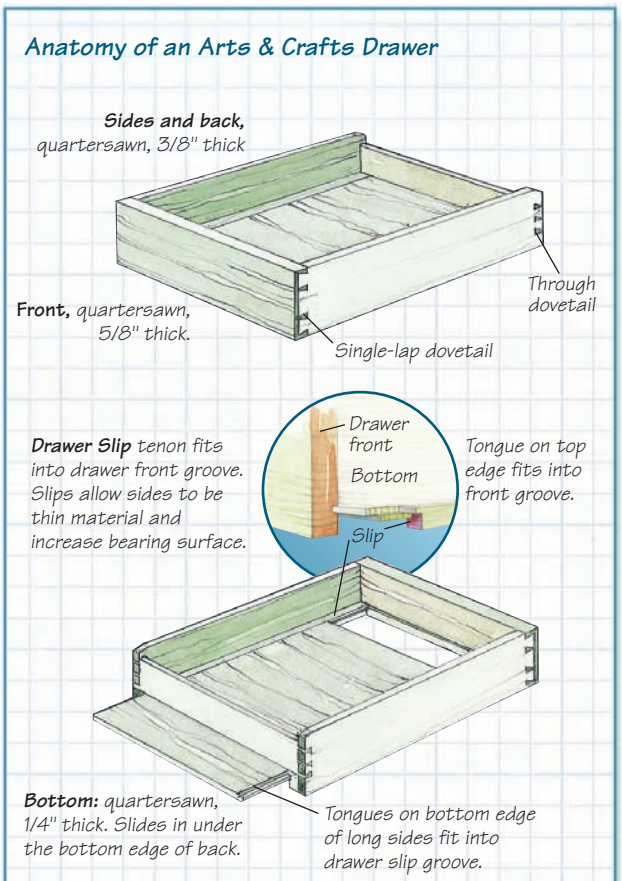
Making a Single-lap Dovetail

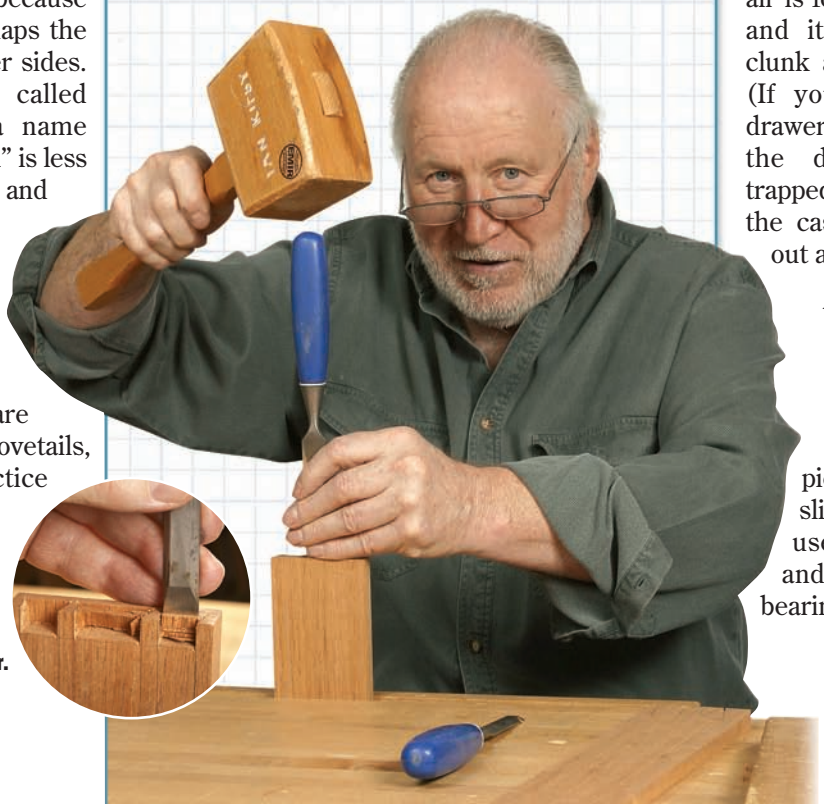
The single-lap dovetail is one of over 30 steps in making a classic handmade solid wood drawer.

By Ian Kirby

In a previous article about making through dovetails (*Woodworker's Journal*, April 2003), I argued the case that learning to make the joint is challenging enough without the added complexity of making it part of a project. Now that you've mastered the through dovetail, the next logical step is to master the single-lap dovetail. This time, however, you will work on a project. It's a study project rather than one destined for sale or display, but you can use it for storing valuable papers or knickknacks, as a reference for solving drawer-making problems, or to impress your friends with the intricacies of a handmade drawer.

The single-lap dovetail is the joint at the front of any drawer put together using dovetail joinery. It's so-called because the drawer front overlaps the tail ends on the drawer sides. The joint is often called a "blind dovetail," a name I dislike because "blind" is less descriptive than "lap," and potentially confusing. How would one describe a double-lap dovetail, for example — a "double-blind dovetail"? The back corners of a drawer are joined by through dovetails, so you get to practice making both joints.





Paring the sockets of the single-lap dovetails is just one of over 30 steps that Ian explains in making this Arts & Crafts drawer.

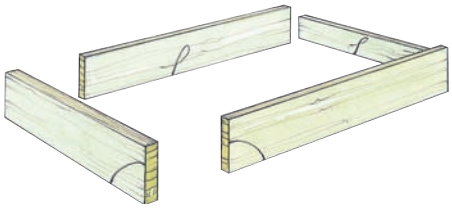
This study drawer is the classic method of making a solid wood handmade drawer, and it represents the furniture maker's craft at its best. More than 30 steps are involved: no other furniture assembly poses more technical and methodological challenges.

Be under no illusion: this is not a quick and easy project. Nor is it to be compared to a machine-made dovetailed drawer with a plywood bottom on metal slides, which does an excellent job in the right setting. This drawer parades quality and elegance, starting with its feel and sound in use, especially as it is closed. Pushed by fingertip pressure, it slows down as air is forced from the case, and it makes a muffled clunk as it comes to rest. (If you don't make the drawer back narrower than the drawer sides, the trapped, compressed air in the case pops the drawer out an inch or so.)

Ordinary drawer bottoms are grooved into relatively thick sides. The bottom of this drawer fits into a supplementary piece called a drawer slip, which allows the use of thinner sides and increases their bearing surface.

To begin the process, fit the individual pieces of the drawer to your drawer case. Accuracy is essential. A one shaving taper on the inside edge of the drawer front allows it to snug into the opening. The sides and the drawer back are then sized, as described in steps 2 and 3 in the article below.

Finally, all the parts, including the bottom, are made of selected quartersawn material. Honduras mahogany is the best choice. Avoid softwood because it's not hard enough and flatsawn material because it's unstable. Quartersawn wood is also easier to work, a major consideration when so much handwork is required. Although machine tools handle the initial preparation of the stock, the skilled use of a hand plane is essential throughout this study project.



Orientation marks record what goes where: face sides in; face edges down; left and right shown by quadrants.

Making and Fitting the Parts

Even with only four parts, keeping track of what goes where is impossible without a marking system. The simple system shown here is directly descended from British Arts and Crafts furniture makers. It uses fewer marks than any other system I've seen. Face sides go inside, face edges go down. Left, right, front, and back on the drawer sides are indicated by a quadrant mark on the front bottom. Left and right on the drawer front and back are indicated by a quadrant mark on the bottom edge, either end.

Use a soft pencil to mark a face side, a face edge, and a quadrant on all four parts. One secret of success to precisely fitted drawers is taking the time to fit all four parts to the case opening before you join them. With that said, let's move on to the first of the steps.

1. Fit the front

Plane one end of the front to fit the case. Check the fit by offering the front at an angle: the goal is an exact reflection of the opening.

Crosscut the other end as close as you can and plane it to fit the opening. Go too far and the front will be too short. A prudent approach is to take a shaving off the inside edges, so the wood has a minute taper toward the inside — that is, the face side. Assuming the case has straight sides, the front now fits on three sides. Leave the top edge proud by 1/16".

2. Fit the back

Fit the ends of the back in the opening, just like the front. To do this, the bottom edge should sit on the bottom of the case with about a 7/8" gap at the top. Make sure the face side is looking at you as you fit the back because that's how it goes in the case.

3. Fit the sides

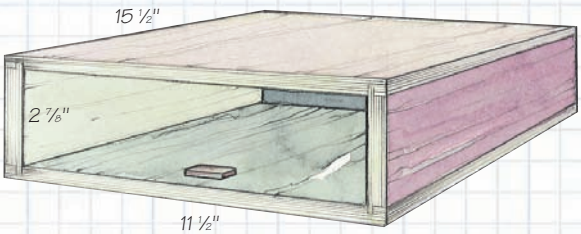
Square the ends and cut to length. Plane the top edge until the side is a push-fit that enters halfway or better. To check that you are planing parallel, turn the side around and enter the front end first: it should slide with the same push-fit.

4. Clean up the inside faces

Plane mill marks from the inside faces before you lay out the dovetails. Mill marks must be removed in preparation for polishing later; the outside faces don't get polished.

Although all steps are critical, this one may not be obviously so. If you plane the inside of the pin pieces — that is, the drawer front and back — after you've cut the joints, they become smaller and therefore loose.

Case for Study Drawer



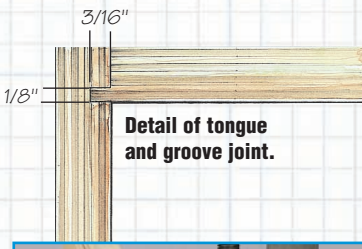
Measurements are internal dimensions.

Make the study drawer case of 1/2" Baltic birch plywood. Join the corners with tongue and groove joints cut on a table saw. See the detail at right.

Make the case parts dead accurate on the table saw. Before you cut the joints, sand the inside of the sides and the areas where the drawer edges run on the top and bottom pieces. Sanding helps the drawer glide better.

Cut the tongue and groove joint on the table saw. Clamp the case square using correctly designed clamping blocks. Remove all traces of glue from the inside corners before it dries. Ignored and hardened glue will prevent the smooth running of the drawer.

When gluing up the case, make specially designed clamping blocks to direct pressure to the right place.



Detail of tongue and groove joint.

Jointing the Parts

A handmade drawer forcefully demonstrates the logic of initially making the joints with the end grain of the front and back left below the long grain surface of the sides. You make the front and back of the drawer to fit the drawer opening, then you make the sides so they're proud of the end grain. In other words, the drawer is too big for the opening. But once you plane the sides down to the end grain of the front and back — which act as precise signposts — the drawer fits perfectly!

5. Mark out and cut the single-lap dovetail front joints

Setting 1. Set your cutting gauge less than the thickness of the side by about 1/32". This is the amount by which the tails will sit proud of the pins. Knife this setting on the face side of the drawer front. Setting 2. The second gauge setting determines the length of the tails and, at the same time, the thickness of the end wall. Knife down the end grain of the drawer front and knife around the end of the drawer sides.

Lay out the tail piece as per the drawing. Cut the tails as if you were making a through dovetail.

Mark the pins from the tails by clamping the pin piece in the vise so that it protrudes about 1/8". See the photo at lower right on page 55. Position the tail piece to the lap gauge line and align the bottom edges flush. Mark the tails as for a through joint.

Sawing the pins introduces a new technique. Start the cut on the corner nearest you. Saw across the end grain to establish the correct line, then saw down the vertical line. Avoid wandering in the first line to prevent ragging out the kerf. Next, chop out the waste with a chisel and mallet. This is one of the rare woodworking procedures best done sitting down. I use a sawhorse. Lay the drawer front on the bench and, using the widest chisel that will fit between the saw kerfs, begin to chop by positioning the chisel about halfway down the joint. The first piece will come flying out. Make two or three more chops towards the knife line, but keep off the line by about 1/16".

Cutting the tails for a single-lap dovetail is the same as cutting the tails for a through dovetail. After cutting the tail slopes with a dovetail saw, remove the bulk of the waste with a coping saw. Your next step is to clean up to the lines by vertical and horizontal paring.

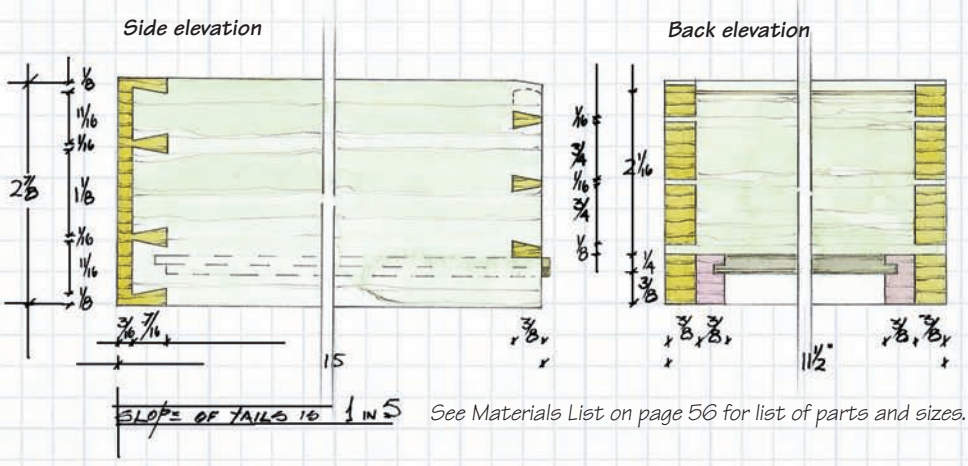
Next, clamp the drawer front upright in the vise and, slice by slice, cut down vertically with gentle mallet blows. With the bulk of the waste removed, pare to the knife lines by hand.

You can't remove the waste from the corners until the end grain fibers have been severed. Do this on each side with a skew chisel — 1/4" chisels ground and sharpened to the angle of the tail. Now, by judicious paring, you can clean out the corner waste.

Assemble the two parts with a hammer as for the through joint. The surface which is sitting above the end grain is what will later be planed off to make the drawer fit.

Study Drawer Details

These dimensions make for elegant looking and refined front and back joints. The hidden detail (the shape described with dotted lines) shows the groove — in the drawer front that accepts the tongue on the bottom — going through a tail socket. It also shows the line of the bottom pin on the back joint.



See Materials List on page 56 for list of parts and sizes.

6. Cut the groove in the front for the drawer bottom

The groove is easiest cut on a table saw using a 1/8" kerf blade. It goes through a tail socket so it's not visible on the side of the drawer. Leave 3/8" below the 1/8" groove.

7. Locate the back joints

The top edge of the groove is the line of the bottom edge of the back. Set a marking gauge to the top edge of the groove and gauge the back end of the sides to indicate the first pin in laying out the back joint.

8. Mark out and cut the through dovetail back joints

The bottom pin socket on the back is dovetailed on one edge only. This avoids unnecessary fussing with measurements to position the back so that the bottom can slide past it. Take your measurements from the drawing and cut the through dovetail joints.

9. Radius top edge of the back

Use a plane to gently curve the edge of the back. You may wish to finger gauge pencil lines down each side 1/16" from the edge as a guide and another down the center of the edge — this line comes off last. Getting a symmetrical curve in this manner is a nice exercise in planecraft.

After cutting with a dovetail saw, lay the front on your bench and begin chopping out the waste across the grain

Next, clamp the drawer front in the vise and continue chopping out the waste down the grain.

The corner waste is removed by first severing the end grain with a pair of purpose-made 1/4" skew chisels. The goal is pins and sockets that are clean as a whistle.

Polishing and Gluing the Parts

For me "polish" means apply shellac and wax — the traditional Arts and Crafts finish.

10. Polish the inside faces

Be careful not to get any wax on the joints or the lower surfaces where the drawer slip gets glued.

11. Glue up the joints

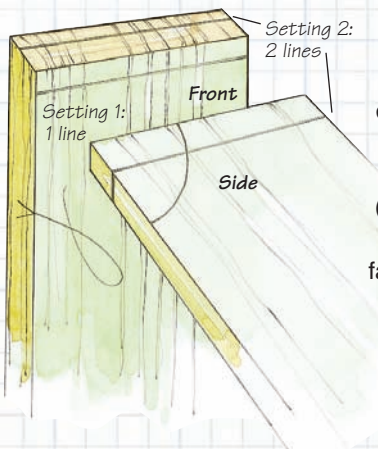
Using a shaped wooden paddle, wet all the mating surfaces with glue, but do so sparingly to minimize squeeze-out. Assemble the parts, tap the tails down with a hammer, then close each set of tails one by one by nipping with a bar clamp. Clamping blocks are unnecessary because the faces of the sides stand proud of the ends of the pins. If the joints are as tight as they should be, there's no need to leave the work in clamps.

12. Check for accuracy

Measure the diagonals to check for square. Sight across the sides to check for twist. Correct any inaccuracies by pushing or twisting the four parts.

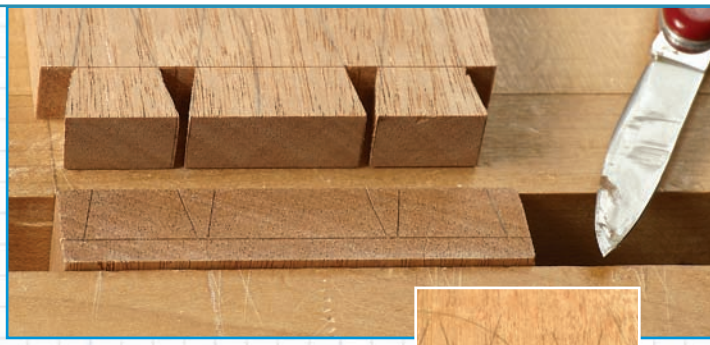
13. Edge clamp the front joint

Because the two outer lines on the front joint are not trapped like the inner glue lines, the glue tends to push the joint open at these interfaces. Close the joint tight with light pressure from a small clamp.



Marking Out and Jointing

The single-lap joint on the drawer front is marked out by two gauge settings and three gauge lines. The first setting (1/32" less than the thickness of the side) determines how far the tails stand proud of the pins. The second setting determines the length of the tails and, at the same time, the thickness of the end wall.



Use the tails to mark the pins by positioning their ends up to the lap gauge line. After you've completed step 5 (above) trial fit the joint. Note the drawer side stands proud of the ends of the pins (inset).

Making and Gluing the Drawer Slip

Drawer slips add an elegantly functional detail to a handmade drawer. Other designs exist, but only this one leaves a square corner.

14. Make the drawer slips

Cut the slips from the same quartersawn material as the drawer sides. Saw the groove in each slip on the table saw before sawing the slip to width — about 1/16" wider than need be. Make an extra piece to check the fit of the tongues which you will make on the drawer bottom.

15. Clean up the slips

Plane off the mill marks on the grooved face and the top edge that will be visible from inside the finished drawer.

16. Make the front joint

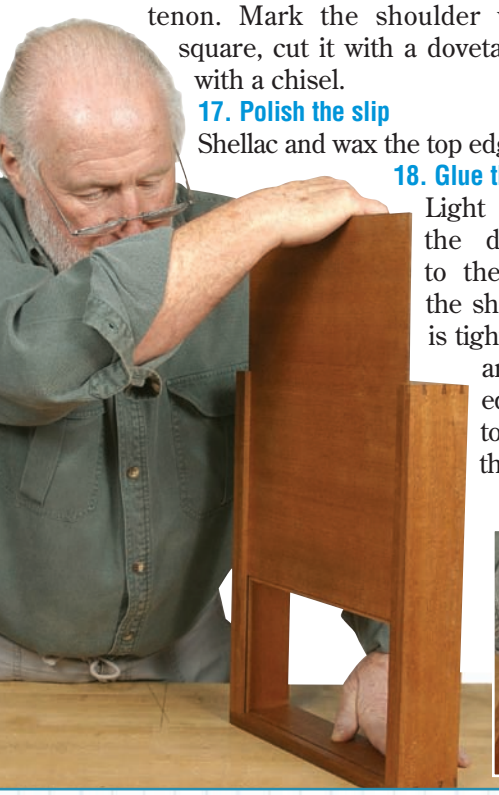
The slip is held in the groove in the drawer front by a tongue, which amounts to a bare-faced mortise and tenon. Mark the shoulder with knife and try square, cut it with a dovetail saw, and clean up with a chisel.

17. Polish the slip

Shellac and wax the top edge of the slip.

18. Glue the slips into place

Light spring clamps hold the drawer slips firmly to the sides. Check that the shoulder of the tongue is tight to the drawer front, and clamp the top edge of the slip tight to the bottom edge of the drawer back.



Making and Fitting the Drawer Bottom

The long grain of the solid wood bottom runs from side to side. This allows for shrinkage and expansion front to back. If the grain were made to run front to back, expansion of the bottom would either jam the the drawer shut tight or bust the case open. The bottom has tongues on three sides to fit the grooves in the slips and the drawer front. The tongue on the front is on the top face of the drawer bottom. The tongues on the sides are on the bottom face of the drawer bottom.

19. Prepare the bottom

Glue up boards to make the bottom and plane to 1/4" thick.

20. Size the bottom

Plane the end grain of one edge square to the front edge.

21. Make the first tongue

Mark the tongue with a cutting gauge and cut it with a shoulder plane. Check it for a sliding fit using the spare slip.

22. Mark the second tongue

Fit the shoulder of the first tongue tight to the bottom of its drawer slip and knife the shoulder line of the second tongue, using the drawer slip as a guide.

23. Cut to length

Leave 3/16" for the tongue beyond the shoulder line you just knifed and saw off the excess material.

24. Make the second tongue

Cut the tongue with a shoulder plane and check it for a sliding fit with the spare slip.

25. Flush the slip and the bottom

Using the spare drawer slip as a guide, plane any excess from the top face of the drawer bottom to make the two parts flush.

26. Insert the bottom and square the front edge

Slide the bottom into place. If it doesn't fit square to the front, remove and adjust accordingly. The bottom should slide in and out with little effort so it can shrink and expand easily.

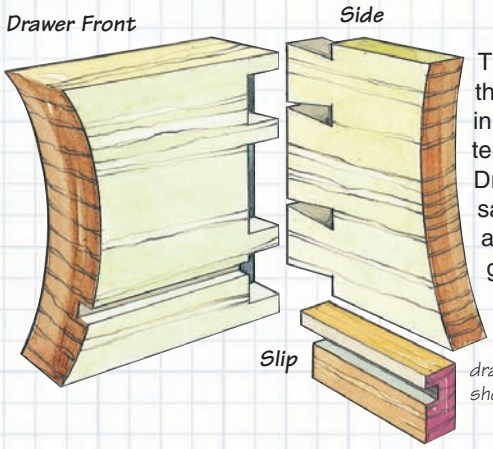
To create the second tongue on the drawer bottom, establish the shoulder with a knife line. Cut all tongues with a shoulder plane.

MATERIAL LIST

	T x W x L
Case (Baltic birch ply)	
Top/Bottom (2)	1/2" x 12½" x 16"
Sides (2)	1/2" x 3¼" x 16"
Back (1)	1/2" x 3¼" x 11⅞"
Drawer* (Selected quartersawn hardwood)	
Front (1)	5/8" x 3¼" x 12"
Sides (2)	3/8" x 3¼" x 15½"
Back (1)	3/8" x 2¼" x 12"
Bottom (1)	9/32" x 15½" x 11"
Slips** (2)	3/8" x 7/8" x 15½"

*All dimensions before final fitting.
**Cut from wide board. Make one spare.

Drawer Slip and Bottom Assembly



This inside corner view shows the relationship of the groove in the drawer front and the tenon on the drawer slip. Drawer slips are cut from the same quartersawn material as the drawer sides. Cut the groove on a table saw.

A short tenon on the front of the slip fits into the groove on the drawer front. The shoulder of the slip should fit tight to the drawer front.

27. Make the front tongue

The tongue on the front is on top of the drawer bottom. This means that if there is a little shrinkage in the drawer, any gap will be out of sight on the bottom. Even a dressmaker's pin can't fall into a crack.

28. Cut to length at the back

Leave the back projecting 1/4" or less.

Shooting the Drawer

In woodworking parlance, shoot means to "make straight," hence the expressions "shoot the edge" and "shoot the drawer." This also explains why an 07 is known as a "shooting plane."

29. Plane off excess drawer slip

The drawer slips were made wider than needed so they project below the sides after being glued in place. Now is the time to plane them flush with the bottom edges of the drawer sides. Check that they are aligned by laying a straightedge across both slips.

Plane both drawer sides down to match the end grain of the dovetail pins.

The final test: closing your handmade drawer with fingertip pressure.

30. Shoot the drawer

Hold the drawer front in the vise and support the side on a board as wide as the drawer is long, clamped across the benchtop. Plane the side from end to end, checking for straightness as you go. When you've planed both sides down to the end grain of the pins, the entire drawer should enter the case, though the fit may be very tight.

Ease the fit a shaving at a time. Working the drawer in and out will burnish any high spots, identifying exactly where a shaving must be removed.

Contact surfaces may be lightly rubbed with candle wax, then buffed with a tight wad pad until you buff it all off. Don't sand the surfaces and don't wax them with beeswax — it will cause the drawer to stick.

Finishing the Drawer Front

The three remaining steps will take you to the end of the drawer making process, and to a new level of woodworking.

31. Planing the top edge of the drawer to fit the case opening

If, when you made the single-lap joints at the front corners, you didn't align the bottom edges spot-on, you can make them flush now and still have some drawer front material to plane to fit. Either way, you now finally fit the front to the opening.

32. Flush the front

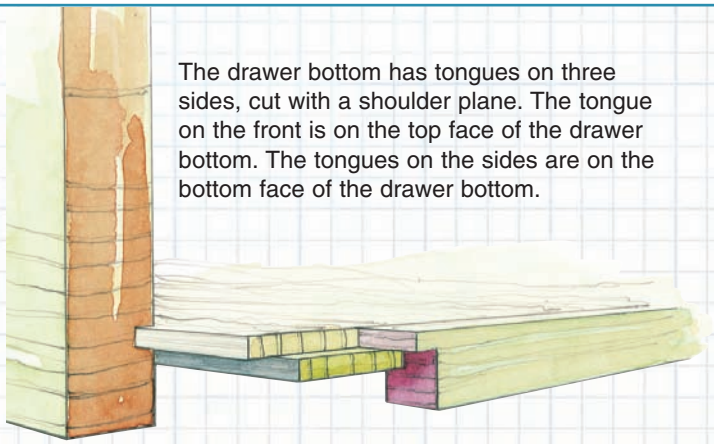
Once the drawer enters the case fully and easily, hold the drawer tight in the opening by clamping it in the vise and plane the front so that it's flush with the case edges.

33. Make and glue the stop in place

The drawer stop brings the drawer to rest where you want it — flush, inset or proud; it's your choice. The stop is a small piece of material, sized about 3/16" thick to allow clearance for the drawer bottom. I position it by setting an adjustable square as a guide, then glue and clamp it in place.

"The goal is a drawer that slides as easily as a skate blade on ice and closes with fingertip pressure."

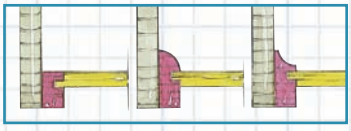
Ian Kirby is a master woodworker and regular contributor to the Woodworker's Journal. *His book,* The Complete Dovetail, *is available from Linden Publishing.*



The drawer bottom has tongues on three sides, cut with a shoulder plane. The tongue on the front is on the top face of the drawer bottom. The tongues on the sides are on the bottom face of the drawer bottom.

Detail showing how tongues on drawer bottom fit into grooves on the drawer front and sides. Slip is pulled back.

The flush slip with its long shoulder lines presents the most demanding work, although it has the simplest look when finished. A less demanding alternative is to make slips that stand proud of the bottom, thus eliminating the visible shoulder line.



Drawer slip variations, left to right: flush, rounded over and coved.

The proper position of the drawer slip is tight to the side, engaged in the drawer front's groove and snug to the bottom edge of the back.