



Building A Large Workbench

Bill of Materials - Beech*

1 Top	2 1/2" x 4" x 64"	Notch for bench stop
1 Top	3 1/2" x 4" x 64"	Can be built up
1 Top	2 1/2" x 12 1/4" x 79"	Can be built up
1 End batten	2 1/2" x 4" x 25 1/4"	
1 End batten	2 1/2" x 4" x 19 1/4"	
1 Top filler block	2 1/8" x 2 1/2" x 21 1/2"	Use with tail vise
1 Tool well back	1" x 3" x 84"	
1 Tool well bottom - plywood	3/8" x 8 1/2" x 80"	
1 Tool well strip - pine	1/2" x 1" x 79"	
1 Tool well strip - pine	5/8" x 1 1/2" x 80"	
1 Sweep out	1/2" x 6" x 5 1/4"	
1 Batten spline	5/16" x 1" x 12 1/2"	
1 Batten spline	5/16" x 1" x 18 1/4"	
Top splines as needed	5/16" x 1" x 78"	
2 Locator battens - pine	1 1/2" x 2 3/4" x 8 1/2"	For top locator pins
2 Locator pins - dowel	1" diameter x 2 1/2"	Taper one end in lathe
1 Front vise jaw	3 1/2" x 6" x 20 3/4"	
1 Tail vise jaw	2 1/2" x 4 5/8" x 22 3/4"	Notch for vise stop
1 Tail vise jaw	1 3/8" x 3 1/2" x 22 3/4"	
1 Tail vise jaw	3 1/4" x 3 1/4" x 22 3/4"	Recess for vise nut
1 Tail vise offset jaw	4" x 4 5/8" x 8 1/2"	
4 Legs	2 5/8" x 2 5/8" x 31 1/2"	26 1/2" between tenons
4 Frame tops and bottoms	2 5/8" x 2 5/8" x 24 1/2"	
2 Stretchers	1" x 5" x 56 1/2"	55" between tenons
1 Drawer front	1 5/16" x 5 3/8" x 18 3/8"	
2 Drawer sides	3/4" x 4 1/2" x 18 1/4"	
1 Drawer back	5/8" x 4 1/2" x 18 3/8"	
1 Drawer bottom - plywood	3/8" x 18 3/8" x 17 7/8"	Groove 5/16" into front
2 Drawer slides	9/16" x 1 1/16" x 17 5/8"	Groove 1/8" into sides
2 Drawer hangers	1 1/2" x 2" x 22 1/2"	
1 Drawer stop - pine	3/4" x 3/4" x 8"	

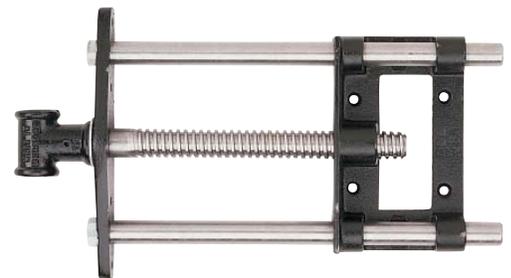
Hardware

Front vise fixture (17D03 or 144806); tail vise fixture (17D01 or 144804); 2 bench stops; 4 hex head bolts and nuts, 1/2" x 6 1/2"; 2 hex head bolts and nuts, 1/2" x 6"; twelve 1/2" flat washers, 4 flat head wood screws, 3 1/2" No. 16; smaller screws as needed.

*Any good hardwood may be used, preference given the closed grains.

Note relative to hardware: The old adage, "Better safe than sorry", applies to the hardware for workbench projects. Have your hardware in hand before you make any cuts involving their sizes. Use the various pieces to check your layouts before cutting. When dimensions are given with a plus or a minus sign, it usually means plus or minus 1/32".

17D03



17D01





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Product #40A41

Construction Notes

1. Start by building the frame. Cut top and bottom pieces to size; lay out mortise joints. The plan calls for through joints, but deep blind ones are fine. Through joints should be laid off and cut from both sides toward the middle. Cut decorative ends and foot depressions before gluing.

2. The stretchers use a dry draw-bolt joint with four shoulders. Cut tenons and mortises. Use drill press to bore holes through sides of legs for bolts. Assemble and clamp members together. Run a bit through leg holes to mark where to bore into stretchers. Before boring these holes, lay out and cut nut recesses. Allow for nut and washer.

3. A woodworker's bench should have a flat, square surface, without warp or twist, humps or hollows, and it should have a lot of mass. Thus, the pieces in this top are large and heavy. The lumber should be well seasoned. The front is thicker than the middle, and a deep tool well with a plywood bottom is handy at the back for keeping tools out of the way without danger of their falling. Most home shops are not equipped to surface such a top by machine, but the job can be done well by cross-planing with a hand plane and a good straight edge for testing. Start with lumber $\frac{1}{8}$ " thicker than the top is to be. This will give you some truing up room.

4. The joints of all top pieces, edge to edge, may be made on a jointer, planer, or by accurate sawing aided by careful hand planing. The end battens will be put on after the main top has been put together, at which time, make the cuts in the top for the batten splines. The top should be splined lengthwise, except for the bench-stop piece. When the top has been glued up and is dry, plane the top to a flat surface, mark and bore $\frac{3}{4}$ " holes for the bench dogs.

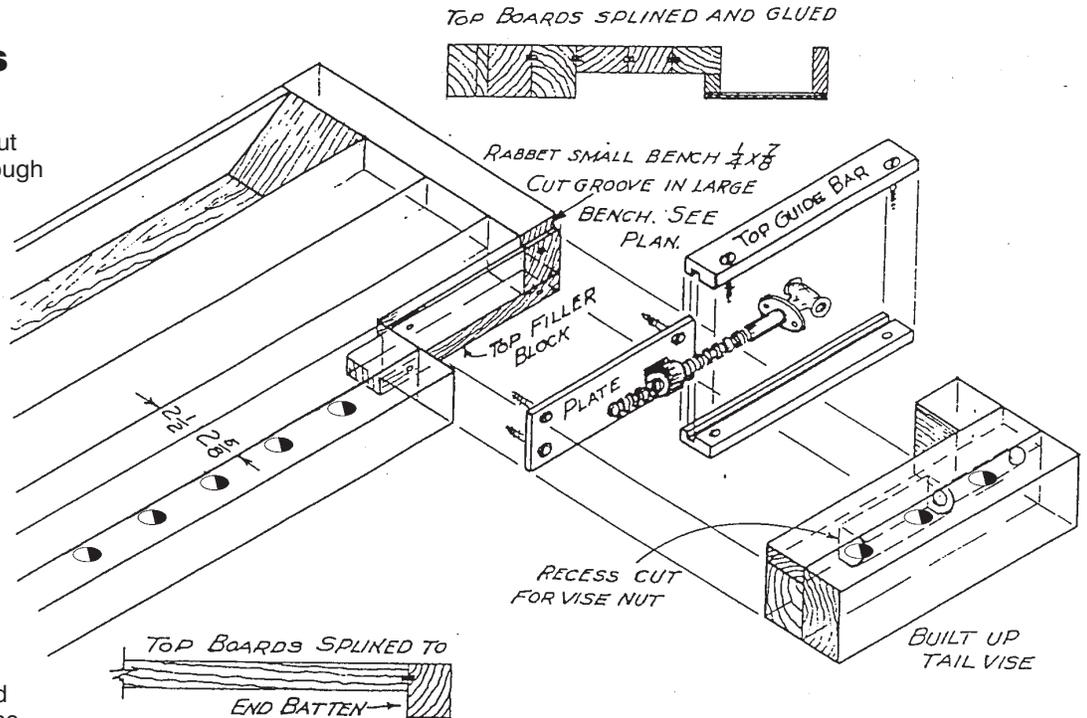
5. Place the top on the completed frame and brace it out from a wall, so that cross planing may be done. Check with a long straight edge across, diagonally and lengthwise. With a sharp jack plane, shave off the high places across the grain. Cut only the high places found by the straight edge, checking at frequent intervals. If this work is done slowly, and deliberately, a near perfect surface can be had of which you can be proud. After planing, use a cabinet scraper along the length of the top from first one end and then the other. Take off only enough to rid the surface of plane marks, continuing to check for truth. After all cutting sanding may be undertaken, and this should be with the grain, with a hand block. Take great care when using power sanders. Sanding should be delayed until the end battens and tail vise have been attached and their surfaces brought down to that of the top.

6. Some study of the cross section detail of the tail vise should help with its construction. Bore a hole in the edge of the top for the head of the bolt that holds the vise nut to its steel plate; line up the plate and attach it temporarily with only two screws. After the parts are all together, if the vise binds here or there, don't hesitate to use a paper shim where needed. The experts do. Make the wood parts purposely thick enough to allow for some shaving off on top for surface matching. The piece of wood that hides the vise's top slide may (after all parts are working smoothly) be doweled and glued, or glued and screwed in place with counterbored and plugged screw heads.

7. A penetrating oil finish is a favorite for workbenches, because it is in the wood and not on the surface.

Item 2 of the small bench material bill calls for a top piece of $3" \times 5\frac{1}{8}" \times 59"$. This can be a solid piece notched out for the tail vise or built up as shown above, using one piece $3" \times 2\frac{5}{8}" \times 49\frac{1}{4}"$ and one $3" \times 2\frac{1}{2}" \times 59"$, splined and glued together. Splining makes a stronger job and prevents the pieces from sliding, while clamping.

Bench tops may be simplified by using all thick material, but this makes the top needlessly heavy and wastes expensive lumber. The tops are quite secure on their frames, held in place by the two locator pins, but you can run two heavy lag screws up through the frame into the top. I would suggest size $\frac{3}{8}" \times 4"$ with a flat washer under the heads.



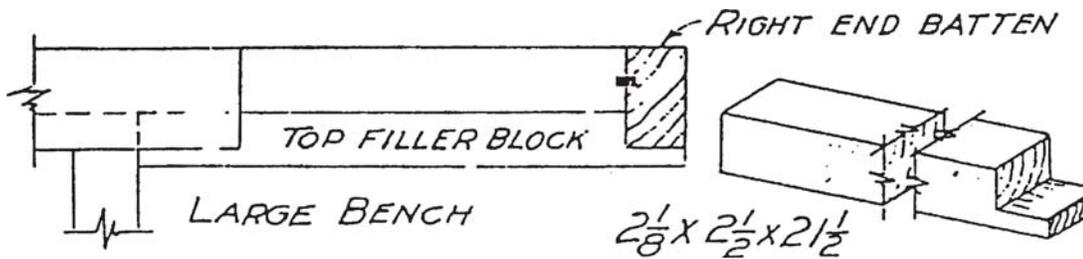


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End battens are splined to the top boards and rabbeted $\frac{1}{2}$ " deep to admit the tool well bottom. Ulmia benches use one draw bolt in each end batten set slightly off center, front to back. Use two for a stronger job.

Ulmia left end battens are as wide as the bench tops. Make your front top piece $2\frac{1}{2}$ " longer ($66\frac{1}{2}$ " large bench; $51\frac{3}{4}$ " small) and the left batten shorter by the width of that top piece. This will avoid having a joint on the inner jaw of your front vise. You should end-spline the batten to the front piece.



Carlyle Lynch