Boarded Tool Chest

Note: This is a draft chapter and is not for distribution.

Every household – even those devoid of a proper woodworker – needs a tool chest. On the day we closed on our first house (correction: slightly frightening shell) in Lexington, Ky., I bought a shiny red metallic toolbox, a hammer, screwdrivers and a miter box.

That metal box filled up within a month of work on the house and soon my tools took up two kitchen cabinets. A tool chest like this would have been a far superior choice, and it was in the range of my fresh-out-of-college skills (e.g. getting hammered and trying to nail something).

This chest is based on a lot of agricultural examples I've studied at antique stores, in private collections and at museums. It is designed to hold a kit of tools you need to maintain a household, farm or to begin woodworking.

It is long enough to hold full-size handsaws – which were more common than the panel saws used by joiners – plus any planes, levels or bigger tools

you might need. And the two sliding trays and interior racks can swallow all the little hand tools.

It's a great choice for a person who starts work on his or her house and makes the jump to furniture-maker – the path that most North American woodworkers seem to take.

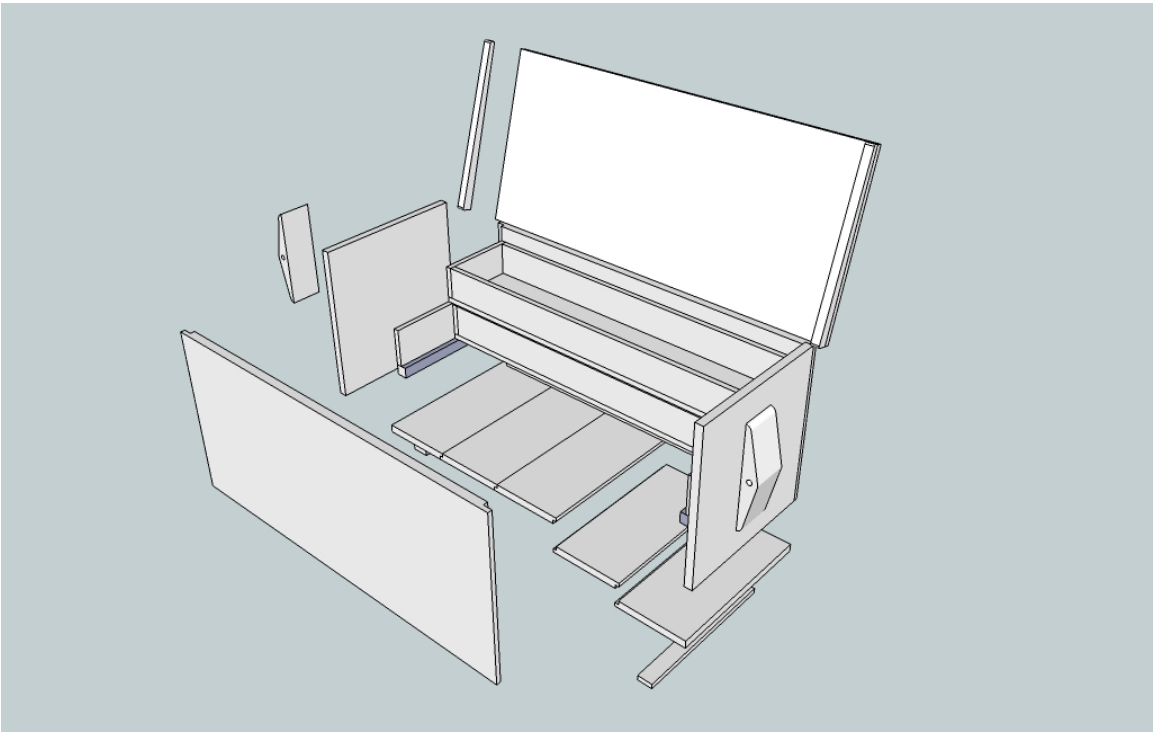
How it's Built

This chest is simple but, if made with care, stout enough to last a couple hundred years. The ends, front and back are rabbeted, glued and nailed – and the type of nail you choose is the key to the chest's long life.

The bottom is simply nailed to the underside of the carcase to make it easy to replace the bottom boards should they rot. As further protection against rot, there are two water-resistant "rot strips" screwed to the bottom to lift the chest off a wet floor.

The lid is a simple panel of wood with a batten screwed on at either end. The battens help keep the lid flat and also repel dust from penetrating your chest.

Inside the chest are two sliding trays – also nailed together – that slide on oak runners secured to the interior walls of the chest.



Woods for Building Chests
To make the chest easy to move, use the lightest-weight species you can find. My first choice: One of the white pines. Clear cedar or cypress are almost as good. If you come up empty-handed, poplar will do. Tool chests get moved around. Even if you are a stay-at-home woodworker, you want a lightweight chest.

That said, there are a few bits and pieces of the chest that need to be resistant to water, wear and whacking. The rot strips take the most abuse. Consider using white oak or even something exotic (purpleheart or teak) if you have some scraps lying about.

The runners and the bottoms of the trays needs to resist wear, so white oak is a good choice for these thin bits. And the battens that restrain the lid need to be straight and stout – oak again.

Prepare the Panels
Dress the stock for the front, back and end panels. If you need to glue up narrower boards to make your panels, see "One Panel; One Clamp" at <DIRECTION>. Cut the panels to width and length and remove any machine marks with a handplane.

<INSERT edge jointing sidebar here>

Before cutting any joinery, mark the four panels using a cabinetmaker's triangle, a simple but effective marking system that will reduce the chance of an error at joinery or assembly.

Two triangles. Mark the triangles on the top edge of your panels. Each triangle should point toward the front of the chest and be marked when the panel and its opposite part are placed together.

Now lay out the rabbets on the ends of the front and back panels. The 3/4”-wide x 3/8”-deep rabbets will strengthen the corner joint and assist you when you align your corners at assembly time.

This rabbet is cut across the grain of the panels, so you need to prevent the joint’s shoulder from splintering as you cut it. A moving fillister plane has a nicker that knifes in a clean shoulder before the iron levers out the waste. So it’s the best choice for this joint.

Even if you use a moving fillister, I recommend you also use a cutting gauge to define the waste. The cutting gauge’s lines act as further insurance against splintering. Plus they will point out if your plane’s fence or depth stop have moved during the operation.

Extra step. Scribe in the width and depth of your rabbet with a cutting gauge. Then use these lines to guide you as you fine-tune the setting of your moving fillister plane.

Even the best moving fillister planes are fussy. The tool's iron and nicker need to be in perfect alignment and extend out from the body of the tool the

tiniest amount so the plane will cut a square shoulder. The fence and depth stop can slip. And even if they don't slip, they won't save you from making a sloping, out-of-90° rabbet.

Making square rabbets requires practice and (until you are good) continuous inspection as you make the joint.

How you hold the tool is important. The fingers at the front of the tool should press the fence against the work. That hand's thumb should be in front of the mouth of the tool. That hand at the rear of the tool should push the plane forward only. If you grip the tool too tightly you will tilt it and cut a sloping rabbet.

Head games. Get your head over the tool and use your hands to crowd the body of the tool against the work.

Also important: Where you put your head. It sounds odd, but you are much less likely to tilt the tool if your head is over the tool and you are looking at the place where the tool's sidewall and the joint's shoulder meet.

Get in position. Start the tool at the far end of the work and pull it backward toward you. The nicker and your scribe line should be one and the same. If they aren't, you need to adjust the plane's fence.

If they are the same, then push the tool forward. When working across the grain you can take a thick shaving with ease. I usually start with a slightly thinner shaving on the first rabbet to make sure everything is in working order. After about four strokes, stop planing and check your work with a square. The floor of the rabbet needs to be 90° to the end of the board, and its shoulder should be perfectly vertical.

If things are out of whack, adjust your hands, lean in or out slightly to correct the problem. Take two strokes to see how you did.

Verify. It's not a rabbet if it slopes down and the shoulder isn't 90°. That's a beveled moulding, and it is no good for joinery.

The step is to nail the carcase together, so this will be your last opportunity to clean up any dings on the interior faces of the case.

Nail the Case

The case is assembled with glue and nails. Considering all the end grain that is in these corner joints, you might not expect the box to be very strong. But if you apply the glue and nails in the correct way, it will outlive you.

As to the glue, I prefer hide glue for furniture in almost all cases, but if you have only yellow or white glue, it will be fine here. What's most important about the glue is that you use it to "size" the end grain in the joint before adding glue to the face-grain surfaces.

"Sizing" is simple. Paint a thin layer of glue on the end grain and let it sit for a minute, maybe two. This first application of glue will get sucked into the end grain and clog the wood's vessels. Then, when you apply the second batch of glue, the end grain will not be able to suck the glue away from the joint (that's what normally weakens a joint that uses end grain).

This procedure was developed by a glue scientist, but I've tested it in the shop. When these sized joints are intentionally broken, you see a lot of wood failure and little glue failure. That's a good thing.

The second factor is the nail you choose for the joint. You should use a tapered nail that has a significant head – either a cut nail or a blacksmith-made wrought nail. These nails have a shank that tapers, and early 20th-century studies showed that these nails hold as much as 400 percent better than a same-size wire nail. That's because the nail's tapered shank acts like a wedge.

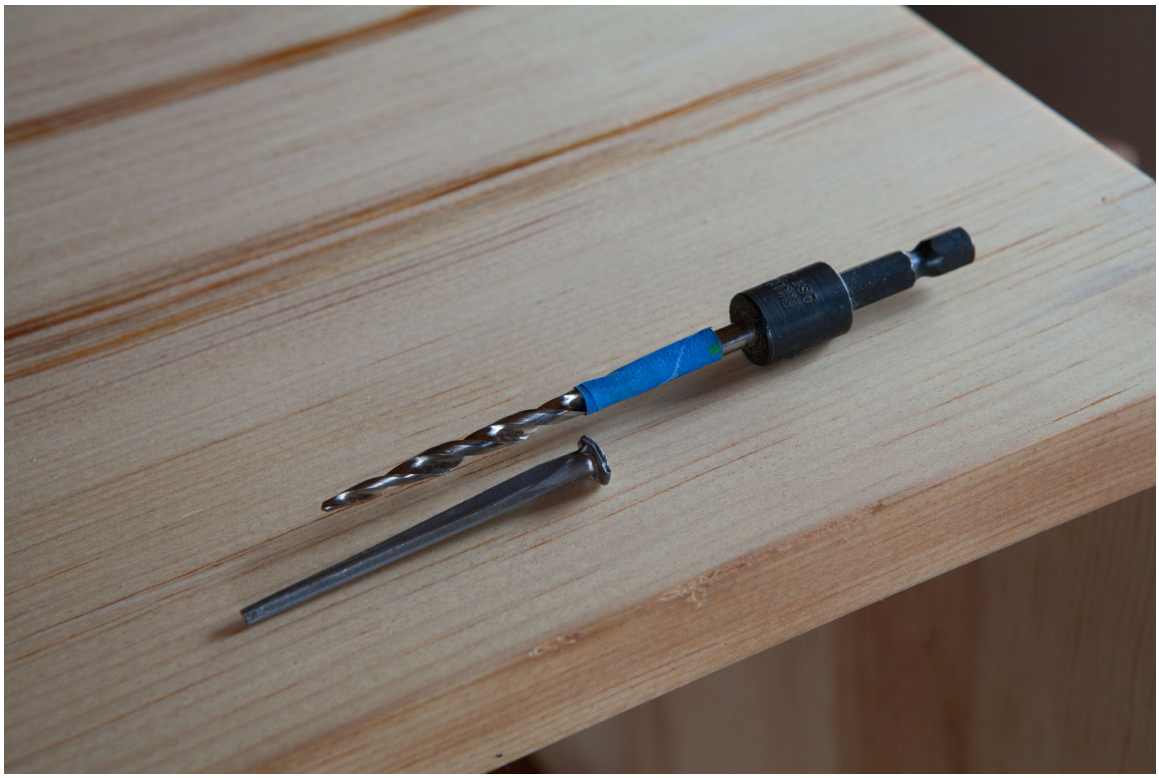
As to the size of nail, you can use a 4*d*, 5*d* or (in a pinch) 6*d* cut nail. The larger nails are more likely to split your work, but I'm going to show you how to get around that.

Lastly, you will strengthen the joint if you drill your pilot holes at alternating angles, kind of like dovetails. You don't want a lot of angle, just 5° or so. Mark out the locations of the five nails at each corner and get out the glue.

Exposed joinery. You are going to see these nails every time you look at the chest, so I recommend spacing the five pilot holes at each corner with care.

The most difficult part of using cut (or wrought) nails is drilling the correct pilot – both its diameter and length. The best way to approach the problem is to do some test joints in the same kind of material and get a feel for the correct diameter bit. With typical 4*d* and 6*d* nails I start with a 3/32" pilot hole and adjust up or down in size from there.

The pilot depth should be about two-thirds the length of the nail. If you make the pilot the full length (like with a screw), the nail's hold will be weak. The nail has to do some of the work.



Tape marks the stop. The pilot hole should stop short so the nail has to burrow its way into the material. Here I'm using a tapered drill bit for the pilot holes. It isn't strictly necessary, but it helps.

The last thing to remember before driving the nails is that the tapering action of the nail should be parallel to the grain of the top board. If you apply the wedge across the grain, it's like splitting firewood. This confuses some people at first until they do it wrong. Then they never forget the rule.

Now it's time to put the box together. Begin by attaching the back to the ends.

Size the end grain of the end boards with a thin coat of glue and let it dry for a minute. In the meantime, apply a thicker coat of glue in the rabbets on the back panel.

A minute for strength. The thin coat of glue size on the end grain is an important component of a strong rabbeted butt joint.

Place the back panel on the end panels and drill your pilot holes – don't forget to angle each hole slightly to increase the wedging action of the nails.

If you are even the slightest bit worried about splitting (and I am always worried), put a bar clamp across the joint to reduce (greatly) the chance of the work busting apart.

A clamp for safety. Clamping across the joint significantly reduces the chance you will split the top part of the joint or the board below. Note the alternating slopes of the nails.

Drive the nails and set the heads flush with the surface. Headed nails, such as clouts, roseheads and wrought-head nails, are not typically set below the surface of the work like a brad. Setting the head only increases the chance for splitting.

Affix the back panel. Flip the carcase over and repeat the process for the front panel. When the glue is dry, level your joints with a plane, including the top and bottom rim of the carcase.

Bottom Boards

The bottom boards are merely nailed to the bottom rim of the case. The individual boards should have some sort of edge joint to allow for seasonal movement. I used a tongue-and-groove joint; shiplaps would be another good choice.

Note that the grain of the bottom boards runs from front to back, not side-to-side. This is for strength.

Special planes. While you can make a tongue-and-groove joint with plow and rabbet planes, it's much faster if you have a dedicated set of match planes or a metallic plane dedicated to the task.

Cut the edge joints on your bottom boards and then remove the machine marks. If you'd like to dress up the bottom boards, you can cut a small bead on the boards. If you are using a tongue-and-groove joint, cut the bead on the shoulder of the tongue section of the joint.

A strong bead. Bead the shoulder of the tongue section of the joint. If you bead the groove section you will weaken the joint.

Now you can nail the bottom boards to the rim of the carcase using 6*d* clouts or rosehead nails. Use the same pilot hole you used earlier for the carcase and apply a clamp across the carcase if you want to prevent splits.

Nails all around. Don't glue the bottom boards, just use nails. I drive three nails into the ends of the carcase. Then I space the nails ever 4" or 5" when nailing into the front and back of the carcase.

After the bottom is on, true up the carcase all around to flush the bottom boards to the carcase.

The Rot Strips

The last bit of work on the bottom is to affix the two rot strips to the underside of the bottom boards. There are two (at least) philosophies when it comes to rot strips. One philosophy is to make them from pine and nail them on with iron nails. If these start to rot, they will fall off and you will know it's time to replace them.

The other philosophy is to make the rot strips from a water-resistant species, attach them with epoxy and brass screws. And then oil and wax them. These rot strips will refuse to rot or soak up water.

Both methods protect the chest from moisture.

I had some teak scraps so I used those for the rot strips. After cutting them to size, I planed a small chamfer on the edges to make the chest easier to slide around on an uneven floor.

Automatic chamfers. Consistent chamfers are easy with a block plane. Clamp the work in your face vise so it is about 3/8" above the benchtop. Rest one corner of the plane on the benchtop and plane for 20 strokes. Flip the board over and repeat.

Glue the rots strips on with epoxy and screw the strips down with brass screws. A few coats of linseed oil on the teak and bottom boards will also help moisture from wicking into the carcase.

Waterproof. Teak and epoxy will prevent water from migrating from the floor into your bottom boards.

Add the Chest Lifts

The last bit of work before the lid is to make and attach the chest lifts on the ends. You can use metallic lifts or make your own using wood and some rope.

Your call. Chest lifts made from wood and rope, called "beckets," are one traditional choice. Iron lifts are another. There is no real functional advantage to either.

The Lid

The chest's lid is a simple flat panel with battens screwed to the end. You can decorate the edges of the panel anyway you please – a thumbnail profile was a typical edge treatment.

To make the thumbnail profile, fetch your moving fillister plane. Use the same fence setting (a 3/4"-wide cut) as you did for the rabbet joinery. Adjust the depth stop so the plane takes a cut of about 1/8" deep.

Cut the profile on the ends first. Then rabbet the front edge of the lid. To complete the profile, use a block plane to round over the top lip of the panel.

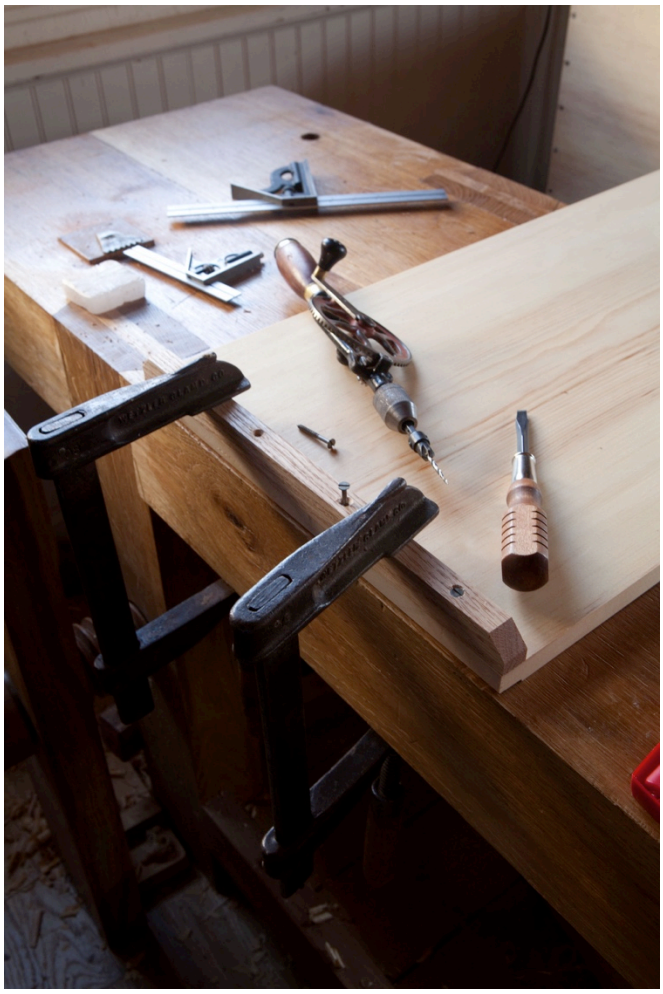
For decoration. It's OK if this rabbet slopes a bit. After cutting the rabbet on three sides, round over the sharp corner all around until it looks nice.

Now affix the battens. On early chests, the battens were secured with clinched nails. This works really well, but it takes a little practice to get good at the operation. If you don't want to attempt clinched nails, the other option is to use wood screws in holes that are slightly elongated to allow for seasonal wood movement.

The first step is to shape the battens. At the least, ease the lower corners to make them nicer to handle. I sawed a beveled on the corners and cleaned up the cut with a block plane.

Quick cut. Many early chests had a rounded corner. Or the batten would taper toward the front and then end in a rounded corner.

Remove any machining marks and drill pilot holes and clearance holes for your wood screws. The clearance holes in the batten need to be slightly elongated parallel to the grain. This slight elongation allows the top to move without cracking.



Screws that move. By elongating the clearance holes in the battens the threads of the screw will stay tight in the lid without (usually) splitting.

Elongating the holes is simple, quick work. After drilling each clearance hole, put the bit back into the hole. While the bit is spinning, tip the drill forward and then back about 10°. That's enough.

Screw the battens to the lid. Then attach the lid to the carcase with hinges.

Interior Trays

The two sliding tool trays hold all your small tools and grant you access to the large well below. The bottom tray sits on oak runners that are 5-1/2" above the floor of the chest. This space is critical because it allows you to put a typical bench plane on the floor of the chest with the sole of the tool flat on the bottom boards.

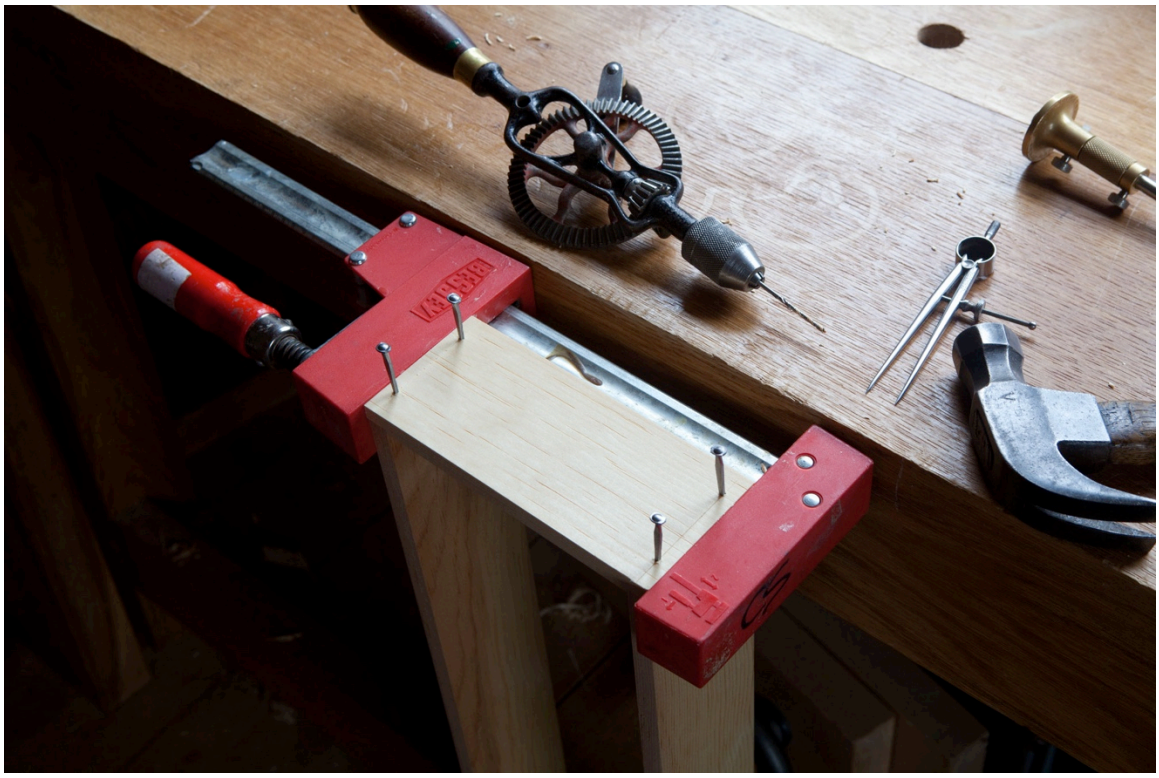
So the first task is to make a 5-1/2”-wide spacer so you can nail the lower runner in perfect position on either end of the carcase. Cut a scrap to this dimension and stand it on the floor of the chest. Place the lower runner on it. Then glue and nail it to the wall of the carcase.

Permanent Jenga. The pine board shown at the bottom puts the lower runner in its correct position. After the first runner is in place, install the second runner on top of it. Then remove the spacer and repeat the process on the other end of the chest.

With all the runners glued and nailed in, cut the bottom pieces for the trays to size and fit them to the inside of the carcase. It’s easier to do this before you add the walls of the trays.

Shoot the bottom. After cutting the bottoms to a close size, shoot the ends until the bottom slides smoothly on its runners.

The trays are built a lot like the carcase, with rabbets, glue and headed nails. The rabbets on the end boards are 1/2” wide and 1/8” deep. The only significant difference between the tray and the carcase is that you want the bottom of the tray to poke out of the end of the carcase by 1/16”. This slight proudness makes the tray simple to fit and ensures the nail heads won’t rub against the walls of the chest and jam the tray.



Familiar operation. The trays are assembled with the same joints and procedures as the carcase.

You can attach the bottom to its tray with screws or nails. Just be sure to slightly elongate your clearance holes if you choose screws (nails will bend on their own without any further help).

Slightly proud. Leaving the bottom edge slightly proud of the tray solves a variety of potential problems.

A little beeswax on the trays and runners will help them slide, but that's really all the finish you need on the inside of the case.

On the outside, a few coats of a long-wearing paint is the typical choice for a tool chest. I used varnish only on the lid, though that doesn't offer near the same protection as paint.

The rest is up to you. You can make racks for the inside walls to hold small tools. And there should be room to affix your handsaws to the inside of the lid.

— Christopher Schwarz, June 2015