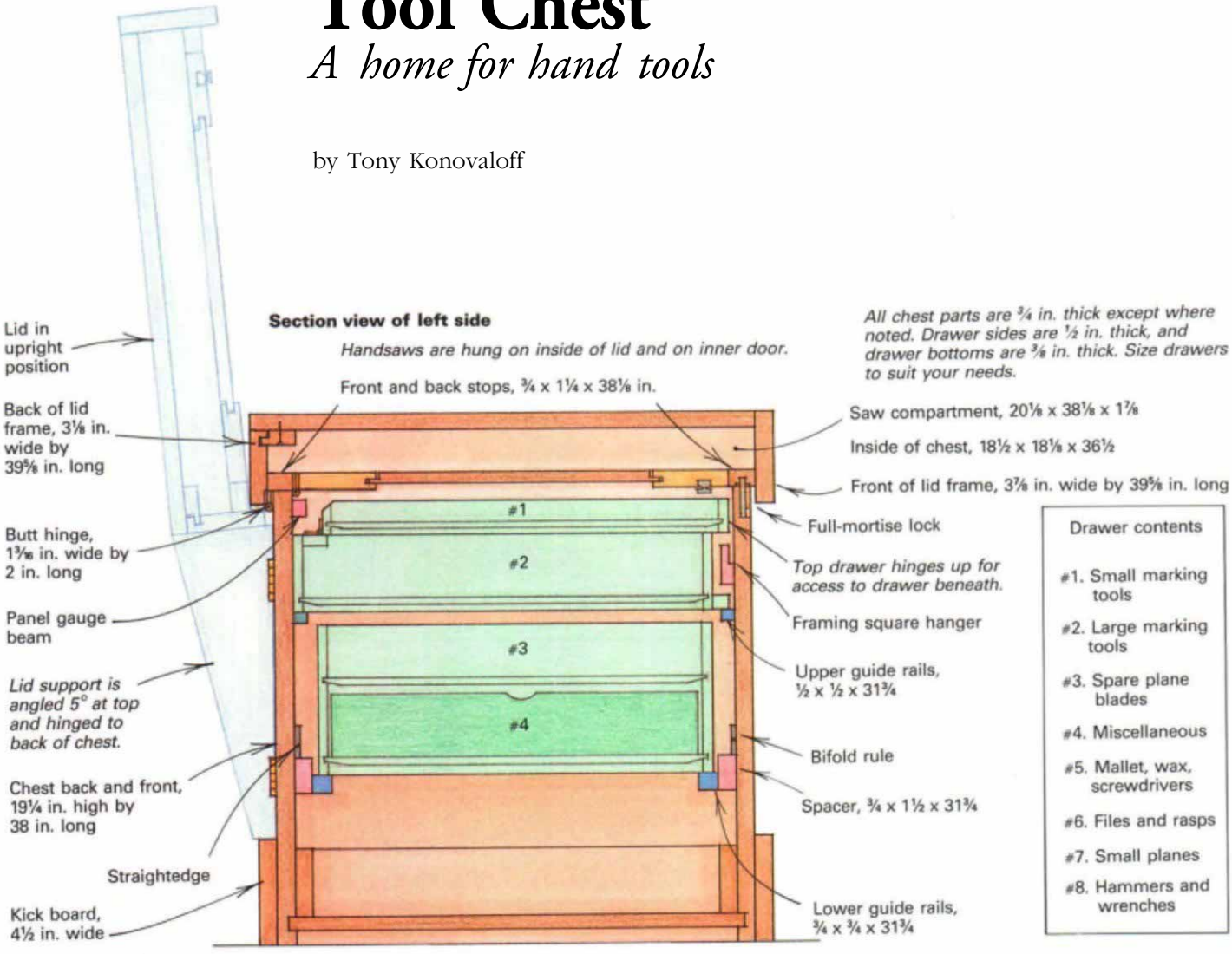
All these tools fit inside *the pine chest on the left. Saws hang inside the lid; planes sit on the bottom; a drawknife, spokeshaves and chisels hang on the chest's ends; long marking and measuring tools hang on the front and back; everything else fits inside eight drawers or in two removable boxes. Konovaloff built the walnut chest on the right to refine some of the storage systems.*

A Cabinetmaker's Tool Chest

A home for hand tools

by Tony Konovaloff



If you work wood, you need a place to store your tools. So for many of us, a tote box, a tool cabinet or a chest is one of the first woodworking projects we undertake. My pine tool chest, shown on the left in the photo on the facing page, was one of my earliest projects, and it served me well for years. Each tool has a home—on the bottom of the chest, in one of eight drawers, in removable boxes or on a rack inside the chest or its lid. As I collected new tools and learned new storage tricks, I altered the chest's storage layout by moving drawer guides and tool racks. The inside of the chest is now pockmarked with screw holes, as evidence of these alterations. So after too many alterations on my pine chest, I decided to build a new chest of walnut.

Since the size of my first tool chest is as practical as it is big, I made the new one, which is shown in the drawing on the bottom of these two pages, the same size. I wanted the chest to be portable, although it takes two people and a forklift to carry it. I was so familiar with my first chest that I could find anything with my eyes closed. So, I reasoned, why not just refine that same storage system in the new chest?

I went through the same steps to plan my new chest as I did when I built the first one—listing, grouping and measuring all my tools (as well as some I hoped to buy)—but in the end, I only altered my original design slightly. I decreased the tolerances between drawers and boxes, I made some drawers shallower, and I added a couple of drawers. And, for appearance sake, I made the kick board wider so it would be in balance visually with the sides of the lid. I'll tell you how the new chest was built and more about its design, but remember that the compartments inside (see the drawings) are for my tools. So use the drawings as a guide to customize a chest for your own tool collection.

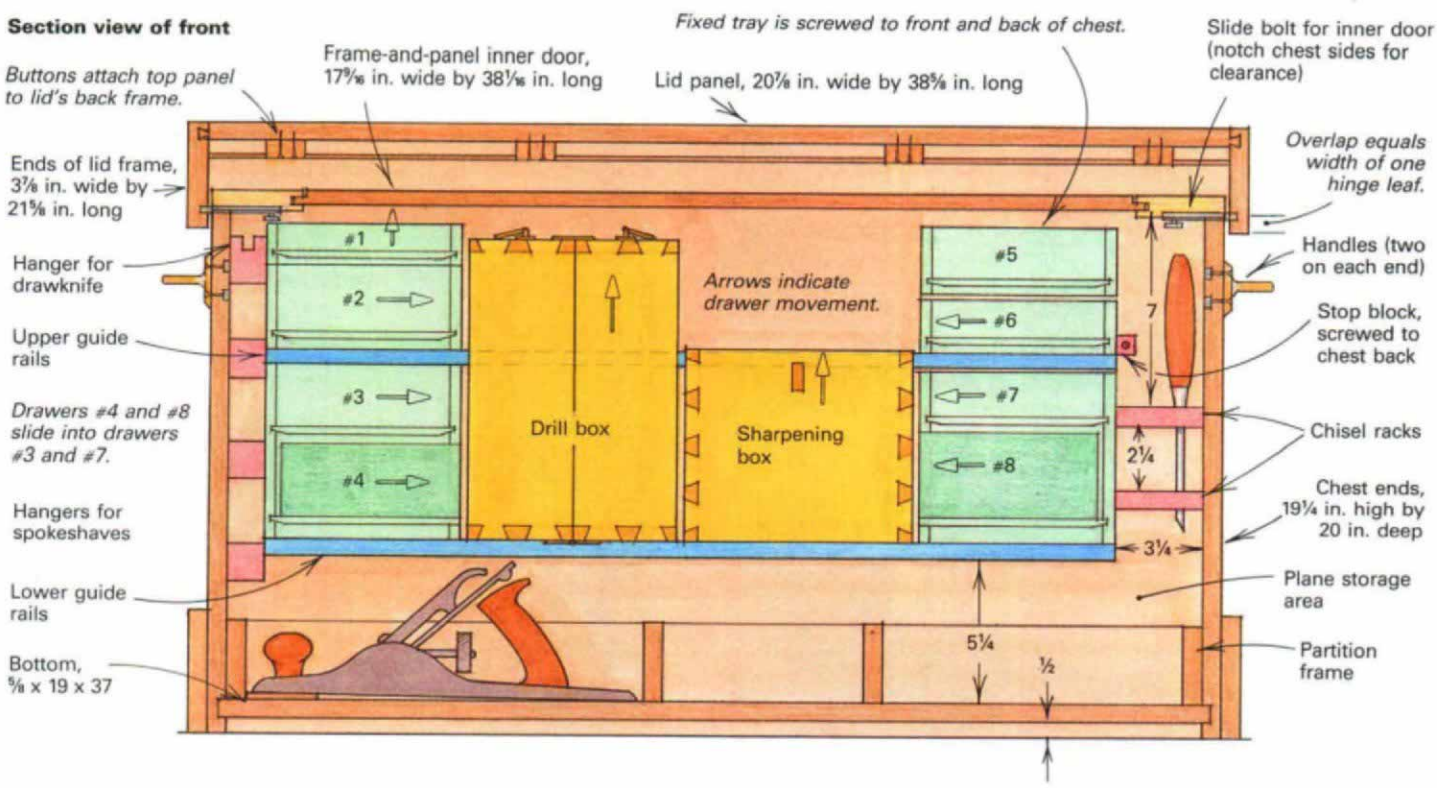
Planning a place for each tool

A snug home for the tools not only saves space, but also prevents them from banging around when I move the chest or shuffle through its contents. I arranged my planes and other large tools on a "floor plan" of the bottom to arrive at the chest's overall length and width. The chest's depth was determined by the 16-in.-long tongue of my framing square, which I decided to hang between the drawers and the front. And I designed a compartment within the lid for storing my handsaws.

Once I knew the chest's overall size, I turned my attention to the storage racks, drawers and removable boxes inside. Since I had already decided to store my planes on the bottom, I needed to devise a way to get them out without having to remove everything else first. The solution was to have a bank of drawers at each end of the chest with an open well between them. I can lift the planes out through the central well, or 1 can slide all the drawers to one end of the chest and lift the planes out through the open space at the other end. I filled the space in the well with two removable boxes. One box holds my screwdrivers and my drilling tools (bits, a brace and a geared drill). All my sharpening equipment fits in the other box. The minimum size of the well was determined by how much space I needed to remove my largest plane, a Stanley #7 jointer. Once I knew the minimum size of the well, I divided the remaining space between the two banks of drawers and racks for hanging tools on the back and on the sides, as shown.

Like the framing square, long or awkward tools hang on racks between the drawers and the chest's sides and ends. I also hang the tools I use often, like a folding rule and chisels, because this way they're always visible and accessible. My drawknife and spokeshaves hang on one end; chisels hang on the other end; a square, straightedge, folding rule and panel gauge beam hang on the front and back sides. I then sized the depth of the drawers according to their contents. I put a mallet and commonly used screwdrivers in one top drawer, and measuring and marking tools in the other. Each of the other six drawers contains a different tool group, with the least-used tools in the lower drawers.

The chest holds too many tools to list. I'm amazed that everything fits inside when I see all the tools spread out on the floor in front of the chest, as shown on the facing page. In that photo, the empty walnut chest is almost complete, except for the drawer guides and tool racks. Although I could have glued the guides and racks into carefully spaced grooves, I chose instead to screw them to the chest sides so I can alter their arrangement easily.



Photos: Gary Weisenburger; drawings: Kathleen Rushton

***Sliding dovetails** on the ends of the lid are hand-cut with a dovetail plane (left). The scoring blade on the plane's side prevents tearout when cutting across the grain.*

***Konovaloff hangs the lid** by screwing hinges to the chest's back. Then he turns the lid upside down, props up the chest to align hinges and mortises, and screws the hinges to the lid (below).*

Making the chest

I made the chest and most of its drawers, boxes and racks from walnut. My first chest is a testament to the durability of pine, but hardwood can take more abuse and still look good. However, I used alder for the bottom panel because its lighter color improves visibility inside the chest. Before starting the project, I bought 80 bd. ft. of 4/4 lumber: 50 bd. ft. for the chest, kick board and lid, and 30 bd. ft. for the storage compartments inside. I also used a lot of scrap.

I began by gluing up all the large panels for the sides, ends, top and bottom, and then I thickness-planed them after the glue dried. I work exclusively with hand tools, and so I scrub-planed the panels nearly to thickness (see the sidebar on the facing page for more on this) and then surfaced them flat with a jointer plane. Next, I cut each panel to size (given in the drawings) and plowed a groove in the sides and ends ½ in. from their lower edge, for the bottom panel. The sides and ends are joined with dovetails, and I cut the tails first because I find that it's easier to make the pins fit the tails. As unorthodox as it may sound, I used a file and fine-tooth rasp, rather than a chisel, to trim the pins.

I made the kick board next. Although it strengthens the bottom of the chest, the kick board is really just a protective base molding. On my first chest, I made the kick board the same width as the sides of the lid, but the kick board looked too narrow. So on the walnut chest, I made the kick board ½ in. wider, and it looks more balanced. To ensure that the dovetailed kick board fit the chest tightly, I cut the pins on the end pieces first, glued them to the chest, screwed them in place from inside, and then held the front and back pieces up to mark for the tails. After cutting and fitting the tails, I glued and screwed the front and back pieces in place.

Making the lid

The lid is basically a shallow box mat overhangs the outside of the chest. Long wood cleats, glued inside the front and back of the lid frame, act as stops and rest on the top edges of the chest when the lid is closed. An inner frame-and-panel door is hinged to the back stop and held closed with slide bolts that engage the sides of the lid frame. The space between the underside of the lid and the inner door is 1⅞ in.—enough for saws to be hung on both surfaces.

The construction of the lid is somewhat unconventional unless you think of it as a traditional dovetailed drawer turned upside down. In traditional drawermaking, the back is made narrower than the sides so that the bottom can slide over the back and into grooves in the sides. In the case of my chest's lid, the top-to-side-frame joints aren't just tongues in grooves, they're sliding dovetails. The top panel is butted and glued to the frame in front and secured to the back with cabinetmaker's buttons, like those used to hold solid tabletops to aprons. This construction anchors the panel at the front while allowing it to expand or contract at the back.

I cut the sliding dovetails on the ends of the top panel and the mating grooves in the sides of the lid frame before joining the frame parts. The sliding dovetails, which are half as thick as the top panel, are not centered on the panel's ends. I located the tails close to the panel's inner surface so there would be as much wood as possible above the mating grooves in the side frames. I cut the tails with my Ulmia dovetail plane, as shown in the top photo. (I bought my Ulmia plane from Woodcraft Supply, 210 Wood County Industrial Park, Parkersburg, W.V. 02102-1686.) After planing the side frame's grooves, I cut the angled sides by tilting a side rabbet plane to match the dovetails' angle. It may seem imprecise to do this by eye, but it's easy with practice.

When the panel slid freely in the grooves, I cut the dovetails that join the lid-frame corners. I laid out the corner dovetails so that the sliding-dovetail groove would fall between two pins at the frame's front and in the middle of a wide pin at the frame's back. I cut the pins on the side pieces first, and then slid them onto the top panel's dovetails to mark the tails on the front and back frame pieces. When assembling the lid, I was careful not to get glue in the dovetail grooves, lest the panel not be able to expand and contract.

Hanging the lid

After planing and scraping the lid smooth and gluing the stops inside, I hung the lid on the chest. The brass butt hinges that mount the lid to the chest are screwed to the back of the chest and to the inside edge of the lid's back frame (see the bottom photo). I used five 1³⁄₁₆-in.-wide by 2-in.-long hinges, which fit perfectly on the ½-in.-wide overlap below the stop on the back of the lid frame. The hinges ¹⁄₁₆-in. overhang on the back of the lid frame allows the lid to open slightly past 90° and rest on two fold-out supports hinged to the chest's back (see the drawings on pp. 62-63). The lid tilts just enough so I can unlatch the inner door without it falling open.

I first chiseled hinge mortises in the lid's back frame and temporarily mounted the hinges so I could set the lid in place and mark the hinge locations on the chest. Then, after chiseling the hinge mortises in the back of the chest, I removed the hinges from the lid and screwed them on the chest, since the hinge screws in the chest aren't accessible with the lid in place. To screw the hinges to the lid, I put it upside down on my bench, laid the chest on its back, and propped up the chest with a piece of wood to align the hinges in their mortises on the lid (shown in the bottom photo).

The chest was complete except for installing the lock. I chiseled the front of the chest for a full-mortise lock and screwed its strike plate on the lid's front stop. I didn't use a spring-loaded lock, as is suggested in early-cabinetmaking texts, because I was afraid I might

leave my keys inside the chest. If I were to close it with a spring-loaded lock, the chest would lock automatically. Need I say more?

Installing the storage compartments

I built the storage compartments from the bottom up. First, I divided the bottom of the chest for individual planes by dadoing partitions to a 3-in.-high frame that fits around the inside perimeter of the chest. Next, I screwed the tool racks to the sides and ends of the chest and then installed the drawer guides around them. The L-shaped guides keep the drawers and removable boxes at various distances from the hanging tools. As shown in the drawings, the framing square and 24-in.-long straightedge sit in their own racks or directly on the drawer guides. After installing the drawers, I added the two top trays; one is hinged to the drawer beneath it, and the other is screwed to the front and back of the chest.

I finished the chest's outside with three coats of a mixture of 4 oz. of beeswax melted in 1 gal. of boiled linseed oil. I applied a coat on the inside too, leaving the chest open to dry. Then I fastened bronze handles on the ends with ¼-20 stove bolts. □

Tony Konovaloff formerly made furniture in Tahoe Paradise, Cal. He is presently a woodworking student at the College of the Redwoods.

Thicknessing boards with a scrub plane

If you've ever considered working wood only by hand, you probably shuddered at the idea of thickness-planing rough boards. But I flatten and thickness a board quickly with a scrub plane and smooth the board with a jointer plane.

A scrub plane, which has a flat sole and a convex cutting edge, leaves a rough, fluted surface, and removes stock quickly. I not only use mine in the shop, but also to preview lumber I want to buy. You can even scrub-plane tabletops or panels that are too wide for your thickness planer. A wood scrub plane sells for about $50; but you can use a plane you already own and just regrind an extra blade. (A new blade is about $12 at hardware stores.)

Turning a jack plane into a scrub plane: The difference between my jack plane and its scrub plane alter ego is how the blades are ground: A jack plane's blade is straight and a scrub plane's blade has a 3/32-in.-high convex curve (see the top photo). You don't need more curve than that because it's hard enough to plane a 1/16-in.-thick shaving. To make the curved edge, I first beveled each corner 3/32 in., and then I ground the curve from the outside corners of the bevels to the middle of the cutting edge. I worked slowly with a hand-crank grinding wheel and quenched the edge often so I didn't anneal the tempered blade. While grinding, I maintained *a 27°* bevel, and I sharpened the cutting edge by honing a secondary bevel on it.

Since a scrub plane removes thick shavings, I opened the throat by setting the plane's frog as far back as possible. However, when scrub-planing figured wood, I move the frog forward a bit. To set the depth of cut, I align the edge of the cap iron with the corners of a convex blade, as shown in the top photo, and put the blade in the plane. I start by exposing about 1/32 in. of the blade and adjust depth to suit the wood's hardness and figure.

Using a scrub plane: I use my scrub plane to cut with the grain, shown in the bottom photo, diagonally to the grain or, with care and a sharp blade, directly across the grain.

To flatten and thickness-plane a warped or twisted board, I first scrub equal amounts of wood off the high spots on one side, and ensure that it is flat by sighting across winding sticks and planing the board until the sticks are parallel. I then finish that surface with a jointer plane. Lastly, I scribe a line on all four edges to mark the desired thickness of the board, and then I scrub the other side to the line and joint it flat. When removing lots of wood like this, I plane with the grain and diagonally to it.

When planing a large panel, the blade can get hot, so I'm careful not to lay the plane where the blade could burn me or the workpiece. To keep the blade cooler and to avoid dulling it, I don't drag the plane blade back over the wood before taking another cut. I also scrub-plane dried squeeze-out from glued-up panels before I thickness-plane and smooth them. I use the leading edge of the plane body, not the blade. —*T.K.*

A scrub-plane blade *can be made by grinding a convex edge on a 2-in.-wide jack-plane blade (left). In use, the cap iron's edge should align with the blade's corners.*

To thickness-plane a panel, *the author scrub-planes diagonally to the grain. Then he scrubs with the grain (below) and smooths the panel with a jointer plane.*