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FEATURE



Cover photo credit to Ray Pilon

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LINDA FULCHER

The porcupine toothpick holder on page 16 is a cute little thing. Although I noticed the animal is not so cute in real life when its quills found their way into the jowls of my cousins' German Shepherd dog. I wondered, "Did the dog try to take a bite out of a porcupine?"

A little research on Hinterland's Who Who (www.hww.ca) revealed that the porcupine: "lashes its tail threateningly when disturbed, possibly detaching loose quills, which fly through the air as though they were thrown".

Though I have visited the west, I am not familiar with the caragana wood used for the project. I will have to look for this wood the next time I'm there, as I find the story of how it was brought to the prairies, from far away lands, an interesting one.

My cousins may know of this wood, as they live in Alberta. It is their childhood dog "Whiskers", whose name has been changed to protect the (innocent?) canine, who suffered from repeated porcupine attacks.

While the wood used for this project is unique, the porcupine is one of Canada's most common mammals, and once your porcupine toothpick holder is made and displayed, it will certainly evoke a few memories amongst friends and family.

lfulcher@canadianwoodworking.com



PAUL FULCHER

I was recently asked by a reader why we sometimes illustrate projects, rather than use a photo.

I thought others may have wondered the same thing, so why:

We receive projects from a diverse number of woodworkers across Canada.

Some of those woodworkers have the ways and means to take a photo of their project placed in a lovely setting, with the photo being well lit, balanced and attractive.

It's great when that happens, but sometimes we receive photos of projects that have already been built and given away, or sold - and there isn't a photo with sufficient lighting or pixels for publication.

In such cases, rather than loose a good project because we can't get a good photo of it, we do what we consider the next best thing, and illustrate the project in what we consider an ideal setting for it.

Having said that, we are in the process of bringing on additional writers, and are looking for woodworkers who can both write and take photos. If that is something that interests anyone, I hope that you will drop in to see me at an upcoming woodworking show, or shoot me an email.

I hope to be able to publish some of your projects (and photos) in future issues.

pfulcher@canadianwoodworking.com

CORRECTIONS: Re Aug/Sept '07, Issue #49

In our review of Belt Sanders we inadvertently left out the King 3" x 21" Sander #8356.

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On page 21 (Leigh Super Jigs), the "minimum through dovetail board thickness of $7/8$ " and a minimum half blind board thickness of $13/16$ " should read "maximum through board thickness of $13/16$ " and maximum half blind board thickness of 1". The E-Bush replaces the Variable Template Guide only on the new Super Jigs. www.LeighJigs.com



Super Jig 12 with VRS



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Looking for Router Info

Recently my wife and I retired, and we find ourselves becoming increasingly interested in woodworking as a lucrative hobby.

My wife has just started a project in making a cluster of 3 different sized birdhouses.

We were buying supplies at our local Home Hardware when we spotted your magazine. It was the Aug./ Sept. '07 issue and as I was reading through it,

I got caught up in the article about Router Basics. I found it very interesting, but noted that it was part 2 on this topic and was wondering if it would



be possible to obtain a copy of part 1.

My wife and I find it a very informative Canadian magazine and would like to subscribe. In fact, my wife already spotted a couple of projects she would like to try her hand at. Router knowledge would be required.

Thanks for all the helpful information and keep up the excellent work.

Gary & Joanne T., Marmora, ON

Need Construction Details

My husband is a high school carpentry teacher and this year I started buying him Canadian Woodworking for his classroom.

Then lo and behold I had the chance to work with students in another school with a vocational carpentry program (I'm an educational assistant).

Now I am learning how to do some of the stuff hubby could do but never gets to. Even better, the shop was full of back issues of woodworking magazines. My head spun with the possibilities.

Yesterday I rescued the April/May issue from the puppy (well she got the cover). As I paged through it again I noticed the photos from the 'Woodworkers Gallery'. How excited I became when I saw that the beautiful table featured by Rob Jackson was to have photos and construction details. Although I looked on your web site and searched the woodworkers forum, I only found the photos, no construction details.

So can you please point me in the direction of those details.

Thanks, Lois E., Steinbach, MB

continued on page 46



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Wine Rack with Serving Tray

This simple to build wine rack will store up to eight one-litre bottles of wine. It has a handy shelf that you can use to store a cork remover, wine guide, white gloves and the like, and a removable top that does double duty as a serving tray.

A bit too small for your collection of Mouton Rothschild 1945? No problem - you can easily extend the storage capacity by making the sides taller and adding more rails. However if you do build a taller rack secure it to the wall to prevent it from tipping over.

To simplify joinery I used dowels, splines and knock-down hardware. Connector bolts hold the side assemblies to the rails for easy disassembly. If you don't have access to a doweling jig for this project you can use biscuit joinery, mortise and tenon joinery, or countersunk screws. To keep the design as clean and uncluttered as possible, and to reduce material costs, I chose quarter-sawn red oak. In place of oak you can use any hardwood that compliments the decor in whichever room you put your wine rack.

Legs and Stretchers Bear the Load

To avoid glue lines and achieve a slim, straight look, begin with 8/4 (2" thick) quarter sawn-stock. If you can't get 8/4 stock, glue together three pieces of 3/4" stock, mill it 1/8" undersized, and then glue a piece of 1/8"

veneer over the glue line. It is quite easy to re-saw your own veneer (for more on re-sawing see the "Little Ripper" article in Canadian Woodworking magazine, Feb/Mar'04, Issue #28). You'll want to place the best side of each leg facing towards the front, which will be most visible.

- Cut and mill stock for the legs (A) stretchers (B).
- Locate and drill 3/8" dowel holes, first on the stretchers, and then on the legs.
- Dry fit the legs and stretchers together with dowels.
- Before you mill stock for the panel (C), measure the distance between the upper and lower stretchers and the legs. Ensure that you cut the panel so it fits snugly between the stretchers.
- You can dowel or biscuit the panel to the stretchers. I used #10 biscuits.
- Dry fit the end assemblies to be sure everything lines up.

Rack and Rail

The rails that hold the bottles in place form the racking for this stand. Select the material

for the front rails carefully, as they will be most visible. Choose pieces that have straight grain; wild looking grain will clash with the curves on the rails and give the project a confused look.

- Cut and mill the material for the shelf (D) and the rails (E).
- Use a drill press to cut the curves into the rails that will hold the bottles. The curves for the rear rails are cut with a 4" hole saw and the



Use hole saw to drill curves

ones on the front rails are cut with a 2" hole saw. Clamp a piece of plywood to the drill press table as a fence and clamp the wood to the table when drilling the holes.

- Drill $\frac{3}{8}$ " dowel holes in both ends of each rail and one $\frac{1}{4}$ " hole in both ends of the shelf. Center the shelf holes $\frac{3}{4}$ " from the outside edge.

- Locate and drill corresponding dowel holes on the legs (A).

- Dry fit the end assemblies, and then dry fit the rails and shelf in place.

Knock Down Fittings for a Collapsible Rack

To make this unit collapsible, a few of the dowel holes that have already been drilled will need to be enlarged. However, if you prefer to permanently assemble this rack, skip the knock-down section below, and just assemble the unit with dowels.

- Using a $\frac{1}{4}$ " drill bit, drill all the way through the lowest dowel hole in the legs. Back the leg up with some scrap wood to avoid chipping the hole as the bit exits the leg.

- Repeat this for the single shelf hole at the top of each leg.

- Turn the shelf (D) upside down, and drill $\frac{7}{16}$ " holes to intersect with the $\frac{3}{8}$ " holes that you drilled in the ends of the shelf. Be careful not to drill through the top of the shelf. These holes will hold the connector bolt cross-dowels.

- Turn the two bottom rails upside down, and repeat the process, drilling $\frac{7}{16}$ " holes for the cross-dowels.

A Convertible Top

- If you do not have material that is wide enough, select some straight-grained boards and glue up stock for the top (F). Mill it flat and cut it to size.

- Cut the material for the long edges (G) and the handles (H), and mill to size using the jointer and thickness planer.

- Drill two $\frac{3}{8}$ " dowel holes in the edge of the top, and then corresponding holes in the handles.

- Using a hand plane or sandpaper, gently round over the top side of the long edges.

- Install a $\frac{1}{2}$ " piloted cove bit in the router table. Using a fence in combination with the bit rout a cove on the inside edge of both handles.

- Install a $\frac{1}{4}$ " piloted round over bit in the router table and raise the bit above the table to cut the round over adjacent to the cove. With the first side cut, lower the bit, turn the piece over and run a cove on the other side as well to form a smooth rounded top on the handle.

- Install a $\frac{1}{2}$ " piloted round over bit in the router table and round over the outside lower edge of the two handle pieces.

- Put a $\frac{1}{8}$ " wide chamfer on all edges of the four legs, the four long edges on each stretcher, the four long edges on each panel, and the four long edges on each rail. You can do this quickly with a block hand plane on the straight sections, and with a 45° chamfer bit in the router table for the curved sections.

Apply Finish Before Assembly

At this stage, all of the pieces have been machined and shaped. Sand the pieces with 150 and 180 grit sandpaper. Apply a coat of Watco Natural Danish Oil Finish to every part, being careful not to get any finish in the dowel holes or on surfaces that will be glued—a thin strip of masking tape will help with this. Follow up with a coat of wax. If you are building this piece to match an existing set of cabinets or furniture adjust your finish to suit.

All Good Things Come To an End

This project goes together without much fuss. The important thing to remember is not to glue the rails to the dowels if you are making a knock down rack. For the splines you can use $\frac{1}{8}$ " plywood or solid wood.

- Glue and clamp the long rails (G) to the top (F). Let the glue dry.



- Apply glue to the dowel holes on the handles (H) and the top, insert the dowels, clamp and let the glue dry. Be careful when tightening the clamps; the handle ends are rounded and tall, and your clamps may want to pinch the pieces together, opening up the joint on the underside.

- Apply glue to the dowel holes on one set of stretchers (B) and the legs (A), insert the dowels into the leg holes, insert the biscuits (or dowels) in the stretchers, slip the panels (C) onto the biscuits, and clamp the legs to the stretchers. Check for square.

- Repeat for the other set of stretchers and legs.

- When the glue has cured on the end assemblies insert dowels in the ends of the rails, and clamp the legs in place.

- Slip the shelf (D) into place.

- Insert the connector bolt cross-dowels into the shelf and the lower rails, and feed the connector bolts through the legs into the shelf and the lower rails.

- Carefully tighten the connector bolts.

- Using a $\frac{1}{2}$ " Forstner bit, drill a hole in the top of each leg to receive a $\frac{1}{2}$ " diameter 'nail in' furniture glide. The hole should be slightly



First rout handle with $\frac{1}{2}$ " piloted cove bit



Rout again with $\frac{1}{4}$ " piloted round over bit



Finish with $\frac{1}{2}$ " piloted round over bit

deeper than the nylon glide is thick. Set the four glides in these holes, nail pointing up, and center the tray on the wine rack. Press it in place until the glides stick, and then turn the rack over and use a tack hammer to drive them in the rest of the way. This will keep the tray centered on the rack and prevent it from sliding off the legs.

- Wait one half hour after applying the glue and then remove any squeeze out before it hardens completely.

- Once the glue has dried give everything a

final coat of wax to even out the sheen on the project.

Now you're ready for the most important part of the project. Place the rack in its domain, stock it with your favourite bottles of the fruit of the vine, cozy into your favourite armchair with this month's copy of Canadian Woodworking, put your feet up, and toast the completion of another project.

MICHAEL KAMPEN
mkampen@canadianwoodworking.com

MATERIALS LIST (All measurements in inches)

Part	Qty	T	W	L
A Legs	4	1 1/2	2	15 3/4
B Stretchers	4	3/4	2 1/4	5
C Panels (w)	2	7/16	3 3/4	7 3/4
D Shelf	1	3/4	7 3/4	16
E Rails	4	3/4	2 1/4	16
F Top	1	3/4	10	22
G Top, long edges	2	3/4	1	22
H Handles	2	1	1 3/4	11 3/4

All stock is quarter-sawn red oak except: (w) walnut

SUPPLY CHECKLIST

- 5 BF oak
- 1 BF walnut
- 16' of 1/8" x 1/2" spline (ply or solid wood)
- Four - 70mm (2 3/4") connector bolts and cross-dowels
- Four 1/2" furniture glides

SOURCES

LUMBER/PLYWOOD

www.BCWLumberandPlywood.com
www.CenturyMill.com
www.HomeHardware.ca
www.WoodShedLumber.com

HARDWARE

www.HomeHardware.ca
www.HouseOfTools.com
www.LeeValley.com

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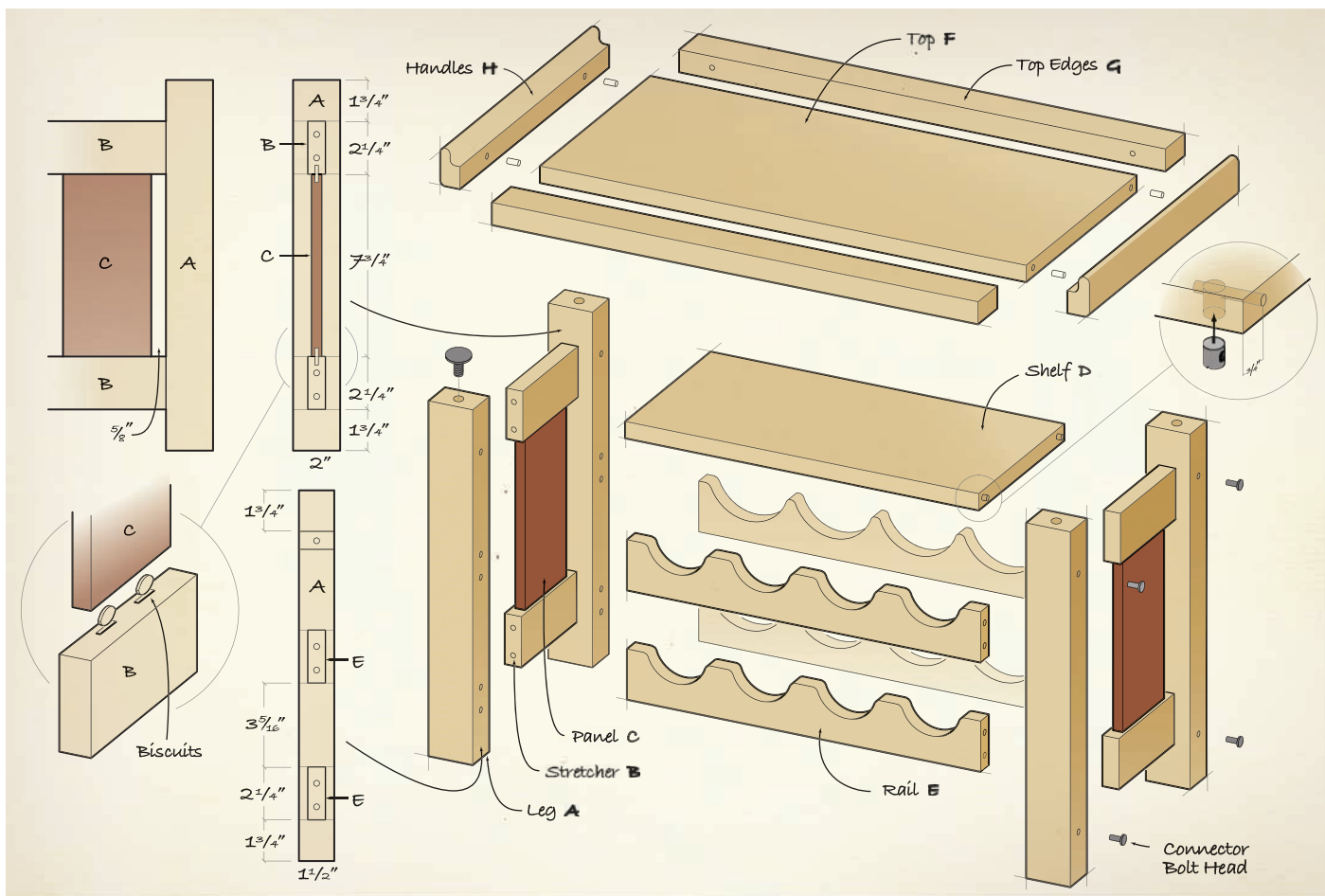


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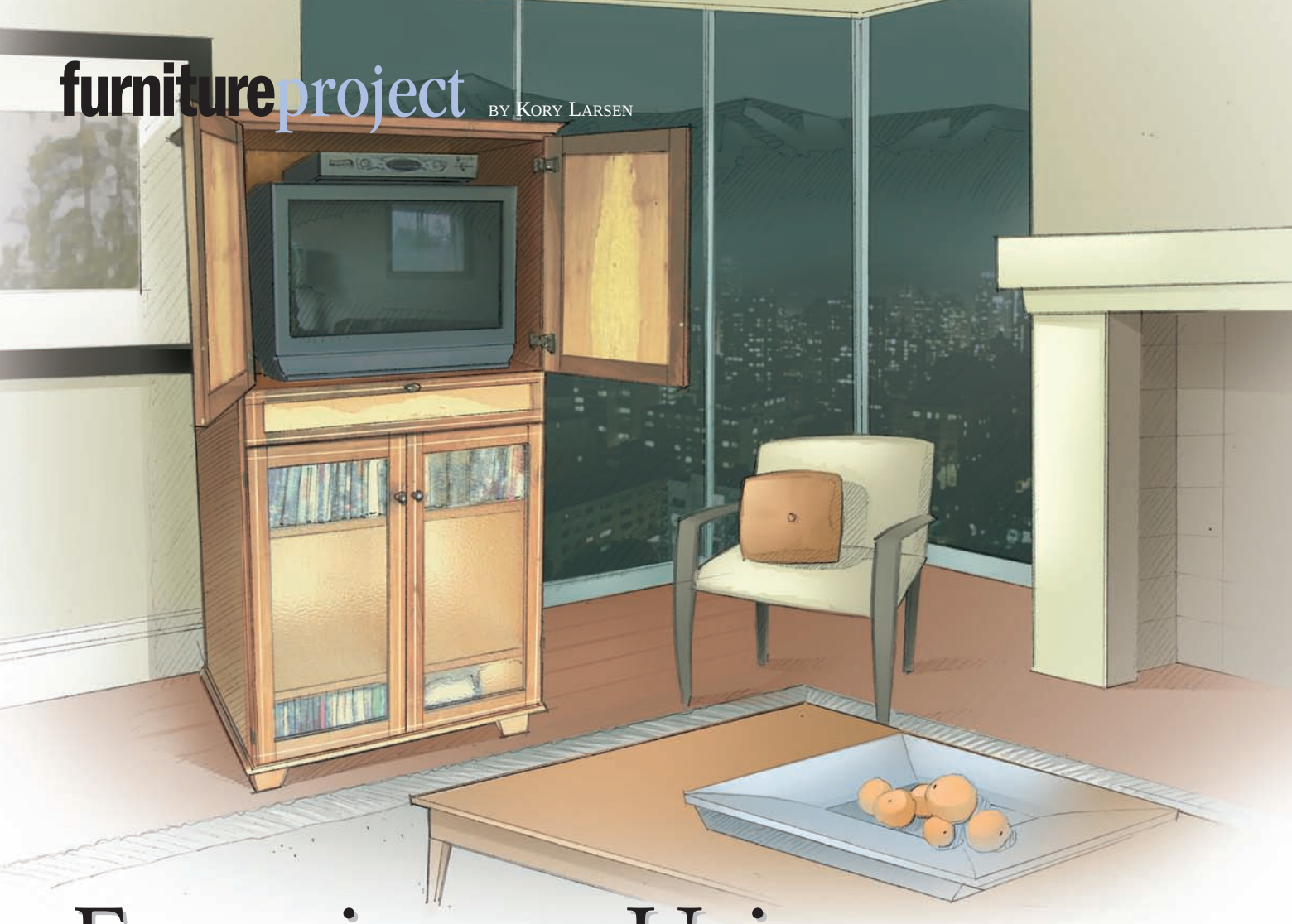
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Entertainment Unit

When moving into our first new home my wife and I decided to do away with much of the store bought furniture we previously bought. This resulted in an ultimatum of sorts – “TV on the floor”, or “Kory into the workshop”. I didn’t need much persuasion.

For this project I used materials I had on hand, and managed to be creative enough to make them all work together. The dimensions in this article reflect the size of TV and other gear I own – you’ll need to adjust dimensions to suit your media collection. The overall design of this project is based on a quick sketch and then measurements taken of the components that needed to be housed within the unit. I did, however, give some thought to ventilation for these components and planned the dimensions of the carcass accordingly. I needed the cabinet to be assembled easily so I constructed it as two units, the upper one for the TV and the bottom one for the stereo and CD/DVD collection.

I used two-sided pre-finished birch plywood for the tops, bottoms, sides and backs, and spalted maple and black walnut for contrast and accents. I was fortunate to find the spalted maple in a second hand shop on Saltspring Island that was already re-sawn and planed to $\frac{3}{16}$ ".

Construction Notes

I chose a combination of dado and pocket-hole joinery to construct the cabinet carcasses. This type of joinery is quick and strong enough to withstand the weight of the TV and other components. The pre-finished birch is a great product to work with, being stable and of uniform thickness. Not having to finish the inside

and outside of the cabinet before assembly saves a lot of time and work. The finish used on this product is both durable and easy to fix with spray lacquer if a scratch or two occurs during the construction. When using pre-finished plywood ensure that you use a sharp blade and have your table saw set up square and true to avoid splintered cuts. Using a zero clearance insert is a good idea as well. You also need to rough-up the finished surface in those places where it is to be glued to ensure good adhesion. Make sure you leave sufficient ventilation space around the TV and electronic components as they tend to heat up in use. For this I cut holes in the back panels.

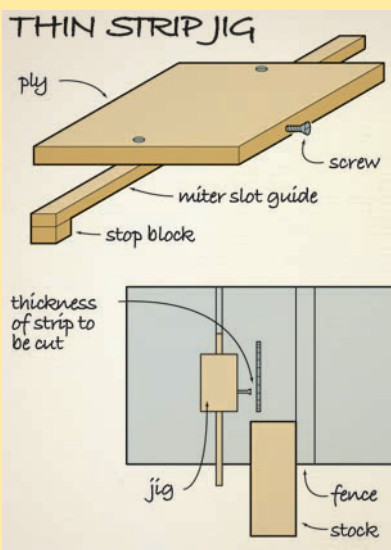
Begin With Upper and Lower Units

- Cut the sides (A, B), tops (C) and bottoms (D) of the upper and lower units to size.

- Cut the shelves (E) to size.

- You can either fix the shelves in place or make them adjustable. (Note: the top shelf to which the flip down door is attached should be fixed in place). For fixed shelves lay out dado lines on the sides. Cut the dados using a dado blade on the table saw or a router. For adjustable shelves lay out shelf pins. Drill the holes with a drill driver or a router and shelf hole jig (see Shelf Hole Drilling Jig sidebar.). If you don't have a dado blade you

Cutting Thin Strips



Cutting thin strips on the table saw can be a bit nerve racking. Use this handy jig to make the job safer and quicker. You'll need a piece of ply or wood 3" – 4" long, and about 1/2" narrower than the distance from the table saw blade to the outside edge of the mitre slot. Cut a 3/8" x 3/4" strip of wood about 14" long to fit into the saw mitre slot. Screw the ply onto the strip, and then add a small stop block to the end of the strip so that it stays in place in use. Insert a flat head screw into the edge of the ply. Now place the jig into the mitre slot, and adjust the screw so that the distance from the outside edge of the saw blade to the head of the screw is the thickness of the strip you want to cut. Move the rip fence so that it pushes the stock up against the screw head, and cut a strip. Continue re-adjusting the rip fence after each cut. For thin stock you only need to raise the saw blade slightly above the height of the stock. Make sure that you use a push stick.

can cut the dados on the table saw in two 1/8" passes and mill a 1/4" rabbet on the shelf sides.

- Cut rabbets on the tops and sides to accept the back panels (F, G). I like to leave the rabbets for the back panels rather deep (at least 1 1/2") so that if the cabinet is up against a wall there is room for wiring behind the cabinet.

- Lay out and drill holes for pocket screws on the two tops (C) and two bottoms (D). Drill the holes on the outside surfaces so that the holes will not be visible from inside when the boxes are put together.

- Dry assemble the units.

- Cut the back panels (F, G) to size and test fit them.

- Glue and clamp the upper and lower units together. Check to ensure that they are square.

- Assemble the top unit and the bottom unit with pocket hole screws.

- Apply glue to the back rabbets and install the back panels.

- Check for square once more and adjust if necessary before the glue sets.

- Pin or screw the back panels in place.

- Set the two units aside to dry. You can scrape off any excess glue about one-half hour after glue-up, as the glue will be tacky yet come off easily.

Splined Door Frames are Easy to Make

Because I don't own a stacked door frame router bit set, I chose to use spline joinery for the stiles and rails. I cut through dados, which means that the splines are visible on the ends of the frames. Optionally you could use dowels or mortise and tenon joinery.

- Mill wood for the upper door and folding door panels (H, I). You may have to glue up several pieces to obtain the required width. Make the panels slightly oversize and trim them to finished dimension after the stiles and rails are made.

- Purchase the frosted glass for the lower door panels (J). It's best to obtain the glass before you begin the project. Optionally use a wood panel.

- Select 1" wood for the rails (K, L, M) and stiles (N, O, P). Straighter grain wood works best as it tends not to warp or rack as much when machined to the finished dimensions.

- Plane the stiles and rails to the finished thickness and then joint and cut them to width.

- Cut the stiles and rails to length allowing a little extra to be trimmed exactly to size later.

- Set a dado blade to the thickness of the panels (slightly proud of 1/4" to let the panels 'breathe' in the frames), and 3/8" above the height of the table saw top. If you don't have a dado blade set you can rout the dados on a router table. (Note: If you are using glass for the lower doors carefully measure the thickness of the glass before cutting the dados).

- Use scrap pieces to test the depth, position of cut, and thickness of the dado before cutting the dados on the stiles and rails. Make your cut in the center on each frame piece.

- Trim the stiles and rails to finished length, label them, and set them aside.

- Cut the door panels to finished length and width to fit the doors frames.

- Mill the splines (Q) for the door joints. Cut the splines from the same stock as the stiles and rails. Aim for a spline thickness that is a hair thinner than the spline width. Cut the splines slightly longer than needed and sand them flush after the doors are assembled.

- Glue splines in the bottom rail and stiles and clamp lightly.



- Slide the panels in place, but don't use any glue. The panels will expand and contract within the frames.

- Glue splines in the top rail and stiles and clamp. Check for square, adjust if needed and set aside to dry.

- If you use glass for the lower doors insert a piece of thin felt between the glass and the trim pieces. Use brads to hold the trim in place (pre-drill the nail holes). This makes it easy to change the glass if it breaks.

Trim Covers Plywood Edges

- Cut $\frac{3}{8}$ " x $\frac{7}{8}$ " strips (R) from left over black walnut material and plane to $\frac{1}{4}$ " thickness for trimming out the carcass boxes later.

- To hide the end grain of the birch plywood on the boxes, I edge banded the edge grain with a $\frac{1}{4}$ " x $\frac{7}{8}$ " hardwood edge banding (R) of an accent wood.

- Place the upper cabinet on the lower cabinet and temporarily screw them together.

- Begin working your way around the boxes applying the edge banding, mitreing corners and taping the material to the box to fit perfectly, with edges flush to the inside of the cabinet and proud by $\frac{1}{4}$ " on the outside. Glue strips in place and either use tape to hold them while the glue dries, or if you have a

headless pinner gun, pin them in place.

- Glue and fasten the middle trim (T) only to the lower cabinet so that you can disassemble the unit if you need to move it in the future.

- Complete the trimming of all raw edges to finish the carcass.

Crown Moulding Enhances Top

For the mouldings I used western maple cut on a simple 45° profile.

- Cut material for the top (S) and bottom (U) mouldings. For this style of cabinet a modern, simple, beveled profile worked best. You only need to install moulding on the front and sides of the top and bottom.

- Rout or cut on the table saw the desired profiles.

- Cut the mouldings to length, using mitres at the front corners.

- Glue the moulding in place. Optionally secure them with headless brads.

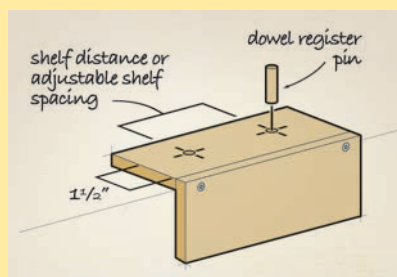
- To stabilize the top mouldings glue support blocks (X) to the top (C).

- Mill stock for the feet (V). I cut a 10° taper on the sides.

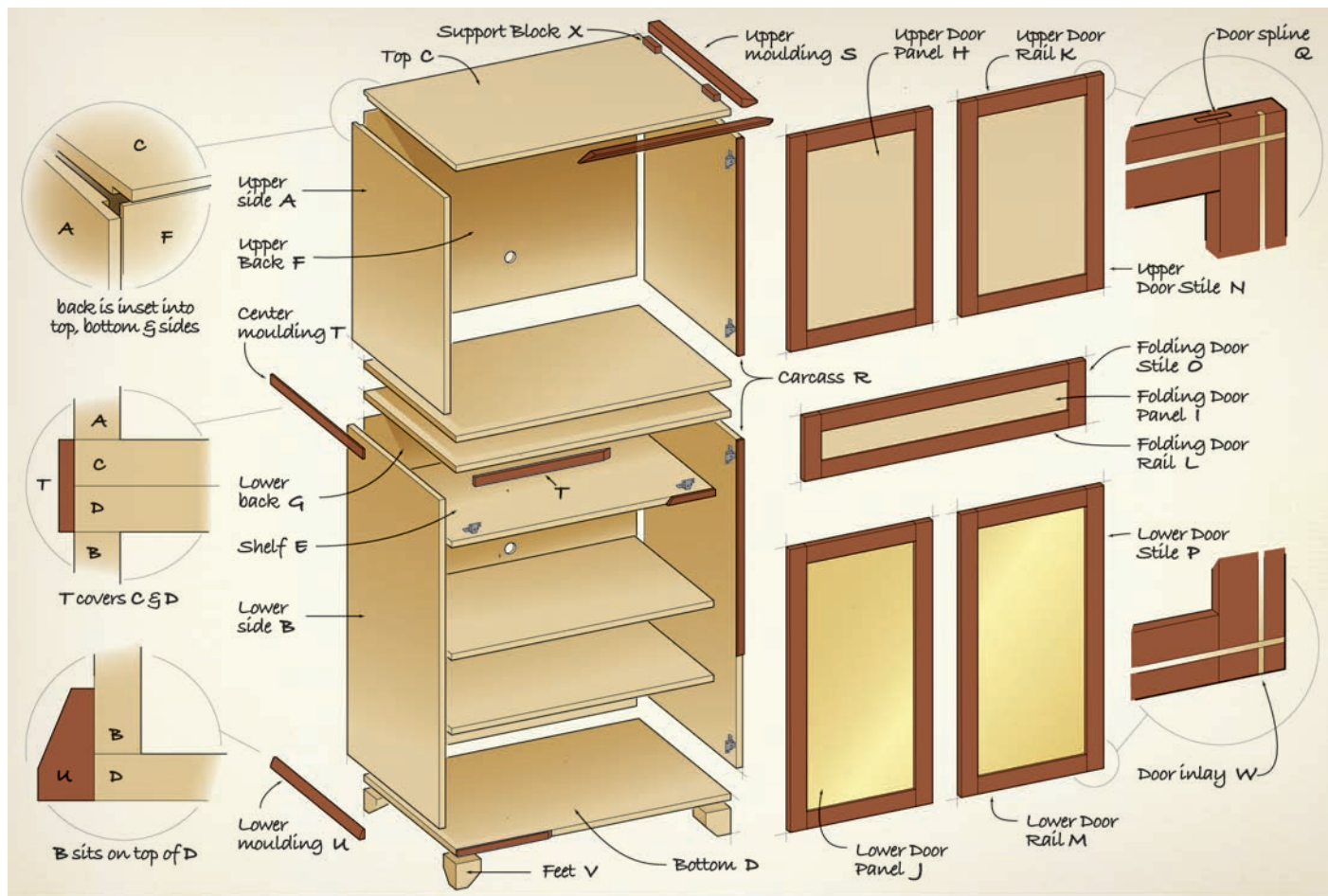
Simple Inlay Embellishes Doors

I used a very simple inlay method to

Shelf Hole Drilling Jig



To drill consistently spaced shelf holes use a simple shelf hole drilling jig. This one is made from scrap plywood. Locate two or more holes the distance that the shelf holes are to be from the edge of the shelf – $1\frac{1}{2}$ " in from each side is a good distance. Space the holes at whatever distance you want your shelves to be – if you want adjustable shelf spacing drill the holes every $1\frac{1}{2}$ " to 2" apart. A lip on the side of the jig allows you to hold it tightly against the shelf while drilling. Use a dowel as a register pin to ensure that the holes will continue to be accurately spaced. To make a more permanent jig use bushings and inserts available from Lee Valley (item #25K62.20).



‘pretty-up’ the door fronts on this cabinet, involving just a thin kerf saw blade and preparing matching inlay strips. Of course, if you don’t have a thin kerf blade, a standard saw blade will work – only you’ll end up with a thicker inlay.

- Set a sharp, thin kerf combination blade in your table saw, and raise it about $\frac{1}{8}$ " above the saw table top.

- Set the rip fence to center on each door frame.

- Rip thin dados in all four frame sides of all the doors. Remember to hold the frame down on the table saw with even pressure when dadoing to provide an even depth.

- Rip thin strips of contrast wood (W) to fit the dados (see Cutting Thin Strips sidebar). Cut the strips slightly thicker than the dado depth.

- Apply glue and tap the inlay into the dados leaving them slightly longer than needed. You can flush sand the ends later.

- Allow the inlays to dry, then hand plane or sand all the edges flush.

Final Touches Personalize Cabinet

I installed the shelves (E) to accommodate my particular stereo components, and drilled holes for wiring to exit the back of the cabinet. I also applied walnut trim to the front of the shelves. To ensure that the DVD’s and CD’s would remain accessible at the front of the cabinet I installed battens at the backs of the shelves.

I finished the cabinet with a clear satin wipe-on polyurethane. I applied three hand rubbed coats, sanding lightly between each coat. This really brought out the beauty of the black walnut and spalted maple.

I chose 230° Hetal hinges for the four front doors on the unit. They were easy to install (with the right size Forstner bit) and are self-closing and slightly adjustable to get all the gaps around the doors as perfect as possible. For the flip-down door I used a pair of simple European Blum overlay hinges that are also self-closing and adjustable to get perfect alignment with the top and bottom doors.

This project was born out of necessity but has become a beautiful part of our living room. When closed, it shows off the wonderful grain and high contrast of the black walnut and spalted maple. When open, we have all of our components and media materials easy to access and organized (and all those pesky wires are hidden!). This cabinet was fun to build and the result is very satisfying!



KORY LARSEN
www.thefinishedroom.ca

SUPPLY CHECKLIST

- 3 sheets $\frac{3}{4}$ " 2-sided pre-finished birch ply
- 1 sheet $\frac{1}{4}$ " 2-sided pre-finished birch ply
- 10 BF birch
- 12 BF walnut
- 2 panes of $\frac{1}{8}$ " glass
- 4 pairs of 230° self-closing door hinges
- 1 pair of overlay self-closing flip down hinges
- $\frac{3}{8}$ " shelf pins and sockets (if you are using adjustable shelves)
- 4 door pulls
- polyurethane

SOURCES

LUMBER/PLYWOOD

www.BCWLumberandPlywood.com
www.CenturyMill.com
www.HomeHardware.ca
www.WoodShedLumber.com

POCKET HOLE JIG

www.LeeValley.com

HETAL HINGES

www.Richelieu.com

OVERLAY HINGES

www.LeeValley.com

FINISHING SUPPLIES

www.Circa1850.com
www.HomeHardware.ca
www.LeeValley.com
www.WoodEssence.com

RESOURCES

Cutting Dados & Grooves on the Table Saw, Issue 47, Apr/May'07
See our review of the Router-Ease Guide at:
www.canadianwoodworking.com/newsletters/reviewindex.htm

MATERIALS LIST (All measurements in inches)

Part	Qty	T	W	L
A Upper sides	2	$\frac{3}{4}$	22	25 $\frac{1}{2}$
B Lower sides	2	$\frac{3}{4}$	22	38 $\frac{1}{2}$
C Tops (upper & lower)	2	$\frac{3}{4}$	22	33
D Bottoms (upper & lower)	2	$\frac{3}{4}$	22	33
E Shelves	3	$\frac{3}{4}$	21 $\frac{1}{2}$	32 $\frac{1}{2}$
F Upper back	1	$\frac{1}{4}$	32 $\frac{1}{2}$	24 $\frac{1}{2}$
G Lower back	1	$\frac{1}{4}$	32 $\frac{1}{2}$	32 $\frac{1}{2}$
H Upper door panels (m)	2	$\frac{1}{4}$	13	21
I Folding door panel (m)	1	$\frac{1}{4}$	3 $\frac{1}{2}$	29 $\frac{1}{2}$
J Lower door panels (g)	2	$\frac{1}{8}$	13	29
K Upper door rails (w)	4	$\frac{7}{8}$	2	12 $\frac{1}{2}$
L Folding door rails (w)	2	$\frac{7}{8}$	2	29 $\frac{1}{4}$
M Lower door rails (w)	4	$\frac{7}{8}$	2	12 $\frac{1}{2}$
N Upper door stiles (w)	4	$\frac{7}{8}$	2	24 $\frac{1}{2}$
O Folding door stiles (w)	2	$\frac{7}{8}$	2	5 $\frac{1}{2}$
P Lower door stiles (w)	4	$\frac{7}{8}$	2	32 $\frac{1}{2}$
Q Door splines (w)	20	$\frac{1}{4}$	1	2 $\frac{1}{4}$
R Carcass trim (w)	-	$\frac{1}{4}$	$\frac{7}{8}$	40 feet
S Upper moulding (m)	-	2	2	10 feet
T Center moulding (m)	2	$\frac{1}{4}$	1 $\frac{1}{2}$	6 feet
U Lower moulding(m)	-	1	2	10 feet
V Feet (m)	4	3	3	3
W Door inlay (w)	-	$\frac{1}{8}$	$\frac{1}{8}$	50 feet
X Support blocks	6	1	1	4

All materials are birch plywood except: (m) maple, (w) walnut, (g) glass



Mission Style Bunk Bed

Bunk beds make for fabulous sleeping accommodations for younger folks. They are easy enough to build, and take up less space in a bedroom than conventional single beds.

I made this bunk bed at the request of my young son. He's making new friends and would like to be able to invite them to sleepovers. This bunk bed should fit the bill. As with a lot of the furniture in my house, it's made in the Mission style, for which the words 'big', 'square', 'quarter-sawn' and 'white oak' immediately come to mind. However, instead of using harder to find and more expensive quarter-sawn white oak, I opted to use rift-sawn and plain-sawn red oak.

This bunk bed essentially consists of two bed frames, one mounted on top of the other. The joinery is a mix of old and new schools. I used mortise and tenon joinery to fasten the bed frames together, pocket hole joinery and dados for the ladder, and plugged screws for the safety rails. In keeping with more traditional bunk beds of

the Mission period, I used slats in place of a box spring. This also freed up a bit more space underneath for that all important storage space.

I was able to buy some 4/4 rough oak that I milled to $\frac{7}{8}$ " thickness for all the bed parts except the vertical stiles ($\frac{3}{8}$ ") and the legs ($2\frac{5}{8}$ "). If you choose to use $\frac{3}{4}$ " stock you will have to adjust the dimensions in the materials list accordingly. Bear in mind that using thinner stock will likely result in a less stable bunk bed – particularly with a couple of young lads jumping about on them. You'll also want to buy your mattresses before you begin building.

Sturdy Legs Make a Sturdy Bed

- Glue up stock for the legs (A, B). I laminated three pieces of wood for the legs, and after the glue dried I milled the legs

square, to a dimension of $2\frac{5}{8}$ " x $2\frac{3}{8}$ ". The narrower dimension will be for the sides that show the glue lines.

- You don't want the glue lines to show. To hide them, glue $\frac{1}{8}$ " rift-sawn veneer over them. If you don't have access to rift-sawn veneer you can use plain-sawn wood. The final dimension of the legs will then be $2\frac{5}{8}$ " x $2\frac{5}{8}$ ".

- Select the leg sides on which you will lay out the mortises. Each leg has one face with two mortises, one face with one mortise, and two outside faces without mortises.

- Mark out the locations of the mortises. For this I use a story stick – a strip of scrap wood or plywood cut to the length of the leg (see Story Sticks, Feb/Mar '06, Issue #40). I mark the mortise locations on the story stick, and then transcribe the marks

onto the legs (remember to mark which end of the story stick is the 'top'). The mortises for the head and footboard rails are $\frac{1}{2}$ " x $1\frac{5}{8}$ " x $5\frac{1}{2}$ " for the bottom mortises, and $\frac{1}{2}$ " x $1\frac{5}{8}$ " x $4\frac{1}{2}$ " on the top mortises. Mortises for the side rails are $\frac{1}{2}$ " x 1 " x $5\frac{1}{2}$ ". All mortises are centered on the width of the legs.

• Cut out the mortises. I drill and then chisel them out. You could also use a router and a mortising jig, or a chisel mortiser.

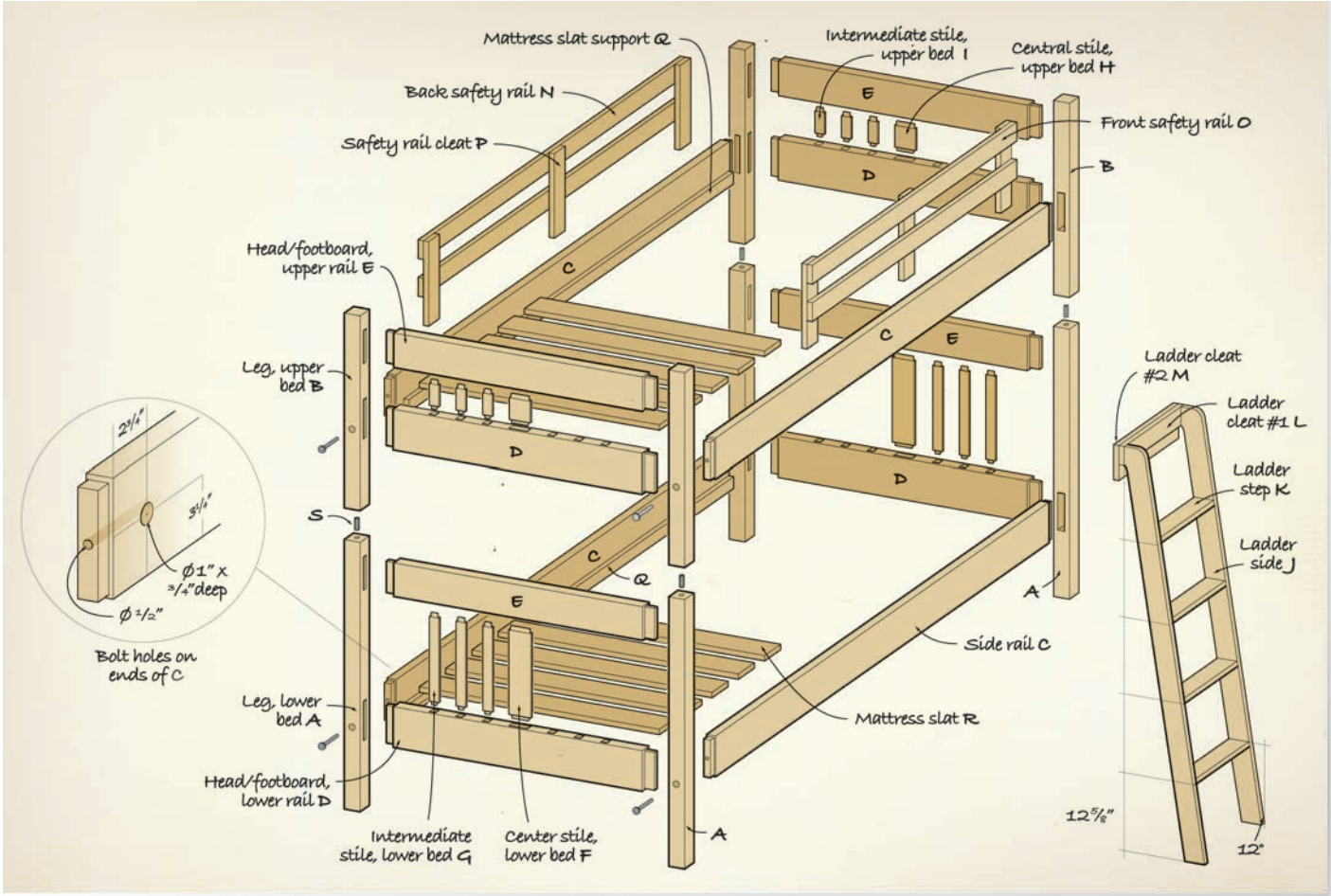
Tenons Join Rails to Legs

• Mill the stock for the bed side rails (C) and headboard and footboard rails (D, E). Note that the upper rails (E) are $5\frac{1}{2}$ " wide.

• Mark out the locations for the tenons on all the bed rails. Scribe guidelines $1\frac{5}{8}$ " in from the ends of the head and footboard rails and 1 " in from the ends of the side rails (C). These mark the shoulder locations of the tenons. The tenons are $\frac{1}{2}$ " thick and the shoulders are $\frac{1}{2}$ " in from the edges.

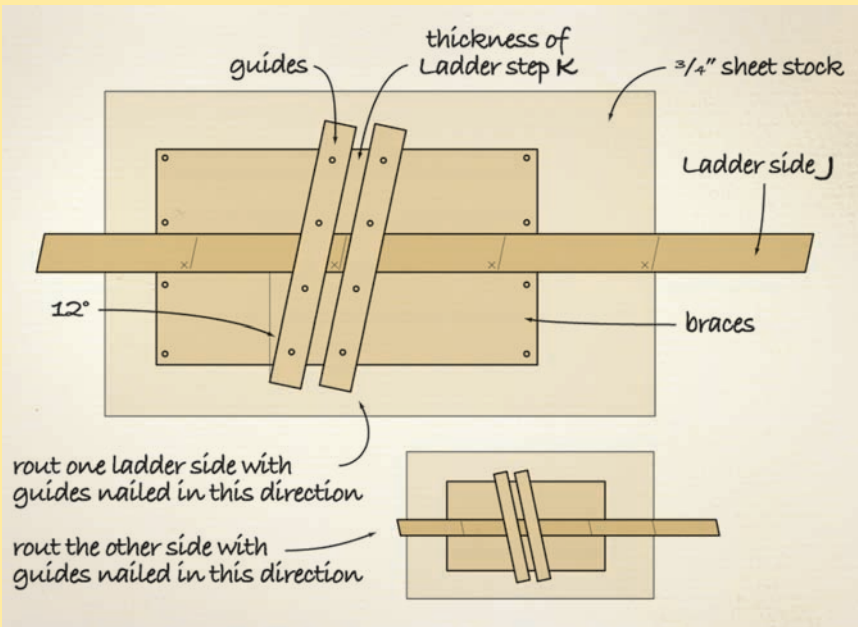
• Cut the tenons. I cut the head and footboard rails on the table saw, using a tenoning jig (Apr/May '07, Issue #47). I cut just shy of the guidelines, and do my final trimming with a shoulder plane, rip tooth

MATERIALS LIST (All measurements in inches)				
Part	Qty	T	W	L
A Legs, lower bed	4	$2\frac{5}{8}$	$2\frac{5}{8}$	43
B Legs, upper bed	4	$2\frac{5}{8}$	$2\frac{5}{8}$	31
C Side rails	4	$\frac{7}{8}$	$6\frac{1}{2}$	$75\frac{3}{4}$
D Head & footboard, lower rails	4	$\frac{7}{8}$	$6\frac{1}{2}$	41
E Head & footboard, upper rails	4	$\frac{7}{8}$	$5\frac{1}{2}$	41
F Central stiles, lower bed	2	$\frac{3}{8}$	$3\frac{1}{2}$	$18\frac{1}{4}$
G Intermediate stiles, lower bed	12	$\frac{3}{8}$	$1\frac{1}{2}$	$18\frac{1}{4}$
H Central stiles, upper bed	2	$\frac{3}{8}$	$3\frac{1}{2}$	$6\frac{1}{4}$
I Intermediate stiles, upper bed	12	$\frac{3}{8}$	$1\frac{1}{2}$	$6\frac{1}{4}$
J Ladder sides	2	$\frac{7}{8}$	$3\frac{1}{4}$	$65\frac{1}{4}$
K Ladder steps	4	$\frac{7}{8}$	4	15
L Ladder cleat #1	1	$\frac{7}{8}$	3	$16\frac{1}{4}$
M Ladder cleat #2	1	$\frac{7}{8}$	$5\frac{1}{2}$	$16\frac{1}{4}$
N Back safety rails	2	$\frac{7}{8}$	3	$73\frac{3}{8}$
O Front safety rails	2	$\frac{7}{8}$	3	$57\frac{1}{4}$
P Safety rail cleats	5	$\frac{7}{8}$	3	$13\frac{1}{2}$
Q Mattress slat supports	4	$\frac{7}{8}$	$1\frac{7}{8}$	$73\frac{3}{8}$
R Mattress slats	24	$\frac{7}{8}$	$4\frac{1}{2}$	$39\frac{9}{16}$



Routing Ladder Dados is Easy

- Lay a ladder side (J) on a piece of $\frac{3}{4}$ " sheet stock.
- Nail or screw two $\frac{3}{4}$ " x 3" x 8" braces on either side of the ladder side.
- Nail or screw two $\frac{3}{4}$ " x 2" x 10" guides at 12° across the braces, the width of one of the ladder steps (K).
- Install a $\frac{5}{16}$ " top bearing bit in a router and set the depth of cut to $\frac{1}{4}$ ".
- Earlier you will have made four alignment lines on the inside face of each step ladder side. Position one of the lines against the inside edge of the left guide on the jig.
- Rout a dado across the ladder side. Repeat this for all four dados on one ladder side.
- Once all of the dados are routed on one leg side, remove the guides and adjust them the opposite way to rout the dados on the other ladder side.



back saw and a very sharp chisel. The side rails are too long to safely cut using a tenoning jig. I trim these using the cross cut



fence, cutting off about $\frac{1}{16}$ " on each pass, and then clean up using a chisel. You could also use a router to mill the tenons.

- Dry fit the legs and the rails, making sure that they all go together snugly with light hand pressure.

Tenons Join Stiles to Rails

- Mill the stock for the vertical stiles (F, G, H, I) to dimension. The stiles are $\frac{3}{8}$ " thick. This is so that a 1" board can be re-sawn so there is less waste when thicknessing. The vertical stiles will fit in between the head and footboard rails (D, E).
- Cut the tenons on all the stiles. The tenons on the wide stiles (F, H) are $\frac{1}{4}$ " x 3" and on the narrow stiles (G, I) are $\frac{1}{4}$ " x 1". All tenons are $\frac{3}{8}$ " long.

Stiles Fit in Head/Footboard Rail Mortises

- On the head/footboard rails (D, E) mark out the locations of the mortises for the vertical stiles. All mortises are just over $\frac{3}{8}$ " deep.

- Cut the mortises on the top edge of rails (D) and the bottom edge of rails (E).
- Dry fit all of the stiles to the rails.

Drill Bed Bolt Holes in Legs

- Mark out the holes on the legs for the bed bolts. Bed bolts, used in conjunction with the dry (un-glued) mortise and tenons, will make for a sturdy joint that you can easily un-assemble in the future. The holes are centred on the legs.
- Chuck a 1" Forstner bit into a drill press and drill $\frac{5}{16}$ " deep holes in each leg.
- Chuck a $\frac{3}{8}$ " brad point bit into the drill press and drill into the center of the 1" hole and out through the mortise. This will provide a guide hole for the drill bit when you drill into the end of the main bed rails (C).
- Apply a stain (optional) and a finish to all of the legs, slats and head/footboard rails, making sure to mask the tenons and plug the mortises. I used an Early American stain from Minwax and followed this with four coats of amber shellac and one coat of dark brown wax. Note that the wax really accentuates the open pores of the red oak – you may want to test the look on a piece of scrap wood beforehand.

Bed Frame Assembly

- Dry fit the side bed rails to the head and footboards. Using the previously drilled holes in the legs as a guide, drill a $\frac{1}{2}$ " hole into the end of the side rails. Drill as deep as you can, and then remove the side rails from the legs and complete drilling the holes to $3\frac{1}{2}$ " deep.
- Measure $2\frac{3}{4}$ " from the shoulder on the inside face of the bed rail. Make a mark.
- Measure up $3\frac{1}{4}$ " from the bottom of the rail and intercept the first mark. This will be the center of the hole for the bed bolt nut.
- Using a 1" Forstner bit drill to a depth of $\frac{3}{4}$ " with the POINT of the bit. Any deeper and you run the risk of drilling a hole right through the rail.
- Using a $\frac{5}{8}$ " chisel, square up the top and bottom of the holes.
- Bolt the head/footboards to the side rails.
- Drill $\frac{1}{2}$ " holes $1\frac{1}{4}$ " deep on the top of the bottom bed legs and the bottom of the top bed legs. Use a jig to make it easier to drill accurate holes: Draw diagonal lines across one face of a $1\frac{1}{2}$ " cut-off for one of the legs, and using a drill press drill a $\frac{1}{2}$ " hole through the block. Clamp the block to the end of the leg to be drilled and drill a hole to a depth of $1\frac{1}{4}$ ".
- Cut four pieces of dowel to a length of $2\frac{3}{8}$ ". Chamfer the ends and insert the dowels into the tops of the bottom legs. If the fit is too tight, sand them until they will slide in and out with hand pressure.

- With a helper, place the top bed onto the bottom bed and check the fit.

The Ladder

- Cut all of the pieces for the ladder (J, K, L, M) to rough length.

- Using a mitre or table saw cut the bottom of each side (J) at 12°. Take one of the sides and rest it against the upper bed rail so that the bottom is flat on the floor. Mark the point where the side touches the top of the upper rail (C). Using a square resting on the top of the rail, extend a line 3" above the top of the upper rail. This will be the top of the ladder – cut with a hand saw and plane to fit.

- Select which faces of the legs will be on the inside. Lay them side-by-side with the outside faces down. Measure up 12 5/8" from the bottom of each side. This is the bottom of the first step. With your bevel set to 12°, mark both the legs, and put a small 'x' just above the line on each leg. This is where the mortise for the steps will be. Measure up 12 5/8" again. Repeat this procedure until all four steps are laid out.

- Rout 1/4" x 7/8" dados in the ladder sides for the steps (see "Routing Ladder Dados is Easy" sidebar).

- Set the bevel on your table saw to 12° and rip both edges of the steps (K) so that the total width is 3 1/2".

- Drill two pocket holes on the bottom end of each step.

- Glue and screw the ladder together.

- Take the 3" wide cleat (L) and screw it to the back of the top of the ladder. Screw the 5 1/2" wide cleat (M) to the 3" cleat so that the ladder will hook over the rail.

- Apply finish to the ladder.

Safety Railing and Mattress Supports

- Mill stock for the safety rails (N, O, P). There are two safety rails, one for the back of the bed and a narrower one for the front.

- Countersink and screw the two back safety rails (N) to the three rail supports (P) – one at each end and one in the middle. Ensure that the top rail is flush with the top of the supports.

- Countersink and screw the two front safety rails (O) to two rail supports (P) – one at each end, again ensuring that the tops are flush.

- Finish both sets of safety rails.

- Countersink and screw the back safety rail to the inside of the top side rail (C) so that there is 2" from the bottom of the lower rail to top of the bed rail.

- Countersink and screw the front safety rail to one side of the front top side rail (C) – this will provide room for you to attach the ladder to the other side.

- Mill stock for the mattress slat supports (Q) and mattress slats (R).

- Countersink, glue and screw the mattress slat supports flush with the bottom of the side bed rails (C).

- Place the mattress slats on the supports and space them out evenly. Countersink one screw into the end of each of the slats to keep them from moving around. I did not apply any finish to the slats or the slat supports.

With the finishing complete, assemble the bed in its future domain. Whoever occupies the top bunk may find it takes a bit of time to get used to 'sleeping up high', but the novelty is something that tends to generate lasting good memories.



DERRECK BRYANS
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SUPPLY CHECKLIST

- 90 BF 4/4 oak
- 4 BF 3/4" oak (for stiles)
- 45 BF 3/4" pine (for mattress slats)
- 52 feet of 1/8" rift-sawn oak
- 12" of 5/8" dowel
- eight – 5 1/4" bed bolts
- eight bed bolt covers
- stain
- amber shellac
- dark brown wax

SOURCES

LUMBER/PLYWOOD

www.BCWLumberandPlywood.com
www.CenturyMill.com
www.HomeHardware.ca
www.WoodShedLumber.com

POCKET HOLE JIG, BED HARDWARE

www.BusyBeeTools.com
www.LeeValley.com

FINISHING SUPPLIES

www.Circa1850.com
www.HomeHardware.ca
www.LeeValley.com
www.WoodEssence.com

finishingtips

by Circa 1850



What is the ideal environment for applying a finish?

Finishes should always be applied in a **clean, dust-free environment**. It would be ideal to create a specific finishing room that is separate from your wood shop to ensure that no dust comes floating in to ruin the smooth finish you are trying to achieve.

How much working time do I have once I'm done applying the finish?

The working time, or the amount of time that you have before a finish begins to get tacky, varies by finish.

Oil finishes generally have **more working time**, so you can go back and remove runs or dust up to several hours later.



Varnishes tend to tack up more quickly, so you have to **apply the finish faster**. However, do



not sacrifice precision for speed as you may not be able to go back to remove the brush marks or drips even after a few minutes.

FOR MORE INFORMATION ON FINISHING, CONSULT THE EXPERTS ON OUR INTERACTIVE FORUM AT
WWW.CIRCA1850.COM

Porcupine

Toothpick Holder

Sharpen your carving skills with this fun, little project.

The idea for this carving project came to me while cleaning up broken caragana branches (see Sidebar) in my mother-in-law's garden a number of years ago. I wanted the design to be simple as I had just started carving a short time earlier, and my tools consisted of a V-tool and two gouges.

This is a relatively easy piece to carve if you follow the instructions. You should end up with a well-armed conversation piece whose tail makes a neat handle.

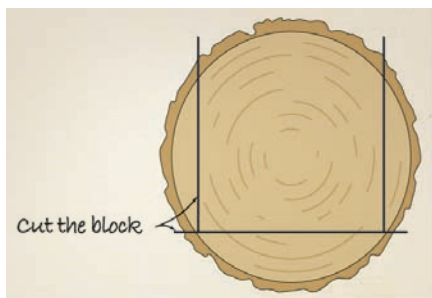
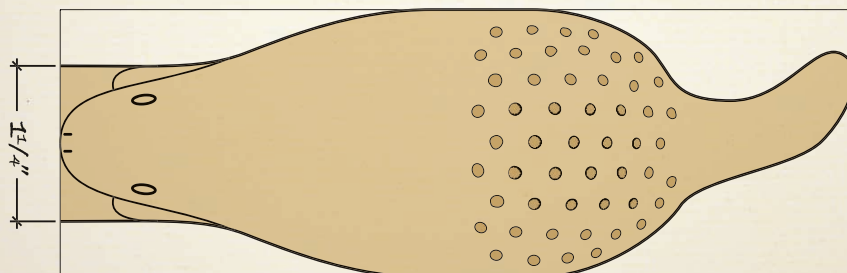
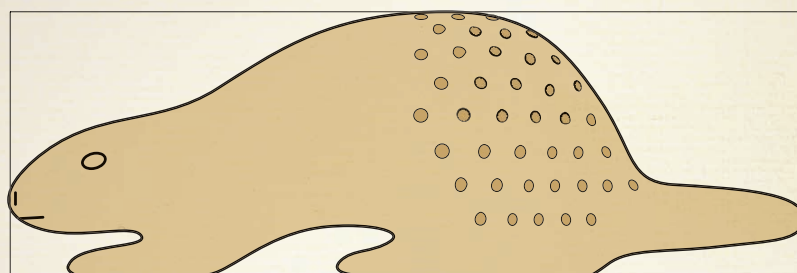
- Cut your stock to size. I began with a piece of wood that was 2 1/2" diameter by 6". If you don't have a single large block to start with, you can glue up pieces of 3/4" stock to make the blank. However, the glue lines will be visible in your finished piece.

- If you are using round stock, orient the blank so that any knots or concave spots are at

the bottom. Use the band saw to take 1/2" off the bottom. The Little Ripper (see our review in Canadian Woodworking magazine, Feb/Mar '04, Issue #28) is ideal for ripping. If you make this cut with a fence only, insert a wedge on the table against the stock

to help stabilize it.

- Use the band saw to cut 1/4" off each side.
- Draw the side profile onto the wood. Pick the side with the most sawn surface exposed.
- Cut out the side profile on the band saw. The tail can be curved up slightly or straight,



Cut lines for round stock

Enlarge pattern to 160%

whichever shows the best grain.

- Draw the top profile onto the wood and cut with the band saw. Make sure the head end is 1 1/4" wide to allow the front feet to show on either side of the head.

- Using the V-tool, cut in the flank outline. Use the carving knife to round out the body, tail, etc. The nose is slightly blunt and the eyes are set 1/2" back from the tip of the nose. The neck is about 1" wide behind the eyes and just over the front feet.

- Use a gouge to hollow out a strip between the feet on the bottom side, leaving each foot about 3/8" wide.

- Use a pencil to mark the points to drill for the quill sockets. Start 1/2" above the tail and space the points 3/8" apart. Mark holes in a line along the side, extending to one mark in front of the flank. The next row is 3/8" above and halfway between the first row markings.

- Drill holes about 1" deep, starting at an angle of 20° in the first row. All quills should point up and back, somewhat parallel. The angle at the top is more than 45° from the base. Don't fret if the holes don't work out evenly. (I've never seen a nicely groomed porcupine yet.)

- Sand lightly with 120 grit sandpaper.

- Put in markings for eyes, nose, toes, and fur either using a wood burning tool, or a black Micron pen. Don't forget to sign your piece.

- A coat of spray lacquer finishes the surface.

When the porcupine is dry, add the toothpicks and set it on the kitchen table.



CAL ISAACSON
woodycal@shaw.ca

Caragana Wood

If you are not from the prairies it is unlikely that you will be familiar with caragana wood, as it is not native to Canada. The caragana shrub is native to the steppes of central Russia and, therefore, is well adapted to the extremes of a central continental climate like the prairies. It was brought by Russian immigrants that came to homestead on the prairies. The shrub's hardiness was taken advantage of by the Prairie Farm Rehabilitation Act to provide windbreaks and to prevent soil erosion. In the past it was common to see neatly trimmed caragana hedges around farm yards as well as in urban settings. In the fields, or as windbreaks, they grow to approximately 15 feet high, with trunks commonly 2" to 3" at the base, and occasionally up to 5". Its weakness is that it rots readily when the stem gets large and old. When harvesting it for carving, the bottom foot or two has to be discarded as it will have rotten heartwood. The sapwood is off-white with a tinge of yellow, while the heartwood can vary from bright reds on the outside to shades of brown inside, or it can be the same color as the sapwood if it has grown in a sheltered place.

SOURCES

CARVING TOOLS

www.BusyBeeTools.com
www.LeeValley.com

FINISHING SUPPLIES

www.Circa1850.com
www.HomeHardware.ca
www.LeeValley.com
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Sierra Wooden Pen

Regardless of what the computer manufacturers say, handwriting is far from being a lost art. Hand crafted pens and pencils are still very popular among consumers and crafters. In fact, pen turning is one of the fastest growing woodworking hobbies.

It's relatively easy to get started – if you have a mini or full size lathe and a set of chisels, you're halfway home to making your first pen. You won't have to invest in a lot of expensive tooling, and it provides almost instant gratification – you can finish a simple project in a couple of hours.

Gearing Up

Before you begin to turn your first pen, you'll need to purchase some basic tooling. You'll need an arbor that slides into the headstock of your lathe – a Morris Taper (MT) #2 fits most lathes; a mandrel with brass nut that screws into the arbor and fits between the headstock and tail stock; the appropriate size drill for the kit you're making (in this case $\frac{27}{64}$ "); appropriate bushings to determine the final size and mount on the mandrel for the kit you are using (in this case a 20A bushing); glue to secure the brass tube inside of the blank (either a cyanoacrylate (CA) or two part epoxy); a pen mill for squaring the ends of the blank and of course, the wooden blank (for this pen we used black ash burl) and kit itself. All totalled that makes the cost of getting started around \$85.00.

The various parts that you need to make

a pen, with the exception of a blank, are included in a 'pen kit'. This kit contains the final/clip assembly, the nib assembly, a brass tube to fit inside your blank, the twist assembly and the ballpoint refill. The Sierra pen is one of the easiest kits to make, and perfect for your first pen project. It's a great looking pen and its size and weight make it ideal for almost any hand size.

Preparing the Blank

- A standard pen blank is approximately 5" long. For a Sierra, you will need only half of that length. Cut a pen blank slightly

longer than the brass tube, approximately $2\frac{1}{2}$ " long.

- After you have cut the blank to the correct length, mark the center point on one end of the blank. The blank is now ready to be mounted on your drill press in either a special pen vise or a simple wooden hand clamp.

- With a $\frac{27}{64}$ " bit, drill the blank all the way lengthwise through the center. Go slow and clear the debris often.

- Scuff the brass tube with 220 grit sand paper to roughen the surface, clean off oxidation and give the glue better surface adhesion.

- Thoroughly mix two-part 5-minute epoxy on a paper surface– wax paper or Post-it Notes work well. Thick CA glue can be used instead of epoxy, but the drying time is very fast so you will need to be quick during the next step.

- Roll the tube in the glue and insert it into the blank using a twisting motion to ensure even glue coverage. Make sure the tube is equidistant from both ends of the blank and wipe excess glue off the ends. Be sure you don't get any glue inside the tube; if you do, clean it out immediately. Set aside for five minutes to dry.

- Use a Sierra pen mill, also known as a



Tooling and supplies to get started

barrel trimmer, mounted in your drill to trim the ends flush with the brass tube. The pen mill comes in two parts: the $\frac{3}{4}$ " cutter head at the top, and the pilot shaft, which fits inside the brass tube and keeps the trimmer perfectly square to the end of the barrel when trimming. The cutter



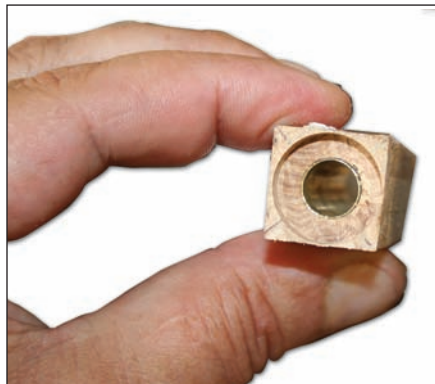
Ready to drill



Insert glued-up brass tube into blank



Trim blanks with pen mill



Properly trimmed blank

head is interchangeable with all the different sizes of pilot shafts required to do various styles of pens. Be careful not to trim beyond the surface of the open edge of the brass tube – accurate tube length is crucial for the pen to work properly, so do not trim away any of the tube's length.

Turning and Finishing the Blank

- Mount the mandrel/arbor assembly into the headstock of your lathe. Slide one of the two bushings on the mandrel, followed by the blank, then the other bushing. These bushings have a shoulder; the smaller diameter shoulder fits inside the brass tube.

- Place spacer/spacers on the mandrel in order to take up the space to the threaded portion on the end of the mandrel. To make a quick and easy spacer, drill a 7 mm hole through a piece of scrap wood measuring $2\frac{7}{8}$ " long. Alternately, extra 7 mm bushings from other kit styles also make excellent spacers. Once you have your spacer in place, tighten the brass nut on the mandrel up against the spacer. Be careful, over-tightening can cause the mandrel to bow and may damage it.

- Bring the tailstock up to the center of the mandrel and lock it down.

- Turn the blank, starting with a gouge to round the blank and then use a skew to make the cut smoother as you approach the finished diameter. It is very important to use very sharp tools and to take light cuts. If you are too aggressive in your cutting, you may split the blank. When the blank is close to the finished diameter, begin sanding with 120 grit and progress though to 400 or 500 grit until the blank is turned to the size of the adjacent bushing.

- If you desire a higher quality finish, continue sanding with Micro Mesh, which ranges from 1,500 to 12,000 grit. Micro Mesh is a long lasting, cushioned, and abrasive that does a terrific job on pens.

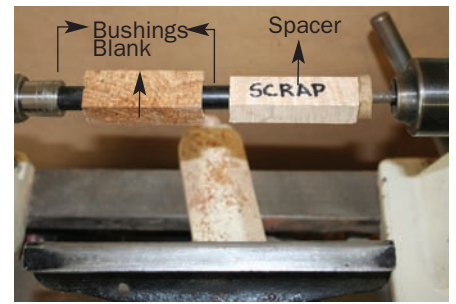
- With the lathe turning, apply the finish of your choice and polish. The choices of finishing products are nearly endless, but some of the more popular are Renaissance Wax, Mylands friction polish and even thin CA glue. The pen in this article is finished with Renaissance Wax.

- Remove the blank, bushings and spacers from the mandrel.

Assembling the Pen

- Carefully lay out all the pen kit parts. Take care here as the small parts are easily lost.

- Using a hand clamp or bench vise, press the finial/clip assembly into one end of the finished blank until it's snug up against the adjacent metal part. Do not



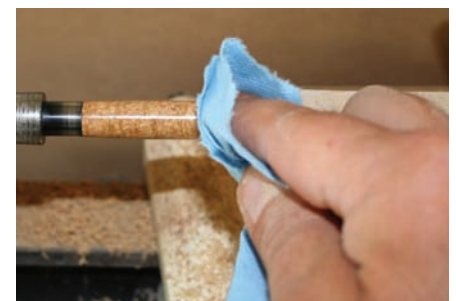
Blank, bushing and spacer on mandrel



Use skew to smooth the blank



Sand barrel



Apply polish to barrel



Press finial/clip assembly onto barrel

over press the parts or the excessive pressure could crack the blank.

- Insert the refill into the nib assembly.
- Screw the twist mechanism over the refill and into the nib assembly.
- Slide the blank, finial/clip assembly over the twist mechanism to complete your pen.

This pen is very simple to make and is an easy introduction into pen turning. Pens can be made out of an almost endless supply of materials, including figured domestic and exotic woods, acrylics, and resin impregnated stabilized and dyed woods. Pen kits come in a wide range of styles and finishes, including gold, chrome, titanium and platinum.

Bet you can't make just one!

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SUPPLY CHECKLIST

- mandrel A
- drill bit 27/64"
- Sierra pen mill
- Micro Mesh (optional)
- Sierra pen kit (brass tube, refill and spring, twist mechanism, nib, assembly, finial/clip assembly)
- bushing 20A
- five minute epoxy
- sand paper – various grits to 500 grit
- pen blank $\frac{3}{4}$ " x $\frac{3}{4}$ " x 2 $\frac{1}{2}$ "

SOURCES

www.LeeValley.com www.PenBlanks.ca
www.PenMakingSupplies.com

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Part III Routing Basics Straight Bits

The ability to quickly change the bit in a router is one of the features that make it such a versatile tool in the workshop; in a few moments you can switch from a joinery bit to a decorative edge-profiling bit.

The variety of bits available is impressive, and if you purchase bits from a leading bit manufacturer you can be confident of getting a high quality product (see A Bit on Bits sidebar). When it comes to bit quality there are two general categories – ‘hobbyist’ bits made for the DIYer, home handyperson and woodworking

hobbyist market, and ‘professional’ quality bits made for production shops and professional woodworkers. If you are new to routing, consider one of the hobbyist sets containing an assortment of joinery and profile bits. These bit sets are often on sale and you can pick up a 30-piece set for about two dollars per bit.

While they are of lower quality and will not last as long as higher quality bits, they are a great way to begin a collection. When you find out which bits you use most often, replace the hobbyist bits with professional quality bits.

The most useful type of bits in router joinery work are **straight bits**. These come



Hinge mortising



Single flute for plowing dados



Two flute for cutting smooth dados

in several configurations specifically designed to accomplish certain tasks, but they share two common features – they will cut an edge perpendicular to the base of the router or the surface of the router table, and if they are designed for plunge use, they will also cut at the bottom of the bit, parallel to the base of the router. Smaller diameter bits come in $\frac{1}{4}$ " shank sizes, while larger bits come with $\frac{1}{2}$ " shanks. Blade diameters typically range from $\frac{1}{16}$ " to $1\frac{1}{2}$ ". Blade cutting length varies from $\frac{1}{2}$ " to 2". Some of the most useful straight bits are listed below.

Fluted

Double fluted straight bits are likely the most widely used router bit on the market. These bits have two flutes (arms), with a carbide blank brazed (joined) onto each flute. Double fluted bits give a very smooth finish. They excel in routing grooves, dados, rabbets, mortises and tenons.

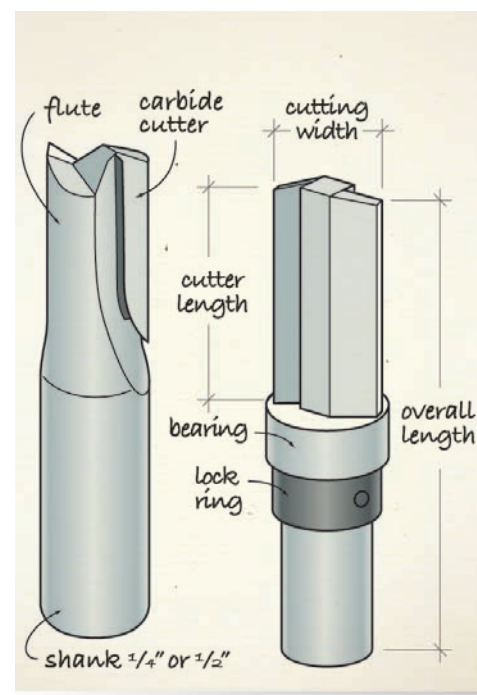
You can also find single and triple fluted straight bits. A single flute bit is designed for repetitive work and affords the maximum

amount of chip clearance. Single flute bits excel in production routing grooves and dados. Pay particular attention to the feed rate when using smaller diameter single flute bits; feeding the material too fast may cause excessive chatter and the added resistance could break the bit. Straight bits $\frac{1}{2}$ " and larger in diameter sometimes have three flutes. These produce an exceptionally smooth surface, but require a slower feed rate.

Most fluted bits have cutters milled perpendicular to their base – i.e. they are 'straight'. You can purchase some fluted bits with shear angles – the downward shear helps eliminate chipping and splintering on the top of stock, and generally gives a smoother finish, particularly on wood with an irregular grain pattern.

Hinge Mortising

Mounting hinges and other hardware often requires cutting a mortise. Sometimes, chopping such a mortise close to the edge of a work piece can lead to corners breaking out. Getting a perfectly flat bottom also requires a bit of skill. While



Parts of a Straight Bit

	Fluted Uses: Grooving, dadoing, rabbeting, mortises, tenons, box joints, edge planing, pattern cutting Cutter widths: $\frac{1}{8}$" – $1\frac{1}{2}$" Cutter lengths: $\frac{1}{2}$" – $2\frac{1}{2}$" Available as: 1, 2 and 3 flutes, with shear angle, plunge, non-plunge, stagger tooth
	Bottom bearing Uses: Laminate trimming, pattern cutting Cutter widths: $\frac{1}{4}$" – $\frac{3}{4}$" Cutter lengths: $\frac{1}{2}$" – 2" Available as: 2, 3 and 4 flutes, with shear angle, V-notch
	Double bearing Uses: Pattern cutting Cutter widths: $\frac{1}{2}$" – $\frac{3}{4}$" Cutter lengths: $\frac{5}{8}$" – $1\frac{5}{8}$" Available as: 2 flutes
	Mortising Uses: Shallow mortises, shallow dados Cutter widths: $\frac{1}{2}$" – $1\frac{1}{4}$" Cutter lengths: $\frac{1}{4}$" – $\frac{3}{4}$" Available as: No bearing, with bearing, bottom cleaning
	Top bearing Uses: Pattern cutting Cutter widths: $\frac{1}{2}$" – $\frac{7}{8}$" Cutter lengths: $\frac{1}{4}$" – 2" Available as: 2 & 3 flutes, with shear angle
	Spiral Uses: Grooving, dadoing, rabbeting, mortises, tenons, edge planing Cutter widths: $\frac{1}{8}$" – $\frac{1}{2}$" Cutter lengths: $\frac{1}{2}$" – 2" Available as: Up-cut, down-cut, compression



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installing a mortising bit in the router takes a little bit of set-up time, the perfectly formed flat bottom mortises are well worth the effort. Mortising bits can be bought with or without a guide bearing. A mortising bit with a bearing on it can be used to rout hinge mortises on a door using a hand held router with a template, and it can also be used for other template work as well.

Bottom Bearing Flush Trim

This is essentially a straight bit with a bearing on the bottom of the bit. The cutting edge is lined up perfectly with the edge of the bearing, making it the bit to reach for when working with sheet goods and laminates. Glue solid wood edging on plywood and then quickly trim the edge banding perfectly flush with the surface of the plywood. Bearing flush trim bits make excellent template bits when used in a router table.

TIP

Always select a bit with the shortest cutting length and shortest overall length to suit the job at hand.



Top bearing flush trim for template routing



Flush trim three flute for template routing

A Bit on Bits

So many different bit manufacturers producing so many bits. You can be excused for feeling a little flustered when it comes to selecting from the router bit smorgasbord. But, you can also feel secure in knowing that competition for your purchasing dollar means that most manufacturers adopt the leading technologies to produce their bits.

The cutting edge is where the bit actually does the work. While there are still some high-speed steel bits on the market, carbide is now the material of choice for cutting edges. The quality of the cut is influenced by the quality of the carbide. High quality carbide is composed of micro grains of carbide that are baked together with a binder to form the carbide blank. The finer these grains are, the finer the edge that can be ground onto it. As the bit wears, the pieces that break off the edge will be smaller and the edge will remain sharp longer.

The steel that forms the body of the bit plays a factor as well. High quality steel will result in a more durable bit; the carbon content of the steel will affect its hardness and heat treating it further enhances this. Heat treating the larger diameter bits produces a radial grain orientation that enhances its strength and durability.

Brazing fastens the carbide blanks to the steel body of the bit. In the past, this was done by hand – today most manufacturers automate this process. CMT for example, uses a silver/copper/silver 'sandwich' to braze their bits; this provides a tight bond as well as some shock absorption capacity for harder woods.

The process used to grind the edges of a bit includes many variables as well. As with brazing, grinding is no longer done by hand. This has removed much of the variability in quality, but the complexity of the bit, the programming of the grinder and the grit of the wheel all affect the final edge.

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Top Bearing Flush Trim

This is a straight bit with the bearing on the top of the cutting edges. Placing the bit in this location allows the bit to be plunged into the work for grooving or hollowing cuts. This bit is also widely used in pattern routing. With a template and a bearing flush trim bit you can make any number of identical parts quickly and easy. The radius of the bit will determine how tight a curve you can cut.

As the bearing travels along the edge of the template, the work piece fastened to the template will be trimmed to the exact shape of the template. The bearing will transfer every bump on the template faithfully to the stock, so take the time to produce a good clean edge and keep sawdust and debris from coming between the bearing and the template during the operation.

Flush Trim with Double Bearings

This is a more recent innovation that has bearings on either end of the carbide cutting edges. When using this bit for template work it is possible to change the direction of cut to compensate for grain that is prone to tear out by simply raising

or lowering the bit and turning the work piece over.

Spiral

These are straight bits that have the cutting edges wrapped around the bit to form a double helix. This reduces the cutting angle of the bit causing more of a slicing action that leaves a smooth flawless finish.

Spiral bits excel at cutting grooves, rabbets, dados and mortises in highly figured hardwood stock. The tip is specifically designed for plunging into the material, and they are exceptionally efficient at clearing the chips. Spiral bits come in 'up-cut', 'down-cut' and 'compression' variations. Up-cut bits leave a smooth bottom, rough top edge, and pull chips upward. Down-cut bits leave a smooth top edge, rough bottom, and push chips downward. Compression bits leave both top and bottom edge clean, and emit chips in both directions.

Because these bits are made of solid carbide they are more expensive than standard straight bits, particularly in the larger sizes. They are also available in more limited range of diameters, typically from 1/8" to 3/4".

TIP

Do not exceed the recommended speed for router bits. This is especially important when using large diameter bits. These are speed ratings recommended by most manufacturers:

Bit Cutting Width	Maximum Speed (RPM)
Up to 1"	24,000
1 1/4" to 2"	18,000
2 1/4" to 2 1/2"	16,000
3" to 3 1/2"	12,000

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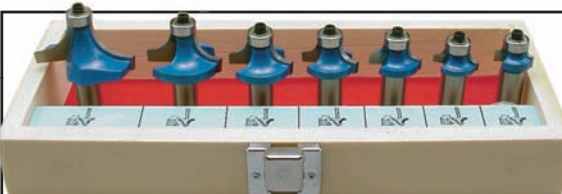
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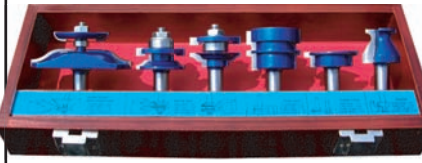
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Patterns, Templates & Jigs

If you are looking to make your woodworking easier, faster and safer, then you'll want to use patterns, templates and jigs.

For a very simple project, such as the saw blade storage box (June/July 2007, Issue #48), all you may need is a basic sketch of how the parts fit together, along with a material or cut list. Then it's off to the shop.

For a more complex project, like Rob Brown's Secretary Desk (Apr/May 2007, Issue #47) you'll want to give careful consideration to the kinds of shop aides that can help you mill project pieces easily, accurately and safely.

For difficult projects it is a good idea to draw, on paper, a full sized **pattern** of the whole project. You'll more easily be able to work out (and understand) construction details; you'll get a much better visual impression of how the completed project will look (enabling you to make design changes before you commit to the construction process); and you'll be able

to cut out parts of the pattern to aide you in milling individual project pieces.

Some parts of a project might be fairly complex and time consuming to build. In such a case you could transfer the patterns for these parts onto sheet stock – these sturdier **templates** would stand up to more repetitive use and could also be easily stored for future use.

In other situations there may be parts of a project considerably more intricate and time consuming to build, and you may have to construct many of these parts. You might even envision using these parts on other projects in the future. Using more robust sheet stock and some additional hardware, you can build sturdier **jigs** that will significantly increase productivity, accuracy and safety in milling.

The Pattern – A Basic Overall Guide

A pattern is a physical representation of a project. Typically this is a full-size drawing of the project. Newsprint (available at art supply stores) is excellent for large drawings. You can easily lay out grid lines on the paper. For smaller scale drawings graph paper (also available from art supply stores) that has $\frac{1}{8}$ " squares allows you to quickly transfer measurements from a project plan. Draw the pattern using a soft 2B pencil – use a light touch and the soft lead will leave a nice dark line that can easily be erased.

You can then cut out individual parts of the pattern using a sharp utility knife and a straight edge for the straight sections and a pair of scissors for the curved sections. Use

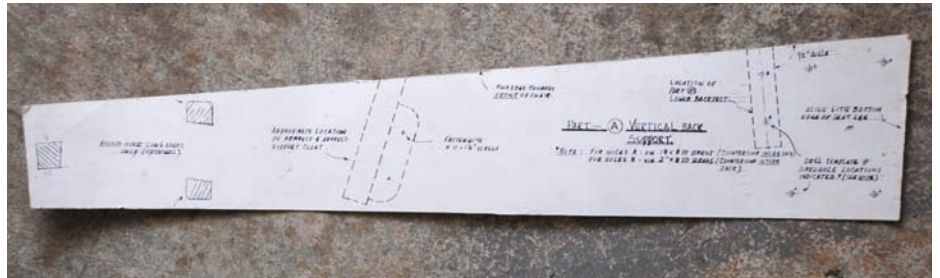
Place the pattern on a piece of stock. Keep in mind that grain running contrary to the curves on your pattern won't enhance the look of the final product, so place the pattern accordingly. If it is a complex pattern you may wish to tape it in place. Use a sharp 2B pencil to trace the outline on your stock. Remove the pattern and then use the appropriate tools to shape the part. Remember that with a pattern you can transfer the shape onto your stock, but all of the processes to mill the part will still need to be done manually. The pattern mounted to poster board is fine for a limited number of uses, but it is not very durable and will deteriorate after a while.

When you have more parts to make than a simple poster board pattern will allow it is time to make a template. A template is a more robust version of the pattern. To make a template, follow the same steps in drawing the pattern for the part on the graph paper; if your parts are longer than the paper, tape two sheets together. Use spray adhesive to attach the pattern to a piece of $\frac{1}{8}$ " hardboard and trim away the excess on the band saw. Refine the edges using a sander if necessary, but files are the best tools for fine-tuning a template. You can also use $\frac{1}{4}$ " MDF or Baltic birch plywood for your template. MDF is a little sturdier than hardboard, it can be shaped easily, and its extra width will support a bearing guided router bit. Baltic birch is the ultimate in durable template stock because of its strength and rigidity. When fine-tuning the edge of a template that will be used with a piloted router bit be sure to keep the edge perpendicular to the face of the template.

Jigs are production tools used to make a task easier, more productive and invariably more accurate. A template is often the starting point for a jig. If the template is sufficiently robust it can actually be used as the base for the jig – otherwise use the template as a guide to make the jig out of thicker, sturdier material, such as 1/2" Baltic birch. An essential part of most jigs are holding mechanisms for the stock that will be milled. Cam clamps are probably the most widely used jig hardware. In each issue of Canadian Woodworking we present a shop jig that will help you make various woodworking operations safer and more precise. Use these jigs as a guide for building your own.

for future use on other projects and it will quickly repay the time you invested in building it.

www.BusyBeeTools.com
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www.LeeValley.com



A close-up photograph showing a person's hands using a hand plane to smooth a curved wooden piece. The workbench is covered in wood shavings, and a red-handled tool is visible in the background.

CANADIAN WOODWORKING 29



14.4 Volt Drill/Drivers

One of the most useful tools you can own is a drill that can both drill holes and drive screws. Drill/drivers come in all sorts of shapes and sizes, both corded and cordless. They are equally useful in a workshop, on a construction site, or out in your yard where you are building that new deck or fence.

Let's have a look at some of the features that you need to consider when selecting the right drill/driver for your needs.

Cordless Versus Cordless

This is one of the most important decisions to make when buying a drill. Cordless drills have the advantage of being able to be taken anywhere. If you need it to put up a fence project on a five acre property, you can take two or three battery packs out with you and not worry about having power nearby. Recharge the batteries over your lunch break and you're ready to go again for the afternoon. But cordless drills come at a much higher price, and those batteries aren't cheap.

While I definitely use my cordless drills more often, I still prefer a corded one for heavy duty tasks like drilling into concrete.

Even drilling into hardwood end grain for a large number of dowel holes seems to go better with a corded drill as you have plenty of power without battery power falling off. Another problem with cordless drills is that the high end RPMs tend to be much lower than on a corded drill, particularly as battery power drops off. While slower speeds actually tend to be preferable for driving screws, drilling holes with smaller diameter bits requires higher speeds. Sometimes a corded drill is better for the job. I'll cover both corded and cordless drills for the rest of this article, specifying which I'm referring to as I go along.

Weight and Power

As with most hand operated power tools, choose as much power as you can get in a lighter package. Corded drills usually

offer the most power for a given weight, as cordless drills can have very large and heavy batteries in the larger voltages. The convenience of not having a cord, though, is hard to beat. Consider what kind of work you do. If you need to drill through steel and concrete all day long, you'll likely need either a corded drill or a very large voltage cordless drill (which will be heavy). But if you're main task is drilling small diameter holes through construction lumber and driving drywall screws, you don't need a lot of power. People laugh at me for recently upgrading my 9.6 Volt cordless drill to (only) a 12 Volt replacement! But driving $\frac{3}{4}$ " screws into a cabinet's back panel doesn't require much power. Using a heavier drill in the horizontal position can be very tiring over the course of a day.

	Black & Decker SC1400 - \$129.99 0-350/0-1400 RPM, 210 in-lbs torque, One year warranty Lithium-ion battery integrated into drill/driver 6 clutch settings, 2.75 lbs Features: holds charge up to 18 mths, on board battery power indicator, 16 piece bit/drill set www.blackanddecker.com
	Bosch 32614-2G - \$199.00 0-400/0-1,400 RPM, 300 in-lbs torque, Three year warranty (Two year on battery) 2 Ah battery, 30 minute charger 15 clutch settings, 5.3 lbs Features: carbide chuck teeth www.boschtools.com
	DeWalt DC728KA - \$199.00 0-400/0-1,400 RPM, 400 in-lbs torque, Three year warranty 2.4 Ah battery, 1 hr charger 17 clutch settings, 4.7 lbs Features: keyless ratcheting chuck www.dewalt.com
	Hitachi DS14DL - \$329.00 0-200/400/850/1,750 RPM, 460 in-lbs torque, Five year warranty 3 Ah battery (lithium-ion), 50 min charger, 22 clutch settings, 4.4 lbs Features: save mode 4 speed settings, LED work light & belt clip, auxiliary handle www.hitachipowertools.ca
	King 8014 - \$69.99 0-400/0-1150 RPM, 260 in-lbs torque, Two year warranty 1.5 Ah battery, 1 hr charger 22 clutch settings, 6 lbs Features: LED light, bubble level www.kingcanada.com
	Makita BDF440 - \$560.00 0-400/0-1,400 RPM, 339 in-lbs torque, One year warranty 3Ah battery (lithium-ion), 1 hr charger 16 clutch settings, 3.5 lbs Features: all metal gearbox, 3 built in lights, belt clip www.makita.ca
	Porter Cable 9978 - \$159.00 0-450/0-1400 RPM, 420 in-lbs torque, One year warranty 2 Ah battery, 1 hr charger 22 clutch settings, 5.25 lbs Features: locking/ratcheting steel chuck, 3-stage planetary gearing www.portercable.com
	Ridgid R830153 - \$239.00 0-400/0-1600 RPM, 475 in-lbs torque, Three year warranty, lifetime service agreement, 2.5 Ah battery, 30/20 minute charger 24 clutch settings, 6.86 lbs Features: locking carbide chuck, die-cast gear housing, auxiliary handle www.ridgid.com
	Craftsman 0922514 - \$119.99 0-600 RPM, 100 in-lbs torque, One year warranty (Three years on charger) 1.3 Ah battery, 1 hr charger 24 clutch settings, 10 lbs Features: bubble level www.sears.ca
	Skil 2587-06 - \$99.99 0-400/0-1250 RPM, 250 in-lbs torque, Two year warranty 1.2 Ah battery, 1 hr charger 22 clutch settings, 4.1 lbs Features: on tool removable stud finder, battery power indicator, one battery www.skiltools.com
	Milwaukee 0615-24 - \$249.00 0-500/0-1700 RPM, 460 in-lbs torque, Five year warranty 2.4 Ah battery, 1 hr charger 20 clutch settings, 5.9 lbs Features: reversible battery, spindle lock, belt clip, side handle www.milwaukeetool.com
All drills have a 1/2" keyless chuck (except King, Craftsman and Skil: 3/8"), come with 2 NiCd batteries (unless noted otherwise), charger, bit (except Craftsman and Skil) and carrying case or box (except Skil)	

With a corded drill, compare the number of amps the tool draws, from one model to another. Higher amperage usually means more power. With a cordless drill, ask for the number of "Unit Watts Out" or the torque rating in inch-lbs. I looked at several 14.4 Volt models and found power ratings from about 110 inch-lbs. to a whopping 475 inch-lbs.

Variable Speed

Because higher RPMs are often needed to drill smaller diameter holes, it is worth looking at the speed ratings of the models you're comparing. Most corded drills run from 0 to about 3000 RPM, which gives you everything you need. Some cordless drills, however, have only one speed that tops out around 750 RPM. I consider that speed to be only suitable for driving screws and perhaps drilling larger diameter holes. I prefer a cordless drill with two speed settings. The lower setting often tops out around 400 RPM, which is more than sufficient for driving. And the higher setting usually runs up to 1200 to 1600 RPM – great for drilling holes.

Whether corded or cordless, one of the most useful functions on a drill is a variable speed trigger. I like to start a drill bit slowly and then increase the speed as I go. Often slowing the RPMs in the middle of drilling a hole will make the bit cut faster. Having more speed control also aids in driving screws when trying to start one without a pilot hole, or prevent the driver bit from spinning free of the screw head.

Chuck Size and Style

Both cordless and corded drills still have 3/8" chucks as the most common size, which means it can hold a 3/8" diameter shank. Larger or more heavy duty drills will have 1/2" chucks, which can hold a wider variety of larger bits. The 3/8" chuck is sufficient for most common jobs, but if you use larger bits regularly, consider the 1/2" size.



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Courtesy Skil



Work lights are handy in cramped spaces

Chucks also come in keyless varieties and those requiring a chuck key to tighten and loosen a bit. The keyless type is often a ratcheting, single sleeve style, allowing you to tighten bits with one hand while hanging onto a ladder. It's a very convenient feature worth looking for. When using larger bits in my corded drills, however, I do prefer a keyed chuck. Larger diameter bits can exert enough force on the shank of the bit to allow it to spin in the chuck if it doesn't have a hex shape. Being able to lock down the chuck very tightly with a key can be a bonus in some cases, even if a little more time consuming.

Clutch Settings

Most corded drills don't have a clutch. If you use one to drive screws, it simply stops turning when the screw gets really tight. That is when a variable speed trigger is almost a necessity because it's so easy to over-torque a screw. Cordless drills, however, always have a variety of clutch settings. The 14.4 Volt models I looked at ranged from just 6 settings up to 24. This handy feature makes the drill stop turning when a screw reaches a certain tightness. So if you're driving a bunch of screws into the same material, you might be able to



Courtesy King Canada

Bubble levels help in freehand drilling

Go to our on-line product review site for a detailed review of the Milwaukee 0615-24 and B&D SC1400: www.canadianwoodworking.com/newsletters/reviewindex.htm

find one clutch setting that always leaves the self-countersinking screw head just below the surface. For harder materials, increase the clutch setting. For drilling holes, set the clutch to its locked position (maximum torque).

Batteries and Charger

For cordless models, you need to consider the charging systems, battery types and charging times available. If you use your drill only for short bursts and it comes with two batteries, then you might not mind a three-hour charging time. Believe it or not, long charge times like that still exist on the market. If you only have one battery or you need a refreshed one often, consider a model with one-hour charge or less. Many models now feature 20 to 30 minute charge times, which is more than adequate.

You should also look at the amp-hour (Ah) ratings of the batteries. This rating gives you a better idea of how the batteries hold up through one working session. There's no point in having a drill that only runs for 10 minutes and has to be recharged for an hour. You want a drill that works longer than it takes to recharge.

While many cordless drills still use NiMh (nickel metal hydride) or NiCd (nickel cadmium) batteries, there are other options out there that run longer. The newer lithium-ion batteries hold their charge longer when not in use, so that is something else to consider. (see "Lithium-ion", Aug/Sept'07, Issue #49.)

In Summary

You normally get what you pay for in all tools. If you're a contractor who uses your drill/driver for long hours and treats it roughly, better to buy the more expensive, rugged models. If you are a 'weekend warrior' or DIYer, perhaps a simpler, less expensive model will do. It is up to you to balance your budget with a realistic assessment of how much tool you need.

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SOURCES

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The Power To Do More. Hitachi HXP Lithium-ion.

The new Hitachi HXP Li-ion cordless drill packs a punch with an industry leading 570 in/lbs of torque – strong enough to power through anything you can put in its way. Plus the new lighter 18-volt Li-ion battery runs harder and longer, so you can make short work of any project, save yourself time, and get the job done sooner.





Illustration: Marcus Cutler

Maybe it's the fact of living on a rock stuck way out in the Atlantic ocean that makes the citizens of St. John's just about the friendliest you'll ever encounter.

Or perhaps it's because St. John's has the most bars per capita in North America (or for that matter one of the lowest crime rates

continent-wide). Whatever the reason, St. John's is a wonderful city with an extraordinary harbour and waterfront.

The provincial tree is the black spruce (*Picea Mariana*), known as the bog spruce. The tree is actually more dark bluish green. Black spruce wood is a soft, lightweight yellowish white wood with long fibres that produce a very high quality pulp.

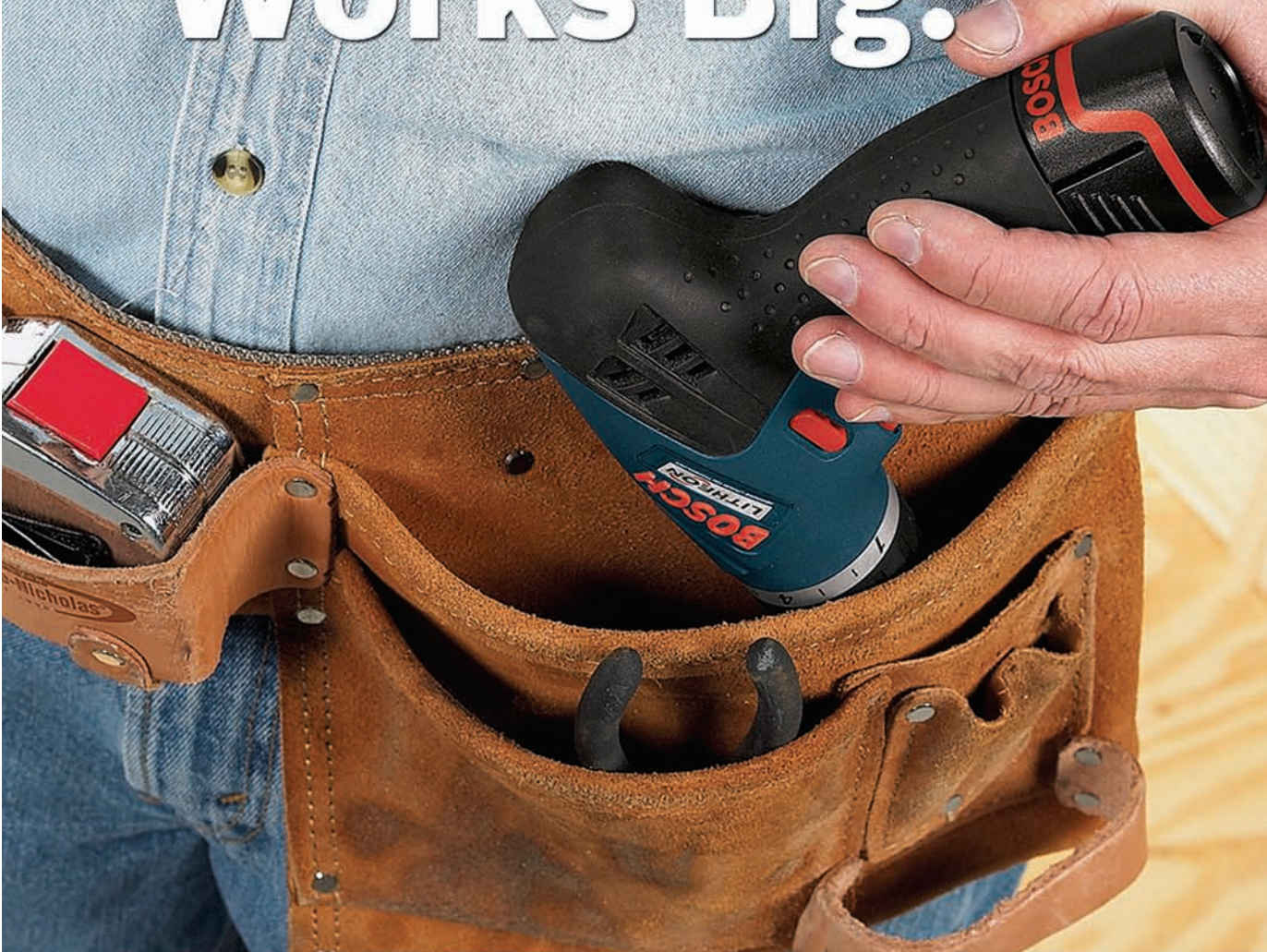
The scroll saw pattern shows the Cabot Tower with its 50' octagonal tower, built in 1897, and located on Signal Hill overlooking the city. At the top of the pattern is the shield from the provincial coat of arms. The shield is

red, over which is a silver cross with lions and unicorns in the quarters.

Scroll Cutting Tips

Photo-enlarge the pattern to the size you want. Cover your substrate (such as 1/4" 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.

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Courtesy of Wilsonart International

Easy Kitchen Countertops

Invariably, if you update your kitchen cabinets you'll think about replacing the countertops.

While solid wood is ideal for cabinetry, it's much less desirable as a work surface in a kitchen. For this you're better to go with a natural stone or a man-made material – granite, quartz, marble, stainless steel, concrete, a solid surface (like DuPont's Corian) or plastic resin laminate (like Wilsonart's High Definition laminate).

Laminate – Easy to Use, Stellar Looks

By far, the most popular choice in countertops is plastic laminate – it's durable, easy to maintain, comes in an astonishing array of colours and patterns, and is the least expensive of the lot. Laminates are available in a variety of textures and sheens that take away the plastic look so common to

melamine resin products. You can purchase made-to-order countertops, or you can build your own laminate countertop. A made-to-order countertop will typically come with a formed laminate edge. With a shop-made countertop you have the option of attaching a flush or bevelled laminate edge at the front, or a solid wood edge that can have a milled profile of your choice. Expect to pay around



Lamination tools



Formed laminate edge



Solid wood edge

Tools courtesy Lee Valley Tools

\$25/sq ft for a made-to-order countertop, compared to \$100/sq ft for a solid surface like Corian. A shop-made countertop will cost around \$10/sq ft, which includes the price of a high quality laminate, substrate and adhesive.

Laminate in the Shop

For the woodworker, laminates are easy to machine, and their drawbacks are manageable (see Working with Laminate sidebar). You don't need any special tools to cut laminate in your shop – a table saw and router will do the job nicely. Likewise, bonding laminate to a substrate, such as plywood, is very easy. All you need is some contact cement, a nylon brush for applying the adhesive, a laminate roller, and a few long dowels. You can cover the edges of the countertop with laminate or with solid wood trim. If you use laminate you'll want to make the sharp edges more 'user friendly' by routing a bevel along all laminate edges. For this use a bevel trim router bit, available in a range of bevel angles from 7° to 30°.

TIP

While glossy laminates look great they require more effort to keep clean than do matte finishes.

Solid Wood Edging

Solid wood edges do away with the black glue line that occurs where two pieces of laminate butt together; they are stronger and more impact resistant than laminate; you can rout all kinds of decorative edges in solid wood; and you can use edge trimming that matches the wood on your kitchen cabinetry.

If you go with solid wood edging, you can glue it to the substrate before or after you apply the laminate, depending on the look you want to achieve. Either way, always cut the laminate a few inches longer and wider than the substrate and then trim it flush with a hand held router and a 90° flush trim bit.

While the new water-based contact cements don't give off the strong odours commonly associated with contact cement, it's still advisable to use a respirator when working with this adhesive. You'll want to follow the manufacturer's instructions for applying the product. Typically this involves applying contact cement to the bottom side

Note

The only thing you won't be able to do with laminate is form complex curved edges. If you want a countertop with a curved laminate edge then you'll need to purchase it from a cabinet shop or a building material supply centre. They typically have a wide range of laminates available with various edge and backsplash configurations.

of the laminate and to the top side of the substrate, and then allowing the cement to set for around 30 minutes. Once you are ready to apply the laminate remember that contact cement isn't slippery like PVA glue – it will 'grab' onto the laminate and the substrate. This means that the pieces must be in the right position before you press them together.

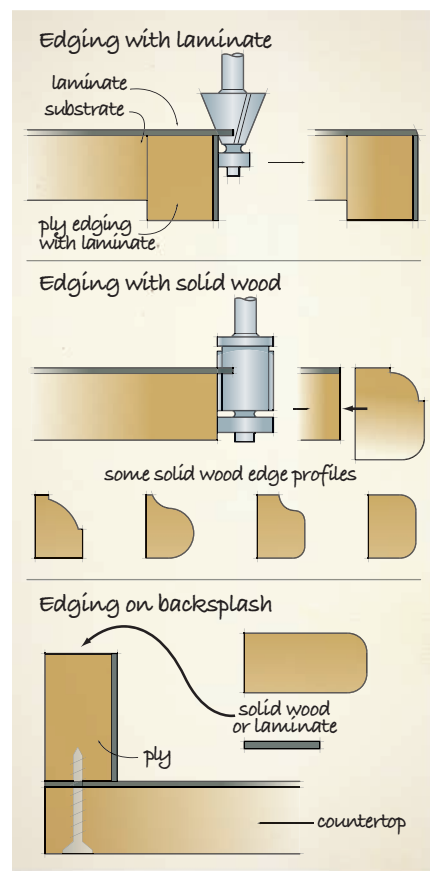
The best way to ensure that the laminate ends up in the right place is to lay several dowels on top of the substrate, and then lay the laminate on the dowels. Next, slowly pull the dowels out from between the two, making sure that the laminate stays in place – as the dowel has a small bearing surface it won't stick very tightly to the substrate. Now roll the laminate down with a laminate roller, starting at the center of the panel, moving out to the edges. Occasionally run your hand over the surface of the laminate to make sure that it's flat and that there are no trapped air bubbles between the laminate and substrate.

Don't Forget the Backsplash

A backsplash keeps debris and liquids from finding their way behind the back of the countertop, and it can help to balance out the look of the countertop solid wood edging. While you can apply a partial or full backsplash to the wall behind the countertop, it's much easier to install a 3" to 6" high backsplash directly on the back top of the countertop. Begin by applying laminate on the front face of a substrate. You then have the same options for the top edge of the backsplash as on the countertop front edge – apply laminate or apply solid wood. After finishing the top of the backsplash glue and screw it onto the countertop.

TIP

Titebond III is an excellent glue for bonding solid wood to sheet stock. It has a long open time, so you don't have to rush the job, it has a high solids content, and it's waterproof.



You really can enhance the look of your kitchen (or bathroom for that matter) with a new countertop. And it's not as difficult as you might think.

CARL DUGUAY
cduguay@canadianwoodworking.com

SOURCES

LAMINATE SUPPLIES

www.Circa1850.com
www.HomeHardware.ca
www.LeeValley.com

RESIN LAMINATE

www.HomeHardware.ca

Working with Laminate

Working with laminate is not overly difficult, though there are a few problems that might occur. Fortunately, there are easy solutions:

Problem

Seams can delaminate if subject to excessive water or heat

Solution

Always try to locate seams away from major work areas, especially to the sink

Conventional kitchen abrasives can dull laminate surfaces

Always use the manufacturer approved cleansers for laminate, particularly if you install glossy laminate

Laminate surfaces can be easily cut by sharp knives

Provide cutting boards or a built-in cutting block

This project was chosen by the members of our website's woodworking forum.

Greg Schlitt, a self-taught, hobbyist woodworker from Chilliwack, BC, built this sliding door buffet from Douglas fir and black walnut. The doors slide in grooves in the oversized top and bottom rails.

Greg used mortise and tenon and dovetail joinery on the cabinet. The side panels have a gentle curve to them, which Greg accomplished using bent lamination, a technique that he has used for the first time on this project. The curve on the sides is carried through to the legs. Both of these features help to take away what would have otherwise been a 'boxy' look to the cabinet, giving it a subtle upward movement. The thin walnut stiles that run along the front of the doors provide visual relief to the front of the cabinet. The stiles extend 'rib like' out from the inside of the cabinet, here again adding some visual interest to the interior. The cabinet is finished with dewaxed orange shellac followed with a wiping varnish, and a thin coat of wax.

One can appreciate Greg's fondness for the quiet figure of vertical grain Douglas fir and the manner in which it ages to subtle red tones in this piece. "I appreciate that Douglas fir is one of our (West Coast) local woods, which I prefer to use for environmental and aesthetic reasons," says Greg. "It can be somewhat of a demanding wood to work with, as it has a tendency to splinter and can tear-out unexpectedly, but it responds quite well to a scraper."

Greg usually doesn't completely design a piece in advance, but begins with basic ideas and does what 'feels right' during the construction phase. He tells us that this piece looks very different from what it was when first conceived.

Among the important lessons Greg learned on this piece: slow down, and make sure you build your jigs correctly and completely the first time.

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Bevel Chisels

Planes, saws and chisels form the triumvirate of woodworking hand tools.

Chisels come in a wide range of shapes, sizes and functions. While most building supply stores will carry only one or two styles of chisels, specialty tool stores offer a multitude of choices – framing, dovetail, bevel, skewed, sash, mortise, corner, butt, paring, firmer and gooseneck.

Of all these chisels, there are three primary styles that you'll find in most woodworking shops: mortise, firmer and bevel.

Mortise Chisels

Mortise chisels are heavy, the blades are large and stout and they usually have heavy-duty handles reinforced with steel hoops to prevent the handle from splitting when struck with a hammer or mallet. As the name implies, these chisels are typically used to chop out mortises – particularly deep mortises in hard, dense woods.

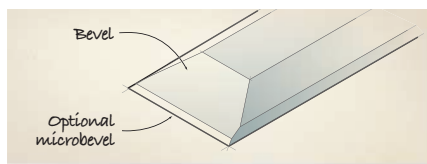
Firmer Chisels

Firmer chisels are lighter versions of the mortise chisel (or heavier versions of the bevel chisel) that won't stand up to heavy pounding with a hammer, but can still be used to chop mortises with a mallet. While you might select a mortise chisel to chop out a 3" deep mortise on a bed frame, a firmer chisel would be lighter and easier to use when chopping a 1 1/4" deep mortise on a small table leg. Many woodworkers find firmer chisels too large and bulky to use for most furniture making tasks that require light and precise cuts. Furthermore, the square sides on mortise and firmer chisels make it impossible to get into tight corners when cutting dovetails or other intricate joinery.

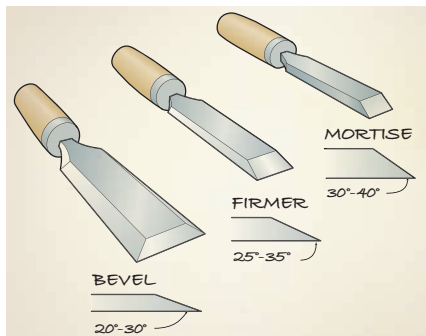
Bevel Chisels

Bevel chisels are the ubiquitous woodworking chisel, commonly referred to as 'bench chisels'. They are so named because there are three bevels on the blade. In addition to the one at the front that does the actual cutting, the two long upper edges are bevelled back toward the centre of the top giving the blade a triangular form. This allows the tip to penetrate into tight areas, such as when cleaning up dovetails or cleaning up narrow

mortises. Beveling the sides of the chisel removes a fair bit of the metal that stiffens the blade; as a result bevel chisels are generally used only with hand power. Take a look at the handle of a bevel chisel - if the handle has a metal striking cap and is made of a synthetic material, or if it is made of wood with metal hoops fitted to the end, then it is designed to be struck.



Optional Microbevel



Chisel bevel angles

You'll find bevel chisels with both long and short blades. Bevel chisels with long blades typically have a bevel cutting angle of 20° to 30° (compared to the steeper 30° to 40° of a mortise chisel). Short-bladed bevel chisels are called **butt** chisels and are the favourite of carpenters. They fit easily in a tool pouch and their shallower bevel angle (20° to 25°) make them perfect for hand paring thin shavings or quickly chopping out the very shallow mortise for a door hinge. Many woodworkers hone a secondary 3° to 5° bevel or 'microbevel' on the tip of the blade. This strengthens the edge and reduces the time to hone the blade in between sharpening – you only have to hone the microbevel.

Long-bladed bevel chisels are what most woodworkers seem to prefer. They allow a clear view of layout lines because the chisel

can be held further up the handle and the increased length of the blade makes it easier to ensure the chisel is being held at 90° to the work. Bevel chisels with long blades make it possible to lay the back flat on the surface of a sliding dovetail to clean out the joint farther in from the edge or to trim off a wooden plug in the same manner.

Sometimes bevel chisels are ground with very shallow cutting angles, of from 15° to 20°, in which case they are referred to as **paring** chisels. The shallower angle enables them to remove very thin shavings, perfect for when you need to take away just the smallest amount of wood. Typically paring chisels will also have somewhat narrower and longer blades than conventional bevel chisels.

Cranked neck paring chisels have an offset handle that keeps the chisel flat on your work piece, while keeping your hands above the work surface. They are ideal for working in tight places, flush trimming plugs and dovetails, and cleaning up stopped dados.

Fine-Tune Before Using

Just like a hand plane, you will need to fine-tune the chisel before its first use. High-end chisels such as the Japanese bevel chisels from Lee Valley arrive sharp and ready for use right out of the box. Most other chisels will require some work to get them in shape. There are many different ways to sharpen tools and everyone has their favourite. Perhaps the most popular method is to use water stones. A lot of woodworkers like to use a sharpening and honing guide in tandem with water stones. The Veritas Mk.II Honing Guide or Kell Honing Guide enable you to sharpen and hone



Trimming dovetails



chisels quickly and easily. There are also power sharpening systems such as the Veritas Mk.II and the Tormek wet grinding system, which you can use for virtually all your sharpening and honing needs.

Whichever method you use, begin by examining the back of the chisel. In most cases the back will not be flat – the manufacturing process may result in the edge being slightly rounded over at the tip, or it may have faint, though still visible milling marks. Flattening the back is repetitive work, but it doesn't take as much time as you might think, primarily because you don't have to flatten the whole back – only about $\frac{3}{4}$ " to 1" from the tip. And once flattened, you won't have to do it again for quite some time – until the tip of the chisel is worn down past the flattened area. Once the back is flattened you should hone (polish) it, using progressively finer abrasive grits or water stones or diamond stones. Next you'll want to hone the bevel side of the chisel. Here is where a sharpening jig really comes in handy, as it will enable you to maintain a consistent bevel angle while you hone.

It's All in the Steel

Fortunately, the steel used in chisels and plane blades today is generally of exceptionally high quality. If you buy a set of chisels from a known manufacturer, such as Two Cherries, Pfeil, Lie-Nielsen, Irwin, Sorby, or Crown, then you needn't worry about the quality of steel in the tool. Typically the steel will be A2, which is a high-carbon steel alloyed with small amounts of chromium and molybdenum. The hardness of tool steel is measured by the Rockwell scale (Rc). Most chisels are hardened in the range of Rc58 to Rc64. A lower Rc number means the steel will be softer and the tool will be easier to hone but it won't hold its edge as long, while the higher number implies the reverse. Most manufacturers seem to aim for a compromise between hardness and brittleness, and edge holding ability and ease of honing. Buying Japanese chisels does get a bit more complicated, as they are typically made by individual master blacksmiths. They feature a hard steel layer hammer-welded to a laminated soft steel core. Your best bet is to consult with a retailer who specializes in Japanese tools, such as The Japan Woodworker.



Trimming tenon face

Guide to Honing and Sharpening

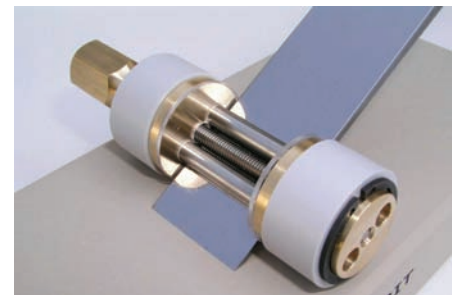
Honing chisels is not as difficult as it may appear at first glance. A lot of woodworkers like water stones because of their ease of use and moderate cost. You can start with three stones. A 1000 or 1200 grit stone will enable you to quickly form a basic edge. Follow this with a 4000 grit stone to get a near mirror finish. If you are looking for the sharpest edge you can get, then go on to an 8000 grit stone. An economical alternative is to purchase a combination stone that has 1000 grit on one side and 4000 grit on the other. Use a stone of the highest grit to put on an optional secondary bevel. It makes good sense to store your water stones in an unclosed plastic container partially filled with water (just below the top of the stones). Add a couple of drops of bleach to prevent mold build-up. Every week or so top up the water. You don't have to put the 4000 or 8000 grit stones in water. Just splash water over the stones prior to using them. It's important to keep your water stones flat. The best thing you can do is rub them against a flattening stone after every use. It only takes a minute or two, and you'll always be ready to hone when needed. Norton makes an excellent flattening stone just for this purpose. If you want to know more about honing and sharpening, check out the Two Cherries sharpening DVD available from European Hand Tools.



Try It, You'll Like It

When buying a bevel chisel the most important thing is to hold it in your hand. This will give you a feel for the heft and balance of the tool. For example, while all bevel chisels will come in standard widths ($\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ " and so on), they will not come in standard lengths, weights or handle sizes. Many manufacturers have opted for handles made of synthetic materials, often with over-moulded grips. Some handles have round grips, much like broom sticks, others are octagonal in shape, while others have contoured handles with turned finger grips. A chisel should fit in your hand naturally and function as an extension of it. An uncomfortable or unbalanced tool will not be enjoyable to use in the shop.

Buy chisels suited for the task for which they will be used. This is one tool that is advisable to purchase as a set. A typical set of bevel chisels will consist of six chisels in nominal widths from $\frac{1}{4}$ " to 1". A set of standard length general purpose chisels are ideal for the bulk of day-to-day chopping and paring at the workbench. An inexpensive set of butt chisels are handy for light hand paring work and for when you need to reach into tight spaces. They are also small and light enough so you can carry one or two of them in an apron pocket around the shop or to a job site. For fine work where precise joinery is required, a set of high quality chisels is called for. Using these exclusively



Honing Chisel with Kell Guide

for fine work means you can go longer between honings. However, your first set of chisels need not be an expensive set. A basic set will get you off to a good start and then, as your work progresses, invest in high quality chisels as the need arises.

EDITORS

SOURCES

CHISELS AND ACCESSORIES

www.EuropeanHandTools.com
www.LeeValley.com

JAPANESE CHISELS

www.JapanWoodworker.com

TORMEK GRINDER

www.AdvMachinery.com
www.BigBearTools.com

RELATED READING

Two Cherries Chisels
 Apr/May '04, Issue #29
 Veritas Mk.II Sharpening System
 Aug/Sep '04, Issue #31
 Kell Specialty Honing Guide
 Dec/Jan '05, Issue #33
 Water stones
 June/July '05, Issue #36



Trimming tenon shoulder

Tools of the Trade

Those We Hate and Those That Hate Us Back



There is a maxim to do with woodworking that we all know, and must heed, and prepare for. Okay, it's not really a maxim but it should be. I call it, 'Wilk's Maxim of Woodworking'.

My maxim clearly states, "Anyone who works around sharp, and/or pointy things will sooner or later hurt themselves." That's rather to the point, and is very clear-cut, isn't it? Sooner or later it will happen to you, so prepare yourself for the eventuality of it.

Sure, there are people out there that claim they have been woodworking for 156 years and they haven't had so much as a bad splinter. To those people all I can say is, "Liar, liar." Either that or they're just not trying hard enough.

If you gather two or more woodworkers together in a room, sooner or later, (surprisingly sooner) the conversation will swing around to the injuries and maimings they have experienced. If you listen long enough, someone will even claim they were killed at some point by a tool or errant piece of oak or poplar. Well, probably not poplar, who would ever admit they died because of poplar? Not a macho wood!

I sometimes think the only reason anyone gets into woodworking is so they can garner respect from their peers by the

accumulations of scars, amputations and other such wounds. Just as every woodworker has a favorite tool, they also have a tool they hate. Some woodworkers are even convinced that a particular tool actively hates them, and spends its spare time in the cupboard or on the wall plotting just how it is going to get its revenge on them.

Well, let me tell you, that is just plain stupid. If you think like that then maybe woodworking isn't for you. You have serious problems of paranoia and should seek help. Believe me – the tools simply do not care. They're perfectly willing to hurt anyone. It's not just you they're after.

Being the past owner of a do-it-yourself woodworking shop, I have taught and watched, both neophytes and experienced woodworkers, as they move around the shop turning large boards into small and then joining them back together again into beds, hutches, toys or just sawdust. Within a remarkably short time it is possible to pick out which tool it is that any particular woodworker fears, and as everyone knows, that which you fear, you will grow to hate.

I have watched people give a table saw a wide berth but were more than willing to use a handsaw to rip 300 board feet of two inch thick maple by hand rather than turn on the saw. I was fine with that since they rented my shop by the hour, but that's plainly ridiculous. I eventually removed all the safety posters after noticing newcomers' reactions upon reading them. Those posters instilled more unnecessary

fear than all the horror stories I could ever come up with. It's difficult and dangerous to use tools when you're timid or terrified of what the tool might do to you. That's not to say you shouldn't respect them, however. Especially in the morning!

One person was so leery of the chop saw that she would jump and let go of the handle every time it started up. The kick-back startled her every time and she was never able to use it properly. I ended up performing all her crosscuts for her. She had no problem with the table saw or jointer, however, even though they are both infinitely more evil.

Another client was perfectly willing to use three inch diameter shaper bits but was terrified of routers. He would also gleefully use the table saw to make cuts that I thought were just plain foolhardy, but I could never convince him to use a push stick. That's where a really good liability waiver comes in handy.

Every single person who used my shop was afraid of at least one tool and their fears were groundless since none had ever been injured or even knew of anyone who had. In fact, in all the years I owned that shop, I am proud to claim that I never had a single injury occur there.

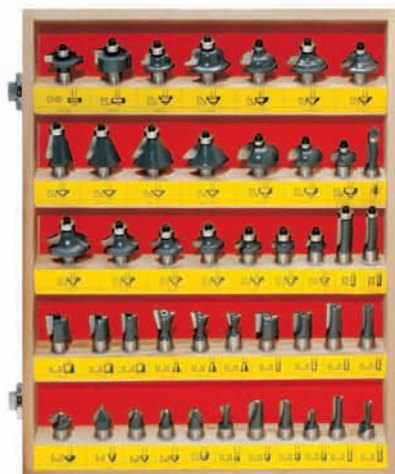
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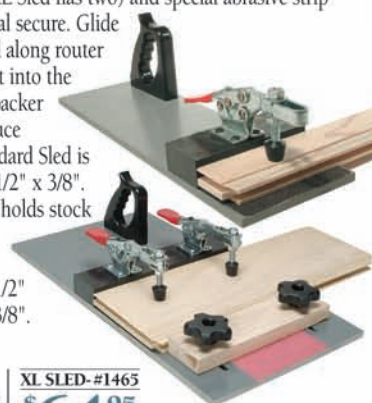


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International Centre
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www.WoodworkingExpo.ca/index.html

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**THE MONCTON
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Moncton Coliseum
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www.WoodShows.com

**THE OTTAWA
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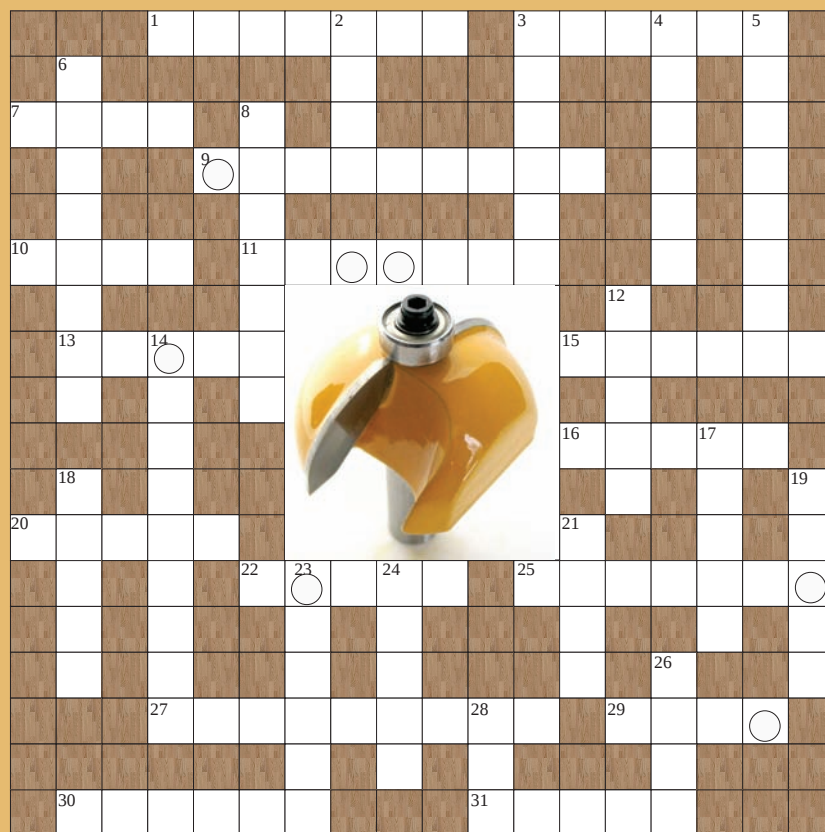
Crossword BY MEL SEVINDIK

ACROSS

- 1 ___ board, shop accessory used to hold stock next to a fence or guide
- 3 Space between a saw blade's teeth
- 7 Semicircular piece of moulding
- 9 Forms the framework of wood cells
- 10 Heated chamber for drying lumber where the air flow, heat and relative humidity can be controlled
- 11 Tendency to splinter the trailing edge of material when cutting across the grain
- 13 Part of a power saw to which the blade is mounted
- 15 Machine with an interchangeable rotary cutter head to cut profile shapes on the edge or face of material
- 16 Decomposition of wood substance caused by the action of wood
- 20 Enclosure in which window sash or door panels are mounted
- 22 Number of teeth on a saw blade per inch
- 25 Glued wood panel usually 4' X 8' made up of thin layers of wood laid at right angles to each other
- 27 Cellular separation in the interior of a wood piece
- 29 Head jamb ___, the top horizontal member of a door or window frame
- 30 The distance between the cutter/blade and the body of a woodworking machine
- 31 Straight guide on a tool used to keep the material parallel distance from the blade or cutter

DOWN

- 2 Point on truss at which the top and bottom chords intersect
- 3 Brace or bracket used to strengthen a structure
- 4 Dimension of a board measured from end to end
- 5 Pattern to guide the marking or cutting of a shape, often a router is used with a piloted bit
- 6 A position that is upright or at a right angle to the horizon
- 8 Relative size and arrangement of the wood cells
- 12 Part of a tenon parallel to the face of the board
- 14 Successive layers of veneer are arranged side by side to resemble a mirror image of each other
- 17 Frame around the base of a table to which the top and legs are fastened
- 18 The direction of fibers in lumber or other materials
- 19 The dimension of a board measured from edge to edge across the face
- 21 Geometrical drawing
- 23 Table saw accessory that surrounds the blade and supports the work piece
- 24 The part of a drill that holds the bit in place
- 26 Concave profile milled into a board's surface
- 28 Medium density fiberboard



WORD SCRAMBLE: Compound that strengthens steel: _ _ _ _ _

Lois

Sorry that you had a hard time finding the construction details for the floating top table. We had quite a few readers who had the same experience, so we have simplified the process. From now on, any additional construction details/photos referred to in our 'Woodworkers Gallery' will be clearly referenced on our website's 'Woodworking Forum'.

Woodshows in Quebec

I always enjoy reading your on-line newsletters, but I noticed that Quebec seems to be missing from your list of all the woodworking shows in Canada. I ask myself, "how can this be?" You can find all the details about the foire du bois by checking out their Web site at www.FoireDuBois.com/en/index.htm. In case you are wondering, I don't have any connection with this woodworking show (held each year in Saint-Hyacinthe) other than visiting it and marveling at the workmanship on display. It is an excellent and very popular show – it would be nice to see it take its rightful place in the list of Canadian woodworking events.

All the best,

Richard S., Philipsburg, PQ

Richard

Thanks for bringing that show to my attention. We have now listed Fois du Bois on our website's 'Woodworking Shows' as well as this issue's 'Coming Events'. Be sure to see the full listing of all Canadian woodworking shows at: www.CanadianWoodworking.com/woodshows.php. There are a number of new shows listed, so be sure to check them out.

Skil X-Bench

Enjoyed your June newsletter, as usual. I think I could use the Skil X-bench you showed, but haven't been able to come up with anyone selling it in Edmonton or on the internet in Canada. Would you happen to know?

Thanks –

Gina S., St. Albert, AB

Gina:

By the time you get this issue of Canadian Woodworking the X-Bench should be available from retailers across Canada (the closest retailer to you is the Northland Home Hardware Building Center in Edmonton). We've been getting a lot of queries from readers about the Skil X Bench since we first mentioned it in our June eNewsletter (www.canadianwoodworking.com/Newsletters/June2007).

Many of our readers work out of small spaces, and a flexible, easily stored workstation is just the ticket. We'll be reviewing the X-Bench in an upcoming issue of the eNewsletter, so make sure you regularly check out the review index at: www.canadianwoodworking.com/Newsletters/reviewindex.htm CWM



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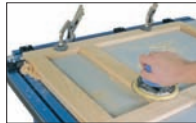


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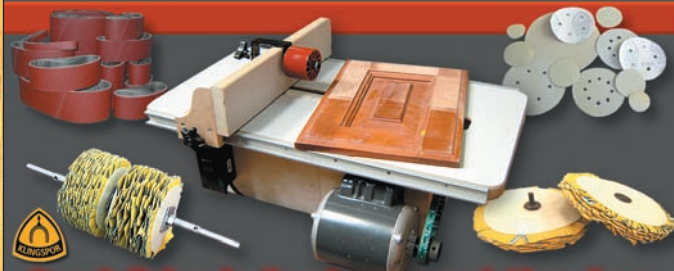
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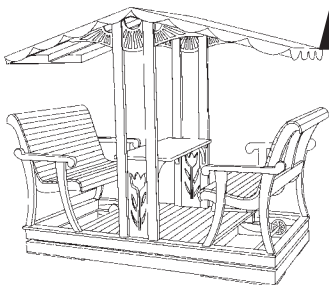
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Crossword page 45

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Shooting Board



Normally you flatten a face and the edges of a board on a jointer, and flatten the opposite face with a thickness planer. You then square the ends on the table saw, or perhaps with a miter saw. Regardless of your method, the edges and ends of the board will more than likely show milling marks – those tiny concave cuts made by the jointer and planer knives.

Sanding is one way to remove these marks, but you risk rounding over those crisp edges. Another way is to work the edges with a card scraper – a bit of a nuisance, particularly on a long board, or half a dozen of them. However, with a well tuned hand plane and a shooting board you can quickly and accurately true and smooth the edges and ends of boards.

Shooting boards come in various sizes. In many shops you will find two: a long shooting board for edge grain, and a shorter version for trimming end grain.

Making the Jig

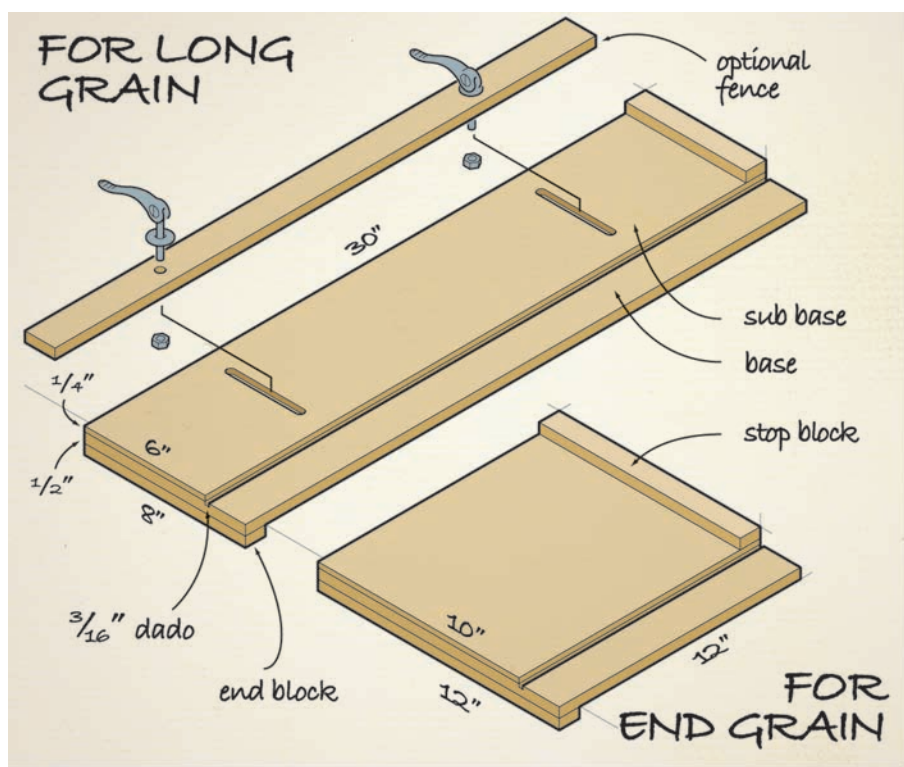
Make this jig from almost any sheet goods, or from solid wood. At minimum you need a **base**, a **sub-base**, and a **stop block**. Melamine is a good base because it's smooth and the hand plane will glide across it. The sub-base need only be about $\frac{1}{4}$ " to $\frac{5}{16}$ " thick –

the width of the offset of the blade in the hand plane you are using (it can vary from plane to plane, so select the plane you will use with the shooting board before you build it). A stop block keeps your stock from moving around as you plane it. An **end block** helps in immobilizing the jig in use. A small dado cut along where the sub-base meets the base provides a channel for debris. An optional adjustable fence, held firmly in place by a pair of cam clamps, helps hold stock in place – particularly thin pieces.

Using the Jig

This shooting board is simplicity itself. Just position your work piece on the jig so that it extends a hairs breath over the edge of the sub-base that faces the extended portion of the base, apply firm pressure to the stock, and plane away. A bit of practice is all you need. The Veritas low angle Jack plane or low angle smooth plane make superb shooters. The sides of these planes are ground perfectly square to the sole, and the low cutting angle of the blade makes them perfect for difficult grain, and unbeatable for end grain. Keep the blade super sharp and use a very fine setting. You're not hogging off a lot of wood here, but taking the finest of shavings. If you end up using the shooting board a lot consider investing in a second blade for your plane, using it expressly for face and end trimming.

EDITORS



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