full-size Pattern** and **Figure 4**). Round over the edges of the yokes with a 1/4" roundover bit except where it will be joined to the front axle carriage.

Use the steering pin, washers and lock nut (pieces 14 and 15) to assemble the yoke to the front axle carriage, then turn the wagon upside down and assemble the axles, washers, axle caps and wheels (pieces 16-19), making sure not to overtighten the axle caps. Now drop one wheel assembly into each axle carriage and secure it with an axle retainer (piece

20). Screw the retainers in place - but don't forget to drill pilot holes - then turn the wagon over and set it on its pneumatic tires.

The handle shaft (piece 21) is ripped to size and all four edges are rounded over with a 1/4" radius roundover bit. The two sides of the handle (pieces 22) are cut to shape (see the **Full-size Pattern**) on a band saw, but not until holes are drilled for the handle bolts (pieces 23 and 24) and the 2 1/2" screws that will hold the handle (piece 25) in place.

Round over the edges of the handle, and clamp the assembly together. Continue the 9/32" holes through the handle shaft for the bolts and drill pilot holes for the screws. Tighten the assembly with washers and locking nuts (pieces 26 and 27).

Stakes and Rails

The two long rails on each side of the wagon (pieces 28) should already be cut to size. The only milling required here is a radius on the front

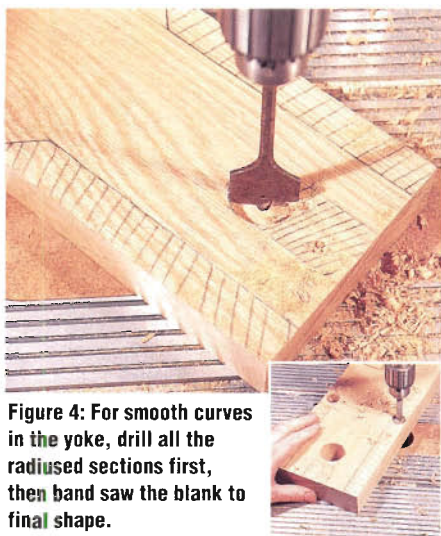


Figure 4: For smooth curves in the yoke, drill all the radiused sections first, then hand saw the blank to final shape.

end of the uppermost long rail on each side (see the exploded view above), and this is done on the band saw following the profile shown on the **Full-size Pattern**. The shorter side rails (pieces 29) receive the same radius. However, the profile is created on both ends of each rail.

Assemble each set of side rails using two long stakes (pieces 30) toward the back, and one short stake

(piece 31) at the front. Use 1/4" flat-head screws to screw and glue them together after first drilling pilot holes and countersinking for the screw heads. Note that the screws are driven from the inside of the wagon, and remember to use weatherproof glue and exterior or stainless steel screws since your wagon will be outdoors. Use your hand saw to shape the front top end rail (piece 32) as shown in the **Full-size Pattern** and attach the end rails to their stakes, two for the front and three for the rear.

Finishing Up

Thoroughly sand all the surfaces, starting with 80 grit and moving down through the grades to 220. Pay special attention to any areas that might cause splinters in little hands, such as unbroken sharp edges on the rails or bed sides. Make sure all the screw heads are properly sunk and the nuts on the bolts are tightened sufficiently.

I debated whether to finish my wagon with Spar varnish. It's probably the most durable finish, but my paint store consultant pointed out that it would eventually flake away if left out in the weather, and the underlying oak would then blacken with mildew. Besides, I just didn't want that glossy, store-bought finish on my handcrafted wagon, so I opted for two coats of General's Exterior Oil. It's easy to apply - just soak it in with a rag or a foam brush until the wood won't take any more - and just as easy to reapply at the end of each summer (after a light sanding). It's a rich, durable, satin finish that adds a little depth to the white oak.

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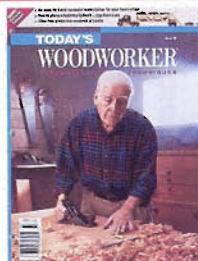
All of our back issues are still available. Volumes 6 through 8 are shown here and the rest are on the order form or in the Sourcebook. Remember, we'll send you a free Today's Woodworker binder if you order six or more back issues.

31



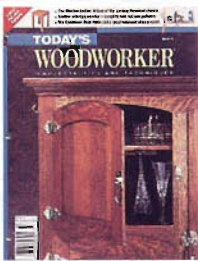
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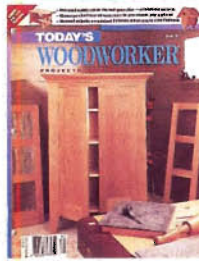
A modular computer desk, the 18 wheeler for kids, a cherry end table and CD holder. Item 97255\$4.95

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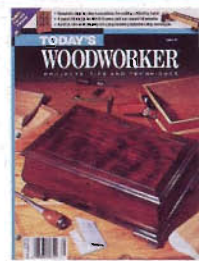
A classic oak icebox, deck table, adjustable band saw fence and a woodworker's whirligig. Item 97263\$4.95

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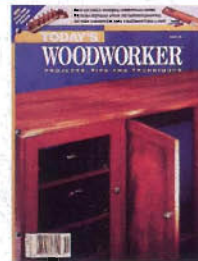
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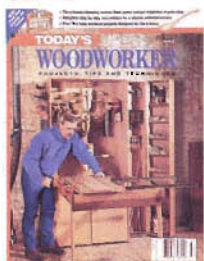
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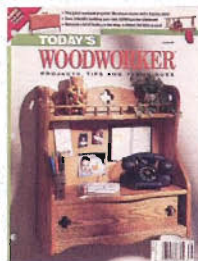
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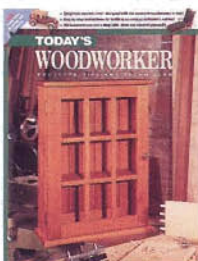
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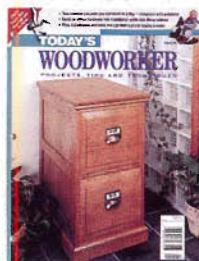
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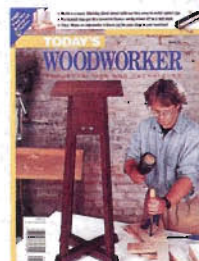
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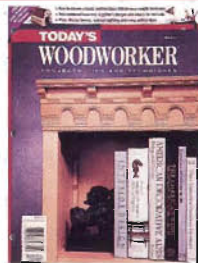
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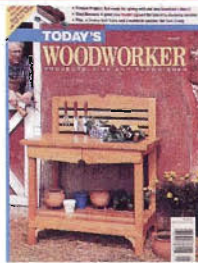
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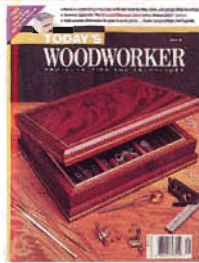
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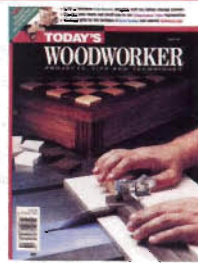
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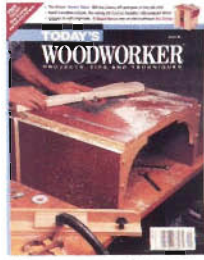
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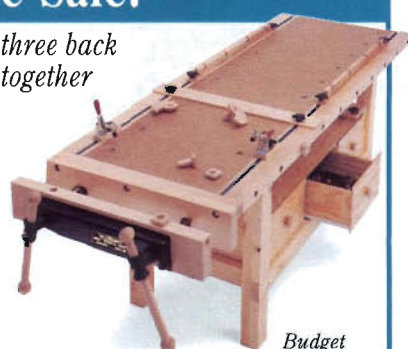


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Entertainment Center III

Cherry dentil moldings crown this third generation of our most requested plan, and building it yourself can save you thousands of dollars.

By Rick White



It's hard to avoid the technology revolution. No matter how determined we are to leave the TV off, by seven o'clock on most evenings there we are - sitting in our favorite chair, remote in hand.

Like it or not, television and videos have become fixtures in 20th century America's living rooms and dens. And if you have music lovers or

teenagers in your home, it's not just a TV and VCR that occupy center stage: You also have to deal with CD players and stereo components. All of this technology can really clutter things up, unless of course, you have a home for it.

This is the third entertainment center I've built for Today's Woodworker: The other two appeared in issues 24 (November/December 1992) and 36 (November/December 1994). So

many readers wrote in telling us of their experiences building those two projects that we decided it was time to take this idea to the next level. Many of those same readers offered great suggestions for a new generation of this project, and we've included the best of them in this design. For example, almost everyone wanted more drawers, and larger ones, too. The next most popular suggestion was making the center sectional, so

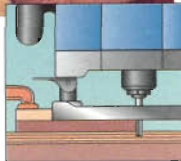
Planning Ahead: Entertainment Center III

Constructing the entertainment center will require about 100 hours of shop time. You'll need a table saw (with dado set), both portable and table-mounted routers, and a drill.

- 7 sheets of 3/4" hardwood plywood.
- 37 board feet of solid hardwood.
- 3 sheets of 1/4" hardwood plywood.
- 1 1/2 sheets of 1/2" Finnish birch plywood.
- Hardware (see kits on page 20).



Figure 1: To cut the shelf dados in the cabinet sides, run a router against a straightedge jig clamped to the workpiece.



it could be moved from the shop to the living room, then assembled.

We also added Larry Heinonen's technique for cutting dentil molding (see page 25). And we retained at least one really solid idea from the previous version: Flipper doors on the TV compartment that disappear when it's time for the big game.

The Center Cabinet

It will help organize your work if you think of this project as three separate units - a center cabinet and two wings (see the exploded views on pages 20 and 21). The wings are mirror images of each other, so there are really only two unique elements to consider.

Each center cabinet side is made up of a plywood panel (piece 1), a hardwood front edging (piece 2), and a plywood back edging (piece 3). By extending the panels with the back edging strip, you can cut both side panels from a single sheet of ply. While you're at the saw, go ahead and cut all the entertainment center's pieces to size: These dimensions are given in the Material Lists on pages 20, 21 and 24. With that done, use clamps to edge glue the back trim to each panel. Dowels or biscuits will help to keep the two parts aligned during glue-up.

The cabinet top and bottom (pieces 4) and the four fixed shelves (pieces 5) are all the same width. All six pieces will later be set into dados cut into the cabinet sides. For now, locate the six 3/8" deep dados in each side by referring to the **Pinup Shop Drawings** between pages 16 and 17. Cut these dados with your portable router and a clamped-on straightedge (see **Figure 1**), using a 1/2" diameter straight bit. Work from front to back so that any cross-grain tearout occurs at the back, then use the same technique to cut a 3/8" wide by 1/4" deep rabbet down the back edge of each side: This will accommodate the 1/4" thick plywood back (piece 6), and cutting it removes the tearout from the previous operation.

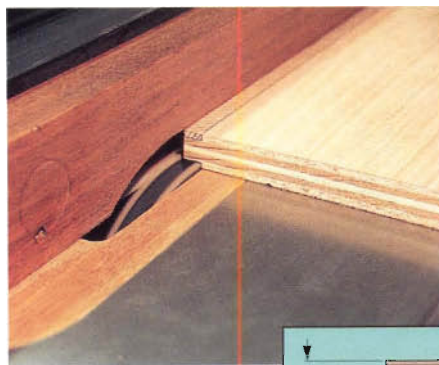
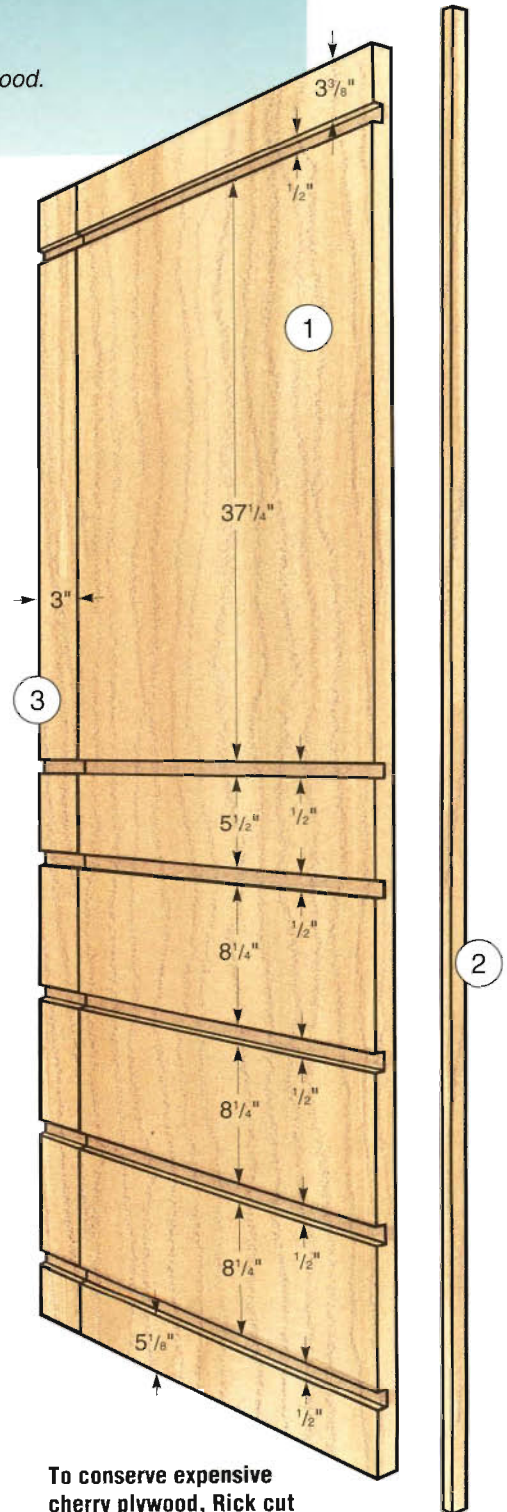


Figure 2: Cut two opposing rabbets with a dado head to make the tongues on the edges of the shelves.

Finish up the sides by attaching the 1/4" thick front trim to each panel (use clamps and glue to avoid having to fill nail holes later on), then move on to the shelves.

Mill the Shelves and Dividers

Start your milling by forming a 3/8" long tongue on each side of each shelf, and on the top and bottom.



To conserve expensive cherry plywood, Rick cut two 23 3/4" wide panels from a single sheet of stock, then added a hardwood molding to both back and front edges to build each side panel out to its full dimensions.

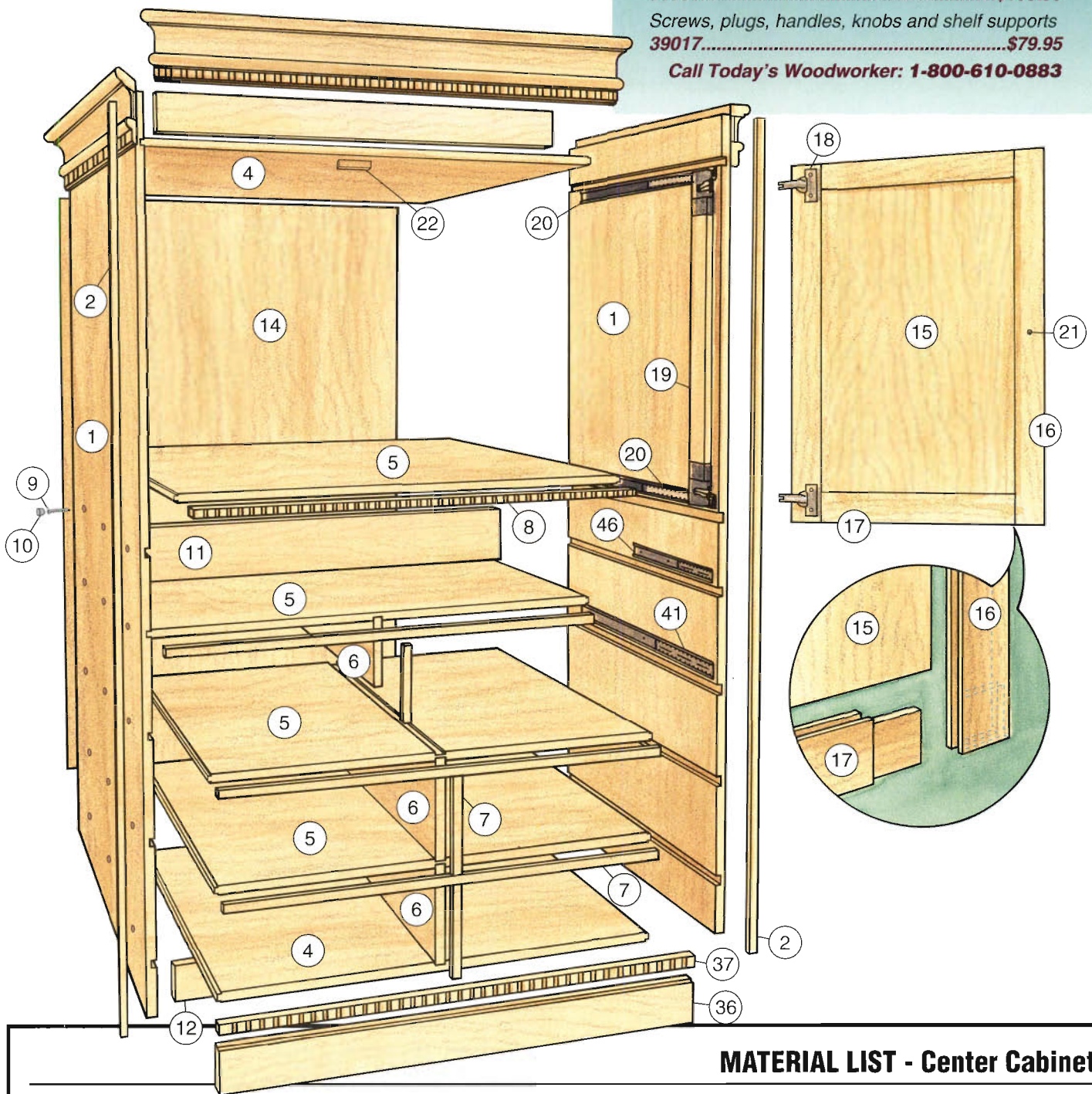
Molding details on page 22

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MATERIAL LIST - Center Cabinet

	T x W x L		T x W x L
1 Sides (2)	3/4" x 23 3/4" x 79"	12 Toekick Long Brace (1)	3/4" x 5" x 36 1/2"
2 Side, Front Edging (2)	1/4" x 3/4" x 79"	13 Toekick Short Brace (1)	3/4" x 5" x 10"
3 Side, Back Edging (2)	3/4" x 3" x 79"	14 Back (1)	1/4" x 37 1/4" x 72"
4 Top & Bottom (2)	3/4" x 37 1/4" x 26 1/2"	15 Door Panels (2)	1/4" x 14 1/4" x 33 1/2"
5 Fixed Shelves (4)	3/4" x 37 1/4" x 26 1/2"	16 Door Stiles (4)	3/4" x 2" x 37"
6 Dividers (3)	3/4" x 8 1/2" x 26 1/2"	17 Door Rails (4)	3/4" x 2" x 17 1/4"
7 Shelf and Divider Edging	1/4" x 3/4" x 144"	18 Door Hinges (2 pair)	Concealed, 35mm.
8 Top Shelf Dentil (1)	3/4" x 3/4" x 36 1/2"	19 Follower Strips (2)	See kit instructions for size.
9 Screws	#8 x 2" Square-X	20 Flipper Door Slides (2 pair)	24"
10 Plugs	Flat Top	21 Teardrop Handles (2)	2" Solid Brass
11 Top Shelf Brace (1)	3/4" x 5 1/4" x 36 1/2"	22 Door Stop (1)	1/2" x 3/4" x 2 5/8"

Molding
details on
page 22

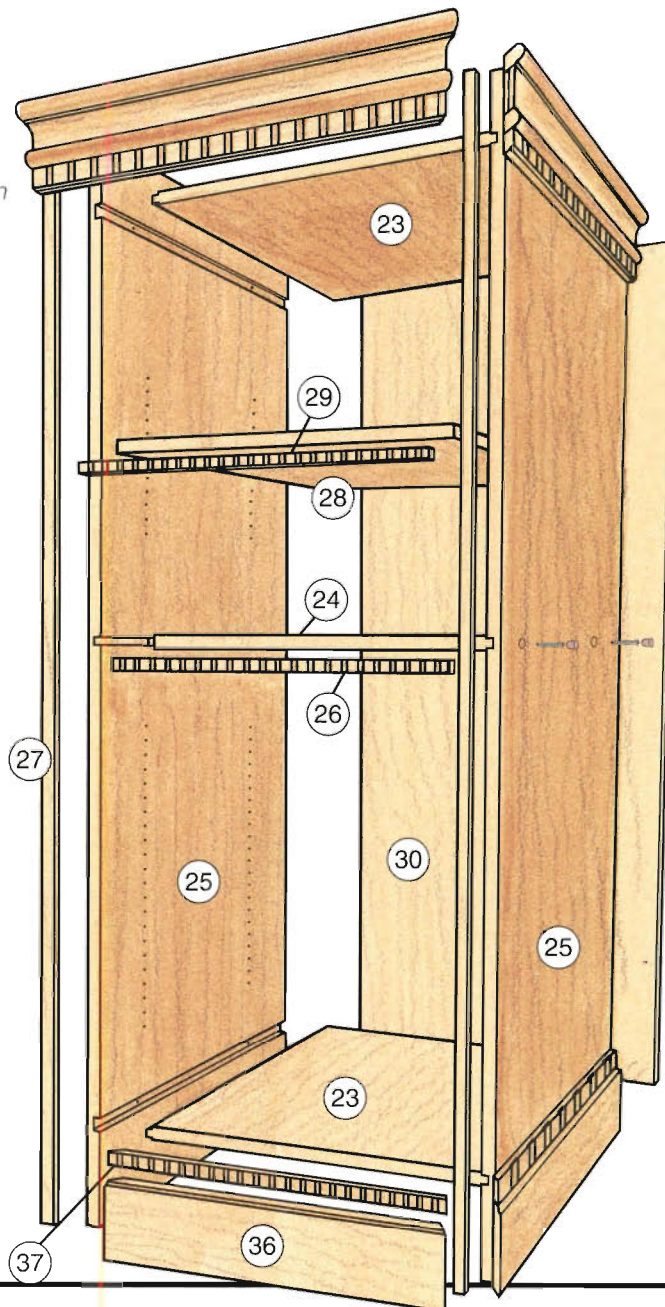
These 1/2" wide tongues make for a very clean joint, and the easiest way to form them is on your table saw, as shown in **Figure 2**: Simply cut a 1/8" rabbet into both the top and bottom faces of each piece (see **Pinup Shop Drawings**).

The top and top shelf need no more milling than these tongues, but the three shelves and bottom are connected to dividers (pieces 6). These dividers separate pairs of drawers, and both the locations and dimensions of the dados that hold them can be found on the **Pinup Shop Drawings**. Cut them with your portable router and a straightedge, then turn your attention to the trim that goes on the front edge of each of the fixed shelves and dividers. This trim (pieces 7) is just 3/4" wide hardwood stock on the lower shelves and it can be applied with glue and clamps. The trim on the top shelf (piece 8) is actually a dentil molding, so named because it looks like teeth. For information on how to create this molding, turn to the techniques article on page 25. Once it's made, glue and clamp it to the shelf edge.

Assembling the Center Cabinet

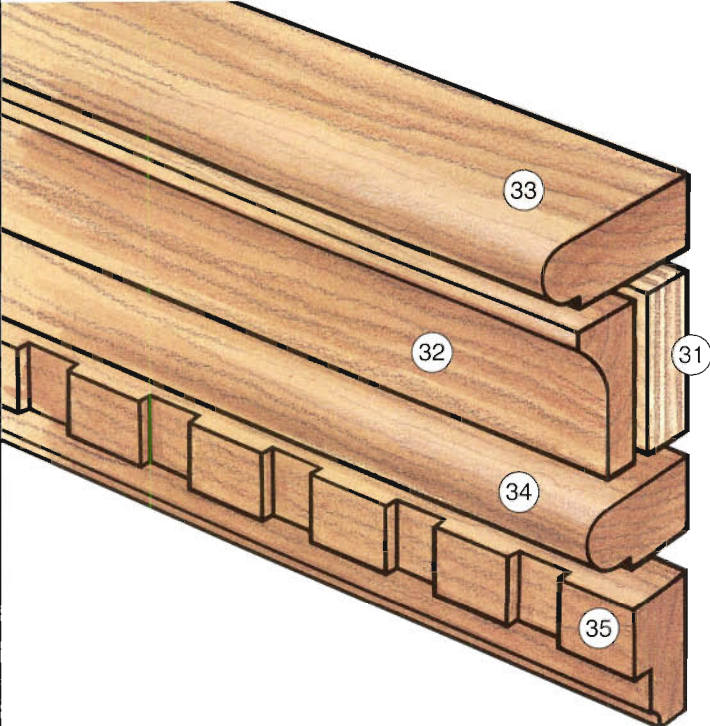
There are no great secrets to this assembly process - just make sure everything is square before your glue starts drying. If you're not used to building cabinets, it may help to know that the best way to square up a rectangle is to measure it diagonally from top right to bottom left, and then from top left to bottom right. When both diagonals are exactly the same, your assembly is square.

I used screws (pieces 9) to pull the sides tight to the shelves. The trick here is to drill pilot holes through the sides, large enough for the screw shanks to slide easily though. Then drill smaller holes in the shelf so that the threads can grip. This will allow the screws to pull the two pieces of wood tightly together. After drilling both sets of holes, counterbore for the screw heads and wooden plugs (pieces 10).



MATERIAL LIST - Wing Cabinets and All Moldings

	T x W x L
23 Tops and Bottoms (4)	3/4" x 21 1/8" x 20 3/4"
24 Fixed Shelves (2)	3/4" x 21 1/8" x 20"
25 Side Panels (4)	3/4" x 20 3/4" x 74"
26 Shelf Dentil (2)	3/4" x 3/4" x 20"
27 Side Panel Edging (4)	1/4" x 3/4" x 74"
28 Adjustable Shelves (10)	3/4" x 20" x 20"
29 Adjustable Shelf Dentil (10)	3/4" x 3/4" x 20"
30 Backs (2)	1/4" x 21 1/8" x 65 3/4"
31 Crown Backer	1/2" x 1 1/8" x 200"
32 Crown Cove	3/4" x 1 1/8" x 200"
33 Upper Bullnose	3/4" x 1 1/8" x 200"
34 Lower Bullnose	3/4" x 1 1/8" x 200"
35 Crown Dentil	3/4" x 1 1/2" x 200"
36 Toekick	3/4" x 5" x 144"
37 Toekick Dentil	7/16" x 3/4" x 144"



Dressing up the top of the three cabinets is easier than it looks. The compound crown molding is made up of five elements - four of which are milled with common router bits.

Glue and screw the carcass together (I like to attach all the fixed shelves to one side with a few screws first, then glue and screw the second side in place). Then I remove the first side, glue it up, and screw it back in place). Add bracing (pieces 11, 12 and 13) behind the top drawer and toekick (refer to the **Pinup Shop Drawings** for locations), then tack the back (piece 14) in place with a 1" tack every 6".

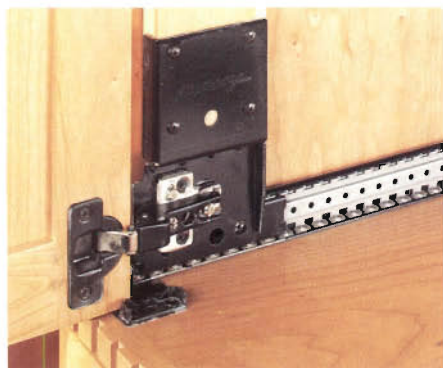


Figure 3: Although installing the flipper door hardware looks complicated, it's really not. Full instructions are included in the kit.

Frame and Panel Doors

The input we got from readers suggested keeping doors on this entertainment center to a minimum. For some people, that was a matter of aesthetics, while others felt that building doors can be a complicated process. That, however, is certainly

not the case with these doors: They're simply a pair of 1/4" thick plywood panels (pieces 15), framed in 3/4" solid hardwood stock.

You've already cut the stiles (pieces 16) and the rails (pieces 17) to size, so stay at your table saw to create the grooves in these pieces for the plywood panels. Do this with a 1/4" dado set, centering your cut on the workpiece (see the **Pinup Shop Drawings**). You should keep in mind that some mills supply plywood that is nominally 1/4" thick, but may in reality only be 7/32" or so: You must adjust your dado set accordingly.

Use the same dado setup to create the joinery that holds the frames together. Referring to the **Pinup Shop Drawings** for layout dimensions, adjust your blade height and use the table saw's miter gauge to create tongues on the ends of the rails that are exactly the same thickness as your plywood.

The open ended mortises that are cut into the ends of the stiles (refer to the exploded view of the doors on page 20 for a good illustration of these mortises) can also be cut with your 1/4" dado head, although these cuts should be made with the aid of a tenoning jig or similar support that holds the workpiece vertical to the table. Make several passes to remove all the waste, checking the fit as you work.

When the rails and stiles are all milled, dry fit your door assemblies. If everything looks right, glue and clamp them together (checking that they're square by measuring diagonals), but don't glue the panels in place - they have to move freely to accommodate wood movement.

Wait until after the glue has dried to mill a 3/16" chamfer all around the outside face of each door (see **Pinup Shop Drawings**), which you can do either on your router table or with a guided bit in a portable router.

The Flipper Door Hardware

Each door is mounted with a pair of European style hinges (pieces 18) to a strip of wood called a follower (piece 19). This strip of wood is then screwed top and bottom to slides (pieces 20) that are not unlike standard drawer slides. The door glides in and out on these slides (see **Figure 3**), kept on track by a pair of plastic retainers that come with the kit.

Full instructions for installation are included with the hardware. You'll need two sets of slides, two pairs of hinges, and a 35mm Forstner bit to install the hinges. I also suggest using a drill press to accurately control the depth of cut when drilling.



Figure 4: To create the cove molding, make the first cut on your router table with a cove bit, then remove the rest of the waste on your table saw (see inset).

Clearance was an issue with the two flipper doors - I needed a handle that had a low enough profile to allow the doors to be slid all the way back into the cabinet when open. The brass teardrop pulls (pieces 21)

not only fulfill that function, but also add a touch of elegance, in keeping with the crown and dentil moldings. A small wooden stop (piece 22) keeps the doors in line when closed.

The Wing Cabinet Carcasses

Each wing cabinet is a mirror image of the other, rather than an identical copy. Remembering this will be critical when you're applying moldings later on, but it's also important now: It allows you to choose the least attractive of the four available faces to put up against the center cabinet, where it will be hidden.

As in the center cabinet, dadoes hold each wing's top and bottom (pieces 23) and fixed shelf (piece 24) in place. The locations of these dadoes in the side panels (pieces 25) can be found on the **Pinup Shop Drawings**, and they, too, are cut with a portable router and guide.

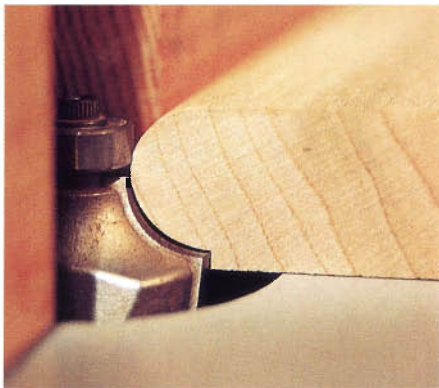


Figure 5: To create the bead on the bottom edge of the bullnose molding, raise the roundover bit 1/8" when making the second cut.

Dentil molding (piece 26) is applied to the front edge of each fixed shelf with glue and clamps - make sure the teeth at either end are the same size. The same method is also used to apply 1/4" thick trim (piece 27) to the front edge of each side panel. When all the glue is dry, sand the edging flush and install the top, bottom and shelf in each unit using screws and glue.

I made adjustable shelves (pieces 28) for the wing cabinets, after first applying dentil molding (pieces 29) to each shelf front. And the wing cabinet backs (pieces 30) are simply tacked in place every 6" with 1" tacks.

The Crown Assemblies

Let's face it - a cabinet is just a square box until you add moldings and doors. To dress up the top edge of these three units, I added a compound molding made up of five elements. This compound is applied to the front and both sides of the center cabinet, and to the front and one side of each of the wings (see the exploded views on pages 20 and 21).

The first element in this compound is a strip of plywood (piece 31), which is glued and screwed in place, flush with the top edge of the cabinet side. A cove molding (piece 32) is glued directly to the exposed face of this plywood. To make this cove, rip hardwood stock to the correct dimensions and install a 3/4" core box bit in your router table. With the bit protruding about 1/8" above the tabletop, set the fence so that there's a 1/4" gap between the bit and the fence. Then run the workpiece through several times, raising the bit 1/8" between passes until it makes a 3/8" deep cut in the hardwood (see **Figure 4**).

Completing the molding is a simple matter of ripping off the excess stock below the cove using your table saw (**Figure 4, inset**), then giving the workpiece a thorough sanding. With that done, glue and clamp your cove in place and turn your attention to the next molding element, the bullnose.

The same bullnose profile is used in two places: Above the cove molding it forms a cap (piece 33), and below the cove it becomes the transition (piece 34) between the top and bottom of the crown assembly. Both upper and lower bullnose moldings can be milled from a single length of 3/4" thick by 1 3/4" wide stock. Use a 3/8" radius roundover bit in your router table or portable router to radius the top edge of the stock, then raise the bit 1/8" to create the bottom, beaded profile, as shown in **Figure 5**. Note that the lower bullnose is not as wide as the upper, so cut them to length and then rip the lower one to width on your table saw.

Earlier, you used Larry Heinonen's technique to mill dentil molding for the shelf edges, and the same type

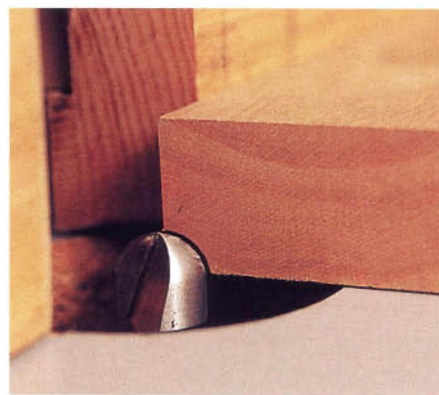


Figure 6: The base molding is a board with a cove cut in its top edge with a round nose or cove bit, and a cap of dentil molding.

molding is used here in the crown assembly (piece 35). It's tucked in under the lower bullnose, and there are three steps to making it.

First, trim the workpiece to size and cut your dentil profile on the cleanest face, following Larry's instructions. Second, move to the table saw and cut a rabbet on the bottom half of this same face (see **Pinup Shop Drawings**). The third step is to create the small cove with a 1/4" radius bit in your router table.

Cut all the moldings to length, miter their ends if needed and dry fit them. When everything fits, glue and clamp them in place.

The Base Trim

There are only two parts to the compound molding that dresses up the bottom of the entertainment

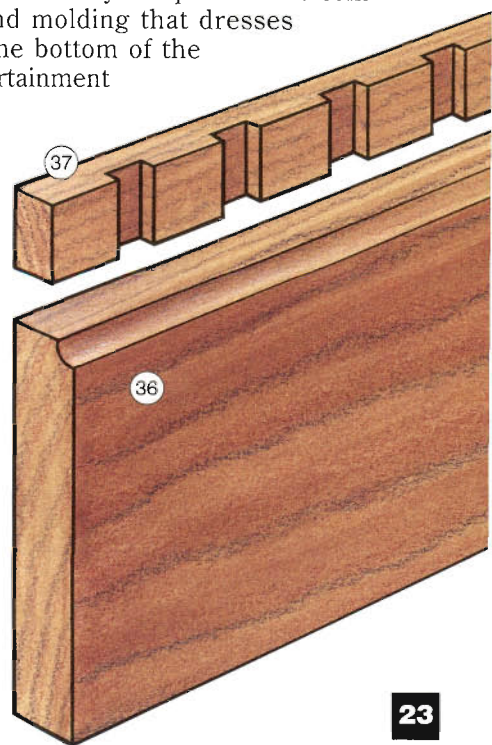




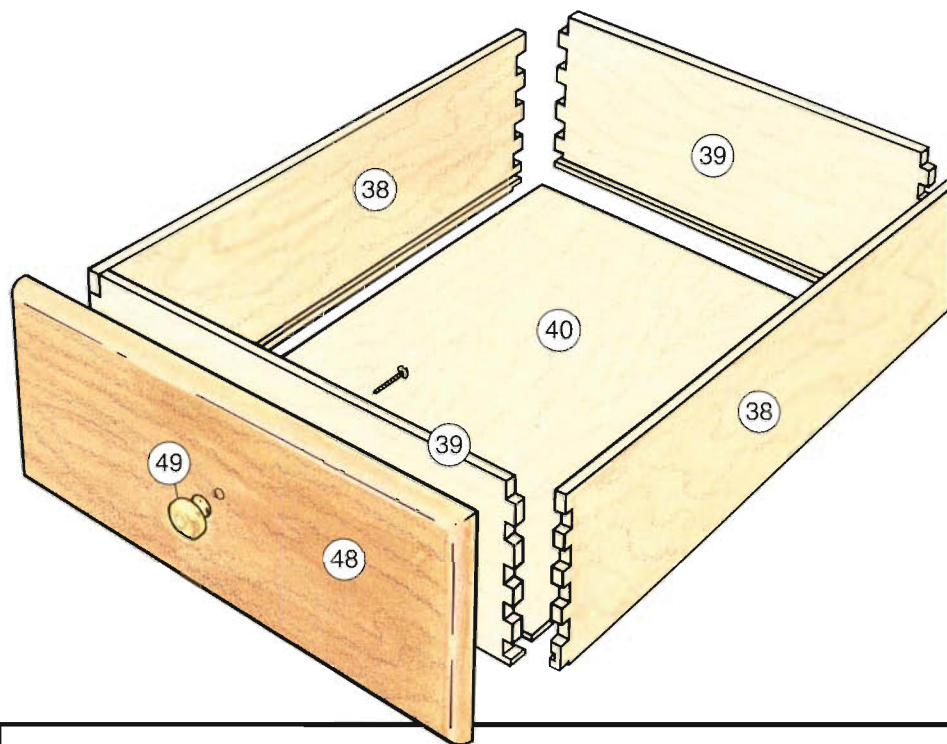
Figure 7: Cut the finger joints with a dado head, using an index pin on your miter gauge's auxiliary fence (see inset) to space the cuts evenly.



center: A baseboard (piece 36) and a cap of dentil molding (piece 37). The baseboard is simply squared-up stock with a small cove cut into it along the top edge. This 1/4" radius cove, like the ones in the crown molding, can be formed on your router table (**Figure 6**) with a core box bit. Then cut it to length, miter as needed, and attach it to each carcass with glue and clamps. Then do the same with the dentil cap.

Building the Drawers

I used finger joints to hold the sides of the deep drawers (pieces 38) to the fronts and backs (pieces 39). The dimensions for these finger joints can be found in the **Pinup Shop Drawings**, and the cuts are easily made on your table saw, as shown in **Figure 7**. (For a more detailed look at this technique, see issue 47, page 20.) Run a 1/4" wide dado in all four



MATERIAL LIST - DRAWERS

	T x W x L
38 Deep Drawer Sides (12)	1/2" x 7" x 24"
39 Deep Drawer Fronts & Backs (12)	1/2" x 7" x 16 13/32"
40 Deep Drawer Bottoms (6)	1/4" x 16 3/8" x 23 1/4"
41 Deep Drawer Slides (6 pair)	24" Full Extension
42 Wide Drawer Sides (2)	1/2" x 4 1/8" x 15 1/8"
43 Wide Drawer Fronts & Backs (2)	1/2" x 4 1/8" x 35 3/8"
44 Wide Drawer Bottom (1)	1/4" x 14 3/4" x 34 7/8"
45 Wide Drawer Divider (1)	1/2" x 3 3/4" x 14 1/4"
46 Wide Drawer Slides (1 pair)	14" Full Extension
47 Wide Drawer Face (1)	3/4" x 5 5/8" x 36 7/8"
48 Deep Drawer Faces (6)	3/4" x 7 13/16" x 17 3/4"
49 Drawer Pulls (8)	1 1/4" Solid Brass
50 Shelf Pins (40)	5mm Solid Brass



Figure 8: Try this specially designed jig (available from The Woodworkers' Store, 1-800-279-4441) to install the drawer slides correctly.

pieces of each drawer to hold the bottom panel (piece 40), then glue and clamp the deep drawers together, letting the drawer bottoms float freely. Install the slides (pieces 41) according to the manufacturer's instructions (see **Figure 8**).

I used the same finger joinery to hold the wide drawer's sides (pieces 42) to its front and back (pieces 43), then installed the bottom (piece 44) and used 4d nails and glue to secure the divider (piece 45) in place. I then screwed in the slides (pieces 46) before positioning the drawer faces (pieces 47 and 48) and attaching them with screws from the inside.

The seven drawer pulls (pieces 49) are centered on the deep drawer faces. The wider top drawer receives two pulls (see **Pinup Shop Drawings**).

Before finishing the entertainment center, I drilled holes for the shelf pins (pieces 50) at the locations shown in the **Pinup Shop Drawings**. Then I removed all the hardware, sanded the entire project and applied a sealer and three coats of matte lacquer. Finally, I drilled air holes (see **Pinup Shop Drawings**) in the back of the TV compartment - they're hidden by the TV - to prevent overheating when I'm watching the big game.

Making Dentil Molding with Your Router

By Lawrence Heinonen

Dentil is a classic trim molding that people don't usually mill themselves. There's a perception that it's too difficult, requiring fine skills and specialized equipment. That's not necessarily true. The following technique takes advantage of tools that most of us already own - a portable router and a table saw - to create perfect dentils every time.

Besides its simplicity, there is another major advantage to using this technique. Unlike dentils created on a radial arm or table saw, router cut dentils require little or no sanding. All you really need is a sharp straight bit and an easily made auxiliary base to guide the cut.

The Setup

Start by making a new base for your router (see illustration at right) that has a guide rail attached. This rail rides the end of the board to make the first dado, then runs along one edge of that dado to make the second cut, and so on (see **Figure 1**).

To set the width of the teeth and gaps, use a combination of the distance from the bit to the guide rail, and the router bit's diameter. For example, when Rick White made the dentil molding for the top crown of his entertainment center, he wanted 3/4" wide teeth with 1/2" gaps. So he used a 7/16" wide guide rail set 3/4" from a 1/2" diameter bit. For the rest of his dentils (on the shelves and base molding), he kept the 3/4" teeth, but switched to a 5/16" gap to bring a sense of proportion to the project. This second setup required a 1/4" spacer and a 5/16" bit. The distance between the new 1/4" wide spacer and the bit remained at 3/4".

A point worth noting is that, in the examples above, the guide rails are narrower than the router bits' diameters. This is because a 1/2" guide rail won't ride smoothly in a 1/2" wide groove: Any minute variance in humidity or temperature could cause binding.

Preparing the stock

It's absolutely essential that the end of your stock is perpendicular to its front edge, since the first cut uses the end of the board as a guide. If it's not, succeeding cuts won't be true.

I have also found that it's difficult to rout just a single piece of molding, because it doesn't have enough shoulder to keep the spacer running straight. If you use stock wide enough to correct this, you can simultaneously take care of tearout at the end of the dado. By working with wide stock, you can rip off the torn edge on your table saw, then reset the fence and rip off lengths of nice, clean molding (**Figure 2**).

A further benefit to using wide stock is that you can build up an inventory for future projects. Saw off a 3/4" wide strip for a deep profile, or a 1/4" wide one for a shallower, more decorative appearance. This latter can be butted up to the 5/16" shoulder of a cove molding without having to build out the cove.

As one edge of the dentil will usually be seen, it's a good idea to plane or sand that edge before sawing, and then let it ride the fence as the cut is made. This method also cuts down on sanding, and that's always a welcome result in my shop!

By changing the guide rail's location and dimension, you can mill different patterns of dentil molding.

Rick White used this jig to create the dentil molding for the entertainment center (page 18).

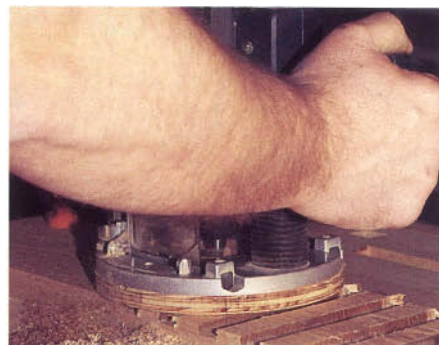
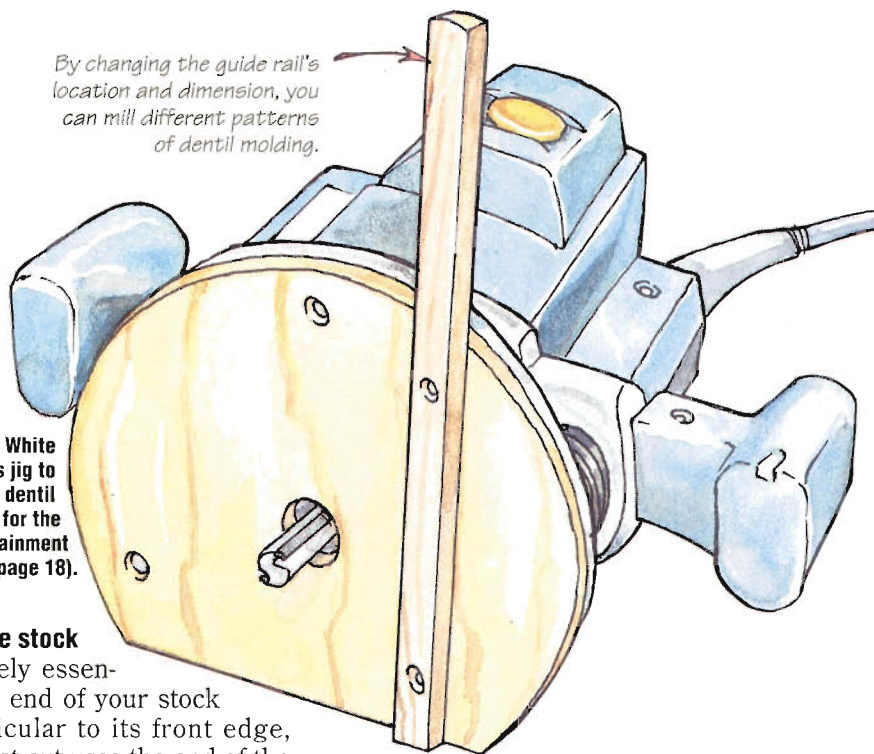


Figure 1: After running the guide rail against the end of the board to create the first dado, just drop it into that dado to cut the next one.



Figure 2: With the dados cut, simply rip off lengths of dentil molding on your table saw. Be sure to use a very sharp blade to avoid tearout.

A Vintner's Valet

This Gustav Stickley inspired piece holds a full complement of wine glasses and champagne flutes, and keeps a case of your favorite wine close at hand.

By John English



Gustav Stickley (1857-1942) began his working life as a mason in his native Wisconsin. In his late teens he moved to Philadelphia, where he found a position at an uncle's furniture business. Given his early experience working with stone, it's not surprising that he later professed a "love for working in wood and (an) appreciation of the beauty and interest to be found in its natural color, texture and grain."

Our wine table follows Stickley's design tradition. However, remembering that the master had at his disposal a full complement of fine craftsmen, I've taken the liberty of simplifying some of the more complicated aspects. For example, the two bottle racks are set in stopped rabbits in the legs, rather than in the more daunting through mortises for which Stickley was famous. And the distinctively Arts & Crafts inspired slender slats in either end of the table are secured with spacers in a dado, rather than being mortised directly into the stretchers.

So roll up your sleeves and head for the shop. But keep the wine for later, when the work is all done.

Quarter-sawn Stock for the Legs

Quarter-sawn white oak was Stickley's wood of choice for the vast majority of his furniture pieces. Why quarter-sawn? According to Stickley, "the quarter-sawing method of cutting oak - that is, the making of the cut parallel with the medullary rays and thus largely preserving them, instead of cutting across them and thus destroying their binding proper-

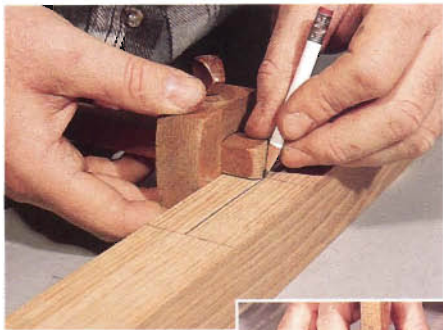


Figure 1: A marking gauge (set to the right thickness with one of the side aprons, as shown in the inset) is used to lay out stopped rabbets in the legs.

ties, renders quarter-sawn oak structurally stronger, also finer in grain, and ... less liable to check and warp than when sawn in any other way."

Trouble is, 1 $\frac{3}{4}$ " square white oak is not always readily available as quarter-sawn stock. That's not necessarily a bad thing: If you look at a wide plain-sawn board, the stock near the edges - where the annual rings are tightly packed together - is, in effect, quarter-sawn. When you choose the lumber for your legs (pieces 1), just make sure you keep one of these quarter-sawn faces to the front.

Rip the four legs to size about 1/8" larger in each direction than the dimensions that are given in the Material List on page 28. (While you're at the saw, this is a good time to cut all of the wine rack's parts to size.) Joint or plane the legs to final dimensions, then cut them to length.

The two racks that hold the wine bottles and the apron that supports the tabletop are all set in stopped



Figure 2: To stop chipping and tearout, a sharp utility knife is used to score across the grain at each end of the stopped rabbets.

rabbets cut into the legs (see the exploded view on page 28). For the locations and dimensions of these rabbets, please consult the **Pinup Shop Drawings** between pages 16 and 17. Mark these locations on the legs using a pencil and marking gauge (see **Figure 1**), then score the ends of each rabbet location with a sharp knife, as shown in **Figure 2**. Use a Forstner bit in your drill press to remove most of the waste, then clean out each rabbet with a sharp chisel (see **Figure 3**).

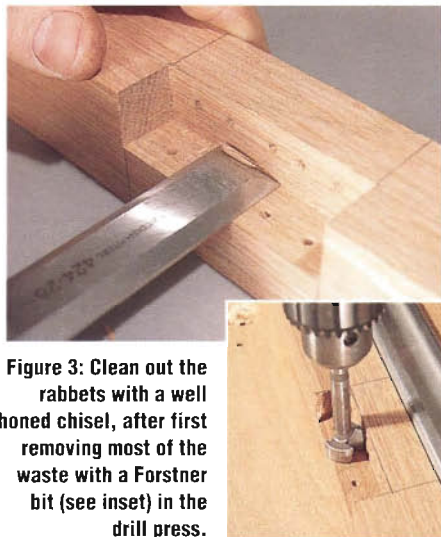


Figure 3: Clean out the rabbets with a well honed chisel, after first removing most of the waste with a Forstner bit (see inset) in the drill press.

If You Don't Like Chisels ...

An alternative to the traditional drill and chisel method for making stopped rabbets is to split each leg, cut dados in one half, then glue the leg back together.

The only disadvantage to this method is that a joint line is created, but it could be located in the side, rather than the front of each leg. You'd also have to oversize your stock in one direction by 1/8" to compensate for the blade kerf.

Cut Out the Bottle Racks

Your favorite beverage bottles will rest on two pairs of racks, each of which is scalloped out to hold seven bottles. The cuts in the two front racks (pieces 2) are 1 $\frac{3}{4}$ " diameter,



Figure 4: The two front racks are clamped together when drilling the half circles along their top edges. A drum sander cleans up these borings (inset photo).

while those in the back (pieces 3) are 3 $\frac{1}{4}$ ". I created both of the front racks at the same time by clamping them edge-to-edge, then drilling seven holes along the joined edges (see the **Pinup Shop Drawings** for locations) with a spade bit chucked in my drill press, as shown in **Figure 4**. The rough walls left by the spade bit can be cleaned up with a drum sander mounted in the drill press, as shown in the inset, above.

The larger indents in the back racks are best cut on a band saw (**Figure 5**), because a 3 $\frac{1}{4}$ " hole saw can really chew up a nice piece of stock. However, a sharp circle cutter may make an acceptable cut. Either way, clean up these cuts with the drum sander, too.

Build Two Frames

The frame under the tabletop is made up of the front and back aprons (pieces 4) and two side aprons (pieces 5). Before that assembly can be completed, however, you need to do a little milling.

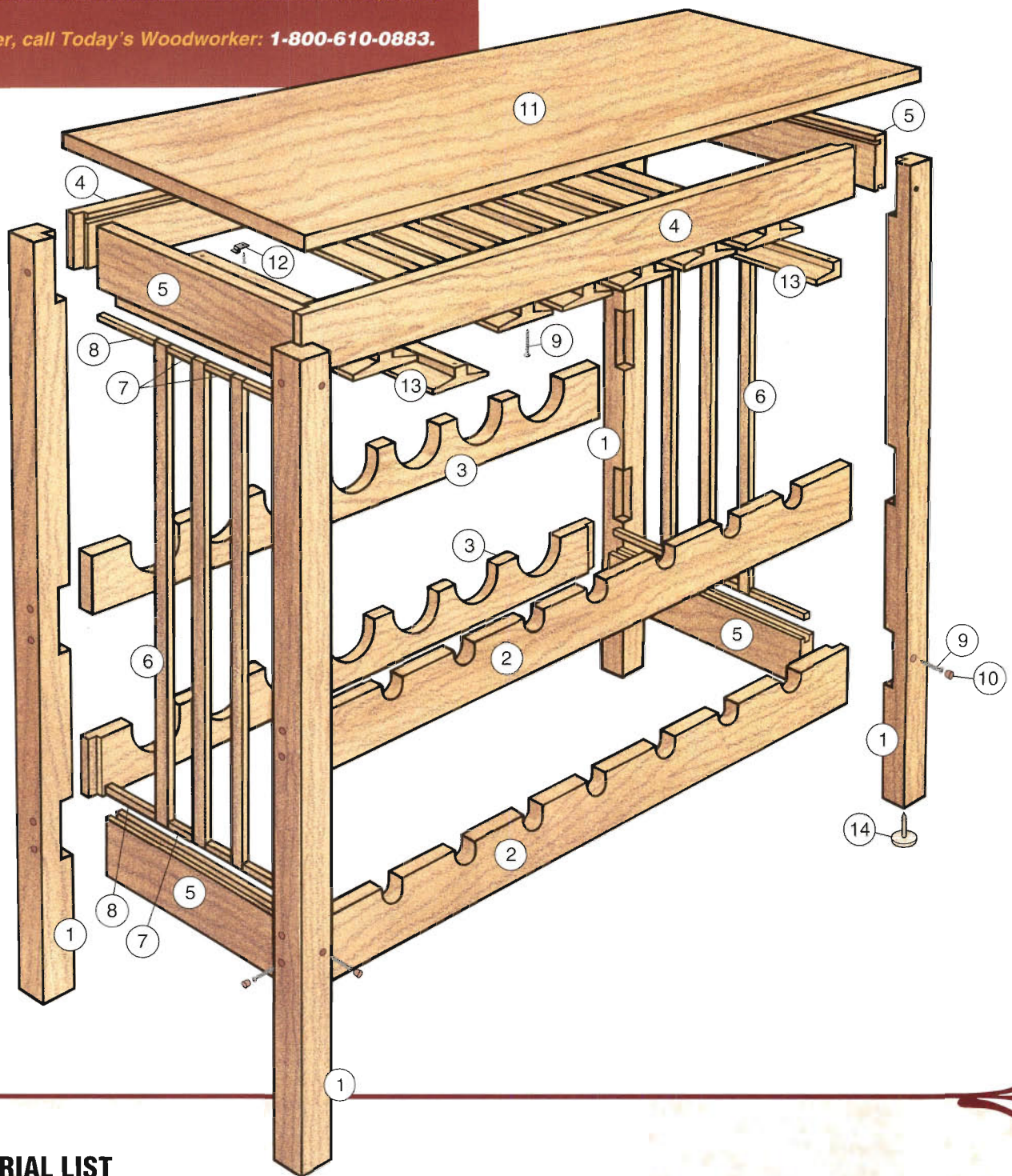
Start by creating a single saw kerf in the inside face of each top apron piece (see **Pinup Shop Drawings**) for the fasteners that will later hold the tabletop in place. Then cut a 7/16" wide dado into the bottom edge of each short apron, and the top edge of each stretcher (pieces 5) as shown in the **Pinup Shop Drawings**. These dados will house the slats (pieces 6) that adorn the sides of the table, and the spacers (pieces 7 and 8) that separate these slats.

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This hardware kit includes all the wine glass molding, tabletop fasteners, leg glides, screws and oak plugs you'll need to complete the project.

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MATERIAL LIST

	T x W x L		T x W x L
1 Legs (4)	1 1/4" x 1 1/4" x 35 1/4"	8 Large Spacers (8)	7/16" x 3/8" x 2"
2 Front Racks (2)	3/4" x 3" x 28 1/4"	9 Screws (46)	#8 x 2 1/2" Flathead
3 Back Racks (2)	3/4" x 3" x 28 1/4"	10 Plugs (28)	3/8" Oak Face Grain
4 Front & Back Aprons (2)	3/4" x 3" x 28 1/4"	11 Tabletop (1)	3/4" x 14 3/4" x 32 3/4"
5 Side Aprons & Stretchers (4)	3/4" x 3" x 9"	12 Tabletop Fasteners (10)	3/32" Steel
6 Slats (6)	7/16" x 1" x 22 3/4"	13 Wine Glass Molding (7 or 8)*	3/4" x 2 3/4" x 10 1/4"
7 Small Spacers (8)	7/16" x 3/8" x 1"	14 Glides (4)	7/8" Nylon Glides

* Depending on your stemware (see Pinup Shop Drawings).



Figure 5: The large half circles in the back racks are created on a band saw; the kerf marks are removed with a drum sander.

Cut a rabbet on each end of the two longer aprons. This rabbet not only makes for stronger joinery, but it will keep the joints invisible by hiding them inside the legs. Cut these rabbets on your table saw with a dado head, then predrill for the screws (pieces 9), and assemble the apron frame with glue.

A second frame is created when the side stretchers are joined to one front and one back rack in the same manner as the tabletop apron. Rabbet the racks just like you did with the long aprons (see **Figure 6**), then assemble this frame too.

Assembling the Frames to the Legs

Dry fit your two frames - and the six slats - to the stopped rabbets you cut in the legs (the apron frame goes in the top rabbets, and the bottle rack in the bottom one). Test the fit of the remaining rack elements in the middle rabbets, then use glue and screws to complete this assembly - setting the slats loosely in place without their spacers now, as you won't be able to install them until after the frame is glued up. To do so, drill large pilot holes through the legs (so

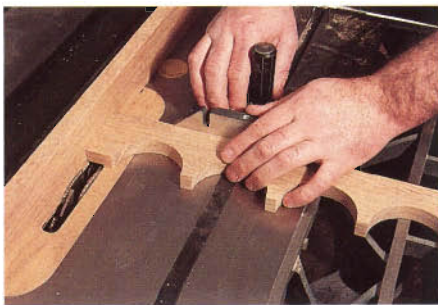


Figure 6: Use your table saw to cut shallow rabbets into each end of the front and back aprons and the lower racks.

the screws can move freely), and small pilot holes in the frames where the screws need to grip. Counter-bore for the screw heads with a 3/8" Forstner bit, placing screws at the locations indicated on the **Pinup Shop Drawings**, then cover their heads with glued-in oak face grain plugs (pieces 10).

The Tabletop

Three boards work well for the tabletop (piece 11), edge joined and glued together. When the glue is dry, cut the top to size and sand it before installing it with tabletop fasteners (pieces 12). These lock into the saw kerf you cut earlier, and are screwed to the underside of the top (three on each side and two at the ends).



Figure 7: Use scraps of pine between the clamps and workpiece when installing the slat spacers in their dadoes.

Your wine glasses will be held in place by moldings (pieces 13) which are cut to length and screwed to the bottom edges of the long aprons. Note that the two outside moldings are made from a single piece that's ripped in half. You can use either seven or eight moldings, depending on the size of your stemware (if in doubt, go with the wider spacing), and dimensions are given on the **Pinup Shop Drawings** for scrap wood spacers for this installation.

Glue and clamp the slat spacers into their dadoes, as shown in **Figure 7**, then sand the project and apply your finish: I chose a darker walnut stain to match Stickley's original furniture. Finally, tap a nylon glide (pieces 14) into the bottom of each leg, and call your best friends over to admire your new Stickley style wine table.

Storing Wine

Many wines age well when cellared in a controlled environment.

According to Bill Abrahamson of Sutler's Wines & Spirits in Stillwater, Minnesota, the temperature in a wine cellar should be between 55° and 58° F, while the ideal humidity range is a little more forgiving - 40% to 60% works well. The most important aspect of both temperature and humidity is that, once set, they remain constant. Large variations in either can cause irreparable damage. Wine must also be protected from direct sunlight, which will break it down and cause an "early death".

Cellared wine should never be stored in a vertical (upright) position, where there is no contact between the wine and the cork. If the cork dries out, oxygen can come in contact with the wine, causing rapid aging. Wine laid on its side lets the entire bottom surface of the cork contact the liquid: This is ideal. However, some vintners prefer to store wine at an angle, an arrangement that allows a better view of the label. This is fine as long as at least some of the cork is immersed.

Abrahamson also points out that not all wines are intended for prolonged cellaring: Some wines are best when used closer to their bottling date. A good wine merchant can help you choose the best options here.



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END GRAIN

He's Making His List...



Now here's the guy you want for your uncle! Subscriber Jack Kennedy needed a few Christmas presents, so he built five steamer trunks from the plans in Today's Woodworker issue 29.

Good Ole Uncle Jack!

I built these steamer trunks from your plans in issue 29 for Christmas presents. One of the trunks was made entirely of walnut and the other four were made of oak. My son wanted a different color strapping for his trunk and chose padauk, which I think turned out rather well. The trunks were presents for my son and daughter in Minneapolis and two nieces in California. My wife decided the walnut trunk would stay at home.

Jack O. Kennedy
Winterset, Iowa

TWW responds: The steamer trunk has been one of our most popular projects, Jack, but out of all the pictures we've seen, you're the first woodworker to take a production approach to this challenging project. Congratulations - great job!

The Tiger Woods of Woodworking

An amateur woodworker stationed in Hawaii, I've been building furniture since last summer. My first piece was the Craftsman end table from your issue 40. It was challenging, very rewarding and an excellent design.

I do have several years of woodworking experience from my teenage days as an apprentice carpenter, but I didn't attempt to build furniture until my wife became pregnant with our first baby girl. The end table was a warm-up for the crib and high chair from issues 30 and 22. I realized after building them that we'd also need a dresser/changing table to complete the nursery, so I designed one, based

on your look. Built of maple and poplar (for the drawer sides), it looks terrific in the nursery.



Mark Calhoun of Hawaii designed a changing table to match our crib and high chair (which he also built).



We found a nice changing pad at a local baby store, with a seat belt and straps that can be secured to the bottom rear of the tabletop.

Mark T. Calhoun
Wahiawa, Hawaii

TWW Responds: Congratulations, Mark, on both your excellent craftsmanship and your brand new baby daughter!

Please send your letters and photos to: End Grain, Today's Woodworker, P.O. Box 261, Medina, MN 55340. You can also reach us by E-mail at: editor@todayswoodworker.com

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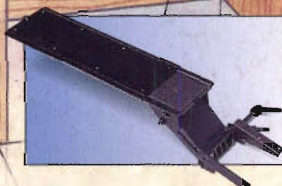
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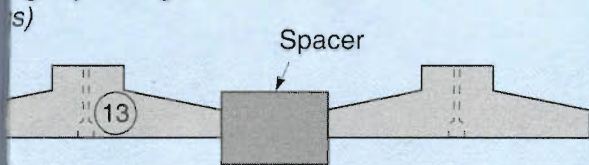
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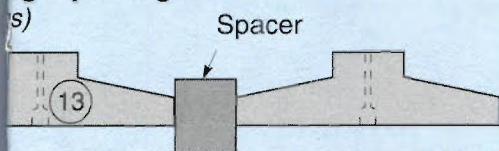
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ing Spacing

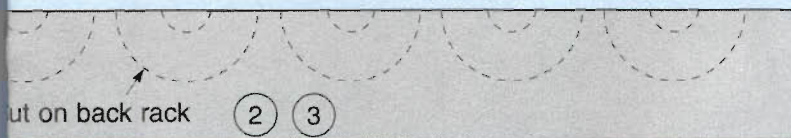
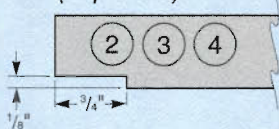


Use either seven or eight moldings, depending on your stemware. Use $1\frac{3}{32}$ " spacers with seven moldings or $\frac{7}{8}$ " spacers with eight moldings (below).

ing Spacing



Lower Racks and Front and Back Aprons (Top View)



MATERIAL LIST

	T x W x L
1 Legs (4)	$1\frac{1}{2}$ " x $1\frac{1}{4}$ " x $35\frac{1}{4}$ "
2 Front Racks (2)	$\frac{3}{4}$ " x 3" x $28\frac{1}{4}$ "
3 Back Racks (2)	$\frac{3}{4}$ " x 3" x $28\frac{1}{4}$ "
4 Front & Back Aprons (2)	$\frac{3}{4}$ " x 3" x $28\frac{1}{4}$ "
5 Side Aprons & Stretchers (4)	$\frac{3}{4}$ " x 3" x 9"
6 Slats (6)	$\frac{7}{16}$ " x 1" x $22\frac{3}{4}$ "
7 Small Spacers (8)	$\frac{7}{16}$ " x $\frac{3}{8}$ " x 1"
8 Large Spacers (8)	$\frac{7}{16}$ " x $\frac{3}{8}$ " x 2"
9 Screws (46)	#8 x $2\frac{1}{2}$ " Flathead
10 Plugs (28)	$\frac{3}{8}$ " Oak Face Grain
11 Tabletop (1)	$\frac{3}{4}$ " x $14\frac{1}{2}$ " x $32\frac{3}{4}$ "
12 Tabletop Fasteners (10)	$\frac{3}{32}$ " Steel
13 Wine Glass Molding (7 or 8)*	$\frac{3}{4}$ " x $2\frac{1}{2}$ " x $10\frac{1}{4}$ "
14 Glides (4)	$\frac{7}{8}$ " Nylon Glides

Full-Size Patterns

PINUP SHOP DRAWINGS

- Open staples carefully, remove pattern and fold staples back in place.
- Use graphite paper (available at art supply stores) or cut and trace full-size patterns onto your stock.
- Cut out the elevation drawings and pin them to your shop wall.



Entertainment Center III

Includes detailed elevations for the dentil moldings, shelf dadoes and drawer finger joints. Plus, complete plywood cutting guides.

Vintner's Valet

Locations for the stopped rabbets in the legs, dimensions for the wine bottle racks, plus a complete material list.



Ultimate Yard Wagon

Includes full-size patterns for all the shaped parts and shop drawings for the wagon bed and steering assembly.



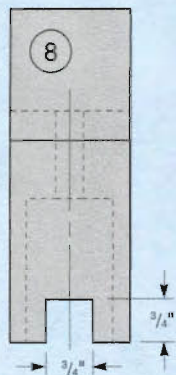
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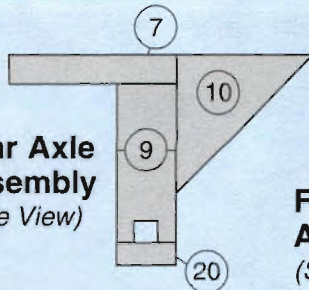
Front Axle Carriage

(Side View)



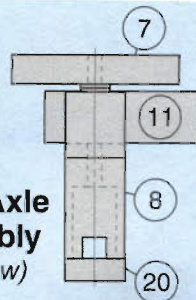
Rear Axle Assembly

(Side View)



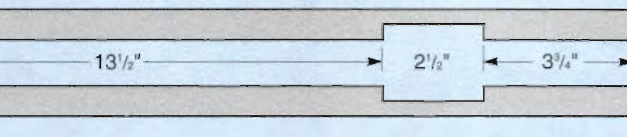
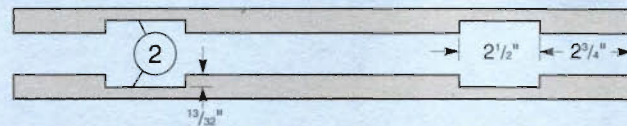
Front Axle Assembly

(Side View)



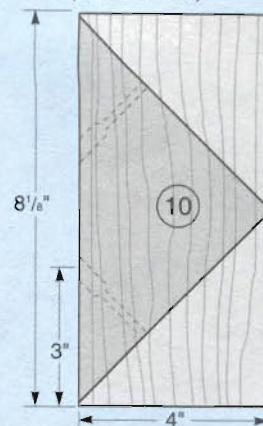
Bed Ends

(Top View)



Rear Axle Braces

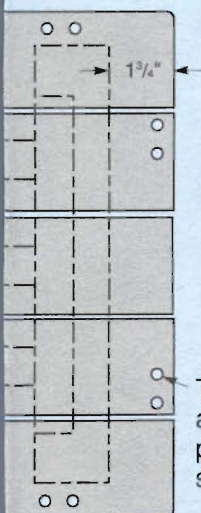
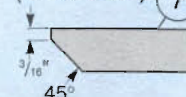
(Side View)



The grain pattern should run parallel with the long side of the rear axle braces.

Crossbraces

(Side View)



The 1/2" drainage holes are lined up with the stake pockets cut in the bed sides and ends.

28

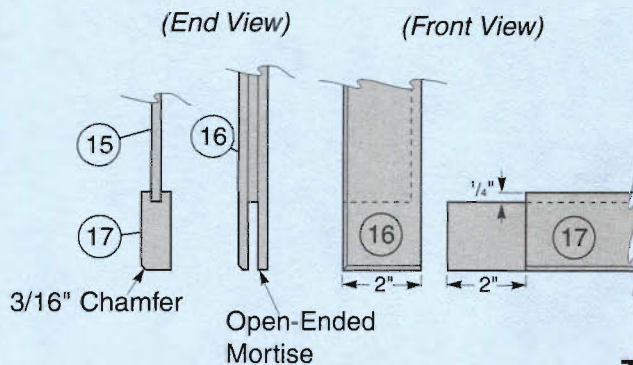
29

Side Rails

MATERIAL LIST

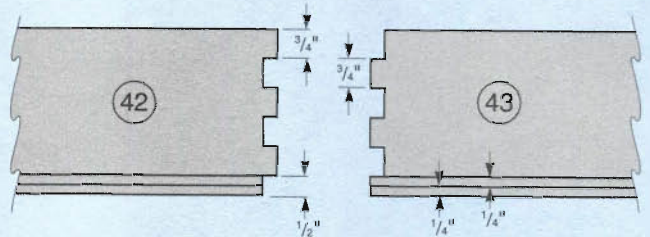
	T x W x L
1 Bed Sides (2)	1 1/2" x 3 1/2" x 42"
2 Bed Ends (2)	1 1/2" x 3 1/2" x 19 1/2"
3 Long Screws (30)	#8 x 2 1/2" Flathead Exterior
4 Screw Hole Plugs (8)	3/8" Diameter
5 Floorboards (5)	3/4" x 4 1/4" x 42"
6 Short Screws (108)	#8 x 1 1/4" Flathead Exterior
7 Crossbraces (3)	3/4" x 3 1/2" x 19 1/2"
8 Front Axle Carriage (1)	1 1/4" x 5 3/4" x 14 1/4"
9 Rear Axle Carriage (1)	1 1/4" x 6" x 14 1/4"
10 Rear Axle Braces (3)	1 1/4" x 4" x 8 1/8"
11 Yoke (1)	1 3/4" x 6" x 15"
12 Steering Pin (1)	1/2" x 6" Carriage Bolt
13 Handle Pin (1)	1/2" x 4" Bolt
14 Pin Washers (5)	1/2" ID
15 Pin Nuts (2)	1/2" Locking Nut
16 Axles (2)	3/4" x 21" Threaded Rod
17 Axle Washers (8)	3/4" ID
18 Axle Caps (4)	3/4" Locking Nuts
19 Tires (4)	10" x 4" Pneumatic
20 Axle Retainers (2)	3/4" x 1 3/4" x 14 1/4"
21 Handle Shaft (1)	1 1/2" x 1 1/2" x 28"
22 Handle Sides (2)	3/4" x 2" x 8"
23 Handle Bolt, Short (1)	1/4" x 2 1/2"
24 Handle Bolt, Long (1)	1/4" x 4"
25 Handle (1)	1 1/8" x 1 1/8" x 4"
26 Handle Washers (2)	1/4" ID
27 Handle Bolt Caps (2)	1/4" Locking Nuts
28 Side Rails, Long (4)	3/4" x 2 1/2" x 42"
29 Side Rails, Short (2)	3/4" x 2 1/2" x 26"
30 Stakes, Long (6)	3/4" x 2 1/2" x 14"
31 Stakes, Short (4)	3/4" x 2 1/2" x 10 1/2"
32 End Rails (5)	3/4" x 2 1/2" x 18"

Doors



Wide Drawer Sides (Side View)

Wide Drawer Back (Front View)

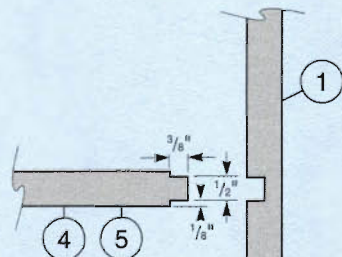


Top, Bottom, and Shelves (Front View)

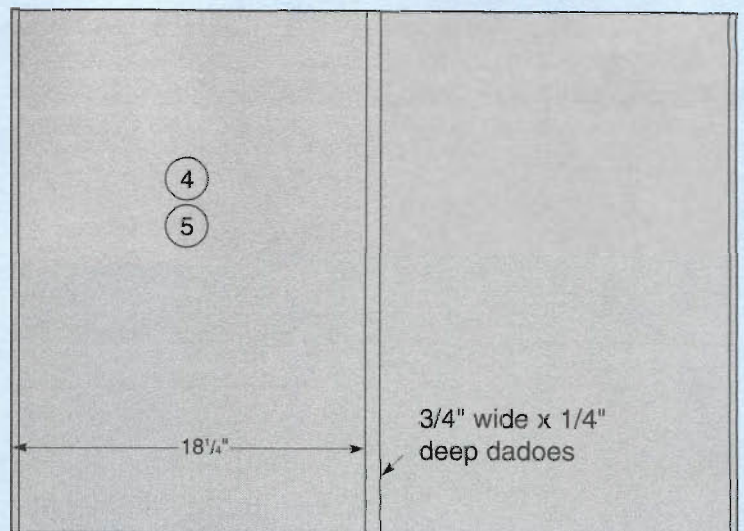
One shelf and the bottom each receive 1 dado, and two shelves each receive 2 dados (top and bottom).



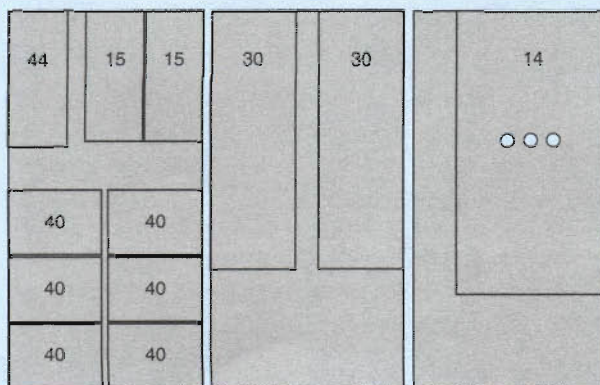
Shelves and Sides (Front View)



Dimensions of dados in cabinet sides are shown above. See page 19 for shelf dado locations.

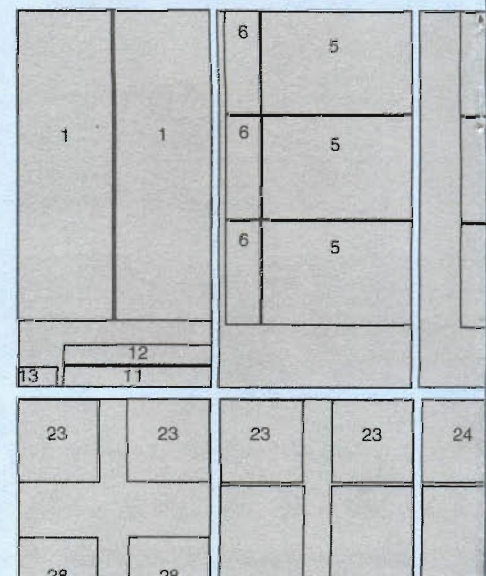


(Top View)



4' x 8', 1/4" Plywood (Cutting Guide)

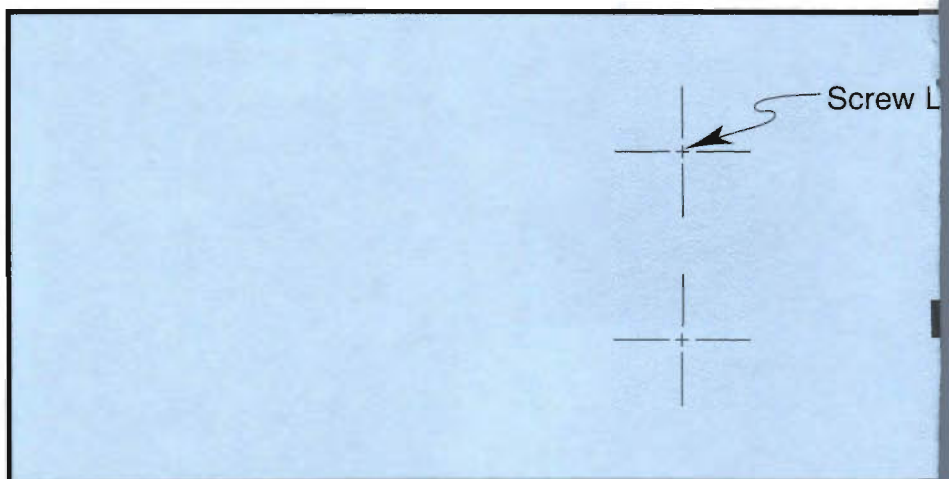
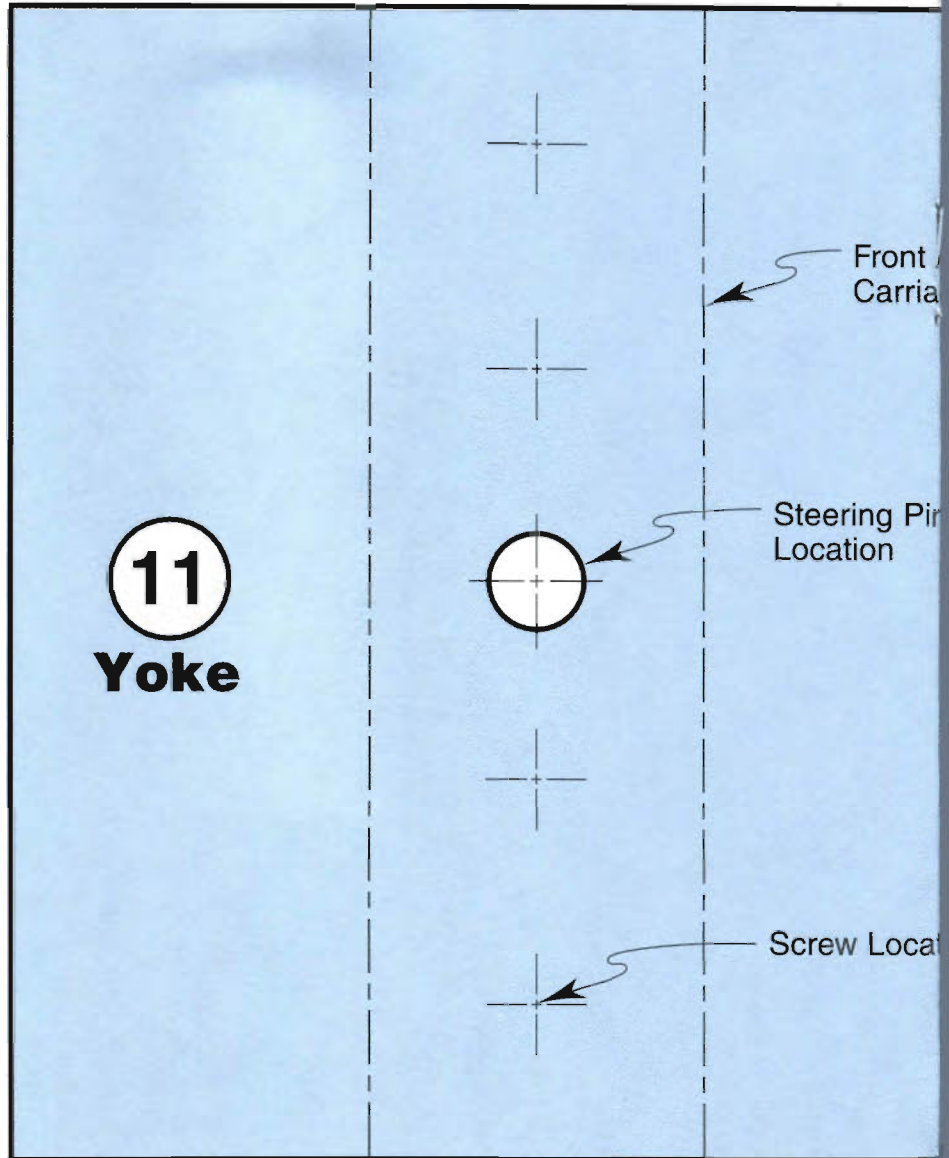
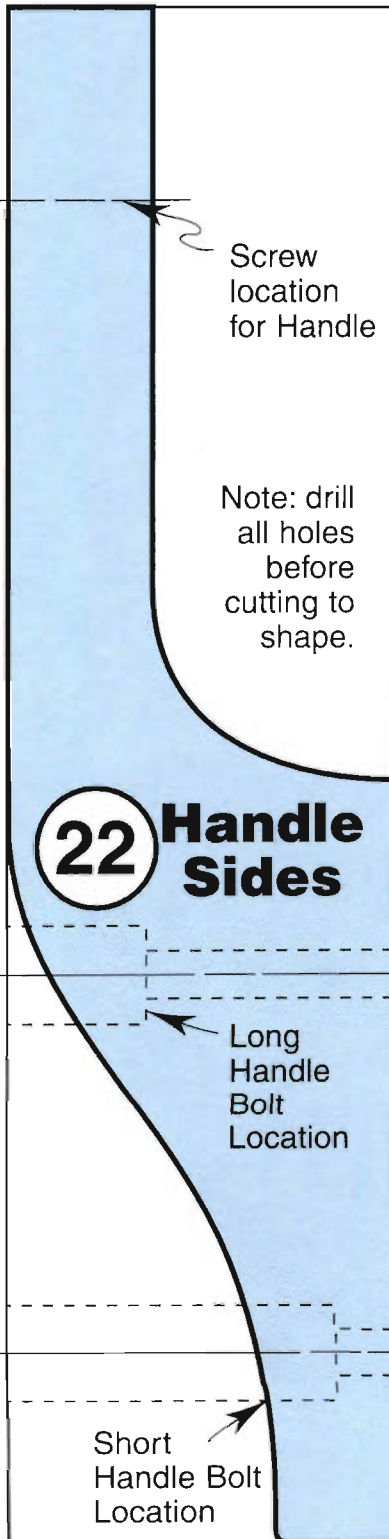
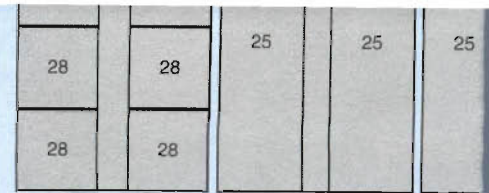
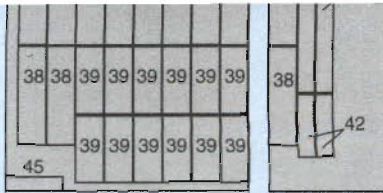
Note: To avoid overheating, locate your air holes so they're hidden by the TV.



5' x 5', 1/2"

Finished Birch Plywood (Cutting Guide)

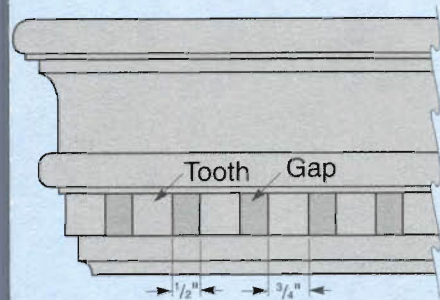
Note: use scrap from this plywood for piece 31.



Drawer Front (Front View)

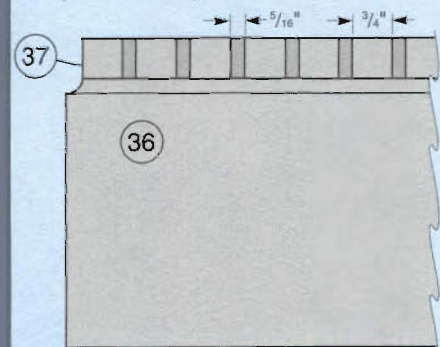


Molding Assembly



Refer to page 25 for instructions on milling the dentil molding. Dry fit each piece before cutting it to length. Center it on the cabinet and leave the same amount of tooth or gap at each end.

Base Trim (Front View)

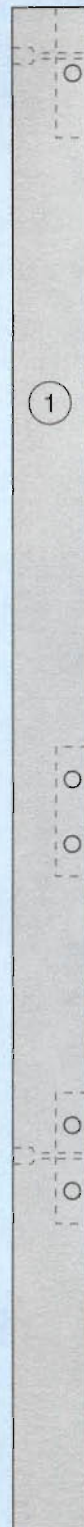


	T x W x L
(4)	3/4" x 3/4" x 20"
s (10)	1/4" x 3/4" x 74"
Dentil (10)	3/4" x 20" x 20"
	3/4" x 3/4" x 20"
	1/4" x 21 1/8" x 65 3/4"
	1/2" x 1 3/4" x 200"
	3/4" x 1 3/4" x 200"
	3/4" x 1 3/4" x 200"
	3/4" x 1 3/4" x 200"
	3/4" x 1 3/4" x 200"
	3/4" x 5" x 144"
	7/16" x 3/4" x 144"
s (12)	1/2" x 7" x 24"

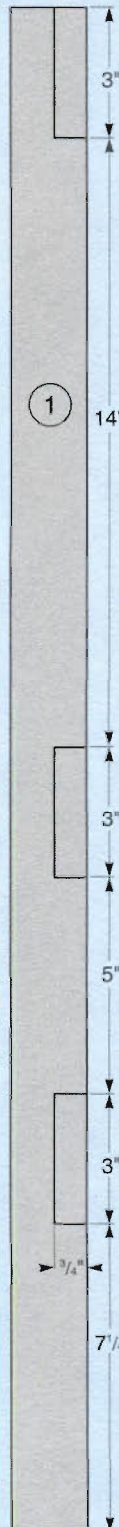
Pinup Shop Drawings

Vintner's Valet

Back Leg (Side View)

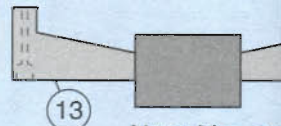


Back Leg (Front View)



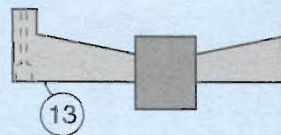
Note screw locations

Wine Glass Molding (Front View - 7 Molding)

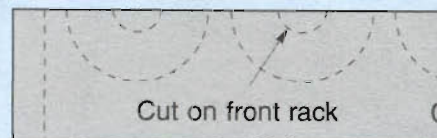


Note: You can adjust the size of your wine glass (above) and...

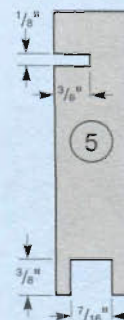
Wine Glass Molding (Front View - 8 Molding)



Front and Back Racks (Front View)



Side Aprons & Stretchers (End View)

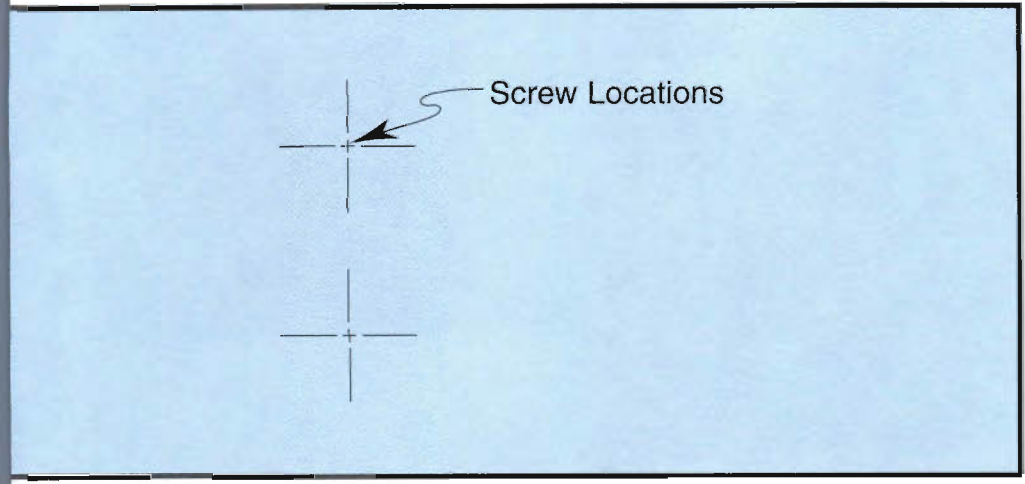
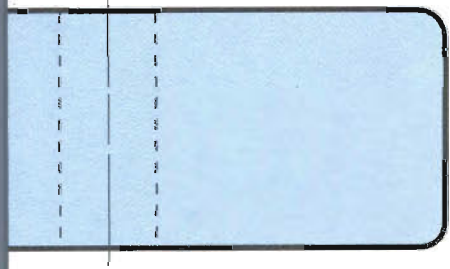
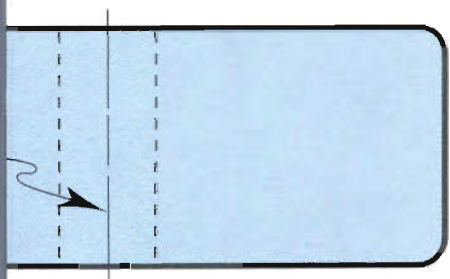


The 1/8" kerf at left is also cut in the front and back aprons (pieces 4), but not in the bottom stretchers.

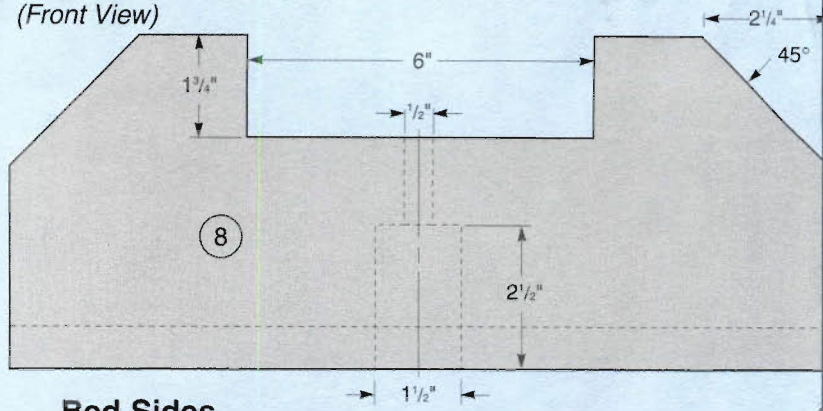
Pinup Shop Drawings

Ultimate Yard Wagon

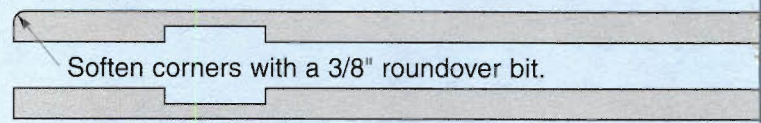
is & Backs (12)	1/2" x 7" x 10 1/2"
oms (6)	1/4" x 16 5/8" x 23 1/4"
es (6 pair)	24" Full Extension
s (2)	1/2" x 4 1/4" x 15 1/4"
ts & Backs (2)	1/2" x 4 1/4" x 35 3/8"
om (1)	1/4" x 14 3/4" x 34 7/8"
ler (1)	1/2" x 3 3/4" x 14 1/4"
es (1 pair)	14" Full Extension
e (1)	3/4" x 5 3/16" x 36 7/16"
es (6)	3/4" x 7 1/8" x 17 3/4"
	1 1/4" Solid Brass
	5mm Solid Brass



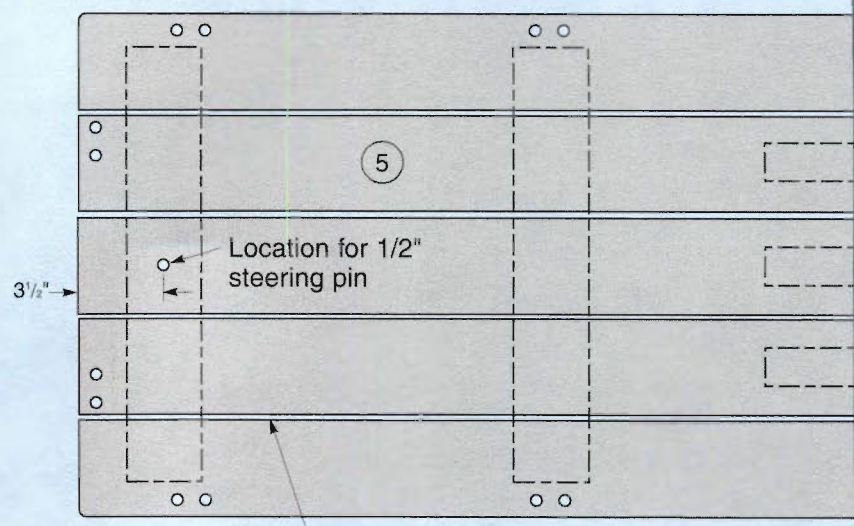
Front Axle Carriage (Front View)



Bed Sides (Top View)

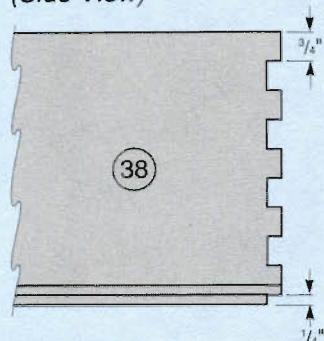
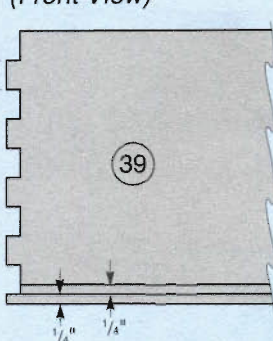
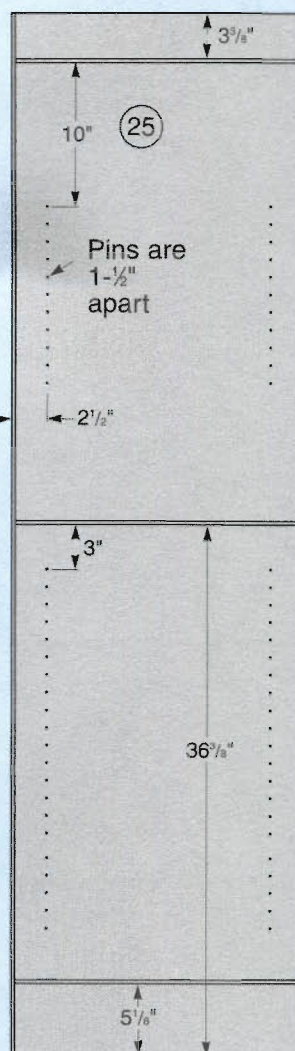
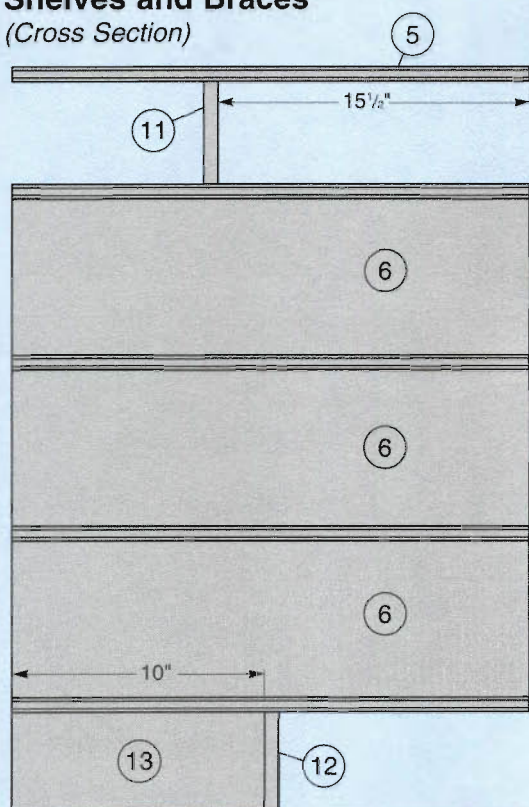
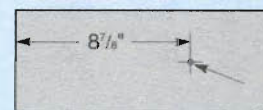
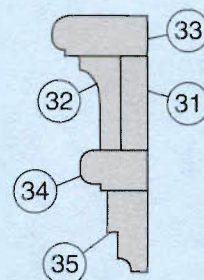


Floorboards (Top View)



Note: use 1/4 inch scrap to evenly space floorboards.

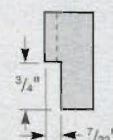
Note: This radius is cut on the front ends of the two middle side rails (pieces 28), and on both ends of the short side rails (pieces 29), as shown on page 15.

Deep Drawer Sides
(Side View)

Deep Drawer Backs
(Front View)

Wing Cabinet Side Panels
Side View

Shelves and Braces
(Cross Section)

Wing Cabinet
(Front View)

Crown Molding

Making Crown Dentil Molding (piece 35)

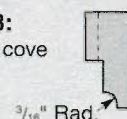
Step 1:
Rout dentil molding



Step 2:
Cut rabbet



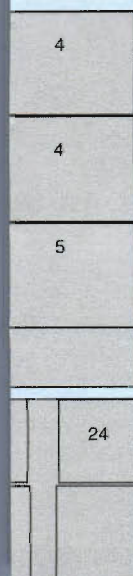
Step 3:
Create cove

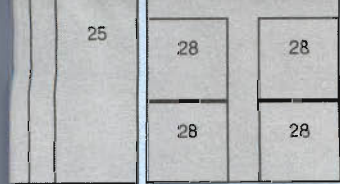


MATERIAL LIST

	T x W x L	
1 Sides (2)	3/4" x 23 3/4" x 79"	26 Shelf Dentil (2)
2 Side, Front Edging (2)	1/4" x 3/4" x 79"	27 Side Panel Edging
3 Side, Back Edging (2)	3/4" x 3" x 79"	28 Adjustable Shelf
4 Top & Bottom (2)	3/4" x 37 1/4" x 26 3/4"	29 Adjustable Shelf D
5 Fixed Shelves (4)	3/4" x 37 1/4" x 26 1/2"	30 Backs (2)
6 Dividers (3)	3/4" x 8 1/2" x 26 1/2"	31 Crown Backer
7 Shelf and Divider Edging	1/4" x 3/4" x 144"	32 Crown Cove
8 Top Shelf Dentil (1)	3/4" x 3/4" x 36 1/2"	33 Upper Bullnose
9 Screws	#8 x 2" Square X	34 Lower Bullnose
10 Plugs	Flat Top	35 Crown Dentil
11 Top Shelf Brace (1)	3/4" x 5 1/4" x 36 1/2"	36 Toekick
12 Toekick Long Brace (1)	3/4" x 5" x 36 1/2"	37 Toekick Dentil
13 Toekick Short Brace (1)	3/4" x 5" x 10"	38 Deep Drawer Side

4' x 8',
3/4" Plywood
(Cutting Guide)





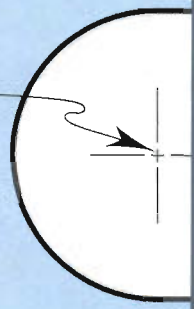
15 Door Panels (2)	1/4" x 14 1/4" x 33 1/2"
16 Door Stiles (4)	3/4" x 2" x 37"
17 Door Rails (4)	3/4" x 2" x 17 3/4"
18 Door Hinges (2 pair)	Concealed, 35mm.
19 Follower Strips (2)	See kit instructions for size.
20 Flipper Door Slides (2 pair)	24"
21 Teardrop Handles (2)	2" Solid Brass
22 Door Stop (1)	1/2" x 3/4" x 2 5/8"
23 Tops and Bottoms (4)	3/4" x 21 1/8" x 20 3/4"
24 Fixed Shelves (2)	3/4" x 21 1/8" x 20"
25 Side Panels (4)	3/4" x 20 3/4" x 74"

40 Deep Drawer Bottom
41 Deep Drawer Slide
42 Wide Drawer Side
43 Wide Drawer Front
44 Wide Drawer Bottom
45 Wide Drawer Divider
46 Wide Drawer Slide
47 Wide Drawer Face
48 Deep Drawer Face
49 Drawer Pulls (8)
50 Shelf Pins (40)

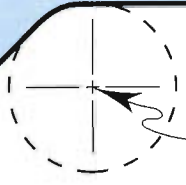
Axle
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Handle Pin Location

Create this radius with a 1 1/2" Forstner bit, then band saw to shape.



ions



Create this radius with a 7/8" Forstner bit.

Ultimate Yard Wagon

ocations

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End Rails

Note: this curve is only cut on the top front end rail.