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Multi-functional Routing System

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- How-to photos with instructive captions.
- Tips to help you complete the project and become a better woodworker.

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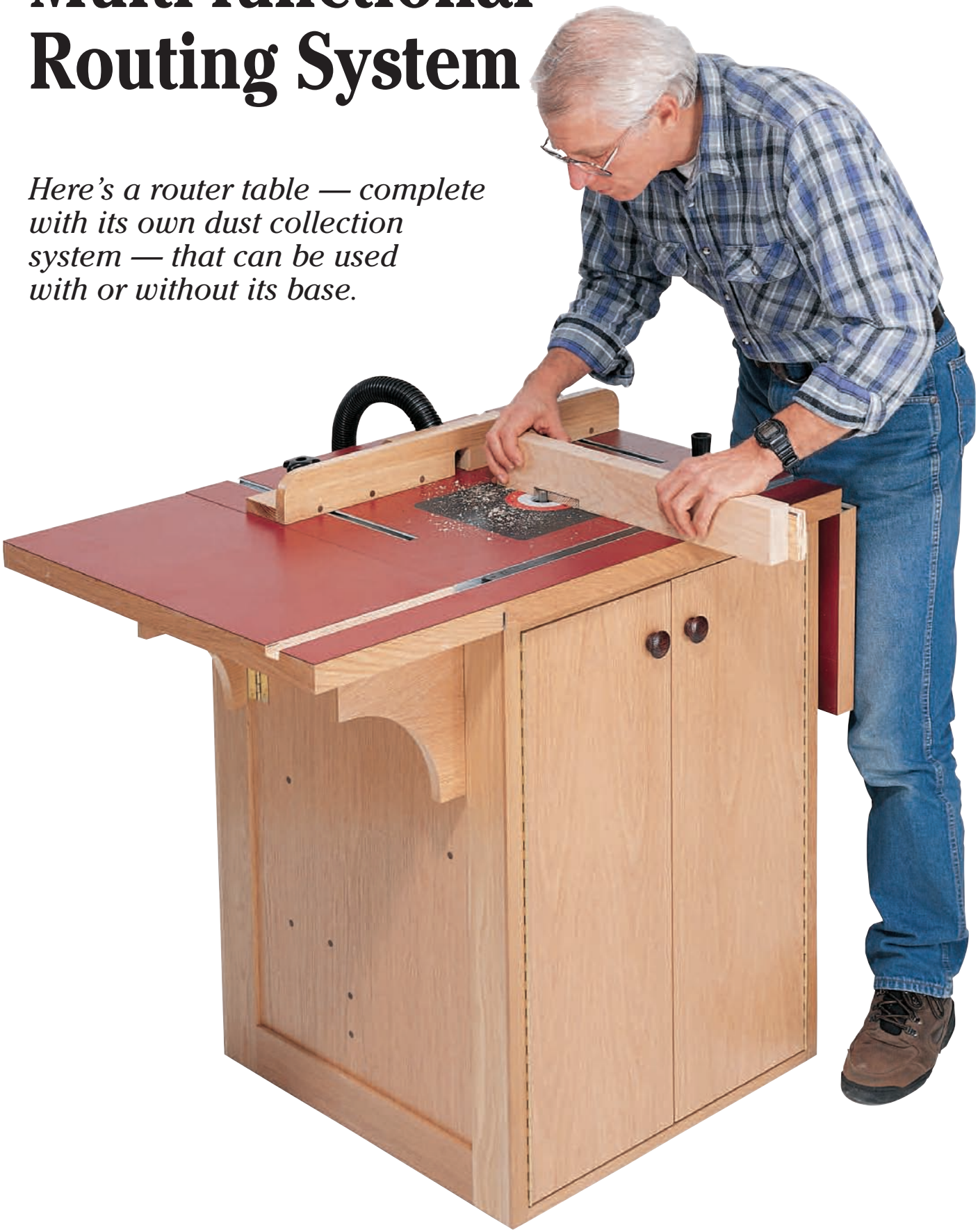
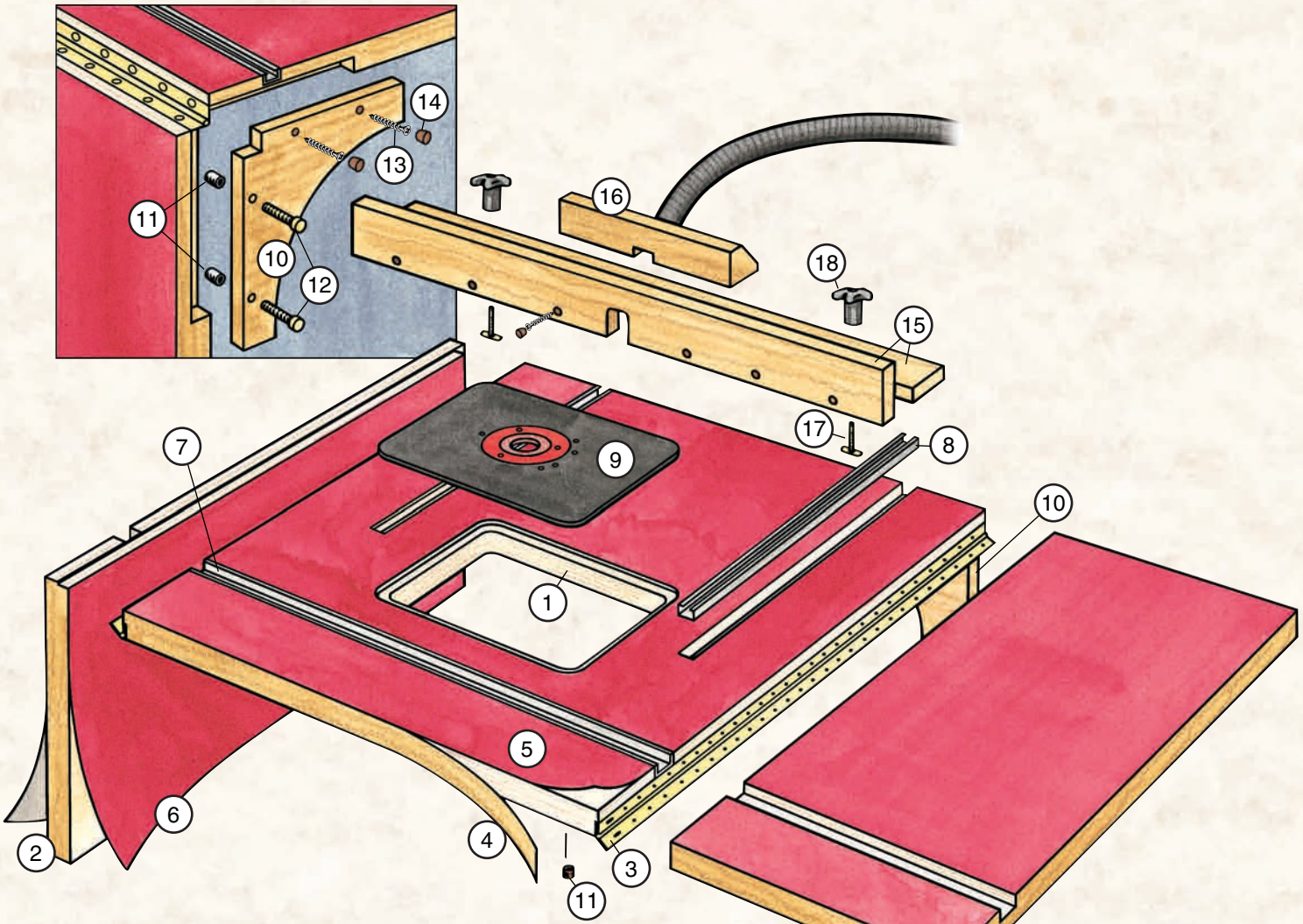
Multi-functional Routing System

Here's a router table — complete with its own dust collection system — that can be used with or without its base.





If your shop has neither loads of floor space nor a central dust collection system, this multi-functional router table is for you. With its wings up, it provides plenty of support for long stock. Flip the wings down, and it rolls up against a wall for ordinary-sized routing tasks or doubles as an extra table for storage. In this mode, it only occupies a little over 4 square feet of floor space. We've designed the fence with a port to hook up to your shop vac, which should help keep your lungs cleaner. Best of all, the top comes off and becomes a stand-alone benchtop unit that you can take with you for those routing jobs outside the shop.

MATERIAL LIST - Top

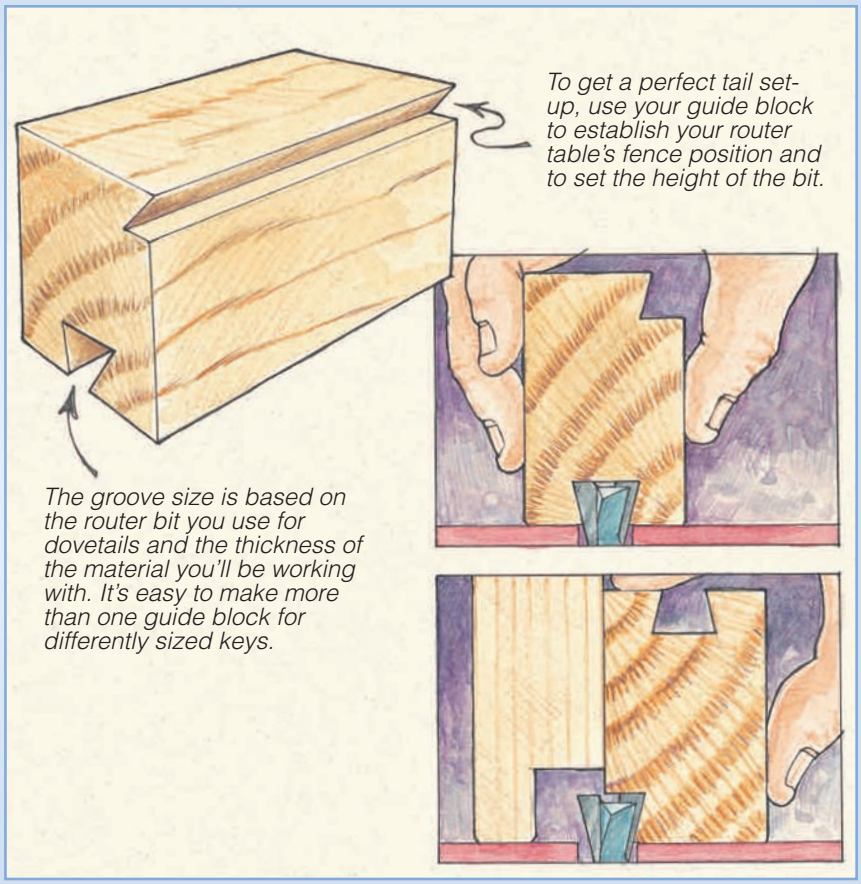
		T x W x L
1	Tabletop (1)	1½" x 26" x 26¼"
2	Wings (2)	1½" x 26" x 12"
3	Piano Hinges (2)	1½" x 26"
4	Edging (2)	1½" x 8' Plyedge
5	Tabletop Laminate (2)	1/40" x 26¼" x 26½"
6	Wing Laminate (4)	1/40" x 26¼" x 12¼"
7	Miter Gauge Track (1)	½" x 1" x 26¼"
8	Fence T-track (2)	½" x 13/16" x 15½"
9	Router Base Insert (1)	¼" x 9" x 12"
10	Gussets (2)	¾" x 8" x 8"
11	Threaded Inserts (8)	¼"-20
12	Brass Knurled Knobs (4)	¼"-20
13	Screws (36)	#8 x 1½"
14	Plugs (36)	⅜" Diameter
15	Fence Face and Brace (2)	¾" x 3" x 26¼"
16	Dust Collection Port (1)	2" x 2" x 9"
17	T-slot bolts (2)	5/16"-18 x 1½"
18	Star Knobs (2)	5/16"-18

Quick Tip

Template Key for Sliding Dovetails on your Router Table

Sliding dovetails are a great joint. There's lots of surface area available for glue, they look great and hold forever. But they can be fussy to set up on a router table.

Generally we find the easier something is to do, the more likely we are to do it. An example is making this simple guide block for setting up sliding dovetails. Using a scrap of hardwood, carefully cut and fit both the groove and tail of a dovetail joint. Now, instead of starting from scratch each time, use the guide block to establish your bit height and fence setting. Mark the bit size on the guide block as well. Save the block, and you'll probably build more sliding dovetails than ever. Make similar blocks each time you set up a different joint size.



To get a perfect tail set-up, use your guide block to establish your router table's fence position and to set the height of the bit.

The groove size is based on the router bit you use for dovetails and the thickness of the material you'll be working with. It's easy to make more than one guide block for differently sized keys.

Tabletop Core

The tabletop is the most critical element of any router table. If it doesn't stay flat, sturdy and stable, your milling suffers. So building the tabletop is the first order of business.

To ensure that this table stays flat, we built the core from two layers of Finnish birch plywood. However, a less expensive high density fiberboard (the same material used by cabinet shops for countertops) would also work, and so would ordinary ¾" MDF.

Begin by gluing and clamping two sheets of ¾" thick core stock (26" x 50½" — large enough to make pieces 1 and 2) together, exerting enough pressure on the center of the panel to ensure good adhesion. To do that, you can use special clamps with long jaws, or you can weigh down the center with sand bags or cinder blocks. Another good idea is to screw the two panels together. If you go this latter route, screw from the bottom up with 1¼" screws after drilling clearance holes through the bottom sheet. The screws will pull the two plates together. Use a straightedge to check that the assembly is flat. After the glue has dried, cut the top and wings to size on your table saw. Then reset your fence and blade height to create the rabbets for the hinges (pieces 3) on the four inside edges (see the *Technical Drawings* on pages 34 and 35).

Glue and clamp hardwood tape (piece 4) to all the edges of the three panels except the ones to which the hinges will be screwed, using long straight pieces of scrap between the clamps and the tape to ensure even pressure. Sand the tape flush with the top and bottom and move on to laminating the tabletop and the wings.

Laminating the Tabletop

Each piece of laminate in the *Material List* on page 31 (pieces 5 and 6) is deliberately oversized by ¼". This is because you'll be using your router to trim it to the correct size after

it has been applied to the top and wings.

If you used screws to glue up the tabletop, fill any depressions and sand the filler flush. Then spread a coat of contact adhesive on the bottom surface of each wing and the tabletop, following the adhesive manufacturer's directions. (Note: Laminating the bottom surfaces will ensure that the tabletop will stay flat.) Apply a similar coat to the relevant pieces of laminate. When the cement is dry to the touch, lay dowels or thin sticks every six inches along the plywood, then position the laminate on top of these spacers. Remember, you'll only get one shot at lining up the laminate — contact adhesive is unforgiving.

When you're happy with the positioning, begin removing the spacers from the center. Work your way toward the ends, pressing the laminate down firmly as each spacer is removed. Use a roller to roll the entire surface once all the spacers are removed, then use a laminate trimming bit in your router to cut the laminate flush with the edges of the tabletop and wings. When the bottoms of all three panels have been laminated, repeat the process on the top surfaces. This time, set the router bit height so the bearing doesn't ride into the hinge rabbets.

Figure 2: Gussets that are mortised into the back of the tabletop allow the top to be converted into a portable benchtop unit.

Tabletop Hardware

Now that your tabletop and wings are laminated, you can start machining for the hardware that guides the fence and miter gauge. The first step is to install the piano hinges that hold the wings, then lay the entire assembly on a flat workbench. Secure it to the bench with clamps, then install a 1" straight bit in your router (if you don't own a 1" bit, make several passes with a smaller one). Refer to the *Technical Drawings* for the location of the miter gauge groove, then clamp a fence in place and rout this groove across all three panels at the same time. That way, you'll be sure they line up.

Install the miter gauge track (piece 7) in the tabletop next, but don't install track in the wing grooves or the gauge will get stuck. Predrill and countersink for screws to hold the track in place, then slip the miter gauge from your table saw into the track and tighten the screws until it slides easily with no play.

The T-tracks for the fence (pieces 8) are installed in a similar fashion. Cut the grooves according to the locations given in the *Technical Drawings*, then screw the tracks in place. The last hardware element in the top is the table insert (piece 9). Follow the instructions that come with your insert plate for cutting the rabbet (shown in *Figure 1*) that holds it in the tabletop.

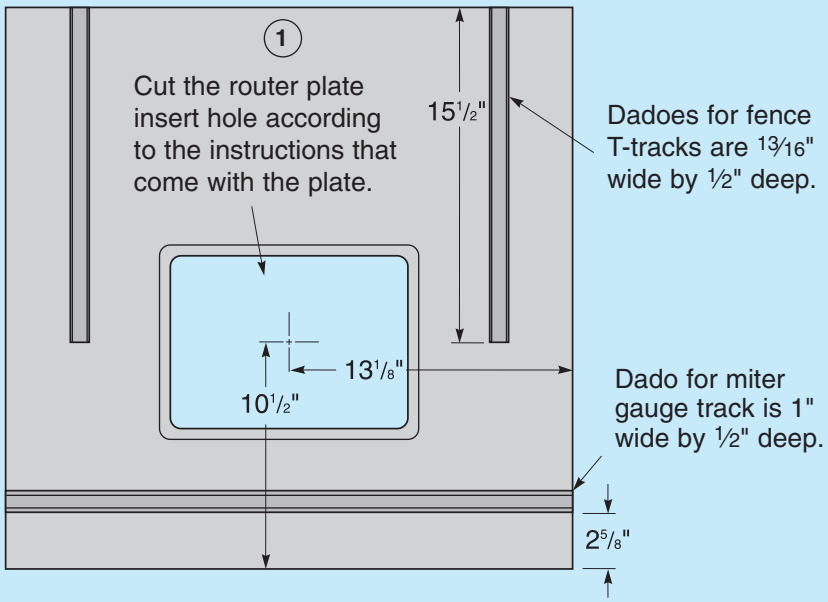
Figure 1: The router table insert rests on a rabbet that holds it flush with the tabletop. Follow the instructions that come with your plate for cutting this opening and rabbet.

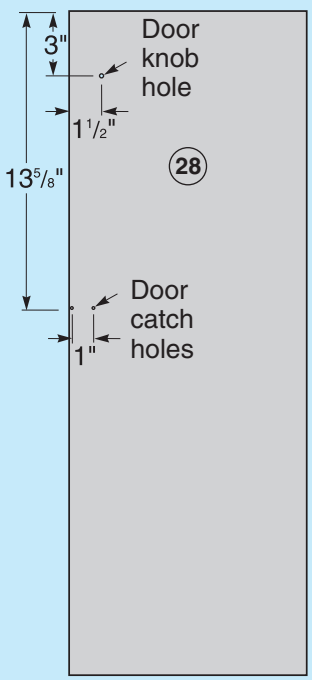
Adding Portability

To use the tabletop as a stand-alone unit, the wings serve as legs. They are secured in position with a pair of gussets (pieces 10) that are mortised into the back of the tabletop like hinges are mortised into doors. These mortises (see the *Technical Drawings*) are cut with a router equipped with a straight bit (after removing the piano hinges), then cleaned up with a chisel. A matching mortise is then cut in the back of each wing.

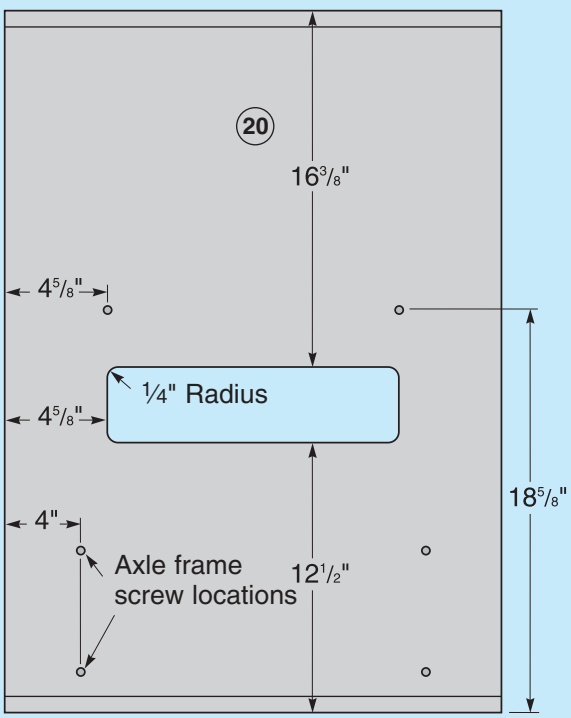
Bore holes in each wing for the threaded inserts (pieces 11), and in each gusset (see *Figure 2*, at left) for the knurled knobs (pieces 12). The *Technical Drawings* locate the holes for the inserts plus the screws and plugs (pieces 13 and 14) that anchor the gussets to the tabletop. To secure the wings in the down position, pass the brass knobs through the holes in the gussets and screw them into the inserts.

Tabletop

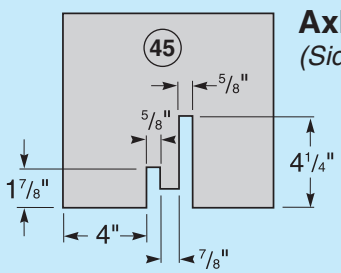




Door

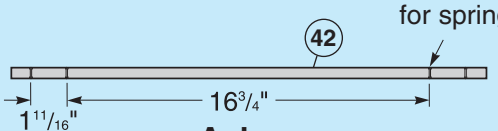


Base Back
(Front View)



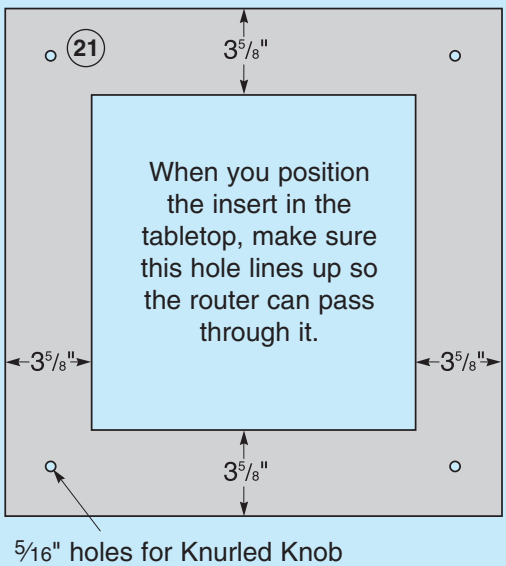
Axle Frame
(Side View)

Use a hacksaw to cut shallow grooves for spring clips .

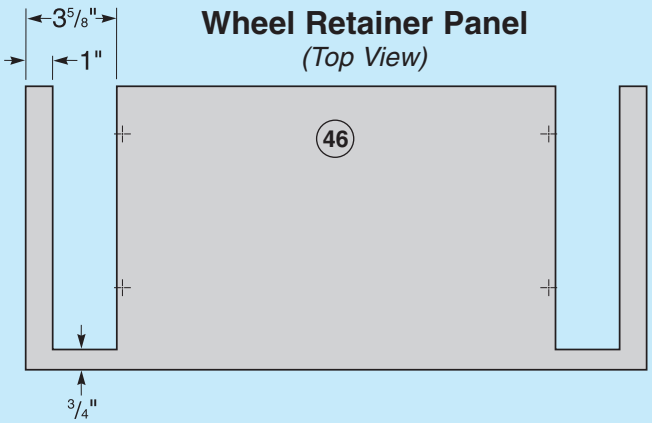


Axle
(Front View)

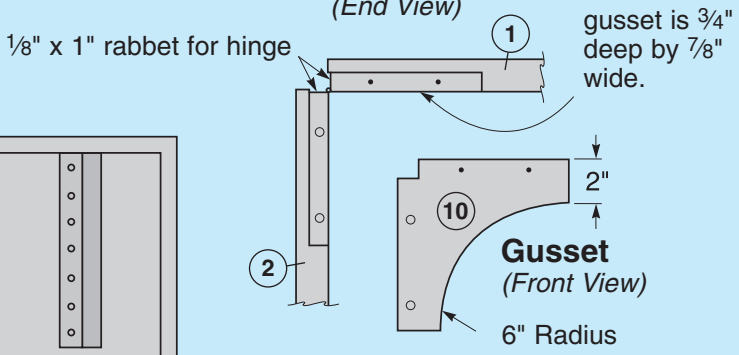
Base Top
(Top View)



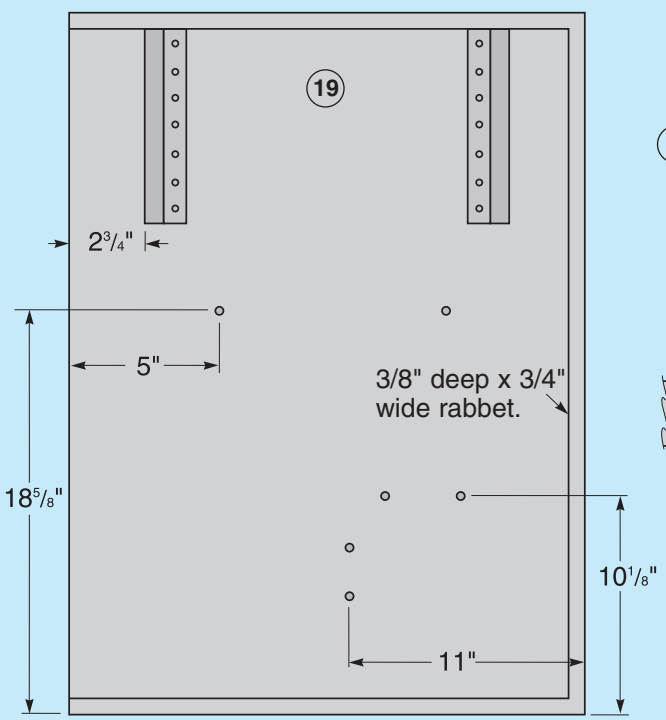
Wheel Retainer Panel
(Top View)



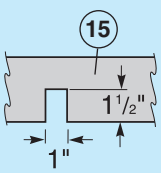
Tabletop Joint
(End View)



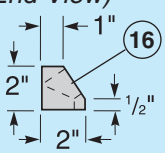
Base Side
(Front View)



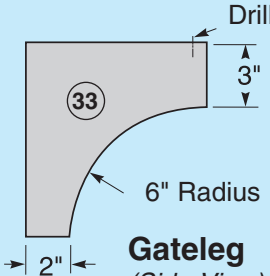
Fence
(Front View)



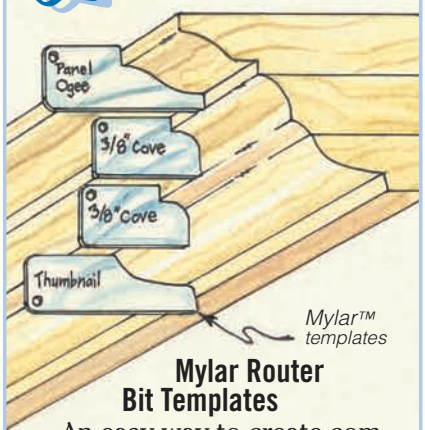
Dust Port
(End View)



Gateleg
(Side View)



Quick Tip

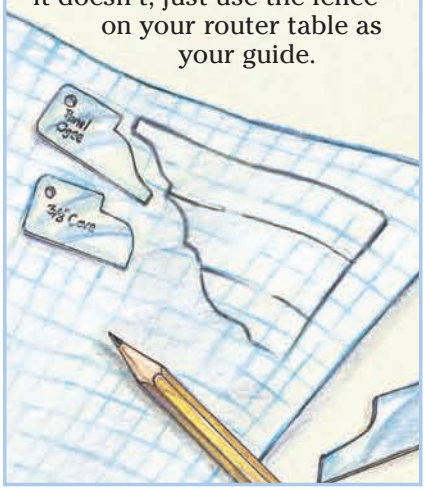


Mylar Router Bit Templates

An easy way to create complex profiles with your router bits is to simply trace the profile of each onto Mylar (a stiff, opaque, thin sheet of plastic film that's available in blueprint and artist supply stores). Note the profile of the bearing as well, then carefully cut out each profile with scissors. Punch holes in the templates and store them on a key chain.

When designing a stacked shape, create a paper storyboard by using the various profiles to lay out the final shape. The slightly opaque Mylar allows you to see profiles already traced.

While designing in this manner, you can easily determine if the bit will have a bearing surface to ride on. If it doesn't, just use the fence on your router table as your guide.



The Fence

Use straight hardwood stock to make the fence face and brace (pieces 15), then cut a hole in the middle of the face (see *Technical Drawings*) for router bits before screwing and gluing the two pieces together. Counterbore the screw heads (they'll be plugged later), then make the dust collection port (piece 16), a block of wood (see *Technical Drawings* for profile) with a hole drilled in it at an angle: Use a hole saw or Forstner bit that matches the diameter of your shop vac hose fitting. Screw, but don't glue, the port to the back of the fence behind the hole: You may need to replace the fence face sometime in the future.

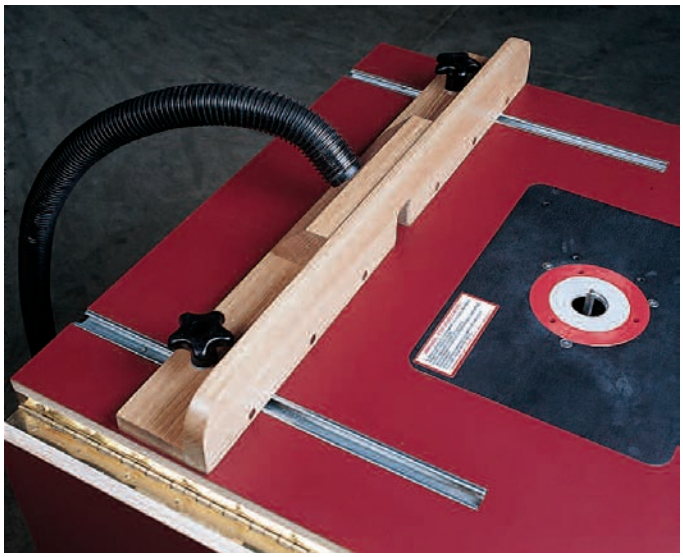


Figure 4: The router table's fence incorporates a dust collection port. Your shop vac hose should friction-fit to this hole.

The fence is secured to the tabletop with two T-slot bolts (pieces 17) and a couple of star knobs (pieces 18). This hardware also allows you to easily move and set the fence.

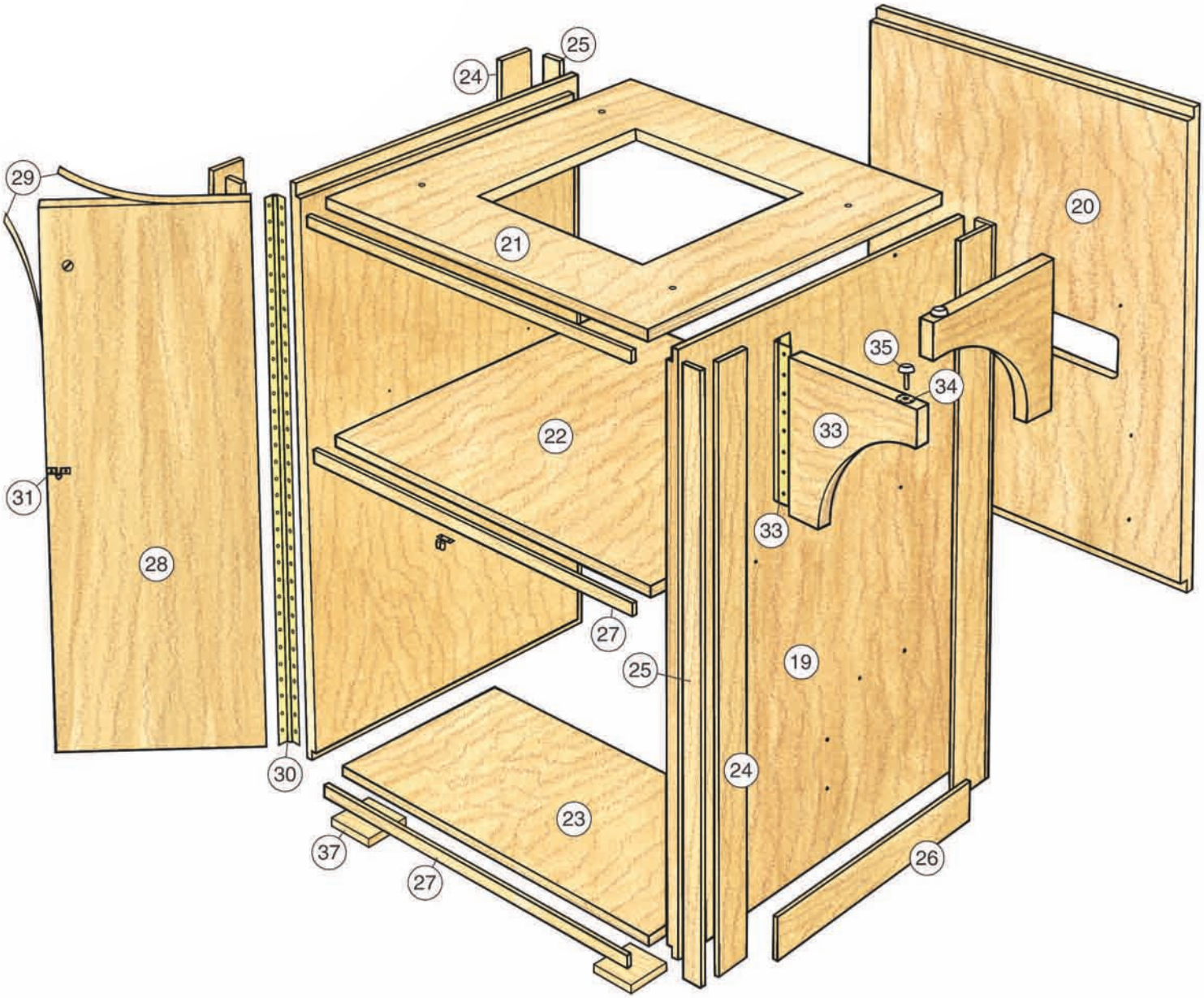
The Base Cabinet is Next

Even though it becomes a portable, self-contained unit, the tabletop subassembly is designed so it can rest on a mobile base cabinet. This base's two sides (pieces 19) are rabbeted on their top, bottom and back (see the *Technical Drawings* for locations and dimensions), and these are easy cuts to make on your table saw.

The cabinet back (piece 20) is milled next. The only machining here is a rabbet along the top edge and a large hole (see the *Technical Drawings*) that will allow air to reach your shop vac if you stow it in the cabinet and the router cord to exit the cabinet. If you already have a dust collection system, all you'll need is a hole large enough to accept your cord's plug. If not, the hole can be cut with a jigsaw after first drilling out the four corners. Finish up by sanding any jagged edges left by the saw.

After you have cut the top, shelf and bottom (pieces 21, 22 and 23) to size, return to your jigsaw to cut the hole in the top (see *Technical Drawings*) for your router. You also need to drill a hole in the back of the shelf for your router's power cord. Note: If you decide not to install wheels on your cabinet, the bottom should be the same size as the top.

You can now assemble the top, bottom and shelf to the sides and back, using glue and 1½" screws. The screw heads should be sunk ¼" below the surface in ⅜" diameter counter-



MATERIAL LIST - Base

	T x W x L
19 Base Sides (2)	¾" x 23⅞" x 32½"
20 Base Back (1)	¾" x 23" x 32½"
21 Base Top (1)	¾" x 23" x 23½
22 Base Shelf (1)	¾" x 22¼" x 21 15/16"
23 Base Bottom (1)*	¾" x 23" x 13"
24 Side Stiles (4)	⅜" x 2¾" x 32½"
25 Front & Back Stiles (4)	¼" x 1" x 32½"
26 Side Rails (2)	⅜" x 2¾" x 18⅜"
27 Edging (3)	¼" x ¾" x 22¼"
28 Doors (2)	¾" x 11" x 30¾"

	T x W x L
29 Door Edging (2)	¾" x 96" Tape
30 Door Hinges (2)	1½" x 30¾" Piano
31 Door Catches (2)	Double Roller
32 Door Knobs (2)	1½" Diameter
33 Gatelegs (4)	¾" x 9" x 8⅜"
34 Threaded Inserts (4)	5/16"-18
35 Gateleg Levelers (4)	⅜" x 1⅛"
36 Gateleg Hinges (4)	1½" x 9" Piano
37 Cabinet Feet (4)	¼" x 2" x 2"

*If you decide not to install the wheel system, the bottom should measure 23" x 23½".

Figure 3: Apply pressure sensitive hardwood tape to all four edges of the base unit's plywood doors, then sand the tape flush. Sand carefully to keep from sanding off the plywood surface veneer.

bores that are drilled with a Forstner bit (for clean edges and a flat bottom).

Add Some Trim

There's something about a well-built shop fixture (a fine European workbench, for example) that brings pleasure to the most mundane woodworking tasks — even sanding! That's why we suggest you trim out the router table's base cabinet, giving it a frame-and-panel look. The trim pieces are simply cut and jointed to size, then applied to the cabinet with glue and clamps.

The trim pieces must be applied in a specific order so that everything fits perfectly. Begin by attaching the side stiles (pieces 24), followed by the front and back stiles (pieces 25), the side rails (pieces 26) and the edging (pieces 27).

Making the Doors

Flush doors (pieces 28) are simple to make and have a low profile. To build them, cut plywood panels to the correct dimensions and apply pressure sensitive hardwood tape (piece 29) to all four edges (see *Figure 3*). Sand the tape flush, then dry fit the hinges (pieces 30), the catches (pieces 31) and the door knobs (pieces 32). Locations for all of these can be found on the *Technical Drawings*. Once all the screw holes have been started, you can remove the hardware until after the cabinet has been finished.

Gatelegs Support the Top

When working with long stock, this router table's two extension wings are invaluable. However, it's essential that the wings are lined up in the same plane as the tabletop. To ensure that they are, two pairs of gatelegs (pieces 33) support them when they're in use.

To make these gatelegs, begin by transferring their shape from the *Technical Drawings* onto your plywood stock, then move to your drill press. Bore a hole in the top of each blank for a threaded insert (pieces 34). These inserts will house plastic leveler glides (pieces 35) that will allow you to make fine adjustments to the height of the wings. Boring holes for them is a lot easier to do now, before the gateleg profile is cut. That's the next step, and it's done on your bandsaw. Then use a drum sander in your drill press to refine the bandsaw cuts.

Install the gatelegs with 9" lengths of piano hinge (pieces 36). The locations for these hinges can be found on the *Technical Drawings*. Once they're in place, attach ¼"-thick feet (pieces 37) to the four corners to keep the bottom of your cabinet off the floor.

Wrap up the base by gluing plugs in the screw counterbores. Trim these with a chisel and sand them flush.

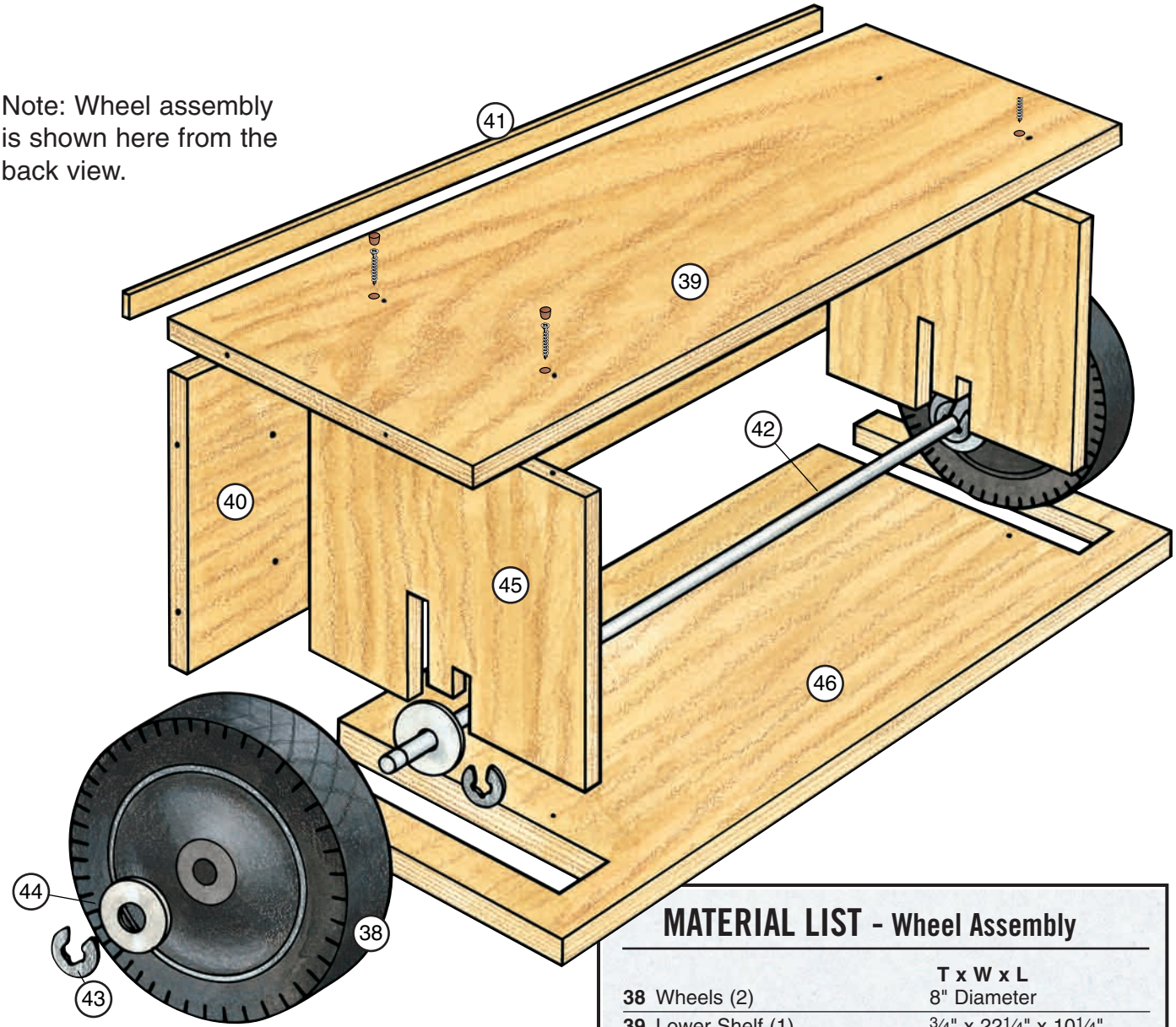
The same four brass knurled knobs that hold the wings in position when the router system is being used on a benchtop are also used to secure the top to the base. Drill holes through the top of the base, then bore four corresponding holes in the underside of the top for the threaded inserts (pieces 11). This ensures that you'll get a steady, safe and non-moving surface.

Building the Wheel Assembly

To make the table mobile (so it can be pushed against a wall and moved out when needed), we added a pair of wheels (pieces 38). However, if you decide that you don't need this option, just skip the rest of this section and move on to "Wrapping Up".

The wheel system we devised lets you tip the router table away from you to engage the wheels, then toward you to disengage, using the stepped slots cut in the axle frames (pieces 45). It's enclosed by the lower shelf (piece 39) and a support (piece 40). These are cut to size, then the leading edge of the shelf is trimmed with an oak strip (piece 41). Cut and build the wheel assembly using the *Technical* and *Exploded Drawings* as guides. Assemble the axle, wheels, washers and clips, then build the wooden assembly. You'll need to hacksaw a pair of grooves into the axle at both ends for locking the pair of clips that hold each wheel in place. To mount the assembly in the cabinet, position it so the bottoms of the wheels are even with the cabinet feet when the

Note: Wheel assembly is shown here from the back view.



axle is resting in the shorter stepped slots in the axle frames. Drive countersunk screws through the cabinet sides into the lower shelf and lower shelf support. Plug these screw holes in the base.

Wrapping Up

After all the assembly is accomplished, you're ready to finish the cabinet. We sprayed the base and tabletop edging with four coats of lacquer, sanding between coats.

Mount your router to the insert plate you've selected for your project. It probably comes either predrilled to fit your router or with instructions for drilling the holes yourself. If not, remove the baseplate from your router and use it as a template for locating the countersunk screw holes in the insert plate. Attach the router to the insert plate with screws and drop it into place.

MATERIAL LIST - Wheel Assembly

		T x W x L
38	Wheels (2)	8" Diameter
39	Lower Shelf (1)	¾" x 22¼" x 10¼"
40	Lower Shelf Support (1)	¾" x 22¼" x 9
41	Lower Shelf Edging (1)	¼" x ¾" x 22¼"
42	Axle (1)	½" x 22" Steel Rod
43	Axle Clips (4)	½" ID Spring Clips
44	Axle Washers (4)	½" ID x 2" OD Fender
45	Axle Frames (2)	½" x 9¾" x 9"
46	Wheel Retainer Panel (1)	¾" x 23" x 10½"

RESOURCE GUIDE

Find the piano hinges, plywood edging and other hardware along with all your woodworking necessities at Rockler Woodworking and Hardware. Call 800-610-0883 or visit the web site www.rockler.com to order.