PROJECTS PLANS TIPS JIGS TOOLS

Canadian Woodworking

AUGUST/SEPTEMBER 2007
Issue # 49

DEVELOP YOUR SKILLS • TOOL YOUR SHOP • BUILD YOUR DREAMS

Router Basics
Improve Your Router Skills
10 Helpful Tips

Craftsman Style
Harvest Table
Expands for Additional Seating

Workshop Project
Tapering Jig
Cut Angles Safely on Your Table Saw

Turning Tips
6 Tips to Make Your Turning Easier

Belt Sanders
11 Models to Choose From

PLUS:
- Carving
- Hand Tools
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Canadian woodworking
Issue #49

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Contents

August / September 2007

Projects

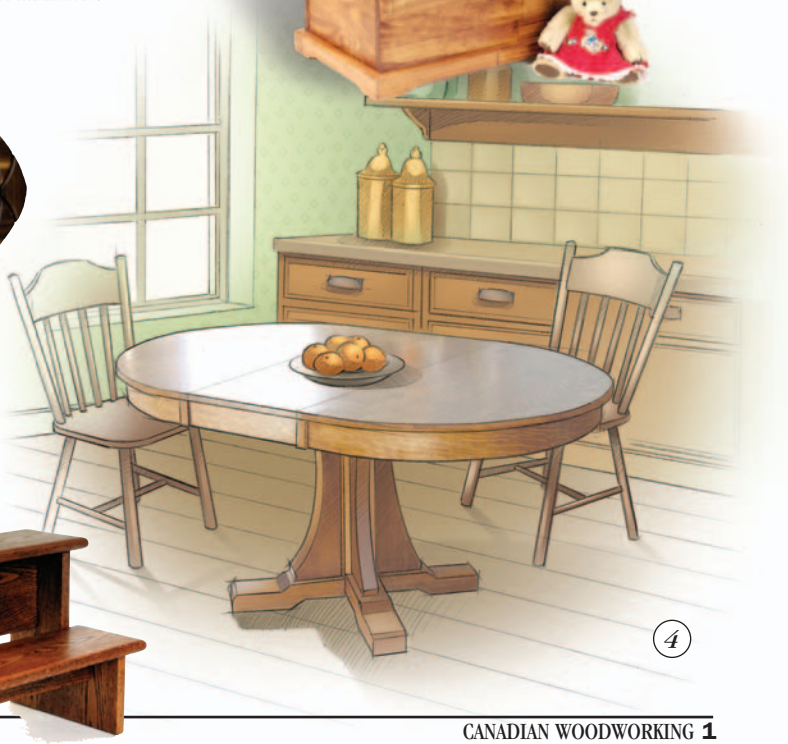
Feature

Cover photo Ray Pilon.

24

8

28



4

16

Departments

Linda Fulcher

As you begin making a project, take note of all the different ways that woodworkers measure and mark their work. Some simply say "mark" and leave it up to you what marking tool you use and how you will accomplish this.

A marking tool and pencil are the basic tools, but creativity abounds when it comes to measuring and marking stock: "Take one pass with the router to scribe the outline of the circle, cut the circle with a jigsaw, and then clean up the cut using a router."

Beyond simply 'getting it right' there are other things to consider, such as "marking locations of pieces out on rough stock, grouping them so you can cut the board into manageable lengths" and "planning your cuts to get the most out of the wood."

To avoid wasting expensive stock, many woodworkers use 'sacrificial stock', for example: "Set panels on a sacrificial piece of plywood and align them using alignment pins" and "use a sacrificial fence cutting right next to it, if not into it".

Precision cutting isn't only achieved by marking. As one woodworker says: "Using an actual milled piece, rather than your tape measure or ruler, will give you a more precise fit" and she goes on to describe how you can "use one of your side pieces to set your table saw fence."

Watch for other helpful suggestions: "enlarge patterns on cardboard or hardboard and lay out the pattern on the stock; use winding sticks to help determine if a panel is flat and true; and notch the board ends to allow fitting of the legs."

Finally, here is a favourite saying to put into action: "Measure twice, cut once." –and if you have ever done the opposite I am sure you have already learned to mark these words and your wood.

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CORRECTION: *In the solution for last issue's crossword puzzle on page 47, #10 down should have been "router".*

Paul Fulcher

As Canadian Woodworking magazine grows, we are constantly looking at our efficiencies and seeing where we can improve the magazine and its content. This search for efficiencies has recently lead us to the decision to change printers.

Accomplishing this change-over was a nerve-racking, nail-biting experience. As, after more than 8 years with the same printing company, we had grown comfortable with the pre-press and printing routines that we had developed over the years.

Change can be scary at first, even debilitating. There were a few times that we wondered if we should leave well enough alone, but we kept pushing through and in the end everything is turning out even better than I had expected.

You may find the same thing when you incorporate a new tool or woodworking technique. You go from having a comfortable, tried-and-true method of doing something, to trying to accomplish the same end, with unfamiliar tools or methods.

At first, the efforts seem too great for the anticipated results, and the unfamiliarity makes the process less than pleasing. But if you keep your eye on the goal of mastering your new tool or technique, you are sure to get through it, and become a better woodworker because of it.

You may be following our router series (see page #24), and thinking of picking up a router to incorporate into your woodworking. You may be looking to make some of your own woodworking tools (see page #22). Or, you may want to try your hand at intaglio (see page #33). Regardless of what you are trying that is new – keep your eye on the goal, and remind yourself that what at first seems awkward, will soon be familiar, and rewarding. Heck, it will probably even turn out better than you expect!

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Sir,

I am novice at wood working and I have question. I am going to make the bird house on page #26 of the April/May issue.

My first attempt will be in pine. I will not paint the interior. How should I finish the exterior? Should I paint-stain?

Victor H., St. Lambert, PQ

Victor:

The birds will thank you for not painting the interior. As for the exterior, if there are knots on the pine, and if you have any shellac, paint the knots with one or two coats of shellac – it will seal them to prevent cracking. You could also put a dab of shellac on the knots inside the box. As for a finish, an exterior polyurethane varnish is a good choice. If you want colour, apply a stain of your choice first before applying the varnish. And to make the varnish easier to brush on, pour some varnish into a clean container, and add about half that amount of mineral spirits to the varnish. Because the varnish will be thinner you should apply 3-4 coats, letting it dry thoroughly between each coat.

For more information on finishing see: Aug/Sept'03, issue #25: Surface Preparation; Feb/Mar'04, issue #28: Shellac; Aug/Sept'04, issue #31: Varnish; and Dec/Jan'06, issue #39: Staining. CWM

Re: Router table project

Can the Router table in the April/May'07 issue be used with the Freud router fence and top?

Thanks, John L., Richmond, BC

Hi John,

We checked with Freud and yes, the router table in the April/May'07 issue can be built to use the Freud fence and top.

continued on page 42

IN A RECENT REVIEW OF THE YEAR'S "BEST NEW TOOLS," NOT ONE OF OUR TOOLS MADE THE LIST.*

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* December 2006, Popular Woodworking "Best New Tools of 2006"

furnitureproject BY GINA SHEAR

Harvest Table

The clean lines of the Craftsman style have always appealed to me, so when I wanted a pedestal dining table that wasn't Country or Modern, and wouldn't look out of place with my grandmother's antiques, I settled on this design.

The table is built in three steps: the top, the apron, and the base. In keeping with the Craftsman era, I used quarter-sawn white oak for the top and aprons, and plain-sawn white oak for the rest of the table. Of course, you can use a different wood to suit your decor.

Top and Leaf

The top consists of two semi-circular halves and one leaf.

• Select 5/4 stock for the top (A) and leaf (B). Cut the boards a couple of inches longer than the finished length, and mill them to the same thickness. Arrange the boards to present a pleasing grain pattern. (If you do not have access to 5/4 stock you can use ¾" stock for the top).

• Joint the edges of the boards, and then glue them together to form two top panels and a leaf. I used biscuits, placed every 6" to 8", to facilitate assembling and levelling the boards. Alternately you could use dowels or splines to join the boards.

• Use a doweling jig to drill holes in the two halves and the leaf. The holes will be used to hold the table leaf alignment pins. You can either use metal alignment pins or wooden dowels.

• Place the two top panels bottom-side-up on a sacrificial piece of plywood, and align them using the alignment pins. Using a router trammel (see Router Trammel sidebar) and a carbide spiral up-cut bit, cut out the circular table top. Rout in a counter-clockwise direction, taking shallow cuts with each pass, until the circle is cut through. Alternatively, take one pass with the router to scribe the outline of the circle, cut the circle with a jigsaw, and then clean up the cut using the router.

• Insert the leaf in between the two top halves, and mark out the final dimension of the leaf. Then cut the leaf to final size on the table saw.

• Plane, sand or scrape the top, ensuring that both halves, and the leaf, are level.

Apron and Keys

There are three ways to make the apron: kerf bending, steam bending or laminate bending. I had intended to use kerf bending, but then I read that the kerfs would eventually 'telegraph' to the outside of the apron - something I did not want! That left steam and laminate bending. I chose laminate bending for my apron, as it seemed the easiest for one person to accomplish (see the Bending Form sidebar)

• Build the plywood form, remembering that the outside diameter of the form will be the inside diameter of your apron.

• Prepare stock for the aprons (C, D). Cut the top aprons (C) about 6" longer and ½" wider, and then trim them to finished dimension after they have been laminated.

• Using a bandsaw, re-saw your apron stock into three thinner pieces.

• Plane one side of each piece, and then align, glue and clamp these pieces around the form.

• Clean up one edge of the aprons on the jointer, the other on the table saw, and trim to fit the table top. Leave a little room between the two apron halves for wood movement; the gap will be covered by the decorative keys.

• Attach the aprons to the underside of

the top. I used a Kreg pocket hole jig for this. To allow for seasonal wood movement I enlarged the bottom holes. You could also use expansion washers.

- From the scrap ends of your apron, shape the decorative keys (E). I made mine ¼" thick.
- Glue and pin or nail the keys to the apron and the leaf.
- I used metal slides, but you could substitute wood slides. Use a file to lengthen the mounting holes in the slides to allow for wood movement in the table top.
- Attach the slides to the underside of the table, ensuring that they are square to the table opening, and parallel to each other.
- Attach the leaf locks.

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Top panels (qs)	2	1	22 ½	45
B	Leaf (qs)	1	1	15	45
C	Top aprons (qs)	2	¾	3	66
D	Leaf aprons (qs)	2	¾	3	15
E	Keys (qs)	2	¼	1	3
F	Pillar	1	4	4	24 ¼
G	Fins	4	2	6	19 ¼
H	Feet	4	3 ¼	3 ¾	15 ¼
I	Splines (bb)	4	½	2	19 ¾
J	Supports	2	1 ½	1 ¾	28
K	Sub-base (bb)	1	1	24	24

All stock is plain-sawn white oak, except: (qs) quarter-sawn white oak, (bb) Baltic birch ply.

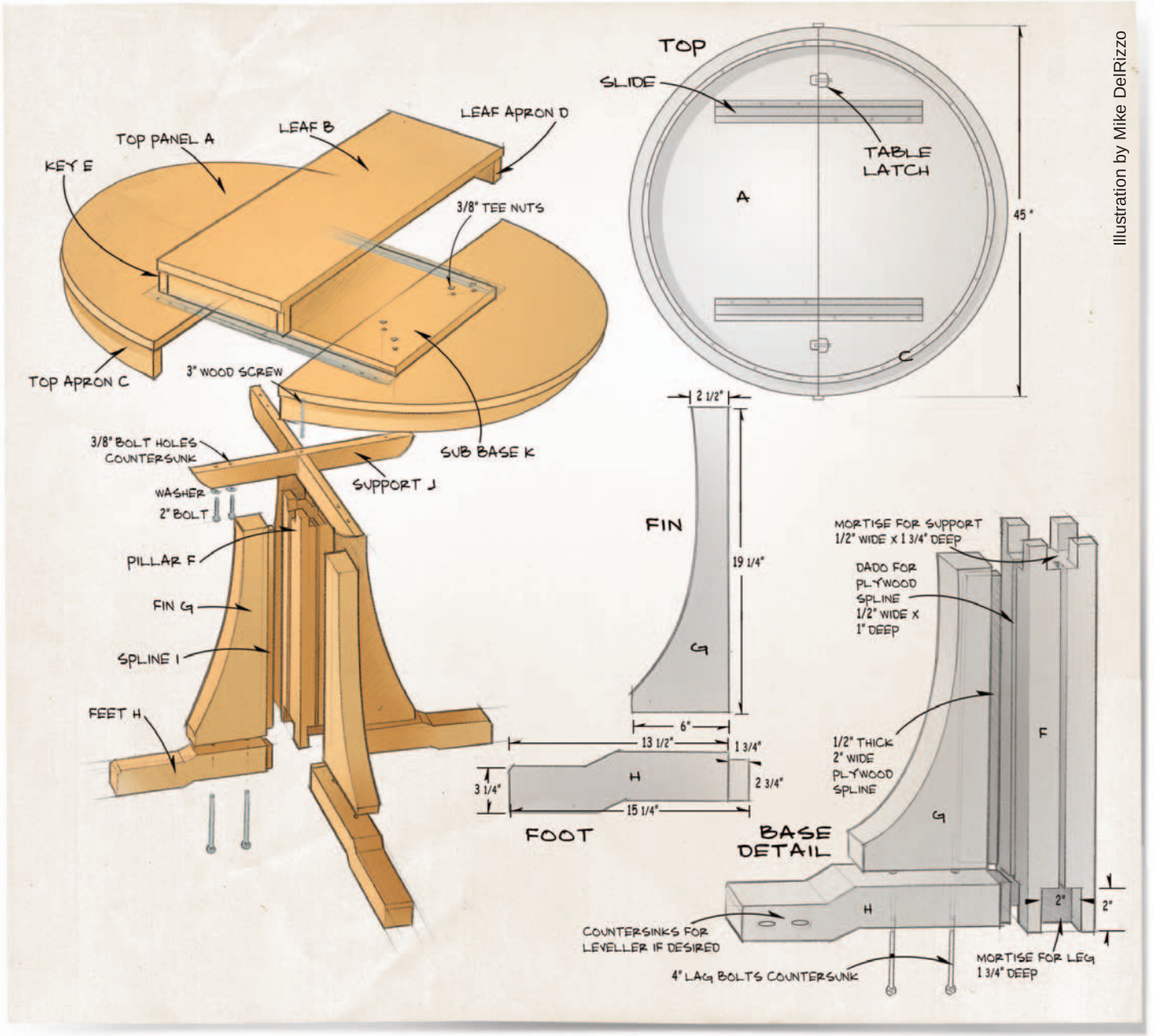

Illustration by Mike DelRizzo

Make this Bending Form to Make Curved Apron

There are a number of ways to make bending forms. The method I use is adapted from Tage Frid Teaches Woodworking, Book 2, (ISBN 1-56158-068-6, available through your local bookseller). The form should be about ½" wider than the piece you are bending – for my aprons the form needed to be 3 ½" wide. Make the form longer than the finished length of the apron so you'll have enough to trim the ends neatly. I made the form out of one sheet of ½" ply and four sheets of ¾" ply (you could also use MDF). Having an extra pair of hands makes assembly and glue-up easier.

- Layout the apron curve on the ½" ply.
- Bandsaw or jigsaw the curve.
- Sand or hand plane the curve smooth.
- Use the ½" ply as the template for cutting the ¾" sheets of ply.
- Glue and screw the five sheets of ply together.
- An inch or so in from the edge of the form use a saw tooth bit to drill holes through the form to accommodate the heads of your clamps. I placed the holes 6" apart.
- Wax the curve or apply cellophane tape (to prevent the veneer from adhering to the form).
- Glue up the three pieces of veneer (but don't put glue on the two outside faces of the veneer stack).
- Lay them on the form. Tape helps to position and temporarily hold them in place.
- Place the backer on the outside of the veneer stack. You can use a continuous piece of ¾" ply or smaller blocks.
- Apply the clamps, beginning in the middle and working towards the sides.
- Allow the glue to dry overnight before removing the clamps.

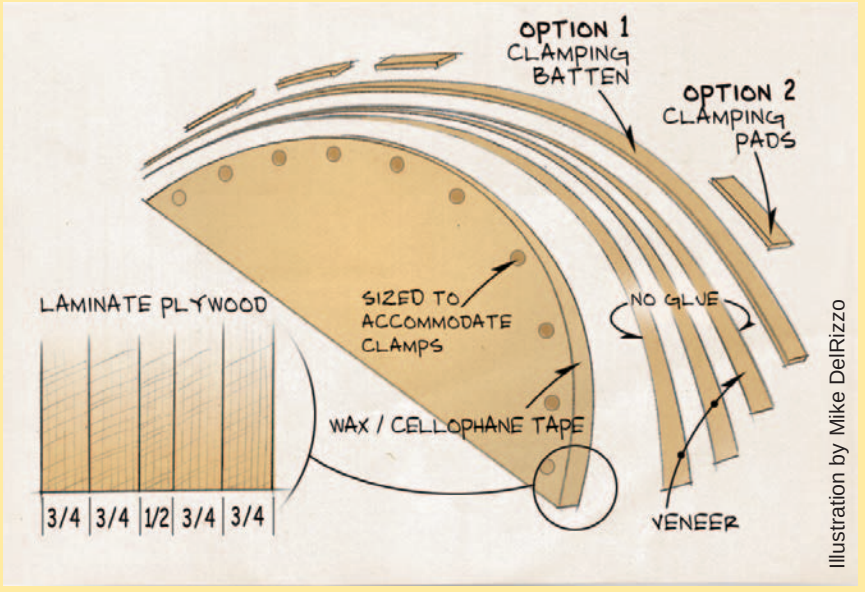

Illustration by Mike DelRizzo

Base

The base is comprised of a pillar, four fins, and four feet. I used plain sawn white oak for the base. When it is cut for the fins and the feet, the ray grain is most visible on the outer edges of the fins and the top of the feet. I attached the feet to the pillar with mortise and tenon joints. To attach the fins to the pillar I used spline joints, and I used lag bolts to secure the feet to the fins.

- Dimension and glue the 4" square base pillar (F), and then square the ends.
- Cut mortises in the top of the pillar to accommodate the table supports.
- Glue up the blanks for the four feet (H) from ⅝ stock, preferably from the same board so the grain patterns match. It is critical that the top and bottom edges of the feet are parallel to each other so that the table will sit square on the floor. To accomplish this, machine the feet blanks square before band sawing them to shape.
- Mark out the shape of the feet onto cardboard or hardboard, cutting and fine tuning the feet pattern. Then lay out the pattern on the feet stock and shape with bandsaw and drum sander.
- Draw a pattern for the fins (G) as well, and cut and shape them from ⅝ stock.
- Rout the grooves in the pillar and the fins to accommodate the ½" plywood splines (I).
- In the bottom of the feet, drill and countersink the holes for the lag bolts. I also countersunk holes to accommodate two plastic levelling glides in each foot to compensate for the uneven slate floor in our kitchen.
- Cut the mortises in the bottom of the pillar, and cut the mating tenons on the feet.
- Glue and clamp the feet into the pillar, using the fins to check for square.
- Glue the splines and fins onto the pillar.
- Drill pilot holes and screw in the lag bolts.

Table Support and Sub-base

Cut the table supports (J) from straight-grained stock and trim to fit the dado in the pillar.

- Mark and cut a half lap joint in the center of the supports.
- Drill and countersink the bolt holes in the supports.
- Cut the plywood sub-base (K) from 1" Baltic birch ply.
- Center the plywood on the supports, and mark the location of the bolt holes, then drill and insert T-nuts into the plywood.

• Center the plywood on the underside of the top, pre-drill holes into the slide centers and then attach with #10 screws.

Finishing

I wanted a finish that would really 'pop' the quarter-sawn grain of the white oak. This involved applying an aniline wood stain followed by several coats of Watco Oil. The aniline stain highlights the ray grain, and the oil highlights the straight grain. You can, of course, apply a finish of your choice to the table.

• Sand to 220 grit.
• Wet the wood to raise the grain, and then re-sand lightly.
• Apply the Light Oak Aniline Wood Stain. I found I had to re-wet the wood prior to application to avoid lap marks.
• Coat the end grain around the table edge and on the legs with a thin coat of lacquer to keep it from absorbing too much colour and getting too dark.
• When totally dry, start applying coats of Dark Walnut Watco Oil, one coat every one or two days, until the colour is as dark as you like. Then switch to Natural Danish Oil until you have built up at least seven coats.

So now that the table is finished all I have to do is make six matching chairs to go with it.

GINA SHEAR
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Make this Router Trammel to Cut Perfect Circles

You can make a simple router trammel out of scrap ¼" or ½" plywood.

• Cut a piece of ply approximately 1" wider than the width of your router base, and about 6" longer then the radius (half the diameter) of the circle that you want to make (for this project cut the ply about 30" long).
• Remove your router's sub-base, place the router on one end of the trammel board, and trace out the bit opening and the locations for the mounting screws.
• Cut out the hole for the router bit, and then drill and countersink holes for the router's mounting screws.
• Chuck a ¼" or ½" spiral or straight bit into your router, and attach the router to the trammel with the mounting screws.
• Mark out the radius from the inside edge of the router bit to the other edge of the trammel, and drill a pivot hole. For the pivot you can use a nail, dowel or screw.

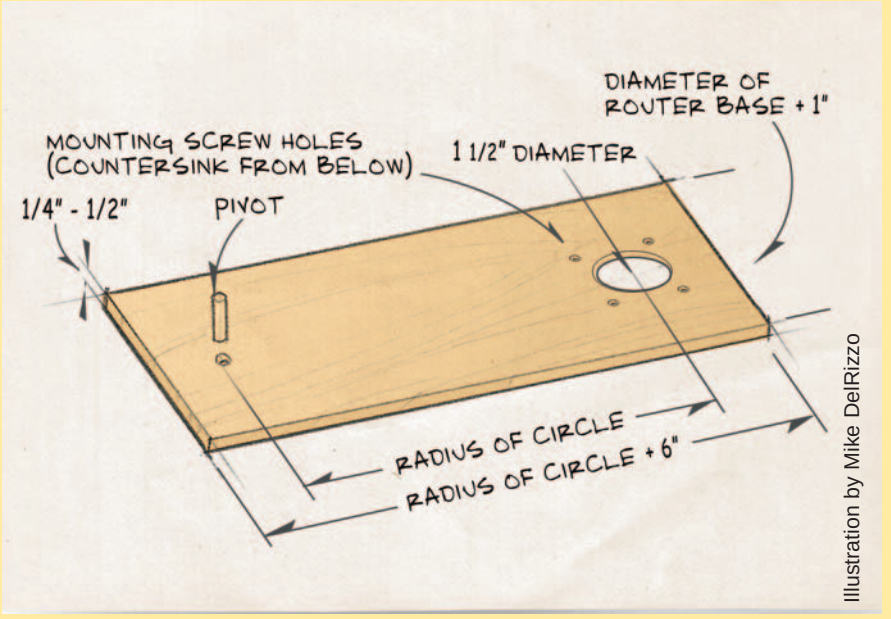

Illustration by Mike DelRizzo

Photo by Lee Valley

Pedestal slides

SUPPLY CHECKLIST

- 24BF quarter-sawn 8/4 lumber
- 5BF quarter-sawn 4/4 lumber
- 20BF of 4/4 plain-sawn lumber
- 2 sq ft of ½" and 1" Baltic birch ply
- pair of 26" pedestal slides
- 4 alignment pins
- 8 expansion washers
- 2 leaf locks
- 8-2" and 8-4" lag bolts
- 8 plastic levelling glides
- Light Oak Aniline Wood Stain
- 1 quart Dark Walnut Watco Oil
- 1 quart Natural Danish Oil.

SOURCES

WHITE OAK
www.WoodShedLumber.com
www.BrantCustomWood.com

DOWELLING JIG
www.Dowelmax.com

POCKET HOLE JIG
www.KregTool.com

CARBIDE SPIRAL UP-CUT BIT
www.Sharpco.ca
www.Woodline.com
www.LeeValley.com

HARDWARE
www.HomeHardware.ca
www.WorkshopSupply.com

FINISHING SUPPLIES
www.Circa1850.com
www.HomeHardware.com
www.LeeValley.com
www.WoodEssence.com

easyproject BY MICHAEL KAMPEN

TINY Toy Box

Here is a great little project for you and the younger woodworker in your family to make together in a weekend. You can use a table saw and mitre sled to cut the parts, do the shaping on a router table, and then turn the pieces over to your assistant to assemble.

I used the Dowelmax jig and a cordless drill on this project. This is a very safe system, and allows interested children to participate in some quality time in the shop, under your supervision.You can, of course, use a different model of doweling jig.

This project was made using finger-jointed laminated pine shelf panels. The ones that my supplier had on hand were 5/8" thick; if yours are of a different thickness, adjust the length of the ends (B) accordingly. I also used the Dowelmax without the shim normally used with the 1/4" bushings to give me the recessed ends.

With careful planning you can cut all the pieces for this project from a single 12" x 8' board, or two 12" x 6' boards.

The Box

- Cut the top (A) to size from the shelf stock. If you are not using laminated shelf panels then you will need to glue up enough stock for the pieces. Set the top aside for now.
- Cut the pieces for the ends (B) and the front and back (C) to size.
- Set the ends in place and then decide which of the other two panels will become the front. Choose the one with the most pleasing grain pattern; the best side should face out in each case.
- Place a depth stop on your 1/4" drill bit and set it to allow you to drill 3/8" deep holes with the doweling jig. Configure the jig to clamp on the end of a board and using the guide pin, drill a row of dowel holes on the inside faces, the full width of both the front and back. Not using the shim supplied with the 1/4" guide bushings on the fence block moves the holes back from the edge about 1/16".
- Configure the doweling jig to mount on the end of a board and reset the depth stop on the drill bit to limit the depth to 7/8". Drill a series of dowel holes up each end on both sides. Use two or three dowels in each corner to check the fit with the front and back.
- With the main portion of the box fitted together, confirm the measurements and cut the bottom (D) to size. Also, at this time, cut the stock for the four base pieces (E, F) and for the two top cleats (G).

The Base

- The base pieces must be cut to length, mitred and the dowel holes drilled before they can be shaped on the router. To cut these with fool-proof

results every time I use a 45° mitre sled on the table saw.

• Begin by cutting the first mitre on one end of a base piece. Set this piece against the bottom and use a knife to strike a line at the other end of the piece. Cut the mitre on the second end. Continue cutting all of the base pieces to length.

• Label the base pieces and the corresponding edges on the bottom. Use the end of the edge on the bottom, and the start of the corresponding mitre cut as a reference edge, and drill dowel holes to mount the base pieces to the bottom edges. The base pieces should be mounted so that they provide a ¼" lip around the edges of the bottom.

Off to the Router Table

• Set up a 5/16" round-over bit in your router table and round over the edges on both faces of the top. Use a fence for this operation and make the full cut in several passes by backing the fence up for each cut until you have the final depth. Do the end grain on the first pass, and clean up the inevitable blow out with the subsequent long grain passes.

• Use this same technique and rout a 5/16" round-over on the top outside edge of all of the base pieces as well.

• Use a 3/8" spiral router bit to cut the finger recesses in the front and ends as well as the cut outs in the base pieces. Set up a couple of stops on your fence on either side of your bit to limit the travel of the work piece. Begin the cut by setting the piece against the right hand end stop and with a firm hold on the piece, pivot it into the cutter. Move it along the cutter until you hit the other end stop. At this point, pivot the piece away from the cutter and turn off the router. Repeat this using several shallow passes. Move the end stops closer together after a few passes for a two-stage cut out such as this one.

• Measure the thickness of the hinge you are using. Deduct 1/16" from this number and rip this amount from the top of the back to accommodate the hinge. Deducting 1/16" from this amount ensures that you won't have a bound hinge later on.

The Finish

• At this stage the fabrication of the parts is done. It is much easier to apply the finish while the parts of the box are still flat. Sand all of the parts to 180 grit and apply two coats of an interior stain, such as Varathane Gel Stain, which comes in 11 different colours. Stain only the outsides of the box. Once the stain has thoroughly dried apply a couple of coats of paste wax. Be careful not to get finish or wax into the dowel holes.

• As an alternative, give your young assistant a couple of narrow paint brushes, three or four tubes of their favourite colours of paint, and let them at it – you'll end up with a uniquely finished box that showcases their creativity. Once the paint has dried cover with a coat of clear waterborne finish.

Assembly

The assembly of this toy box is best done in two steps. Begin with the base.

• Dry fit all of the pieces together to

finishingtips by Circa 1850

What's the best way to apply my finish?

Finishes can be applied using a variety of methods - by brush, rag or cheese cloth, or a spray gun.

The application method is dependent on the **properties of the finish** (viscosity, drag, tack time) and the **woodworker's preference**.

Apply **oils**, **oil-varnish combinations** and **gelled varnishes** in thin uniform coats using cheese cloth. Rub on the finish in a circular motion and then wipe off the excess in the direction of the grain.

Liquid varnishes are best applied using a brush or spray.

When using a brush, apply a thin uniform coat against the grain, and finish off by **tipping** the brush at a 45º angle and lightly going with the wood grain.

It is always recommended to follow ***"the less is more"*** method, i.e. building up the finish with thinner coats rather than *laying it on thick*.

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

be sure there will not be any snags. Lay out the pieces in an organized manner and work quickly once the glue hits the wood. Glue the base pieces to the bottom of the box. Use clamps to draw the base assembly tight or you will have gaps in the mitre joints.

• When the base has been removed from the clamps, assemble the main section of the box. Again, work in an organized manner once you begin. Glue the front, back and ends together with dowels. Spread a bead of glue around the perimeter of the base and set the main section of the box into place on the base. Apply some clamps to draw the two pieces together and drive in some screws from the underside.

• Turn the lid upside down on a protected surface and center the box on it. Draw a line along the underside of the top along the back. Mark both ends - you'll need this to line up the hinge.

• Cut a piano hinge to length and file the end smooth. Mount it on the back of the box with two screws. Mark the face of the hinge that will be against the underside of the top and unscrew the hinge. Place the hinge on the top and line it up with the edge and ends marked earlier. Use a self-centering drill bit and drill two pilot holes and install two screws. Put the top in place and drive the two screws into the back. If you've measured accurately then everything should be fine, go ahead and drill out the rest of the pilot holes and install the screws.

• Screw the cleats to the underside of the top.

• All of the no-slam hardware I could find was too large for a box of this size. Instead, I added a leather strap held in place with a couple of brass screws and washers to limit the travel of the lid and provided a recess along the top of the front and sides to provide some protection for little fingers.

• With the box assembled, all that is left is to give everything a final wipe with a coat of wax.

MICHAEL KAMPEN
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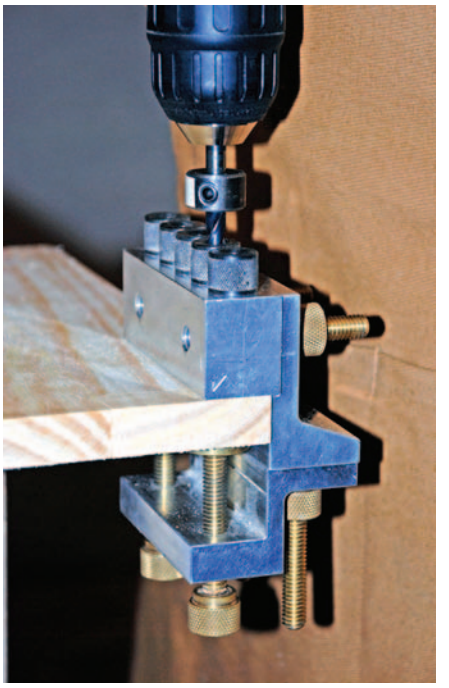
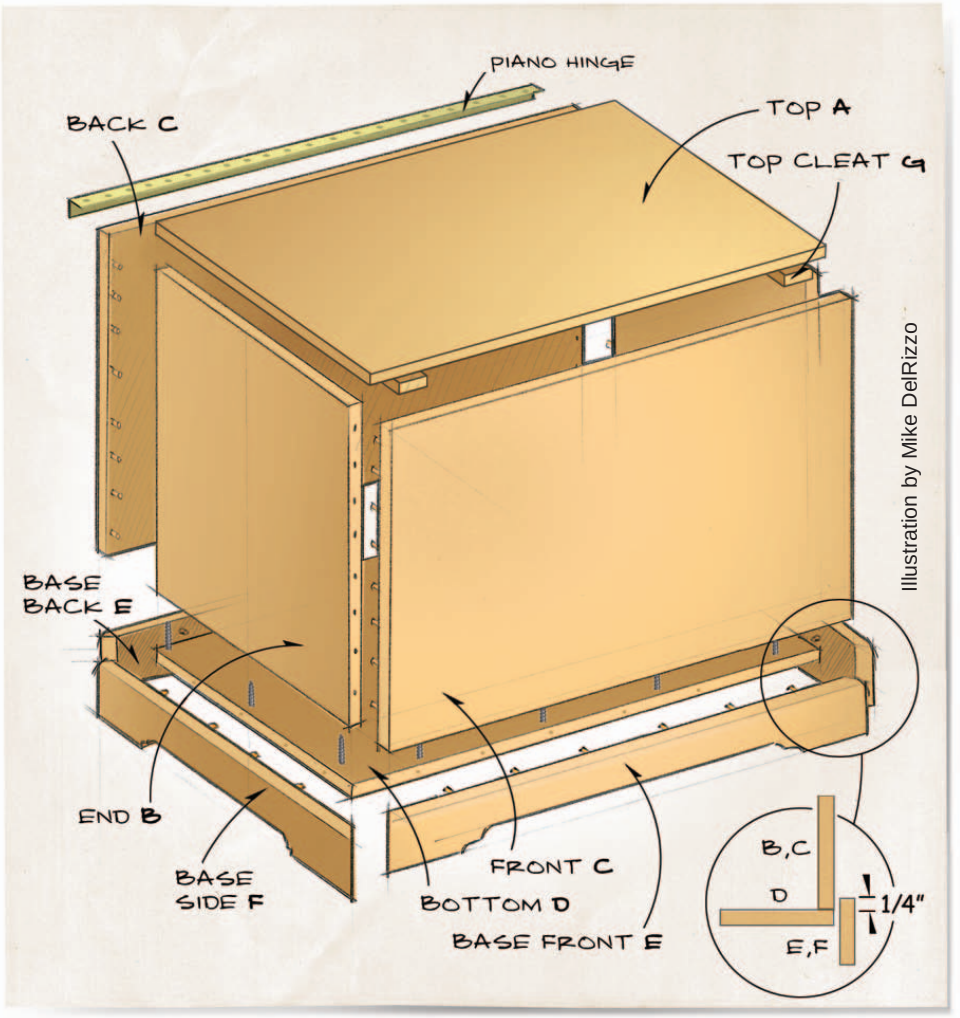


Configure doweling jig to mount on end of board.



MATERIALS LIST
(All measurements in inches)

	Part	Qty	T	W	L
A	Top	1	5/8	12	19 1/8
B	Ends	2	5/8	9 7/8	9 1/2
C	Front and back	2	5/8	9 7/8	17 15/16
D	Bottom	1	5/8	10 5/8	17 15/16
E	Base front and back	2	5/8	1 3/4	19 1/4
F	Base sides	2	5/8	1 3/4	12
G	Top cleats	2	5/8	1 1/8	9 3/8

SUPPLY CHECKLIST

- 4 BF lumber
- 5/16" round over bit
- 3/8" spiral router bit
- 1" x 16" piano hinge
- 1 quart stain • furniture wax.

SOURCES

HARDWARE

www.HomeHardware.ca
www.WorkshopSupply.com

FINISHING SUPPLIES

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

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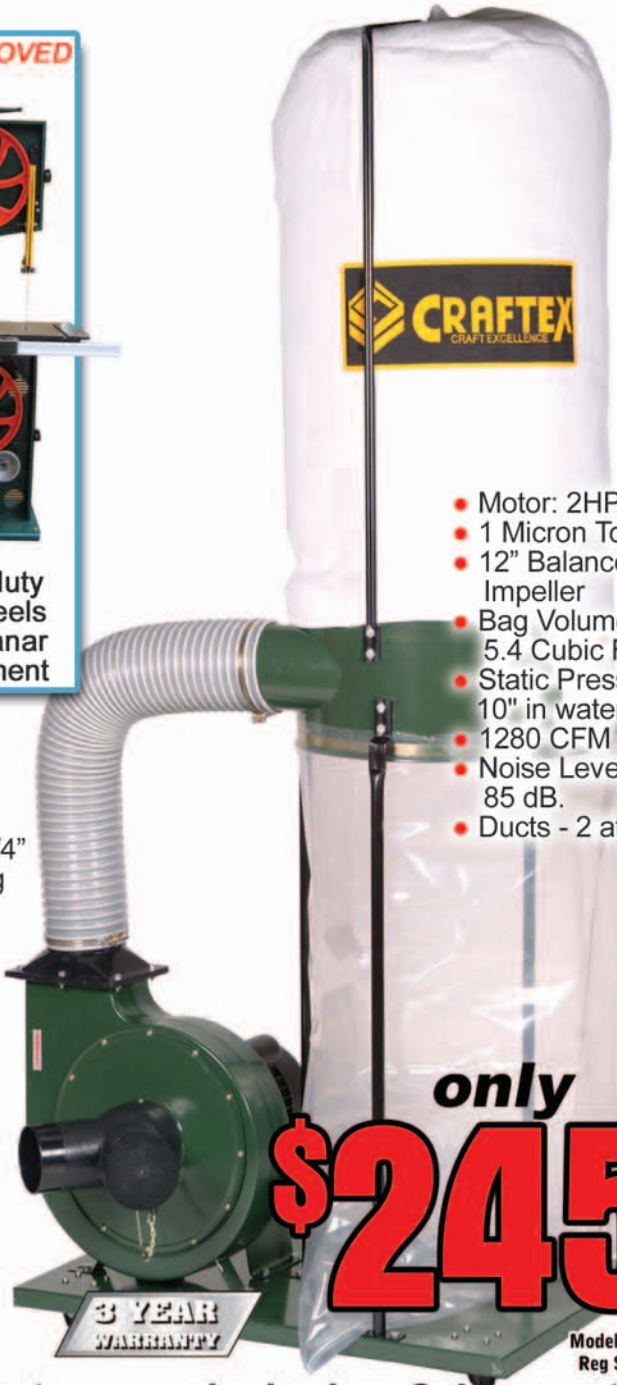

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BY TREENA GOULD

Ebony Inlay Cherry Box

I designed this cherry box with an ebony inlay for a beginner's woodworking class that I teach. It is pleasing in proportion, colour and shape, and satisfying to build.

This box is a suitable project to guide newcomers through some of the fundamentals of woodworking, it is more of an intermediate skill level project for someone working alone – due to the tapered sides on the box and the need for at least one template. I chose cherry as the main wood and ebony for the inlay, but just about any two contrasting woods could be used. It was designed to be the size of a jewelry or small treasure box. However, it could be built to any size that suits you. A limiting factor would be the size of your table saw blade or, more specifically, how high a taper your table saw can cut. The overall width and length of the box is practically limitless.

There are two main components in the construction of this box. First, you build the box and then you fit your inlayed lid to the box. You should be able to build this little treasure box in a day.

Begin By Making the Box

• Crosscut a rough piece of stock 3" x 36". From this board you will cut the front and back (A), and sides (B) of the box. If you alter the dimensions of the finished box, ensure that you cut the rough stock a few extra inches longer. This way you will be able to trim off any machine snipe in the finished pieces.

• Joint a face and edge of the board flat, true, and square.

• Rip the board to 2 1/16" on the table saw. The extra 1/16" can be cleaned up on the jointer or with a hand plane to rid the board of saw marks.

• Plane the board to 5/8" on your thickness planer. If your board is fairly thick you can resaw it to 11/16" on your table saw or band saw to save time planing.

• Using a mitre saw and crosscut blade, cut the board to finished lengths. Square up one end first, and then measure and mark the lengths. Then cut two pieces at 9" for the front (A) and back (A) and two at 5 1/4" for the sides (B).

• Use a dado blade on your table saw to cut a 1/4" x 1/4" dado on the insides of the front and back pieces. Alternately you can cut it with two passes on a rip blade, or use a router table and 1/4" router bit. The distance in from the ends is the thickness of the box material. Using an actual milled piece, rather than your tape measure or ruler, will give you a more precise fit. In other words, use one of your side pieces to set your table saw fence so that when the fence is locked in position the outside surface of the piece is flush with the outer side of the blade.

• Reset your table saw to cut the corresponding rabbets on the sides. Again, you could use a dado blade, two passes with a single blade, or router table. A rip blade will give a nice square corner inside the dado and the rabbet. A cross cut blade will leave a tiny ridge. Note that the rabbet is cut on the outside of the side pieces. You will find it helpful to begin with the blade lower and cutting less in width than desired, and gradually raising the blade to the exact height and moving the fence away from the blade to create the correct rabbet width. Attach a sacrificial fence to the table saw's fence because you will be cutting right next to it, if not into it. Keep adjusting your setting by minute increments until the rabbet fits perfectly into the adjoining dado. A masterful fit takes some pressure to push the joint together but not a lot of force. "Fit, don't force," as an instructor of mine used to say. Ideally you should be able to push the two pieces together and then hold it upside down without the rabbeted piece falling out.

• Run a 3/32" groove into the front, back and side pieces (A, B) for the bottom to fit into. The groove needs to be 5/16" deep and 5/16" above the bottom. My preferred method is to use a router table. This way, it is easy to do a stopped groove in the front and back pieces (A) without having to resort to any chisel work.

• Edge glue two or three strips of stock together to make the bottom (C). Start oversized, glue up flat, plane to thickness, and then cut to final width and length.

• Cut a rabbet on the bottom piece to fit into the groove on the box frame. I like to make this rabbet 1/16" wider than the groove so that a reveal details the bottom of the finished product. Be sure to check your sizes before assembling. The width of the bottom should have room to expand and contract within the groove.

• Assemble the box without glue, making sure everything fits together nicely. When you are satisfied with the fit, glue the box together, measuring the diagonals to check for square.

• After the glue has set, cut the tapers

on all four sides of the box using a combination blade in your table saw. The angle is approximately 6º, but what is more important is that the angle is maximized for the thickness of the wood without interfering with the dado or groove on the other side. To figure out the angle draw a line on the box going from the outer top tip of the side to a point that leaves the bottom groove plus 1/8" intact. Use a T-bevel to record the angle and set your saw blade.

• Sand the box to 180 grit.

Now Make the Lid

• Glue up sufficient stock for the lid (D), making it slightly oversized.

• Plane the lid to thickness, and then cut it to width and length.

• Plane a piece of ebony to 1/8", and then cut 1/8" strips for the inlay (E, F, G). Cutting your ebony strips with your band saw and a fence will reduce wasting too much of an expensive wood.

• First cut a 1/8" dado along the ends of the lid for inlay (F). The dado should be 3/4" in from the lid edge.

• Glue the ebony strips along the ends.

• Now you can cut the dados along the sides of the lid for inlay (G).

• You will be cutting through the end inlays.

• Glue the ebony strips along the sides.

• Sand the inlays flush to the top of the lid.

• If you plan on making a number of center inlays, it is best to make a diamond template to be used in conjunction with a router and bit. If you will only be making one inlay, it will suffice to mark out the shape on the lid and freehand cut it with a router and clean up the edges and corners with a chisel.

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Front and back	2	5/8	2	9
B	Sides	2	5/8	2	5 1/4
C	Bottom	1	5/16	5 1/4	8 1/4
D	Lid	1	1/2	6	9
E	Inlay	2	1/8	1/8	9
F	Inlay	2	1/8	1/8	6
G	Inlay	1	1/8	1 1/4	1 1/4

All stock is cherry, except the inlay, which is ebony.

SUPPLY CHECKLIST

• 1.5BF cherry, ebony leftovers
• two 9/16" x 1" hinges • spray on lacquer or wipe-on polyurethane

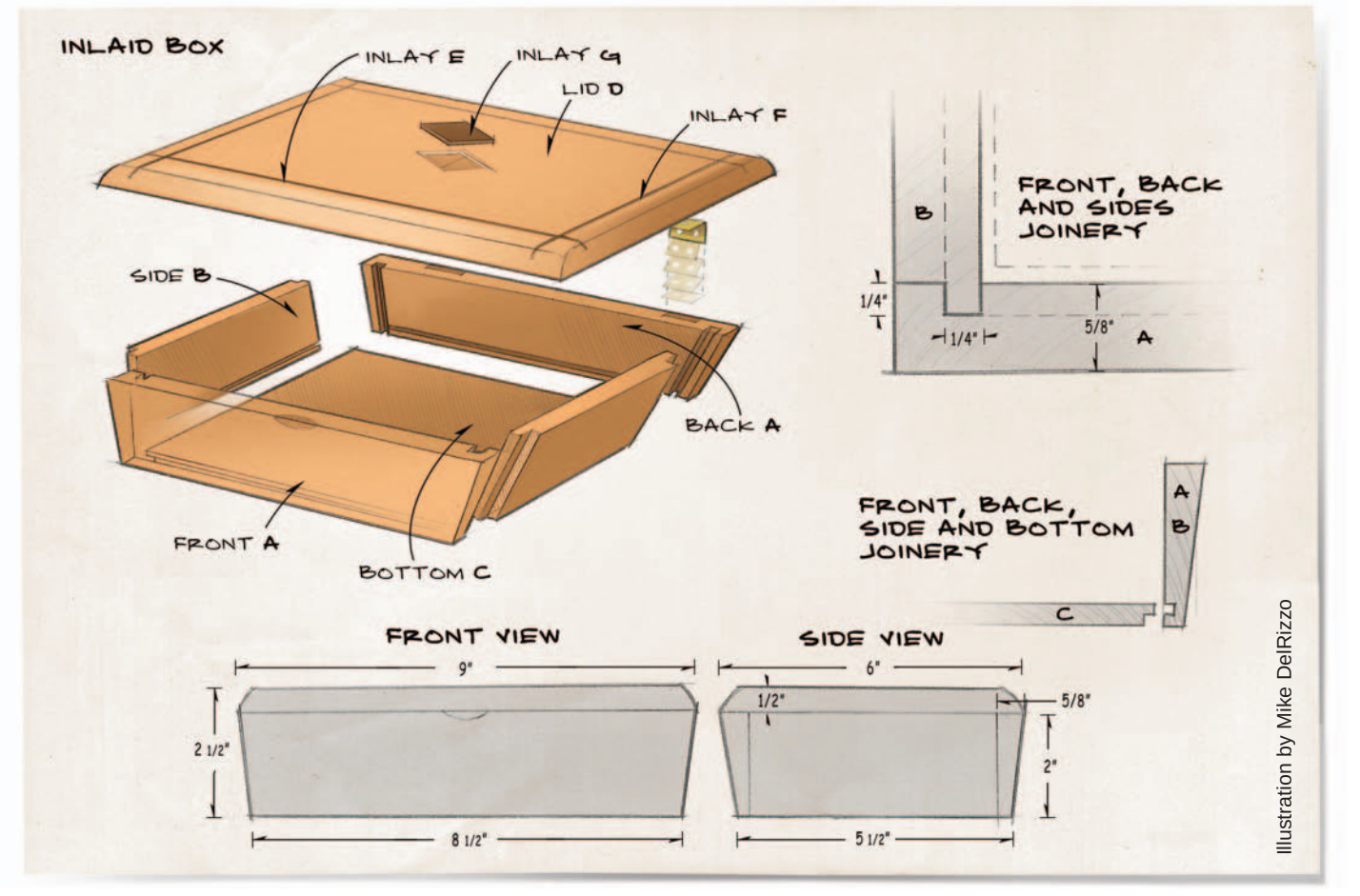
SOURCES

HARDWARE

www.HomeHardware.ca
www.WorkshopSupply.com

FINISHING SUPPLIES

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



A thin cardboard template or an actual inlay piece will help to draw out the exact shape on the cherry.

• Fit the ebony shape to the cutout and glue it in. Sand flush.

• Profile the edges of the lid using a ¾" radius router bit. You need only expose part of the bit to get a gentle curve.

• Rout a finger pull in the front of the box using a cove bit. The size is your choice.

• Cut the mortises for the hinges, which should be just less than ⅝" wide so that the screws will not protrude the lid profile. This can be done with a chisel or with a router and template, and template bit. Pre-drill carefully marked out holes for the screws and screw on the hinges.

Apply the Finishing Touches

While there are many finishes that would work on this box, my personal favourites are sprayed-on lacquer or wipe-on polyurethane, for ease of application and protection. For a small project like this you can use a can of spray lacquer. Cherry has a tendency to blotch, so consider using a wood sealer, particularly if you use an oil based finish.

Small boxes like this are a great way to use up leftover stock, which we all seem to accumulate, and they provide a way for you to showcase your woodworking skills. The design possibilities, and ways of combining various woods are endless. And, best of all, they make unique gifts for which everyone seems to find a myriad of uses.

TREENA GOULD
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turningtips BY CARL DUGUAY

Tips for the Novice Woodturner

Courtesy of Oneway Manufacturing

These tips are bound to help you get the most out of your time at the lathe.

• Choose clear, straight grained, soft wood like pine, alder or poplar to practice with before moving on to harder and irregularly grained wood.

• Instead of using a bandsaw to trim rough stock to an octagonal shape before mounting it on the lathe –enhance your tool skills by using a roughing out gouge to turn square stock to round.

• Use a spindle gouge and slow lathe speed to further shape your stock once it's been rounded.

• To turn bowls, mount the stock with grain running lengthwise.

• Get to know your tools. Gouge and round nose tools cut flat and concave surfaces; skews shape convex and flat surfaces; and on bowls use a bowl turning gouge.

• Generally, turn larger diameters first, working from the top to bottom of a bead, and from the outside to the center of a bowl.

Skew chisels (above) are widely used for spindle work. These versatile tools are ideal for planing smooth surfaces, cutting V-grooves, forming beads, and facing off the end of cylinders.

SOURCES

www.LeeValley.com www.Oneway.ca www.EuropeanHandtools.com

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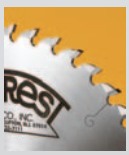

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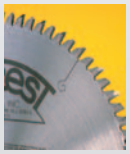

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homeproject BY MICHAEL KAMPEN

STEP Stool

Get a step up on things with this handy little kitchen or shop accessory.

We've all been there, standing on our tiptoes, stretching for all we're worth trying to reach an item on the top shelf. Or worse yet, we reach, while perched precariously on the edge of a chair. With this handy step stool you'll be able to step up and reach for the top with confidence. This stool also makes a great companion to the Kitchen Island Table (Dec/Jan '07, Issue #45).

Originally I had planned on using screws with plugs on this project, but the two structural joints in the stool are in end grain, and screws driven into end grain have very little holding power. To ensure joints that are strong enough for years of use, I've used dowels to assemble the parts of this project. A dowelling jig assures that everything fits together perfectly. If you choose another method, adjust the instructions accordingly.

I wanted a rigid stool that would not deflect under weight, so I used stock that was 1⅛" thick, milling it down to ⅞". With careful layout I was able to get all the pieces from one 8" x 8' board. If you don't have access to wide stock, glue up narrower stock and adjust the thickness as required. Almost any wood will suffice for this project.

- Mark out the eight pieces for this project on your rough stock, grouping them so that you can cut the board into manageable lengths. I was able to cut my 8' board into two 4' lengths.
- Mill the stock straight, square and to final thickness.
- Cut all the pieces for the project to finished dimensions, but leave an extra inch in length to be trimmed off later. When cutting the piece from either end of the board, allow some extra waste, as there may be checks in the wood that you will need to cut away.
- Cut the short risers (A) and the long risers (B) to final length. Place the two sets of risers together in such a way that the pattern of the grain on the two pieces makes the glue line less visible. Using the bottom edges of the risers as the reference edge, drill dowel holes to join the two risers. As the stool will be subject to some stress, use the maximum number of dowels that the width of the material will support. Don't glue the risers together just yet.
- Cut the two treads (C) to final length.
- Using the back edge of each riser as the reference edge, drill dowel holes into the tops of the risers.
- Drill corresponding dowel holes in the underside of the treads. If you are using the Dowelmax, strip it down to the core guide block and clamp a wooden block to the underside of the tread to act as a fence. Use the fence on your table saw to keep everything aligned and drill a row of dowel holes in the underside of the treads. After you drill the first hole, insert the guide pin to lock the jig in place.
- Dry fit the two riser assemblies and then fit the treads to the risers with dowels. Measure the actual distance between the risers and cut the front cross brace (D) and rear cross brace (E) to length.
- Drill dowel holes on the inside faces of the risers using the top edge of the risers as the reference edges. If you're using the Dowelmax, place the back of the risers against the table saw fence and use a block of wood to act as a spacer for the row of holes. Remember to reset the depth stop on your bit or you may drill through the opposite face.

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Short risers	2	7/8	5 11/16	6 3/16
B	Long risers	2	7/8	5 11/16	13 3/16
C	Treads	2	7/8	6 11/16	19 1/2
D	Front cross brace	1	7/8	15 7/16	2 1/2
E	Rear cross brace	1	7/8	15 7/16	6 9/16

SUPPLY CHECKLIST

• 6 BF lumber • 10 3/8" x 2" and 28 3/8" x 1" dowels • 1 litre Home Hardware Fine Wood Maple Stain #723 (optional), polyurethane

SOURCES

DOWELLING JIGS

www.Dowelmax.com
www.BusyBeeTools.com
www.LeeValley.com

FINISHING SUPPLIES

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

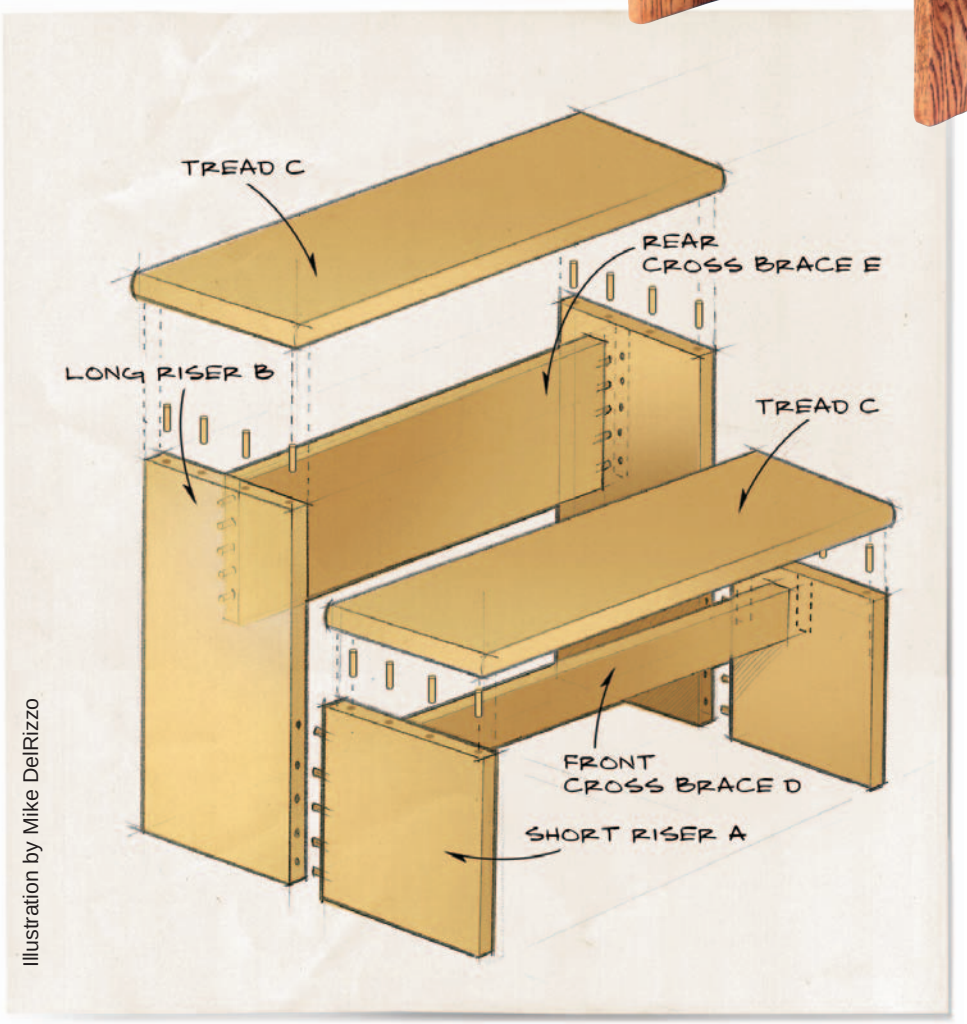

Illustration by Mike DelRizzo

• Drill the corresponding dowel holes in the end of each cross brace.

• Set up a 3/8" round over bit in your router table to round over the edges of the treads. Begin with the ends and let the long grain cuts remove any tear out left behind by the end grain passes. For two of the end grain cuts you will need to back up the tread with a block of wood in order to prevent tear out.

• Dry fit the parts together to ensure everything fits perfectly.

• Carefully take the stool apart and be sure that you have sufficient dowels and glue on hand. Before the project can be assembled the four risers have to be assembled into the two ends.

• Using dowels and glue assemble the long and short risers into a pair of ends. Spread a little glue on the edges of the two pieces as well as in the dowel holes. After about 1/2 hour, remove the clamps and scrape off any glue that has squeezed out of the joint, it should still be stringy and should peel off easily. Then let the assembly cure.

• Before assembling the rest of the stool, sand all of the parts. If you are building this as a companion piece for the Kitchen Island (Dec/Jan '07, Issue #45), finish it with Home Hardware's Fine Wood Maple Stain #723. To leave the stool with an easily cleaned and durable surface I followed this with a couple of coats of polyurethane. Be careful not to get finish in the dowel holes.

• With all of the parts finished, it's time for the final assembly.

• Begin by putting glue in the cross brace dowel holes in one of the ends, then put glue in the holes in the cross braces. Insert the dowels in the risers and tap them in with a mallet if need be. With these dowels at full depth, insert the braces into the corresponding hole on the ends. Repeat this for the other side.

• Apply glue to the dowel holes in the risers and the treads. Insert the dowels into the risers first and then set the treads in place and push then down evenly onto the risers. When everything has been assembled clamp the whole assembly together to draw the joints tight, and let the glue set.

• Give this project the maximum time recommended by the glue manufacturer for the glue to cure.

Once the project is completed head for the kitchen and go hunting for the cookie jar on the top shelf.

MICHAEL KAMPEN
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BY RYAN SHERVILL

Garden Bench

Every garden needs a garden bench – a place to rest while absorbing the beauty of nature. A handmade wooden bench will not only enhance your garden sitting experience, but serve to grace the garden area itself. I was able to make this bench out of a single board of yellow birch, as I have access to old growth lumber, cut 165 years ago. It's an awesome experience to be able to work with such large pieces of such beautiful old growth wood.

To make this bench out of a single board you'll need rough 8/4 stock about 18" wide and 8' long. If you don't have large enough stock you can easily laminate smaller pieces together. While you can use almost any wood: teak, mahogany, redwood and western red cedar are all good choices.

Prepare the Board

- Begin by milling your board. I used a straight edge and a circular saw to cut off one of the 'live' edges of this board. I then set the fence on the table saw, and with a ripping blade I trimmed off the other live edge leaving me with a straight edged plank to work with.
- Flatten and true the board. My piece was far too large for my jointer. While I flattened the board with hand planes and winding sticks, you could also do this with a sled for the planer, or using a carriage and router set-up. First I flattened one face of the board and then trued it up in the planer using light passes. You want to end up with a flat board that measures 1 ½" thick, with two clean faces.
- Once the board is trued, joint one edge, and then use the table saw to square the opposite edge.
- Lay out the parts for the bench. This is where careful consideration of your stock pays off. My board had sapwood (creamy white) wood for about 75% of its length. Then, because of how it was cut at the mill, it shows heartwood (reddish brown) for the last quarter or so. I decided to follow the grain of the board for the legs. You want to pick the nicest stock for the bench seat, and reserve the rest for the legs, breadboard ends, and stretchers.

Cut the Parts

- Before cutting any of the parts, trace them out on the board in pencil. Cut out the parts oversized and then trim them to their final measurements.
- The seat top (A) should measure 12 ½" x 44", (which is small enough to run through a 13" planer – if you have a smaller planer rip the boards in half, dress them, and then re-glue them together). The breadboard ends (B) should measure 1 ¼" x 4 ½" x 14 ½".
- If you want to form a gentle curve in the breadboard ends as I did, now is the time. Mark your curve in pencil, band saw, and then sand up to your lines.
- Cut the stock for the legs (C). I made the legs with a gentle curve, though you can make them straight. If you use a curve, ensure that it

ends within 7" of the top on the inside face to allow easy attachment of the stretchers.

• Cut the stock for the stretcher (D) and braces (E). When milling the stretcher ensure that the top edge is flat, as it will provide additional support for the seat.

Assemble the Top

• The top needs to be flat, but still allow wood movement. The simple solution is to use breadboard ends. Breadboard ends are comprised of a narrow board placed at the end of a panel, and running perpendicular to the grain in the panel. They provide an easy way to make strong, stable joints. I used a hand held router spinning a ½" straight bit to mill a 12" x 1" deep slot into the ends of the main board.

• Using the table saw and a ½" stacked-dado blade set, mill a matching groove in the breadboard ends.

• Notch the breadboard ends to allow fitting of the legs. Carefully lay out a 1 ¼" x 1 ½" notch on the inside corners, and cut it out with the band saw or handsaw.

• Cut a piece of ½" Baltic birch ply to fit into the groove and glue it into the end pieces, effectively forming a stable, strong spline.

Attach the Legs

• Cut a 1" x 1 ¼" notch into the top of each leg.

• Apply glue into the notches of the legs, and clamp them in place on the breadboard ends.

• Once the glue has set, drill a ½" hole 1" deep, and drive a 1 ¼" #8 wood screw through the leg and into the end. Apply some glue into the holes, and insert a ½" x 2 ¼" fluted dowel. Trim the ends of the dowels flush with the legs.

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Seat	1	1 ½	12 ½	44
B	Breadboard ends	2	1 ¼	4 ½	14 ½
C	Legs	4	1 ½	3	17 ¾
D	Stretcher	1	1 ½	2 ½	44 ½
E	Braces	2	1 ½	2 ½	8 ¼

SUPPLY CHECKLIST

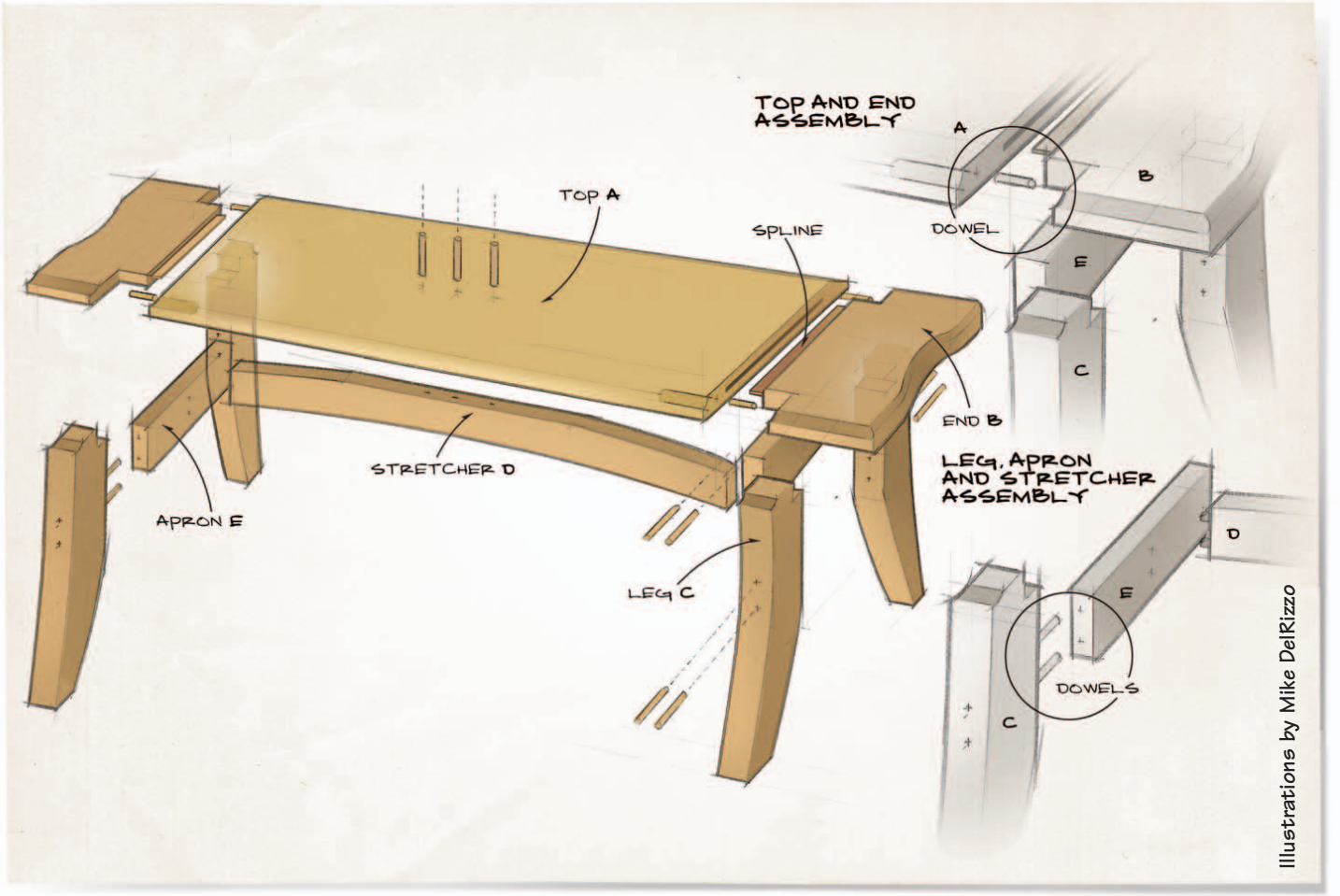
- 25BF of 8/4 stock
- 1 quart polymerized tung oil

SOURCES

LUMBER
www.WoodShedLumber.com
www.BrantCustomWood.com

WINDING STICK
www.LeeValley. com

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



• Put a small amount of glue on the ends of the braces, and put them in position between the legs. Put a clamp across the bottom of the legs to hold the assembly in place, and drill two ½" holes completely through the leg and 1" into the brace. Apply glue to a ½" x 2" fluted dowel, and drive it into the hole. Use another piece of dowel with the flutes sanded off to countersink the glued dowel until it bottoms out in the hole. Then, using a tapered ½" plug cutter, cut plugs from a contrasting wood (I used bloodwood) and glue them into the holes.

Final Assembly

• Put a little glue on the breadboard tongue, applying it only to the center ⅓ of it's length (to allow for wood movement) and slide the ends into place. Check that the legs are 90° to the bottom of the main board, clamp, and allow to dry.

• Test fit your stretcher between the two braces, and once satisfied with the fit, slide it into place and secure it using the same countersunk dowel approach outlined above. You can add some visual interest to the top by doing the same thing. I chose to use three dowels, but one would suffice. If you wish, you can eliminate this step completely and have a 'clean' top by securing the stretcher to the top with a #20 biscuit instead.

• Chuck a ¾" round over bit into a router, and round the front and rear edges of the seat, stopping approximately 2" from each end.

• Using a sanding drum, round over the ends of the breadboards.

• Using a sanding drum shape a cove along the end-grain of the breadboard ends and across the top of the legs, extending about 1" to 1 ½" along the edges of the seat.

• Complete rounding over the rest of the breadboard ends.

• Sand your bench to 180 grit, then apply the finish of your choice. I used polymerized tung oil as it is easy to apply, relatively durable, and brings out the character in figured woods. I applied five heavy coats over as many days, wiping off any excess with a clean rag. Allow the finish to fully cure, and then apply a coat of wax.

This bench looks great outside on the porch, in a sunny garden spot, or even in your living room.

RYAN SHERVILL
www.rarewoodcreations.com

Photos courtesy of Lee Valley.

Winding Sticks

When levelling a panel with a hand plane, a pair of winding sticks will help you determine when the panel is flat and true. Winding sticks are two pieces of narrow wood sticks whose edges are perfectly flat and square. The sticks are placed on either end of the panel that is to be levelled. You then look down across the tops of the sticks. If the panel is not level, the tops of the sticks will not be parallel. With judicious hand planing and constant re-checking with the winding sticks you'll eventually turn the panel into a flat, level surface. It might sound like a lot of work, and it is. But it's enjoyable work, and when completed gives you a level of satisfaction that you just can't get from running the panel through a thickness planer. In an upcoming issue of the magazine we'll show you how to use winding sticks to level a panel like a pro.

– CWM

Leigh Super Jigs

Photo courtesy of Leigh Jigs

Do a bit of research over the Internet, or read reviews of dovetail jigs in any woodworking magazine, and you'll find that the Leigh DR4 and D1600 dovetail jigs are unanimously considered the best on the market.

The jigs are exceptionally well made, versatile, and easy to use – providing you first read the instruction manual. But with average prices of $519 and $369 respectively, they're pricey investment for the novice or part-time woodworker. That is until now. Leigh Industries has just introduced a new line of 'super jigs'.

The Super Jigs will feature the same high level of quality that you find on the DR4 and D1600, but at substantially reduced prices, and with a few new enhancements. The Super Jigs will come in three lengths, 12", 18" and 24", with street prices expected to be in the $199, $259 and $329 range. They will handle boards from 1/8" to 1" thick, a minimum through dovetail board thickness of 7/8" and a minimum half blind board thickness of 13/16". Leigh has made some minor design changes to enable these lower prices, without reducing product quality. The new body employs a 2-piece aluminum extrusion, the same as on the original D4, rather than the single extrusion found on the DR4 and D1600; the clamping surface is no longer machine textured, but uses non-slip tape; and the side stops are not machined in, but bolted on (with the added benefit of now being adjustable). As a bonus, with these new jigs you'll be able to easily make micro adjustable 5/16" and 5/8" box joints without using additional templates. The jigs come with a unique oval guide bushing – the 'E Bush' – that enables you to make fine fit adjustments (.001") on box joints (this replaces Leigh's Variable Template Guide Bush System); a reversible spacer for establishing the offset on half-blind and through box joints; and on-board instructions. There is also a new vacuum and router support accessory, the Leigh VRS, picks up 99% of the router chips, and provides exceptional router support. We'll be bringing you an in-depth review of the Super Jig and VRS in the near future. – CWM

For more information visit: www.leighjigs.com

Super Jig 12 with VRS

VRS close-up

BY MICHAEL KAMPEN

Spokeshave

The spokeshave looks somewhat like a drawknife, but performs more like a hand plane. Like the drawknife, it has two in-line handles, and as with the plane, it uses a cutting blade which projects from a short sole to regulate the depth of cut. Traditionally used to shape spokes for ships' steering wheels, wagon wheels and the like, shaves are still the tools of choice to shape and smooth convex and concave surfaces, and are a favourite tool of chair makers.

This is an easy and enjoyable project to make and a great way to use up some exotic off-cuts. Make the shave to suit your hand size. A blank of wood approximately 1" x 2" x 12" should be sufficient. You'll also need a blade and a couple of #4 flat head wood screws. Shaves can have flat, convex or concave soles – we'll make one with a flat sole. When choosing your wood try to find something that feels nice to the touch when finished and has a comfortable heft. This version uses bubinga for the handle.

• Mill the blank for the handle being sure that it is perfectly square.

• Using a pencil draw a centered line lengthways down the blank and place a mark on the front of the shave.

• Draw a line ⅜" in from the back top of the blank. Locate the tang holes along this line. It is vital that these holes be laid out and drilled accurately. Drill the hole so that it is just slightly larger than the diameter of the tang. Confirm the actual measurements with the blade you will be using.

• Turn the blank over and insert the blade so that the top of the blade is resting on the bottom of the blank. Use a sharp pencil to trace the outline of the blade onto the bottom of the blank.

• Extend the lines from the edge of the blade to the rear of the blank and use a square to extend these up the back of the shave. Mark a line, ¼" down from the top of the shave, between the first two lines. This defines the upper edge of the rear opening. The front edge of the blade defines the forward edge of the opening on the bottom. Use a saw to cut along the sides of the opening to the two depth lines.

• Use a sharp chisel to remove most of the waste between the two cuts. Clean up the remainder with a rasp and then a fine file.

• The tang ends of the blade are let into mortises on the bottom of the shave. The mortises must be slightly deeper than the thickness of the blade. The blade sits on two jackscrews at the bottom of them ortise. This allows you to adjust the blade a little.

• The simplest way to cut the mortise is to use a Forstner bit in combination with a fence on the drill press to remove most of the material, and then follow up with a sharp chisel to clean up the rest. If you use this method, be extremely careful when working on the rear of the mortise. The section of wood at that point is very narrow and can easily break away. Optionally you

can use a spiral bit in combination with a router fence and a couple of end stops on the router table. This will produce a flat-bottomed, clean cut that needs no further work.

• Test fit the blade to the handle. It should slide in smoothly and be slightly below the level of the wood.

• Drill two small pilot holes for the #4 screws that the blade sits on. Locate these half way between the tangs and the opening.

• If you plan on adding a piece of harder wood as a wear strip ahead of the blade, cut a mortise for this piece now and glue it in place.

• To complete the business end of the shave, use a stationary sander to bevel the area just ahead of the blade. This section, called the shoe, should slope away from the blade by one or two degrees.

• Shape both ends of the shave to fit comfortably in your hand while still giving you plenty of grip to control its movement. Use the template provided or experiment with your own version. Use band saw, scroll saw or fret saw to cut out the handle shape, and rasps and files to soften the edges and shape the handle. To provide a smooth surface, sand the handle using a sanding mop mounted in a drill press.

• Install the two #4 screws under the blade. Countersink the hole as the head must be able to sit flush with the surface of the wood.

• Install the blade and note how deep it sits in the mortise. Remove the blade and back out the screws until the blade just barely projects above the surface of the wood at the leading edge of the blade. Try the shave on some wood. When you are able to take a fine wisp of a shaving the blade is set correctly. By changing the angle at which the blade meets the wood, rolling the shave towards or away from you slightly, you can easily control the depth of cut. If the shavings pile up inside the opening, refine it gradually using a fine file. Proceed slowly, fitting the blade often and taking a few test cuts as it is easy to make the opening too large.

If you choose a softer wood for the handle stock, you will need to cut a recess into the handle ahead of the blade and glue in a small section of harder wood to prevent premature wearing of the shave.

MICHAEL KAMPEN
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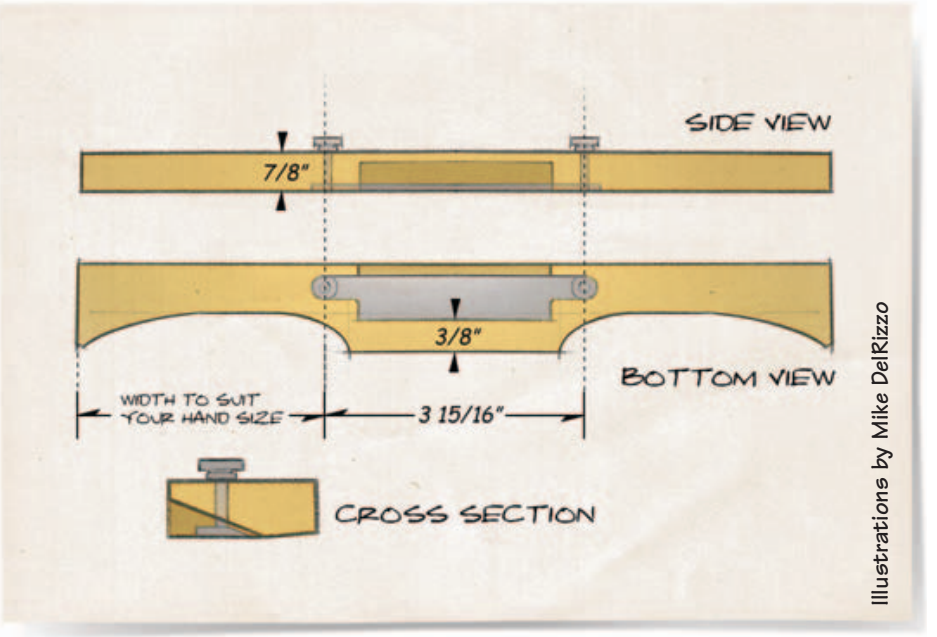
SUPPLY CHECKLIST

• 1" x 2" x12" stock • spokeshave blade
• two #4 flat head wood screws

HARDWARE SOURCES

SCREWS
www.HomeHardware.ca

BLADE
www.LeeValleyTools.com



Illustrations by Mike DelRizzo

Angled bed for blade

Shaves are Easy to Use and Maintain

Blade Installed

Keep it sharp. Even though spokeshave blades are quite small, they are easy to sharpen. Spray glue 400 grit wet/dry sandpaper to one side of a 1" x 2" x 10" block of wood and 600 grit paper to the opposite side, and secure the block in a vise. Skew the angle of the blade as you hone – this will reduce the chance of rocking the blade.

Cock the cutter. Try setting one side of the blade a bit higher than the other. Cocking the blade enables you to change your shaving thickness without adjusting the depth of cut: use one side of the blade for fine cuts and the other side for coarser cuts.

Push or pull. Use whatever is most comfortable and efficient for you. For either method, keep your hands toward the center of the shave, use light even strokes, and let the shave do the work.

Go with the grain. Shave with the direction of the grain to help reduce tearout and chatter.

Skew the blade. This will generate less resistance, particularly when working on curved surfaces.

Practice. Unlike with hand planes, it takes some practice to master a spokeshave. But stick with it, and you'll marvel at what you can do with this versatile tool.

skillbuilder BY MICHAEL KAMPEN

Routing Basics Part II

The router is one of the few tools that comes fully set-up and ready to go right out of the box. Insert a bit into the collet, set the depth of cut, and you're ready to start routing.

For most woodworkers, using a hand-held router is their first introduction to this incredibly versatile tool. The router is a loud and powerful tool and has gained a reputation of being dangerous; but with an understanding of the proper techniques for using this tool, and a healthy measure of respect, this can be one of the safest, most versatile power tools in the shop.

Think 'Safety' To Work Without Worry

Before using your router, make sure that you are wearing the right safety gear. Eye protection is an absolute necessity. A router removes a lot of dust and chips, and it ejects this debris with considerable force.

Adequate hearing protection is also mandatory. Routers are among the loudest of power tools in the shop and exposure to noise at this level will have a detrimental effect on your long term hearing. Whether you choose expansion-type foam plugs or full earmuffs, use them every time you use the router.

Keep your work area clear of all obstructions. Remove any tripping hazards from the floor area, and arrange your power cord in such a way that it doesn't interfere with the travel of the router. If the router has facilities for dust collection, hook up a dust collector or a shop vacuum to collect the chips – this will keep your work area clean and the majority of the debris out of the air.

Before you begin routing a piece of wood, look it over carefully. Locate any cracks or loose knots in the piece – these could shatter when the router bit contacts them, sending debris flying. Disregard such pieces and only use sound stock.

Inspect your router bits before you use them. Clean off any accumulated pitch and sawdust from the carbide edges, and the bearing if it is fitted with one. A clean bit will give a smoother cut with less burning, and the bit will both run cooler and last longer. Check that the screw holding the bearing in place is tight. If the bearing comes off in operation the bit will dig into the wood and could result in injury.

Practice – The Best Instructor

While a router table is a great accessory, there are still many operations that you will need to do while holding the router by hand. Understanding the relationship between the type of wood you are using, the characteristics of the bit, feed rate, depth of cut and bit speed will help you produce professional results. It's a good idea to practice using the router before you begin to use it on a project.

Speed Burns

Just as every species of wood has a unique appearance, each responds to machining with a router in its own way. Western red cedar routs easily, but produces a very fine dust that some people are allergic to, and because of the high silica content in the wood, bits dull very quickly. Routing walnut with a sharp bit is like passing a hot knife through butter. Cherry and maple respond well to the router, but to avoid burning you must use sharp bits and adjust the speed accordingly. You may even find that some boards from the same tree will burn more than others.

Give yourself room to correct any burning with the router by taking incremental (shallow) passes until you arrive at the final cut. If the piece shows a tendency to burn, adjust the speed and feed rate. Get a feel for how the wood responds by experimenting with an off-cut before using the router on a project.

Most new routers come with a variable speed control that allows you to adjust the RPM of the bit, typically from 10,000 - 25,000 RPM. If your router is equipped with speed control, use the slowest speed you can while still maintaining the quality of cut. Not only is a lower speed easier on the router and the bearings, but the bit will run cooler. At a lower speed the router will run considerably quieter and require less effort to maintain control.

Some bits should not be used in a handheld router. These are usually larger bits as well as some joinery bits that must take a full depth cut in one pass. You should only use bits larger than about 1" diameter in a router table.

Proper Routing Direction

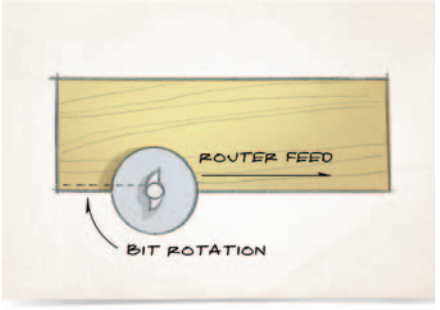
When freehand routing, the bit will be spinning in a clockwise direction. To maintain control of the router, move the router so that the feed direction is *against* the rotation of the bit. This moves the router along the work piece with a cutting action rather than allowing it to dig in and skip along the surface. When routing the outside edges of a frame or a panel, move the router in a counter-clockwise direction. If you are using the router on an inside opening, move the router in a clockwise direction.

On a router table you move the stock rather than the router, which is suspended upside down under the table. The bit will now be spinning in a counter-clockwise direction. Move the stock against the rotation of the bit – from the right to the left.

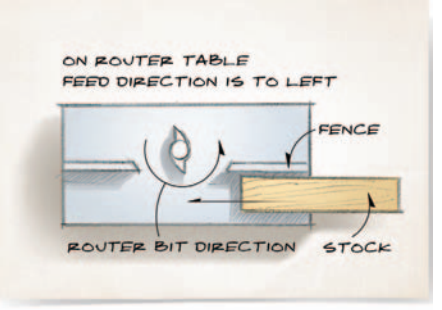
Climb Cutting

There are times when it may not be possible to move the router in the standard direction. Running the router over the work piece in the opposite direction is known as climb cutting. Moving the router in this direction changes the angle of the router bit to the wood. Instead of a cutting action it becomes more of a scraping action. In this case, the rotation of the router bit will want to pull the router bit out of the cut, much like the way the blade on a radial arm saw will want to climb out of the cut as you pull the carriage toward you.

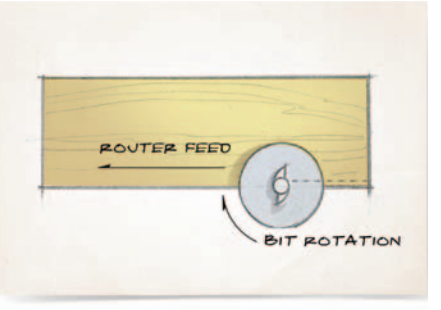
Typically you will use climb cutting to avoid tear-out . To achieve a clean cut on wood fibres, they must be under tension. If they are under compression the tendency will be for the fibres to pile up in front of the router bit until they break off, causing tear out. If you are routing a profile on an edge and the grain is running off the edge at an angle, you may need to climb-cut in from one edge to avoid tearing out the corner.



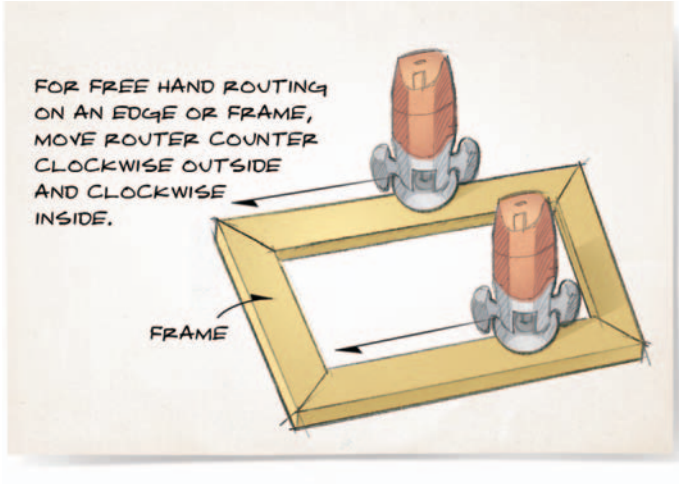
Standard feed direction



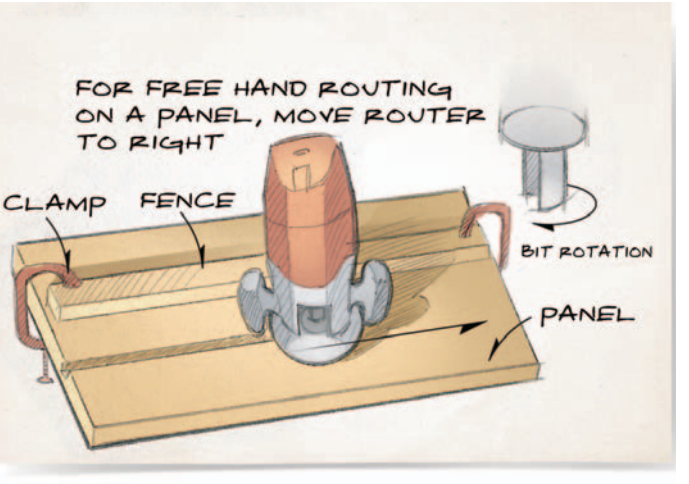
Feed direction on router table



Climb cutting



Feed direction on frame



Feed direction on panel

Dust collection is a must

Routing Tips

- Always wear eye protection and a dust mask.
- Unplug your router before changing bits.
- For the best cuts use clean, sharp bits.
- Connect your router to a shop vac or dust collector.
- Rout against the rotation of the bit (for freehand routing move the router counter-clockwise outside and clockwise inside; on the router table move stock to the left).
- Take multiple, shallow cuts.
- Use a constant feed rate.
- Adjust your feed rate for the type of wood, size of bit and speed of bit (if the wood is burning increase your feed rate; if the motor is straining slow the feed rate or reduce bit speed).
- Always use a fence or a ball-bearing piloted bit.
- Rout the ends of a board first, then the sides, to prevent end splits.

Blow dust off switches

Climb cutting is probably the most dangerous operation you will perform with the router, but there are ways to perform the operation safely. Clamp your work piece securely to the work-bench, adjust your depth of cut to take light passes, and maintain a firm grip on the router. Approach the cut with the expectation that the router will want to run away into the cut, so be prepared to hold a steady feed rate against this pull.

Set the Depth of Cut

Before turning on your router, set the depth of cut. When cutting a profile on an edge, set the depth so that the first cut removes about 30% of the material. This first run through all of the pieces will give you a feel for how the wood is responding to the bit. Based on the feed-back, you can either proceed to a 90% cut followed by a light finishing pass, or change the feed direction and take shallower cuts to compensate for any problems. Taking shallow cuts will also help reduce burning and chipping.

Maintenance

Routers operate at very high speeds and generate a lot of heat. The most important thing to remember is to keep your router clean. Most routing operations generate a fair amount of debris, some of which will find its way into the motor. To keep the router running cool, a fan attached to the armature will direct air over the inner sections of the router, typically drawing air in at the top and exhausting it at the bottom. As debris becomes lodged in the router, the cooling flow of air is restricted and the temperature begins to rise. The only insulation on the copper windings of the electric motor is a thin layer of varnish and if the motor continually runs too hot, this varnish will begin to break down and eventually fail.

Variable speed routers now dominate the market and the speed control is achieved using electronics on a small circuit board that is mounted under the external housing of the router. To set the speed you either adjust a rotary dial or slide a multi-position switch to the correct setting. When cleaning up your router after using it, use compressed air with a blowgun to direct air into these areas. Be sure to wear hearing and eye protection when using compressed air.

Inspect your brushes; replace when worn out

Not only will dust interfere with the proper electrical operation of the router, many of the adjustments and controls are mechanical and an excessive accumulation of dust can cause problems there as well. Because the router runs at such high speeds, the bearings are subject to heat build-up as well. As fine dust begins to accumulate around the bearings they will run hotter than they should. When the build-up becomes critical, the bearings will fail and will have to be replaced.

Keep the columns on a plunge router free of any dirt and debris for a smooth plunging action. If your router is equipped with a rotating depth stop, watch for accumulations of dust under the mechanism that could lead to erratic operation.

Keeping your router clean will help prolong its life. If you do notice excessive sparking on the armature or if there is a noticeable drop in power and/or a change in pitch from the motor during use, you may need new brushes. Depending on your router, this may be something you can easily do yourself, or you may need to take it to a service centre. If your router has easily accessible brush covers you should be able to do the job yourself.

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In Routing Basics III we will be looking at router bits.

SOURCES

ROUTERS/ACCESSORIES

www.BusyBeeTools.com
www.HomeHardware.ca
www.HouseofTools.com
www.LeeValley.com
www.Woodline.com
www.Sharpco.ca
www.WelbeckSawmill.com
www.MarksMach.com
www. MorelyMillerMachinery.com
www.TegsTools.com

woodworkersgallery

Projects featured in the woodworkers gallery are chosen by our woodworking forum members.

Tony Belbeck has always had a dream to design and build a bar, one worthy of handing down as an heirloom. Although he has never visited England, it is his heritage, and he drew on that heritage when he designed this project.

The bar consists of 13 pieces, connected to each other with screws and dowels to complete a transportable unit measuring 84"H X 78"D X 118" L . It is made of solid walnut and maple, walnut and maple veneers, Hungarian ply, and wiggle board. The doors, trim, bar top and rails are in solid walnut, and the plywood framing trimmed with solid maple. The dark cherry finish was applied by 'Dave95v6', a fellow member of the Canadian Woodworking forum.

The curved surfaces are comprised of two to three layers of ¼" wiggle board laminated together, veneered on both sides with a paper backed maple veneer using contact cement, and topped with a solid walnut trim. The curved doors also have a hardwood trim to give rigidity and strength, and to allow acceptance for the hinges.

The bar top is made from a double layer of ¾" plywood glued and screwed flat, with a book matched walnut veneer top. It has an acrylic 'mirror coat' finish. The Elephant bar rail was coved (top side) on the table saw including the solid round corners.

The back bar mimics the front bar in design, complete with rosettes made on the drill press and expanded with a router and template guides. The fluted pilasters are made with a ½" round nose bit and sit on 7" plinth blocks. The cupboards doors are a five piece solid walnut raised panel construction, complete with European hinges.

Because glass moulds are very costly to make Tony designed the upper showcase around the curve of the bent glass doors. The canopy is built in two sections. There is a hidden seam down the middle among the raised panel rails, and held tightly together with six counter bolts. The subtle lighting inside the canopy illuminates the stained glass and really brings out that old English pub feeling.

Log on to our web site to see the work of other readers and to submit photos of your own work:
www.canadianwoodworking.com

–CWM

You can see blueprints and more pictures of this bar at:
http://www.canadianwoodworking.com/forum/vbpicgallery.php?do=view&g=162

scroll project BY GARNET HALL

Chickadee

One of the most distinctive bird calls is that of the Chickadee. It's wonderful to hear them calling "Chick-a-Dee-Dee-Dee" to each other as you walk through the woods.

There are two species of chickadees found just about everywhere across Canada – the Boreal Chickadee and the Black Capped Chickadee. Both have a characteristic dark cap and bib with white cheeks. They don't mind the company of people and often frequent feeders. They are not overly aggressive and are often in the company of other birds.

Most intarsia projects start with ¾" material, but for these little guys, I used ⅜" stock for the bird in the back and the tree, and ½" stock for the bird in the front. The finished project measures 14" x 11½", and consists of 59 pieces.

Here are some things to keep in mind when working on your project.

• Careful consideration of the colour, texture and pattern of the wood you use in intarsia is important. Most of the colours in this project are straightforward, but shades can vary to some degree. The light, medium or dark shades specified in this project should vary in relation to each other.

• Transfer the pattern to the wood, using either the template or pattern glue-on method.

• For the template method use spray glue to attach the template onto some thin material such as ⅛" MDF. Use the template pieces to trace onto the wood.

• Cut out all the pieces with a thin blade, such as a #0 or #2/0.

• The smaller the kerf the tighter the fit you will get.

• You can also photocopy the pattern, in which case you will need five or six copies.

PATTERN LEGEND

- 4" x 12" Aspen
- LT (light shade) – Light western red cedar
- M (medium shade) – Medium western red cedar
- MD (medium dark shade) – Medium dark western red cedar
- B (black) – Black walnut
- G (green) – Poplar
- 0 (open backing) – ¼" Baltic birch plywood

GRAIN DIRECTION/THICKNESS

- Frame – ¾"
- L – lower to ⅜"
- L1 – lower to ¼"
- R – raise to ⅝"
- The bird furthest away is ⅜"
- The black lines on the tree branches are burnt in with a wood burning tool

⟷ Grain direction

SOURCES

LUMBER	www.WoodShedLumber.com
	www.BrantCustomWood.com
INTARSIA SUPPLIES	www.LeeValley.com
INTARSIA PATTERNS	www.Sawbird.com

• Cut the pieces off the pattern and spray glue them onto the wood.

• Take your time when cutting out the pieces on your scroll saw. The more careful you are the better the pieces will fit. The wood you are cutting is thin, so you can use a small blade, #3 DT/R or P/S. You could also go as small as a #1 hook tooth blade. The smaller the kerf the better the fit will be. Make sure your blade is square to the table and follow the line.

• Once you have all the pieces cut out, assemble the project to check the fit. The pieces should fit reasonably well. A business card makes a good gauge for checking the fit between pieces.

• A light box and spindle sander can also be useful for the fitting. I made a simple light box on which I assemble my projects. This enables me to easily see any gaps and mark where I need to sand or cut down a piece.

• There isn't much raising and lowering in this project. It requires so little material, you can easily size the material before you start. Use a Flex sander to make hand shaping and sanding easier.

• The shaping is a very creative part of any intarsia project. The more effort you put into it the better your project will look. Give the birds and the tree a rounded look. Sanding up to 220 grit is sufficient.

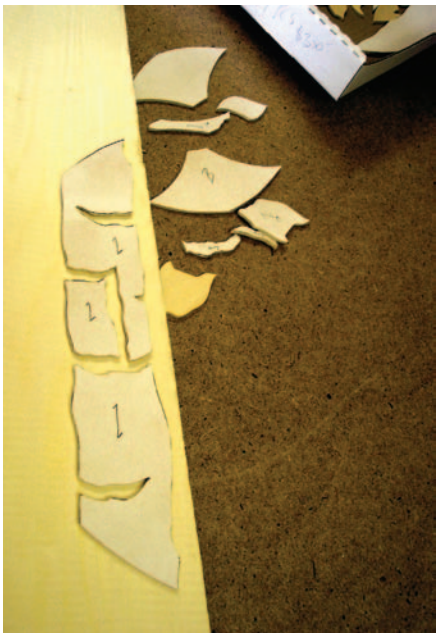
• Use 1/4" Baltic birch plywood for the backing.

• Glue the project up using ordinary carpenter's glue.

• Lightly sand the project, clean off the dust, and then apply at least two coats of your favourite finish (one coat is sufficient for the back of the project). On this project I used Old Masters satin spray finish.

• Attach a hanger and you are done.

GARNET HALL
www.sawbird.com



Trace template pieces

Garnet Hall gives readers permission to make up to eight copies of this pattern for personal use and not for resale.

Belt Sanders

I consistently stress to my woodworking students the importance of using hand planes for fine woodworking. Nothing can get a surface quite as flat, not even sanding. However, hand planes take a great deal of skill to use, never mind learning how to tune and sharpen them. I wouldn't call a belt sander a replacement for a hand plane by any stretch. But if your main need for a hand plane is to flatten glued-up panels, you just might get by with a quality belt sander and a sanding frame.

A belt sander is handy for all kinds of general DIY work as well. If you need to grind something down in a hurry while building a deck or fitting some rough carpentry work, the belt sander might be the best tool. You can also use it for other grinding jobs like sharpening metal tools, so it's not just for wood. Let's take a look at the features you should look for in a belt sander.

Weight and Power

You don't need tremendous power for most sanding jobs, so I wouldn't put this high on my list of needs. Of course, more power at the same price is always nice, so it's still useful to compare motor amperages from one model to another. You'll find amperages ranging from as little as 6 and as much as 10 or more.

As for weight, this is one tool where I don't mind a little extra weight because I use a belt sander mainly in the horizontal position. Weight isn't such a bad thing if you're trying to hog down some badly misaligned panel boards. On the other hand, if you do a lot of home renovation type work and might need to use a belt sander vertically or even overhead, then pay attention to the weight ratings. A 12 to 15 lb. machine will be very tiring when used vertically, compared to a sander 10 lb. or less.

Size

While there are some different sizes out there, most belt sanders fall into two sizes: 3" x 21" or 4" x 24". (Note: belt sanders are categorized by the size of the sanding belts they use, as measured by the width and length of the belt.) Replacement belts for both belt sizes are readily available. Personally, I own and prefer the 3" x 21" size. While the 4" x 24" model will make quicker work of a large panel, it is a much larger machine. Aside from additional weight, it is just a little cumbersome for my taste. Choose the larger model if you are going to use the tool to level large panels and you want a really heavy, industrial machine. Choose the smaller model if

you're likely to use the machine in a wider number of circumstances and especially for any vertical or free-hand on-site work.

Variable Speed

The older belt sander I own has only one speed: 1100 feet per minute (fpm). For the limited use my sander gets, it has always served me well. Many models now have variable speed, which can range from about 500 fpm to about 1500 fpm. Some models have two distinct speeds, while others have a dial to give you any in-between speed that you want. Having variable speed is useful if you will use the sander on a wide variety of materials. What might work well on hard maple could be too aggressive on pine. If you work primarily with hardwoods, a single speed machine working at the mid to high end of the scale will work just fine. Take the variable speed option if the price isn't much more. But if your budget is tight, a single speed will still fit the bill. You can still control the aggressiveness of a single-speed sander by changing to a finer grit belt.

Belt Changing and Tracking

Take a close look at the machine you're considering and how the belts are changed. Most belt sanders allow you to change belts very quickly and easily by pulling a lever to take the tension off the belt and pushing it back in to re-tighten. After putting the new belt on, you'll also have to track the belt, much like tracking a blade on a bandsaw. Some machines say they have automatic tracking, while others have a knob that you turn until the belt stays in the middle of the platen (the metal plate that supports the belt between the rollers). Manual tracking isn't a big deal – turn the knob one way and the belt starts to move to the left. Turn the knob the other way and the belt moves right. Run the belt sander upside down while you turn the tracking knob and you'll have it tracked in the center in just a few seconds.

Dust Collection

If there's one thing a belt sander does well, it's to produce a lot of sawdust. While no belt sander will catch all the sawdust, many do a respectable job of collecting dust in an on-board dust bag or canister. Make sure the bag is large enough that you don't have to empty it too often. Once the bag is over half full, it isn't as effective. You should also look at how easy it is to remove the bag and reattach it to the machine. Some belt sanders even allow you to remove the bag and connect a shop vacuum hose directly to it, so that is worth looking at if you plan to use it often.

Black and Decker DS321 - $99.99
6 amps, 800 ft/min, 8.25 lbs; Two year warranty
Features: low profile design, flush sanding, retractable hood exposes top of belt, three position handle, single action belt release, belt tracking adjustment knob, lock-on button. Includes: medium grit belt, dust bag
www.blackanddecker.com

Bosch 1274DVS - $259.00
6.6 amps, 550-1,100 ft/min, 7.1 lbs, One year warranty (30 day satisfaction guarantee). Features: graphite platen protector pad, removable front handle, flush sanding, single action belt release, belt tracking adjustment knob, replaceable wear inserts. Includes: cloth dust bag, graphite platen pad, one belt
Accessories: sanding frame, stand, fence, airsweep hose **www.boschtools.com**

DeWalt DW433 - $239.00
8 amps, 850-1,400 ft/min, 12 lbs, Three year warranty
Features: all metal housing, three wheel design, dust collection shut-off, 2 position front handle, top exit cord, rubber grips. Includes: sanding belt, dust bag
Accessories: vac adapter, sanding frame and inversion stand
Also available in a kit with sanding frame
www.dewalt.com

Hitachi SB75 - $220.00
8.7 amps, 1,180 and 1,475 ft/min, 10.8 lbs, Five year warranty
Features: dust sealed bearings, flush sanding
Includes: dust bag, one belt
www.hitachipowertools.ca

Makita 9903 - $275.00
8.8 amps, 690-1,440 ft/min, 9.5 lbs, One year warranty
Features: 85dB level, electronic speed control, auto belt tracking, flush sanding, front grip, 16.4' power cord, double insulated
Includes: dust bag, one belt
www.makita.com

Milwaukee 5936 (4" x 24") - $379.00
10 amps, 1,400 ft/min, 14.5 lbs, Five year warranty
Features: 8' power cord, double insulated, centered weight for optimum balance and control, flush sanding, single action belt release
Includes: dust bag, one belt
www.milwaukeetool.com

Porter Cable 352VS - $279.00
8 amps, 850 - 1,300 ft/min, 10.75 lbs, Three year warranty
Features: fingertip belt tracking knob, flush sanding, single action belt release, centered weight for optimum balance and control
Includes: dust bag, one belt
www.porter-cable.com

Ridgid R2720VS - $199.00
10 amps, 800 - 1,500 ft/min, 10.5 lbs, Three year warranty (lifetime service agreement)
Features: fingertip belt tracking knob, flush sanding, single action belt release, soft start, die-cast construction, 3 position pommel handle, easily accessibly brushes. Includes: dust bag, one 80-grit belt, hex key
www.ridgid.com

Craftsman 25722 - $119.99
6 amps, 800 ft/min, 8.25 lbs, Two year warranty
Features: three position handle, retractable hood exposes top of belt, dust vac adapter, flush sanding
Includes: dust bag, one belt, vacuum adapter
www.sears.ca

Skil 7500 (3" x 18") - $69.00
6 amps, 1,050 ft/min, 8.2 lbs, Two year warranty (home use – over the counter exchange)
Features: auto belt tracking, micro filter dust canister, flush sanding, soft grip, lock on power switch
Includes: dust canister, one belt, vacuum adapter
www.skil.com

Ryobi BE321VS - $119.00
5.4 amps, 755 - 1,148 ft/min, 7.9 lbs, Two year warranty
Features: electronic variable speed, straight line design for optimum balance, flush sanding, single action belt release
Includes: dust bag, one belt
www.ryobitools.com

SOURCES (Unless noted otherwise, all sanders are 3' x 21")

www.BusyBeeTools.com
www.HomeHardware.ca
www.HouseofTools.com
www.WellbeckSawmill.com
www.MorleyMillerMachinery.com
www.TegsTools.com

Design and Comfort

Don't underestimate comfort in hand operated power tools (and that includes decibel ratings). You might use a belt sander for a good stretch of time, so be sure that it feels comfortable in your hands. Pay particular attention to the shape and location of the handles and switches. Some models have handles that can be set to several positions or even removed to get into tight spaces. Also, look for a button to lock the power on. It's annoying to have to hold the trigger for long periods of time. And remember to make sure the machine is turned off before you plug it in. Unless you're at the starting line of a belt sander race, these machines can do a lot of damage in a short time.

You'll find that most belt sanders have one or both sides completely flat, allowing you to sand right up against a vertical surface. Some have a three-wheel design, allowing a larger platen in between the front and rear wheels. This gives a larger usable sanding area at any given time.

Sanding Frame

One accessory that I consider essential is a sanding frame. It is a frame which holds the belt sander just above the work surface. Turning a dial gradually lowers the sander towards the surface. So by barely touching the surface, the frame allows you to sand just the high points within the sanding frame area. The larger footprint of the frame makes the belt sander work more like a hand plane, in terms of flattening ability. The frame also prevents tipping and gouging. This accessory is so important to me that I wouldn't purchase a belt sander that doesn't have a sanding frame available. For construction type work, you won't need it.

In Summary

Belt sanders are simple machines and they don't vary from one model to another quite as much as other tools. Still, be sure to buy one that is comfortable and suitable for your needs. Above all, buy the best quality you can afford and the sander will give many years of good service.

HENDRIK VARJU
www.passionforwood.com
info@passionforwood.com

Looking for tools for your shop? Upcoming coverage includes:

- Drill Drivers
- Wheel Grinders
- Finish Sanders

BY DAVID BRUCE JOHNSON

Intaglio Revisited

"Intaglio", the reverse of "relief" carving, is an age-old carving technique. It involves carving everything below the surface of the wood. In other words, intaglio is carving negative rather than positive shapes.

Conceptually, intaglio seems complex. In practice, however, it is quite straightforward. One has only to remember the following guideline: the most distant features are carved first and shallow, while features in front are carved last and deep.

The familiar technique of "chip carving" is a form of intaglio. In its traditional form, "chip carving" is done with a knife and involves the creation of precise flat-sided shapes in symmetrical patterns. In contrast, I have found great pleasure in pieces, like this project, that are comprised exclusively of curved surfaces made with a variety of gouges. The manner in which these curved surfaces reflect light results in a delightful optical illusion that cannot be achieved with chip carving.

Preparation and Analysis

For this project use a 6" x 6" piece of basswood. I used a piece that was ½" thick although ¼" would have done just as well. To provide superior contrast on the finished carving, paint the surface with black gesso and let it dry thoroughly. Then, trace the pattern onto the painted surface. I positioned the pattern diagonally across the board to make better use of the available space.

Before starting to remove wood, closely examine the pattern to determine what elements are furthest away from the viewer and which are closest. In this project, the stems of the plant are furthest while the flower heads are closest. To ensure everyone is seeing the same thing, the second furthest part is the stem of the treble clef.

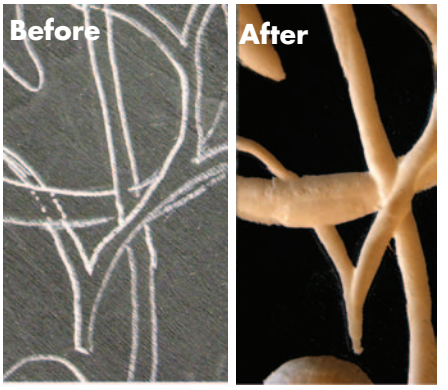
Paint surface then trace pattern

Carve in Layers

This project has several layers: the plant stems in the rear, the thin stem of the treble clef, the wider parts of the treble clef, the plant/leaf stems in front of the treble clef, the leaves, and the flowers. Each of these layers should be carved in

Plant stems are furthest from viewer

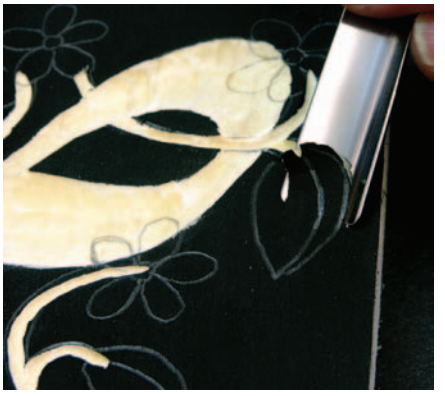
Stem of treble clef is second furthest



Most complex area demands layers

Carving with precision is essential

Wide areas require multiple passes



Carve top half of leaf with #8 gouge

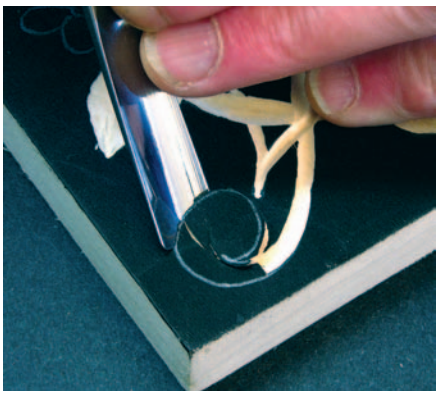
Carve bottom half of leaf with #9 gouge

This leaf shows the intaglio illusion

Use a #11/3 gouge for greatest depth

Carve petals from both ends

Make precise edges with #9 gouge



Carve tail with a twist of the gouge

Drill the flower centers

sequence. Also, as the carving progresses, the features come closer to the viewer and must be carved deeper. I used #7, #8, #9 and #11 gouges. The importance of multiple depths is most evident at the bottom of the treble clef where several layers overlap.

Remembering our guideline to carve the most distant part first and shallow, use a #7/5 gouge to carve the small portions of plant stem that pass behind the treble clef. This is an excellent exercise in carving technique – one must keep both points where the gouge emerges from the wood on its pencil line. Use the same gouge with the same precision to carve the second layer – the thin stem of the treble clef. Carve the wide stems of the treble clef with a #8/14 gouge. Because the width of the feature is wider than the gouge, a number of passes will be needed.

The twining plant, with its leaves, stems and flowers, is perhaps the most striking element of this intaglio project. As such, each part requires special attention. The leaves are made in two layers. First, carve the upper half of the leaf with a #8 gouge. Then, use a #9 to carve the bottom half using the central vein as the upper edge of the cut. This is a perfect example of the "intaglio illusion" – because the bottom half is carved deeper, it looks closer to the viewer.

After finishing the leaves, the stems are incised using a #11/3 gouge. This gouge has a round bottom with pronounced straight and vertical sides. One objective is to make smooth transitions from the #7 or #8 cuts made earlier.

PATTERN

Finally, the flowers are added. Each individual petal of every flower is also made with two cuts – one from each end of the petal. This is necessary because many of the petals are aligned with the grain. Attempting to "scoop" out the petal along the grain would result in the undesirable and uncontrolled removal of a large chip.

Finishing Touches

To make a good impression, a few elements benefit from some special attention. Where features overlap, (i.e. where a #8 gouge cut across a #7 feature), use a small #9 gouge to sharpen the edge. To make the treble clef's tail, twist your #8 gouge in a circle. Finally, use a small drill (or a Dremel tool) to make the centre of each flower. A deep hole will look totally dark while a shallow hole will look like a button.

I always like to seal the finished piece to prevent any unexpected cracking. For that purpose, I use a lacquer finish. Of course, there are many options like wax or oil. The most important thing is to preserve your masterpiece for posterity's (and enjoyment's) sake.

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BY GRAHAM MCCULLOCH

Lithium-ion

The Newest Cordless Tool Power Source

Just over two centuries ago we were able to harness electricity and save it in a container for later use. These containers were called batteries and their first form was a cumbersome voltaic pile of silver and zinc.

Such batteries were the start of a long trek by scientists and inventors to cut the electrical umbilical cord, and to provide consumers and industry with the highest capacity power in the smallest possible package. There were also a lot of other issues that had to be solved along the way, including managing high voltage, recharging times, and long service cycles.

First Off the Block - Nickel Cadmium Batteries

Nickel cadmium (NiCd) batteries have been around in one form or another for the past 100 years. Re-chargeable nickel cadmium batteries were the first promise of a cordless tool industry. However, the first nickel cadmiums were plagued with problems. They had a very short shelf life, a limited number of service cycles (number of recharges) and they had 'memory' problems (i.e. batteries would not fully recharge if they had not been fully drained prior to recharging).

Porter Cable Big Ten portable drill, 1962

In 1962 Porter Cable became the first tool company to introduce a cordless drill, powered by a 10 Volt nickel cadmium belt-pack. In 1989 Porter Cable introduced the first 12 Volt nickel cadmium cordless drill with a removable battery pack. The race to produce cordless tools was on.

NiCd batteries have improved significantly over the years, and are still a standard power source for cordless tools. NiCd battery packs consist of a quantity of 1.2 Volt cells that are bundled into a shape and total voltage to suit the individual tool manufacturer. For example, there are 15 cells in an 18 Volt battery pack.

Most tool manufacturers offer nickel cadmium batteries that are in the 2.0 to 2.2 mAh power range in their 18 Volt configuration. (mAh stands for Milliamp Hour, a technical term for how much power a particular battery will hold.) Bosch offers an 18 Volt battery pack that provides a 2.4 mAh rating, which is exceptional for a nickel cadmium battery pack.

New Kid on the Block - Nickel Metal Hydride

The early 90s brought a somewhat controversial new technology called Nickel Metal Hydride (NiMH), with only a handful of tool manufacturers adopting this new power source (Black & Decker, Fein, Makita, and Panasonic). NiMH rechargeable batteries offered a more constant torque from initial full charge to full discharge, and provided up to 40% more power than NiCd batteries. However the cost for this additional power was a reduced battery life (fewer service cycles) and a higher cost per battery. NiMH battery packs are less prone to memory problems than NiCd batteries and require a longer charge time to avoid overheating.

Bosch Blue Core NiCd showing individual cells

An unused healthy NiCd battery pack will self-discharge to about 10% of its power in 10 to 20 weeks, while a NiMH battery pack will self-discharge at a slightly lower rate. Discharge rates are dependent upon the ambient storage temperature of the battery packs.

The NiMH battery packs consist of 1.2 Volt cells in just about the same size configuration as nickel cadmium batteries and the weight of the cells is just about the same.

Bosch NiCd battery

Porter Cable first 12 Volt cordless drill, 1989

Enter The Age of Lithium-ion

2006 saw the introduction of a new era in cordless tool power – Lithium-ion (Li-ion) batteries. Li-ion battery packs offer significant advantages over the previous two power sources: lighter weight cells (up to 50%), higher voltage cells (up to 3.6 Volts) , higher amperage, flat discharge rate, and virtually no self discharge (+/-10%) even after nine or more months of being left idle. The flat discharge rate has prompted companies such as Milwaukee and Ridgid to include a 'gauge' on the battery pack for easy monitoring of battery drainage. With only 5% of the full charge left, you may notice a slight drop in power.

Milwaukee was the first cordless tool manufacturer to utilize the Li-ion power with a 28 Volt cordless tool platform. To achieve this, Milwaukee was able to configure their Li-ion cells to contain 4.0 Volts. DeWalt followed with a 36 Volt series which they claim provides corded power without the cord. The 36 Volt batteries weigh the same as 18 Volt nickel cadmium batteries.

Lots of manufacturers are now using Li-ion batteries. Milwaukee has introduced an 18 Volt Li-ion battery that is reverse compatible - all existing Milwaukee 18 Volt cordless tools will be able to operate on lithium ion power. However, a new one-hour charger will be required. Ridgid is offering dual-voltage cordless tools that will run on their newest 2.5 MAh NiCd batteries or on their new 24 Volt Li-ion batteries.

The contractor or serious woodworker can now have a full-size 7 ¼" circular saw that is battery powered and has the same level of power that you would get from a corded circular saw.

Some Li-ion tool manufacturers even offer warranties such as five years or 2,000 charges. How do they know how many charges have been made? They incorporate a chip in the battery pack that will provide the initial charge date and then continue counting. The chip also looks for trouble areas and even battery abuses.

Li-ion battery packs are more expensive than NiCd or NiMH batteries at the moment, but as more and more tool manufacturers change their platforms, these prices will become more reasonable. One other major advantage of Li-ion technology is that these more powerful (and lighter) battery packs can power a whole new range of cordless tools including rotary hammers, portable bandsaws and even automobiles (see www.teslamotors.com).

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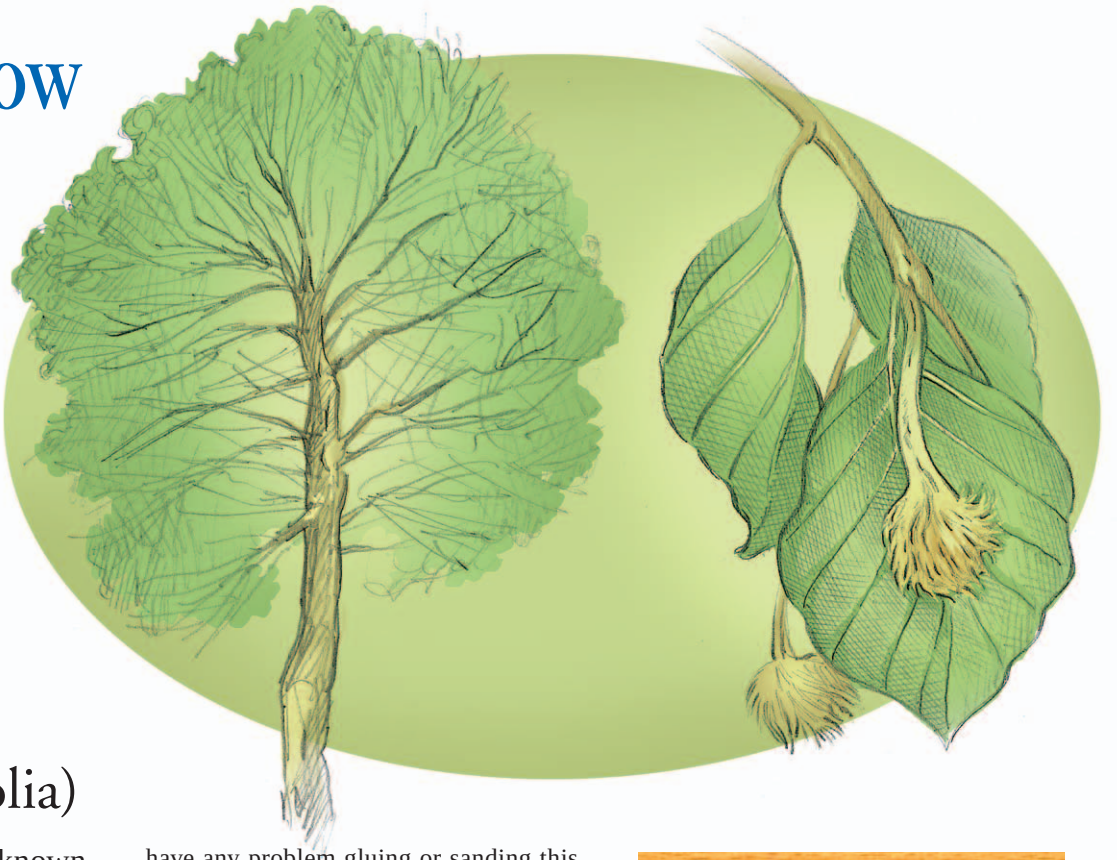

Beech
(Fagus grandifolia)

Only one of the 10 known species of beech is native to Canada. It grows from the southernmost part of the Great Lakes into the St. Lawrence Forest region and the Acadian Forest. When left to mature beech grows up to 80' with diameters of up to 4'. Of course, most trees that make it to market are much smaller. You'll find beech interspersed with other hardwoods such as maple and birch. Whether referred to as American, White or Red Beech, you'll know it as the tree with smooth, skin-like silvery gray bark, great for vandals of all ages to carve their initials into.

Characteristics
The wood is generally straight and tight grained with conspicuous rays. However it isn't uncommon to come across interlocked grain. The sapwood is white and the heartwood is pale to reddish brown. Unlike oak, but like birch, it is diffuse-porous (the vessels are smaller and spread evenly throughout the sapwood).

Working Properties
If tools are sharp beech works well with both hand tools and machinery. You won't have any problem gluing or sanding this wood, and if you pre-drill, screw penetration and holding power won't be an issue. The wood is excellent for steam bending. It accepts stain well and takes a good finish. It does have a tendency to warp when subjected to dramatic changes in shop humidity, and you may also notice surface checking and end splitting. Be sure you allow for adequate seasonal wood movement when using this wood for furniture projects.

Physical Properties
Beech is a heavy, hard and strong wood that has a high resistance to shock and good resistance to abrasive wear. At 12% moisture content it has a specific gravity of .64 and a weight of 45 pounds per cubic foot.

Uses
It's widely used for flooring, millwork, paneling, and various woodenware such as brush and tool handles, toys, and turnings. While it's entirely suitable for furniture it doesn't have the status of the more sophisticated native woods like cherry and walnut. With wear, beech becomes glossy, making it ideal for drawer sides and runners. It is particularly suitable for food and liquid containers since the wood has no odour or taste, which is why it has been traditionally used for snuff boxes and butcher blocks. For generations it was the preferred wood for making hand planes. Expect to pay about $5 per bf for 4/4 select and better lumber. – CWM

Beech

Shrinkage

Moisture Content	0%	6%	20%
Tangential	11.9	8.8	3.7
Radial	5.5	4.1	1.7
Volumetric	17.2	13.0	5.4

Use It For
Tools and tool handles, toys, turnings, drawer sides, drawer runners, steam-bent parts

Get it From
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Installation from HELL

Illustration by Mike DelRizzo

Last issue I spoke of "Projects from Hell". I'm sure we have all had projects in which nothing has gone right. Often, those projects end up in the scrap heap or in the woodstove. Sometimes, in spite of all the problems, it is necessary to use the project anyway. Then, there it sits, lurking there, just waiting for you to accidentally glance over and notice it once again. It will haunt your every waking hour and cause you shame if ever you drop your guard and think about its myriad flaws.

And yet, it's quite likely that you are the only person who would ever see the flaws and mistakes. In fact, you're probably the one who will draw other people's attention to them in the first place.

One such project of mine was something magnificent, a newborn beauty to behold. A creation that I could justly be proud of. That is, until it came time to install the thing!

At the time I was living in the Far North and owned a custom furniture shop. I was willing to take on any project that was brought to me, whether it be a full size carousel horse or a funeral urn for a lady's husband. (Unfortunately, I made the lid a little too tight, and when she pried the lid off to disperse the ashes, they swirled in her face and covered her from head to toe in a gritty grey cloud. She wasn't happy combing her husband out of her hair – but that's another story).

One day the manager of a local electronics store brought over a set of blueprints and asked if I could put together a bid on supplying him with a series of display shelves, cupboards and a cash counter. The plans had been drawn up by the store's national headquarters and were clearly the work of someone not even remotely familiar with woodworking, although the draftsman may have once seen a picture of a tree - from a distance. But that's as close as he ever got to the building industry.

Dimensions of various units were such that they would maximize wastage of material – panels that were one or two inches larger than the width or length of a standard sheet of plywood; solid wood edging precisely thick enough that I would have to plane more wood away than I would be left with; and custom arborite that would unerringly place a seam where it would be most obvious and likely to get damaged.

The culmination of his ineptness was a lovely, slant-topped cabinet that was a full two-and-a-half inches wider on the inside than it was on the outside. I looked it up and nowhere do the Laws of Physics cover such a possibility. One 16 foot cabinet needed to be placed between two concrete pillars and would be accessible from either direction by eight doors ranging along either side. The manager insisted, against my heartfelt urgings, that he would take all the dimensions necessary and fax them to me. Against my better judgment, I agreed.

I prepared my bid with an extremely healthy profit built in to cover any further surprises, and to my utter astonishment it was accepted. After a few weeks of work, I announced that the units were complete and ready for inspection prior to pickup. It was at that point I was informed that I was to deliver, and then install the units myself. It was for situations exactly like that that I had so heavily padded my bid – which didn't stop me from carefully explaining

that delivery and installation would be extra. The client couldn't really kick since he could readily see just how nice the units looked while sitting in my shop and not in his store.

Early Sunday morning, using a borrowed flat-bed truck with a mobile crane, I delivered the units. All went well and the store was beginning to look good until it came time to install the long unit. Using the crane, I carefully lifted the unit off the truck and lowered it safely to the carts I had specially made for it. Seven of us wheeled it into the store after first removing all of the door handles from the unit, as I had forgotten to consider the doorway's width.

We carefully maneuvered the unit and slowly edged it between the pillars. It slid into place beautifully with barely a quarter inch to spare until it was in about six inches. And there it jammed solid. I measured the space and compared it to the measurements I had been faxed. Everything tallied on this side of the pillars. The other side was a different matter entirely. The posts had originally been poured with a slight twist to them and one side was a good ¾" narrower than the other.

While I was double-checking the measurements, the manager and assorted underlings unsuccessfully tried to bend, warp, and/or move the concrete pillars enough that the unit would slip into place. They had little luck so they sent for a sledge hammer and some cold chisels. It was at that point that I washed my hands of the whole job. Three hours of chiseling away 75-year-old concrete, some judicial slams of a 12 pound sledge hammer, six men jumping on the counter top and the removal of one end panel and the unit slid neatly into place with not a single door of the 16 aligned with any other. A few were never opened again.

The store's grand opening was held five days later and the press and assorted dignitaries were invited. As was I, much to my surprise. I declined politely and demanded, in writing and duly notarized, the solemn promise that they would never, ever, reveal the identity of whomever it was that built that unit.

DON WILKINSON
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crosswood

BY MEL SEVINDIK

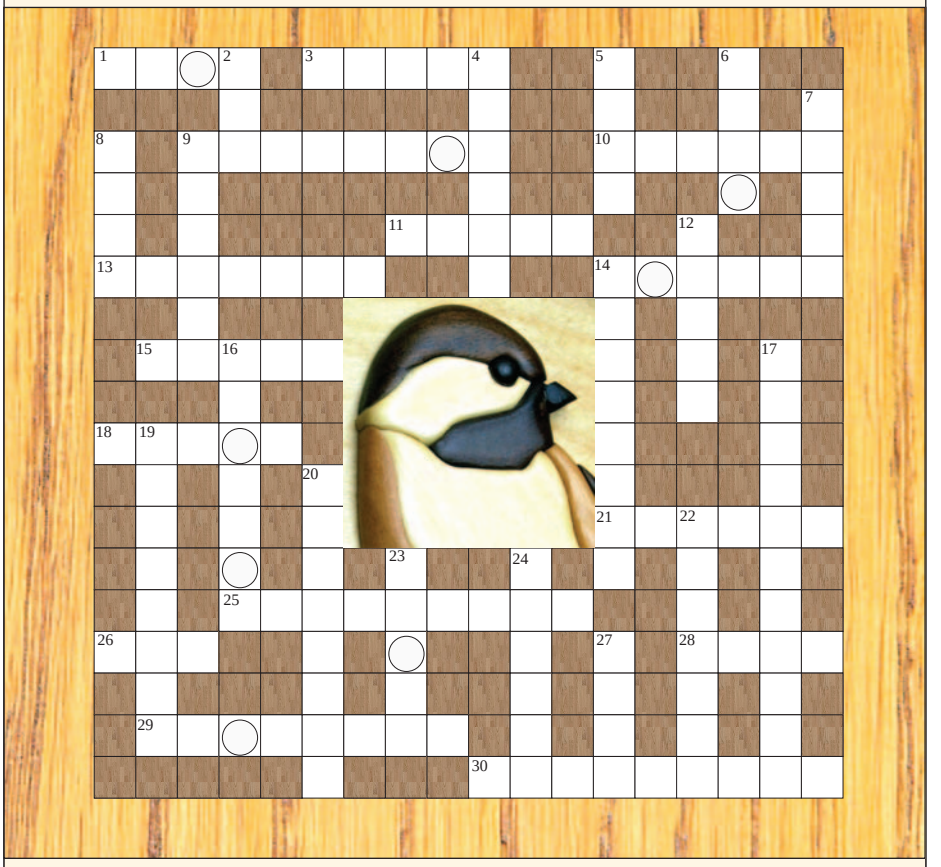
ACROSS

1 Horizontal member between stiles (or vertical members) of a door frame
3 Wood pin used to align and hold two adjoining pieces
9 Change in the texture of wood caused by colonies of fungus growing within the dead wood
10 A long narrow channel cut into wood
11 Where two or more woods are joined
13 Lifting of the paint from the surface in the form of scales
14 Flounder, roll
15 Angled cut made through a board from face to face
18 Spin, rotate, revolve
21 To bring, send, or put back to a former or proper place
25 Wood cut from the center of a tree
26 Device for gripping or holding material or machine components in place
28 Framework that holds the glass in a window
29 Distance across a circle through its center
30 Removing moisture from wood through the drying process

DOWN

2 A joint of two pieces lapping over each other
4 Thin cementing layer between the wood cells
5 Either of the two longer sides of a board, perpendicular to the face
6 The lower end of the leg of a chair or table
7 Re-cutting dressed lumber to produce two or more thinner pieces
8 The width of cut made by a saw
9 Tool used by carpenters to obtain accuracy
12 Strip fastened to one part to hold it in place or to facilitate the fastening of another part
14 Craft of a carpenter
16 Liquid preparation applied to a surface that dries to form a hard lustrous coating
17 Force exerted to push the components of a joint together
19 Lumber from the group of trees with broad leaves
20 Vertical element of an assembly; usually refers to ornate elements of a doorjamb or mantle
22 Force exerted that pulls the components of a joint apart
23 Any vertical element of an assembly; usually associated with panel construction
24 The amount of space occupied by a three-dimensional object as measured in cubic units
27 Thin protrusions of a dovetail joint

Crossword solution on page 47



Decorative pictures created by laying pieces of various natural woods into groundwork of solid wood: _ _ _ _ _ _ _ _

COMING EVENTS

WELBECK WOODCRAFTERS EXPO
AUGUST 10, 11
Welbecks Sawmill
Durham, ON
www.WelbeckSawmill.com

SHUSWAP CARVERS & WOODWORKERS SHOW & SALE
AUGUST 18, 19
Sorrento Memorial Hall
Sorrento, BC
j2nerbas@telus.net

WEST COAST ROUNDUP WOODTURNING SYMPOSIUM 2007
SEPTEMBER 7, 8, 9
Richmond Hotel and CC
Richmond, BC
www.gvwg.ca

THE WOODWORKING TOOL AND HOBBY SHOW
SEPTEMBER 14, 15, 16
Westemer Park
Red Deer, AB
www.toolshows.ca

THE WOODWORKING TOOL AND HOBBY SHOW
SEPTEMBER 21, 22, 23
Prairie Land Exhibition Grounds
Saskatoon, SK
www.toolshows.ca

THE WOODSTOCK WOODSHOW
SEPT. 28, 29, 30
Woodstock Fairgrounds
Woodstock, ON
www.WoodstockWoodshow.ca

VICTORIA WOODWORKING MACHINERY, TOOL SHOW AND SALE
OCTOBER 12, 13, 14
Pearkes Recreation Centre
Victoria, BC
www.WoodandToolShow.com/

SURREY WOODWORKING MACHINERY, TOOL SHOW AND SALE
OCTOBER 19, 20, 21
Cloverdale Fairgrounds
Surrey, BC
www.WoodandToolShow.com

WOODCARVING SHOW AND COMPETITION
OCTOBER 20, 21
The Moose Lodge
Windsor, ON
http://WindsorWoodcarvingMuseum.ca

THE EDMONTON WOODWORKING MACHINERY, TOOL SHOW & SALE
OCTOBER 26, 27, 28
Northland Park
Edmonton, AB
www.WoodandToolShow.com

WOODWORKING MACHINERY & SUPPLY EXPO (WMS) TRADESHOW
OCTOBER 26, 27, 28
International Centre
Mississauga, ON
www.WoodworkingExpo.ca/index.html

continued from page 2

The Freud fence and top are designed to work together and the top simply needs to be mounted to the cabinet. If you are fastening a wooden top, the easiest method is to use angle brackets on the underside of the top, which are then screwed into the sides of the router cavity. – CWM

Hello

I'm looking for information on moisture meters. I am starting to dry my own lumber, small pieces and would like an affordable hobby type meter. A lot of the sources I have found on the Internet are US based, but I'm looking for Canadian dealers. Can you help?

Ron S., Regina SK

Ron

Thanks for your email asking about Canadian made moisture meters.

A well known Canadian manufacturer is Electrophysics – www.electrophysics.on.ca

I'm sure that they will have what you are looking for.

Paul

Questions from our Woodworking Forum:

Router Question:

I am new to wood working and have been accumulating tools slowly. Some of my choices have been good and some not so good. Anyway it is time for a router and a table and I really get spinning trying to decide what would be a decent purchase. As I mentioned I am new to this and will not be doing any real fine work for some time. My first projects for it will be some picture frames and I hope to be able to progress from there to other things. My ability is limited and I will be learning as I go. Any thoughts and opinions on a reasonable unit would be appreciated. Thanks in advance for this great forum.

Jim

Table Saw Question:

I'm in the market for a 10" cabinet saw. Like most people I don't have a mountain of money to spend. I would like to keep it below the $1200.00 range.

So far I believe my only option is a hybrid saw. I've looked at the Delta, General, and King.

They all seem to be very similar (i.e. fence, motor, and where they are manufactured off shore).

Does anyone have any comments on the above saws, or can anyone suggest an alternative saw that I may be overlooking. I want to make sure I've covered all the bases before I purchase something

Thanks for your help

Neil

Too see what woodworkers from across Canada answered to these questions, go to:

- **ROUTER ANSWER**
  CanadianWoodworking.com/forum/showthread.php?t=16440
- **TABLE SAW ANSWER**
  CanadianWoodworking.com/forum/showthread.php?t=16880

From CanadianWoodworking.com FREE CLASSIFIED ADS

Leigh Router Vacuum Attachment
Used twice.
Asking: $25.00

General Power Feeder
Has forward and a reverse switch.
Never been used
Asking: $ 300.00

Delta Hybrid Table Saw
1¾ HP, only used a few times. Excellent shape, will still be under Delta warranty.
Asking: $750

Craftex 25" Wide Belt Sander
Model # B2269, 3HP, 220V single phase machine. Excellent condition.
Asking: $1,000.00 OBO

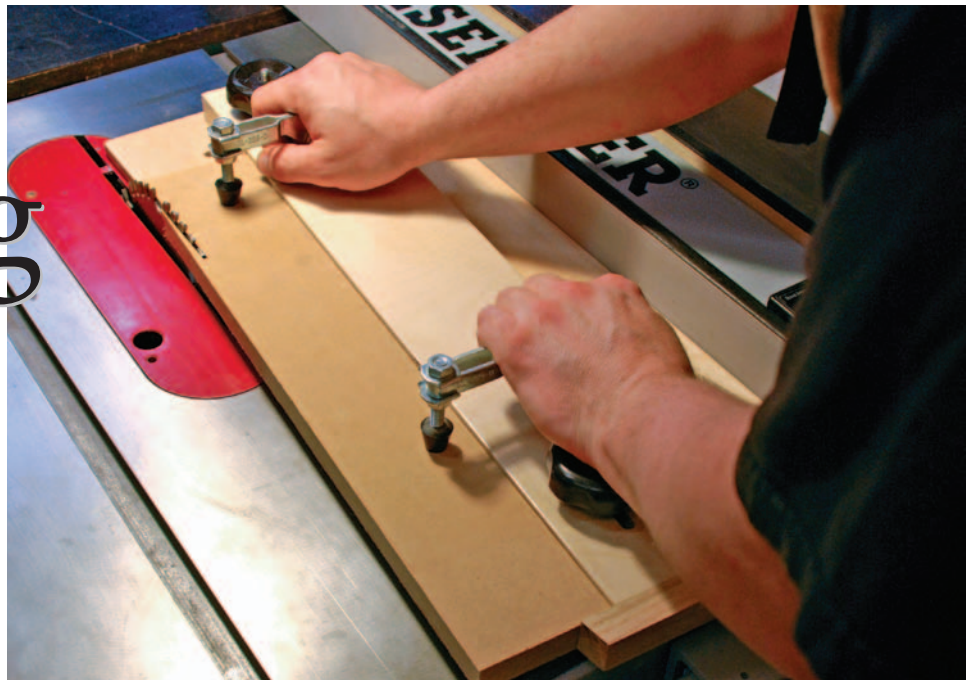
Wood Dust Collector
Assembled, barely used, 2 HP, 115V, 1400CFM
Asking: $200 OBO

6 ⅛" King Jointer
46" bed, hardly used, real good shape, comes on a rolling platform.
Asking: $300

To see hundreds of additional items, complete with photographs, go to:
www.canadianwoodworking.com/classifieds/

shopjig

Tapering Jig



To cut a consistent angle on the table saw with safety and precision, use a shop made tapering jig.

Unlike other tapering jigs that have a pair of arms connected with a hinge, this version features a moveable fence with an end stop, mounted to a base. The jig also includes a couple of hold down clamps to grip the wood, allowing you to concentrate on using the jig. While this jig is designed to cut tapers on your table saw it could also be used to put a clean edge on rough lumber.

Making the Jig

• To keep this jig light and rigid, use ½" Baltic birch plywood. You can modify the suggested dimensions to suit the kind of tapering you need to do. The fence is simply two layers of ply glued together and then squared up on the table saw.

• Use a spiral bit in a router table to rout the two stopped grooves in the fence and the base for the carriage bolts. Rout out a recess to accommodate the head of the carriage bolt on the underside of the base. Dowel the fence stop to the fence.

• Adjust the jig so that the fence is at its maximum angle, but do not let the fence project over the right side of the jig. Set your table saw fence so that the left side of the jig clears the blade by ⅛" and the right side is against the fence. Trim the fence stop at this setting. Flip the jig around and adjust it so that the end of the fence projects over the edge of the jig. Then, with the right side against the fence, notch the top corner of the fence. Disassemble the jig and sand all surfaces. To make it slide easily, apply several coats of paste wax to the parts. Reassemble the jig and install the two hold down clamps.

Using the Jig

• This jig could not be easier to use. Run the right side of the jig along your table saw fence. Loosen the knobs and adjust the jig fence to whatever angle you need and tighten the knobs to lock the fence in position. Clamp the blank into the jig and set the saw's fence. Check to ensure the jig clears the saw blade, and then cut your stock.

• When cutting tapers on two faces of a leg, save the first off-cut. Cut a piece of ⅛" hardboard approximately 80% as large as the tapered area. Apply two sided tape to the hardboard and then insert it in place of the saw kerf between the part and the offcut. Make the second cut as required and then remove the spacers. For a standard width saw blade with a ⅛" kerf, the hardboard will represent the width of the cut. If you regularly taper thick stock, simply add a few extra laminations to the fence.

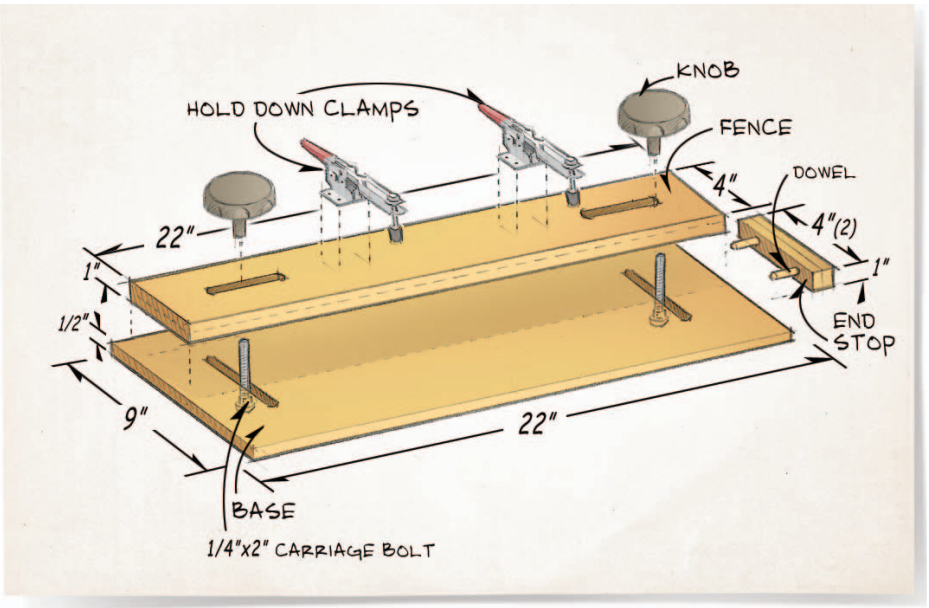
– CWM

SUPPLY CHECKLIST

- ½" Baltic birch ply
- two ¼" x 2" carriage bolts
- two knobs (female configuration)
- two horizontal style toggle clamps • paste wax

HARDWARE SOURCES

www.HomeHardware.ca
www.WorkshopSupply.com
www.LeeValley.com



Illustrations by Mike DelRizzo

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Our huge showroom boasts one of the largest selections of machinery and power tools in the country. We carry a complete line from the biggest brand names in the tool industry. Our huge on-hand inventory ensures that you can get what you need when you need it.

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They began to display at many regional and national woodworking shows across Canada and soon it became evident that a store was the next move in their expansion. They acquired the dealership for many of the finest names in the industry and Berg Woodworking Machinery was born. A 1986 trip to Taiwan gave George a view of what the future had in store. He believed that a combination of the more affordable machines together with the higher end products would best serve his customers. By 1988 the store was open and ready to serve the area woodworkers, schools and industries. George and Brian are proud to stock a large inventory of machinery, power tools and accessories to serve every type of customer from the hobbyist to the professional.


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