Machinist's Tool Chest



A few years ago, I found a dusty, beat-up three drawer machinist's tool box in the basement of my 1900-built farmhouse. Originally made by noted tool manufacturer, C.E. Jennings, it had been modified several times and wasn't in very good condition. After cleaning out the contents, I've used the box to store numerous things over the years, most recently my collection of files and rasps and various other small tools. It's been a valued part of the way I work but it had some limitations that made it less than perfect for a woodworker.

I decided to build a slightly modified version of the chest to address those limitations. The biggest changes are that it has two drawers instead of three, and I made the top well deeper. These changes allow me to store saws, planes, and chisels in the box, something that was difficult to do in the original.



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SIDE VIEW

Cut List

No.	Item	Dimensions (inches)			Material
	CASE	т	w	L	
2	Side upper rails	3/4	2	9	Chestnut
2	Side bottom rails	3/4	41/2	9	Chestnut
4	Side stiles	3/4	2	111/4	Chestnut
2	Side panels	1/4	6	10	Plywood
1	Front top	3/4	27/8	21	Chestnut
1	Front bottom	3/4	2	21	Chestnut
1	Case back	3/4	111/4	22 ¹ /2	Beech
1	Case bottom	1/4	13	221/2	Plywood
1	Top well bottom	1/4	111/2	21	Plywood
2	Top well side strips	1/2	1/2	101/2	Beech
2	Top well F&B strips	1/2	1/2	21	Beech
	LID				
2	Subframe sides	3/4	11/4	13	Chestnut
2	Subframe F&B	3/4	11/4	223/4	Chestnut
1	Panel	1/4	13	223/4	Plywood
1	Interior facing top	1/4	~101/2	~201/4	Plywood

0.	Item	Dimensions (inches)			Material
	DRAWERS	т	W	L	
	Top drawer runners	3/4	3/4	111/2	Beech *
	Bottom drawer runners	3/4	2	111/2	Beech
	Drawer sides	3/4	21/2	11	Chestnut
	Drawer backs	3/4	21/2	21	Chestnut
	Drawer fronts	3/4	21/2	191/2	Beech
	Drawer bottoms	1/4	11 3/4	21	Plywood
	CASE MOULDINGS				
	Case moulding sides	3/4	2	13	Beech
	Case moulding front	3/4	2	21 1/4	Beech
	Top moulding front	3/4	1	241/2	Beech
	Top moulding sides	3/4	1	13	Beech

*Centered to opening, screwed to side and set 3/4" from opening

Dowel Joinery

The original box is built from chestnut and finished with a dark stain. When studying the original, I was unable to intuit much about the way the case of the box was constructed. No joinery is visible from the outside. Given that this early 20th century box was produced in a factory, I posit that the box was either splined or doweled together. Due to the ease of doweled construction in a hand-tool only shop, I chose this method.

The construction begins by laying out and cutting the parts to the dimensions listed in the cutting list. To hold the case together, I used 1/4" dowels, two at each of the top corners and three in each of the bottom corners. I like to use a marking gauge to lay out the drilled holes in each piece. There are dowel center points available commercially, but I personally get much better results if I lay out each hole with scribed lines and carefully drill them.

Test fit the two side frames together without glue and make any necessary adjustments. Once that's done, lay out and cut the 1/2" deep x 3/8" wide rabbets in each of the two top and bottom pieces that make up the two side frames. Then, glue and clamp up the side frames and set them aside to dry. The side panels will simply float in the rabbet and will later be held in place with the drawer runners, so you can make the panels and fit them while the frames are still in the clamps. Aim for a gap-free fit on the vertical pieces and rely on the top and bottom edges to hold the panel in place.



I ripped all of the parts for this project by hand. Ripping with a handsaw isn't much fun but a foundational skill. In some cases, I'll knock down stock with a hatchet to move things along quickly before approaching my line with a plane.



Cutting the rabbets for the side panels depends as much on layout as it does skill with the cutting tools.



Once the side frames are together, plane the outsides flush.

The two front pieces are constructed in exactly the same fashion as the side pieces. Crosscut and plane them to precise length, then dowel them in place. Dry-fit the joinery using a clamp to draw it all together and make any necessary adjustments to ensure two square sides with gap-free corners. When that is finished, glue up a board wide enough for the case back and carefully fit it into the dry-assembled frame. Once you're happy with the fit, dowel it into place with four 1/4" dowels (one at each corner). With all the corners fit to your specification, glue up the case.

Case Braces

After an hour or so in the clamps, install the four bottom corner braces on the inside of the case. This is somewhat of an unusual technique, but the original has them. The original had

steel braces but I chose to spend the extra \$1.29 per four to go with brass to match the rest of the hardware.



The corner brackets were steel on the original but I opted for brass.

The top corners will also get these brackets, but they must wait until the top well's bottom board is in place. The next step is to make 1/2" square strips which will support the top well-bottom from below. These are screwed into place with 1" long #6 wood screws. To make sure that each strip is installed squarely, I butted each strip against the end of a combination square rule set to the proper depth, with the fence resting on the top edge. Be sure to pre-drill each strip as the wood screws are highly likely to split without pre-drilling.



Pre-drill the ledger strips that will support the well bottom. Once these are in place, you can add the brass brackets for the top of the box.



The well-bottom fits under the corner brackets and sits on the ledger strips.

With the strips in place, cut a piece of 1/4" plywood to fit the opening and plane it so that it just drops in and rests on the strips. Once you're happy with that fit, attach the top corner brackets so that the brackets hold the bottom tightly down onto the strips below. It can be a bit finicky to get the screws installed due to the limited clearance but it's possible if you pre-drill screw holes of the proper size and take your time.

Drawer Runners

The drawer runner which supports the top drawer actually performs four separate duties. In addition to providing the running surface for the top drawer, the runners serve as drawer stops, they help hold the side panels in place and will also ultimately hold the screws which attach the side handles. They're made from 3/4" square strips of beech and are placed so

that the center of the runner is precisely in the middle of the front drawer opening.

To mark out their precise length, set the case on its back, then take a scrap piece of 3/4" material and put it on the inside face of the backboard. A piece of 3/4" scrap is used because the drawer faces are 3/4" thick, and this will ensure that the drawer stops with the front face of the drawer flush with the case sides. Put the runner in place on top of the scrap, then use a pencil to draw a line on the runner where the runner intersects with the front edge of the case. Cut the runner on this line using a fine crosscut backsaw.

The runners are screwed into place using countersunk 3/4'' # 6 wood screws, one in each of the case side stiles and one into the center of each of the side panels.

The bottom drawer runners are made to the same width as the bottom front case rail but require a notch on each end to clear the bottom corner brackets.



Use 3/4" scrap to precisely mark out the drawer runner length.



Use a piece of sandpaper to ensure that the runner is just slightly higher than the bottom case inside rail. This prevents hangups when fitting the drawer.

Once the runners are affixed, rough cut a piece of 1/4'' plywood to fit the case bottom. Screw it into place using 3/4'' wood screws. Once the bottom is in place, plane the edges flush to the case using a sharp block plane.

Drawer Construction and Mouldings

On the original, the drawers were simply butt nailed together from plywood with an added front made from chestnut. I've chosen to replicate this in my chest (the original did survive a century of use), but you may choose to dovetail them together. To produce nailed-together drawers that approximate the original ones, I planed up stock to the proper width, which must accommodate the 1/4" drawer bottoms, and then crosscut them to length. Nail

them into a square drawer box and then nail on the 1/4'' plywood drawer bottoms.

Test fit them into the drawer openings and make any required adjustments to ensure they operate smoothly. The boxes should ideally stop about 1/4'' back from the front edge of the drawer runners.

Once the drawer boxes fit properly, it's time to make the faces. Dimension two pieces of beech to match the cut list. Shoot the ends so that they just slip into the opening, and then screw each face onto their respective drawer box. On the top drawer, the face should overhang the bottom of the box by 3/8" to engage the drawer runner/stop. On the bottom drawer, the opposite is true, the top edge of the drawer face should stick up that same 3/8" over the top of the drawer box. Fit the drawers at the same time to identify any clearance issues. Once any issues have been corrected with a sharp plane, cut a 5/16" bead along the top and bottom edge of each drawer, four beads in all. When that is done, the drawers are finished.

The final step on the case is to produce a run of moulding to wrap around the case along the bottom. This helps to hide the plywood bottom and provides a finished look.



With the drawers finished, bead the top and bottom edges of both drawers.

The moulded board should be slightly narrower, perhaps 1/8", than the bottom front rail. Miter the mouldings and then attach them with wood screws from the inside. You may find it beneficial to temporarily remove the plywood case bottom when attaching the mouldings. If you do so, make sure to use a scrap piece of plywood as a spacer to ensure that you overhang the mouldings over the bottom case edge far enough to account for the thickness of the bottom.

The Tilting Top

The top subframe is made from $3/4" \times 11/4"$ beech. Each corner is half lapped and then held together with a single wood screw driven in from the top face (so that no screw heads are visible on the inside). I make the top so that it overhangs about 1/8" over the case front

and sides while holding the back edge flush with the case back. This will make the top easy to open later on without significantly impacting the top's ability to protect the contents inside from dust and moisture.

Begin by measuring the top of the case and then add 1/4" to the width and 1/8" to the depth and cut the pieces to those newly revised lengths. Half lap the corners by laying the front and back frame pieces on top of the two side pieces in a square frame, then marking the shoulders on the components. You'll be cutting away 1/2 the thickness of each frame piece so mark out 3/8" away from the bottom face on each using a marking gauge. Using a rip-filed backsaw, remove the bottom 3/8" on the front and back pieces and the top 3/8" on the two side pieces. Cut the shoulders with a crosscut-filed backsaw. Use a sharp chisel to refine the joint, then test fit the frame. Each corner should overlap properly, producing a flat frame that's square. Then, pre-drill each corner for a screw and drive in a 3/4" wood screw.



Trim the plywood skin so that it's flush with the frame pieces. Once the whole assembly is square, it's ready to be covered with molding.

The frame is skinned on the top with a 1/4" piece of plywood. Use whatever species you desire. (I happened to have a good-looking piece of red oak). Cut it to rough size, and then glue it down to the top of the frame using long beads of wood glue. Clamp it down then set it aside to dry. When it's dry, plane all four sides of the top skin flush to the frame using a sharp block plane. Install the top using a continuous hinge, mortising as necessary to ensure a flush, tight fit between the top and the lid.



Scribe the top hinge prior to mortising. Temporarily attach one side to the case, then use spacers to mark out the other half of the hinge.

When you've got the hinge installed correctly, remove the top from the hinge, cut and fit another piece of 1/4'' plywood to the inside of the frame so that it fits inside the center edge of the frame, and glue it down to the inside of the top skin. This provides a more attractive inside surface than whatever is on the back side of the top plywood skin.

Once the top is reinstalled, make a run of $1 \frac{1}{4''}$ tall, 3/4'' wide moulding. The profile is up to you but I used a small ogee with a fillet. Wrap the moulding with miters around the two

sides and front edge of the top then glue and nail it in place with the top edge of the moulding flush with the plywood top skin.

Finishing Touches

Then, install the handles. I used brass sash handles from the hardware store but feel free to be as fancy or as simple as you like. The important consideration here is to ensure that the handle is at least partially screwed into the side drawer runner. This provides a much stronger substrate for the screws over just attaching them into the 1/2" side panels. It's acceptable to have a few screws that just go into the panel but at least half of them truly need to enter the runner.



Brass sash handles align with the drawer runner so that the screws have plenty of wood to bite into.

To install the drawer pulls, mark out small pencil marks on the top edge of the case approximately 5" in from the sides of the case. Next, take a square and draw a light pencil line to extend both pencil marks down across both of the drawer faces. Then, divide each drawer width in half and make a light horizontal line across the previously drawn vertical lines. That intersection marks the point where the pull knobs should be installed. Pre-drill and test fit the pulls to ensure they line up properly.

Remove the hardware before finishing. Erase any stray pencil lines then sand the entire project to #220 grit. I finished the chest with my favorite wood finish ("boat soup"), which is nothing more than equal parts pine tar, turpentine and linseed oil. I wiped three coats on the exterior and, after it dried, applied a coat of paste wax. I also applied paste wax to the drawer runners to help the drawers operate smoothly.

Once the finish has dried, the fun part begins: filling the chest with your prized collection and figuring out the best way to fit everything inside. Enjoy!