

The Secret to Perfect Dadoes

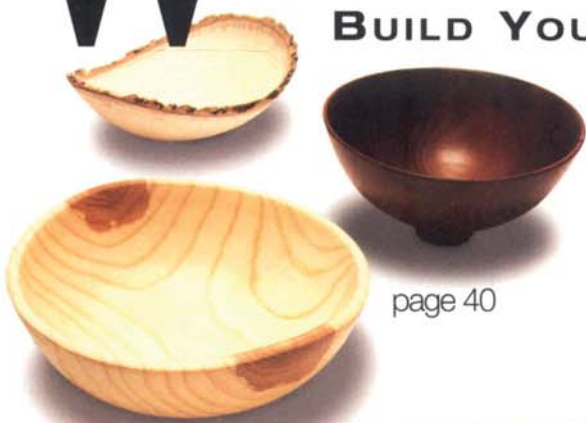
Cube in a Cube, Puzzle or Trick?

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Puzzle or Trick?



page 40

The Amazing Adjustable Bench

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adjustable



workbench



My workbench has always been the heart of my small shop. When I made it years ago, I outfitted it with a good face vise, an innovative sliding tail-vise and a plain trestle base. But the bench's height always bugged me. It was too low for some jobs and too high for others.

by Tom Caspar

I found a solution! I retrofitted my top with commercially-made adjustable legs (about \$480, see *Adjust-A-Bench Legs*, page 53). I also built a new cabinet-style base for added storage space.

Adjustability has saved a lot of strain on my back. When routing, I raise the bench; when sanding, I lower it. The bench has 12 different heights, from 28 to 44 in.

Adjustable metal legs allow you to raise or lower the bench to a variety of working heights. Set low, it's an excellent assembly table.



Raise the top all the way for detail work. A tall bench is a wonderful luxury. It's perfect for drawing sketches, routing inlay, sawing dovetails and many more jobs.



The coolest bench ever:
It changes size before your eyes!

FIG. A
EXPLODED VIEW

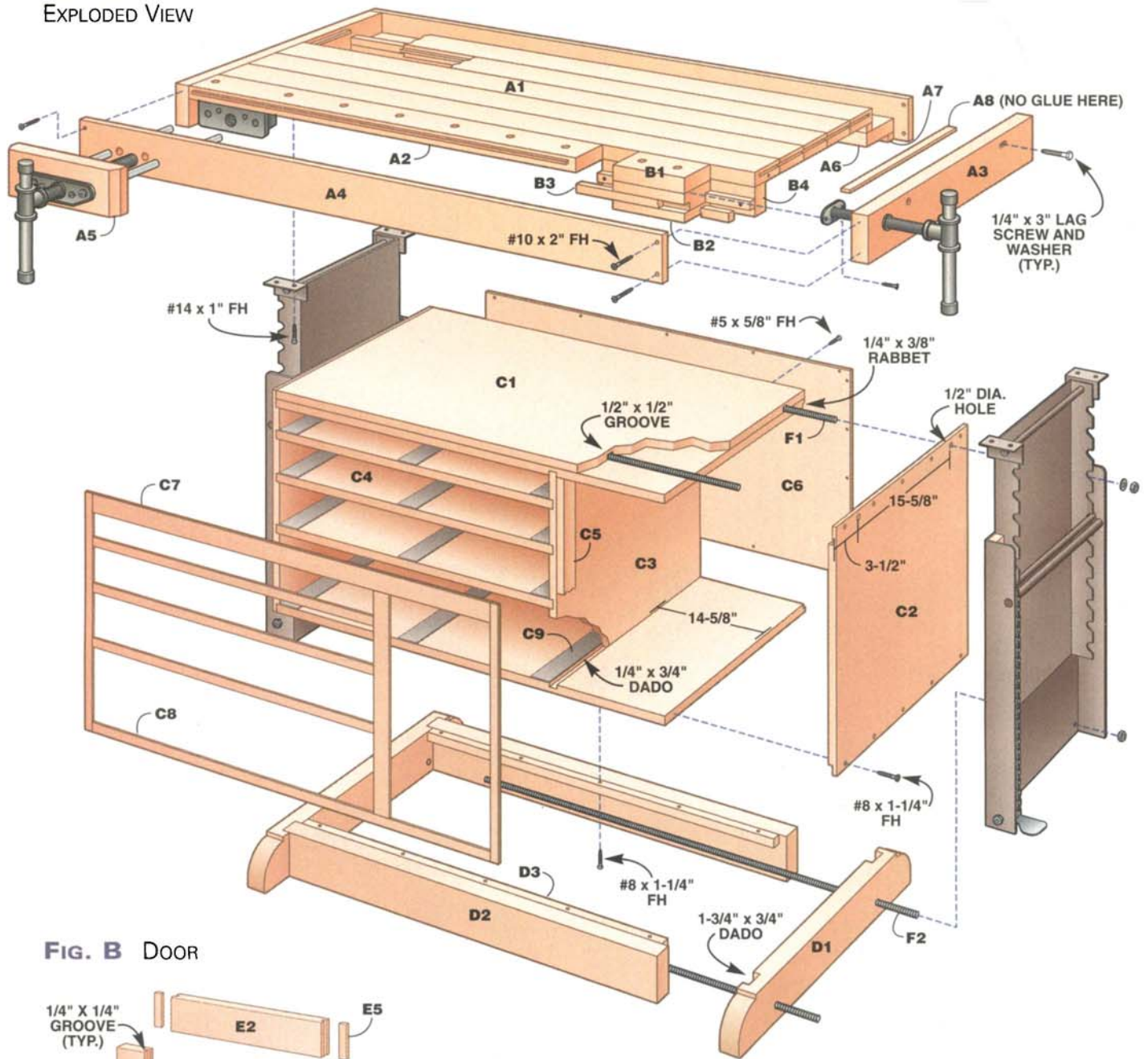


FIG. B DOOR

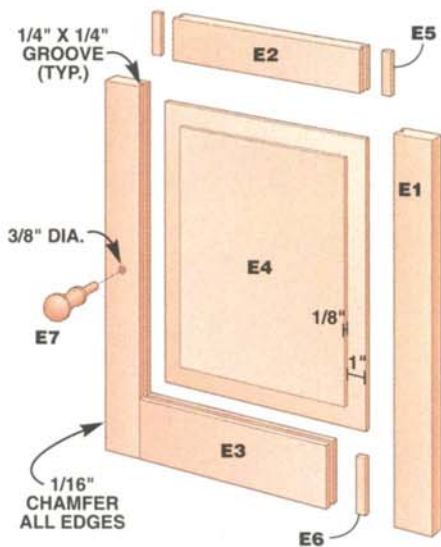


FIG. C DRAWER

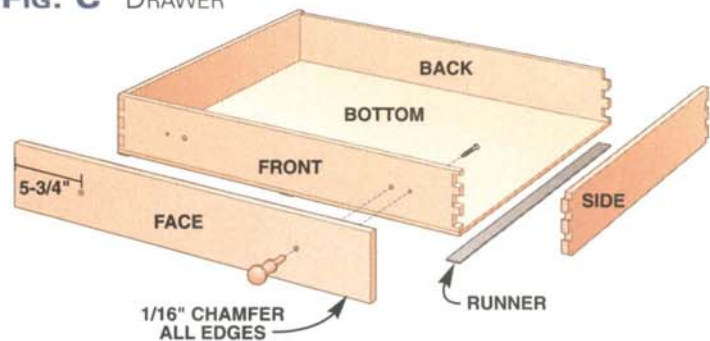


ILLUSTRATION: FRANK ROHRBACH

BUY THE HARDWARE

Every experienced woodworker knows this rule, but it bears repeating: Buy the hardware before you build. With this bench, those critical parts are the adjustable legs, the face vise and the tail vise. Check their dimensions and the placement of their mounting holes, then fine-tune the plans if necessary.

BUILD THE TOP

The top is fairly straightforward, but there are a few things to consider as you're building. The main top (A1) may be composed of as many boards as you want. Cut them 1 in. extra-long and rout slots for splines (A8). You could alternatively use biscuits to help with alignment. Glue the boards together, then trim them all the same length (see Cutting List, page 53). Cut the dog board (A2) an extra inch long, too, and drill the dog holes (Fig. H) before gluing the dog board to the top, again using a spline or biscuits for alignment. Trim the top and dog board to final length using a router, straightedge and flush trim bit.

A solid wood top with a frame must be able to shrink and swell with changes in humidity, or it will crack. Rout spline slots in both ends of the top to align it with the ends (A3). Don't glue these splines or the ends when you assemble the top. Use two lag bolts to hold each end in place. Make an elongated hole for the rear bolt (Fig. E), so the bolt can move with the top. Drill extra-large diameter holes for the screws that hold the tool tray (A6) to the top (Fig. D). They allow the tray to remain fixed to the back (A4) and the top free to move. Don't glue the spacing cleat (A7) under the top where it connects to the tray.

The tail vise is simplicity itself (Fig. F). Slide the dog block (B1 and B2) along the guides (B3) before attaching the right end (A3) to the top. The screw mechanism for the vise comes with a loose plate that fastens to the dog block and a threaded guide that fastens to the bench's end (see photo, at right). After drilling the hole for the threaded guide, rout the inside of the hole with a 1/2 in. roundover bit to accommodate the threaded guide's curved shape (Fig. E). Buy or make round bench dogs for the dog holes (see Source, page 53). Finish the top with oil to keep glue blobs from sticking.

BUILD THE CABINET

This cabinet is designed to be very rigid. Three shelf dividers (C4) dadoed into the sides (Fig. J) pre-

FIG. D CROSS SECTION OF TOP

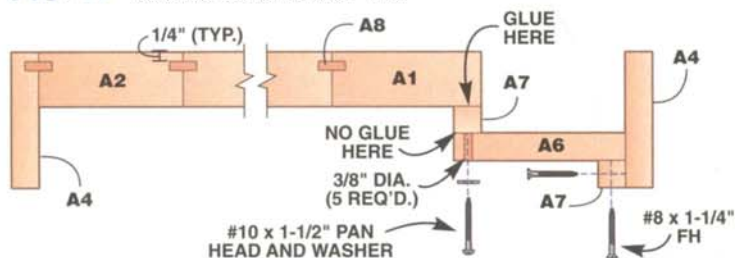


FIG. E END VIEW OF TOP

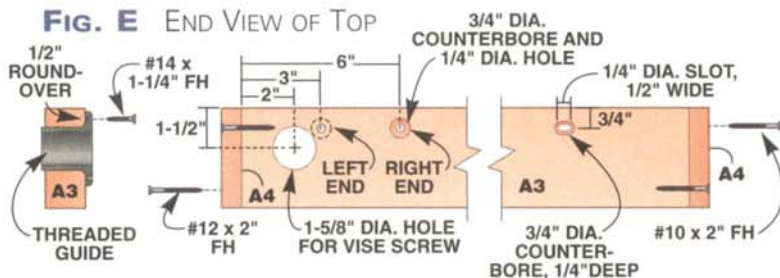


FIG. F CROSS SECTION OF END VISE

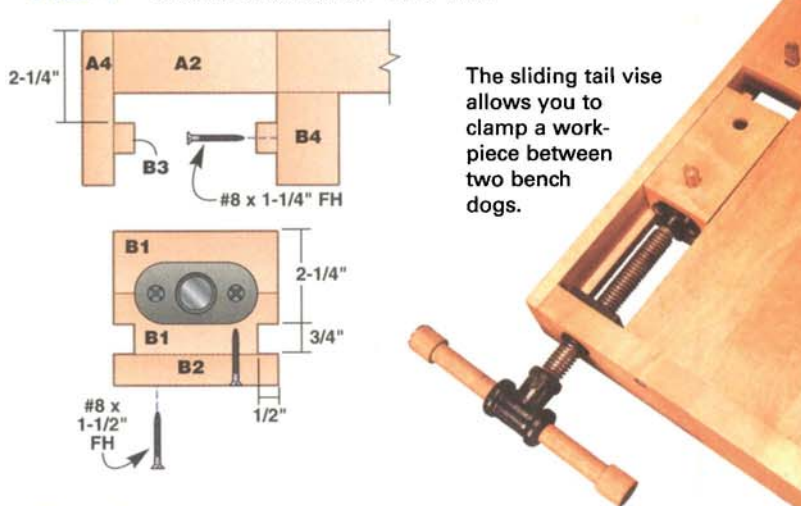


FIG. G FACE VISE MOUNTING HOLES

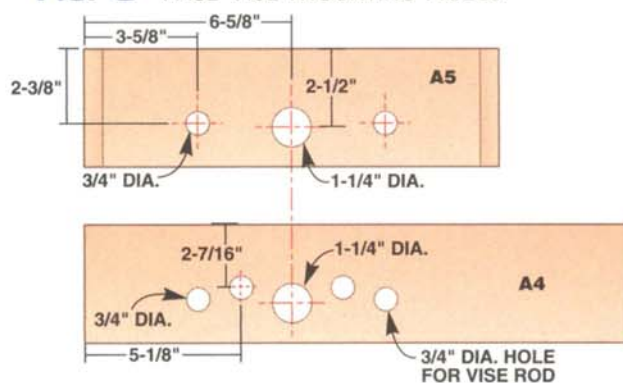


FIG. H BENCH DOG HOLE SPACING

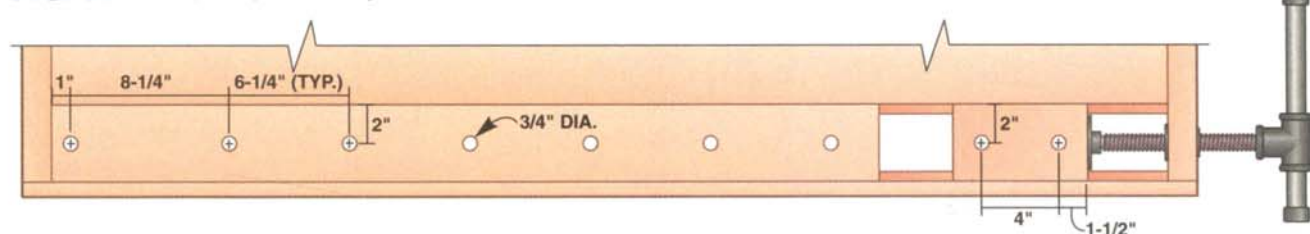


FIG. J CABINET RABBET AND DADO LAYOUT

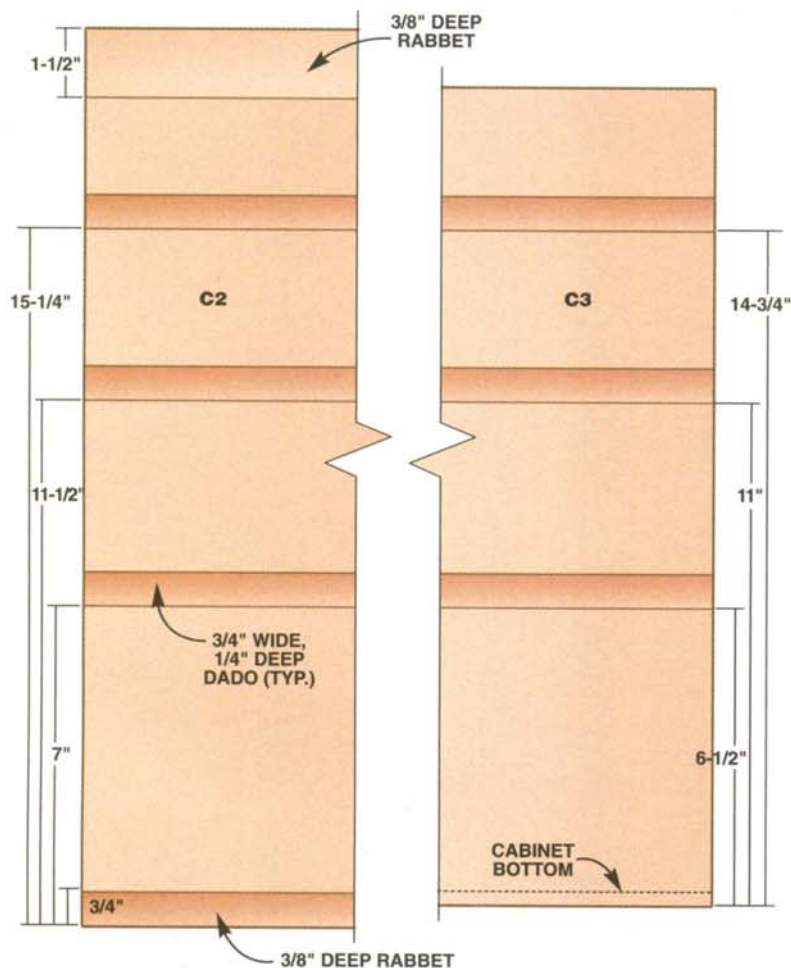


FIG. K PLYWOOD CUTTING DIAGRAM

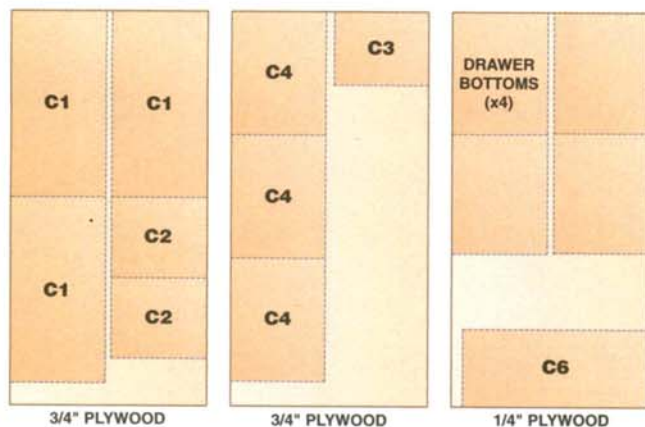
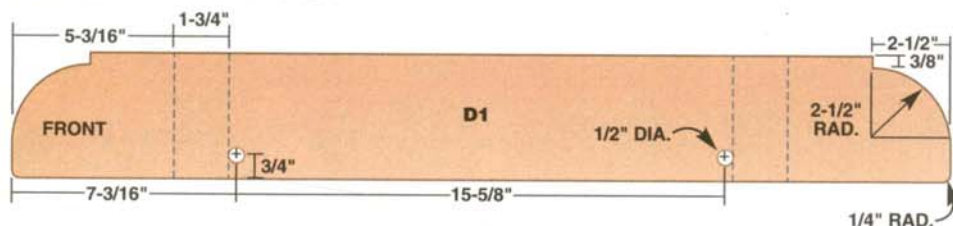


FIG. L BASE STRETCHER



vent the cabinet from twisting. A double-thick top and a stout base keep the cabinet box from bending. The cabinet's back (C6) prevents racking.

Here's a few tips on making the base: Be sure to cut two grooves in the top for the threaded rod before gluing the top pieces (C1) together. Make the two top pieces oversize before gluing. Place weights such as bricks or sandbags on top of them to apply clamping pressure. Glue on all the edging parts before you cut the cabinet pieces to size (see *Frameless Cabinet Joinery*, page 92), or cut and apply the parts one at a time after you assemble the cabinet box. Using the latter method, make the edging 1/16 in. extra wide and trim it flush to the cabinet with a router.

BUILD THE DRAWERS

The drawers are simple boxes with applied faces (Fig. C). Loaded with tools, these drawers can get quite heavy. Use half-blind or through dovetails for a strong joint between the front and sides. Make the back of the drawer boxes 1/16-in. narrower than the front, as specified in the cutting list. A tapered drawer box is easier to slide. If you use drawer slides, build the drawer boxes with parallel sides.

To give each drawer maximum depth, glue the bottom directly to the underside of the drawer box. Glue plastic-laminate strips to the underside of the drawer bottom and to the shelf dividers to additionally help the drawers slide.

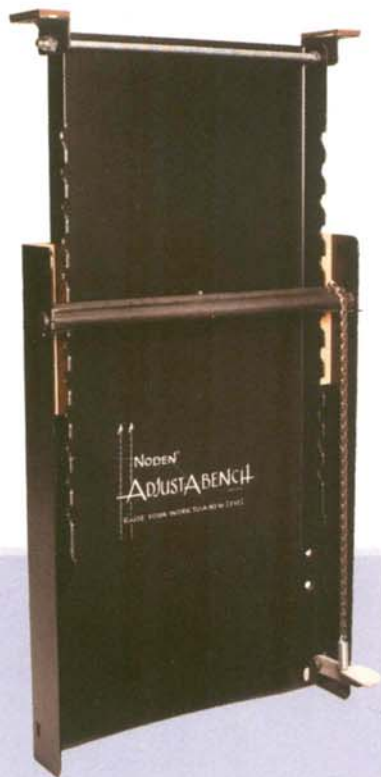
FIT THE BASE

The base and cabinet should be exactly the same length because the adjustable legs fasten to both parts. It's best to build the cabinet first, then build the base and adjust its length to fit the cabinet. To start, make the base about 1/8 in. longer than the cabinet. After dry-fitting the base, remove one of the short stretchers (D1, Fig. L) and joint it a few times to fine-tune the base's length.

ASSEMBLE THE BENCH

You'll need a helper to put the bench together. First, attach the base to the cabinet. Next, slide the threaded rods through the holes in the base. Put on the adjustable legs. One person must hold the nut on one end of each threaded rod while the other tightens the nut on the other end.

Raise the adjustable legs about halfway up to give you clearance when attaching the top. Clamp together the two telescoping parts of each end so the upper portions are plumb. Place the top on the legs so the rear brackets butt against the tool tray cleat (A7). Shift the top side to side so the bracket on the left end sits midway between the face vise's left rod and the vise's screw. Mark all the holes, turn the top over, drill the pilot holes and attach the top.



ADJUST-A-BENCH LEGS

Cabinetmaker Geoffrey Noden first designed these legs for his own shop. Their operation is very simple. Each end is composed of two heavy-gauge metal panels. The adjustable panel has a series of notches that engage a rod in the fixed panel. Depressing a pedal rotates the rod out of a notch, allowing you to lower the bench. To raise the bench, you just lift its top.

The whole system is so robust that it can take an enormous amount of weight. Its simplicity ensures that it will work for many years, even in a dusty shop. You'll find much more information, alternative bench plans and castor sets at www.adjustabench.com or by calling (609) 882-3300.

Source:

Adjust-A-Bench, (609) 882-3300, www.adjustabench.com Adjust-A-Bench leg set, \$430 plus \$50 S&H.
 Lee Valley, (800) 871-8158, www.leevalley.com
 Bench dog, #05G04.01, \$12 ea. Shoulder-vise screw (for the tail vise), #70G01.51, \$31.50. Front vise, #70G08.01, \$55. Handle for each vise, #05G12.03, \$5.
 Horton Brasses, (800) 754-9127, www.horton-brasses.com Cherry cabinet knob – Shaker style, #WK-7, \$2 ea.

CUTTING LIST			Overall dimensions:		Top: 3-3/4" Th X 60"L x 30"D Cabinet: 19-5/8"H x 46"L x 23-5/8"D Base: 4"H x 46"L x 30"D	
Section	Part	Name	Qty.	Material	Th x W x L	Notes
Top						
	A1	Top	1	Maple	1-1/2" x 20-3/8" x 57"	(A)
	A2	Dog board	1	Maple	1-1/2" x 4" x 42"	(B)
	A3	End	2	Maple	1-1/2" x 3-3/4" x 28-1/2"	
	A4	Front, back	2	Maple	3/4" x 3-3/4" x 60"	
	A5	Vise face	1	Maple	2" x 3-3/4" x 13-1/4"	
	A6	Tool tray	1	Maple	3/4" x 4-3/4" x 57"	
	A7	Cleat	2	Maple	3/4" x 3/4" x 57"	
	A8	Spline	30 ft.	Maple	1/4" x 1/2" x length as needed	
Dog Block						
	B1	Block	2	Maple	1-1/2" x 3-15/16" x 7"	
	B2	Bottom	1	Maple	3/4" x 3-15/16" x 7"	
	B3	Guide	2	Maple	1/2" x 23/32" x 15"	
	B4	Support	1	Maple	1-1/2" x 2-1/4" x 15"	
Cabinet						
	C1	Top and bottom	3	Birch plywood	3/4" x 23-3/8" x 45-1/4"	(C)
	C2	Side	2	Birch plywood	3/4" x 23-3/8" x 19-5/8"	
	C3	Door divider	1	Birch plywood	3/4" x 23-1/8" x 17-7/8"	
	C4	Shelf divider	3	Birch plywood	3/4" x 23" x 30"	
	C5	Stile	1	Birch plywood	3/4" x 1-3/4" x 17-3/8"	
	C6	Back	1	Birch plywood	1/4" x 18-7/8" x 45-1/4"	
	C7	Wide edging	6 ft.	Birch	1/4" x 1-1/2"	(D)
	C8	Narrow edging	14 ft.	Birch	1/4" x 3/4"	(E)
	C9	Wear strips	12	Plastic laminate	1/32" x 2" x 23"	
Base						
	D1	Short stretcher	2	Maple	1-3/4" x 4" x 30"	
	D2	Long stretcher	2	Maple	1-3/4" x 4" x 44"	
	D3	Cleat	2	Maple	3/4" x 3/4" x 42-1/2"	
Door						
	E1	Stile	2	Birch or maple	5/8" x 2" x 17-3/8"	(F)
	E2	Upper rail	1	Birch or maple	5/8" x 2-1/2" x 9-1/2"	
	E3	Lower rail	1	Birch or maple	5/8" x 3" x 9-1/2"	
	E4	Panel	1	Birch or maple	1/2" x 9-7/8" x 12-1/4"	
	E5	Upper spline	2	Birch or maple	1/4" x 1/2" x 2-1/4"	
	E6	Lower spline	2	Birch or maple	1/4" x 1/2" x 2-3/4"	
	E7	Knob	1			
Drawers						
	#1	Face	1	Birch or maple	5/8" x 2-1/16" x 29-1/2"	
		Front	1	Poplar	1/2" x 1-3/4" x 29-1/2"	(G)
		Back	1	Poplar	1/2" x 1-1/2" x 29-3/8"	(H)
		Side	2	Poplar	1/2" x 1-3/4" x 22-13/16"	(J)
	#2	Face	1	Birch or maple	5/8" x 2-15/16" x 29-1/2"	
		Front	1	Poplar	1/2" x 2-5/8" x 29-1/2"	(G)
		Back	1	Poplar	1/2" x 2-3/8" x 29-3/8"	(H)
		Side	2	Poplar	1/2" x 2-5/8" x 22-13/16"	(J)
	#3	Face	1	Birch or maple	5/8" x 3-11/16" x 29-1/2"	
		Front	1	Poplar	1/2" x 3-3/8" x 29-1/2"	(G)
		Back	1	Poplar	1/2" x 3-1/8" x 29-3/8"	(H)
		Side	2	Poplar	1/2" x 3-3/8" x 22-13/16"	(J)
	#4	Face	1	Birch or maple	5/8" x 6-3/16" x 29-1/2"	
		Front	1	Poplar	1/2" x 5-7/8" x 29-1/2"	(G)
		Back	1	Poplar	1/2" x 5-5/8" x 29-3/8"	(H)
		Side	2	Poplar	1/2" x 5-7/8" x 22-13/16"	(J)
		All bottoms	4	Birch plywood	1/4" x 22-13/16" x 29-3/8"	
		Runners	12	Plastic laminate	1/32" x 2" x 22-3/4"	
		Knobs	8			
Adjustable Ends						
	F1	Upper rod	2		3/8" x 49-1/2"	
	F2	Lower rod	2		3/8" x 47-1/2"	

Notes

- (A) Make from 5 boards 1-1/2" x 4-1/8" x 58"
 (B) Trim board to 43" rough length, glue to top.
 (C) Make tops 24" wide and 46" long; trim to final size after gluing.
 (D) Make 1-5/8" wide and trim after gluing.
 (E) Make 7/8" wide and trim after gluing.
 (F) After gluing, trim door 1/8" less than height and width of opening.
 (G) Total height of drawer box is 1/8" less than opening's height. Length of front is 1/32" less than opening's width.
 (H) Length of back is 1/8" less than length of front. All backs are 1/4" lower than sides.
 (J) Sides are 9/16" shorter than opening's depth. Drawer face is 1/16" proud of cabinet.