The Workshop Toolbox

Nine drawers of storage in this 2-piece toolbox give you a place for everything

This workshop toolbox features a total of nine drawers to hold all types of hand tools and small accessories for your MARK V and portable electric tools. It's made in two sections...a top with a large upper compartment and six drawers, and a base with three drawers. Since it's a two-part project, you can either make the entire tool box all at once, or you can split the job into two sessions, building part now and part later.

We built our box out of solid birch and birch plywood. We used poplar for the drawer sides and backs and 1/8" pegboard for the drawer bottoms.

Step 1: If you have a thickness planer, start by gluing up a 12-1/2" wide by 42" long piece of stock for the box sides (A) and base sides (N). The extra width and length will give you enough stock to allow for your saw kerfs and for squaring-up your planed stock. Once the glue has dried, use a hand scraper or bench chisel to carefully remove any glue squeeze-out before planing the stock to its desired 1/2" thickness.

Next, rip your stock to the final 12" width, then crosscut the pieces (A & N) to 12-3/16" and 6-1/16" (1/16" longer than their indicated finished lengths).

If you don't have a thickness planer, start by resawing your narrow pieces of stock to 9/16" thick. If you have a jointer, rip them to a dimension that's narrower than your jointer blades are wide, then make two 1/64" passes across each face, bringing the individual pieces to the desired 1/2" thickness. Next, rip the edges of your stock parallel, joint them on your jointer and glue them up to the 42" x 12-1/2" size, as described above. Use a belt sander to carefully sand off any imperfections where the boards are joined. Next, rip your stock to the final 12" width, then crosscut the pieces (A & N) to 12-3/16" and 6-1/16" (1/16" longer than their indicated finished lengths).

Follow the same procedures outlined above to prepare the remaining pieces of thinned-down hardwood and poplar for the project, bringing each to the desired thickness.

Step 2: Cut all parts to size, according to the Bill of Materials by first ripping all stock to width, then crosscutting to length. Joint 1/32" off each end of pieces A & N to bring them to final dimension (See page 76 in Shopsmith's *Power Tool Woodworking for Everyone* textbook for the proper technique).

IMPORTANT NOTE: You will notice that the height of the box sides (as shown in the ***BOX SIDE LAYOUT*** drawing) is indicated as being 12-1/8" — and the height of the finished box (as shown in the ***FRONT LAYOUT*** drawing) is shown as 12". Both of these dimensions are correct. The additional 1/8" is necessary to allow for the saw kerf when sawing lid from the box in step 17, below.

Step 3: Cut the 3/8" wide by 3/16" deep stop dadoes for the drawer glides (F & R) in the sides (A & N), and partitions (J & T), using a 3/8" router bit in the MARK V Router set-up. **See Fig. 1.**
NOTE: ***Dadoes*** are cuts made <u>across</u> the grain of the wood — ***Grooves*** are cuts made <u>with</u> the grain of the wood.

Next, change to a 1/2" router bit and use the same set-up to rout the 1/2" wide by 1/8" deep stop dadoes in the sides (A) to accept the compartment bottom (G).

Step 4: Cut a 1/8" wide by 1/8" deep stop groove on the upper part of the sides (A). These grooves will accept the front and back faces (B & C). ***Tip:*** Use a table saw blade that makes a 1/8" wide kerf to cut these grooves. Chisel the bottom of the groove to depth for the front face (B) **See *BOX SIDE LAYOUT*** drawing for detail.

Cut the 1/8" wide by 1/8" deep dadoes for the tops and bottoms (H,K,S) in the sides (A & N). Cut the 1/8" wide by 1/8" deep grooves at the top and bottom of the front face (B) and the top only of the back face (C).

Cut the grooves in the backs of the sides (A & N) that will accept the (1/8" x 1/8") tongues on the ends of the backs (L & U). The grooves in the box sides (A) are stop grooves, while those in the base sides (N) run from end-to-end.

Complete the groove and rabbet joints in the back edges of the sides (A & N). **See *BASE SIDE LAYOUT*** drawing for detail.

Step 5: Form the 1/8" by 1/8" tongues on the ends of parts B, C, H, L, S & U as shown in the exploded view. Next, form a 1/8" x 1/8" tongue along the front top edge of part G. Form a 1/8" x 1/8" tongue along the front and back bottom edges...and across the bottom edge of each end of part K.

Step 6: Cut 1/2" wide by 1/4" deep dadoes in the undersides of the compartment bottom (G) and the base top (S) to accept the drawer partitions (J & T). See the ***DRAWER PARTITION LAYOUT*** for details. Use your dado accessory to create these dadoes.

Step 7: Drill the box bottom (H) and base top (S), then counterbores to accept the T-Nut fasteners that will hold the main box to the base. To ensure proper alignment, clamp the two pieces together and drill both at the same time. A total of four T-Nuts will be required and each should be positioned about 2" in from the ends, fronts and backs of pieces H & S. Exact positioning is not critical, as long as all four holes align when drilled.

Drill the 1/4" by 2-3/4" deep locking rod holes in the front face (B) and the front trim pieces (E & P)...centered from front-to-back (See ***FRONT LAYOUT*** and ***TYPICAL DRAWER CONSTRUCTION*** drawings for detail). The holes in pieces B, E, & P must align perfectly so the locking rods can slide freely into position. You'll drill the mating holes in the drawer fronts later. **NOTE:** The locking rod hole in the bottom front trim piece (P) should be a stop hole, going only half-way through piece P.

Step 8: Assemble drawer partitions by first gluing the trim pieces (D & Q) to the fronts of the partitions (J & T). Glue the trim pieces (E & P) to the fronts of pieces H & S. Sand all trim pieces flush with the plywood.

Glue all of the drawer glides (F & R) into the partitions (J & T) and the sides (A & N), as shown in the drawings. Be careful to remove all excess glue squeeze-out.

Step 9: Chisel out the rabbets that will accept the trim strips (E & P) in the top and bottom of the base sides (N)...and in the bottom of the tool box sides (A).

Chisel out the notches for the partitions (J & T) in the lower edge of the front face (B) and the front trim strip (P). See ***PARTITION ASSEMBLY*** detail.

Step 10: Attach partition assemblies into the compartment bottom (G) and base top (S), using glue and #8 x 1-1/4" flathead wood screws. See ***PARTITION ASSEMBLY*** detail.

Step 11: Dry assemble the box. (**NOTE:** The lid will be cut from the box later) Working with the box upside-down, clamp the front and back faces (B & C) to the top (K)...then clamp the box sides (A) to this assembly. Slide the compartment bottom/partition assembly in from back — and slide the bottom (H) in from the front.

Insert the back (L) from the bottom. Remove the clamps from the top to clamp the box sides (A) to the bottom (H). Turn the box right-side-up and check for squareness and fit.

For final assembly, allow the glue to set up on the top (K), front (B) and back (C) faces...then assemble the box sides (A) and bottom (H) to the top assembly before continuing with the assembly. Glue the four glue blocks (M) into position in the upper compartment before sliding-in the partition assembly. Glue all parts in place.

Attach the back (L) to the partitions and bottom with glue and brads. Attaching the back in this fashion will help keep the box and partitions rigid.

Step 12: Dry assemble the base by clamping the base sides (N) to the base top and bottom pieces (S). Slide-in the back (U), then check for squareness and fit. Disassemble and install the Tee-Nuts in the top of the base (See ***BOX TO BASE CONNECTION*** detail).

Reassemble with glue and attach the back (U) with glue and brads.

Step 13: Cut the drawer joinery. NOTE: refer to the ***TYPICAL DRAWER CONSTRUCTION*** drawing for more detail regarding the cuts made in this step.

Using a table saw blade that makes a 1/8" wide kerf and a tenon cutting attachment, stand each of the (9) drawer fronts (V) on end on your table saw and make a 3/8" deep by 1/8" wide cut, 1/8" in from the back edges at each end. **IMPORTANT:** Be sure to position a piece of scrap stock on the outfeed side of each cut to prevent splintering during the cut.

If you don't have a tenon cutting attachment, you can make this cut by using your table saw's rip fence to control the position of the cut. Again, back-up your drawer fronts with a piece of scrap stock on the outfeed side of each cut to prevent splintering during the cut...and use a feather board to hold your stock firmly against your rip fence while making these cuts.

Re-set your saw's depth-of-cut to 1/8" and cut the 1/8" wide vertical dadoes near the front and back (inside) ends of all (18) drawer sides (W).

Next, use your table saw's rip fence and a stop block to control your cut as you form the 1/8" x 1/8" tongues on each end of the front sides of your drawer fronts (V).

Now, re-set your saw's depth-of-cut to 1/4" and cut the 1/8" wide by 1/4" deep rabbets on the outside of each end of the (9) drawer backs (X).

Re-set your saw's depth-of-cut to 1/8" and cut the 1/8" wide grooves, up 1/8" from the bottoms of all (18) drawer sides (W) and all (9) drawer fronts (V). **NOTE:** Do <u>NOT</u> cut matching grooves at the bottom of the drawer backs (X).

Change to a dado blade setup and cut the 7/16" wide by 3/16" dadoes in the (18) drawer sides (W) for the drawer glides (F & R).

Step 14: Dry assemble the drawers upside-down by first clamping the drawer sides (W) to the drawer fronts (V) and backs (X)...while sliding the bottoms (Y) into position from the back. Check for squareness. For final assembly, follow the same steps except use glue in all corner joints (NOT the bottom).

Turn the drawers over. Slide the bottoms into the drawer side grooves from the back. Drive two or three 1" wire brads through the pegboard bottom and into the bottom of the drawer backs. Do not use glue. This will allow the bottoms to move...as well as providing for easy drawer bottom replacement if this should be necessary in the future.

Step 15: Sand the drawers to fit on a stationary belt sander (See Fig. 2), starting with the bottom drawer. Be sure to mark all drawers for location to ensure the best fit...and avoid getting them switched.

Step 16: Belt sand the top of the base and the bottom of the box. Fasten the box to the base with bolts and the Tee-Nut fasteners.

Belt sand the top, sides, back and front (with the drawers in place). Be very careful not to sand through the veneer face of the top and the back. Round the edges very slightly — and very carefully using a sanding block with very fine paper or a radius plane. Remove the drawers, then disassemble the box and base.

Step 17: Cut the lid from the box (See Fig. 3) on your table saw. A hollow-ground planer blade would produce the best results. Set your saw's depth-of-cut at 9/16". At this setting, you will cut through the 1/2" thick lumber, but not through the glue blocks. Finish the job (in the corners) using a hand saw, then smooth all sawn surfaces with a block plane or a sanding block with very fine sandpaper.

Step 18: Drill the 1/4" drawer lock holes in the drawer fronts. The 3/16" diameter rods will slip into these holes, securing the drawers shut.

It's vital that all of these holes align perfectly with the holes you drilled earlier in pieces B, E & P in Step 7 above. The best way to do this is to start with the top drawers and mark the hole locations by shutting the drawer and dropping your 1/4" drill bit down through the hole in the piece above it, marking the holes in the drawer front. Remove the bit and use your drill press (set at a PERFECT 90-degree vertical angle) to drill through the drawer front. Repeat this process for each set of drawers as you move towards the bottom.

Step 19: Mount the hardware. Clamp the top lid to the box and attach the hinges and latches.

Drop the 3/16" steel rods into the locking holes until they bottom out into the shallow holes in the bottom front trim piece (P). Mark them at about 1/2" to 9/16" above the top of the front face (B). Remove the rods and place the marked ends in a **metal**-jawed vise with the marks flush with the top of the vise jaws . Head the rod ends with a propane torch to soften them and bend the ends over to a 90-degree angle, forming a short "L" on the end of each rod.

Using a small chisel or rat-tail rasp, cut a 1/4" to 3/8" deep by 1/4" wide notch on the **INSIDE** (or back side) only of the front face (B). The "L" ends of the rods will slip into these notches when they're dropped into the locking holes — then the box lid will be shut and locked, holding the locking rods down, locking all drawers shut. It's important that these notches **NOT** be cut through the front of the front face (B).

Step 20: Final touches. Remove all hardware and finish sand the project inside and out. Apply the finish of your choice and enjoy.

List of Materials
(finished dimensions in inches)
(ply = plywood — hwd = hardwood — pop = poplar — peg = pegboard)

Top Box

A	Chest sides (2) (hwd)	1/2 x 12 x 12-1/8
B	Front face (1) (hwd)	1/2 x 4-5/8 x 29-1/4
C	Back face (1) (hwd)	1/2 x 4-1/8 x 29-1/4
D	Partition trim (2) (hwd)	1/4 x 1/2 x 4
E	Front trim (1) (hwd)	1/2 x 1/2 x 29-1/4
F	Drawer glides (12) (hwd)	11/32 x 3/8 x 11-1/4
G	Compartment bottom (1) (ply)	1/2 x 11-3/8 x 29-1/4
H	Bottom (1) (ply)	1/2 x 11-1/4 x 29-1/4
J	Partitions (2) (ply)	1/2 x 11-1/2 x 4-1/4
K	Top (1) (ply)	1/4 x 11-1/4 x 29-1/4
L	Back (1) (ply)	1/4 x 8-1/8 x 29-1/4
M	Glue blocks (4) (hwd)	1/2 x 1/2 x 3-7/8

Base

N	Sides (2) (hwd)	1/2 x 12 x 6
P	Front trim (2) (hwd)	1/2 x 1/2 x 29-1/4
Q	Partition trim (1) (hwd)	1/4 x 1/2 x 2
R	Drawer glides (6) (hwd)	11/32 x 3/8 x 11-1/4
S	Top & bottom (2) (ply)	1/2 x 11-1/4 x 29-1/4
T	Partition (1) (ply)	1/2 x 11-1/2 x 2-1/4
U	Back (1) (ply)	1/4 x 6 x 29-1/4

Drawer 1 (make 4)

V	Fronts (4) (hwd)	1/2 x 2 x 11-1/2
W	Sides (8) (pop)	3/8 x 2 x 11-1/2
X	Backs (4) (pop)	3/8 x 1-3/4 x 11
Y	Bottoms (4) (peg)	1/8 x 11 x 11-1/4

Drawer 2 (make 1)

V	Front (1) (hwd)	1/2 x 4 x 5
W	Sides (2) (pop)	3/8 x 4 x 11-1/2
X	Back (1) (pop)	3/8 x 3-3/4 x 4-1/2
Y	Bottom (1) (peg)	1/8 x 4-1/2 x 11-1/4

Drawer 3 (make 2)

V	Fronts (2) (hwd)	1/2 x 2 x 14-1/4
W	Sides (4) (pop)	3/8 x 2 x 11-1/2
X	Backs (2) (pop)	3/8 x 1-3/4 x 13-3/4
Y	Bottoms (2) (peg)	1/8 x 13-3/4 x 11-1/4

Drawer 4 (make 2)

V	Fronts (2) (hwd)	1/2 x 3 x 29
W	Sides (4) (pop)	3/8 x 3 x 11-1/2
X	Backs (2) (pop)	3/8 x 2-3/4 x 28-1/2
Y	Bottoms (2) (peg)	1/8 x 28-1/2 x 11-1/4

Hardware
1/2" dia. Brass drawer pulls (11)
Brass corner caps w/ screws (8)
Brass drawbolt latches w/ screws (2)
Box lock w/ screws & brass plate
14" lengths of brass sash chain w/ roundhead screws (2)
1/4" Tee-Nuts (4)
1/4" - 20 by 3/4" long flathead bolts (4)
Brass hinges w/ screws (1 pair)
Brass box handles (2 pair)
3/16" dia. by 36" long steel rod
5/8" wire brads
1" wire nails
#8 x 1-1/4" flathead wood screws

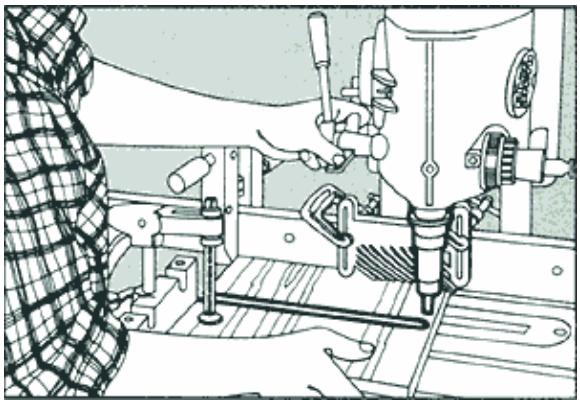

Figure 2
Use the Belt Sander to sand the drawers to fit.

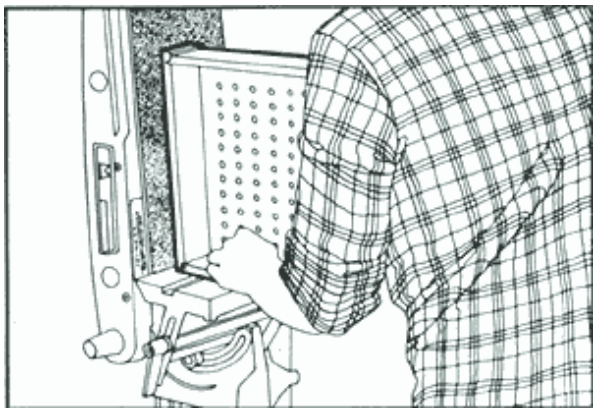

Figure 3.
Use the Table Saw to cut the lid from the box.