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PLANS

TIPS

JIGS

TOOLS

Canadian Woodworking

JUNE/JULY 2007
Issue # 48

DEVELOP YOUR SKILLS • TOOL YOUR SHOP • BUILD YOUR DREAMS

Wavy Bar Stool

Learn Bent Lamination

Saw Blade

Storage Box

Store and Protect Your Blades

Portable

Spray Booth

Finish Like A Pro

Skill Builder

Routing Basics I

Jig Saws

15 Models to Choose From

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• SCROLL SAW

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ISSUE #48

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PROJECTS

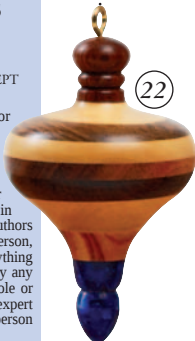
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FEATURE

Cover photo Trish McCulloch. Cover design Ray Pilon.



4 WAVY
BAR STOOL
By TRISH MCCULLOCH



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LINDA FULCHER

The wavy bar stool has very beautiful lines, but when I first saw it I wondered how it could be strong enough to hold people's weight?

The answer reminds me of a story I used to read to our kids about three brothers. Their father wanted to teach them that they were stronger together, so he had them each go out and find a stick.

One by one, he showed them how it was easy to break each of their sticks. Then he had them find more sticks and he bundled them together. Now it was very difficult to break them. They hung the bundle of sticks over the doorway of their house to remind them of this lesson.

Well, the bar stool with its multiple layers of veneer is a very classy example of this same principal.

So, not only will making this chair give you beautiful furniture for your home, it will also be a wonderful reminder that in unity there is strength.



PAUL FULCHER

We have been receiving a lot of reader feedback about Canadian Woodworking's newly beefed up router content.

I don't know if router users are more loyal, or just more vocal, but since our router workstation project (issue #47), readers who love their router, and readers who would love to have a router, have been coming out of the woodwork.

Well, for all of you router-ites, it gets even better with this issue.

To date, we've covered what to look for in a router (issue #42), and how to mount your router in a safe and efficient workstation. In this issue we serve up the meat and potatoes of putting your router to work. It's a three course meal, starting with "Router Basics", (see page 26).

Once you've chowed down the 'router basics' series, you'll be able to use your router, your router workstation, and your newly digested router skills in all of your future woodworking projects.

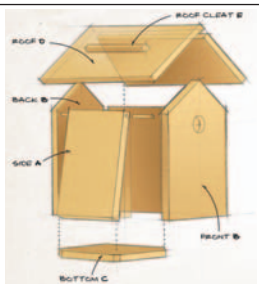
Bon Appetite!

linda@canadianwoodworking.com

fulcher@canadianwoodworking.com

Correction

Issue: April/May 2007, #47
Article: Housing for the Birds
Page: 27
The Roof Cleat
in the Materials List should be
1½" x 1½" x 4"



Woodworking Forum

Our Woodworking Forum is more popular than ever.

Here is a screen shot of some recent topics.

If you are looking for answers to any woodworking questions, this is a perfect place to start.

www.canadianwoodworking.com/forum



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Gentlemen,

Last year you published an article on HVLP spraying and promised to publish plans for a portable spray booth. Well, I got all excited and purchased one of those HVLP sprayers. Now I'm waiting and waiting, and my finishing projects are accumulating. Please... put me out of my misery and publish the spray booth plans.

Cheers, Raoul D., Surrey, BC

Raoul,

Good news - the portable spray booth appears in this issue!

Now you can get on with all of your unfinished business.

Paul

PS Be sure to send us some pics of your 'finished' projects, for publication in an upcoming eNewsletter.



Portable Spray Booth, page 24

Hi Mike,

I would like to comment on the 'Router Workstation' article in the April/May '07 issue, in regard to the dust control aspect.

Firstly to fully enclose a router is a no-no, and then to attach suction to that compartment compounds the problem. All routers have to breathe, and most of them (I use a Freud in my router classes) take air in from the top and blows it out at the base.

When you invert a router into a table, you are sucking air in at the bottom and blowing upwards towards the bit to cool the motor. I know of several cases of people who have made a table (similar to the one described) and have burned out

continued on page 42



ALL RIGHT, WHO LET THE WOODWORKERS INTO THE ENGINEERING MEETING AGAIN?

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Wavy Bar Stool

This project is comprised of five identical laminations joined and mounted on walnut legs. The legs raise the seat to bar height and prevent the chair from rolling backwards.

This is a good exercise in bent lamination, as it consists predominately in making a jig and laminating $\frac{1}{8}$ " strips of maple veneer to form the bent parts for the stool. Using veneer as opposed to milling solid stock saves time and eliminates a lot of waste.

Build the Form

See "Making the Bent Lamination Form" page 7.

- Cut a piece of $\frac{1}{4}$ " MDF to size for template (A).
- Draw the curved seat profile on the template. You can draw the curve freehand, scale it to the appropriate size, or photo enlarge it.
- Using a band saw cut out the profile of the curve on the template.
- Sand the profile smooth, as every bump will transfer into the form and consequently into the lamination. The template needs to be offset $\frac{1}{4}$ " from the curve so the router bit is cutting the same line as the curve.
- Cut three pieces of particle board, one

for the top of the jig (B), the other two for the bottom of the jig (C).

- Screw the template (A) in the approximate middle of the top jig board (B), aligning the top of the template with the edge of the board.

- Install a $\frac{1}{2}$ " straight bit with a 1" guide bushing on your router. Carefully following the template, rout the template profile on the top board (B). Be careful not to drift away from the template, as this will damage the form. You are cutting both sides of the form at the same time. Label both halves as the top, B1 and B2. (Note: there is only one piece on the materials list because in this step you are cutting it in half.)

- Install a $\frac{1}{4}$ " straight router bit and cut the bottom two layers (C) of the form. The $\frac{1}{4}$ " bit will leave excess material to be flush trimmed once the form is glued together.

- Glue the templates together making sure that the first pieces you cut (B) are on top with the other two pieces (C) protruding past.

- When dry, trim the bottom panels flush with the top using a flush trim bit.

- Line the inside of the form with packing tape to prevent the laminations from adhering to the form.

- Cut the guide pieces (D) from scrap hardwood.

- Attach guides to the top and bottom to ensure the form lines up. Each guide consists of three pieces with two guides per side. Each piece is chamfered or rounded on the end so the corners will not conflict when using the form.

- Cover the guides with packing tape, and then screw them onto the form. Ensure that the guides are aligned properly so that the form can be easily pulled apart. To ensure that the guides are adequately tight, clamp up the form with the unglued material inside, and screw in the guides.

Laminate the Veneer

- The stool consists of five laminations. Each lamination is made from ten pieces of veneer. However, the form accommo-

dates twelve pieces of veneer, leaving room for an extra piece of veneer on each side of the veneer sandwich to act as a backer, and to absorb any imperfections. It is best to have two or three people assisting you during the gluing up stage.

- Cut the veneer (E) into 2¼" strips. You will need 52 pieces – five sets of 10 veneers and two extra pieces.

- Cover both sides of the two extra pieces of veneer with packing tape.

- Place the form on a large table or bench. You will need space for the form to be separated so the laminations will fit inside the guides. Use blocks under the form to allow clamping from the top and bottom.

- Lay out the veneer in strips on waste paper.

- Have water, a mixing bucket, plastic resin glue, a roller and tray ready. Plastic resin glue contains a lot of moisture and has a long open time. If you have not used this product before read the instructions that come with the product before using it.

- Do a dry run of the clamp-up.

- Mix the glue following manufacturer's instructions.

- Glue both sides of eight veneer pieces, and one side of the two outside pieces, stacking them together as you glue.

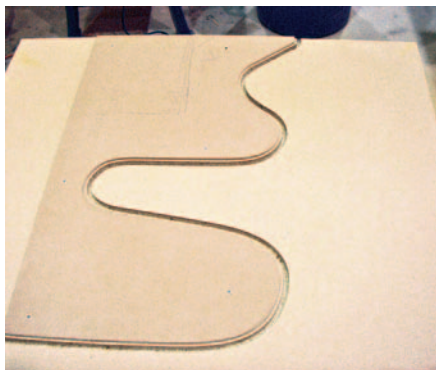
- Add the taped pieces of veneer to the outsides of this sandwich, and place the stack in the middle of the form.

- Pull the laminates down into the large curve slowly until they touch the bottom of the curve. Holding the laminates in place, have helpers gently bend the ends enough that you can slide the form together using the guides for alignment.

- Place clamps alternately, starting in the middle and working your way outward. Re-adjust the clamps until the form is completely closed. Make sure the laminations are closed tightly. You may need to clamp perpendicular to the form to close up the straight end.

- Let the lamination dry as per glue directions.

- Repeat this process for the remaining four sets of veneers.



Form A attached to template piece B

Trim the Laminations

- Remove the guides from the form.
- Cut small pieces of wood ½" thick for spacers that will go underneath the lamination.

- Lay the form flat on a bench and put the lamination inside with spacers beneath. Insert backer pieces to achieve the proper thickness, but ensure they are flat on the bench.

- Clamp the form together using a few clamps. You will need to move these clamps around as you trim.

- Using a laminate trim router and a straight bit, trim the ½" that is protruding out of the form, level with the form. To do this I mounted my trim router on an off-set base. Use the same half of the form to do all the trimming.

- Repeat this process on the remaining four laminations.

- Flip the form over, and using ¼" spacers, trim the other side of each lamination.

Cut the Mortises and Tenons

- Mortise and tenons are used to join the laminations together. To rout the tenons I made three jigs, two jigs for routing laminations and one for routing spacers. (See illustration, page 8).

- Mill the spacers (F) from hard maple. Use a mitre fence and a block to cut the 1" wide strips into 1" squares with a table saw. You will need extra strips because you cannot cut right to the end of the strip for safety reasons.

- Make the three jigs using scraps from around the shop. The tops of the two lamination jigs (Jig A, Jig B) are the same. The goal is to make a square hole that is 1" x ¾" in the center of a surface. This is achieved by sandwiching two ¾" pieces of MDF 1" apart between two larger pieces of MDF. Be sure to mark a centerline on the top and sides before gluing. The difference between these two jigs is the stop block on the bottom. The first jig (Jig A) has a straight stop, the second (Jig B) a curved stop. Both stops are located at the

edge of the hole off the centerline and parallel to the hole. The curved stop allows the jig to be clamped near the curves of the lamination.

- Mark on one lamination the centerline of each spacer. The spacers locate the legs of the stool and are determined by the seat. The centerline for the first spacer is 3½" back from the front curve of the seat and the other two are 3" on center.

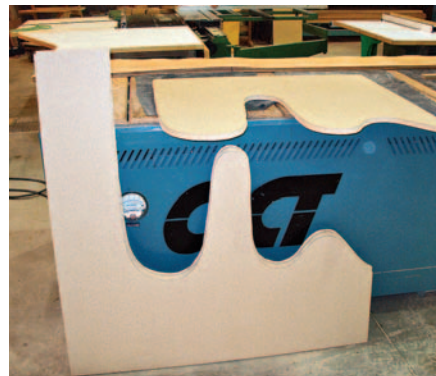
- On the edge of the same lamination, lay a straight edge from the centerline at a 3° angle (towards the front edge) and draw a line on the other two curves. From the back centerline, draw a line at a 20° angle (towards the back edge). These also locate the legs. The top spacers are 2" from the apex of the back curve.

- Assemble the laminations in relation to seat surface and front curve. (It's okay if the ends do not line up). Clamp the laminations together in this position and transfer all the centerlines using a square. Mark the edges of the outside two laminations with a note not to rout them.

- The third jig (Jig C) is to hold the 1" squares in place when mortising them. Using three off-cuts from the spacer stock (F), lay them side by side on a scrap of MDF, lining up the tops of all pieces. Move the middle piece down 1¼" and brad-nail all three pieces in place. Add another scrap of MDF to the other side lining it up with the top so you can drop the squares into the jig, end-grain up, to router.

- Using a router with a ⅝" bushing and a ⅝" bit, rout all mortises in the laminations using the Jig A on the straight parts, and Jig B on the curved parts. Rout the mortises in the laminations ½" deep. Using Jig C rout the mortises in the spacers all the way through.

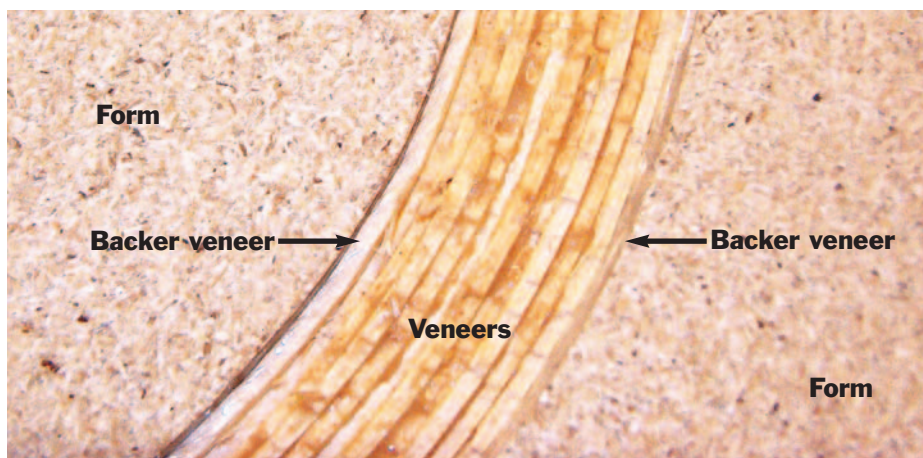
- Mill two strips of hard maple ¾" x ¾" x 40" for the tenons (G). Before cutting the individual tenons to finished length (1½") on the table saw use a hand plane or edge sander to round over the edges until the tenons fit snugly into the mortises. (You can also round the edges on a router table if you have an appropriately sized round over bit).



Two sets of forms B1, C1 and B2, C2



Trim the form B2, C2 flush



The form will accommodate 12 pieces of veneer

- Using a band saw, notch each tenon on its rounded edge. This will help reduce glue run-out during clamping.

Glue the Seat

- To make gluing up manageable, use epoxy glue with a half hour open time.
- Lay the bottom lamination, mortise side up, onto a block so it can be clamped from the underside. You will need eight clamps at least 14" long. Have spacers, tenons, clamps and laminations ready for assembly.
- Time a dry run before you mix the glue. You may need help or need to glue in two stages in order to glue and clamp the stool in time.
- Apply glue to the inside of the mortises on the bottom lamination and in the mortises of the next lamination. Apply glue to the inside of eight spacers. Slip tenons through the spacers and into the mortises. Line up and stack the next lamination. Repeat until all the laminations are glued and stacked with spacers between. Clamp together at the location of the spacers.

Trim the Ends

- Once the glue has cured, plane spacers flush with the laminations using a block plane or chisel.

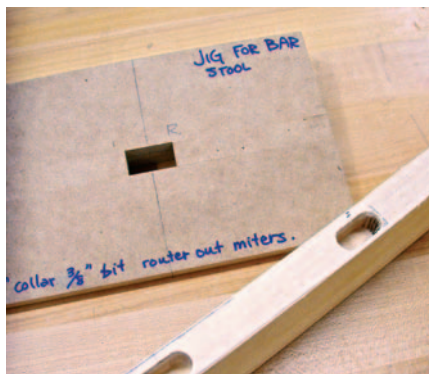


Router with off-set base

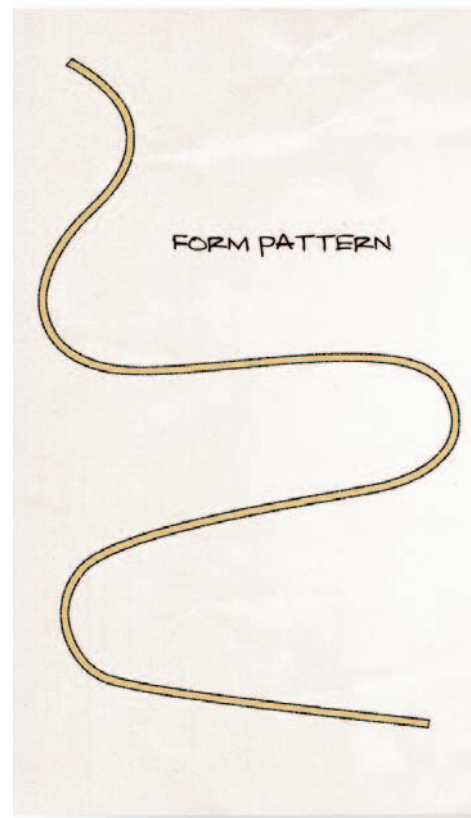
- Mark $\frac{1}{2}$ " above the top spacers and $1\frac{1}{2}$ " below the bottom spacers.
- Place the seat on a scrap of sheet goods with parallel sides, lining the marked edge with the end. Screw a scrap down between the laminations to sandwich the seat flat to the board. Running the straight edge of the scrap along the table saw fence, trim off the ends of the laminations.
- Repeat with the top edge. You will need to prop up the seat for the surface to lay flat.

Attach the Legs

- Mill walnut stock for the legs (H, I) to 1" thick and cut into four strips 1" wide and $25\frac{1}{2}$ " long.
- Trim the ends of all four strips with a 12° angle. This is the bottom; label it with a 'B' to avoid confusion. Cut two of the legs at 23" with the same angle and set aside. These are the back legs.
- From the bottom of one of the two longer legs, measure up $12\frac{1}{2}$ " from the farthest edge. Cut a notch on the inside, 6° up from the bottom and $\frac{1}{2}$ " deep. Keep notching up the leg until the space is big enough for the lamination to slide in tight ($\frac{1}{8}$ "). Lining up the notch with the maple spacers, mark the top notch, and cut it. Cut identical notches on the opposite side of the other leg.



Mortises cut with jig A

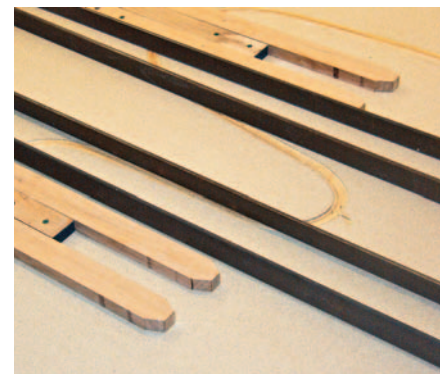


- With the 23" long legs, measure up 11" from the farthest edge. Cut a 9° notch and repeat notching as above, until all four legs fit into the seat.

Finishing Touches

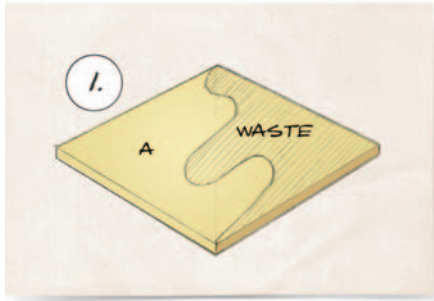
- Hand sand the seat to 120 or 220 grit, depending on the finish you will be applying. Sand the legs, making sure to break the edges.
- Glue legs to seat.
- Smooth the edges on the seat.
- Apply your chosen finish. I used wipe-on polyurethane to decrease the amber colour caused by an oil finish. I recommend two coats, then a wax polish.

Upon completion of this project, you can repeat the process and make enough stools for a bar to entertain company.

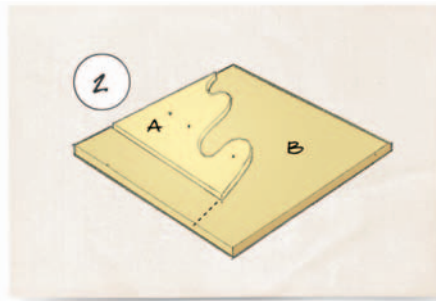


Clamped form showing guides D

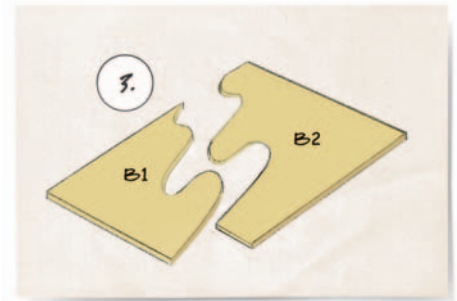
MAKING THE BENT LAMINATION FORM



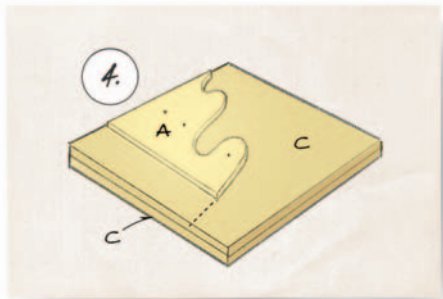
- Draw curve on template piece A
- Cut out on bandsaw
- Smooth edge



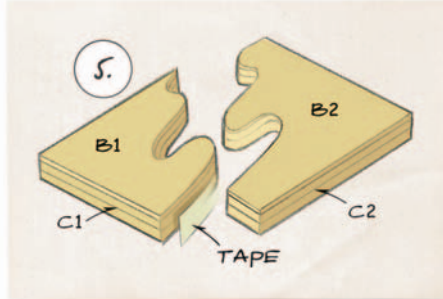
- Attach A onto template piece B
- Rout out piece B using a $\frac{1}{8}$ " bit with 1" guide bushing



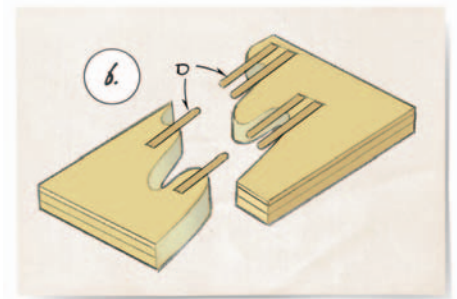
- You will end up with two halves, B1 and B2



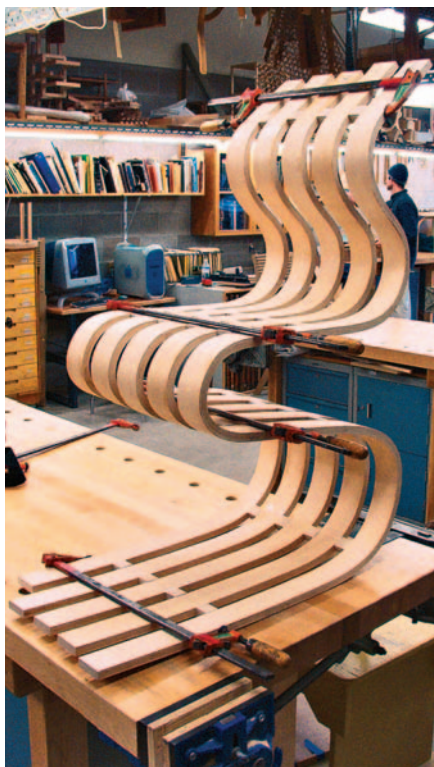
- Screw two layers of template C together
- Attach A onto template piece C
- Rout out piece C using a $\frac{1}{8}$ " bit with 1" guide bushing
- You will end up with two halves, C1 and C2



- Glue and screw B1 and C1 together, and B2 and C2
- Place cellophane tape on the inside edge of both forms
- Use a router with a flush trim bit to trim bottom pieces C flush with top pieces B



- Wrap guides D with cellophane tape
- Screw guides D to the form



Dry run assembly



Laminations with spacers F installed



Legs glued and clamped in place

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Template (MDF)	1	¼	30	40
B	Top of jig (particle board)	1	¾	48	48
C	Bottom of jig (particle board)	2	¾	48	48
D	Guide pieces (solid wood)	12	¾	2	12
E	Lamination pieces (⅙ maple veneer)	52	⅙	2 ¼	96
F	Spacers (hard maple)	32	¾	1	1
G	Tenons (hard maple)	32	¾	¾	1 ⅙
H	Front legs (walnut)	2	1	1	25 ½
I	Back legs (walnut)	2	1	1	23

Photos courtesy Trish McCulloch



This piece was originally entitled:
Undulation: A Study of Linear Form and Movement.
It was designed and built by Trish as part
of her three-year Crafts and Design Program
at Sheridan College.

TRISH MCCULLOCH
trish.mcculloch@gmail.com



LAMINATION AND SPACER ASSEMBLY

LAMINATION PIECE DETAIL

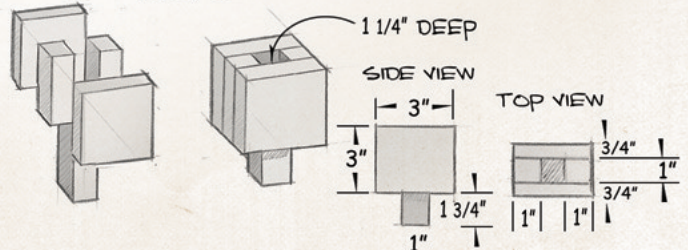
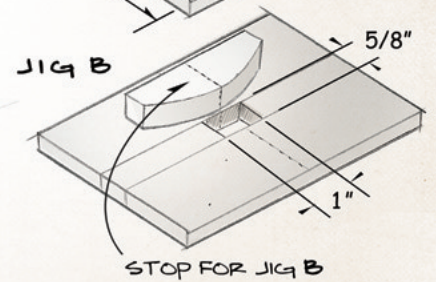
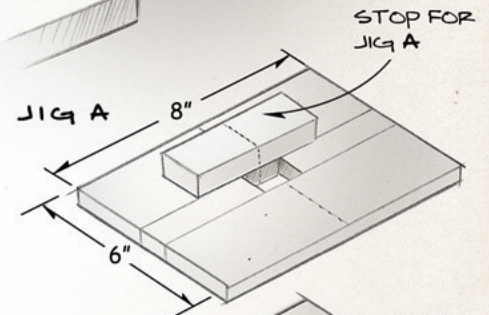
10 PIECES
OF VENEER

LAMINATION PIECE E
BACK LEG I

FRONT LEG H

SPACER F
TENON G

JIG C



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Saw Blade Storage Box

Finding storage space in the shop can be a challenge. Many power tools come with their own plastic carrying case designed specifically for that tool. However, when you buy a new blade for your table saw it normally comes on a cardboard backer or in one of those wretched plastic blister packs. Such packaging may do an admirable job of protecting the carbide teeth on its journey from the factory to your shop, but once unwrapped, you are on your own. In addition, as most woodworkers will acquire several different blades specifically suited to various types of cuts over the years and your storage problem is compounded.

This saw blade storage box (aka 'the box') contains 12 drawers and provides plenty of storage space for all the blades you will likely ever need. Baltic birch plywood is the ideal material for this project. It is stiff, strong and unlike a lot of plywood that you find these days, it is flat. The drawers run in $\frac{1}{4}$ " grooves cut into the plywood sides, and for them to operate without binding, the material for the bottom must be flat. Each drawer is faced with a strip of red oak with a brass knob, and incorporates a stop on the rear edge to prevent it from accidentally being pulled all the way out.

The Box

- Cut the top and bottom (A), sides (B) and back (C) pieces of the box to size.
- Under normal circumstances the sides would sit between the top and the bottom, but because the first drawer groove is only $\frac{1}{4}$ " up from the bottom it would have conflicted with the dowels used to join the carcass bottom to the sides.
- Drill $\frac{3}{8}$ " dowel holes along the four corners of the box (I used my DowelMax), and space the holes every $2\frac{3}{4}$ ". Drill the holes in the bottom and top $\frac{1}{2}$ " inch deep, the ones in the sides 1" deep and use $1\frac{1}{2}$ " dowels. Do not glue the joints yet.
- Set up a dado blade in your table saw and cut a $\frac{1}{4}$ " wide dado, $\frac{15}{16}$ " up from the bottom of both sides, then repeat this at 1" intervals for each blade drawer. The top drawer is extra deep to accommodate a dado blade set. The drawer bottom should fit snugly into the dado yet still be loose enough to allow it to slide back and forth.
- Use the dado blade to cut a $\frac{3}{4}$ " wide by $\frac{3}{8}$ " deep rabbet on the back of both sides. This will house the $\frac{3}{4}$ " back panel.
- To provide a drawer stop to keep the drawers from accidentally being pulled all the way out you will need to drill a set of $\frac{1}{4}$ " dowel holes in each side. Set up a fence on the drill press table to drill a row of

holes $1\frac{1}{4}$ " back from the front of the box. Drill these holes to a depth of $\frac{1}{2}$ ", $\frac{1}{2}$ " up from the drawer groove. There will be one on each side – two for each drawer.

The Drawers

- Cut the 12 pieces of $\frac{1}{4}$ " plywood for the drawer bottoms (D).
- Use a $1\frac{1}{2}$ " saw tooth bit to cut a hole in the center of each blade drawer bottom. Use a backer board to prevent blowing out the bottom of the hole as the bit breaks through the other side.
- Mark out the locations for the wooden buttons that hold the saw blade in place on the drawer bottom and drill them out with a drill press. The buttons I used were $\frac{5}{8}$ " in diameter and mounted in a $\frac{1}{2}$ " diameter flat bottom hole. To make gluing in the buttons easier, do not drill all the way



through the drawer bottom. The buttons that I used required a hole $\frac{1}{8}$ " deep. To keep these holes even and speed up the process, set up two fences at 90° to each other on the drill press and set the necessary depth stop.

Put A Face On It

To keep things simple, each drawer is faced with a strip of oak ripped from the edge of a board. To be able to do this you must start with rough stock that is sufficiently thick to allow it to be milled to a finished thickness of $\frac{15}{16}$ ". As most of the red oak available is flat sawn, cutting the drawer fronts this way will present grain on the face that looks as though it were quarter sawn or rift sawn.

- Begin by milling enough material for the drawer fronts (E) to a thickness of $\frac{15}{16}$ ". The actual width of the drawer front should be $\frac{1}{16}$ " less than the spacing between the dado's cut in the sides, which results in a $\frac{1}{16}$ " gap between each drawer.
- Cut the pieces to cap the front edge of the top and bottom (F).
- The drawer front (G) for the dado blade set must be wider to accommodate the thicker blade set. To maintain the look of the grain on the drawer fronts it will need to be glued up from other stock. Rip three drawer fronts from the same material as the other drawers and glue them up to form a wider blank. When the glue has set, use a jointer and thickness planer to bring the blank to the same thickness as the other drawer fronts and rip it to width.
- Mill the pieces for the drawer stops (H) from the same material.
- Set a stop on your saw and cut all of the drawer fronts to the same length.
- Confirm actual thickness of your drawer bottom material with the stock you have on hand and cut a dado on the rear of each drawer face to receive the drawer bottom. If your material is less than $\frac{1}{4}$ " thick (and much of the plywood sold today is), then the simplest method of cutting the dado will be with two passes over the table saw for each drawer front. Make the first cut in every drawer front $\frac{3}{16}$ " inch up from the bottom and then shift the fence over just enough to complete the dado.

- Mounting the knobs on the drawer fronts requires a few extra steps. Because the drawer fronts are so narrow, it is not possible to simply drill a hole in the center of each, insert the screw and fasten the knob in place. The center of the screw head would coincide with the top edge of the plywood drawer bottom. To get around this use the following method:
- Set up a fence on the drill press with an end stop to correctly position the bit at the center of the drawer front, both vertically and horizontally.

- Use the depth stop on the drill press to drill the holes in the fronts to a depth of $\frac{1}{2}$ ".
- Drill dowel holes in the front edges of the top and bottom as well as the cap pieces.

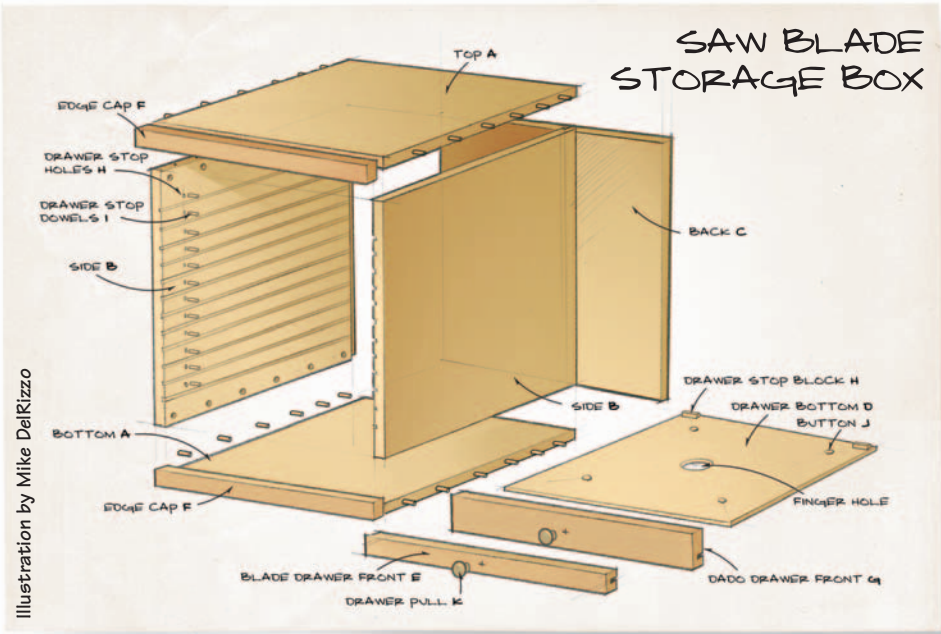
The Finish

- The interior of the box is not finished, so to avoid having a sloppy transition where the finished and unfinished parts meet, apply the finish to the visible parts before assembly.
- Sand the drawer fronts and the plywood box components that are to be finished.
- Apply a coat of oil to the exterior surfaces and follow this with a couple of coats of paste wax. This makes the surface

nice and slippery, so it is harder for dust to stick to it during cleanup. It also makes it easy to repair any future scratches.

Bring It All Together

- Assemble the main section of the box (sides, top, bottom and back) using glue and dowels. Clamp everything up and check the diagonals to be sure it is square.
- When the glue has set on the box, remove the clamps and use dowels to attach the cap to the bottom piece. Set aside until the glue has set.
- Lay the box on its back and place the first drawer bottom in the second dado up from the bottom. It should project above the sides of the box a distance equal to the



MATERIALS LIST (All measurements in inches)					
	Part	Qty	T	W	L
A	Top and bottom	2	$\frac{3}{4}$	$11 \frac{5}{8}$	$11 \frac{1}{8}$
B	Sides	2	$\frac{3}{4}$	$12 \frac{3}{8}$	15
C	Back	1	$\frac{3}{4}$	12	15
D	Drawer bottoms	12	$\frac{1}{4}$	12	12
E	Blade drawer fronts	11	$\frac{3}{4}$	$1 \frac{5}{16}$	$12 \frac{1}{2}$
F	Top/bottom edge cap	2	$\frac{3}{4}$	$\frac{3}{4}$	$12 \frac{1}{2}$
G	Dado drawer front	1	$\frac{3}{4}$	$2 \frac{7}{16}$	$12 \frac{1}{2}$
H	Drawer stop blocks	24	$\frac{1}{2}$	$\frac{3}{4}$	1
I	Drawer stop dowels	24	$\frac{1}{4}$	$\frac{1}{4}$	$1 \frac{1}{2}$
J	$\frac{1}{2}$ " Buttons	48	-	-	-
K	Drawer pulls	12	-	-	-

Notes:
You will also need $\frac{3}{8}$ " dowels to assemble the carcass.



depth of the groove in the rear of the drawer front.

- Apply a bead of glue in the groove in the drawer front. Do not apply glue to the last inch on each end.

- Invert the drawer front and press it in place on the edge of the drawer bottom, centering it on the box. Use a quick-grip style clamp through the finger hole and across the front of the drawer to hold the two pieces together, and remove the drawer from the box. Place it on a flat surface and apply additional clamps to hold everything tight until the glue sets.

- Repeat this for each drawer.

- With all of the drawers glued up, mix up some epoxy to attach the drawer stops. Apply a small amount of epoxy to each drawer stop and set them in place on the rear edge, on either side of the drawer bottoms.

- To attach the knobs to the drawer front, thread the screw all the way into the knob and use a pair of cutters to cut the head of the screw off, leaving 1/2" of the threaded portion of the screw in the knob.

- Mix up some five-minute epoxy and use a toothpick to place some in each screw hole. Push the knob with the headless screw into the hole. The epoxy will harden quickly, so be organized and proceed without delay.

- Install the drawers in the box, and with the drawers in place, insert 1" dowels in the holes in the sides. This forms the other half of the drawer stop mechanism. Don't glue these or the drawer will be in there permanently.

- All that is left to do is insert the drawers into the box and organize your saw blades. Place the cube close to your saw and you'll always have the correct blade stored close at hand in a safe and convenient place.

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Shaker Wall Clock

The Shaker communities reached their height during the 1800's, but the last remaining community at Sabbathday Lake, Maine, still carries on to this day. They are most well known for the enduring legacy of the Shaker furniture style. Simple and unadorned in appearance, it was built with a high degree of craftsmanship with individual craftsmen developing their own discrete ornamentation to set their pieces apart from the others. As the 1800's drew to a close, the Shaker style started to adopt some of the ornamentation of the new Victorian era.

This Shaker wall clock is based on a series of clocks that Isaac Newton Young started in the spring of 1840. While this clock doesn't stray too far from those built by Young in terms of its overall design, I've made some changes to accommodate modern woodworking methods. I've used dowels in this version in order to simplify construction and avoid the need to fill or plug screw holes. Instead of the traditional mitred $\frac{1}{4}$ round pieces to hold the glass, this version uses a rabbet cut on a router. I've chosen to use a solid panel in the lower door, veneered with mottled makore, which contrasts nicely with the black walnut in the rest of the case.

Before you begin cutting any wood, choose your clock movement. You can purchase a battery-powered movement from dealers such as Crafttime Clockery or Lee Valley Tools. If you use a mechanical movement you may have to modify the dimensions of the case. When Young built his clocks he painted all of the faces himself. While reproducing his clock design is easy, painting your own clock face would be quite a challenge. The alternative I chose was a commercially available Shaker clock face and hand set.

From the research I've done, the originals were slightly larger than this version, likely to accommodate the moments of the day and the pendulums and pulleys they required. The quartz movement in this version is quite small and it was the available clock face that set the dimensions for this project. Using historical photos I scaled the clock down while trying to maintain the proportions that make it so pleasing to the eye. To achieve this, I began with 4/4 stock and planed most of the parts of this clock to a thickness of 5/8".

The Case

• The core of this project is the case, and although it is quite basic, most of the machining is done on the two sides. All of the pieces for the clock (with the exception of the hanger) are square and the clock is assembled using dowels. To ensure perfect alignment of the dowel holes I used my DowelMax jig, but use whatever system suits you. Dowels allow the entire clock to be constructed and then finished before being assembled. If you use screws you will need to use plugs of a similar species to cover the heads after assembly and before finishing the clock. You will also need to slightly modify the construction method described below.



• Cut the pieces for the sides (A), top/bottom (B) and the center divider (C). Choose the best material for the sides as these are the most visible parts. Use a jointer and a thickness planer to square up the stock and dress it to a final thickness of 5/8". Cut them to length.

• Use the doweling jig to drill three dowel holes for each corner joint. Be sure that the rear dowel is in at least 1" from the rear edge of the case or it will disappear when you cut the rabbet for the back later. Use the front edge of the case as a reference edge for these holes.

• The center divider separates the front of the clock into two sections. The top of the divider should be 8 1/8" down from the top of the clock (the thickness of the top plus the length of the top). Drill two dowel holes in each end of the divider to attach it to the clock body.

• Set up a spiral bit in your router table and use the center divider as a spacer to set a 5/8" gap between it and the fence. Starting at the top, rout a stopped groove 9 1/2" long, 5/8" back from the front edge of the clock case. This is to accommodate the makore that forms the bezel to which the clock face is attached.

• Reset the fence on the router and rout a 1/4" deep groove, 1/4" down from the top edge of the center divider.

• If the movement you are using does not require a pendulum, then you can use the lower part of the case for storage. If you wish to add a few shelves, drill a series of dowel holes in the side to attach shelves.

• Sand the inside surfaces of the lower section as well as the outside of the sides only and apply a coat of Watco Natural Oil to these parts.

Watch Your Back

• On the original clocks, the back is made of one solid piece of wood. This method would require allowances to be made for seasonal expansion of the back. The back on this clock is made of plywood with solid wood attached at the top to provide the traditional Shaker hanger.

• Cut a piece of Baltic birch plywood for the main portion of the back (D). Sand it to 150-grit in preparation for painting.

• Mill some walnut stock for the vertical (E) and horizontal (F) hanger pieces.

• Use a compass to draw a half circle on the top of the vertical hanger piece.

• Using a 1 3/8" saw tooth or Forstner bit in a drill press, drill out the peg hole on the center mark left by the compass.

• Cut out the curved sections on a band saw and tidy up the edges using a sander. A 1" drum sander mounted in the drill press will quickly clean up any roughness inside the peg hole.

• Join the vertical and horizontal sections of the hanger using a half lap joint. This can easily be cut on the table saw (with multiple passes) or on the router table.

• Glue the two hanger pieces together and clamp them. Use a small square to check that the pieces are square to each other.

• When the glue has set, remove the clamps and drill a series of dowel holes along the bottom edge of the hanger and the top edge of the plywood back.

• Sand the hanger assembly.

The Doors

Most of this project is assembled using traditional yellow carpenters glue, which has a fairly short open time. When working with veneers, (or if you prefer a more relaxed pace) during assembly, use glue such as Titebond III, which has a longer open time.

• Mill the stock for the rails (G) and stile (H) for the upper door as well as the rails (I) and stiles (J) for the lower door.

• Drill holes for two 1/4" dowels for each corner joint in the doors.

• Assemble, glue and clamp the upper. Check the diagonals to be sure that it is square.

• Cut a piece of 1/4" Baltic birch plywood for the lower door panel (K) and sand both sides with 150 grit paper.

• Cut a piece of veneer (L) to the same size as the door panel. Use a paint roller to apply a thin but even coat of glue to the plywood. Lay the veneer on the plywood and starting at the center, press the veneer down. It will have a tendency to curl shortly after you place it on the glue, so work without delay. Cover the veneered face with a sheet of waxed paper and then sandwich the door panel between two thicker sheets of plywood and apply sufficient clamps to press the veneer flat. Be sure there isn't any debris on the pieces or the finished veneer will have indentations in its surface. Allow the glue to cure overnight.

• Unclamp the stack and remove the waxed paper. Then sand the surface of the veneer through to 220 grit.

• Apply a coat of Watco Natural Oil finish to bring out the colour and figure in the makore and follow this with a couple of coats of wax. Doing this now will protect the veneered surface when milk painting the back. Also, it would be virtually impossible to finish the panel properly after it is installed in the door.

• Measure the finished thickness of the door panel and use the router table to cut grooves for the panel in the doorframe members. This could be done with a slotting cutter with the pieces flat on the table, or with a spiral cutter with the pieces in a vertical position.

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Sides	2	$\frac{5}{8}$	4	$26 \frac{7}{8}$
B	Top/bottom	2	$\frac{5}{8}$	$3 \frac{1}{4}$	$8 \frac{1}{4}$
C	Center divider	1	$\frac{5}{8}$	$1 \frac{7}{8}$	$8 \frac{1}{4}$
D	Back (plywood)	1	$\frac{3}{4}$	$8 \frac{3}{4}$	$23 \frac{3}{4}$
E	Shaker hanger, vertical	1	$\frac{3}{4}$	4	$8 \frac{1}{8}$
F	Hanger piece, horizontal	1	$\frac{3}{4}$	4	$8 \frac{3}{4}$
G	Upper door rails	2	$\frac{5}{8}$	$1 \frac{3}{8}$	$6 \frac{11}{16}$
H	Upper door stiles	2	$\frac{5}{8}$	$1 \frac{3}{8}$	$9 \frac{3}{8}$
I	Lower door rails	2	$\frac{5}{8}$	$1 \frac{3}{4}$	6
J	Lower door stiles	2	$\frac{5}{8}$	$1 \frac{3}{4}$	$16 \frac{7}{8}$
K	Lower door panel	1	$\frac{1}{4}$	$6 \frac{11}{16}$	$14 \frac{1}{8}$
L	Lower door veneer	1	-	$6 \frac{11}{16}$	$14 \frac{1}{8}$
M	Top/bottom caps	2	$\frac{3}{4}$	$5 \frac{3}{8}$	$10 \frac{7}{8}$
N	Center half round trim	1	$\frac{5}{8}$	$1 \frac{1}{8}$	$9 \frac{1}{2}$
O	Center bezel ledge	1	$\frac{3}{8}$	$\frac{3}{4}$	$8 \frac{1}{4}$
P	Clock face backer	1	$\frac{1}{4}$	$8 \frac{1}{4}$	$8 \frac{1}{4}$
Q	Upper door glass	1	3mm	$7 \frac{5}{8}$	$7 \frac{5}{8}$
R	Clock face bezel	4	$\frac{3}{8}$	1	8

Notes: You will also need a quartz clock movement, clock face, and hand set.

- Paint the panels.

- Mix up a small amount of milk paint for the back of the door panel and for both sides of the back. The colour used here is called Liberty Blue and is available from the only Canadian manufacturer of milk paint, Homestead House Paint Company in Toronto.

- Apply the paint following the instructions on the package and seal the surface with a coat of Watco Natural Oil finish.

- Follow up the Watco with a couple of coats of paste wax.

The Other Bits

- Mill the material for the top and bottom caps (M) and cut the pieces to length. Unlike the body and doors of the clock, these pieces are a full $\frac{3}{4}$ " thick.

- Mount a $\frac{3}{4}$ " round over bit in the router table and round over the front and sides of the two caps. Make the cut in several passes. Leaving the final pass to remove just a small amount of material will leave you with a smooth finish that should require very little sanding. By doing the ends first, the cut along the front edge will remove any tear out that happened when making the end cuts.

- Mark the cut-out for the hanger on the back of the top cap and cut it out with a band saw.

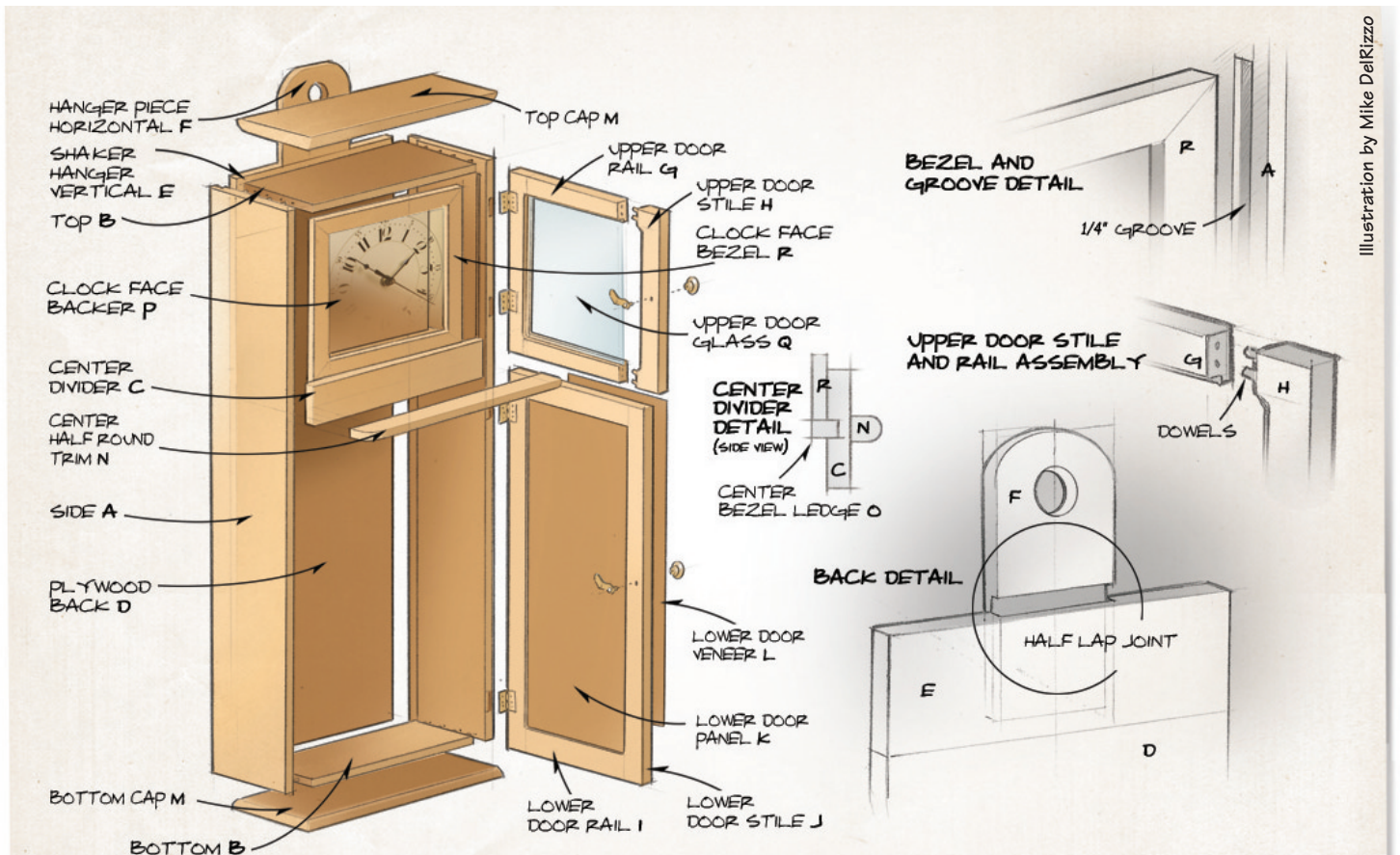


Illustration by Mike DelRizzo

- Mill a piece of walnut for the center half round trim (N) and cut it to length. I don't have a $\frac{3}{8}$ " half round bit for my router, but achieved the same effect by rounding over each side with a $\frac{1}{8}$ " round over bit. Use a belt or disc sander to curve the end inward slightly.

- Cut some strips of makore and mill these to the thickness required to fit into the grooves cut for the clock bezel. Cut a strip of walnut for the center ledge (O). Glue this into place on the back of the center divider.

- Cut a piece of $\frac{1}{4}$ " plywood (P) for the clock face backer and drill a hole in the center to accommodate the shaft of the clock movement. Line up the clock face so it is centered on the backer and use a pencil to trace the outline of the face. Spray the backer and the back of the clock with a coat of 3M Super77 spray adhesive and carefully align the clock face with the pencil lines and press it into place.

- Sand and finish all of the visible areas of the parts before assembly.

- Mount a $\frac{3}{8}$ " piloted rabbeting bit in the router table and rout a rabbet on the inside edge of the upper door to receive the glass (Q). You will need to either shape the corners of the glass to fit the rounded corners of the rabbet or you will need to square off the rounded corners of the rabbet. Because the material for the doors is so thin, when I cut the rabbet, I accidentally cut into one of the dowels. Therefore, I chose not to subject the edges to the hammer and chisel treatment and instead opted to round the glass. Mount the glass using a bead of silicone caulk.

Time for Assembly

- Set out all of the material you will need for each stage of the glue-up. Have enough dowels and glue on hand so that the process runs smoothly. Once the glue hits the wood, time is of the essence. Begin by gluing up the center section of the clock, the sides, top and bottom, and

the center divider. After clamping it up, check the diagonals to be sure it is square.

- Assemble, glue and clamp the lower door, and check the diagonals for square.

- With both doors and the core of the clock glued up, lay out and cut the mortises for the hinges. I used two different lengths of hinges on this project, a shorter one for the smaller upper door, and a slightly longer one for the lower door. To mount the hinges you will need to cut a mortise in the door as well as a matching mortise on the cabinet. The easiest way to do this is to use a spiral bit on the router table. Set up a fence and a couple of end stops to limit the movement of the clock body and the door. Line up the hinges so that the outer edge of each hinge lines up with the inner edge of the closest rail. Use a self-centering punch to start the holes for the small #4 screws.

- Mount the center half-round trim to the center divider from the back, using some #6 wood screws. Drill pilot holes in the trim and drill a clearance hole in the divider to avoid splitting the wood or snapping the screw.

- Glue and clamp the top and bottom caps to the main case.

- Fit the makore pieces that form the bezel. Glue these in place using regular carpenters glue, or some 5-minute epoxy.

- To assure perfect 90° corners, use a 45° cross cut sled on the table saw. Cut one side of the angle on one side of the blade, the other side on the other side of the blade, and you will end up with a perfect 90° joint every time. (Assuming the two fences on your jig are 90° to each other).

- Glue the clock face to the back of the bezel with some five-minute epoxy. Alternatively, set the clock face in place behind the bezel and hold it there with a couple of strips of wood and a rubbed glue joint.

- Mount the clock movement to the back of the face and mount the hands to the movement.

- Glue the hanger to the plywood back with dowels and then affix the back to the clock case using four screws. Drive these into the back of the top and bottom pieces of the main case from the back.

- Touch up any areas where the finish needs it and give the whole clock a couple of coats of wax. If you are not using the lower half of the clock as storage then hanging it from a single peg will be more than enough. If you will be using the inside for storage, then a second screw driven through the back of the clock towards the bottom will keep it from swinging on the wall and ending up continually crooked on its hanger.

The Shaker Spinner

On most of their pieces, the Shakers used simple turned wooden knobs with a shaft that went through the door and attached to a piece of wood to form a spinner. Turning the knob a quarter turn counter clockwise caused this piece of wood to engage a hole cut in the side of the case to keep the door shut.

If you don't have a lathe or don't wish to make your own knobs, here is an alternative. Using the steel knobs in the material list, replace the screw that comes with the knob with one that is longer. Cut a small piece of wood for the catch and drill a hole into it and slip it over the screw. Fashion a wooden spacer out of some scrap wood to provide the proper set-back for the spinner to engage the hole in the case. Use some five-minute epoxy to fasten the wooden pieces to the screw and insert the screw into the hole from behind the door. Install the knob on the front of the cabinet and use a bit of Lock-tite on the threads to keep the screw from backing out of the knob. Cut the mortise in the case sides for the spinner before assembling the case.

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Secretary Desk Gallery & Finish

Part II

The gallery of a secretary desk helps keep smaller items organized. Mail, pens, and notes as well as other often used items are conveniently stored and easily accessible.

In the last issue Rob described the process of making this secretary desk. In this issue he will complete the desk with a gallery and show you how to finish the entire piece.



When the slant top is open one's eyes are drawn to the contrasting small drawers and pigeonholes. From the woodworkers standpoint the gallery provides many options for showing off some finer joinery methods. It will also give you a chance to use some of those highly prized figured woods that you have been protecting at the back of your lumber rack.

The drawers are constructed with dovetail and dado joints, and feature curly anigre on the faces (anigre is an African wood that looks somewhat like butternut but has a figure like curly cherry). The majority of the gallery framework uses dados and V-grooves and is made of mahogany, the primary wood used in the desk.

Design Comes First

Before I started building the gallery I looked through all the furniture books and back issues of magazines I had. With so many options for designs I wanted to re-familiarize myself with them.

The design of a gallery should be both beautiful and functional. It can be customized depending on how its owner will be using it. My client was to use this desk as an office while working at home. A number of mid-sized drawers were needed for stationary and the like, but the most important design consideration was that a laptop would be used on a regular basis. When the slant top was closed there needed to be enough room to house the computer. This necessitated incorporating a 3" space below the gallery and an access hole in the back of the desk to accommodate the necessary wiring.

A full-scale drawing is essential for a small project like this. See the sidebar "Other Options to Consider When Designing a Gallery".

The Gallery Framework

- Start with the larger pieces and work towards the smaller, shorter ones when building a gallery.
- Glue up oversized panels that will make up the two larger shelves (A, B), two smaller shelves (C), two upper dividers

(E), one lower divider (D) and the two pigeonhole dividers (F). Panels can be glued up so that a number of parts can be obtained from one glued up panel. The pieces that will be seen should be made entirely of mahogany. The pieces that will be hidden (bottom shelf, upper shelves and the lower divider) can be made of mahogany for the front 2" and poplar for the back portion. This reduces the use of expensive stock where it will not be seen.

- Plane the boards to final thickness.
- Rout the appropriate dados and V-grooves into the top and sides of the desk. The dados are $\frac{3}{8}$ " wide and $\frac{3}{16}$ " deep and the V-grooves finished at $\frac{1}{4}$ " wide at their opening. As a general rule of thumb use dados for the main structural parts of the gallery and V-grooves for the smaller, thinner pieces. To machine these grooves squarely and accurately I made a wooden square that I clamped to the desk. This square is what I ran the router against. You can also use spacer panels that reference off the inside of the desk.

It's a good idea to have two routers for this job. One is set up with the dado bit and one has a V bit. That will reduce setups and give you consistent results.

- Cut the bottom (A) and middle (B) shelves to length. Machine the dados in these parts to accept the lower (D) and upper (E) dividers.

- Now you can obtain the final dimensions for the shelves (A, B) followed by the upper shelves (C). Cut these parts to length.

- The front edges of the parts that are attached to the desk will have to be rounded to seat properly into the round front of the routed dado.

- Cut pigeonhole dividers (F) to final length. With a block plane chamfer the ends to fit into the V-grooves. Cut the pattern on the fronts of these dividers with a coping saw or scroll saw.

- During the process of machining and fitting these parts you will have to remove and reinstall them many times. Patience is important and will pay off with a snug final fit.

- Once all of the pieces are fitting properly you can rip them to final width.

- Sand the pieces. Be careful not to sand too much. The more they are sanded, the thinner they become creating a loose fit with their mating dados.

- Once the parts all fit nicely you're ready to install them. As you did when machining all these parts start with the larger parts – in this case the bottom and middle shelves (A, B). A bit of glue on both the shelf ends and the dado is all that's needed. Excessive squeeze out will hinder even stain absorption.

- Once dry continue with the other dividers (E, F) and shelves (C) in the appropriate order. I finished the two pigeonhole dividers before gluing them in place.

Machine and Fit the Drawers

- Although we need a slight gap – about $\frac{1}{32}$ " on all four sides – between the drawer and the drawer cavity I start by making the drawers the exact size of the openings and plane or sand them to fit perfectly after they are assembled.

- The drawer fronts (G, H, I) will finish at $\frac{1}{2}$ " thick while I brought the sides (J, K, L) and backs (M, N, O) down to $\frac{3}{8}$ ". I plane a long board down to final thickness

before cutting the parts to length. This way sending short parts through the planer isn't an issue.

- Cut the fronts to final size - the exact size of the opening. At the same time rip the sides to final width.

Other options to consider when designing a gallery

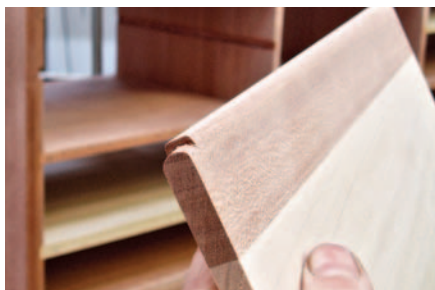
A gallery should be customized to the person who is using it. Whether it will be used for storing $8\frac{1}{2}$ " x 11" paper, mail or a laptop computer, the layout must be both functional and beautiful.

A door in the center of the gallery has always been a very popular feature in secretary desks. It can be paneled or left as a single piece of wood – either way it's often figured or rare wood. These doors are often flanked by fluted pilasters or turned columns.

Drawer fronts and the framework surrounding it can be curved in one of many ways to add ornamentation. Serpentine curves and blocked fronts are common options.

Another way of adding ornamentation to drawers and other parts of a gallery is by adding inlay or string bandings. If you're really up for a challenge you can try making your own bandings.

Many secretary desks of high quality have some hidden compartment or drawers. They can be fairly simple additions to a piece or they can involve very complex tricks to camouflage the location and the way to obtain access to the compartment.



Round over edge of front trim



Mark out dovetails for drawers



Glue pigeonhole dividers in place



Apply a shellac finish to drawers



Wet surface to raise the grain



First coat of stain applied to desk

- I used curly anigre veneer (S) to accentuate the drawer fronts and introduce some contrast to the rich colour of the mahogany. Apply veneer to both faces of each front sandwiching them between small cauls and letting them dry. Trim the overhanging veneer to size. Make sure to cut and apply the veneer so when the drawers are installed the grain lines up with the drawer next to it. This creates a harmonious look that is more appealing.

- The sides join the fronts with a half-blind dovetail. Cut the sides to rough length and start cutting this joint. I am a 'tails first' kind of guy, but cut the dovetails with whatever method you are most comfortable with.

- Once the dovetail joints are all cut the sides can be cut to final length.

- A dado joint will join the drawer back to the sides. Machine the dado groove in the sides at least ½" away from the back of the parts. Cut the drawer backs to length and machine the mating joint on their ends.

- I also ran another dado joint a few inches from the back of the sides on the two topmost drawers. A false back (P) will be fixed in this groove to create a hidden

compartment in the back of the drawers. The drawers will need to be pulled out of their cavity to access this compartment.

- Run a groove in the fronts and sides to accept the drawer bottoms (Q, R). Rip the backs narrower so the bottoms can be slid in after they are glued up.

- Glue up the drawers making sure they are square.

- When the drawers are dry start the task of fitting them into the appropriate openings. This can be done with a sharp hand plane or sander. Aim for a nice even fit that doesn't grab the drawer when it's opened. A little wax on the sides will go a long way to helping the drawer slide smoothly.

Apply a Durable, Beautiful Finish

- The finish should not only protect the piece of furniture from day-to-day abuse, it should be chosen to compliment the species of wood that was used and provide a pleasing surface to see and touch. Because secretary desks were traditionally made of either mahogany or walnut, it's rare to see one that isn't finished with a combination of browns and reds. This desk

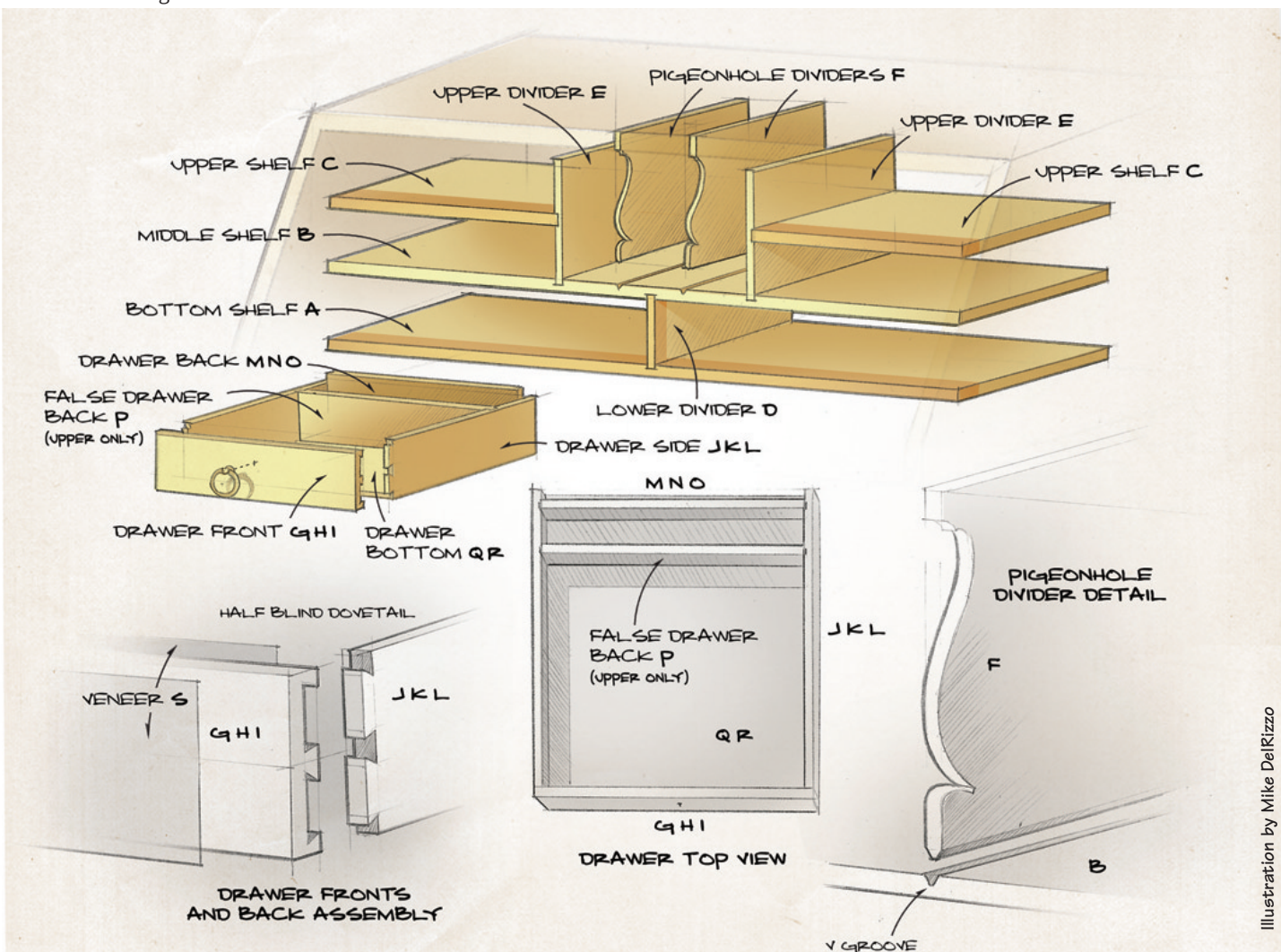
is no different. I wanted to use a finish that was in keeping with the traditional aesthetic.

- A finish that has multiple layers of colour is always deeper and richer looking than a single layer of colour. This is a multi-colour finish system that can be customized for the look you want – one that I have discussed a couple of times before (see Step Tansu, August/September 2005, Issue #37, and Chrysanthemum Coffee Table, October/November 2005, Issue #38).

Enhance the Colour

- Apply multiple layers of colour to highlight wood intricacies.

- Every wood has a specific tone and colour that can be highlighted. With African mahogany it's a warm red. In order to accentuate that colour I mixed up a water based stain. After some experimenting I found the colour I was looking for. Because water based dyes raise the wood grain I wiped down the entire piece with water before applying the stain. After it dried I sanded the desk with 220 grit paper to remove any of the raised grain. The



grain will not raise after the water based dye is applied.

- Apply a washcoat layer - a diluted coat of varnish that seals the wood slightly. I do this because the next coat - an oil based glaze - is a very dark brown and I don't want it to overwhelm the wood with dark brown colour. I applied it about 1/2 of full strength. When dry, sand lightly.

- The dark brown glaze is next. It wipes on as thick as paint but can be manipulated well to highlight the grain pattern. It can also be left thicker in crevices or on mouldings to give a slightly aged look. Let dry overnight or longer, and don't forget to dispose of oily rags properly.

- Three coats of oil based varnish are applied over the glaze. Sand between coats to remove any imperfections and to give the following coat some 'tooth' to adhere to.

- After the varnish has dried for a number of days I use #0000 steel wool and wax to rub the finish out. This leaves the surface water and scratch resistant as well as removes any imperfections.

- The finish on the desk drawers as well as the gallery drawers is shellac. I apply thin coats to seal the wood but I don't build up a thick finish. If you apply an oil based product on interior parts like drawers they may not dry properly and can produce a strong smell.

Final Touches

- To have the drawers sliding smoothly wax the sides and bottoms of each drawer as well as the cavity that surrounds the drawer.

- Install handles and escutcheons on the three main drawers and just handles on the six gallery drawers in keeping with the style of the piece.

- A handle or lock will need to be installed so the drop front can be opened easily. I used an escutcheon and a knob pull.

- A small pull on the end of each support rail will also need to be installed.

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finishingtips

by Circa 1850



How should I prepare my wood before I apply a finish?

The secret to a great finish is a good start - and the best way to ensure that is by taking the time to prepare the surface properly.

For **previously finished wood** surfaces, start with a **furniture cleaner** to remove any build-up of dirt, grime, polish or wax. A thorough cleaning will allow the new finish to stick to the surface.

After cleaning, **lightly sand** the surface to remove any shine - this will also help the new finish adhere properly.



For **unfinished wood**, it is essential to **sand the surface smooth** to eliminate any imperfections, such as planer marks. You can test the smoothness by wiping the surface with mineral spirits. Once dry, the surface is ready to accept the finish.

If you are making a **new piece**, it is important to prepare some **sample pieces** to test the various finishes that you are planning to use.

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Bottom shelf (m/p)	1	3/8	10 1/2	34 5/8
B	Middle shelf	1	3/8	10 1/2	34 5/8
C	Upper shelves (m/p)	2	3/8	10 1/2	12 3/8
D	Lower divider	1	3/8	10 1/2	3 1/2
E	Upper dividers	2	3/8	10 1/2	5 3/4
F	Pigeonhole dividers	2	1/4	10 1/2	5 5/8
G	Bottom drawer fronts	2	1/2	3 1/8	16 15/16
H	Middle drawer fronts	2	1/2	2 5/8	12
I	Upper drawer fronts	2	1/2	2 3/8	12
J	Bottom drawer sides	4	3/8	3 1/8	10 3/8
K	Middle drawer sides	4	3/8	2 5/8	10 3/8
L	Upper drawer sides	4	3/8	2 3/8	10 3/8
M	Bottom drawer backs	2	3/8	3 1/8	16 1/2
N	Middle drawer backs	2	3/8	2 5/8	11 1/8
O	Upper drawer backs	2	3/8	2 3/8	11 1/8
P	Upper false drawer backs	2	3/8	2 3/8	11 1/8
Q	Bottom drawer bottoms (p)	2	1/4	10	16 1/2
R	Middle & upper drawer bottoms (p)	4	1/4	10	11 1/8
S	Face & back of drawer fronts (v)	1	-	10	72

Notes:

- All stock is mahogany except: (m/p) mahogany and poplar, (p) mahogany ply, (v) curly anigre veneer.
- You will also need six 3" drop pulls, three 1 1/2" escutcheons, two 3/8" diameter support rail pulls, two 2" drop front hinges, six 1 1/2" ring pulls, four 3/8" leveller feet, four 3/8" t-nuts, one 1 1/2" escutcheon (with hole) and one drop front knob.

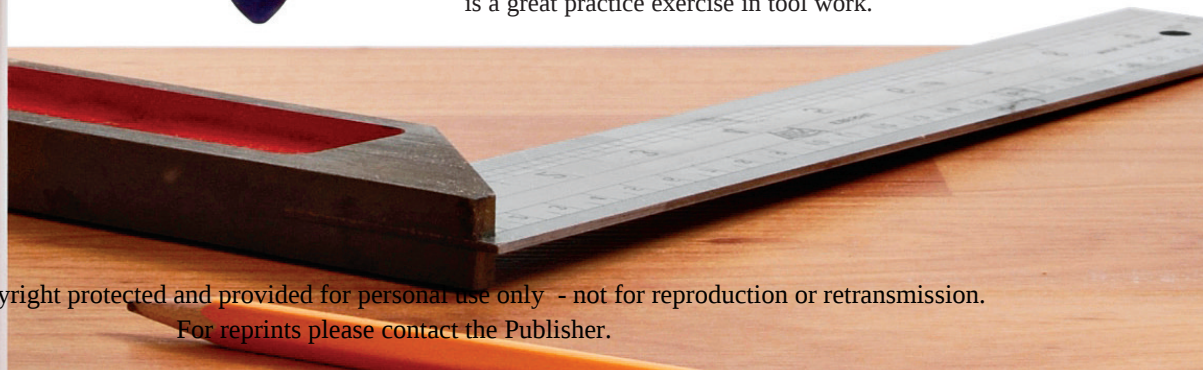
Plumb Bob

Although there are many different styles of plumb bobs, they all, in essence, do the same thing: they enable you to establish a vertical line.

Plumb bobs are one of the earliest tools known to man. The Egyptians made use of them building the pyramids, and the essential design of the bob has remained unchanged since about 1500 BC.

You can use a solid block of wood from a single species (any hardwood will do nicely) or you can glue up a lamination of several species, as I did. I used a piece of acrylic for the toe. The acrylic is glued on with a tenon for added strength. This way there is more surface being glued than just butt gluing the toe onto the wood body. Most bobs follow basically the same shape, although you can alter that slightly.

- Size a tenon on the acrylic toe using a skew chisel and a pair of calipers. You also need to turn a tenon on the top knob and then drill holes for the tenons on the body.
 - Glue the three parts of the bob together.
 - Shape the bob. Remember to always turn from large diameter to small - this avoids a nasty catch.
 - You can add different decorative features such as a cove or bead. I chose to turn a small bead on the acrylic tip. Beads can be cut with almost any tool, but the skew is the best at cutting beads cleanly. If you cut the bead properly, no sanding will be required.
 - Turn a tenon using a $\frac{3}{8}$ " parting tool so that the piece can be held with a chuck. Keep the tailstock in place for additional support.
 - To shape the smaller parts I used a $\frac{3}{8}$ " spindle gouge, which can also be used to roll a bead.
 - Remove the tailstock to finish the toe end of the bob with the toe of the skew. This cut requires absolutely no finishing.
 - Flip the bob in the chuck and finish the top end of the bob with the skew.
 - Drill the hole for the brass eyelet.
- Besides making a functional measuring instrument, this project is a great practice exercise in tool work.





Size tenon on acrylic toe



Project parts ready to assemble



Turn bead on toe



Turn tenon on top



Finish toe with skew chisel



Finish top with skew chisel



Drill hole for brass eyelet



The finished bob

The Beading Parting Tool

The skew can be very tricky to use at first.

When I'm teaching skew techniques and we are cutting beads I often refer my students to a beading parting tool to perform this task.

The beading parting tool is used just like a skew to roll beads but is a little more forgiving. When students have gained the confidence needed to roll beads with a bead parting tool, then they are ready to try their hand with a skew. By this time, it is much more effortless.

Either way a skew or a beading parting tool will cut a bead cleanly with little or no sanding required.



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Portable Spray Booth

Hand rubbed oil and wax finishes are justifiably popular, but there are times when such a finish is not appropriate.

For table tops and other surfaces subject to hard usage, water or abrasive products, a modern film finish is the best choice.

This portable spray booth will enable you to spray water based finishes easily and safely, even if you have only a small workspace.

Water based finishes are ideal for the home shop because they do not produce explosive vapours and they are practically odourless. Also, the electrical equipment in your spray area or any associated fans and ventilation equipment need not be explosion proof.

Most people are familiar with the compressor driven siphon style spray

guns. These operate on the 'venturi principle' - pass air over a narrow opening filled with fluid, and the fluid will rise out of the container and be carried in the air stream. This system tends to result in a great deal of overspray as a result of using turbulent high pressure, low volume air to deliver the coating to the surface.

Alternatively, high volume low pressure systems (HVLP), like the Fuji Mini Mite 4, or the Turbinaire, have put professional quality spray application tools within reach of the average home shop. Such

systems are multi stage turbines that deliver a large quantity of low-pressure air to the spray gun. Some of this air is used to pressurize the cup containing the coating. When the trigger is pulled, this pressure forces the coating up a tube and into the air stream which then deposits it on the surface being sprayed. (see: "High Quality Finishing with HVLP", June/July '06, Issue #42). Transfer rates with a conventional compressor driven gun can be as low as 20% with most of the coating being lost as overspray. With an HVLP system, it is possible to achieve transfer

rates up to 90%. This means less of the coating will end up in the air as overspray, making this a much more efficient system to use in a home shop.

Space is usually at a premium in home workshops and most are not large enough to have sufficient space to set up a dedicated spray area. But with this simple spray booth you can quickly set it up when needed, and easily fold it up and store it between uses.

You can make this booth out of coreplast or a similar lightweight product. Duct tape holds it together. The illustration below shows a freestanding booth with a stand on which to place a fan – this is ideal for spraying large items like furniture or cabinetry. The illustration also shows a smaller unit that will fit easily on a work table. In this case you won't need the stand, simply set your fan on the workbench behind the spray booth.

Begin With the Stand

The stand needs to be more functional than attractive. You can make it simple, so as to hold the fan and some finishing supplies, or more elaborate, with doors and wheels to make it easy to move around the shop. Build it out of $\frac{3}{4}$ " plywood or similar sheet stock.

The Spray Booth

To keep this booth light and portable, the collapsible portion is made with coreplast. This material is available from most home centers and all sign shops. Optionally, you could use a heavy cardboard. To keep construction simple we use duct tape.

“This spray booth is designed to be portable and functional.”

Cut the coreplast panels to the size you will need for the front, back and sides of the booth. The top and sides are held together with duct tape in a specific way, because the way you tape it together will determine how well it folds up. Lay the top face up on the shop floor and butt one of the sides up to it. Apply duct tape to the seam. Take the two pieces and fold them together, face-to-face, with the duct tape in the center. With the two pieces closed, apply tape to the seam from the outside of the joint. This will allow the two pieces to fold up in one direction only. Repeat the previous steps to attach the other side.

The Back

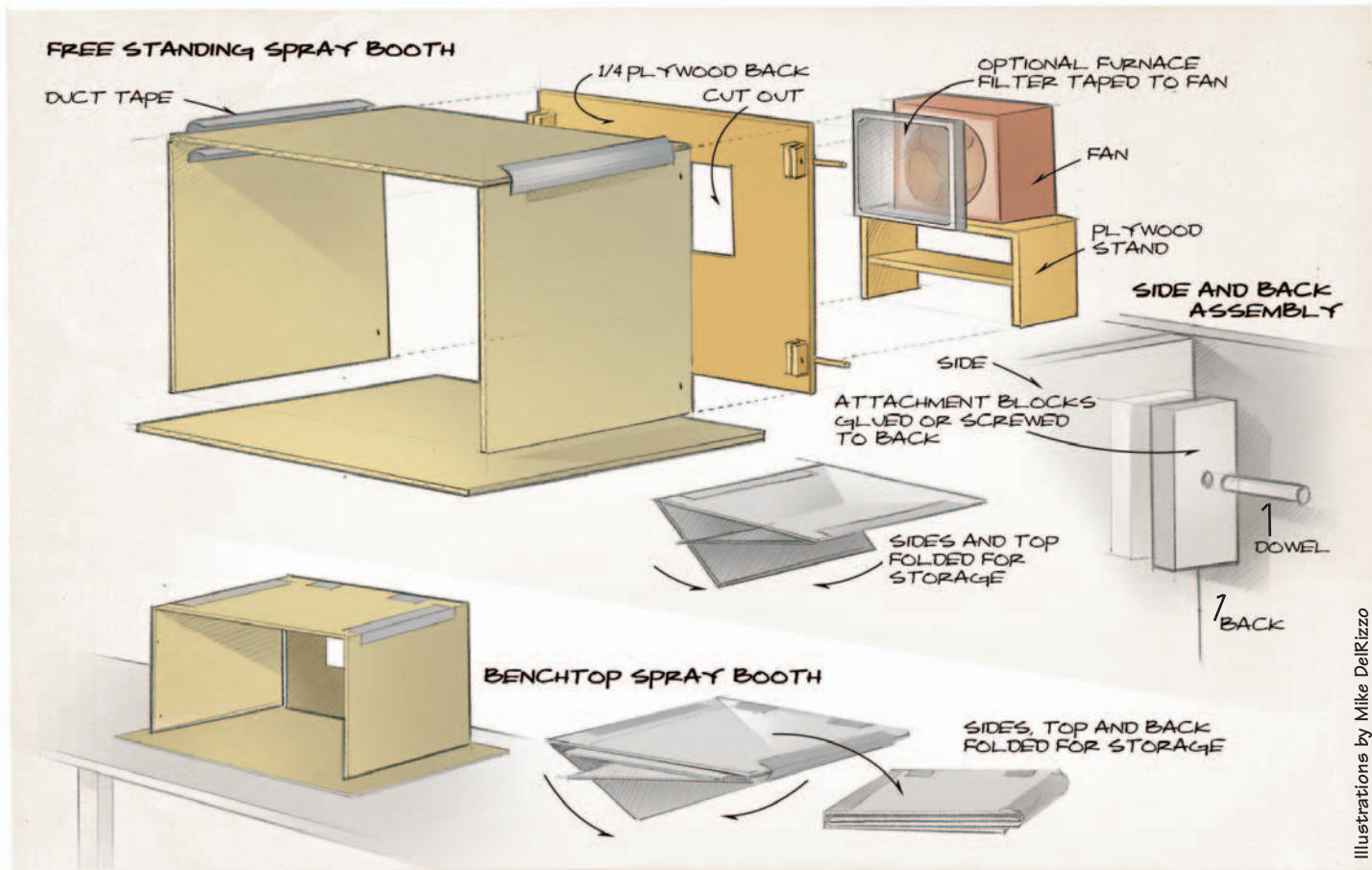
While you could use coreplast for the back panel, $\frac{1}{4}$ " ply will add a lot of

rigidity to the booth, and make a more stable surface for securing the sides. To fasten the sides and top to the back you will need to make several attachment blocks. These are relatively small and could be made from any convenient scraps left over from other projects. You will need at least four pairs – one at each corner. Drill holes in the blocks to accept dowels ($\frac{1}{2}$ " or larger dowels work best), and use a scrap piece of coreplast as a spacer, then glue or screw the blocks to the back. Cut out a window somewhat smaller than the size of fan you will use with the spray booth.

Assembling the Booth

When it comes time to finish your project, setting up the booth is a simple procedure. Lean the back of the booth against the stand (optionally you could attach the back to the stand with bolts), and unfold the main portion of the booth. Slide the edges of the coreplast into the attachment blocks and slip a dowel through the holes (optionally drill holes in both ends of the dowels to accept cotter pins, which will help to keep the dowels from inadvertently moving out of the blocks). Place a fan on the stand (optionally tape a furnace filter over the face of the fan to absorb any overspray), and you're ready to finish.

- CWM



Illustrations by Mike DeRizzo



Routing Basics

Part I

Perhaps no more than forty or fifty years ago, grooving, decorative edge work and intricate joinery in most small wood shops would have been done by a wide range of hand tools.

Not so today. The introduction of the hand held router has significantly changed the way we work. The first routers certainly were not the sophisticated woodshop workhorses we use today.

Long gone are the days of a simple motor with limited adjustability spinning a steel bit with a 1/4" shaft at a single speed.

The new generation of routers offer more versatility, power and features than ever before, and woodworkers are taking to them like ducks to water. Like any other woodworking tool, routers can range from the most basic, inexpensive model to more expensive versions packed with features that dramatically expand the routers' capabilities.

Choices, Choices, Choices...

The array of styles, prices and features can make it challenging for you to select the right model. When choosing your first router it is best to think about the type of work you will most likely be doing with it. Heavy-duty joinery and cabinetwork will require a larger router, but if all you want to do is some decorative edge treatments, one of the smaller versions will do. (See Mid-sized Router Review, June/July 2006, Issue #42).

At the risk of oversimplifying things, most routers generally fall into three basic categories based on their power rating: small, medium and large. Small routers (or laminate trimmers) under 1 HP, like the Bosch Colt are generally used for light duty operations. They can only be used with bits

that have 1/4" shafts. These are great when you need to bevel or round over an edge, cut a shallow mortise for hardware or trim laminate flush. They don't have the power and features of their larger cousins, but they often ship with accessories and attachments for different operations.

At the other end of the spectrum are the large 3/4 HP routers, like the Freud FT3000VCE, that can handle anything you throw at it. These routers are much heavier, but have the power to muscle through the most demanding operations. They also tend to be at the top of the pack when it comes to price and features, though often accessories like fences, circle-cutting attachments and guide bushings are sold as options. These bigger routers will also allow you to use larger bits that have a 1/2" diameter shaft.

Perhaps the most common router is the medium sized one, like the Bosch 1613AEVS or Freud FT1700VCEK. These fall in the 1 1/2 to 2 1/4 HP range. In the majority of cases this is plenty of power for most tasks that you will likely be using the router for. The majority of the routers in this category will have two collets (the

mechanism that secures the bit to the shaft of the motor) to allow the use of bits having either 1/4" or 1/2" shafts.

Size Isn't Everything

Routers come in two different styles – plunge or fixed base. Power considerations aside, this is the most critical factor determining what the router can, and cannot do. Fixed base routers have minimal bit height adjustment and are generally used when you can approach the work piece from the edge. They also tend to be lighter and more compact than the plunge versions, making them somewhat easier to handle.

Plunge base routers allow the bit to be started above the work piece and then the whole motor and bit assembly is lowered into the work piece. This is necessary when routing an opening inside a larger panel, cutting mortises, and when routing stopped dados, grooves and similar operations where it is not possible to bring the bit in from the edge. The motor moves up and down on two posts with internal springs providing upward motion. When the router is started and the plunge locking mechanism is released, the operator plunges the router into the material to a preset depth.

A more recent innovation is the 'combo router', like the Bosch 1617EVSPK - a medium-sized router motor in a kit with both a plunge and a fixed base. This gives you the advantages of both styles in one tool. When you can afford to buy only 'one' router, this is the way to go.

When choosing a router, try to get your hands on the models you are comparing and note how smoothly the plunge mechanism operates as well as the other features and how easy they are to use. With your hands on the handles, pay particular attention to how easy it is to access the various features like the on/off switch and the plunge lock mechanism without removing your hands from the handles.

Watch Your Speed

Routers are high RPM machines and under most circumstances will provide you with a flawless finished surface, assuming you are using a sharp bit. Single speed routers are fine for the majority of bits less than 1/8" or so in diameter, but as the diameter and mass of the bit increases, the speed must be reduced. Fortunately, most routers now come with a variable speed motor. Routers are loud, screaming machines and reducing the speed of the bit to the slowest speed possible without affecting the quality of cut will reduce the



noise considerably. The larger the diameter of the bit, the faster the edge will be traveling as it meets the wood. Some woods like cherry and maple burn easily when the router bit is spinning too fast; slowing the bit down will prevent the black marks that are all but impossible to sand out of complex profiles.

Other Considerations

Depth stops limit the bottom end of the travel when plunging the bit into the work from above. Some of these are easy to use, others can be somewhat awkward, so it is best to try out the models before making a purchase. Some even have multiple depth settings on a rotating turret that allows you to set multiple commonly used depths. In addition to the depth stops, a precision adjustment will let you get close to the setting you need and then dial in the exact setting.

One feature that is beginning to show up on routers is a graduated depth stop. After setting the final depth of cut, this graduated stop is used to remove the material in several controlled passes until the final depth is reached. Making the cut in several passes is easier on the router as well as preventing large chunks of wood from being torn out of the piece being routed.

Routers with variable speed control often come with a soft start feature. This reduces the tendency of the router to jerk in the opposite direction of the motor rotation at start-up by gradually applying power until the router reaches full speed. Most routers with this feature also have an electronic feedback circuit that monitors the speed of the router and maintains constant speed regardless of the load imposed on the motor.

Bits With Bite

Until you install a bit, the router can't do anything, and the vast range of bits



Use an adapter for non-standard shank sizes



Set the depth stop

available is what gives the router its versatility. Bits come in several different shaft diameters with $\frac{1}{4}$ " and $\frac{1}{2}$ " being the most common. Some bits (profiles) are available in both shaft diameters but others are available in only one or the other. When purchasing a router, choose one that can handle both sizes. Some jigs like the Leigh D4R dovetail jig and the Leigh FMT mortise and tenon jig use bits with other diameters. In these cases an adaptor is used to bring them up to the $\frac{1}{2}$ " size the collet can handle.

The $\frac{1}{4}$ " shaft bits are less expensive and can work well within certain limitations. They are, however, meant for light duty work. Using a dull bit or forcing the bit through the work too quickly can cause it to snap off at the shaft. These bits also tend to chatter and vibrate more, which will result in a rougher finish. Better quality bits designed for more demanding work have larger $\frac{1}{2}$ " shafts. These are much more stable in use, have less tendency to chatter, and provide a smoother finish.

The cutting edge on the bit is also crucial. At one time, high-speed steel bits dominated the market but these have lost ground to the higher quality carbide tipped bits. High-speed steel bits are inexpensive and will give you a high quality cut, but they will dull very quickly. They are also getting harder to find as the price of carbide tipped bits continues to fall as new methods of manufacturing come on-line.

Not all bits, carbide or otherwise, are created equally. While it is possible to purchase a complete starter set of 30 carbide tipped bits for less than \$40 on sale, these are not the same quality as bits made by a manufacturer like Freud or Bosch. To bring the cost of these sets



down, certain sacrifices are made during the manufacturing process. Reputable bit manufacturers start with a high grade of steel and manufacture their own carbide, which they then affix to the steel bodies.

The higher quality bits are manufactured with a micro grain carbide formulation and each bit is perfectly balanced. With the bit



perfectly balanced, there will be no vibration as it spins and this will result in a perfectly smooth cut. Not only is the resultant cut of a higher quality, but as the micrograin carbide bit wears during use, the pieces that wear away are much smaller in size, which means that the bit retains its sharp cutting edge longer. An unbalanced bit will introduce vibration into the shaft of the router, which will lead to excessive heat build up and wear on moving parts such as the bearings.

A Bevy of Bits

Bits generally fall into two categories: profile bits, and joinery bits. Profile bits are typically used for adding decorative edges to a project, such as a round over bit to soften the edge of a table, or an ogee bit for profiling the edge of a drawer front, or a v-groove bit for sign making. These come in a dazzling array of styles and sizes to suit almost any style of furniture.

Where the router really shines is its ability to handle various forms of joinery during the construction phase of a project. Using specialized cutters in combination with jigs, it is possible to produce an amazing range of joints, from dovetails (sliding, half blind and through), mortise and tenon, tongue and groove, and even rail and stile doors with a raised panel. The profile and format of the cutter determine its use.

Router bits are available in two forms – piloted and non-piloted. A piloted bit has a small ball bearing guide mounted on the top (or in some cases, on the bottom), which runs along the edge of the work piece to guide the cutting edge of the bit. If the bit does not have this feature, the router must be used in combination with an edge guide (if the router is hand held), or a fence (if it is mounted in a table). Using a piloted bit it is possible to profile a curved edge, such as an arched raised panel door. When using a piloted bit it is a good idea to periodically check the screw that holds the bearing in place as these can occasionally come loose and allow the bearing to separate from the bit.

Frame and panel door construction is a common way to combat the effects of seasonal wood movement. By placing the solid wood panel inside a frame, any

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CABINET FEATURES



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Center Router Bay



Lower Cubbies



4" Dust Port

CABINET OPTIONS



40-084 DOOR PACK



40-083 DRAWER PACK



40-008 CAB-LOC



40-016 PROLIFT

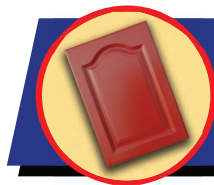


40-011 FEATHER-LOC

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The Freud Router Table System is perfect with the legendary Freud FT2200VCE Plunge Router - also sold separately. This 15-amp powerhouse features 8,000 - 22,000 rpm electronic variable speed control, micro-adjustment knob, plus 1/4" and 1/2" collets; all backed by a 5 Year Limited Warranty & 90 Day Satisfaction Guarantee.

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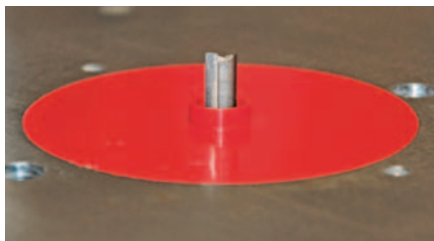
Piloted bit Non-piloted bit



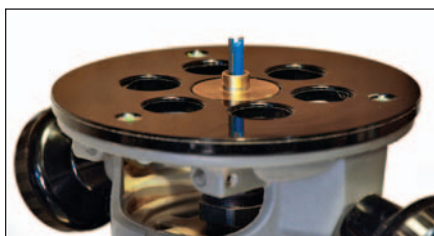
Frame and panel bit



Setting height adjustment



Router table template guide



Guide bushing on router

expansion of the center panel is contained by the outer frame, which means that the door will not change in width from one season to another, resulting in a perfect fit year round. Cutting the joinery for the frame members for this type of door is done using matched bits on a router table. These can either take the form of a matched set of bits, one for the rail and one for the stile, or a reversible bit that can be reconfigured for either operation. Although the matched sets containing both a rail and a stile bit are more expensive than the reversible sets, the profiles fit each other exactly and are much more convenient. These bits can only be used with the router mounted in a table.

Accessories Not Always Included

A router right out of the box is ready to use. Install a piloted round over bit and you're ready for life on the edge. But to get the most out of your router there are several accessories that will greatly increase the range of operations that you can perform. Most router manufacturers offer these as options when purchasing your router. Some, like the Triton plunge router, even include an impressive collection of these as standard equipment. An edge guide acts as a portable fence that moves with the router allowing the bit to maintain a constant distance from the edge of a piece, as when cutting a dado parallel to an edge.

A circle guide is quite handy when making an object like a round table top. The guide is fastened to the center of the top and the router is attached to the base at a distance from the center and is then run around the perimeter resulting in a perfectly round circle.

Another method of guiding the router involves the use of template guides that attach to the base plate of the router. These are used to guide the router in combination with various types of joinery bits when following a template or jig.

Because many woodworkers use their routers in a table for most operations,



Above table height adjustment

manufacturers have recently started equipping routers with above the table adjustment mechanisms. With the router mounted in a table, the controls that are normally well placed for hand held use can be much more awkward to reach. To address this situation router manufacturers are designing new models that include a method of adjusting the bit height from above the table. This usually involves a crank of some sort that passes through a hole in the top of the table to engage the plunge mechanism. Another function that has become popular in combination with these above the table mechanisms is an automatic shaft lock. As the collet travels through the hole in the router table, a locking pin is pushed into place to engage a hole in the shaft of the motor that keeps the shaft locked in place. This allows for bit changes using just one wrench.

Take Control of Your Router

The router is easily the most versatile power tool in your shop, and when used in combination with various accessories there is almost nothing that it cannot do. From flattening large slabs of lumber to cutting functional as well as highly decorative joinery, the router can do it all. In some cases you will need to fabricate specialized jigs and guides, but the creativity and control the router puts at your finger tips is unmatched by any other tool in your shop.

- CWM

In upcoming articles in this series we will take a look at safely using the router for various hand held routing operations, routing using a router table and various router jigs.

Routers, bits and/or accessories are available at:

Busy Bee Tools busybeetools.com
800-461-2879

Home Hardware homehardware.ca

House of Tools houseoftools.com

Lee Valley Tools leevalley.com

800-683-8170

Morley Miller Machinery

morleymillermachinery.com

519-448-1361

Sharpco sharpco.ca

888-742-7726

The Saw Shop TheSawShop.com

877-778-5585

Tegs Tools tegstools.com

Barton 905-545-5585

Upper James 905-388-0784

Welbeck's welbecksawmill.com

519-369-2144

Woodline USA woodline.com

800-472-6950



Illustration: Marcus Cutler

Charlottetown is often referred to as the birthplace of Canada, as the 1864 Charlottetown Conference laid the groundwork for Confederation. About half of PEI's population of 138,000 live in Charlottetown. The city is home to the University of PEI, Holland College, and the Confederation Centre Art Gallery and Museum. For such a small city it has a lot of green space – over 400 acres of parks and greenlands, including the 37 acre Victoria Park, situated near Government

House. The Island is part of the Acadian forest, and at one time would have been covered by red oak, yellow birch, beech, sugar maple, hemlock and pine.

The scroll saw pattern shows Government House (also known as Fanningbank), built in 1834. At the top of the pattern is one of the royal lions of England, originally added to the coat of arms in 1905, and a silhouette of red oak, the provincial tree.

Scroll Cutting Tips

Photo-enlarge the pattern to the size you want. Cover your substrate (such as ¼" Baltic birch ply) with masking tape, and then spray glue the pattern to the substrate. Using a #5 13 tpi blade, cut out the shaded areas on the template. Start cutting out the smallest areas first, moving on to the next larger areas. Once the pattern is cut out remove the masking tape, lightly sand as required, and then apply your chosen finish.



Jig Saws

Nothing beats a jig saw for on-site portable curve cutting.

I use my jig saw quite a lot when I just want to cut a few large boards down to size and don't feel like setting up my table saw for crosscutting. With an aggressive, heavy-duty blade, a quality jig saw can cut almost as quickly as a circular saw. But the jig saw can also make very fine cuts in thin stock and tight curves. It'll also cut steel, aluminum, brass, PVC and other plastics easily with the right blades.

Unless you need a bandsaw for resawing, I often suggest that a good jig saw could hold off that purchase for a long time, or at least until a high level of accuracy is required. Let's take a look at some of the features that make a jig saw a solid performer in the workshop.

Weight and Power

Getting the most power in a lightweight tool is important to me for any portable power tool. There is no point in having the most powerful tool on the market if it is too heavy to be used in a versatile number of ways. A jig saw is most commonly used running flat on top of the material being

cut. But it is also handy for cutting vertically in renovation or construction work. It might even be used upside down in a ceiling. So choose a tool that you can easily handle.

Among entry level corded models, amperage could vary from as little as about 4 amps right on up to 6½ amps. I've also seen models ranging in weight from 4 lbs., all the way up to about 6½ lbs. Besides weight, also consider general comfort, as you will often want to use this tool one-handed.

Cutting Capacity and Stroke

There are many variables that determine how well a jig saw will cut, and in what materials. One factor is the number of strokes per minute, or SPM. Variable speed models sometimes start at 0 SPM, while others start at 500 or even 1000 SPM. The high limit varies from about 2600 to 3200 SPM. I'm not sure that having a super high speed is all that important, as I rarely run a blade at full speed. It might cut faster that way, but can

result in overheated blades and burned cuts. Having a lower SPM limit, though (as opposed to a jig saw with only one fixed speed) is very important. Sometimes a jig saw can kick back at the end of a cut if the off-cut is falling away and pinching the blade. I like to use the variable speed trigger on my jig saw to ease the speed down very low at the end of a cut. I also might choose a slower speed when in the middle of a very tight curve with a fine-toothed blade.

In addition to the strokes per minute, there is the stroke length to consider. The bigger the stroke length the more teeth are used to cut materials of a given thickness, leading to longer blade life. If you cut ¾" material most of the time, you'll notice that only the top of the blade gets used while the teeth at the tip remain sharp. Having a longer stroke length would allow that blade to work longer. Stroke length usually varies from about ¾" to 1".

Variable Speed

A fixed speed model is likely to be a less expensive entry-level jig saw, suitable for occasional use. But if you plan on doing serious work with your jig saw, variable speed is a must. Electronic variable speed is even better because circuitry keeps the blade at a more steady speed even under high load. You should also consider whether the speed control is done by a dial, a speed trigger, or both. Sometimes there is just a dial, which controls the speed you get when you pull the trigger or turn it on. That means you have control over the speed, but it only runs at one speed at a time. A true variable speed trigger allows you to control speed based on how hard you pull on the trigger. That way you can change speeds on the fly, exactly when you need it.

Orbital Action

Having orbital action on a jig saw is, thankfully, very commonplace now. At the 'regular' or vertical setting, the blade just travels up and down. This is required for most curved cutting and when cutting very hard materials like metals. Many jig saws also have two or three orbital action settings, which allow the blade to rotate in a small circle while you cut. The blade rotates forward on the upstroke, which is the cutting stroke, and backward on the down stroke. The larger the orbit, the more aggressively the blade is forced into the wood. When making rough cuts in thick hardwoods, I choose a heavy-duty blade with fewer teeth and set my jig saw to the largest orbital setting. This is where a jig saw can almost outperform a circular saw.

Blower Switch

Some jig saws come with an attachment for dust collector hook-up. I like the idea,

but I dislike carrying a hose around with me on a portable tool. One feature that is worth looking for is a blower switch. Many jig saws now have a switch that directs the motor's air flow at the cut line. The air blasts sawdust out of your way as you work through the cut.

Toolless Blade Change

There is nothing worse than a tool that isn't user friendly when it comes to blade changes. Most tools seem to be getting better in that area and jig saws are no exception. It is quite common to be able to just pop in a blade, turn a handle, and the blade is secured. Look for this kind of feature, especially if you will use your jig saw for different kinds of work in various materials, requiring frequent blade changes.

Bevelling Foot

The foot, or base, of the jig saw usually bevels to various angles so that you can make beveled cuts. You probably won't use it often, but it is handy to have. Some models have positive detents for various angles and allow changes with little or no tooling. My jig saw uses a single hex key, which is stored on-board with the tool. You might also find accessories like zero-clearance inserts that fit into the foot around the blade, and softer foot covers to prevent scratching on delicate items like veneered stock. These are all handy accessories.

Handle Style

Most jig saws break down into two handle styles: a barrel grip and a D-handle. Many renovators and carpenters I know love the barrel grip. They find it easier to make vertical and overhead cuts with that style. However, most of these guys have

huge hands that can wrap around the barrel grip with ease. I have smaller hands and find I have more control with the D-handle, with less vibration transmitted to my hands. I'd suggest that you try both. Comfort is important for a tool that can be used for long stretches and in some awkward positions.

Other Features

There are many other add-ons that come with some jig saws, or can be purchased separately. One is an edge-guide to help you cut parallel to an edge. There are circle-cutting attachments, lighted plugs, longer cords, carrying cases and package deals that include a large number of blades. Compare the different brands carefully to find the extras that really matter to you. Above all, buy a quality tool that will see you through many projects, even as your skills progress. I owned my previous Bosch jig saw for about 12 years and the person I sold it to is still using it.

Jig Saws Available at:

Busy Bee Tools busybeetools.com
800-461-2879

Home Hardware homehardware.ca

House of Tools houseoftools.com

Morley Miller Machinery
morleymillermachinery.com
519-448-1361

Tegs Tools tegstools.com
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info@passionforwood.com

CORDED JIG SAWS



Bosch 1590EVSK

- \$239.00
 - 6.4 amps, 500 – 2,800 SPM, 6 lbs
 - 4 OA, T, 3 yr warranty
 - Dust blower, edge guide, zero insert shoe, non-marring footplate
- www.boschtools.com**



DeWalt DW317K

- \$129.00
 - 6.5 amps, 500 – 3,100 SPM, 6.4 lbs
 - 4 OA, T, 3 yr limited warranty
 - Dust blower, non-marring shoe cover, extra-large rubber grip dampens vibration, all-metal gear case
- www.dewalt.com**



Fein ASTE 638

- \$1080.00
 - 4.7 amps, 1050 – 2,600 SPM, 4.8 lbs
 - Proprietary blades, 3 yr warranty
 - Dust blower, vibration free, extremely quiet operation, rigid saw blade guide, anti-chipping protector
- www.fein.ca**

CORDED JIG SAWS



Hitachi CJ110MV

- \$159.00
 - 5.8 amps, 850 – 3,000 SPM, 4.9 lbs
 - 4 OA, T, 5 yr warranty
 - Dust blower, cast aluminum nickel plate, soft grip handle, LED light, lock-on speed trigger, elastomer covered handle, allen wrench
- www.hitachipowertools.ca



King 8330

- \$49.99
 - 5 amps, 500 – 2,900 SPM, 5.2 lbs
 - 3 OA, U & T, 2 yr warranty
 - Laser light, non-marring base insert, lock-on button, edge guide, dust chute, hex keys
- www.kingcanada.com



Metabo STEB135 Plus

- \$279.00
 - 6.1 amps, 1,000 – 3,000 SPM, 5.7 lbs
 - 5 OA, T, 3 yr warranty
 - Dust blower, aluminum die-cast gear housing, grooved needle bearing roller guide, anti-splintering insert
- www.metabo.ca



Milwaukee 6268-21

- \$249.00
 - 6.5 amps, 0 – 3,000 SPM, 6.4 lbs
 - 5 OA, T, 5 yr warranty
 - Dust blower, LED work light, 12' power cord, cushion grip, anti-splintering device, plastic shoe cover, dust shield
- www.milwaukeetool.com



Porter Cable 9543

- \$249.00
 - 6 amps, 500 – 3,100 SPM, 6.5 lbs
 - 3 OA, T, 1 yr warranty
 - Dust blower, four cutting options straight up & down, ball & needle bearings, optional dust collection kit and edge guide, non-marring base insert, anti-splinter insert
- www.portercable.com



Ridgid R3121

- \$159.00
 - 6 amps, 500 – 3,000 SPM, 6.2 lbs
 - 5 OA, T, 3 yr warranty and lifetime service agreement
 - Dust blower, vacuum adapter, die cast gear housing, 12' rubber power cord w/ lighted plug, vacuum adaptor, anti-splintering insert, allen wrench, dust shield
- www.ridgid.com

SCROLL JIG SAWS



Black and Decker JS700K

- \$69.99
 - 5.5 amps, 800 – 3,200 SPM
 - 3 OA, U & T, 1 yr warranty
 - Dust blower, AccuCut™ patented blade support system, metal gear case, roller support guide, contoured 2 finger trigger
- www.blackanddecker.com



Skil SK469001

- \$89.99
 - 6 amps, 800 – 3,200 SPM, 5.7 lbs
 - 5 OA, T, 2 yr warranty
 - Dust blower, (vacuum adapter will be available later in 2007), integrated laser and work light, metal gear box, precision blade guide, 6' power cord, soft grip handle
- www.skiltools.com



Ryobi P521

- \$79.97
 - 18 volt, 0 – 2,100 SPM, 3.5 lbs
 - 4 OA, T, 2 yr warranty
 - Cordless
 - Integrated laser, die cast gear housing, 360° scrolling action, overmold handle, built in blade storage
- www.ryobitools.com

All the jig saws feature a tool free blade change (except Fein, set screw), tilting bevelling (except Fein, non-tilt), 1" stroke length (except Fein, Black and Decker, Ryobi - ¾", King - ¾"), and case/box (except Fein, Hitachi & Ryobi).
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*Easy lever-action
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and fastest
click-in-place
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without a wrench*

**Precision Control™
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Grab the Bosch 1590 — the next generation of the world's finest jigsaw. Feel for yourself the bold new performance standards it sets. With our new Precision Control Blade Guide, One Touch Blade Change, Tool-Less foot bevel, and the most powerful jigsaw motor on the market at 6.4 amps, you'll easily gain greater control over every cut your work demands.

Pull the trigger, there is no comparison. Look for the Bosch Precision Control nameplate.



BOSCH

Invented for life

Ladybug Fridge Magnet

*Carving this ladybug is simply a matter of rounding
a carefully selected piece of butternut.*

This piece's simplicity is complimented by its unusual but effective detailing. If you choose to use a 4" by 6" block as I have done for this article, you will produce one extremely large and functional refrigerator magnet.

Preparatory Steps

By anticipating the final product, two preparatory steps become obvious. First, to obtain a pattern of rings on the ladybug, select a piece of wood with grain running as close as possible to horizontal. Then draw on the pattern and cut it out with your bandsaw. Second, use a $\frac{3}{4}$ " Forstner bit to drill holes where $\frac{3}{4}$ " rare-earth magnets can be inserted later. The depth of the holes should equal the thickness of the magnets. I located the holes where I would attach my carving vice, thus permitting the holes to be hidden under the magnets when the carving was done.

Carve the Ladybug

Given the infestation of ladybugs in Ontario this year, it was easy to find a reference model. Begin by rounding the block lengthwise using a #2 gouge face down. Then, contour the 'off-round' side profile of the ladybug. It is important to resist the urge to round the corners immediately. Instead, the block should have four ridges where the two curved surfaces intersect. Achieving this intermediate shape will enable you to achieve much better symmetry in this 'dome-shaped' ladybug.



Draw pattern on block

The thorax and the head are created using a parting tool (V-gouge) and a #2 gouge. Outline each section then round to create steps. Define the bottom of the oval head and undercut the thorax and body approximately 1". Finally, make the split down the middle of the back with a parting tool. Your carving work is complete when you have thoroughly sanded the entire ladybug.

Add Details

When I want part of a carving to be black, I usually use my torch. To practise the burning technique, begin with the head and thorax. Here's a hint – use the torch like an airbrush, ie. point the flame in toward the burnt area, not out toward the edge of the burn. To protect the areas I didn't want to burn, I shaped a scrap of soapstone to use as a shield. Using the technique developed when burning the head and thorax, carefully burn the spots on the back. Other than the desire for symmetry, there is no rule for this step; burn as many spots as you like.

The antennae are made with copper wire, super glue, and baking soda. To begin, dip the end of the wire in superglue. Allow the glue to form a drop then dip it into some baking soda. Once the club on the end of the antenna is started this way, don't dip directly into the superglue. Doing so will initiate a chemical reaction that will ruin the remaining superglue. Instead, use a second clean piece of wire to drip superglue onto the club and then dip into the



Select horizontal grain



baking soda. When a sufficiently large teardrop has been created, refine the shape with sandpaper. Attach the antennae to the ladybug by inserting the wire into a pre-drilled hole and secure it with a drop of superglue.

Finishing Touches

The final details are small but very important. Paint the spots with white gesso. Paint the antennae with black gesso. Cover the entire ladybug with a medium or high gloss varnish or varathane. The surface finish, especially over the burnt spots, may require a few coats.

When the finish has dried, insert the $\frac{3}{4}$ " rare earth magnets into the pre-drilled holes and fix them in place with a drop of superglue. I found three magnets sufficient to hold the ladybug firmly on the fridge. With four magnets, I could open the fridge door before the ladybug would let go.

It might come as a bit of a surprise but this large ladybug has proven itself to be much more useful than a mere decoration. Since I completed my first ladybug and located it on my refrigerator, the infestation of ladybugs in my home has ceased. Perhaps the carving is a deterrent. Perhaps ladybugs are territorial.



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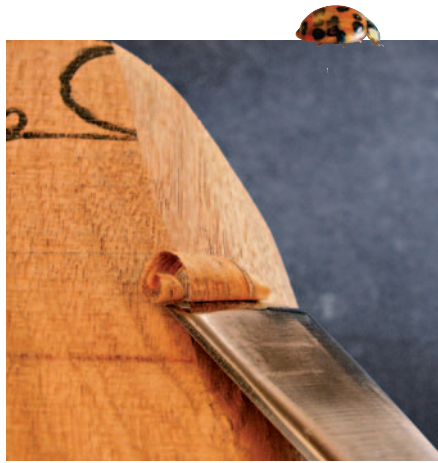
Drill holes for magnets



Holes match holding device



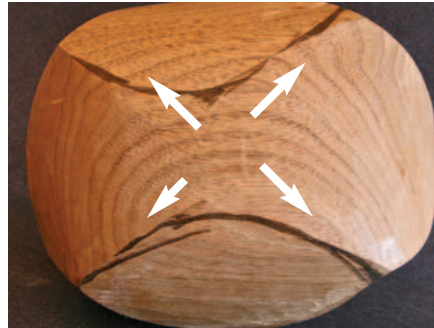
Round block lengthwise



Use #2 gouge face down



Carve off-round profile



Attain symmetrical corners



Start layers with V-gouge



Round to create steps



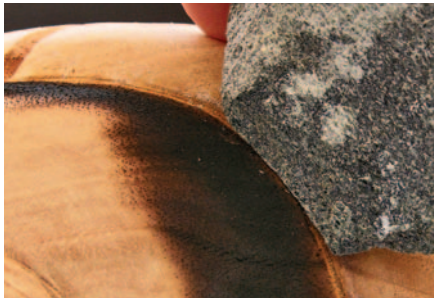
Undercut approximately 1"



Split back with V-gouge



Blacken with torch



Use a heat shield



Burn dots carefully



Club of superglue and baking soda



Shape antennae with sandpaper



Finish with glossy varathane

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Decorative Dovetails with the Incra System

The joint featured on the game box is called a Corner Post Double Dovetail. It's one of dozens you can make with the Incra jig using the templates in the accompanying master reference guide.

The LS Positioner takes no more than 30 minutes to assemble and mount to your router table. It's made from aircraft grade aluminum milled to machine shop standards, then hard anodized for long wear life. The accuracy and repeatability of the system comes from Incra's patented lead screw technology (hence the LS in the name) which comes from the 32 tpi (threads per inch) lead screw that the system is based on. It gives you incremental positioning in $\frac{1}{32}$ " steps as well as micro adjustments of $\frac{1}{1000}$ " (accurate to .002") over the full range of the Positioner. The standard system comes with a LS Positioner carriage and base, 28" Pro Fence, 13" telescoping extender bar with stop, right angle fixture, shop stop positioner and the master reference guide and templates.

Like any woodworking project it is very important to begin with stock that has been milled true and square. In the game box project I used $\frac{3}{8}$ " thick stock to make the corner post double dovetail, with padauk and maple as my contrasting wood colors.

- To begin this joint you first choose the dovetail template you wish to use as well as the corresponding bit. In my case it was template IDDB with a $\frac{3}{8}$ " 9° dovetail bit. You will then need seven pieces of wood, four pieces for the front, back and sides plus one piece for the corner post and one for the trim section (using a contrasting wood) and one for centering. All seven pieces must be of equal width and thickness. The front and back pieces must be of equal length, and the two side pieces must also be of the same length. The corner post section must be the same thickness as the front, back, and sides.

- When using the jig you will be making a series of cuts referred to as A, B, C and D. A cuts refer to front, back and side

pieces. B cuts refer to the cuts along the trim section stock. C cuts refer to the front, back and side pieces after a rabbet cut has been made on them. D cuts refer to long cuts on the corner post section.

- Each template may call for a different size dovetail bit, from $\frac{1}{4}$ " 7.5° to $\frac{3}{4}$ " 7°, depending on stock thickness. Different size straight bits are used for decorative box joints.

The Dovetail Cuts

- Draw a pencil mark at the approximate middle of the centering piece of wood.

- Lock the router fence when you think you have it centered on the dovetail bit and, using a push block, run the stock past the bit, flat side down.

- Rotate the piece and run it over the bit again.

- Turn off the router and turn the bit so the cutters are 90° to the fence and place the stock just behind the cutter.

- Engaging the micro adjust feature, adjust the fence so an equal amount of clearance remains on both sides of the cutter. Your stock will then be perfectly centered.

- Insert the template you are going to use and set the template to the "Center Cut". For the IDDB template I used this was setting 9B.

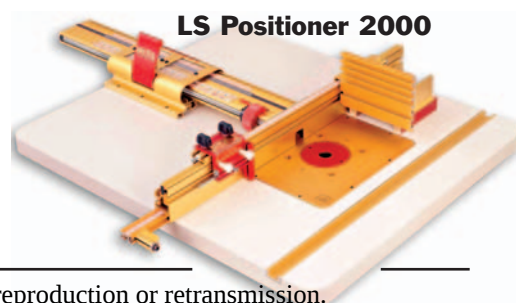
- Set the height of the bit with some scrap stock the same thickness as your project wood (as described in the Master Reference Guide, which comes with the LS Positioner System). Remember to raise the bit to tighten the joint and lower it if the joint is too tight.

- Start by using your contrasting coloured wood to make the cuts for the

The "Game Box" article, which appeared in August/September 2006, Issue #43, showed some sweet decorative dovetails. The dovetails generated a lot of interest among our readers. So we asked Kevin to give more detail on using the Incra jig.



In this article Kevin shows you how to cut such dovetails using the Incra LS Positioning fence system. This system creates beautiful dovetails as well as complex and beautiful box joints. It can also be used for sliding dovetails, rabbet cuts, or dados. Its use is not limited to your router table but can be moved to the table saw, band saw, or drill press. This jig delivers unbelievable accuracy and flawless repetitive cuts.



trim section. These will be the B cuts on the template. The stock will sit flat on the table while you run the stock over the router bit. Move to the next B cut and repeat. For my game box it took two passes to complete this task.

- Place all four front and back pieces with a backer board against the right angle fixture.
- Put a pencil mark on the sides that are against the fence
- Make the A cuts.
- At the table saw cut eight pieces from the trim section making sure they are just slightly longer than the thickness of your backs and sides.
- Glue the trim sections to both ends of the front and back, clamp, and allow them to dry for several hours.
- Sand the trim sections flush with faces.
- Place a line $\frac{3}{32}$ " from the outermost glue joint and cut along that line at your table saw with a crosscut sled or mitre gauge.
- Cut dovetail rabbets on one of either the two side pieces or the two front and back pieces. Remember to sneak up on these cuts $\frac{1}{32}$ " at a time to prevent tear out. The final depth for this template is $\frac{1}{8}$ ".
- Place all four pieces against the right angle fixture and make the C cuts as shown on the template.

The Corner Post Section

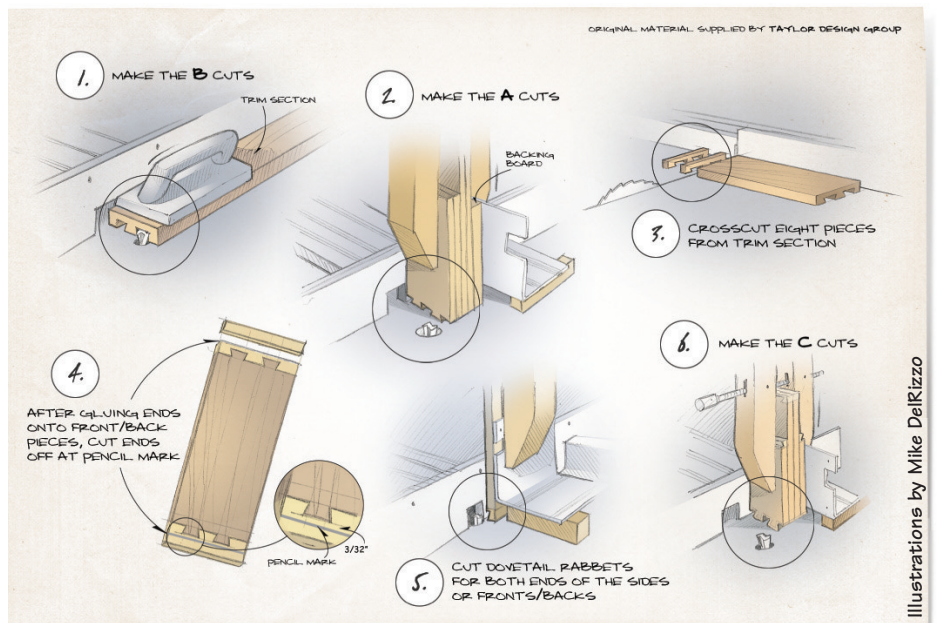
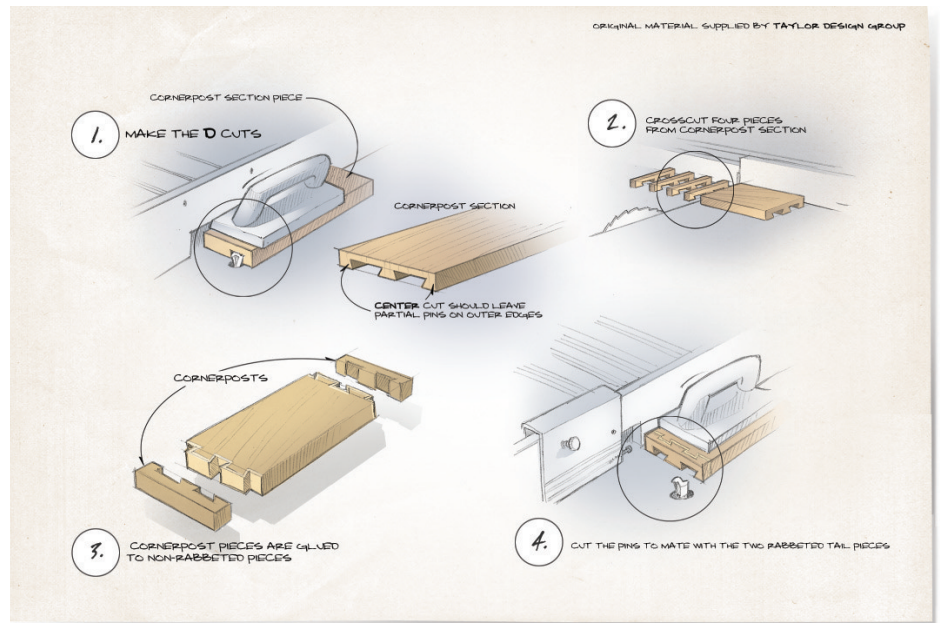
- To add the Corner Post Section make the D cuts along the length of the corner post stock starting with an outside pass moving in towards the bit with each subsequent cut. Remember to use a rubber soled push block for safety.
- At the table saw cut four pieces of wood from the corner post section just slightly longer than the thickness of the front and back.
- Glue the four pieces to both ends of the non-rabbeted pieces.
- After they have dried belt sand these pieces flush with the faces of the two sides.
- Cut the pins to mate with the two rabbeted 'tail' pieces. Set the Incra stop as close to the bit as possible and make the D cuts. Assemble one section dry to see how far to adjust the stop to get a perfect fit. Move the stop away from the bit and make the cuts.
- Dry assemble before gluing to make sure everything fits well.

Remember, that like any shop tool the more you use it the more proficient you will become. In no time you will be making beautiful joints for your projects. I know from experience you will be totally satisfied with your new Incra LS Positioner.

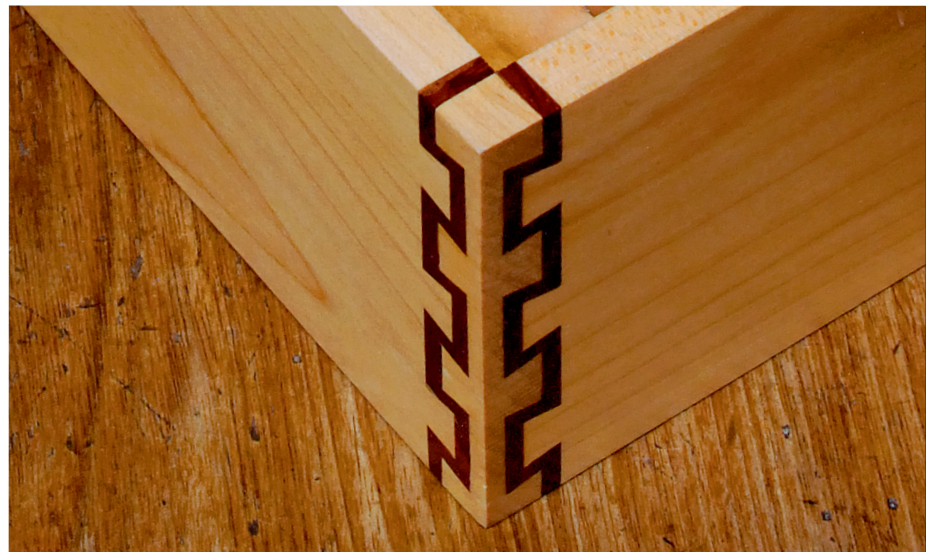
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Illustrations by Mike DeRizzo



Projects from Hell

*In most businesses and endeavors,
there always comes a time you will refer to as,
"the _____ from hell."*

A mechanic may have a car from hell that comes in for every conceivable problem and no matter what the mechanic does, the next week it's back with another problem. A dressmaker may have a client from hell who comes in for their final fitting the day before the special event, having gained fifty pounds, or so, since the previous fitting. Every waiter, waitress and anyone who has ever worked for an airline has had at one time or another, customers from hell that can never be satisfied no matter what you say or do.

If you are a woodworker and have created anything from wood other than a Popsicle stick or toothpick, then you have discovered and experienced your own personal "project from hell".

Mine was a wall unit. I was commissioned to design, build and install an entire room worth of wall unit incorporating two desks, one of which was a drop front complete with pigeon holes. There were file cabinets, computer trays and slide out computer CPUs and book shelves. This was to be matched above with cupboards of various shapes, sizes and functions, stretched from one side of the office to the next and then wrapped around the corner.

The clients had a particular stain colour in mind, and other than the over all dimensions, I was left on my own, which is the way I like it. It's usually best this way both for mine and my clients' sanity. The stain colour was not a standard, off the shelf colour, or any normal colour known

to man. Well, not this man, anyway. It was a sort of oxblood-burgundy, but from a rather anemic ox, and the burgundy wasn't a particularly good vintage.

One of the very first rules of woodworking clearly states: Do not cut off any fingers or other parts that you might wish to use in later life. While that is a really good rule to follow, it has nothing to do with the story. The rule I really wanted was: Measure once, cut twice. Maybe not! No, what I wanted was: Measure twice, cut once. I have heard that rule used many times, and on occasion have even used it myself. Maybe not as often as I should, as it is a very good rule. As is the first rule, which I also should have followed more closely.

For this job however, I followed the rule scrupulously. I returned again and again to the house for further measurements to ensure that I would get it right. And also to replace some of the dimensions I had somehow lost.

This was a newly constructed house so I made the incredibly dumb assumption that it was likely to have been built correctly. As in straight and/or square. Not once did I use a square or level while taking the dimensions of the room. I mean, who does? Me, now, as it turns out. Construction of the various units went well and in four or five weeks, the 20 something feet of cabinets and units were ready for the finish and installation. I tried various tints added to many, many different stains but no matter what I tried, the clients weren't happy with the results.

One stain tint looked pretty good to us on the sample but once it dried on a trial cupboard, it obviously wasn't right. I sanded down the unit and tried again with another promising tint. It didn't live up to its promise.

More sanding. More tints, more sanding. This went on for a while. The cabinet walls were getting a little thin from all the sanding and both my and the clients sense of humour and patience were also wearing thin. And then I hit on the solution to the whole problem. Ask someone else. I just happened to know the best furniture refinisher in all of Ontario, and possibly all of Canada. I took a sample to him and half an hour later he arrived back at my shop with a gallon of the perfect stain. Three days later I was ready to install the units. Because of the sizes and number of units, the entire thing was designed to be dismantled and reassembled individually. Besides, my van was too small to fit the entire thing in at once.

The lower sections went together well until I got to an area where the upper units had to be fastened to the lower units. Once this was assembled, I stepped back and proudly gazed upon the unit as it was so far. Something was off. Either the entire thing was both crooked and leaning out from the wall and on the verge of falling into the room, or my head was on crooked. I tilted my head the other way and, although that seemed to help somewhat I really didn't think I could convince my clients to do the same every time they



entered the room. I checked my measurements. I checked my levels and my squares. Everything was fine. Then I checked the walls and floor.

The walls were out a full inch and a half over the 20 foot width of the room and the floor dropped almost $\frac{3}{4}$ of an inch for the depth of the cupboards. Are there no building inspectors in Ontario? How could that have been missed? And yet, I had missed it as well. I used enough shims to keep the B.C. forestry industry busy for 2½ weeks but eventually managed to level and straighten the entire unit enough to complete the installation. Unfortunately, because of the crooked walls and floor, the final corner unit wouldn't fit and had to be completely replaced.

The clients are happy with the unit now and have since commissioned me for additional work. There is another upside to the entire project.

I now have a lovely, oxblood-burgundy cabinet in the square and level living room of my home.



DON WILKINSON
yukoners@rogers.com

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BY MEL SEVINDIK

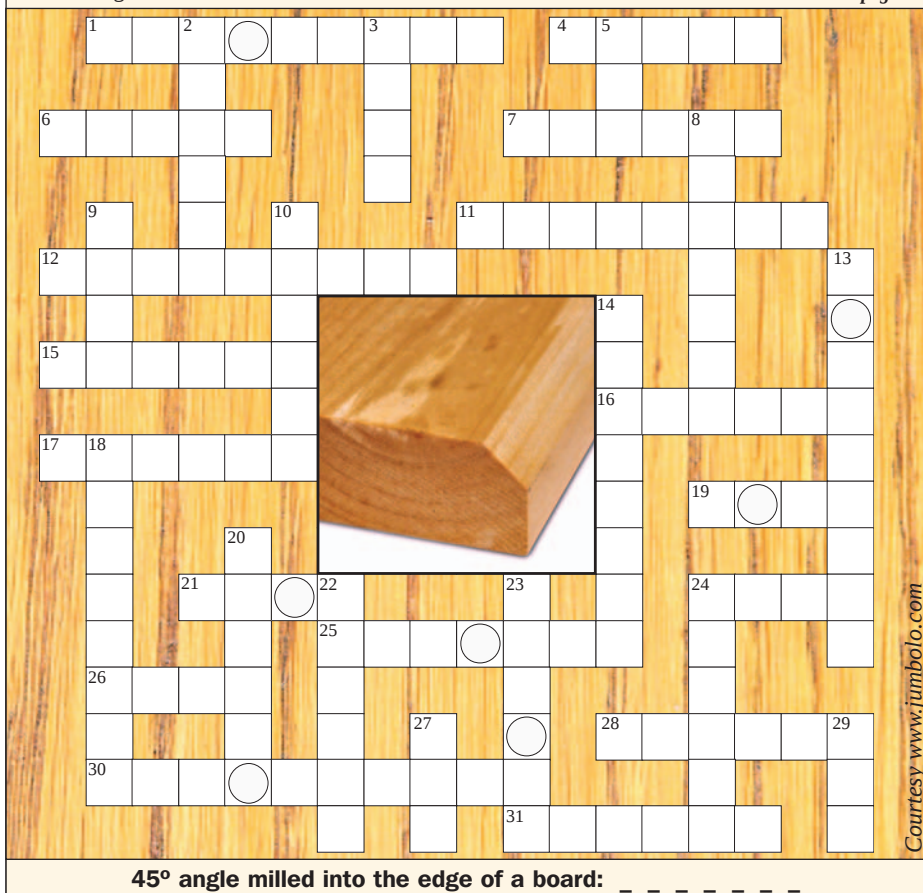
Across

- 1 Dimension of a board measured from face to face
- 4 Tool used by carpenters to strike a line parallel to the edge of a board
- 6 Line of work
- 7 Joining of two similar members in a straight line
- 11 Instrument to measure the thickness of objects
- 12 Material made by pressing wood fibers into sheet goods
- 15 Part of a router that holds the bit
- 16 Naturally occurring decorative patterns in wood
- 17 Piece used to fill the space between two surfaces
- 19 Thin strips of wood that serve as a base for plaster
- 21 Side piece or post of an opening sometimes applied to the door frame
- 24 Lowest horizontal piece of a window or door
- 25 Side of a power tool where the board exits
- 26 Short piece of lumber used to prevent movement of two other pieces
- 28 Timbers supporting the floorboards
- 30 Learner
- 31 Corner cut out of an edge of a piece of wood

Down

- 2 Side of a power tool where a board enters
- 3 Either of the two longer sides of a board, perpendicular to the face
- 5 Pointed instrument that looks like an ice pick
- 8 Type of warping that causes boards to curl up at their edges
- 9 Groove cut into a board or panel, across the grain
- 10 High speed motor that accepts profile bits to cut dados, rabbets, or shapes
- 13 Carpet strip
- 14 Easily worked wood
- 18 Decorative technique in wood, inlay
- 20 Angle cut in a piece of wood to match an adjacent member
- 22 Progressive bending of a composite panel
- 23 Thin slice of wood sawn or rotary cut for laminating
- 24 Thin strips glued in place to reinforce and align joints
- 27 Device used to hold work as a guide in manufacturing or assembly
- 29 Driving nails below the surface

Crossword solution on page 47



45° angle milled into the edge of a board: _ _ _ _ _

Courtesy www.jumbola.com

Folding Card Table

by Kerry Cox

Inspired by the work by Glenn Huey, Kerry built this African mahogany card table with a mixture of hand and power tools.

The front skirt is constructed of alternating layers of pine blocks, covered with shop-sawn veneer.

The rear skirt/swing arm assembly is birch. All joints are traditional mortise and tenon on the rear legs, dovetails joining the rear and front skirts, and bridle joints for the front legs.

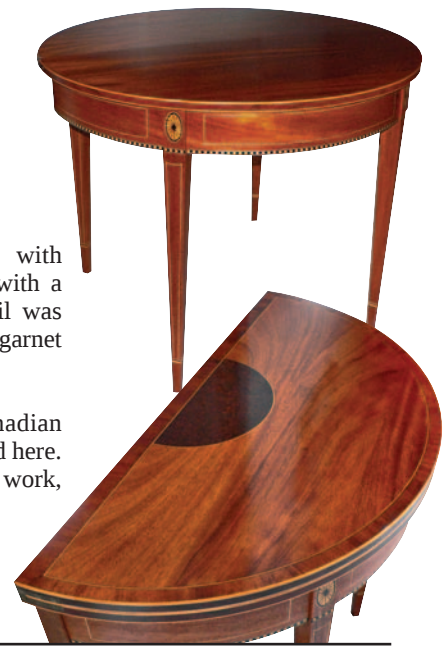
The stringing is maple and the banding and inlays were purchased. The edge treatment consists of maple stringing and mahogany veneer segments.

After protecting the inlay and stringing with blonde shellac, the mahogany was stained with a water-based dye, and then boiled linseed oil was applied and followed up with five coats of garnet shellac.

This project was selected by Canadian Woodworking's forum members to be featured here.

To see more of Kerry's (and other members) work, go to Canadian Woodworking's Woodworking Forum or type in:

<http://www.canadianwoodworking.com/forum/vbpicgallery.php?do=list>



continued from page 2

their router within two years. One thing is that if the router sits close to the bottom it will suck in a lot of fine dust. Rather than a vacuum port on the back, it would be better to install a small fan to blow fresh air into the cabinet directed towards the air intake of the router. I would like to hear back from you on this matter.

Thanks, Ray M.

Nanaimo, B.C.

Hi Ray,

With all due respect, I must disagree with you on the matter of mounting a router in an enclosed cabinet with dust collection.

I use four different router tables in my shop, two of these are open-base type, and two are completely enclosed - fitted with appropriate dust collection.

You are correct that routers incorporate fan-forced cooling to limit the temperature rise during operation, but that is in no way compromised by using dust collection in an enclosed cabinet. In fact, adding the additional air flow of the dust collector will keep the inner workings of the router much cooler as well as cleaner.

I asked **Mark Eaton**, (Product Application Specialist, Freud Canada) if he had any concerns about using the Freud router in an enclosed cabinet. Mark says that as long as there is fresh air coming into the cabinet, via means other than through the hole in the top of the table, there should not be any problem.

The fully-enclosed 'Bench Dog Pro Max Cabinet' that I use has been specifically designed for their 'Pro Max Lift' (it uses the 'Porter Cable 7518 SpeedMaster' production router). This cabinet has provisions to connect a 4" dust collector hose. I can report that when fitted with a 4" dust collection system (I use a Delta

50-850c), the inside of the router cavity is kept virtually free of any dust or other material.

If the end user does not use dust collection in the cabinet, then the router will fail prematurely, but that has nothing to do with the integrity of the design of the cabinet, be it a commercial version (like the Bench Dog product) or a shop built version such as mine.

I brought the matter up with **Mike Guest**, (Product Manager - Woodworking, Industrial Products Group at Delta/Porter Cable) and he confirmed that, with appropriate dust collection, there should not be a problem.

To check the effectiveness of dust collection on my shop made table, I ran 80



feet of trim, using a 3/4" cove bit, on western hemlock. I used the below-table dust collection port, but in this instance I did not use any dust collection on the fence above the table. As you can see from the photo, the inside of the cabinet is virtually spotless. The metal core of the router was cold to the touch after running this test. Notice in the photograph as well, there is plenty of space between the top of the suspended router and the bottom of the cabinet.

With the dust collection system hooked up, 1200 cubic feet of clean cool air is sucked through the cabinet every minute

to pick up the debris. Installing a small fan in an opening to blow air at the router's air intake would not deliver anywhere near the volume of air to the router that the dust collector does. Additionally, the dust and material would fall into the cabinet through the opening in the table, and then make its way down to the base of the cabinet. There it would get sucked into the air intake of your router. By not using a dust collector, material will build up in the cabinet - a cooling fan will not address that situation.

Even if a router is mounted in an open-style base (such as the Jessem), dust collection is still critical. **Pat Magro**, (Product Rep for Jessem Tools) tells me that the new 'Jessem Mast-R-Lift Excel' has included integrated dust collection at the table's opening, to collect this material right at source.

The other open router table I use simply has the router mounted under a steel top on an open base, without dust collection. This router has more debris and dust contaminating its insides than any other router table I have.

Aside from the enhanced safety of using a router in a table, running a router in an enclosed cabinet enhances the effectiveness of the dust collection, and helps extend the life of a router. Running the same equipment without dust collection is sure to shorten the life of any router. If you refer to page 16 in the April/May '07, Issue #47 there is a section on 'Dust Collection and Cooling' that addresses the need and reasons for this.

Thank-you for expressing your uneasiness over that project. I hope that I have addressed your concerns.

Regards, Michael Kampen

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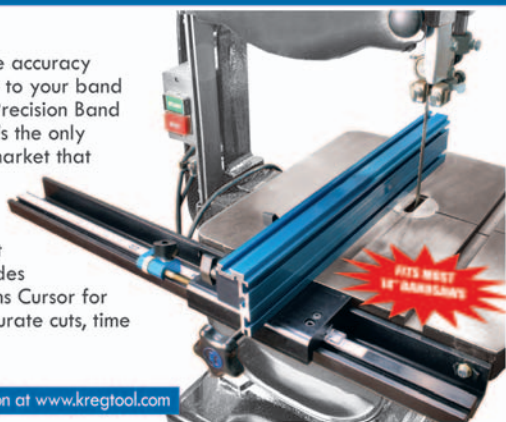
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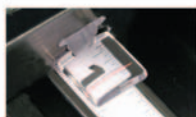
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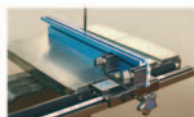
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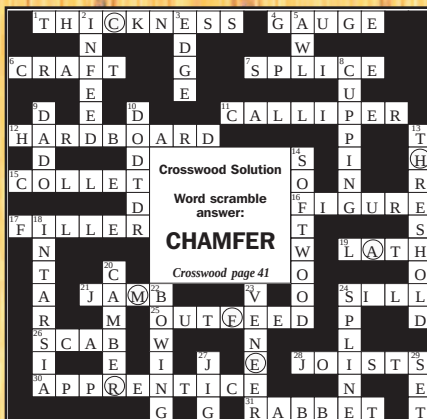
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Crossword Solution

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Crossword page 41

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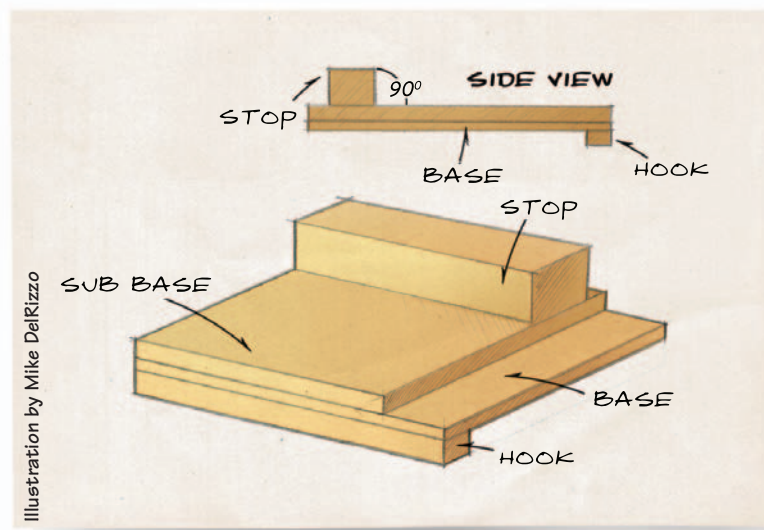
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Bench Hook

The bench hook is likely one of the most basic tools in the woodworkers arsenal. Essentially it's a brace against which you hold stock while sawing or planing. A second brace on the bottom of the jig keeps the bench hook from moving while you saw or plane away. That's it. Nothing could be as simple or as easy to build and use.



Making the Jig

There are four parts to this jig: a base, a sub-base, and two braces – one on the top (the stop) and one on the bottom (the hook).

- A jig like this cries out for solid wood, particularly if you have a dandy handmade workbench on which it will sit. With this jig, exact dimensions aren't critical. Make the jig to suit the kind of stock you will use it with. In fact, make two or three bench hooks for various applications.

- It is important that the stop is square so that your stock snugs up against it firmly. Don't glue the stop to the sub-base, rather, screw it on - that way you can more easily adjust the stop so that it's square to the side of the sub-base, or replace it in the event it gets damaged. A tall stop, of approximately 1" to 1½" high, provides good purchase against which to hold larger stock. It also makes a larger fence against which your saw can ride to help ensure squarer cuts. If you'll be using the jig solely for crosscutting small stock, you can keep the base and sub base fairly short – 3" to 4" in length would be adequate. However, a longer base will enable you to use the bench hook as a shooting board to square up the end of stock.

- Some woodworkers like to drill a hole through the base so that they can hang the bench hook on the wall. Others like to saw a 45° slot into the stop so they can saw mitres.

Using the Jig

- There are no 'tricks' to using this jig, other than to let the saw (or shooting plane) do the work for you. With one hand you'll securely hold the work piece against the stop, while with the other hand you'll saw or plane. Smooth even strokes are best. If you saw too forcefully you'll likely hit the saw teeth against the base as the cut is completed.

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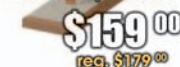


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