

# The North Bennet Street Tool Chest

Learn what the students learn as you build a handsome home for your hand-tool collection

BY STEVE BROWN

Originally conceived simply as a place to put your tools, the tool chest project has become a familiar step in the two-year Cabinet and Furniture Making curriculum at the North Bennet Street School. Though simple in design and appearance, it challenges our students in genuine and surprising ways. They learn the value of planning the order of tasks; fitting the actual pieces, not just working from the drawing; and choosing between various methods and techniques.

This tool chest is the students' first major project, so we've narrowed the parameters to make sure that the focus stays

on the craftsmanship and not the overall design and dimensions. Primary woods can be maple, cherry, walnut, or mahogany. Choices for secondary woods are soft maple, poplar, and pine (for drawer parts only). We allow students to use highly figured woods only for the panels. This tool chest (16 in. deep by 24 in. wide by 14 in. tall) is at the small end of our size range, but students can build them up to 18 in. deep by 30 in. wide by 17 in. tall. Drawer size and configuration is another place where individual designs vary, and so is the frame-and-panel lid.

The typical chest starts with a drawing, scaled or full-size, and consists of a

through-dovetailed carcass with dovetailed drawers running on mortise-and-tenoned divider frames. (For a complete article on our method for dovetailing and also making drawers, see former instructor Janet Collins's article in *FWW* #157). The lid provides a means of locking the box as well as an introduction to setting a full-mortise lock. Above the top divider is a space to put the lid when the box is unlocked.

Although every aspect of building this tool chest—from the dovetails to the ship-lapped back—creates a valuable learning experience, I can't go into all of it in one article. Here, I'm going to focus on machining the dadoes and rabbets, fitting and

## LID STOWS AWAY



**A secure lid.** A lock mortised into the top edge and two pins on the bottom hold the lid in place.



**Dedicated storage space.** When not locked in place, the lid tucks neatly away in the space between the top drawer and the top of the chest.



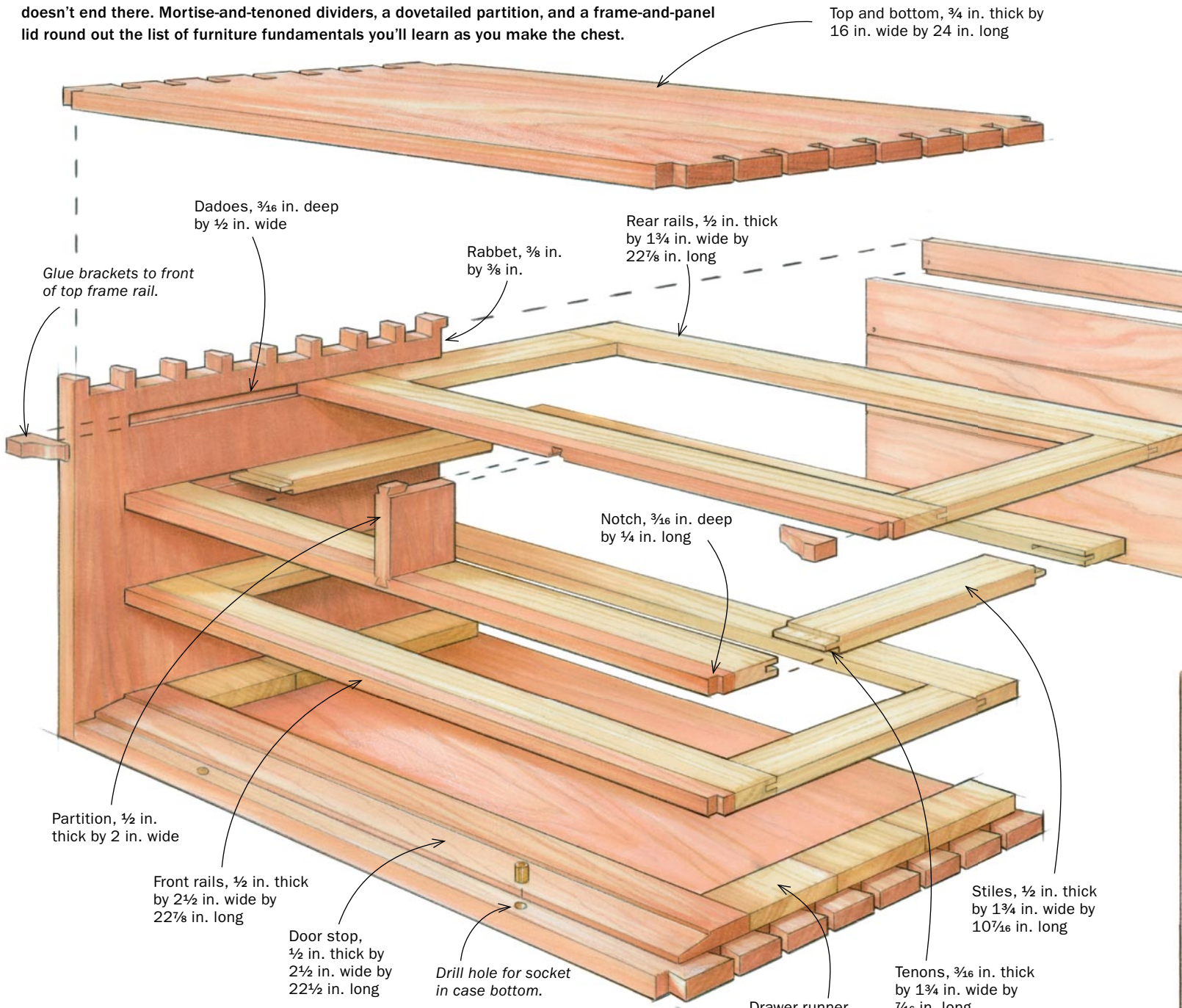






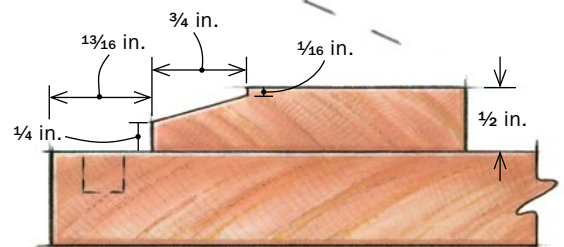
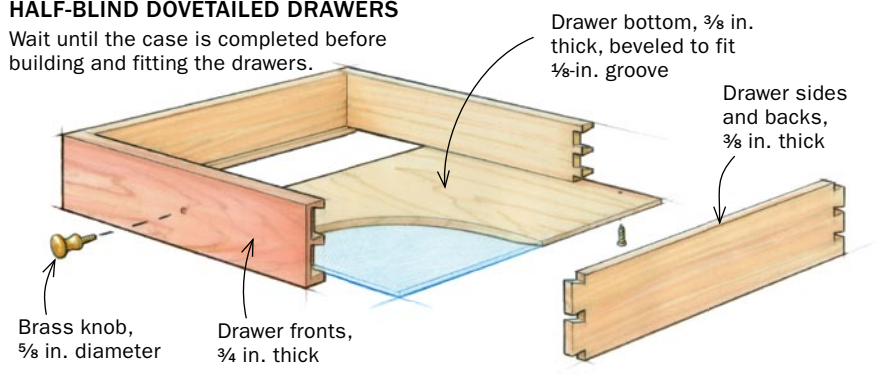
# DOVETAILED TOOL CHEST

Through-dovetails are an attractive, traditional joinery option for this tool chest, but the lesson doesn't end there. Mortise-and-tenoned dividers, a dovetailed partition, and a frame-and-panel lid round out the list of furniture fundamentals you'll learn as you make the chest.

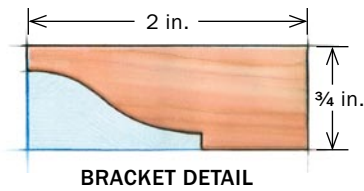


## HALF-BLIND DOVETAILED DRAWERS

Wait until the case is completed before building and fitting the drawers.

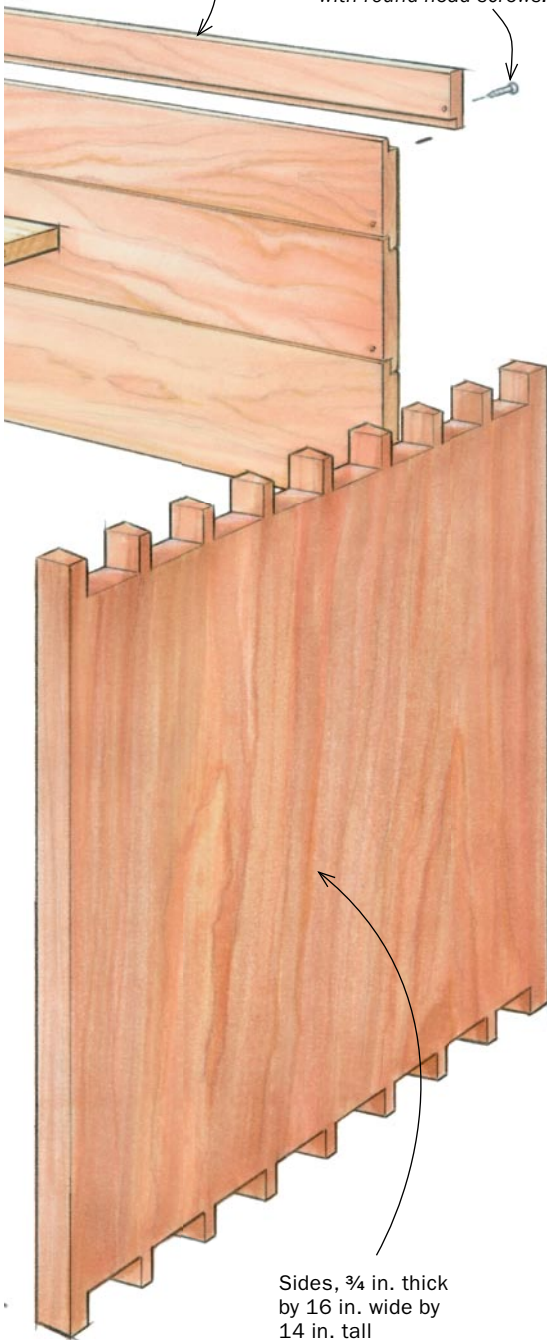


DOOR-STOP DETAIL



Shiplapped back boards,  
3/8 in. thick by 23 1/4 in. long

Secure back boards  
with round-head screws.



Sides, 3/4 in. thick  
by 16 in. wide by  
14 in. tall

installing the horizontal dividers, cutting and fitting the vertical dovetailed partition, and installing the lid and its hardware. Not designed to be portable, the chest looks great on a countertop, or fits neatly under a typical workbench.

### Plenty of learning opportunities

There is nothing stronger than a dovetailed carcass, and dovetails are one of the fundamentals of woodworking. So the choice for the carcass joinery is a natural. With the panels cut to length and width, the dovetails can be laid out, cut, and fitted all by hand. At NBSS, we start with pins and then scribe and fit the dovetails. Once all four corners are dry-fit, we check the case for square before laying out the dados and rabbets. A very important component of the layout is that the front and back edges of the case must be flush to serve as consistent reference surfaces. (For more on through-dovetails, see Christian Becksvoort's "My Favorite Dovetail Tricks," *FWW* #171.)

**How to cut stopped dados safely on the tablesaw**—The dados hold the divider frames securely. But they also provide the opportunity to learn layout principles and techniques, as well as safe and effective ways to make plunge and stopped cuts.

The key is to reference from the inside surfaces of the case while it is dry-fitted, with joints closed and the case square. From the inside face of the case bottom, use a marked story stick to transfer the dado locations to the inside faces of the case ends.

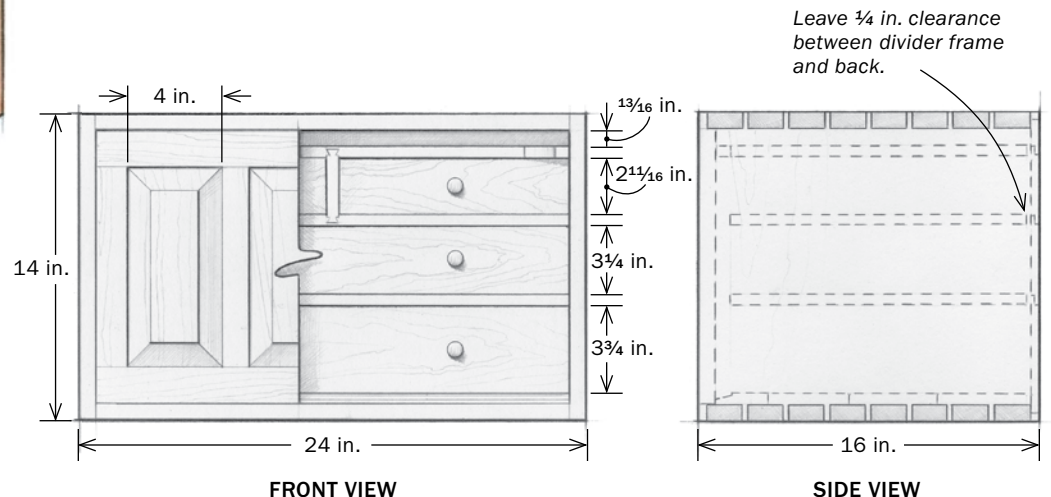
Use a marking gauge off the front edges of the case to lay out the front end of the

stopped dado. Because the front is already flush, the front edges of the divider and the drawer fronts will lie in the same plane, in front of the stopped dados. The dado will run out the back edge, so it will show in the rabbet until it is covered by the shiplapped back.

Once the dados are laid out, I cut them on the tablesaw with a 1/2-in.-wide dado set because it's faster and easier than cutting them with a router. One of the most important safety rules in the NBSS shop is that we never do stop-cuts on the tablesaw without a clamped block backing up the workpiece. The process requires careful layout, labels to help with orientation, and mental focus. Because you are working on the two opposite sides and it's safest to keep the end of the panel closest to the dado against the rip fence, each pair of dados involves one plunge and one stopped cut. So for every dado you are either plunging in at the front and running out the back, or starting through the back and stopping at the front. Mark the fence to show the extent of where the blade will cut to know where to stop and start.

We finish the dados with a router plane for consistent depth, and square up the ends to the layout lines with a chisel.

**Rabbets are the next step**—After the dados, cut the rabbets for the case back. The rabbets in the top and bottom run all the way through. I lay out my pins so they are at least as wide as the rabbet, and that allows me to run the rabbet through them. The sides get stopped rabbets on each side. I cut them on the tablesaw as



Leave 1/4 in. clearance  
between divider frame  
and back.

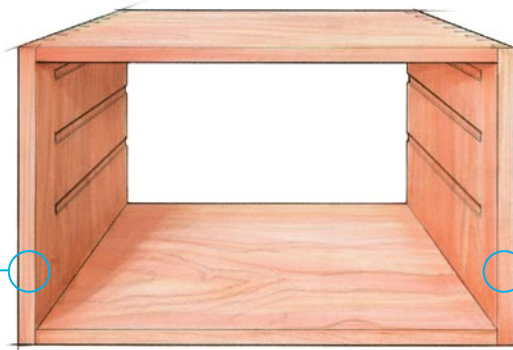


# A lesson in drawer dividers

## North Bennet method

### STOPPED DADOES ON THE TABLESAW

Most woodworkers do these with a plunge router, but a dado set is faster. To keep the same reference end against the rip fence, make these stopped cuts in both directions.



**TIP EASY LAYOUT**  
Dry-fit and use a story stick for layout. The story stick has one clean end and knife nicks along the edge to indicate the dados. Reference from the inside faces of the sides and the bottom. Then carry the marks to the back of each side.

#### LEFT-SIDE DADOES: CUT THEN LIFT



**Go then stop.** Start cutting into the side. When the end mark on the workpiece meets a mark on the fence, use the miter slot to reach under the workpiece and lift it off the blade, keeping the pressure against the fence.

#### RIGHT-SIDE DADOES: DROP THEN CUT



**Stop then go.** The opposite dado cuts begin with a plunge cut. With an L-shaped stop block backing up the workpiece, pivot down into the moving blade and then cut through the back of the side.

I would the dados. The only difference is that each piece has a plunge cut and a stopped cut instead of one or the other.

### Drawers run on mortise-and-tenoned frames

The drawer dividers live in the dados in the sides and provide a place for the draw-

ers to ride, and the top one creates a spot for the lid when it's tucked away. Simple mortise-and-tenon joints keep them together. We use a router table with a  $\frac{3}{16}$ -in. bit for the mortises and cut the tenons on the table saw. When milling the parts, leave them slightly thick so their fit in the dados can be fine-tuned with a handplane.

After gluing up the frames, clean up the glue, flush the joints, and skim any mill marks with a handplane. Check the length of the frame to the space from dado to dado. Trim the frame if needed. Test-fit the thickness of each frame to its dado. If the frame has been skimmed, plane only the bottom of the frame to fit. Once each



## FIT THE DIVIDER FRAMES

Simple mortise-and-tenon frames are carefully fit into the dadoes and notched at the front, but not glued in until later.

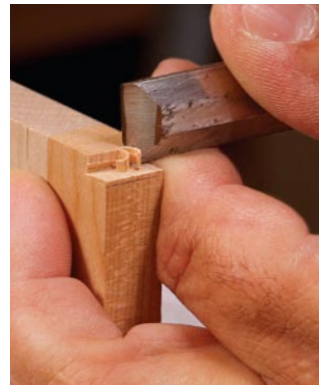
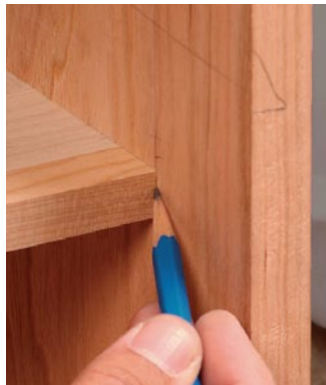


**Hand tools complete the dadoes.** Square the end of the dado with a chisel, and clean out the bottom with a router plane.

frame fits in its dado, skim the front edge of each frame with a handplane, and then lay out the notch and trim with a handsaw. Check the front edges for alignment relative to the case front. If both the stopped dadoes and the frame notches were laid out and executed carefully, the frames' front edges should lie in a plane. If not, adjust them.

The top drawer divider is laid out so there is enough space above it to store the lid. It also has brackets attached to the front, which act as a stop for the lid. They lie in the same plane as the stepped stop at the bottom of the case, which I make by gluing a slightly oversize block to each side of the front of the divider, shaping it at the bandsaw, and cleaning it up at the bench.

**Bottom drawer runs on a different system**—You've created the spaces for the lid and most of the drawers, but the bottom drawer space isn't complete. The bottom drawer rides on a stepped stop (which is also a transition from the plane of the drawer fronts and door stop) and blocks glued in behind it. The dimension between the front edge and the top fillet or step has to be accurate, as does the position of the piece in the case. An effective way to guarantee this is to make the distance between the steps a hair larger than needed. Dry-clip the stop in place, according to the back step. Then glue in the first block behind the stop,



**Test-fit the dividers.** If the fit needs adjustment, plane the bottom face of the frame to fit. That way, if there is tearout or any other issue, it won't be noticeable. With the dividers pushed up against the end of the dado (far left), lay out the notch and use a handsaw and chisel to cut it (near left).

## ADD BRACKETS TO THE TOP DRAWER DIVIDER



**Glue, then shape.** It's easier to glue oversize blocks to the frame and then shape them than it is to shape tiny pieces on the bandsaw and then try to clamp these irregular parts to the divider.





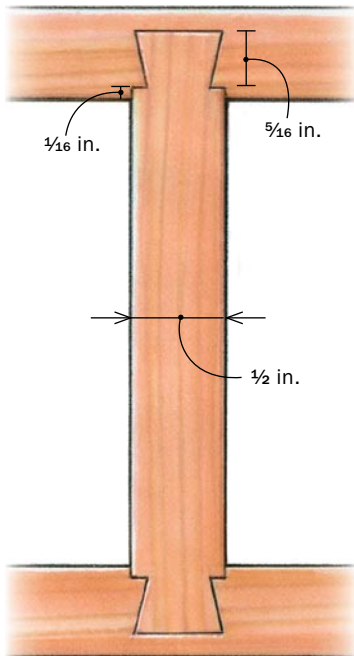
# Dovetailed partitions by hand

When there are only one or two vertical partitions, Brown cuts their small dovetails by hand.

## North Bennet method



**Dry-fit and use a story stick.** Use the story stick to mark the near side of the partition (above) and then the actual partition to mark the far side. Now remove the two dividers and cut the shallow dadoes in them. Before fitting the partition into its dadoes, clamp in a spacer block (right). Base it on the space at the ends of the drawer pocket.



DOVETAILED PARTITION



**Angled guide block makes the dovetail easy.** Chop the dovetail, transfer the location to the divider, and cut the socket.

making sure not to glue the stop yet. Now you can check and adjust the front step as needed and accurately position it when gluing it in.

**Dovetailed partition**—A requirement of the project is that one level of drawers be divided by a vertical dovetailed partition. Before gluing the divider frames in, lay out and fit the dovetailed partition. Again, use a story stick to establish its location. Often a student's first inclination is to align one divider with the other and mark the top and bottom of the partition. Our method is to use a story stick and reference off one of the inside faces of the case. The results are more consistent this way.

Locate the first side of the dado for the partition. The shoulders of the dovetail are sunk into a 1/8-in. dado in the dividers. This registers the partition and gives it rigidity that the dovetail alone doesn't.

After notching the partition so that the shoulders bottom out in the dado, the front 1/2 in. of the partition becomes the dovetail. Make the dovetail and, using a sharp pencil, scribe the socket lines onto the dividers. These lines are transferred to complete the socket layout. Once sawn and pared to the lines, the dovetail is test-fitted to the socket. If adjustments are needed, do them to the socket.

With dividers and partition fitted, dry-clamp everything so you'll know your procedure and what clamps are needed. Glue is only applied to the front 3 in. to 4 in. of the dado. The rest of the frame needs to be free enough for the case to expand and contract. The clamps should be ready to pull the frame tight to the front given the real possibility of the joint grabbing before it closes fully.

## A handsome lid and well-fitted drawers

Size the lid frame to fit the lid space created in the front of the case. After making the frame, dry-fit it and mark the groove depths on the face of the frame to outline the panel sizes. This provides the exact size for the panels.

Raise the panel on the tablesaw and then fit it by hand with a rabbet plane. Pre-finish the panels before gluing them into the frames.

A well-fitted drawer is a hallmark of our program. We want a drawer that slides in and out easily and quietly, with only enough clearances for its function and wood movement.

# Lid is a good place to show off grain

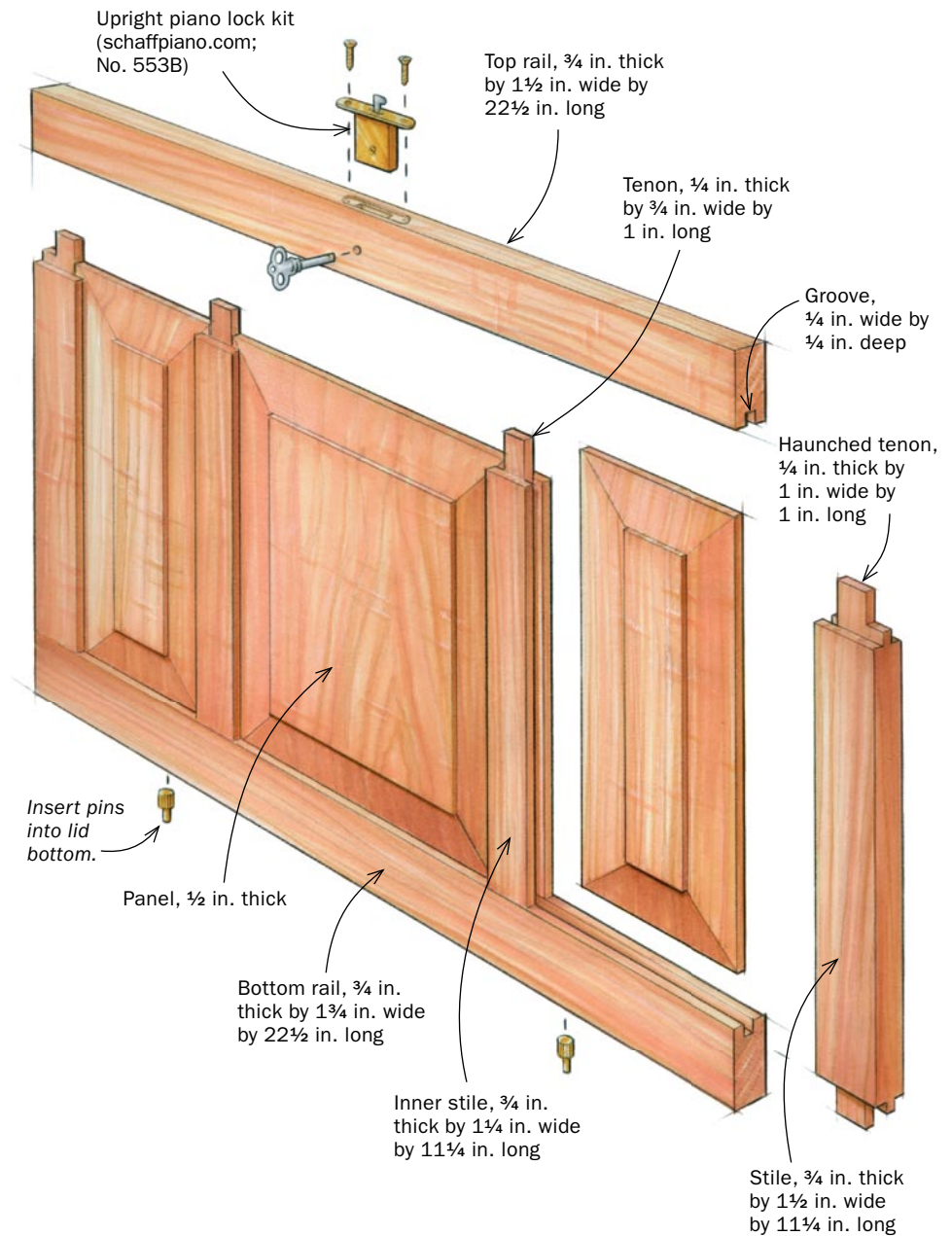
The panels are the only place where students are allowed to use highly figured wood, and these molded panels are an ideal place to showcase beautiful grain.



**Prefinish the panels.** Brown applies the polyurethane finish to the panels before gluing them into the frames so seasonal movement doesn't expose unfinished wood.



**Pins and sockets keep the lid in place.** Basic brass hardware (rockler.com; No. 32334) is pressed into holes drilled into the case and lid bottom.



## Add the hardware and finish

The lid is held in place by pins and sockets on the bottom edge and the full-mortise lock in the top edge. I put the lid in place to lay out the location of the pins and sockets and drill the small holes, and then the hardware simply presses into place.

The lock set is a matter of a deeper mortise with a shallow hand-cut mortise so the whole piece sits flush in the lid, and a shallow strike plate mortised in the top to catch the bolt.

Before applying finish I handplane, scrape, and sand the chest up to P220 grit. I use shellac and wax on the interior and areas of sliding contact. On the exterior, I wipe on Minwax Fast-Drying Polyurethane. After the first coat, I sand with P400 grit. After the second coat, I smooth the surface with steel wool and wax with Boston Polish butcher's wax. □

*Steve Brown is the head of the woodworking department at NBSS.*