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Canadian Woodworking

OCTOBER/NOVEMBER 2005
Issue # 38

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DEPARTMENTS

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OCTOBER / NOVEMBER 2005

PROJECTS

FEATURE

Cover photo by Ray Pilon

Linda Fulcher

There is no question that you can make sturdier furniture than you can buy. I suggest trying the "push test". Every wobbly piece of furniture presents a possible project.

There is a comfortable feel to a chair that holds firm when I give it a few shoves here and there. If it's a good, solid chair I can climb up on it to get a can of soup from the top cupboard. I know, I should use a step stool (but chairs are always so handy)!

A few years ago, while I was at my parents' cottage, a Muskoka chair came bobbing down the lake after a storm. As you might guess it did not pass the push test (had it been a sturdy hand crafted chair, it would not have blown off someone's dock in the first place). The only advantage to these flimsy chairs is that once they blow into the lake, they are easy to lift out of the water!

Generally though, flimsy is not an advantage.

Recently, we were at a function where a couple of brave people decided to get up on the tables and sing a song. The wait staff responded quickly to escort them down. The waiters weren't being party poopers, they were simply ensuring our safety, as the tables might have collapsed.

Still, that might have been a winning performance…. One day, I will replace my wobbly dining room set with a solid hand crafted one, and invite these people over. After all, there's nothing like a good, sturdy table to stand on when you really need to belt out a song!

Paul Fulcher

I was at my friend Steve's recently, and while on his deck, I noticed some old barn boards lying protected, off to the side.

"What's with the boards?" I asked.

"Those are nice, eh?" he said appreciatively, " I want to get a whole bunch more of them."

"What do you plan on doing with them?" I queried

"I don't really know." he stated, as if that was the end of the discussion.

"Well," I pursued, "You must know what you want them for, if you know that you want more."

"No," he insisted. "I just know that I want more."

"But if you don't know what you are going to do with them, how will you know when you have enough?"

"Oh, I'll know all right." he asserted, as if he was stating the obvious.

By the look on his face, I realized once again, that he considered the matter closed.

"I don't mean to belabour this," I apologised, "but how will you know when you have enough?"

With the patience of a carpenter, he smiled and said, "Because when I have enough, I'll know what to do!"

With that, our conversation was ended, and there we sat: me wondering what he would do when he got all that wood, and him wondering where he would get it.

I hope that in the pages of this issue you find something that will inspire you to start collecting that favourite wood of yours.

Once you get enough, you'll know what to do.

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letters to

To the Editor

I am often confused by the names applied to solvents, and wonder how many of those names are interchangeable. It would be useful to others like myself if we could have a clear explanation on the following: methyl hydrate, mineral spirits, paint thinner, varsol, methyl alcohol, grain alcohol, petroleum distillate.

There may be others, but these are the ones that confuse yours truly.

Great magazine, keep up the good work.

Gene N. Dartmouth, NS

Gene

Mineral spirits, paint thinner and Varsol are petroleum distillates commonly used as thinners for oil varnish and shellac. Varsol is simply a registered trademark of Imperial Oil Limited. Paint thinner is a "generic" brand of thinner, while Varsol carries a guarantee of purity. Mineral spirits have fewer aromatic solvents in it than paint thinner, and is what I normally use for thinning oil based varnish and polyurethane. If you can't find mineral spirits, then use paint thinner.

Alcohol is what you get when you ferment sugars and starches – a colourless, volatile, flammable liquid we all know as 'booze'. Ethyl alcohol is also known as ethanol and grain alcohol (fermented grain!). Denatured alcohol, which woodworkers use as a thinner for shellac, is ethyl alcohol to which a poisonous substance, such as acetone or methanol, has been added to make it unfit for consumption (and saleable without the high government taxes that accompany pure alcohol). Methyl hydrate is also known as methyl alcohol, methanol, and wood alcohol. Woodworkers use it for thinning shellac and cleaning brushes that have been used with shellac. It's also used for dissolving gums and resins. If you can, use denatured alcohol rather than methyl hydrate, as it's less toxic.

Carl

Paul

Last year when I was exhibiting at woodshows, I was surprised at how many woodworkers told me they knew about my company and products through your magazine.

That's why now, after booking into every woodshow in Canada, I figure I'd better let your readers know that I will be at their local show.

If you have any ideas about how I might offer your readers a special discount, I would be interested in pursuing that with you.

Thanks

Paul Moore

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Editor's note: See coming events page 39

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BY MICHAEL KAMPEN

Display Cart

My wife and I are vendors at the local farmer's market and I designed this cart as a way to display our wares. It's a great cart to display anything from produce, to wooden crafts, to jewellery. We find our new market cart attracts both attention and business, as people are naturally drawn to and gather around it. I can't say for sure if it was entirely the cart, but the first two times that we used it at the market our sales were record high! When not being used at the farmer's market, we use it on our deck as a buffet table for barbecuing. You could also use it to store cushions and other deck accessories, or place it poolside to store towels and sun screen. It offers a great combination of display and storage. For example, you could display potted herbs and lettuces on and around it, and store your watering can, plant food, and garden snips out of sight inside the cart.

The material for the entire cart is milled from ¾ (1 ¼") cedar decking that I purchased at my local building supply centre. If you can't find ¾ stock you can use standard width (¾") material, but you will have to make adjustments to the dimensions.

Wheels

- Mill sufficient material to 1" for the spokes and the outer center wheel segments.
- Cut the outer segments and spokes to shape.
- Lay them out on a flat surface.
- Cut matching dadoes on the two long spokes and assemble them to begin forming the wheel. With the main and secondary spokes laid out with the filler sections, mark biscuit locations at the ends of the spokes and using a band clamp, glue this assembly together.
- Cut the outer rim segments and glue them on either side of the inner wheel. The joints in these sections are offset by 22 ½° from the first set of joints.
- Mark the center of the intersection of the two long spokes. Drill this out with a 5/16" drill. Using this hole and a circle cutting jig with a router and a spiral cutting bit (see Circle Cutting Jig sidebar page 6). Cut the outside rim of the wheel to its final circular shape.
- Use a ¼" round over bit to profile the outer edges of the wheel with the circle cutting jig.
- Using a V-groove bit in the circle cutting jig, rout a groove 1 ⅜" in from the outer edge of the wheel, ⅛" deep.
- Cut out the inner and outer hubs. Cut the inner hub from hardwood stock ⅜" thick, using a 3 ¾" hole saw and repeat for the outer hub using ⅞" stock.
- Chamfer the outside face of the outer hub on the router table.

Trimming the wheel

Sand and Finish the Hubs

- Use the 5/16" hole in the spokes and the 5/16" pilot hole left by the hole saw to line up the hubs with the wheel and glue the hubs into place.
- Drill out the 5/16" center hole to accept a section of 1/2" copper pipe. Insert a section of copper pipe just slightly longer than the length of the hole.

Sand the Outer Surfaces of the Wheel

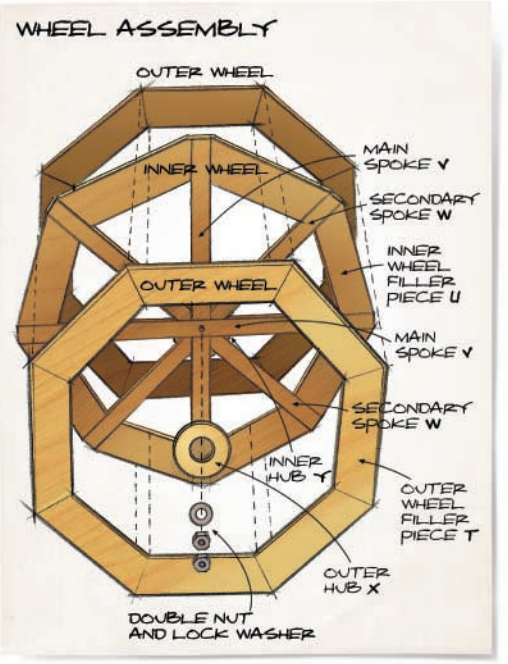
- Paint the outer section of the wheel using black milk paint. Paint the V-groove a contrasting colour to define the edge of the tire.
- Seal the wood and the paint with a clear finish of your choice. If your cart will be exposed to the weather at all, use a penetrating finish; a film-forming finish will crack and peel over time and is much harder to repair.

Axle

- Prepare two pieces of stock for the axle housing.
- Cut a dado to accommodate 1/2" copper pipe in the lower part of the axle housing. This should be a tight fit.
- Cut a piece of copper pipe 19 5/8" inch long.
- Run a bead of glue in the lower piece, in the dado, and center the pipe in it.
- Glue the top piece of the axle housing to the lower piece containing the pipe.
- Insert the threaded rod and using one washer and bolt at each end, tighten it in place.

Body

- The body is made of three frame and panel sections and one face frame section. The center panels must be stained before assembling the frame around them.
- Mill enough 1/4" stock to glue up three panels.
- Glue up, sand, and finish the three panels.
- Mill the stock for the four frames to 3/4" thick.
- Using a table mounted router and a matched set of tongue and groove cutters, cut the tongues and grooves needed to assemble the outer frames.
- Assemble the two end panels and set them aside.
- The front and rear panels require an additional dado to be cut the full length of each piece 3/4" in from the outer edge. Cut these now. Then assemble the front panel and the rear face frame.
- Sand and finish the three panels and the face frame.
- The end panels fit into dadoes at the ends of the large panels. Glue and clamp these together, measuring the diagonals to ensure the assembly is square.
- Cut the ledger strips for the bottom, and glue these into place, using clamps.
- Cut a 1/4" thick piece of plywood for the bottom, and when the glue has set on the ledger strips, glue this in place from the inside. Screws or 1/4" crown staples will hold this in place until the glue has set.
- The two outer top attachment cleats are set inside and flush with the top edge of the main carcass. Glue these to the edge and use 2 1/2" countersunk screws along the front and back edge to hold this in place.
- The center three top attachment cleats are recessed into mortises in the front and back. These can be cut easily with a router.



Top

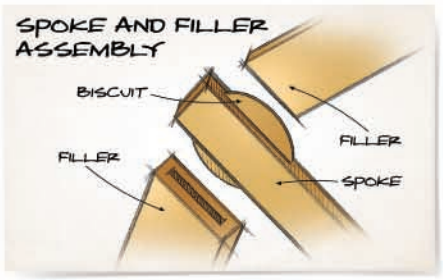
- The top is a 3/4" thick panel glued up from the 5/4 stock. A frame around this panel provides a lip that keeps things from rolling off the edge.
- Mill all of the material for the top to 3/4" thick.
- Glue up the center panel.
- Flatten and sand the center panel.
- Apply two or three coats of finish to the panel and set it aside.
- Cut the material for the outer frame members.
- Run a 3/4" dado the full length on the back face of each board.
- Attach the two front and back sections to the sides of the top using glue and seven countersunk brass screws.
- Cut the ends to fit in between, and fasten them in place in the same manner.

HARDWARE LIST

1	**Copper pipe** 19 1/2" x 1/2"
2	**Copper pipe** 1/2" Cut to length
1	**Treaded rod** 1/2" x 27 1/2"
6	**Nuts** 1/2"
6	**Washers** 1/2"
	Wire or shim stock if required

MATERIALS LIST

A	**2 Handle** 7/8" x 3 1/2" x 27"
B	**2 Leg** 7/8" x 3 1/2" x 34 7/8"
C	**1 Top panel** 3/4" x 26" x 70"
D	**2 Front and back edge for top** 7/8" x 3 1/2" x 72"
E	**2 Side edges for top** 7/8" x 3 1/2" x 25 1/4"
F	**2 Top end batten** 3/4" x 7/8" x 27"
G	**4 End panel rails** 3/4" x 3" x 13"
H	**4 End panel stiles** 3/4" x 3" x 22"
I	**2 End center panel** 1/4" x 16 1/2" x 12 7/8"
J	**4 Front and rear rails** 3/4" x 3" x 56 1/4"
K	**4 End front and rear stiles** 3/4" x 3" x 22"
L	**1 Front panel** 1/4" x 16 1/2" x 56 1/8"
M	**2 Top attachment cleat ends** 1" x 3 1/2" x 18"
N	**2 Top attachment cleat centers** 1/2" x 3" x 25 1/4"
O	**1 Bottom panel** Plywood 1/4" x 17 3/4" x 58 1/4"
P	**2 Bottom attachment cleats front and rear** 1" x 1 3/8" x 58 1/4"
Q	**2 Bottom attachment cleat ends** 1" x 1 3/8" x 14 7/8"
R	**1 Upper axle block** 3/4" x 5" x 19 1/4"
S	**1 Lower axle block** 1 1/2" x 3" x 19 1/4"
T	**32 Outer wheel filler pieces** 1/2" x 4 1/2" x 14"
U	**16 Inner wheel filler pieces** 1" x 4 1/2" x 14"
V	**4 Main spokes** 1" x 1" x 30"
W	**8 Secondary spokes** 1" x 1" x 14 1/2"
X	**2 Outer hub** 7/8" x 3 3/4" dia
Y	**2 Inner hub** 1/2" x 3 3/4" dia



- Cut the stock for the end battens; notch each end to fit and radius the outer corner.
- Drill a countersunk hole 4" in from each end and attach to the top with brass screws.

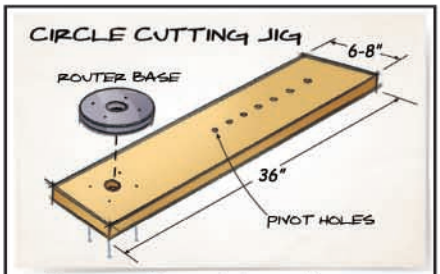
Handles and Legs

- Mill the material for the arms and legs to ⅞" thick.
- Cut the legs and handles to length.
- Cut the half-lap joint where the handle meets the leg.
- Glue, clamp, and screw these pieces to the legs and side handles. Sand and finish these prior to installation.

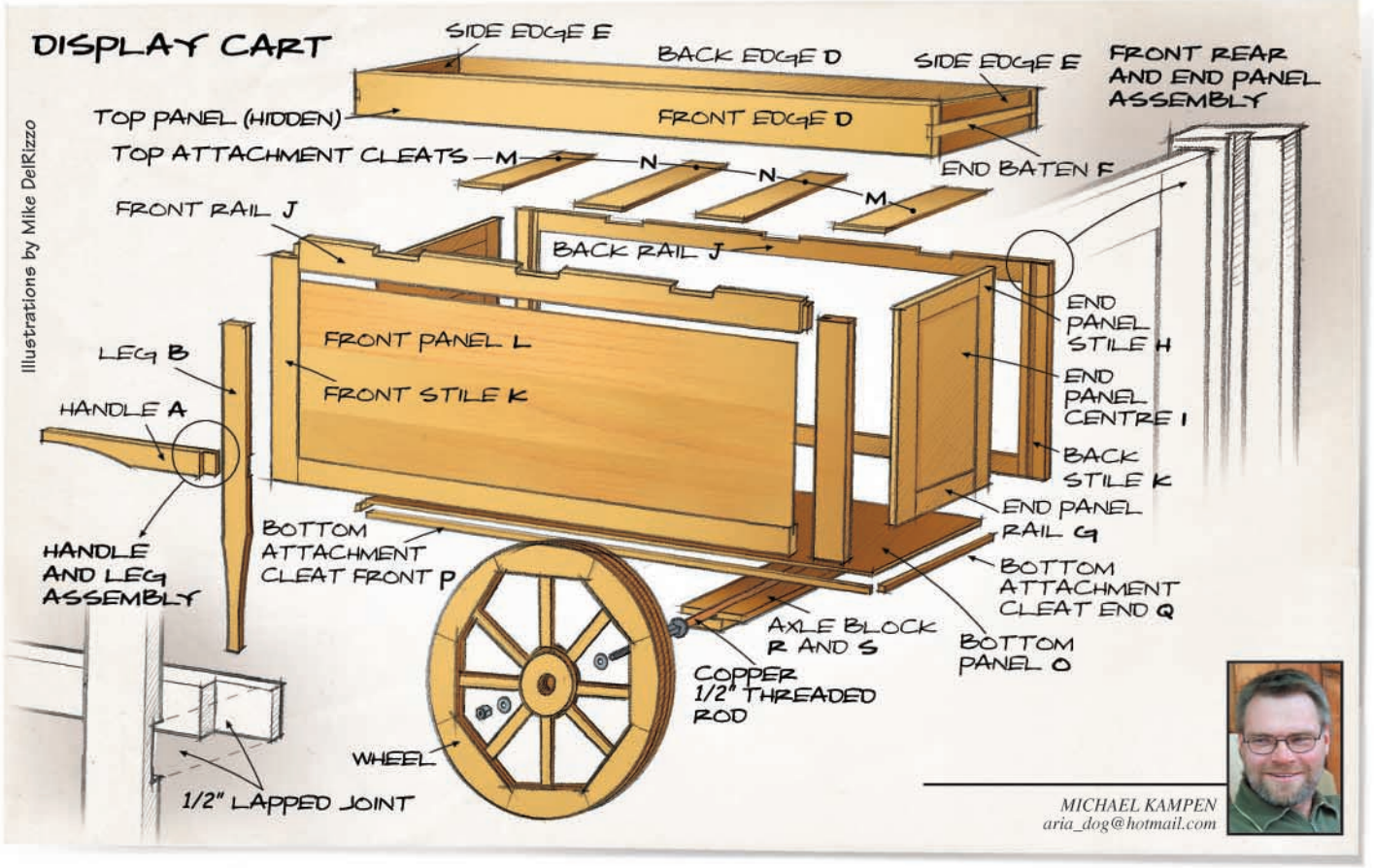
Assembly

- You will need a large level area to begin assembly.
- Invert the main body of the cart on the ground.
- Using glue and screws, attach the axle assembly to the underside of the body at the appropriate place.
- Turn the cart upright to continue assembly.
- Fasten the three center top attachment cleats into the corresponding mortises using glue and screws.
- Temporarily clamp the handle and leg assemblies to the sides of the cart, using a level to keep the top horizontal and the legs plumb.
- Trim the legs to length if necessary.
- Fasten the leg assemblies to the body using screws driven in from the inside of the body.
- Pre-drill four clearance holes for screws in each top attachment cleat.
- Spread glue on the top of the cleats and center the table surface on the top.
- Screw the top in place from the underside.
- Clean up any rough edges and glue squeeze-out and apply another coat of penetrating finish to the entire cart.

If you are going to be leaving your cart outside in the elements, be sure to choose a protective outdoor finish. Once the finish is dry, wheel it into place and you are ready to go. Whether you are barbecuing, working at a market, or container gardening, the possibilities are endless for how you can use this handy cart to fill both your display and storage needs.



- Remove the sub-base from your router.
- Measure the diameter of the base – this will determine the width of the jig.
- Cut a ¼" or ½" plywood the width of your router base and 36" long.
- Place the sub-base over the end of the jig, and mark the location of the sub-base screw holes and the center bit hole.
- Drill out and countersink the screw holes on the bottom side of the jig.
- Drill out the center bit hole.
- Drill pivot holes centered along the jig. Space them 1" apart. (Note - You can also drill the pivot holes as you need them. The distance from the inside edge of your bit to the center of the pivot hole gives you the radius of the circle).
- You can use a nail or screw to attach the jig, through a pivot hole, to your work piece. Be sure to attach the jig to the bottom side of your work piece.



MICHAEL KAMPEN
aria_dog@hotmail.com

You worry about the barbecues, parties and family get-togethers, and we'll worry about the rain showers, heat waves and snowstorms.

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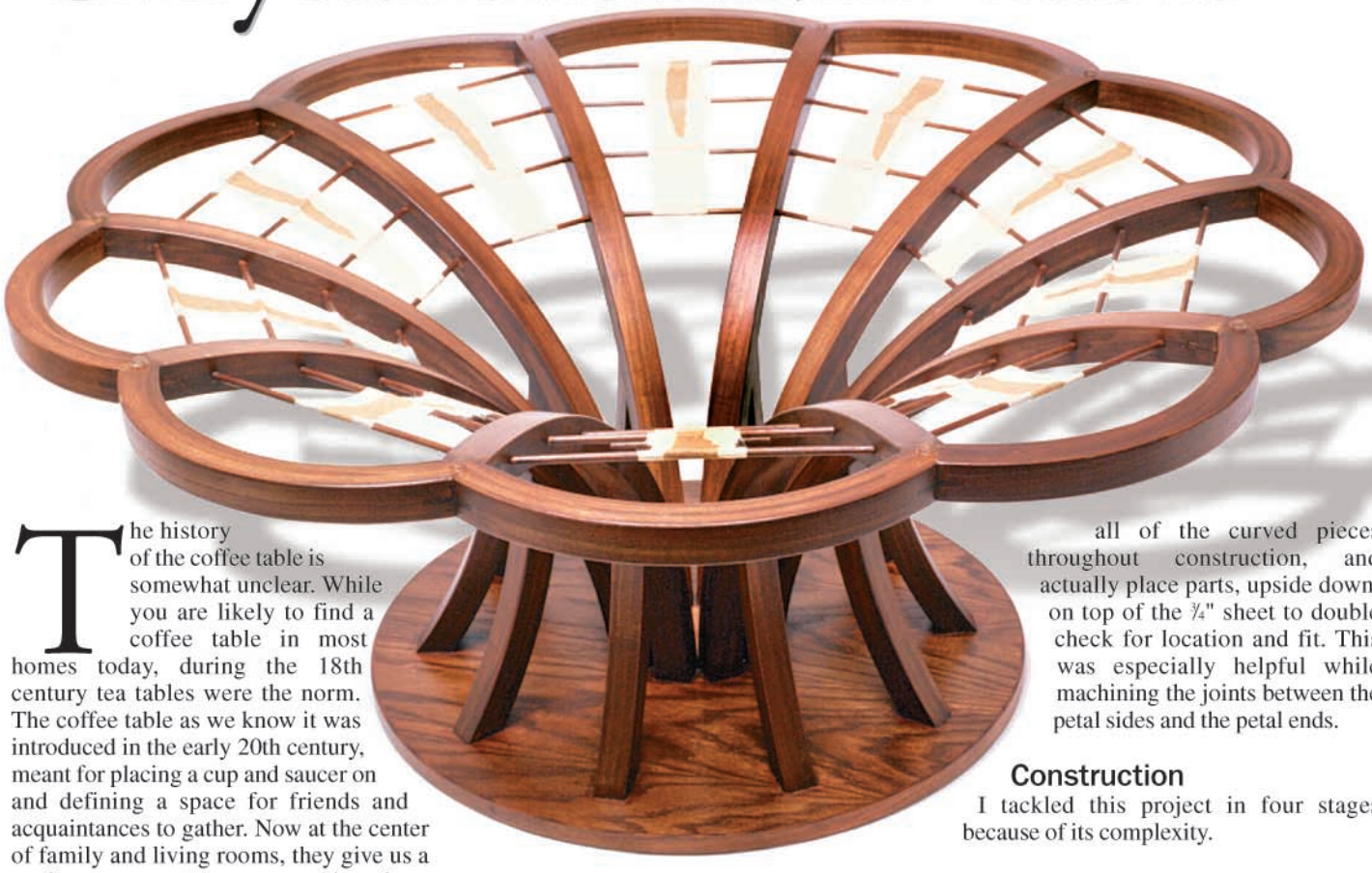
furnitureproject BY ROB BROWN

Chrysanthemum Table



The history of the coffee table is somewhat unclear. While you are likely to find a coffee table in most homes today, during the 18th century tea tables were the norm. The coffee table as we know it was introduced in the early 20th century, meant for placing a cup and saucer on and defining a space for friends and acquaintances to gather. Now at the center of family and living rooms, they give us a perfect spot to place everything from drinks and snacks to magazines and books, not to mention the remote controls.

This one-of-a-kind round coffee table is at home in a spacious, formal living room, dressed with something small and simple on it, say, a chrysanthemum.

Inspiration and Design

I am often inspired to build a piece of furniture from either a specific material or a general shape or form. In this instance it was the shape of the chrysanthemum flower, and the flowing curves of its petals, bursting upwards from the center. Much of today's furniture consists largely of straight lines or boxes; straight lines being easier for large furniture companies to mass-produce. This table's defining feature is its femininity; its curves.

I wanted a strong wood species for the petal sides and ends to support the glass top and whatever stresses may be applied to it. Although the strongest domestic species, in terms of bending strength, is shagbark hickory, strength values of sugar (hard) maple, red and white oak, and white ash are only moderately lower. Since ash is nice to work with, and I like its ring porous grain pattern, I chose to use it for this table.

Preliminary Planning

The two options for making these curved pieces are steam bending or bent laminations. Since the pieces need to be fairly thick, I chose the bent lamination technique. With bent laminations I can obtain strong, consistent results every time. However, it is very important to select clear, knot free stock. Each lamination is only as strong as its weakest link and any knots would compromise its structural integrity.

Before machining, I laid the entire table out on a piece of ¾" particle board. I drew the top view and a cross section view vertically through the center of the table. This allowed me to check dimensions for all of the curved pieces throughout construction, and actually place parts, upside down, on top of the ¾" sheet to double check for location and fit. This was especially helpful while machining the joints between the petal sides and the petal ends.

Construction

I tackled this project in four stages because of its complexity.

Bent Laminations

- Each lamination is made up of 6 strips of solid ash just over 9/16" in thickness. It is important that, when glued, they added up to 1 ¼", to be sandwiched properly in the form.

- The finished length of the 10 petal sides is 27 ½". Add an extra 4" for the rough length. During lamination, some of the strips are sure to shift here or there and a few extra inches save a lot of disappointment in the long run. Also, add at least ½" in width so the laminations can be planed to a final thickness of 1 ¼".

- To machine the 60 strips for the petal sides (I actually made about 65 to account for those "things" that just seem to happen), start with ¾ lumber cross-cut to a rough length of 31 ½". Joint one face and one edge of each board. Using the table saw, rip the strips just shy of ¼" Repeat this process until you have 60+ strips, 31 ½" x 2" x ¼". A careful pass

through a thickness planer will bring the strips down to the correct dimension. Be sure that six pieces sandwiched together total 1 ¼". Strips that are even 1/32" off the mark will add up to be 3/16" too thick down the line.

- Clamp the strips in the form and let them dry more than adequately. Use a glue with a high solids content. The glue I used has a clamp time of 1 ½ hours but I left each lamination clamped for at least 3 hours. Better yet, clamp them overnight.

- While each of the 10 petal side laminations dry, machine and laminate the strips for the petal ends the same way.

- Joint one edge of the laminations. Keep the outside, curved face, flush with the jointer fence through the entire pass. It's critical to keep everything square since small inconsistencies magnify when they occur 10 times.

- With the thickness planer, bring the petal sides and ends down to 1 ¼" thick.

- The stem supports are made the same way and are dressed to 1 ⅛" thick. The sides and ends will meet and be flush on all 4 sides but, since the stem supports are ⅛" narrower, there will be a 1/16" reveal where the two meet.

Cutting Petal Sides and Petal Ends

- Once all of the bent laminations are complete, use the layout board to determine the length of the petal sides as well as the angles that are required for the joints to meet properly.

- Using a cross-cut jig for curved pieces (See "Jigs and Forms" sidebars pages 10-12), cut the laminations to their proper length and angle, one by one, dry fitting them as you go. Because circular top assembly can be difficult and slight variations can occur, leave the last 2 petal ends uncut, and finish cut them just before assembly.

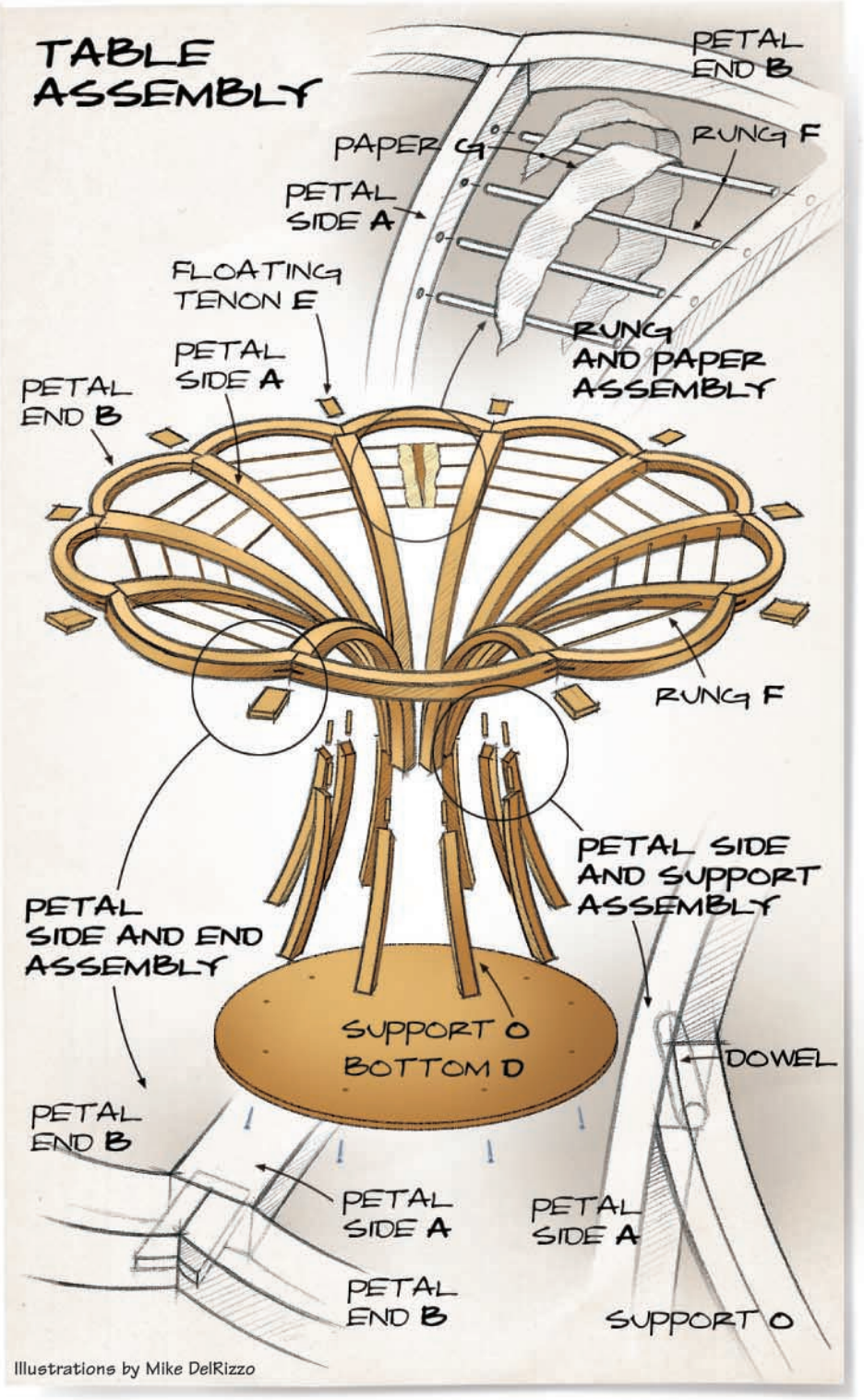
- Machine a 1 ¼" x ⅝" shoulder on both ends of the petal ends. This shoulder, when placed beside its mating partner, will be glued to the petal side.

- Place the petal sides and ends, upside down, directly on top of the layout board as you go, making any minor adjustments as needed. To support the bottoms of the petal sides (that will be moving freely in the air), cut a piece of ½" plywood approximately 12" x 12". Temporarily screw the plywood into the ends of the petal sides to keep them positioned while machining the rest of the parts.

- Once all the petal sides and ends are cut and properly fitted, machine the grooves into their ends to accept the solid floating tenons.

- Machine the floating tenons from one long piece of ash to fit in the newly formed groove. Once you've machined the thickness and width, cut the strip into 10 pieces. This floating tenon adds strength to the joints and provides a much needed locator during glue-up.

- Next, drill all the holes. With a total of 80 holes you'll need a jig to simplify the process. While the table is dry fit, measure appropriate angles and lengths for the ¼" dowel and drill the 80 corresponding holes.



Illustrations by Mike DelRizzo

- Machine the circular table bottom. It is built with ¾" plywood with ash veneer. I didn't use solid ash because of the problems caused when it expands and contracts. Such movement would wreak havoc on the many joints, and eliminate the possibility of a flat bottom for the table. Wrap a piece of ¼" solid [wood] around the edge of the table bottom and glue it in place

Sanding and Primary Assembly

- With the petal sides and ends and table base now machined, finish sand each piece starting with 80 grit and moving to 150 grit sandpaper.

- Plan the glue up. Tackling it all at once would be disastrous. Start with just 2 petal sides and 3 petal ends. To make the process even easier, attach the table base with screws to the base of the petal sides, but don't use any glue. Permanently secure the base only after all the other 20 sides and ends are together.

- Assemble directly on top of the original layout board, the pieces assembled upside down. It is crucial to follow the layout lines already in place. Glue and clamp the pieces, then leave to dry. Repeat this process until everything, except the last 2 uncut pieces, are assembled. At this stage, you'll see exactly how large and at what angle the last two petal ends need to be machined. Once they are sized, assemble them to complete the primary assembly. Trim the exposed portion of the solid floating tenon used to fasten the joint between the petal sides and ends to fit.

Base

- With all of the petals complete, attach the bottom with a screw, a dowel and some glue in each joint.

Final Machining and Assembly (Rungs and Supports)

The 40 rungs serve two functions: to add rigidity to the petal sides, and to provide a place to attach the hand made paper.

- Cut all of the hardwood rungs to the correct length and glue in place.

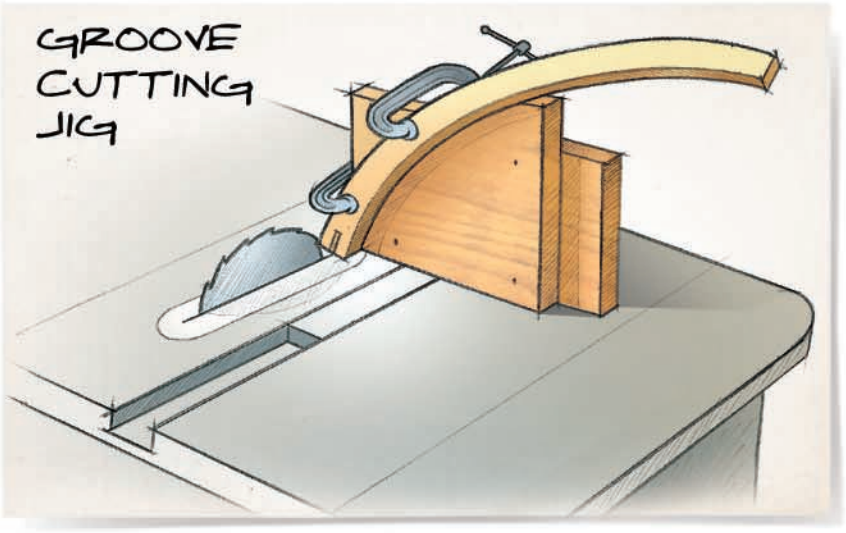
- Cut the 10 stem supports to their final size with the same type of jig used for cutting the other bent laminations. The dimensions and angles are much easier to determine with the mostly finished table to reference. Secure the supports to the petal sides with dowel joints and glue in place.

Finishing

- Because water based stains raise the grain, the entire piece has to be wet with water to pre-raise the grain. Once dry, sand the entire piece to remove the raised grain. This step greatly reduces raised grain when applying the first colour application - a coat of Brown Walnut aniline dye stain. If you don't pre-raise the

Petal

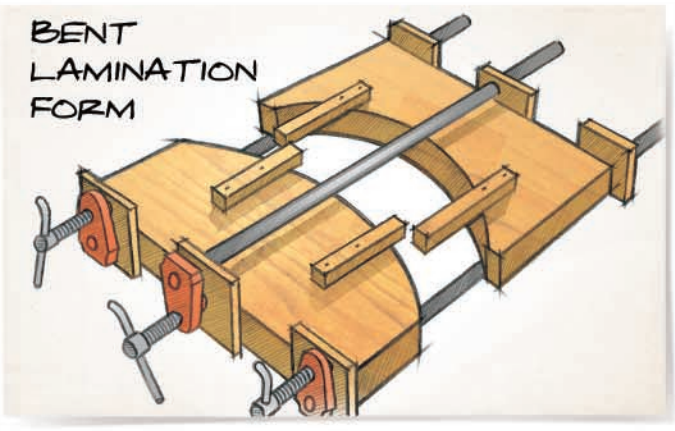
(Continued on page 12)



Groove Cutting Jig

This jig will cut a groove in the petal sides to accept a floating tenon. Cut the petal sides first. For the petal ends, cut a mating groove on the table saw by referencing off the rip fence. Use a backer block to support the piece during this operation.

- Attach a flat piece of stock to your mitre gauge. It should be large enough to support the bent lamination that is being machined.
- Attach a wood block to the flat piece of stock already in place. This block should be the approximate radius of the lamination
- Drive in two screws and adjust them so the lamination will sit flat on the table saw surface when clamped. Apply the sandpaper disks for friction. Use two C-clamps to secure the lamination during machining.
- Ensure that the groove is cut at the center of the petal side.



Jigs and Forms

When I'm dealing with curved parts, angled cuts and repetitive operations, a jig or form always comes in handy. Sometimes they are the only safe, accurate way that the machining can be competed. Nine different jigs or forms were used to complete this table. Only four of them are discussed here because each can be modified to accommodate your needs. For instance, the cross-cut jig I use to cut the petal sides to their correct length and angle can be altered and used to finish cut the petal ends.

Bent Laminations Form

- Glue up a piece of hardwood 2" thick, about 12" wide, and long enough to press the lamination.
- Set up a router with a ½" straight bit and attach it to a circle cutting jig – an 8" wide piece of plywood long enough to obtain the correct radius.
- Attach a different 2" thick scrap block to the workbench. This will be the pivot point for the circle-cutting jig and will bring the router parallel to the form. Measure the radius on the layout board. Drill a hole in the circle-cutting jig the proper distance away from the edge of the router bit. Make sure to reference the correct side of the bit (eg. the inside of the bit for the inside of the curve, and vice versa). Drive a screw through the hole in the circle jig and into the scrap block.
- Attach the hardwood blank (that will be used for the form) to the work surface.
- Machine the groove in the form by taking a number of passes with the router. I recommend a ⅜" –½ " bit.
- For outside curves, measure and drill another hole in the circle cutting jig and repeat the process. Drive the screw through the new hole in the circle cutting jig and into the same hole in the scrap block. After machining the second groove you are left with a male and female form.
- To ensure alignment, attach at least two pairs of guides to the form. The guides will prevent the form from shifting during the glue-up.
- Put a little wax on the form so that the lamination won't stick. Alternatively, you can run a bit of masking tape on the edge of the form if you don't like the idea of putting wax on wood on which you will eventually have to apply a finish.

HARDWARE LIST

1	Clear tempered glass ⅜" x 48"
10	Round plastic bumpers ⅛" x ½"
8	Round felt pads 3/16" x ¾"
20	⅜" Fluted dowels ⅜" x 1 ½"
20	Flat head screws #8 x 1 ¾"

MATERIALS LIST

A	**10 Petal side - bent lamination**	1 ¼" x 1 ¼" x 27 ½" ash
B	**10 Petal ends - bent lamination**	1 ¼" x 1 ¼" x 14 ¾" ash
C	**10 Stem supports - bent lamination**	1 ¼" x 1 ⅛" x 10 ¼" ash
D	**1 Bottom**	¾" x 25" x 25" ash plywood
E	**10 Floating tenons**	3/16" x 1 ¼" x 2" ash
F	**40 Rungs hardwood dowel**	¼" dia., between 5 ½" & 10 ½" long
G	**10 Hand-made paper**	3" x 19" Yamaguchi Chiri Natural
H	**10 Dark brown hand-made paper**	1 ½" x 7"

(Continued from page 10)

grain, you'll find yourself sanding the raised grain after applying the dye and that will damage the colour and leave ugly scratches and splotchy areas.

- Once dry, apply a coat of dark brown glaze and let it dry overnight.
- The next couple of days, brush on coats of durable varnish, sanding in between.

Final Touches

I applied 2 different types of hand made paper from Japan on the 10 sets of rungs to give a bit of ornamentation and add a complimentary colour to the rich brown.

- The first application is a lighter beige paper called Yamaguchi Chiri Natural. Cut it to size, apply rice glue to the rungs then wrap the paper around. Once the glue is dry, tear the paper along a slight radius between each of the rungs by hand. This could be difficult because the paper is naturally resistant to tearing due to its thick fibers.
- Tearing the chocolate brown paper by hand to its final shape will give it a rough, slightly random edge. Glue it on top of the beige paper. Both of these papers, as well as an extensive and imaginative selection of quality, hand-made papers are available from The Japanese Paper Place in Toronto.
- Complete the table with a piece of ⅜" thick glass. Coffee tables can receive a lot of abuse over the years, so I suggest having it tempered for safety.

This table is as beautiful as it is strong, and building it is as difficult as it is rewarding. Set in a living or family room, it is sure to be a place where good friends gather round and talk long into the night.

ROB BROWN
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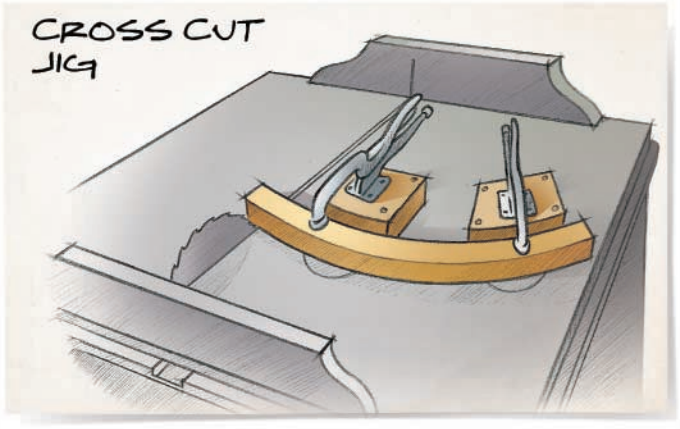
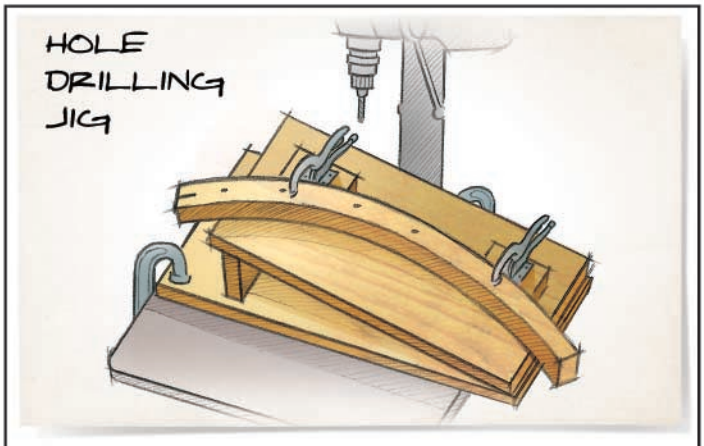


Cross-Cut Jig for Curved Pieces

To cut the petal ends to the correct length and angle I modified my chute board. This jig process can be used to cut both ends of the petal sides, both ends of the stem supports, and both ends, as well as the shoulder cut, of the petal ends.

- Refer to the layout board. Align each petal end with the top-view drawn on the layout board. Draw a line where the cut should be made.
- Screw two pieces of solid wood scrap to the surface of the chute board that reflect the angle of the lamination. Precision accuracy isn't needed.
- Drive a flat head screw (#10 x 1 ½" or so) into the edge of the wood scrap on the surface that the curved piece will rest against. Drive the screw until it protrudes about ⅛". To fine tune the angle just adjust the screw inwards or outwards.
- Place a couple of toggle clamps on top of the wood block to act as hold down devices. For a little extra friction stick an adhesive sandpaper disk on the chute board underneath where the bent lamination will be placed.



Hole Drilling Jig

To drill a series of 4 holes on either side of each petal side build a simple jig for a drill press. The holes are not drilled perpendicular to the lamination. The jig needs to be constructed so that it will hold the petal sides at the correct angle during drilling.

- Dry fit the petal sides, petal ends, and the table base to obtain the angles of the holes.
- Attach a piece of wood to the underside of one end of a piece of 12" x 18" plywood. This places the plywood on an angle.
- Attach these two pieces to a second piece of plywood. This creates an angled surface when placed on a drill press table.
- Set up stop blocks on the angled piece of plywood to help maintain the correct location of the holes. Eight different set-ups are needed for all 80 holes.
- Drill the holes deeply so the rungs can slide into one side far enough to get the opposite end of the rung into the hole on the other side.

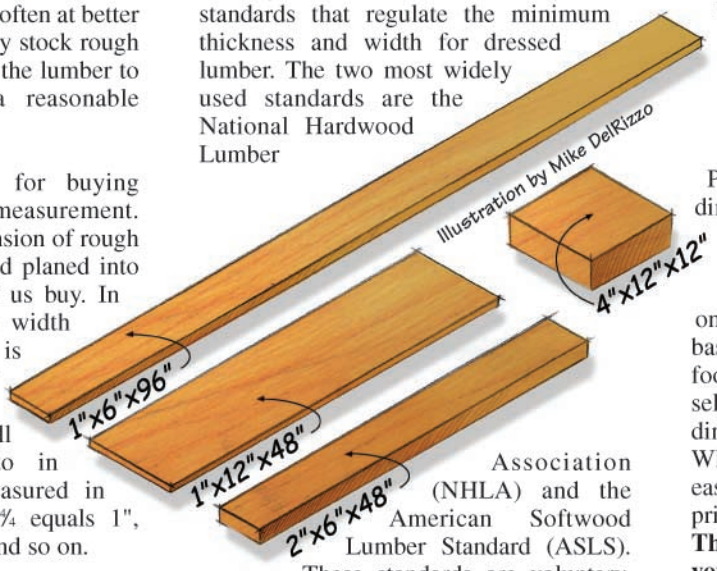
shoptips BY MICHEL THERIAULT

Lumber Measurement

Most of us buy lumber that is either 'dressed' or 'rough'. Dressed lumber (also called 'surfaced lumber') has been jointed and planed after it has been dried, while rough lumber has been dried but not planed. Although it's convenient to buy dressed lumber by the piece from your local building supply store (especially if you don't have the equipment to joint and plane the lumber yourself), lumberyards can provide a wider selection of lumber species, greater variety in board widths, lengths and thicknesses, and often at better value. Lumberyards generally stock rough lumber, but many will dress the lumber to your specifications for a reasonable surcharge.

The standard reference for buying lumber is the nominal measurement. 'Nominal' refers to the dimension of rough lumber before it is dried and planed into the dressed boards most of us buy. In nominal measurement the width and thickness of a board is measured in regular fractions such as 1", 1½" and 2". Sometimes you will see thickness referred to in 'quarters' – lumber is measured in quarters of an inch; thus ¾ equals 1", ¾ equals 2", ¾ equals 1½", and so on.

When you buy a 1" x 6" piece of rough lumber you actually get a full 1" thick by 6" wide piece of wood. If the lumber has been dressed, that 1" x 6" piece of lumber will be somewhat smaller, typically ¾" thick by 5½" wide, which is a result of the loss of material through jointing and planing. That's why a 2 x 4 actually measures 1½" by 3½" and a 2 x 6 measures 1½" by 5½". There are industry wide standards that regulate the minimum thickness and width for dressed lumber. The two most widely used standards are the National Hardwood Lumber Association (NHLA) and the American Softwood Lumber Standard (ASLS). These standards are voluntary, however, and you should always check the dressed dimensions with your supplier.



To calculate the cost of lumber, your supplier uses a standard unit of measurement called a 'board foot' (bf). It's similar to buying nails by the pound or paint by the gallon. Calculating the board foot measure is simple if you think of it as a measurement of volume. A board foot is 144 cubic inches of wood, equivalent to a 12" x 12" x 1" piece. Remember that if you are buying dressed lumber the finished size will be less than the nominal size.

To calculate board feet, multiply the nominal thickness in inches by the nominal width in inches by the length in inches and divide by 144. You can also measure the length in feet – you'll then divide by 12 instead of 144. Typically any length less than a full foot is rounded down to the next lower whole foot.

In the following example we'll calculate the bf of a piece of lumber that is 1" thick, 6" wide and 8' long:

1 x 6 x 8 = 48
48 / 12 = 4 bf

Pricing is based on the nominal dimensions when sold by the board foot ($/bf) even it it's been dressed to a finished size. When sold by the linear foot, the price varies depending on the width and thickness, however the basis for the price will usually be the board foot cost. Many retail outlets stock a selection of dressed boards in standard dimensions and price them by the piece. When comparison shopping, you can easily work backwards to establish the price based on the board foot measure. **The accompanying illustration shows you four boards of various dimensions that are all 4 board feet. Different dimensions, same price.**

The comparison chart provided gives the minimum actual sizes of lumber that has been dressed on four sides as compared to the nominal sizes. The chart also shows the board foot measure for a typical 6' and 8' length of each size.

COMPARISON OF BOARD FEET FOR SOME COMMON NOMINAL AND MINIMUM BOARD SIZES

Nominal Size (")	Minimum Size (")	Board Foot Measure 6' board	8' board
1 x 2	¾ x 1 ½	1	1.33
1 x 3	¾ x 2 ½	1.5	2
1 x 4	¾ x 3 ½	2	2.67
1 x 6	¾ x 5 ½	3	4
1 x 8	¾ x 7 ¼	4	5.33
1 x 10	¾ x 9 ¼	5	6.67
1 x 12	¾ x 11 ¼	6	8

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BY PAUL ROSS

Shipswheel Nutcracker

This is a great project to use as a holiday gift for when you are visiting friends and relatives. It is an especially effective gift when presented with a nice selection of nuts in the shell. Pairing the nuts with the nutcracker establishes that this work of art is not just for looking at and admiring, but for practical use as well. Adding nuts to the gift also gets the party going, because no sooner than the gift is opened, good friends are sitting around snacking.

I've made many variations of this bowl and nutcracker combination. As in the one shown here, one possibility is to singe the rim and an inside ring. I used spalted beech, but you might prefer using your favorite wood for this project. Your choice of wood can give the piece the look and feel you want to achieve.

Mount the Stock and True the Outside

Mount a 12" by 3" blank using a screw chuck. If you vary the stock size, remember that the nutcracker requires a minimum of 1 ½" for the recessed base and spigot. Because the surface of the stock is flat, the screw chuck will make a tight, secure connection between stock and chuck.

True the outside with a ⅜" bowl gouge. Push with your body behind the gouge, towards the headstock, which is the mass of the lathe. Mass absorbs vibration, so when you push towards the mass, you use your body to absorb the vibration.

True the Face and Cut the Spigot

Using the same ⅜" gouge, true the face. Push with your body behind the gouge, from the outside into the center. The center is spinning slower than the outside edge, so go slower as you approach the center. Also, lift the handle of the gouge in order to bring the tip of the tool to the center.

Use a ¼" parting tool to cut the spigot. As you lift the handle of the tool, the cutting edge falls into the wood.

Shape the Bottom

Using a bowl gouge, shape the bottom of the bowl. Your tool should be traveling with the grain, cutting in the direction of the center to the outside. With inboard turning, the bed is in the way of your body getting behind the gouge. So with this cut you must pull; you will have less control of the gouge and a lot of the shavings are going to fly right at you. Ensure that you rub the bevel of the gouge so that the cutting edge of the tool is supported. If you don't rub the bevel, the tool will grab, or skate, across the finished piece.

Use a 3-in-1 tool to mark the center before removing the piece, in case you need to find the center again.

Scrape the bottom surface, using a large heavy scraper. Go with the curve of the bowl.

Use a ½" square-end scraper to create a flat area around the spigot, so that the jaws of the chuck sit 'bang' on.

Power sand the bottom of the bowl, using grits 120, 180, 240 and 400.

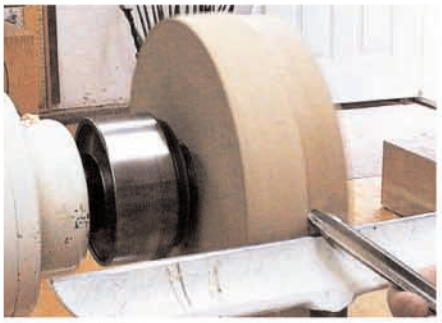
Shape the Top

With the bowl flipped into the chuck and a facing cut completed, take a chamfer cut using a ⅜" bowl gouge.

Use a propane torch to singe the edge. Don't try to burn the whole rim in one pass. Instead take several slow, light passes. Don't hold the torch too close, keep it back a good distance and keep it moving. You can control the burn by lightly rubbing the burned area with a 3M Scotch Brite Pad dipped in water. You may want to practice singing the edge on a piece of scrap material.

Transfer the diameter of the base of the nutcracker to the bowl with a pair of dividers.

With a spear point scraper, make a V-cut right where the burn stops.



True outside

True face

Cut spigot

Rub bevel

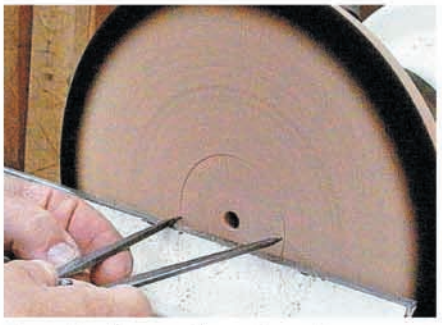
Mark center

Scrape bottom

Create flat area around spigot

Make chamfer cut

Singe edge



Transfer base diameter of nutcracker to bowl

Make V-cut

Shape inside

Make recess for nutcracker

Remove spigot

Make recess for nutcracker bolt

Shape the inside of the bowel. For this you will use two cuts done from opposite directions, blending the two cuts together in the middle.

Finish the Bowl

Make a recess to fit the base of the nutcracker into the top of the pedestal. Cut inside the scribed line with a parting tool and then scrape the recess with a small square-end scraper.

Sand to Finish Grit

Turn the piece over, fit into a jumbo jaw, and turn the spigot off. I like to cut the spigot towards me, until I get the majority off. Then I turn the gouge around and cut towards the center. This ensures that I don't run into a big chunk of wood. Note that at this stage, the piece is held with rubber bungs on the chuck – it doesn't have tremendous holding power. Take only light cuts to finish the bottom.

Make a recess for the bolt by scraping it with a ¼" scraper, or drilling it out.

Finish

An excellent finish for this bowl is General Finishes 'Salad Bowl Finish'. It is an edible finish of oil and beeswax that is ideal for salad and fruit bowls, cutting boards, butcher's blocks, kitchen cabinets, and children's toys. It is a durable, food-safe product that can be used immediately after application.

Mark Your Calendar

Now that your bowl is complete, all you need to do is decide what kind of nuts you want to include with your 'party starter', and mark your calendar. Oh yeah, you'd better make a few extra bowls as back-ups, because once word gets out that you give these as gifts, your calendar is sure to fill up with invitations. Party on!

Ship's wheel nutcracker mechanism available at:

Woodchuckers
800-551-0192
www.woodchuckers.com

Chalet Woodcraft
519-443-5369
www.chaletwoodcraft.com

PAUL ROSS
www.chaletwoodcraft.com
(519) 443-5369

Buying a Bandsaw

When it comes to bandsaws, bigger is often desirable but not always better. Larger 16" bands saws are less prone to vibration because of their mass, have greater power, and a larger cutting capacity. However, they cost more, are heavier to move, and take up more space in your shop. They can also be more intimidating for novice users. A 14" saw is an excellent machine for the average home workshop, whether you are a novice woodworker or a dedicated hobbyist. It will do 95% of whatever is required, and ingenuity will take care of the other 5%.

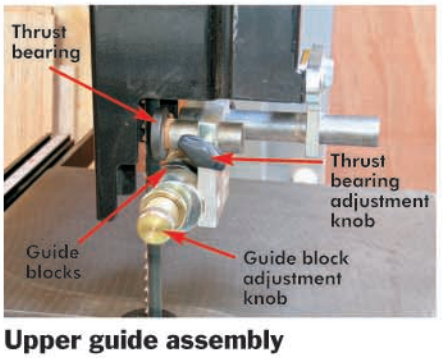
There are quite a few 14" models to choose from. Here are some things you need to keep in mind when you shop for a bandsaw.

Open or Closed Stand

All 14" saws either sit on an open stand, or a closed, cabinet style stand. The closed stand will do a better job of keeping dust away from the motor, and it can provide a space for tool storage. However, an open stand is just as stable as a closed one.

Frame Style

Most saws will have a cast iron frame. Some of the newer models use welded steel frames, which are more often found on larger saws. Cast iron is a good choice. Avoid steel frames on a single cabinet, as the frames are simply not strong enough. Better saws have a second frame sandwich-welded to the first, and the best have a third frame and/or a lateral box-beam to provide the necessary support. The number of layers is easy to see and count, but make sure to compare the thickness of the sheet metal and to check the quality of the welds. Overall fit and finish is an indication of general quality, but a great paint job does not compensate for a weak frame.



Upper guide assembly

Motor Size

Motor sizes range from ½ to 1 ½ HP. Smaller sized motors obviously have to work harder. However, the size of motor you will need depends upon the kind of work you are doing. For craft work and cutting primarily softwoods, a ½ to 1 HP should suffice. For furniture making or cabinet work opt for a 1 ½ HP. For occasional re-sawing, a slow feed rate and the right blade will do wonders.

Wheels

There are both top and bottom wheels. Opt for cast iron wheels over alloy wheels. The momentum their mass generates smoothes everything out and helps compensate for less than optimal power. The wheels will need to be aligned, which is an easy, but essential job (see Wheel Alignment sidebar). The wheels are usually spoked, and more spokes contribute to less vibration and smoother operation.

Trunnions

Trunnions are semi-circular brackets that support the table top and allow it to tilt. Big, strong, cast iron trunnions are far better than the flimsy pot metal (zinc alloy castings) on many, if not most, smaller saws. You are most likely to grab the table top when moving your saw, putting a lot of stress on the trunnions. Some saws may have heavy gauge steel trunnions, which would be preferable to pot metal.

Blade Guides and Thrust Bearings

As you push stock against the bandsaw blade, it flexes backward. A set of bearings, one above the table, the other below the table, counteract this movement. These are the *thrust* bearings. The blade also has a tendency to move sideways, particularly when you are cutting curves. Two sets of *guide blocks*, above and below the table, sandwich the blade, preventing lateral movement. Likely you'll need to adjust both the bearings and guide blocks on a new saw. Doing so is very easy. Just position them so that they are a paper thickness from the blade. Also, position the blocks about 1/16" behind the gullets on the blade.

The bearings and guides are usually made of metal. Many woodworkers replace their guides with 'Cool Blocks' a synthetic, graphite impregnated, phenolic laminate that helps extend the blade life and performance. You can also replace the metal bearings with ceramic bearings, which run cooler.

Cutting Speed

The optimal cutting speed for a bandsaw is about 3,500 feet per minute. While some saws offer a couple of speed rates, the slower speed doesn't make enough difference on hardwoods, and isn't slow enough for other than very light metalwork. In addition, changing the belt on these can be a nuisance.

Table Top

The table top should have a standard ¼" by ⅜" mitre slot designed to accept commonly available gauges. Tables tend to be on the small size and many woodworkers build an auxiliary plywood table to provide a larger work surface.

Fence and Gauge

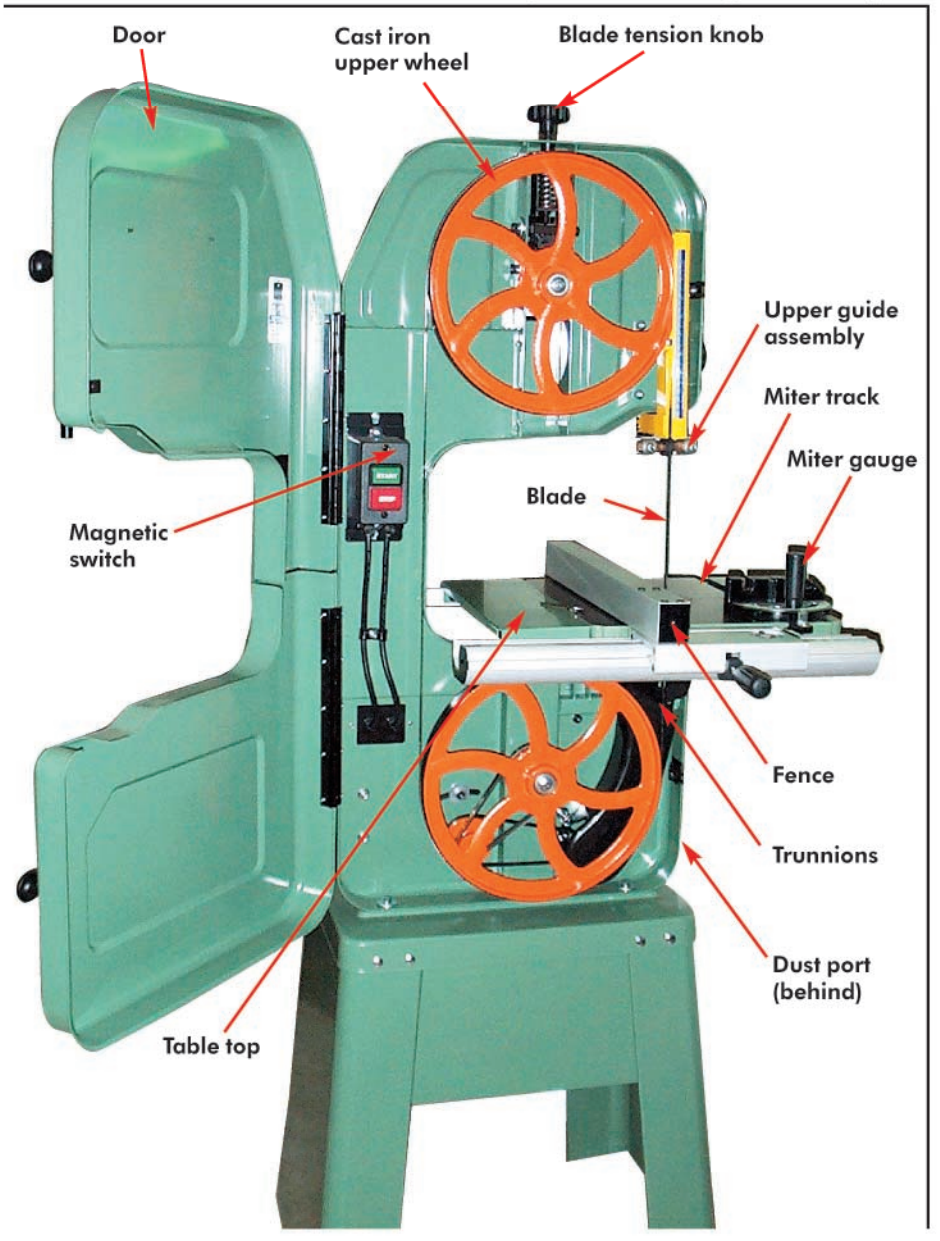
Few saws seem to come with a good quality fence and gauge. The fence must move easily and lock securely, offer at least modest adjustment for alignment to the band, and be easily removed. It should also be easy to true the fence, whether to the mitre slot or blade. Fortunately there are good after market replacements (see Canadian Woodworking Issue #28 for a review of the Little Ripper, and Canadian Woodworking Issue #37 for a review of the Kreg bandsaw fence).

Blades

The three keys to straight tracking are a well-tuned saw, sufficient blade tension, and a blade that is reserved only for straight cuts. Cutting curves changes the set of the teeth and leaves the blade with a tendency to track to one side.

A ½" blade requires about 15,000 psi of tension, so the saw must possess the necessary frame and spring strength to provide and manage the tension. Many saws have a blade tension spring that is not nearly strong enough to handle the required tension. Good, inexpensive, after market replacements are readily available. Also keep in mind that while all bandsaws will have a tension knob to adjust blade tension, some lack a tension scale.

Blades are subject to considerable drag as they slice wood. Drag is caused by the hardness, thickness, and moisture content of the wood and by the width of the blade. The way to reduce drag is to get rid of the sawdust as fast and effectively as possible. Do that by choosing the correct tooth configuration, and by using the narrowest blade that is practical. A ½" 3 TPI hook tooth blade is an excellent choice for general purpose re-saws. It cuts quickly, but does make a wider kerf and leaves a rougher surface than blades with more teeth. Wider blades are more expensive, and require more horsepower and more tension than small saws can deliver, yet they do not produce any straighter cuts.



Parts Availability

Generic brand saws are almost always clones of the Delta saw. Delta parts are readily available and usually fit import saws. When I cracked the pot metal guide holder on my 20 year old Taiwanese copy I replaced it with a Delta guide holder and it fit perfectly.

Other Considerations

Look for high quality, easy to grasp metal handles, knobs, and catches rather than plastic. Not only are they nicer to use, they don't break. The upper and lower doors should be hinged rather than bolted in place, and operate independently of each other. A brush fixed to the lower wheel that sweeps dust off the tire is a real bonus. So is a dust port, but only if it is well-placed - preferably on the back bottom of the saw. A magnetic switch is an important safety component, and a further indication of the quality of the whole unit. Most saws don't come with a lamp, but it's a good idea to attach one to your saw, particularly if you are making a lot of intricate and precise cuts.

If you do a lot of re-sawing consider purchasing a riser block to extend the re-saw capability of your bandsaw (see "Riser Blocks" sidebar).

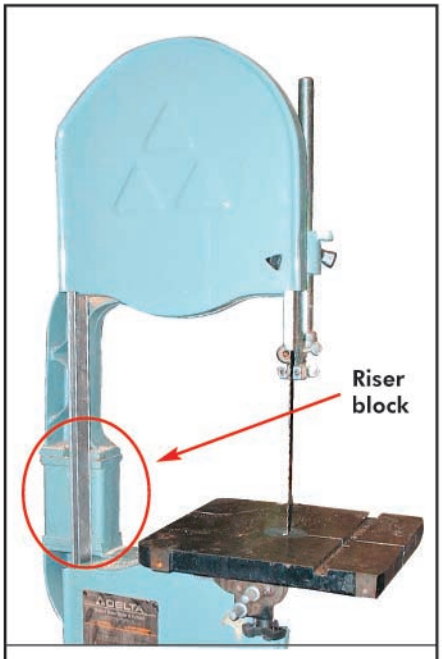
ADDITIONAL RESOURCES:

The Bandsaw Book,
Lonnie Bird, ISBN 1561582891

Tips on installing a riser block:
www.woodshopdemos.com/bs-2.htm

Blades and accessories:

R&D Bandsaws
1-800-461-3895 www.tufftooth.com
Lee Valley
1-800-267-8767 www.leevalley.com/wood
KMS Tools
1-800-567-8979 www.kmstools.com
The Saw Shop
1-877-778-5585 www.thesawshop.com

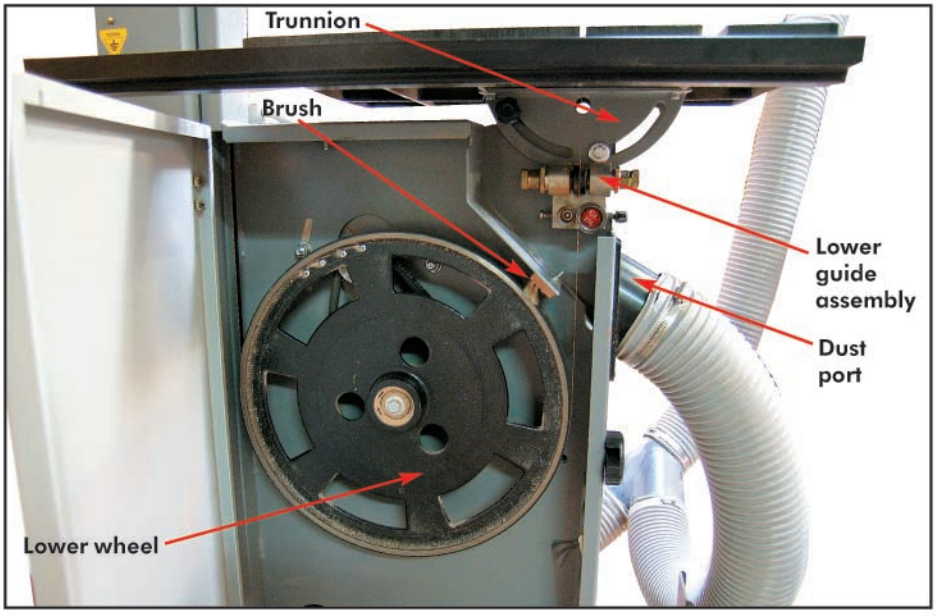


Riser Blocks

You can easily increase the re-saw capacity of your saw by adding a riser block. An 18" saw, for example, provides a 12" re-saw capacity under the guides. Installing a riser block on a 14" saw will give you the same 12" re-saw capability. The riser block is simply a rectangular piece of cast iron, about 6" in height. It's installed between the upper and lower cast iron arms of your bandsaw, effectively increasing the distance between the table and the blade guides. To reduce frustration make sure that the riser block you purchase is well machined. Otherwise the saw halves won't line up without fiddling and fitting.

Wheel Alignment

It's important that you align the upper and lower wheels of your band saw. All you'll need is a straightedge (a straight length of hardwood will do). Start with your bandsaw unplugged. Open the wheel covers and place the straightedge against the outside edge of the bottom wheel (the edge facing you). The top edge of the top wheel should be kissing the straightedge – invariably it won't. Loosen the nut that holds the blade tracking knob in place, and then turn the knob gently until the top wheel just touches the straightedge. Don't forget to tighten the locking nut on the tracking knob when you're done. Its good practice to check that the wheels are coplanar each time you change blades.



Blades and accessories continued:

Global Tools & Equipment
1-800-265-3335 www.globaltools.com
Morley Miller Machinery
519-448-1361
www.morelymillermachinery.com
AccuSquare
1-877-684-7366 www.mulecab.com
Little Ripper
1-866-443-4432 www.thelittleripper.com

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Bandsaw Tips:
Canadian Woodworking Issue #20
Reduce Dust from your Bandsaw:
Canadian Woodworking Issue #22

GARRETT LAMBERT
garrett.lambert@gmail.com

toolspecs BY GRAHAM MCCULLOCH

King

Canwood
(House of Tools)

Ridgid

	King	Canwood (House of Tools)	Ridgid
Model No.	KC-1401HD	CWD 10-260	BS1400
Price	$399.99	$399.99	$498.00
Warranty	2 Years	1 Year	3 Years
Base Type	Sheet Metal, Open	Sheet Metal, Open	Sheet Metal, Open
Upper Frame	Cast Iron	Cast Iron	Cast Iron
Wheel Material	Cast Aluminum, Balanced	Cast Aluminium, Balanced	Cast Aluminum, Balanced
Table Size/Material	14" x 14" / Cast Iron	14" x 14" / Cast Iron	14" x 14" / Cast Iron
Table Tilt	15° Left, 45° Right	10° Left, 45° Right	10° Left, 45° Right
Access Door Type	Hand Screw Closure	Hinged, Hand Screw Locks	Hinged
Tension Release	Hand Screw	Hand Screw	Hand Screw
Dust Port	2 ¼"	4"	2 ½"
Blade Length/Width	93 ½" / ¼" Max	93 ½" / ¾" Max	93 ½" / ¾" Max
Blade Guard Type	Steel, Hand Raised	Steel, Hand Raised	Steel, Hand Screw Raised
Blade Guides	Impregnated Plastic Blocks	Ball Bearing, Graphite Blocks	Micro-adjust, Graphite
Cutting Height	6"	6"	6"
Power Switch Type	Safety Toggle	Paddle	Paddle Type, Safety
Speed(s)	2,760 SFPM	N/A	2,700 SFPM
Motor HP/Voltage	¼ HP / 120v 7.5 amps	¾ HP / 120v, 10 amp	¼ HP / 120v / 240v 10 amps / 5 amps
Weight	150 lbs / 68 kg	175 lbs / 80 kg	178 lbs / 81 kg
Included Accessories	Mitre Gauge	¼" Blade	Lifetime Service Agreement
Optional Accessories	Riser Block, Rip Fence, Bearing, Blade Guides	None	Mitre Gauge, Rip Fence, Riser Block, Cool Blocks

Notes: Prices are approximate street prices. Specifications are accurate at the time of writing. Where indicated, the optional riser blocks will increase cutting height to approximately 12". All bandsaws come with a blade

14" Bandsaws

Craftex
(Busy Bee)

Delta

General

	Craftex (Busy Bee)	Delta	General
Model No.	CT015N	28-276	90-150
Price	$499.00	$599.00	$789.00
Warranty	2 Years	2 Years	2 Years
Base Type	Sheet Metal, Open	Sheet Metal, Open	Sheet Metal, Partially Open
Upper Frame	Cast Iron	Cast Iron	Cast Iron
Wheel Material	Cast Aluminum, Balanced	Cast Aluminum, Balanced	Cast Aluminum, Balanced
Table Size/Material	14" x 14" / Cast Iron	16" x 16" / Cast Iron	14" x 14" / Cast Iron
Table Tilt	45° Right	3° Left, 45° Right	45° Right
Access Door Type	Hand Screw Closure	Hinged	Hinged
Tension Release	Hand Screw	Rapid Release Lever	Quick-Release
Dust Port	3"	4"	4"
Blade Length/Width	97 ½" / 1" Max	94 Max	97 ½" / 1" Max
Blade Guard Type	Sliding Sheet Metal	Sliding Sheet Metal	Rack & Pinion
Blade Guides	Ball Bearing	Micro Adjust, Graphite Single	Ball Bearing
Cutting Height	6"	6 ¼"	8"
Power Switch Type	Paddle	Push Button	Push Button, Safety
Speed(s)	750, 1,230 and 2,800 FPM	3,000 SFPM	3,100 SFPM
Motor HP/Voltage	1HP / 115v	¼ HP / 120v	1 HP / 110v / 220v 9 amps
Weight	97 kg	201 lbs / 91 kg	174 lbs / 80 kg
Included Accessories	Rip Fence, Miter Gauge, ⅜" Blade		Rip Fence, Mitre Gauge
Optional Accessories	Riser Extension Block, Circle Cutter	29-984 Riser Block	5" x 14" Table Extension

GRAHAM McCULLOCH
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Rubbing the Finish

The smooth, clear look that you see on expensive furniture and high-end musical instruments, such as pianos and guitars, is achieved by rubbing out the finish. Rubbing the finish removes dust nibs, brush marks and other imperfections, levels the surface, and gives an even sheen. The only way you can get a super high gloss look is by rubbing the finish. Essentially, rubbing is sanding the finish with successively finer grits of sandpaper, along with a lubricant.

There are two basic steps in rubbing. The first step involves sanding the surface flat. The second step involves rubbing the finish to the level of gloss (or sheen) that you want. After you have rubbed out a few surfaces you can begin to adjust the basic rubbing schedule presented here.

Finishes to Rub

The best finishes to rub are the evaporative finishes, shellac and lacquer. Multiple coats fuse together into one layer, and they cure brittle and hard. The reactive finishes (varnish and polyurethane) and coalescing finishes (water based) are more difficult to rub out. The layers of these finishes do not fuse together - each layer sits on top of the previous layer, so if you rub through one layer into another layer you'll leave a visible mark. Although these finishes are time consuming to sand, they cure tough and, unlike brittle finishes, don't scratch easily.

Rubbing Gear

Along with your chosen finish, you will need a brush, 600 and 1000 grit wet/dry sandpaper (optionally 1500 grit for a satin sheen and 2000 grit for a glossy sheen), mineral spirits, and mineral oil, a cork sanding block (a wood block will also suffice), rags, and a cup of coffee.

Applying the Finish

Finish sand your project to 220 grit. For open pored woods like oak, mahagony and walnut, you may want to apply a pore filler.

If colour is called for, apply a stain. Optionally, finish off with a coat of shellac, then lightly sand. (Note, don't apply shellac under lacquer, and be sure that you use de-waxed shellac under polyurethane).

If you are aiming for a glossy sheen, then use a gloss finish. Lay on at least six coats, lightly sanding between each coat. Be sure to wipe up the dust from each sanding. Allow each coat to dry for a full day before applying a subsequent coat. After you've applied all the coats, you'll want to let the finish cure for about a month before rubbing it out. Minimally, let it cure for a week. I've had excellent results using shellac flakes, Defts' 'Gloss Clear Wood Finish' brushing lacquer, and good results with Minwax's 'Fast Drying Polyurethane'.

Laying down sufficient coats of your finish is important, as you run a risk of rubbing through the finish as you move to the next step.

Rubbing the Finish

You need a lubricant to use with the wet/dry sandpaper. A mixture of 2 parts mineral spirits to 1 part mineral oil will cut quickly, but not too aggressively. You can also use water with a couple of drops of soap added, though this cuts very fast, so proceed with caution.

Wet your surface, and begin sanding with 600 grit wet/dry sandpaper. On flat surfaces use a cork or wood block. Your aim is to produce an evenly dull sheen without any shiny spots. Check your sandpaper frequently – as soon as it becomes clogged ('corned' with tiny balls of finish) clean the paper, or use a fresh piece. Every so often clean off the surface and have a look at your progress. Be careful of rubbing too much along the edges, or you will cut through the finish. If your finish has a lot of brush marks, bubbles, and/or dust nibs you can try using 400 grit paper before the 600 grit. Just go a bit slower and check your work often. Once you've removed all the shiny spots, clean off the surface. Now repeat the rubbing process with 1000 grit wet/dry paper and lubricant or 0000 steel wool until you produce an even shine. You can continue rubbing with finer grit paper until you've reached the level of sheen you desire. Once you get to the higher grits you can optionally use an Abralon sanding pad, which are available up to 4000 grit. Use the Abralon pads by hand or with your random orbital sander.

You can achieve even more sheen by using a rubbing compound, such as the Menzerna compounds. These compounds are applied by hand, with a soft cloth or buffer, after you have levelled the finish with sandpaper. Whether I use a rubbing compound or not, I always end off by applying a coat of wax.

Your first rubbing session may not give you stellar results. Don't get discouraged, like much in life, practice and patience make all the difference.

AVAILABLE AT:

Shellac flakes, Abralon pads, Menzerna rubbing compound available at:

Wood Essence
(306) 955-8775 www.woodessence.com

Deft and Minwax finishes available at:

Home Hardware
www.homehardware.ca
Most building supply centers across Canada

Resources:
'Surface Preparation',
Canadian Woodworking, August/Sept 2003
'Shellac',
Canadian Woodworking, Feb/Mar 2004

CWM

Tuning a Block Plane

Table saws, jointers, planers and other machines are vital tools in a furniture making shop. They get the job done more quickly than hand tools and with the potential for great accuracy. However, for some situations, like making a tenon fit a mortise, or making one surface flush to another, machines are often inadequate. They don't have the finesse and fine-tuned accuracy of a hand tool. Two or three one-thousands of an inch can make quite a difference in fine work – this is where hand tools, and in particular, the hand plane, excel.

Hand planes need fine-tuning whether they're antiques or brand new. After a few hours of remedial work, your hand plane will really sing. I say "sing" because for me, the sound of wood shavings peeling through the mouth of a sharp, well-tuned plane is truly music.

Let's look at the steps to fine tuning a trustworthy friend, the block plane.

What Can it Do?

The block plane is a small plane that is typically held in one hand for light-duty use. Two-handed use is easier when using the plane for longer periods or when slicing through end grain. You can use it to trim the protruding tails and pins on through dovetails. It makes quick work of small chamfers and round-overs when the perfection of a router makes the piece look less "hand-made". It is great for trimming one surface flush with another, whether it be solid wood edging, iron-on edge banding, or simply flushing off through-dowel joints.

Less Work Than Larger Planes

Larger traditional planes such as smoothers, jack planes and jointing planes include chip breakers or cap irons. These must be properly fitted to the blade and smoothed over to promote good chip ejection. These planes also have a frog, which must be fine-tuned. Block planes, however, have no frog and no chip breaker. They are simple planes consisting of a body, a lever cap to hold the blade in place, a blade depth adjuster to move the blade in and out, and a gripping knob near the front. Some have a lateral adjust lever and an adjustable mouth.

The steps to tune-up a block plane:

- Deburring the casting and adjustable sole plate
- Flattening the sole
- Slightly bevelling the sole
- Improving the fit between lever cap and blade
- Flattening and sharpening the blade

Deburring throat

Flattening the sole

Bevelling the sole

Deburring

The first step is simple. Remove the lever cap and blade and take off the adjustable sole plate, if any. Look for sharp metal burrs or paint that shouldn't be there. Use a tiny mill file to remove these imperfections and clean up with some fine steel wool.

The adjustable sole plate, in particular, must be able to freely move in the channels ground into the sole. If there are any burrs or paint in the channels, then it will not move freely and the plate will not be flat with the rest of the sole when adjusted to different positions. Check the underside and edges of the sole plate as well.

Flattening the Sole

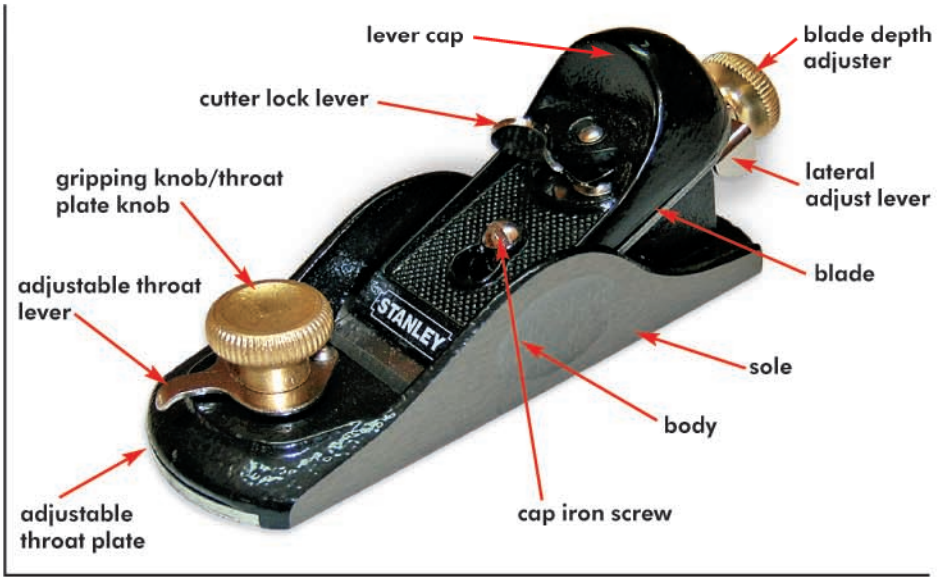
A flat sole is critical for any hand plane. Even more expensive planes can benefit from lapping. Sprinkle some 90 grit silicon carbide powder on a thick sheet of glass (I use ½") and lubricate with kerosene. Make sure the adjustable sole plate is inserted and set to the position in which you will use it most.

The blade should also be in place and properly tensioned, though retracted so as not to grind the blade on the glass. Rub the sole around on the glass in random circles, figure-eight or back-and-forth motions until the entire sole is one dull gray colour.

Repeat the rubbing process with 180, 280, 400 and 600 grit silicone carbide powder. Make sure you clean any residue off the glass before switching from one grit to the next.

At the end of this process, you'll have a flat and relatively smooth sole. Then take the plane apart, and with rags and a small brush, clean out all traces of kerosene and silicon carbide powder.

I often continue the rubbing sequence with waterstones, taking the sheen right up to 4000 grit or more. This produces a plane sole that significantly reduces friction when planing.



Bevelling the Sole

The sole will already have slight bevels ground around its perimeter by the manufacturer. Sometimes the bevels at the front and back of the sole are too small, leaving an almost-sharp edge. This edge may catch on raised areas when planing a surface, so I use a mill file to grind the edge down just a bit more. Push the file on an angle, working away from the sole instead of towards it.

Adjusting the Lever Cap

The leading edge of the lever cap sits on top of the blade, holding it into the body of the plane and preventing chatter. It should touch the blade tightly over the majority of its width. Since the lever cap is often painted on all sides, lumps of paint or minor burrs can prevent correct seating. Rubbing the leading edge of the lever cap on glass with silicon carbide powder can smooth things out.

You can use fine steel wool dipped in lacquer thinner first to remove the paint. If you prefer, you can flatten the metal with wet/dry silicon carbide sandpaper on a sheet of glass, instead of powder.

Flattening and Sharpening the Blade

Now you just need to flatten the back of the blade just as with your chisels. You can do this using silicon carbide powder on glass, or on your waterstones. You need to achieve flatness only over a tiny area directly behind the cutting edge. Then follow through with proper sharpening. (For more details on hollow-grinding and final honing, see "Waterstones" in Canadian Woodworking issue #36).

Enjoy

The true test is how the plane performs. A sharp, finely tuned block plane should be a joy to use, especially on more co-operative wood species such as Honduras mahogany, black walnut and European beech. Use a regular angle block plane for long-grain cutting and a low angle plane for end grain. End grain shavings are proof of a well tuned block plane, so enjoy the rewards!

HENDRIK VARJU
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info@passionforwood.com

Adjuster leveler cap

Blade after flattening

Shavings

Desk Clock

Clocks make wonderful gifts anytime. I make them to sell, give as gifts, and take commissions to customize them. This is a clock I made for Paul and Linda at Canadian Woodworking. The following instructions show you how to make a clock with either the name of a friend or business on it. You can adjust the size of text to accommodate more or fewer letters. If you prefer a scene or picture you can replace the text with a scrolled graphic. Add holiday images to customize it for a special time of year or personalize your clock for events such as weddings, graduations, birthdays, or retirements.

It's a good idea to purchase your clock insert before you begin your project. I used a 2 ¾" clock insert that fits in a 2 ¼" hole. You can choose a different clock, but make sure you have the appropriate sized bit to cut the clock hole.

Cut the base from a piece of ¾" MDF. You can also use plywood, particle board, or solid wood. Tilt your scroll saw table 25° to the left, then cut out the edge of the base in a clock-wise direction.

Prepare two upright pieces from the same stock you used for the base, cutting the edges at a 90° angle.

Round over the edges on the top and sides with a router. If you don't have a router, hand sand the edges.

On the smaller upright piece, drill a 2 ¼" hole for your clock insert. A saw tooth bit cuts a cleaner hole than a hole saw.

On the bottom of both upright pieces drill ¼" holes that you will use to join the uprights to the base. Drill corresponding holes in the base, making sure you don't drill all the way through the base. You can line up the hole locations by eye, or you can use a set of dowel centers, which greatly simplify the task.

Cut out the letters from a piece of ⅛" Baltic birch plywood (available from most building supply centres).

Sand the Baltic birch smooth and apply two coats of clear spray finish.

Glue the lettering in place on the larger upright piece.

Spray the lettering with a clear-coat finish.

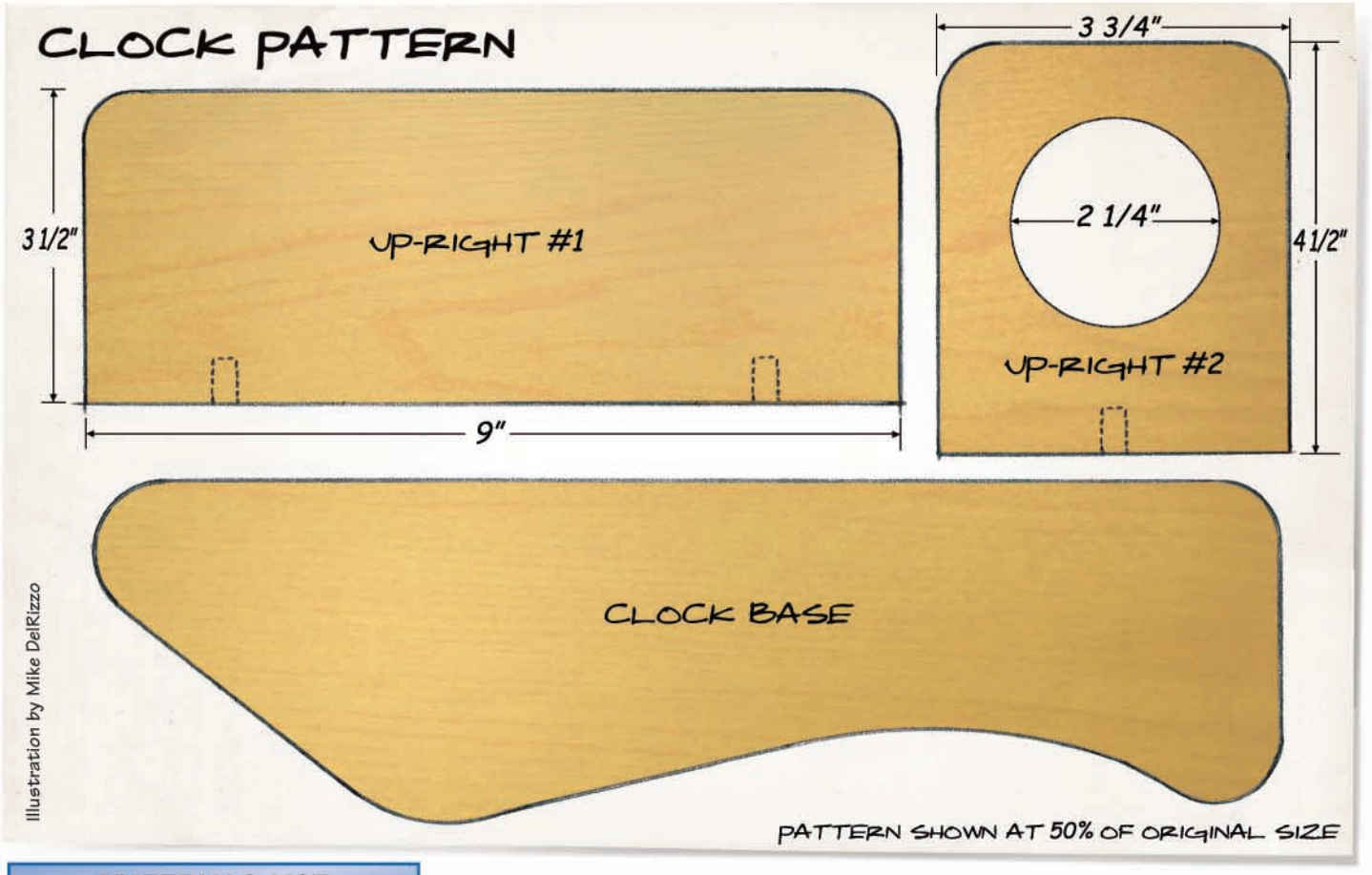
Paint and clear-coat the upright pieces and the base before gluing them together. I painted the front and edges of the clock with Krylon Stone Paint, and the back of the uprights and bottom of the base with a flat grey paint. I then applied two coats of clear-coat finish.

Glue the stand-up parts to the base and secure with 1 ½" #8 screws.

Place four small cork stick-on feet to the bottom corners of the base so it won't scratch the surface it is set on.

Now this is one project that is sure to make a timely statement to celebrate any occasion.

Clocks by Ted Duquette



MATERIALS LIST

1	**Base**	MDF, plywood or solid 3 3/4" x 13 1/2"
1	**Upright 1**	MDF, plywood or solid 3/4" x 3 1/2"
1	**Upright 2**	MDF, plywood or solid 3/4" x 4 1/2" x 3 3/4"
1	**Lettering as required**	Baltic birch

CLOCK INSERTS AVAILABLE AT:

Craftime Clockery
800-263-2569

Kidder
800-263-3556 www.kidder.ca

Workshop Supply
800-387-5716 www.workshopsupply.com

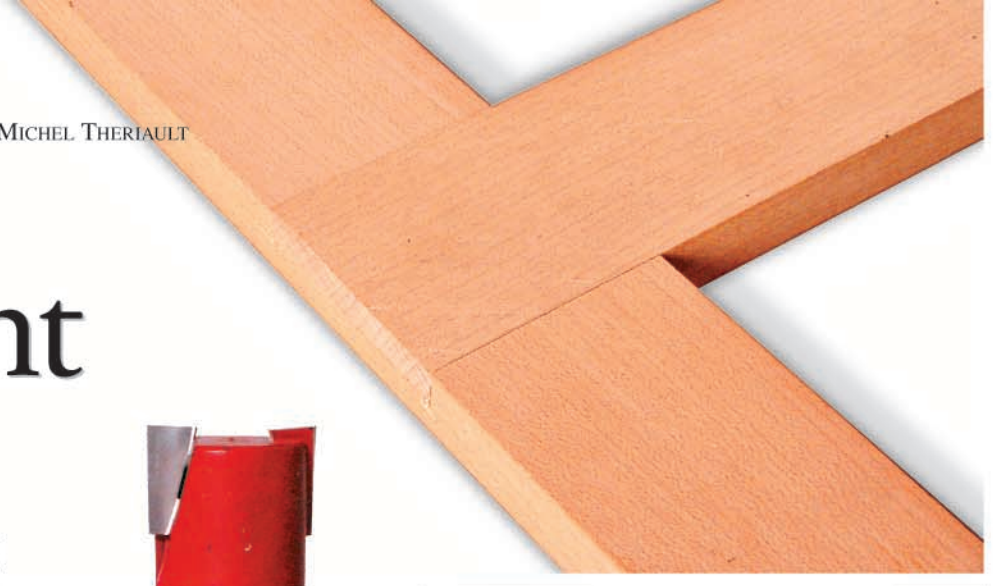
Krylon Paint available at:

Home Hardware
www.homehardware.ca
Most building supply centers across Canada

TED DUQUETTE
tbear@ontera.net

BY MICHEL THERIAULT

Lap Joint



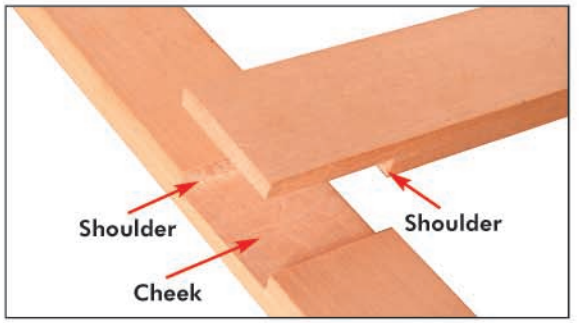
Lap joints may not be as highly regarded by the craftsman as the dovetail or the mortise & tenon, but they serve a very important role and are quite versatile. They are used where two or more pieces meet or cross, enabling you to keep the surfaces of the two pieces flush while improving the strength of your assembly. This includes frame members in a cabinet, legs that cross (to add some style), and other support pieces.

The lap joint can meet at the ends to make an 'L' shape, in the middle of one piece and the end of the other to create a 'T' shape, or two pieces can meet in the middle to make a 'X' shape. The pieces don't have to meet at right angles - almost any angle will work. At the point where they join, a half-lap is used, with half of each matching piece cut away so the pieces are flush with each other where they cross. This improves the gluing surface and resists twisting forces.

What You Need

You can make lap joints using several techniques. In each case, it is as simple as removing the waste on each piece to match the other overlapping piece. The important part of making them is to get a crisp, tight, joint both for strength and for appearance. The simplest way is to make the joint with a saw and chisel. While a handsaw works well, a bandsaw is a quicker, more accurate approach. You can also use a table saw or router table to cut the joint.

Bottom cleaning bit



How to Make the Joint

First, overlap the two pieces in the way they will be in the final project. Using a very sharp pencil or a marking knife, mark where each piece crosses the other piece. Using a square, follow this line down the edge of each piece to half the thickness, creating the shoulder. Scribe a line across at that point, marking the cheek.

Now that you have your reference marks, it's time to start removing the waste. Using your bandsaw or handsaw, cut down the inside of the shoulder mark to the line you made for the cheek. Leave a little extra material to fine-tune the joint. If your lap is on the end of your piece, use the saw to cut the cheek as well. Next, use the saw to make some relief cuts down to the cheek. This will make it easier to remove the waste.

Clamp the piece on your workbench and use a chisel to remove the waste, carefully working your way down to the cheek. You could also cut out the waste using a dado blade on your table saw, or a bottom cleaning bit in your router. Repeat for the second piece.

Test fit the pieces and carefully remove more material until you get a snug fit, with the surfaces flush.

MICHEL THERIAULT
woodstoneproductions.com
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Marking the shoulder

Cutting the shoulder on a bandsaw

Chiselling out the waste

FJ85 – 6 AMP Heavy Duty Variable Speed Jigsaw

- Quick-Fix blade change system provides easy tool-free blade change
- Variable speed electronic switch (500-3,000 RPM) with Lock-in constant speed feature (Maintains Speed Under Load) to reduce chipping and splintering
- 4 orbital settings
- Accepts Bosch® shank blades
- American Woodworker Magazine "Best Buy" Award

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- Cuts up to 3 1/4" wide and 3/32" deep for fast stock removal
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- Reversible carbide knives for extended life and reduced down time
- Dial adjustment with positive detents for quick and accurate depth adjustment (1 full turn = 1/25")

JS102 - 5 AMP Adjustable Fence Biscuit Joiner

- Premium adjustable fence with positive detents at 0, 45, and 90 degrees for easy and precise adjustments
- 6 depth settings (0, 10, 20, A, B, and MAX)
- Model JS100 is the same except the front angle plate adjustment (0, 45, and 90 degree angles exclusively)
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- Includes: 1/4" collet and edge guide
- Large micro-adjustment knob simplifies setting of bit height
- American Woodworker Magazine "Best Buy" Award

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carvingproject BY DAVID BRUCE JOHNSON

Relief Carving

Relief carving is the use of perspective, highlights, shadows, and texture to effectively create an illusion of depth.

This relief carving of two swans, was designed to demonstrate every element of this definition. That is the 'what' we are going to do. The real heart of this article however is the 'how', using a piece of basswood that is 8" high, 10" wide, and ½" thick.

Draw pattern on wood

The process of relief carving doesn't differ dramatically from carving in the round. Carving is a process of refinement involving a series of steps from the general to the specific.

There are three main steps for this relief carving: OUTLINING, CONTOURING, and DETAILING. Start by transferring the pattern onto your piece of wood. Notice the **perspective** introduced by making the swans different **sizes** and by **overlapping**.

Outline the Swans

Outlining raises the subject matter above the wood surface or, put another way, it pushes the background behind the subject. Use a parting tool (V-gouge) with one side vertical on the line of the drawing. To avoid inadvertently lifting strips of wood, be careful to keep the other side of the gouge clear of the wood surface. Remove wood perpendicular to the outline with a #5 gouge. Repeat this step several times until you reach your maximum depth. Use your knife to reach into sharp corners.

I stopped when the maximum depth was ⅜". It is important to keep the outline cut

Outline with V-gouge

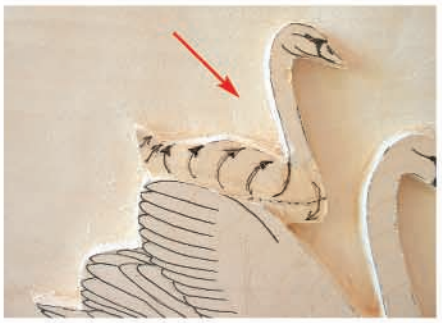
Remove wood with a #5 gouge

Use knife for sharp corners

Deepest point on carving

Complete oval and depth together

Sand to obscure oval shape



Make smooth body/background junction

Carve front swan's body in three layers

Round top layer with #5 gouge, face down

Shape primary feathers with #2 gouge

Define top of tail with #2 gouge

Round cape with #8 gouge

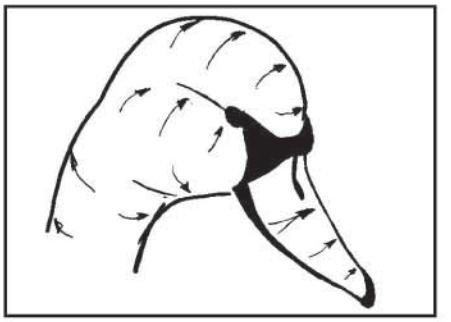
Establish downward angle to join bottom of swan to water surface

Round necks into a half-circle cross-section

Sand to prepare surface for details

Redraw pattern to guide detailing

Carve ripples in front of swans



Direction of curvature

vertical; otherwise, the birds will become fatter than the drawing. Also, go as deep as the wood will reasonably allow. A common error is to not use the available wood. In this project, the deepest point occurs where the rear swan's neck joins its body. This step is complete when the maximum depth is reached and the surrounding oval is created. Add to the illusion of depth by sanding the background thoroughly, making the oval disappear.

Contour to Create Shape

Rounding masses on the swans creates **highlights and shadows**. Progress from the swans' bodies to their necks, then to their heads. First, reduce the thickness of the rear swan by approximately ½ the total depth. Then, round its body until the back meets the background smoothly.

The front swan's body is carved in three layers: the back/secondary feathers, the primary feathers, and the tail/rump. Round each layer toward the top/back. Shadows should cast from each upper layer to the one below it, because the layers are close together. Round the cape (base of neck/back) using a small #8 gouge. Complete the bodies by rounding the rump and belly to meet the background surface at a downward angle. A smooth, angled junction will create the illusion of the swan floating **on** the water. (**Do not** undercut this junction. Undercutting would create the impression that the swan was above the surface.)

To appear distant from the background, the swans' necks must be fairly thin thus preventing a cast shadow. Reduce the thickness of each neck to approximately ½ their width. Then, round the neck to create a half-circle cross-section with both edges perpendicular to the background. The different sized necks of the swans contribute to perspective and the illusion of depth.

Although the swans' heads are quite small, they deserve special attention. Care must be taken to obtain the desired contours. Because of their importance, the heads can be deeper than the neck without detracting from the overall perspective. The head drawing shows the direction of curvature to achieve the desired contours. Before proceeding to the next step, sand your carving thoroughly. It is always best to have a very good surface on which to add details. Details will never hide surface imperfections.

Details Contribute to Illusion of Depth

In this project, few details are necessary. Add contours to the backs; undercut the tail to create the rump; round the leg of the front swan; and separate individual feathers. Finally, to add to the desired illusion, carve ripples around the breast and in front of the first swan.

Again, sand the carving thoroughly with special attention to rounding the ripples. In the final carving, notice how the initial oval also contributes to the illusion of a water surface.

Finishing Your Relief

To finish this carving, I used a satin lacquer and applied one heavy coat followed by two light coats. I also went over the carving with extra-fine steel wool between coats.

Now, to effectively reveal the illusion you have created, find a location for your carving with light coming from the appropriate direction.

DAVID BRUCE JOHNSON
www.davidbrucejohnson.ca

Cedar

Illustration by Mike DelRizzo

Eastern White Cedar (Thuja occidentalis)

Western Red Cedar (Thuja plicata)

What we commonly refer to as cedars are really not "true" cedars but arbor-vitae – the tree of life. Cedars are part of the genus Cedrus, while arbor-vitae are of the Thuja genus. However, we'll use the more common term *cedar* in this article.

Only two kinds of cedar grow in Canada - eastern white (or northern) and western red. Eastern cedar is found in the Maritimes, the Great Lakes/St. Lawrence forest region of Québec and Ontario, and in parts of Manitoba. A modest sized tree, it reaches a typical height of around 50 feet and a diameter of 1 to 2 feet – though some have exceeded 80 feet in height and 3 feet in diameter. Western cedar is found in British Columbia, particularly along the coast, and in parts of Alberta. Western cedars are renowned for their incredible size and stature. The Cheewhat Lake cedar on Vancouver Island is almost 62 feet in diameter and 190 feet high. It's still a youngster compared to the 1,460 year old cedar in Olympic National Forest, Canoe Creek, WA.

Uses

Cedar is prized for its natural resistance to decay and insect damage, which makes it ideal for outdoor projects. This wood is often used for shingles, shakes, posts, poles, outdoor furniture, interior paneling, house siding, decks, and saunas. Also, cedar is lightweight and this makes it an excellent choice for fishing net floats and canoes. First Peoples made extensive use of cedar for medicines, perfumes, teas, clothing, tools, baskets, mats, nets, and canoes.

Physical Properties

Cedars are more durable than other softwoods. They are dimensionally stable and dry with little shrinkage, but have low strength and shock resistance, as well as poor steam bending qualities. Western cedar can range from a light to medium brown, with the heartwood brown and pinkish and the sapwood almost white. Eastern cedar is lighter in colour, with whitish sapwood and light brown heartwood. Both trees usually have a straight and even grain. While eastern cedar has a fine texture, western cedar is more coarse. The cedar trademark is actually its scent, which is described as spicy. If you are working with this charismatic wood, keep in mind that it can cause an allergic reaction in some people.

Working Characteristics

You will find that cedar machines easily and works well with hand tools. It's easy to split or cut along the grain. Cutting across the grain, however, may cause tear out, because of the long fibers. The wood is quite easy to glue, while pre-drilling is recommended for nailing or screwing. Western cedar stains and finishes somewhat better than Eastern cedar. For an outdoor, weathered look you can leave cedar unfinished, and the wood will change to a silver colour over time. While cedar may not be your main choice for indoor furniture, it makes an excellent wood for home renovation and outdoor furniture projects.

LAURA MORRIS
www.lauramorris.ca

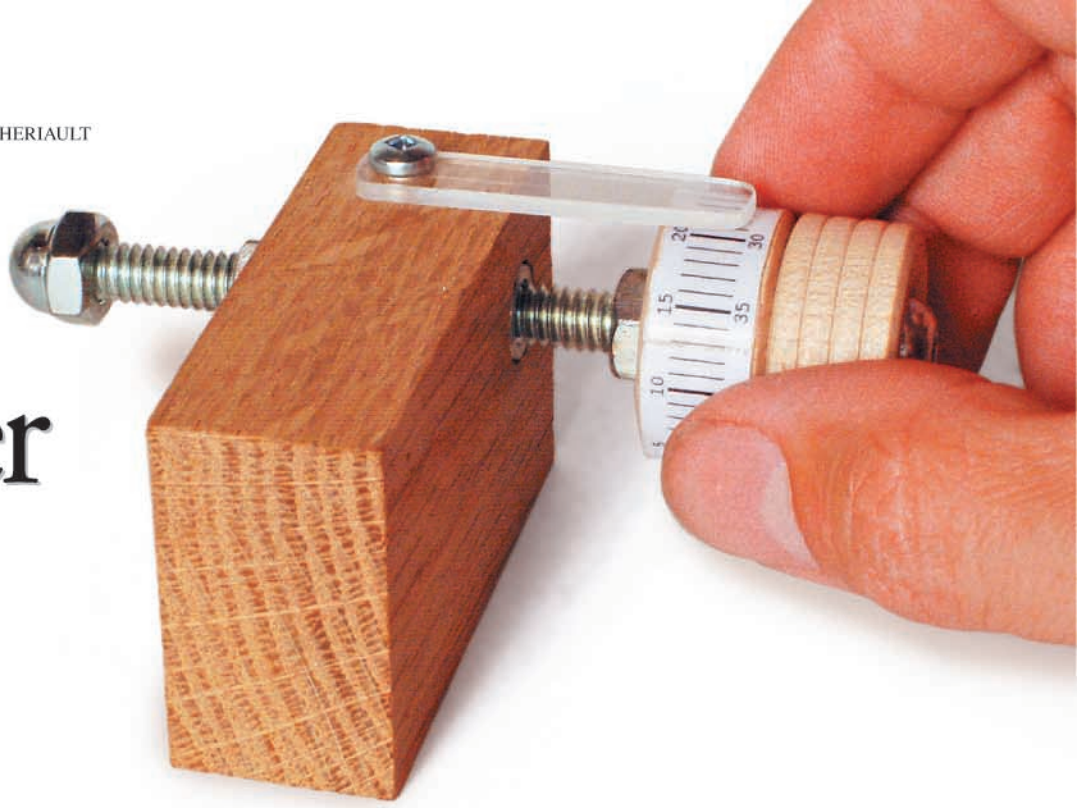
Eastern White Cedar

Western Red Cedar

Working characteristics

Radial shrinkage	2%
Tangential shrinkage	4%
Volumetric shrinkage	7%
Weight (lbs/cu ft)	22 (Eastern) 24 (Western)
Crushing strength max (lbs/sq in)	304 (Eastern) 485 (Western)

Adjuster Jig



This adjuster adds accurate, repeatable adjustment to your jigs and fences. It uses a ¼" -20 bolt and a scale to enable accuracy as small as 0.001". The adjuster itself is very easy to make from commonly available parts. How you mount it and use it will depend on what you are adjusting. It is versatile enough for just about anything, including accurately positioning a router or table saw fence.

This particular adjuster is made from a short block of oak and a few pieces of hardware from my local hardware store.

Making the Adjuster

Cut the piece of wood for your adjuster a bit longer than the finished size; you can trim it up later.

Drill a 25/64" hole in the wood where you want the adjustment screw located and press the coupling nut into it.

Position the two wheels onto the bolt and secure them in place with one of the nuts.

Thread the bolt through the coupling nut and position the o-ring on the end opposite the wheels.

Screw the second nut onto the bolt so that it is very snug against the o-ring. This pulls

Adjuster with router table

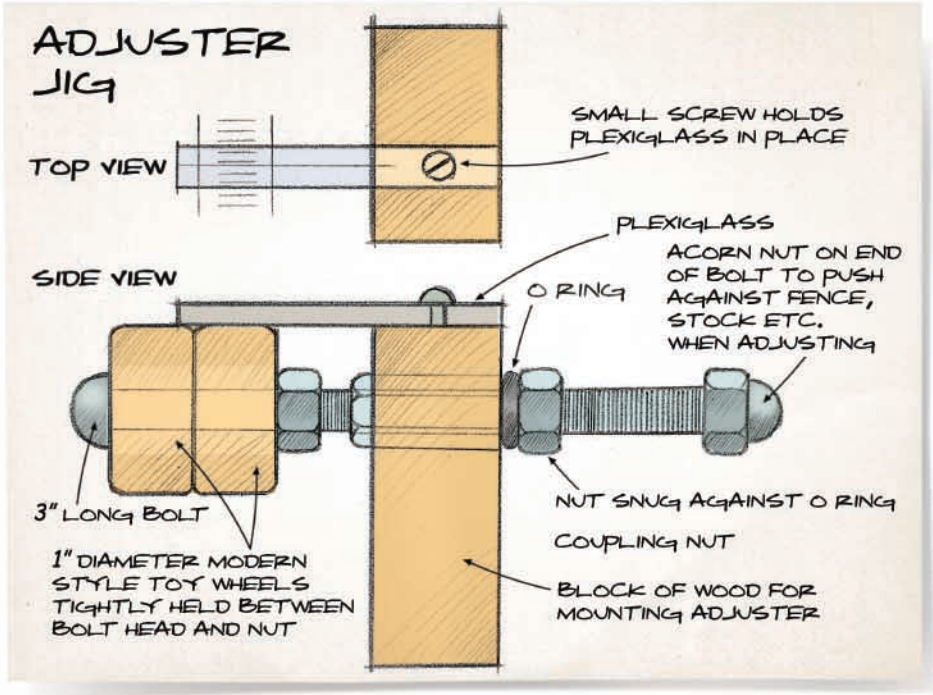
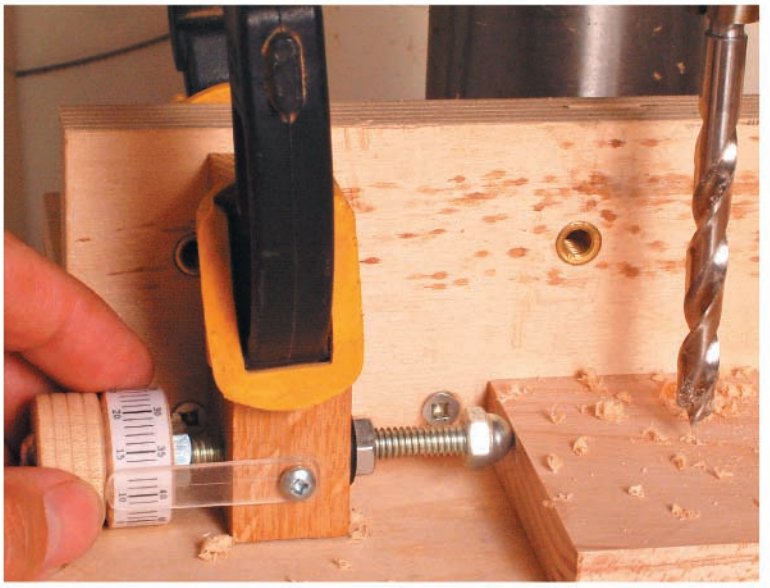


Illustration by Mike DelRizzo



Adjuster with drill press

the threads of the bolt up against the threads of the coupling nut to provide some resistance when turning the knob. It also reduces backlash.

Add the cap nut on the end of the bolt. This is used as a bearing surface against your jig.

Cut a piece of Plexiglas to size.

Drill a hole in one end of the Plexiglas to accommodate the screw and scribe a line on the underside down the centre with a sharp knife.

Drill a pilot hole in the wood in-line with the bolt and attach the Plexiglas.

Make a copy of the scale and wrap it around the inner wheel. The scale lines at each end must match-up when they overlap. If they don't, either sand the wheel down slightly or wrap tape around the wheel to change the size until the scale lines-up.

Using the Adjuster

Once the adjuster is made, you can position it as required. Each mark on the scale represents 0.001" of travel. To use it, set your jig or fence at roughly the position you want and snuggly place the end of the adjuster up against it. Make a test cut and measure your result. Use the adjuster to make the necessary changes until the cut is exactly what you need.

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HARDWARE LIST

1	**Bolt** 3" x 1/4"-20
1	**Coupling nut (3/4" long)** 1/4"-20
2	**Hex nut** 1/4"-20
1	**Cap head nut** 1/2"-20
1	**Flathead screw** 3/8" long
1	**O-Ring** 3/8" Diameter
1	**Plexiglas** 3/8" x 3/16" x 1 1/2"
2	**Wooden wheels (modern style)** 1" Diameter

MATERIALS LIST

A	1 **Hardwood adjuster block** 3/4" x 1 1/2" x 2 1/2" (size to suit)

Copy this scale and wrap around inner wheel

Bench Grinder Upgrade

The bench grinder is an essential shop accessory for sharpening turning chisels, putting a new edge on badly nicked plane blades and bench chisels, grinding drill bits, and for a range of other metal grinding, shaping and polishing tasks. It will also keep your garden tools in top cutting condition.

Essentially, a bench grinder removes metal by means of an abrasive wheel (or 'stone'). Most grinders have an induction motor with spindles mounted on each end of the motor's armature. The grinding wheels are attached to these spindles. Wire wheels, buffs and polishing discs can also be mounted on the spindles. Generally, grinders also come with some kind of tool rest and spark guard.

Grinders are rated by their wheel size, with 6" and 8" wheels being the most common. The wheels come in course, medium or fine grits. Typically, 6" grinders have ½ to ¾ HP motors, and 8" grinders have ¾ to 1 HP motors. The motors run at high speeds, usually around 3,450 RPM.

The most common kind of grinder is a 'dry grinder' or a 'double end grinder' to distinguish it from a 'wet grinder' (which uses a waterstone wheel and water as a coolant and lubricant) and a 'slow speed grinder' (which runs at a much slower speed, of around 1,700 RPM).

In general, you can use turning tools and drill bits straight from the grinder. For bench chisels, plane blades and the like, you follow up grinding with honing on bench stones.

Wheeling Around

Most grinders are supplied with inexpensive carborundum wheels, typically a coarse 36 grit wheel and a medium 60 grit wheel. These wheels work fine for sharpening garden tools, but are really not suitable for the needs of woodworkers. They are slow cutting and become dull and glazed quickly, causing tools to overheat. While this may not be critical when sharpening an axe, if you're re-grinding the bevel on a turning chisel, excessive heat can ruin the temper of the chisel (making it soft and reducing its cutting properties).

Upgrading to higher quality, soft bond, open structure aluminium oxide wheels, is highly recommended. Because these wheels wear faster, you can sharpen faster, with less danger of taking the temper out of the tool. Unless you are a professional wood turner or mechanic using your grinder everyday, a new set of wheels should last a long time.

Wheels don't have the same density throughout their structure, and they can vary in thickness. As a consequence they vibrate when turning. Cheaper wheels tend to vibrate a lot more. Unbalanced wheels make it more difficult to achieve a uniform grind on tools, they can damage the bearings over time, and they reduce the life of the wheel because they have to be trued (or dressed) more frequently.

Steady as She Goes

A common complaint with grinders is that the toolrests tend to be small and flimsy. It's important that the toolrest be rock steady, and have a large enough surface to adequately hold the tool that you're grinding. Otherwise you'll find it difficult to create a consistent bevel on chisels and plane blades. A steady toolrest also makes for safe grinding. To see if your toolrest needs replacing, press down on it with your fingers - there should be no flex.

The King Is In

The King Canada grinder (model KC-890), at $79.99, is good value in a basic, no frills, bench grinder. It has a direct drive motor with permanently lubri-

Wolverine grinding kit

Wolverine balancing kit

cated bearings, and takes 8" wheels up to ¾" thick. Its heavy weight (36 pounds) helps reduce vibration. The carborundum wheels on this grinder are quite coarse, and the toolrests are rather flimsy affairs. They're much too small (1 ⅛" x 2 ¼") to support any but the very smallest woodworking tools, and they flex quite a bit. However, with a few embellishments from Oneway Manufacturing we'll turn the KC-890 into a grinder fit for a king's workshop.

Replacing the Wheels

We'll begin by replacing the stock aluminium oxide wheels on the King with grinding wheels from Oneway Manufacturing. Wheels are easily installed, so we'll put the King wheels aside to use when grinding our gardening tools. Removing the wheels is straightforward.

The Oneway wheels are of exceptional quality. These are 'friable' wheels, which means that the grain in the wheels fractures as you grind, exposing fresh grinding surfaces. Consequently the wheels don't load up and glaze over as quickly as other wheels, and they don't heat up the tool as quickly. They're specifically designed for high speed grinders, like the King, and come in 54, 80 and 120 grits. Because we'll be using this grinder primarily to sharpen turning tools, we'll install 54 and 80 grit wheels. At $57.50 per wheel, these are very good value.

Balancing the Wheels

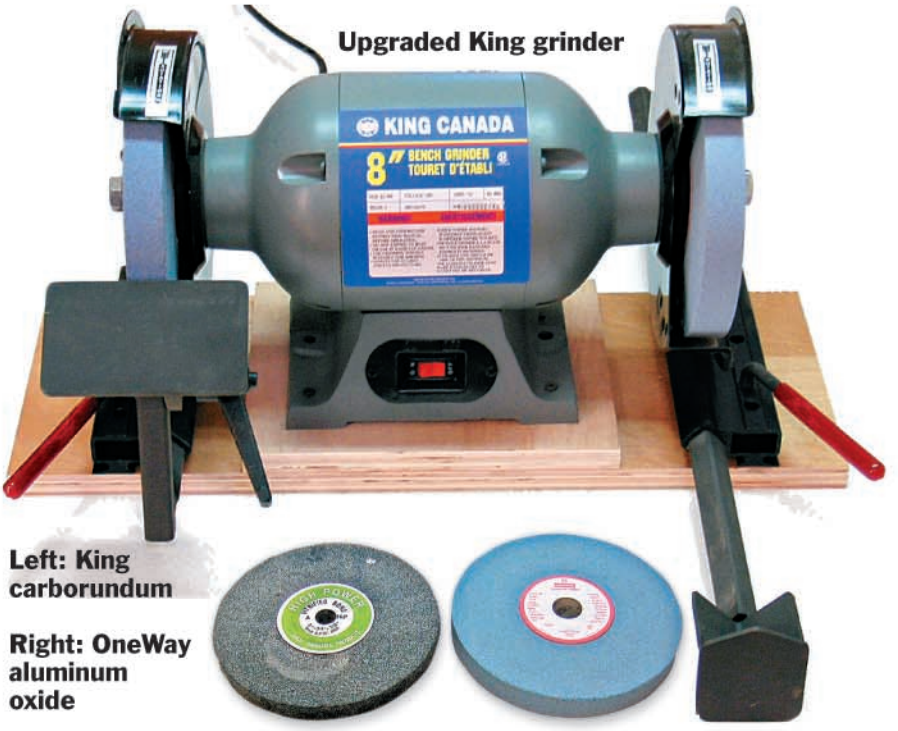
Next we'll balance the wheels, using Oneway's 'Wolverine Precision Balancing System". Sounds complex, but it really isn't. Balancing takes all of half and hour, thanks to well written and easy to follow instructions. The kit is available for grinders with ½", ⅝" and ¾" diameter shafts, though the wheels require a 1" diameter center hole (plastic reducers are included). The kit consists of a stand, axle and bearings, and a two-part flange (a set for each wheel). Once the wheels are balanced mount them on your grinder. At $57.50 this kit is a good investment that will extend the life of your grinder and cutting tools.

Upgrading the Toolrest

The Oneway Wolverine Grinding Jig is the ultimate toolrest. It consists of two heavy-walled aluminium extrusion bases that you mount under each wheel, on top of a plywood platform (user supplied). The bases have cam-lock clamps that serve to hold grinding accessories. The kit also comes with a sturdy 3" by 5" toolrest (for grinding scrapers, paring tools and other square end tools), and a 27 ½" long V-arm (for grinding gouges and chisels). The jig is quick and easy to assemble. You do need to make sure that the center of the diamond-shaped arm holes of the bases is aligned with the center of the grinding wheels, and that the front edge of the bases are even with the front edge of the wheel. Once this is done you're ready to use the jig. This jig is very sturdy and rigid, the way a tool rest is meant to be. And at $79.95 you won't break the bank.

In our next issue we'll put the upgraded King grinder though its paces.

CWM



Upgraded King grinder

Left: King carborundum

Right: OneWay aluminum oxide

shoplist

BY BOB DEARLOVE

Well, it's that time of year again, when woodworkers across Canada start dreaming of wood shows to come. It's a tantalizing dream, where everything related to your hobby is all together under one roof. The lure of the dream is the anticipation of fulfilling all of your woodworking needs.

Unfortunately, those dreams fade and reality sets in once you are at the show, standing in front of a huge display of supplies. You know you need some supplies, but you don't know what size, shape or configuration you need.

As a vendor at woodworking shows across Canada, I see this happen again and again. Fortunately, I also see other woodworkers at the same shows living the dream. By that, I mean that they show up and actually get everything they had envisioned. They are able to do this because they have taken time to prepare before the show.

Without preparation, it's pretty difficult to know all of the specifications for the various saw blades, bandsaw blades, router bits, drill bits, sanding discs, sanding sheets, and other sundry supplies that need 'topping up' in the shop. For instance, what about that 14.4 volt replacement battery for your drill – was it model B4500 or B40510? Multiply this by the number of machines, power tools, and hand tools in your shop, and you can imagine how much you would need to remember. That's why a little preparation will go a long way in helping you satisfy all of your wood show shopping needs.

Here's What To Do

On a sheet of paper, notepad, piece of wood, palm pilot, or other personal digital assistant, note the specifics of your woodworking tools and machines, listing all of the pertinent information required to determine the supplies or accessories that you may want to purchase. For example:

- Machine make, model, motor HP, power rating (110 volt or 220 volt)
- Table saw blade size
- Bandsaw blade length, width and tpi
- Planer/jointer knife sizes
- Scroll saw blade, pinned or unpinned
- Router shank size

Everyone's list will be different and will be more or less detailed, depending on the type of woodworker that you are and the type of woodworking that you do.

Remember to include an inventory of your stock of disposable products, like scroll saw blades, band saw blades, sandpaper discs, belts, grits and types, dust collector filters or bags, and wood screws. Frustration can set in fast when you return home to find that you not only didn't get what you needed, but that you got what you didn't need!

A shopping list can also be helpful when looking for new equipment. When comparative shopping, be sure to include the model number, as a slight change in product will have a different model number. Taking note of such details makes comparing prices and features easy and accurate.

Finally, the most important thing about making and maintaining a shop list is remembering to take it with you. Despite all the expertise available at the wood shows, when you are asked what kind of machine you have, the answer "Green, blue, or brown" won't be very successful in helping you service or supply your machine.

So get busy on that list. I'll be at the shows watching for you. Will you be the one scratching their head, or the one with a big smile and an arm full of woodworking supplies, heading home to live the dream?

BOB DEARLOVE

COMING EVENTS

THE WOODSTOCK WOODSHOW
Sept. 30, Oct. 1, 2
Woodstock Fairgrounds, Woodstock, ON
woodstockwoodshow.ca

THE QUEBEC WOODFEST/SHERBROOKE
October 7, 8, 9, 2005
Edifice Expo, Sherbrooke, PQ
fetedubois.ca

VICTORIA WOODWORKING SHOW
October 14, 15, 16
Pearkes Recreation Centre, Victoria, BC
www.canwestshows.com

VANCOUVER/SURREY WOODSHOW
October 21, 22, 23
Cloverdale Fairgrounds, Surrey, BC
canwestshows.com

WOODCARVING SHOW AND COMPETITION
October 22, 23, 2005
Moose Lodge
777 Tecumseh Rd. W., Windsor, ON
www.members.tripod.com/woodcarving

THE EDMONTON WOODWORKING AND TOOL SHOW
October 28, 29, 30
Sportex Building, Edmonton, ON
canwestshows.com

THE CALGARY WOODWORKING AND TOOL SHOW
November 4, 5, 6
Big Four Building, Calgary, AB
www.canwestshows.com

THE MONCTON WOODWORKING SHOW
November 18, 19, 20
Moncton Colisseum, Moncton, NB
woodshows.com

TORONTO WOODWORKING SHOW
November 18, 19, 20
International Centre, Toronto. ON
torontowoodworkingshow.com

THE ATLANTIC WOODWORKING SHOW
November 25, 26, 27
Exhibition Park, Halifax, NS
woodshows.com

WOODWORKING TOOL SHOW & SALE
November 26, 27
Chilliwack Heritage Park, Chilliwack, BC
allcityshows.com

CHRISTMAS OPEN HOUSE
December 2, 3
196 Industrial Blvd., St. George, ON
morleymillermachinery.com

THE OTTAWA WOODWORKING SHOW
December 2, 3, 4
Aberdeen Pavillion
Lansdowne Park, Ottawa
woodshows.com

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Hand Tools

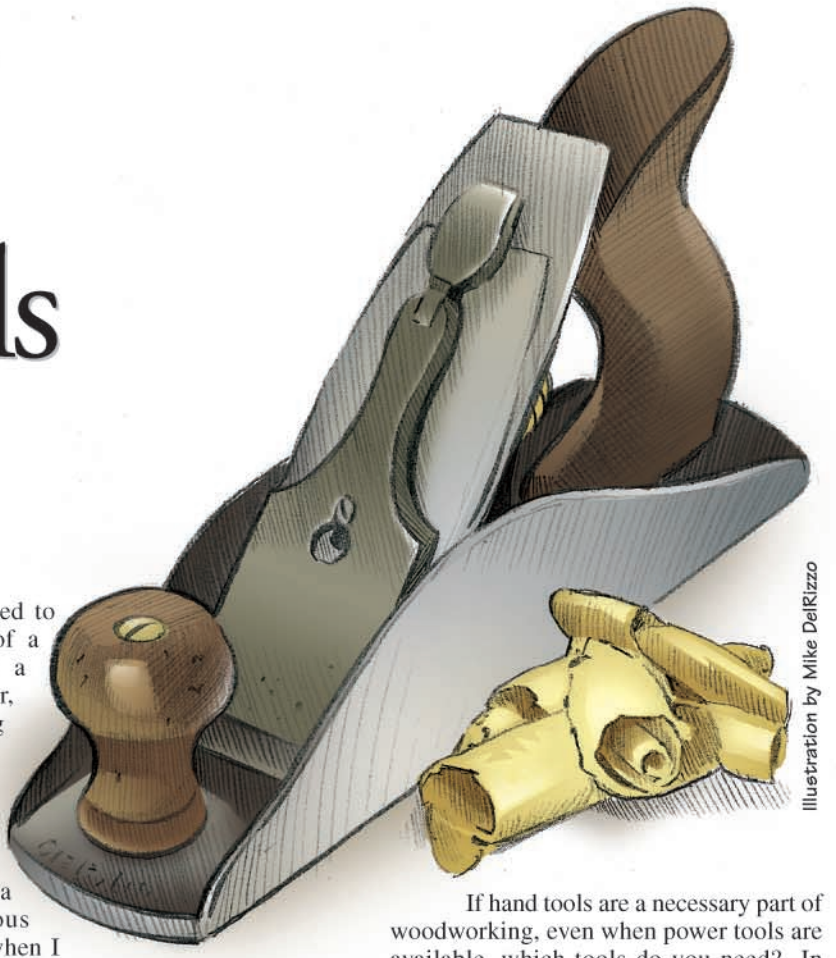


Illustration by Mike DelRizzo

The whole idea of using power tools and machinery to remove arduous work from a project is understandably seductive and makes a lot of sense. Why engage in unnecessary and unbeneficial work if it can be avoided? For instance, I cannot see any virtue in using a foot treadle to operate a wood turning lathe. Clearly, my energy is better spent concentrating on the task of shaping the object, leaving the lathe rotation to an electric motor. Another example is hand ripping of logs or boards. Definitely a job for heavy machinery!

Stanley Router Plane

So, if there are logical places to use electric energy, why not do everything with power tools? Why not just bypass the whole hand tool regime and go directly to the power tools?

I am sure most woodworkers have pondered this question at sometime in their career. If it takes "x" amount of time and energy to build a piece of furniture by hand, how much less would it take to do it with power tools? This line of thinking has brought an increasingly larger number of power tools into even the smallest workshops. When I took my apprenticeship, I was limited to the use of a drill and a belt sander, and using the belt sander was considered cheating. It was a tremendous novelty when I bought my first electric router because it opened the door to the potential of power tools. Since then, scores of power tools have been invented and are an accepted part of woodworking.

Lie Nielsen Side Angle Plane

The question still remains, "could we do everything with power tools alone and therefore take all the work out of woodworking?" The answer is no, if we are talking about a small-scale operation. A hobbyist or a one or two person furniture shop is going to need the help of quite a few hand tools. If, on the other hand, you intend to operate a furniture factory, you might well be able to produce finished components by machine.

If hand tools are a necessary part of woodworking, even when power tools are available, which tools do you need? In some cases, hand tools are used to adjust machined conditions. The following examples show the indispensability of hand tools, even if you use power tools for most of the work.

I like using a dado system for cabinet box construction. Using a carbide dado set on a table saw, I can achieve good locational accuracy and easy assembly. This joint encourages the cabinet to go together in a square and secure manner, but it is not perfect. Occasionally, the plywood or veneered chipboard is not completely flat at the time of machining. This means that the depth of the dado can vary slightly. I use an ancient hand router (which is really a chisel held in a block of wood with a

Primus Deluxe Rabbet Plane

Veritas Shoulder Plane

wedge) to confirm the depth of the dados before assembly. Stanley makes a metal **router plane** if you prefer. Unfortunately, all plywood is not sanded to the exact same thickness, particularly at the end of the sheet. To be sure, I preassemble dry. If I find an over thickness piece of ply, I use a **side angle plane** to enlarge the width of the dado to suit.

Rasps and Chisels

When mortise and tenon joints are required, I often use a regular **rabbet plane** to adjust the face of the tenon. Likewise the **shoulder plane** is perfect for fine adjustments to the shoulder. Mortises that are routed leave round ends. Either the corners have to be **chiseled** square or the tenons have to be **rasped** round. When a cabinet is being assembled, it is often an advantage to use a sash clamp to locate the parts and hold them long enough to air nail or staple together. I use a wide range of **clamps** on every project, including "C" clamps, spring clamps and hand screws.

Lee Valley Low Angle Block Plane

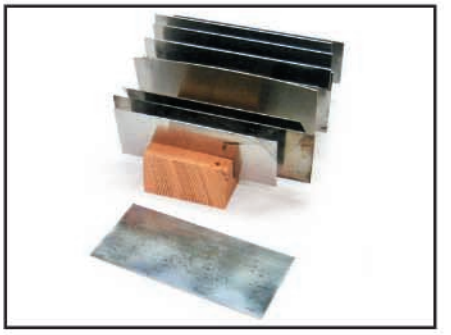
I use a block plane to adjust the mitres on mouldings that are applied after assembly. I adjust open mitres on mouldings that might be slightly twisted or inconsistent profile with this **low angle block plane**.

Lee Valley Bullnose Plane

Clamps

Lee Valley Fore (Joining) Plane

Tight inside corners that need some help can easily be reached with the **bullnose plane**. The latest design even allows the front to be removed. Doors that are to be fitted into a front frame often need to be adjusted with a **joining plane** .



Card Scrapers

Inevitably, when it comes to the final cleanup sanding before finishing, you find a spot of glue or a tear out from the planer. I use the simplest tool in my collection, the **card scraper**. This single piece of sheet metal thickness steel, when sharpened properly, removes glue and tear out without a trace. A few strokes with the sanding block and the project is ready for finishing.

In addition to the already mentioned tools, I use number of other handtools, including a dovetail, tenon, hand and coping saw, a brad point hammer, a mallet, a variety of chisels and screw drivers. I also use a three-piece set of oilstones to keep the edge tools in working condition.

You can easily see that my collection of hand tools (originally bought to be used on their own) work quite well with a number of power tools.

Perhaps, like me, you have begun to wonder which way this really works: hand tools are a perfect compliment to power tools; or is it the other way around?

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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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