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JUNE/JULY 2008
Issue # 54

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Departments

Linda Fulcher

Our editors are getting more serious about showing you the skills you need to deepen your involvement in woodworking. Project articles have more information, step-by-step instruction, detailed joinery in the illustrations, and side-bars to explore the finer points of the projects.

You may be complementing your growing skills with tool purchases and improvements in your shop. I really get a kick out of the image of everyone out in the shop, "making sawdust". This image of sawdust-a-flyin' brings up all the wonderful feelings of both doing and enjoying your woodworking.

However, sawdust also serves as a reminder to pay attention to an important consideration in your next round of shop improvements: dust collecting. The more woodworking you do, the more sawdust you make, and the greater the need for good dust collection systems.

It is surprising how many people don't think about this because their parents or grandparents didn't. However times have changed: consider the amount of dust our improved new tools can make; the number of exotic but toxic woods we have available; and finally, the cumulative effect of air pollutants from modern transportation, industry, and chemical products we use everyday. These factors make it more important to ease the filtering load on our lungs today than it was in the shops of days gone by.

When I first started reading about woodworking in the early issues of the magazine, I had no idea how many ways there were to either make sawdust, or control it. In the last decade there have been vast improvements to dust collection systems on individual machines. However, don't let these lull you into thinking you've got it covered.

Today, when it comes to sawdust, we want to come at it from every angle: a central dust collection system if you are really starting to spend a lot of time in the shop, and personal dust protection, especially when working with woods that are known to be especially hard on the lungs.

In this issue Carl takes a look at ambient air cleaners and gives you the information you need to assess your own dust collection needs and make the dust collection choice that is right for you.

Paul Fulcher

I'm really glad to present the turned Chess set (a three part series) in this issue (page 4). I've noticed at various woodworking shows that when chess sets and chess boards are on display they are often crowded with onlooking woodworkers, so I figured that this classic set would be well received. Bruce Campbell designed the set, and starts you off with the hardest piece of them all, the knight. Once you find that the knight is relatively easy, you'll be on your way to conquering the whole set.

If you have ever been befuddled over which finish to use for a particular project, then you are going to love the Wood Finishing Reference Chart that Carl has put together for you on page 12. Want water resistance? Use Varnish. Want the least colour change on light coloured wood? Then go with a water-based finish. Want something easy to apply? Try an oil/varnish blend. It's all there in an easy-to-read reference chart. Tack the chart up in your workshop and you'll always know how to finish your projects, whatever they are.

For those of you who have been toying with the idea of incorporating dovetails into your work, our contributing editor, Michael Kampen takes a look at the industries top Dovetail Jigs. It is an extensive look at the jigs (OmniJig, Leigh Jig, and Akeda Jig) and how to use them. If you have been wanting to better understand how such jigs work, Michael takes the mystery out of them for you on page 24.

Be sure to pay special attention to our Ambient Air Cleaner coverage on page 34. Such topics and products are often the last things that we think about, but looking after your health should be the first. A good ambient air cleaner will allow you to enjoy woodworking more, and for a longer time. Enjoy!

CORRECTIONS:
Apr/May '08, Issue #53
Page 32: Bosch Pocket Driver model number is PS20-2.
Skil 2346-01 is $39.00 not $49.99

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Finishing a Sanded Board

In Issue #40 (Feb/Mar '06) you featured a slate-topped coffee table with a micro-scorp textured walnut inlay. Oil and wax were the finish. How did you deal with the uneven surface of the textured wood when the time came for finishing?

Mark C., Huntsville, ON

• I used a sanding mop (stockroomsupply.com) on my drill press to smooth out any jagged edges that would have snagged the finishing cloth, and then wiped on a couple of coats of Watco Danish Oil. I then followed this with a couple of coats of Antiq-wax (homehardware.ca). If you are using a film forming finish like a varnish, you will need to apply it in thin layers so as to avoid having it pool in the depressions. The best option would be to spray the film finish in several thin layers. Varnish will provide a greater degree of protection, but is more difficult to apply. Watco and wax go on easily, and can be touched up and repaired just as easily, as required. Michael Kampen

Combination Machines

I've been an avid hobbyist woodworker for the last four years, and am now looking to upgrade my equipment. Most of what I have are small portable machines. My problem is that I work out of a single car garage, that measures 16' by 20' – pretty small. To

Continued on page 45

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BY BRUCE CAMPBELL

Photo by: Ray Pilon, photographyottawa.com

Part 1 Chess Set

Chess is one of the world's most popular games. In this first article, I will begin with the most challenging part, turning the knights.

I have played chess since I was a boy and have used many different chess sets. When I decided to make a set for myself I wanted one that would not only look and feel good, but also be 'playable'. That is, the pieces would have to be easy to distinguish from one another (especially pawns from bishops), easy to grasp, and have a nice balanced weight so they would stay put on the board.

Design

Everyone is probably familiar with what a chess set looks like – a board with sixty-four 2 ¼" squares arranged in eight rows by eight columns, and two sets of sixteen pieces (players). I wanted my chess pieces sized so that they would not appear crowded on the squares, and so that the king and queen would stand out a little from the rest of the players. As is common to all chess sets, I varied the height of the pieces according to their value in the game.

A general principle in turning is to use good materials, and this is especially true for this project. I suggest that you use dense, tight-grained hardwoods that have contrasting colours but similar densities so that all common pieces will have the same weight. My personal favourites are East African blackwood and boxwood. Both are wonderful woods to turn and their natural colour matches the generic black and white common to modern chess sets. If you prefer the original colours for chess sets (red and white), then red heart (a.k.a. Chakte Kok) and boxwood are good choices. Alternately, you can use a wood that bleaches well and apply a stain to the pieces. Again, boxwood is a good choice here.

You will need 40" of 1 ½" x 1 ½" stock for each set of sixteen pieces, for a total of 80 linear inches. This is roughly three quarters of a board foot of materials per side (1 ½ BF in total). To avoid the need to laminate thinner stock it is best to use 6/4 (1 ½") stock. Remember that you will be turning two sets of each piece – one out of your darker wood, and one out of your light wood.

Dimensions of Chess Pieces
(All measurements in inches)

	Diameter	Height
King	1 5/16	3 5/16
Queen	1 5/16	2 7/8
Bishop, Knight, Rook	1 ¼	2 ⅛
Pawn	1 ¼	1 13/16

Turn the Challenging Part First

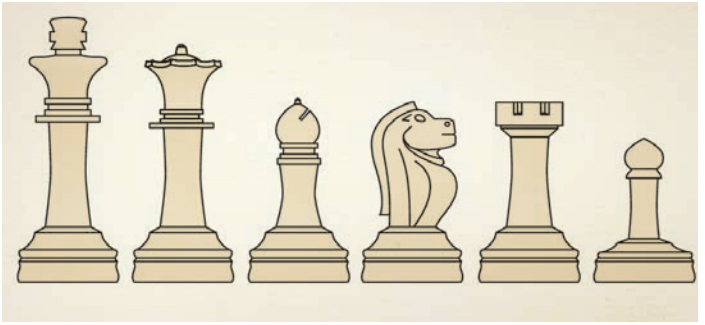
The most challenging piece to turn is the knight, as it needs to be carved as well as turned. I discovered a way to take a lot of the work out of the carving and ensure all four knights are the same size. The technique I use, called 'ring turning', was developed in Seiffen, Germany over 300 years ago. The tops of the knights are turned separately from the bases and then glued together after they have been carved.

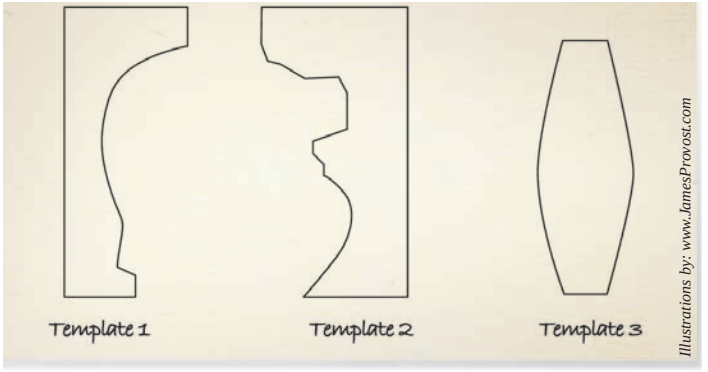
• Start by cutting two pieces of each colour of wood into ⅝" x 1 ¼" x 1 ¼" blocks with the grain running down the long sides.

• Attach a 6" x 6" piece of ½" plywood on a faceplate, mount it on the lathe, true it round, and square up the face so that it is flat. Then scribe a 3 ½" diameter circle centered on the block, and mark two lines through the center of the block 90º apart. Remove the whole thing from the lathe and lay it on a work surface. Glue the four project blocks to the waste block (I use gap-filling cyanoacrylate glue for this job) with the grain running vertically. Use the lines you have drawn to space the pieces out evenly and be sure to line up each piece so it is flush with the circle and centered on the lines. Fill the gaps between the pieces with waste wood that is about the same height as the blocks, and then put this aside for a few moments to let the glue set.

• Make three templates from stiff paper (business cards work well). You need one for the back of the knight (Template 1), one for the front (Template 2), and one for the side profile (Template 3). Now the fun begins. Mount the glue-up back on the lathe and turn the outside to the profile of Template 1. Then turn the inside to the profile on Template 2. I use small homemade scrapers for this. You have two goals – one is to turn the pieces to match the template profiles, the other is to remove enough material so that the front and back templates just touch at the top. This ensures that the pieces are the right depth. Once you are done, remove the setup from the faceplate and cut out the pieces from the waste wood on the band saw. Then, sand the sides of each piece to the profile of Template 3.

You now have four identical, roughed out pieces and are well on your way to completing the knights. The rest of the effort is carving. I do most of the carving with a rotary tool equipped with a ¼" dovetail burr, a 1/16" cylindrical detailing burr, and two small ball-end burrs.





Illustrations by: www.JamesProvost.com

Templates

Photos by: Ray Pilon, photographyottawa.com

"Ultimately chess is just chess – not the best thing in the world and not the worst thing in the world, but there is nothing quite like it."

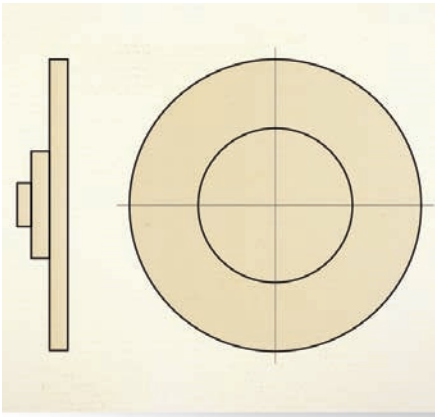
W.C. Fields

There are only a couple of places where you may need to use a small knife.

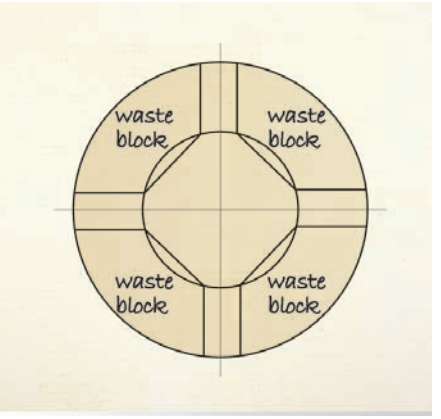
• Start by carving the mane using a dovetail burr. The mane should be about ⅛" high by 3/32" wide. When you have the mane roughed out, texture the sides and edges with a flat-tip cylindrical burr, and round the corners off the chest and back. Then, define the area around the chin, jawbone and under the ears. Carve away the sides of the nose until it is about ¼" wide then blend the cheeks back to the jaw line.

• Round over the top of the chest to merge in with the chin line. The wattle under the chin is not anatomically correct (horses don't have wattles) but it is a nice detail. To finish the chest carve two deep, curved grooves, one near the back and the other to define the chest. Round the sides over and blend them in. Carve away the sides of the nose until it is about ¼" wide then blend the cheeks back to the jaw line. Round the top and bottom of the nose slightly. For the finishing touches add a line for the mouth, shallow holes for nostrils, two lines for each ear, and deeper holes for the eyes. Take care to make them the same on both sides, especially the eyes.

If you are a little worried about your ability to do this I suggest you cut an extra block or two and glue them into the original ring – it's just as easy to turn five, six or more as it is to turn four. Then practice on the extra ones before starting on the final pieces. I hope you will be as surprised as I was with how easy it is to make the 'hardest' part of this project.



Faceplate set-up



Glue-up pattern

Next issue, I will discuss how to turn the bases for all the chess pieces and give some tips on duplicate turning. In the final article I will talk about how to decorate the major pieces.

BRUCE CAMPBELL
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Floor Clock

Our youngest daughter married last year and moved halfway across the province. As a father and a woodworker, I wanted to build the newlyweds a special gift that would remind them of us.

I asked my daughter what she would like to have and her answer was a clock – a simple clock that she could use on a daily basis. With that in mind I set out to build Mike and Jessica a simple, yet stylish floor clock.

The clock is made from zebrawood, ebonized red oak, and obeche, with wenge plugs for the primary numbers on the clock face. Don't be afraid to substitute other woods that are available in your area, as this clock design lends itself to many different wood combinations. It is best to purchase the clock movement before you begin construction.

The Base Provides Stability

The base of the clock consists of two components: an upright (A), which is in the form of an isosceles triangle, and a foot (B). Both pieces are milled to a final thickness of 1 ¾". If you don't have access to 8/4 stock you can laminate thinner pieces.

Biscuits or dowels can be helpful when gluing up the three pieces for the upright (A). Once the glue has set, sand the blank smooth and then lay out the cut lines. Also draw a reference line that runs from the center of the notch perpendicular to the top of the upright. This line will aid in locating the top round support. Cut the angled sides of the upright with a circular saw and a straight edge, and then clean up the cuts on the jointer or with a hand plane.

Cut the notch on the bottom edge of the upright with a crosscut sled on a table saw, and clean up the kerf marks with a chisel. The upright is rather large and heavy, so to provide extra support to keep it from tipping, join two shop-made mitre gauges together using a tall, wide piece of scrap plywood. If you lack a second mitre gauge screw the plywood to a crosscut sled fence. A dozen or so passes across the saw blade will remove the waste. Then cut the tapered sides with a circular saw and a straight edge and clean the cuts on the jointer or with a

hand plane.

Next cut the matching notch on the foot (B) using the table saw and a single mitre gauge. Sand everything to 180 grit, and then glue the upright to the foot and secure it in a countersunk pre-drilled hole with one #8 - 3" wood screw driven through the underside of the base in the notch joint. On a tight joint the single screw acts as a clamp until the glue cures. Don't remove the reference lines from the base yet, as they will come in handy when assembling the clock.

Contrasting Woods Add Visual Appeal

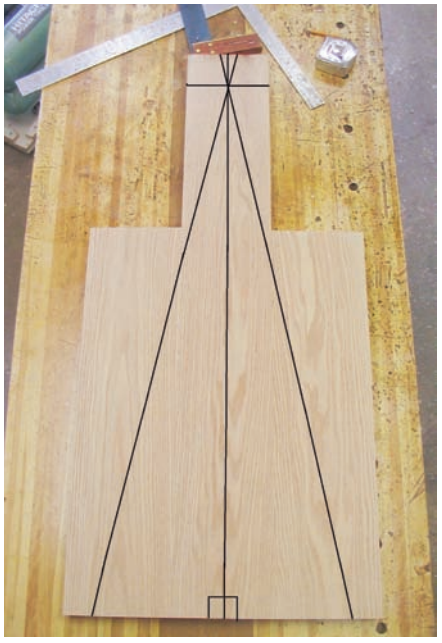
The clock body (C) consists of a scalene triangle (one with three unequal sides), while the face (D) is a round disc. The use of contrasting woods for the body and face adds visual appeal. Mill the stock for both pieces to exactly ¾". This is important if you want to get a seamless, even joint when the pieces are joined together. To facilitate this, thickness plane both materials at the same time and check their dimensions with a pair of dial calipers. After gluing up the pieces for the clock body (C), lay out the cut lines, and then cut the body on the bandsaw staying just outside the layout lines. This leaves enough material to run the body over the jointer for a crisp edge that will accept the clock face.

On the clock face (D) locate the center point, and use a compass to draw a 13" diameter circle. Be careful to align the wood grain on the clock face so it is running north to south as this will result in the grain on the clock body and the grain of the clock face running in the same direction. Mark a 25º cut line on the outside edge of the circle, and using a bandsaw, cut the angled waste piece off the face, and then clean the edge on a jointer. Back at the bandsaw, cut out the clock face, and smooth the band-sawn edge by hand, using a sanding block or on an oscillating spindle or disc sander.

To locate the clock face on the body, place a framing square 8¾" from the top of the body and draw a horizontal line across the body. Match this line with the center point on the clock face. To prevent the two pieces from shifting out of position during glue-up, drill a ¼" dowel into the edges of both pieces before gluing and clamping them together.

Plugs Mark the Primary Hours

Once the glued-up clock face and body assembly has cured, sand the pencil marks off the face and body. Using a compass, draw an 11" diameter circle on the clock face and on the clock body, registering from the center point of the clock face that you made earlier. Bring a framing square along the back edge of the clock body and line it up with the centre point of the clock face. Strike a line across the entire piece, intersecting the circle on the

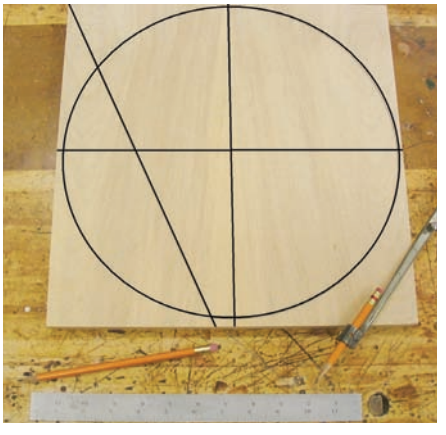


Upright laminated from three pieces

Mitre gauges and ply hold upright ridgid

Upright and foot

Clock body



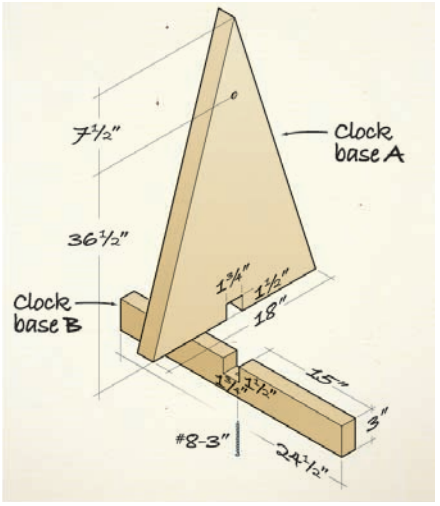
Clock face with layout lines

Face attached to clock body

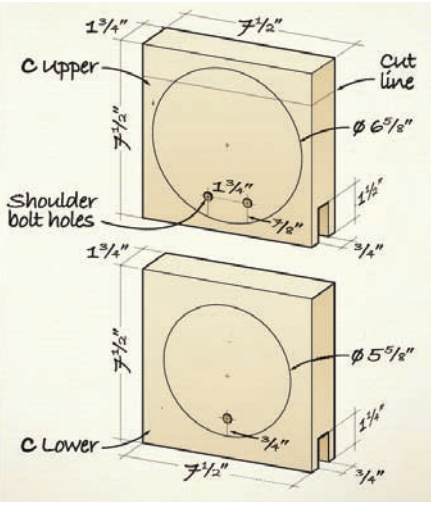
clock face. You now have the locations where the plugs identifying the 9 and 3-hour numbers will be drilled. With the square still on the horizontal line, position a try square on the center point of the clock face, and at 90º to the horizontal line. Mark the intersection on the 11" circle where the plug for the 12-hour number goes. Follow this same process to find the location of the 6-hour number. On the drill press use a 1" Forstner bit to drill holes to a depth of ⅜" at the four hour locations. To make the plugs I used a tenon cutter (item # 06J20.16) from Lee Valley (leevalley.com), and epoxied them into the holes, trimming and sanding them flush after the epoxy cured.

Round Supports Attach Base to Body

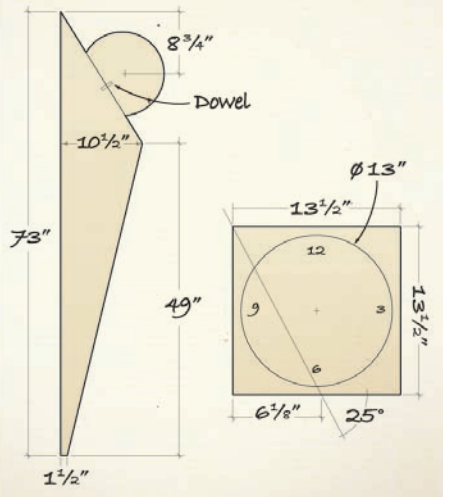
Cut the two round supports (E) from stock left over after cutting the upright (A). They will hold the clock body (C) onto the base assembly. The supports are not the same size, so extra caution is required. Square up the blanks if required, and using a compass lay out a 6 ⅝" diameter circle on the block that will become the upper support, and a 5 ⅝" circle on the block for the lower support. On the table saw, cut a ¾" x 1 ½" dado centered on the bottom of the upper support block, and a ¾" x 1 ¼" dado on



Upright and foot assembly



Supports



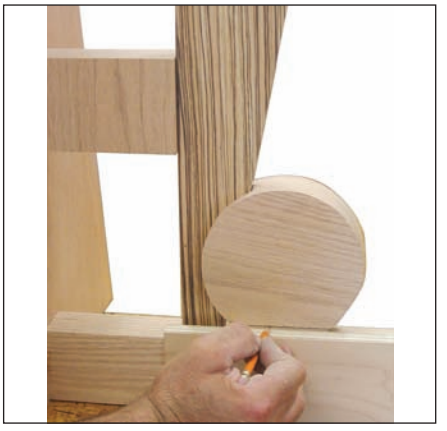
Body and face

Plug holes drilled

Plugs milled with tenon cutter

Lower and upper support blocks

Supports band-sawn



Positioning lower support

Movement cover

the lower block. You can use a standard saw blade and make multiple passes to cut the dado, or use a dado blade set.

On the table saw, cut the top off the upper support block, leaving a flat spot that is 2 ½" wide (you will cut a flat on the lower support block later). You can now proceed to the bandsaw and cut out the supports. An oscillating or spindle sander will make quick work of smoothing the edges.

Join the Pieces

To prevent the assembly from tipping over you may find it helpful to clamp the base to your workbench. You will also need to cut a 1" x 3" x 5 ⅛" spacer and a ¾" x 3 ½" x 5" piece of scrap ply from shop leftovers.

The line drawn up the middle of the upright (A) represents the exact center of the base and the exact center of the notch. It tells you where on the base to mount the upper round support. Measure 36 ½" up from the bottom of the base and drill a ⅜" x 1" hole into the line. Also drill a ⅜" x 1" hole centered on the flat spot on the upper support (E), and then join the two pieces with a ⅜" x 2" dowel. Carefully slide the clock body into the upper support, insert the spacer between the clock body and the upright, and clamp the clock body temporarily to the support. This ensures that the back (long side) of the clock body will be parallel with the clock base.

Place the lower support onto the clock body and slide it down the body until it touches the foot of the base. Slide the scrap ply up against the lower support and draw a line across the support using the top of the plywood as a straightedge. You now have a line that, when cut, will fit perfectly flat on the base foot. Cut the lower support on the bandsaw and then sand it flat, square and smooth on a disc sander. Glue and clamp the lower support onto the base with a #8 - 3" wood screw fastened from the bottom of the base's foot through a countersunk screw hole.

The upper support is now aligned so that the clock body sits perfectly in line with the lower support. Drill and countersink two ⅜" holes through the back of the upright into the upper support, on either side of the ⅜" dowel. Glue the upper support to the upright, and secure with #8 – 3" screws. Cover the screw holes with tapered plugs made from scrap oak and then sand the plugs flush. Drill 3/8" holes through the upper and lower supports for the shoulder bolts.

Remove the clock body from the supports and drill a 3" diameter hole into the back of the clock face to house the clock movement. The depth for the hole will be supplied by the clock movement manufacturer. Install the movement and the 6" clock hands, ensuring that everything fits the way it should. The clock movement cover is made from a leftover piece of wood that is 5" in diameter and has a 3" hole drilled into its center to a depth of ½". The cover is then placed over the back of the clock movement and attached to the clock with a #8 - 1 ¼" wood screw.

SUPPLY CHECKLIST

- Red oak, zebrawood, obeche, wenge
- One ¼" x 2" dowel; one ⅜" x 2" dowel
- One #8 - 1 ¼" screw; three #8 - 3" screws
- Three ¼" x 40mm shoulder bolts and caps (Lee Valley #00N14.40, #00N20.17)
- Clock movement and hands

RESOURCES

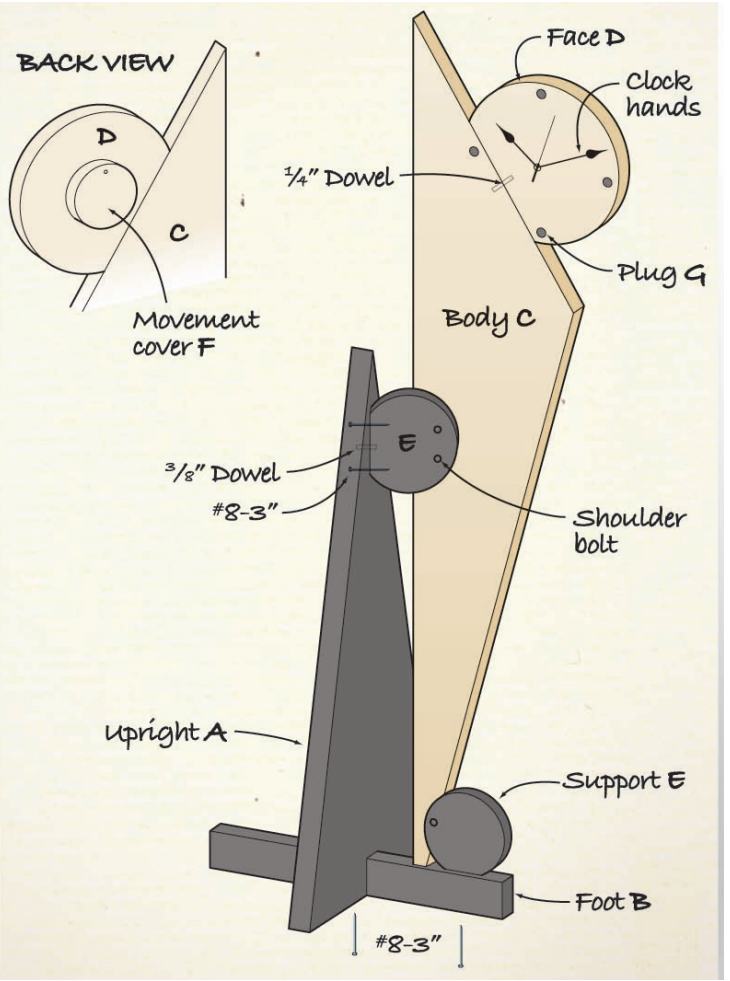
"Crosscut Sled", Feb/Mar '06, Issue #46

Applying the Finish

It is easier to finish the clock body and face when removed from the base assembly. On the body and face I applied a coat of de-waxed shellac followed by four coats of water based polyurethane. For the base assembly I ebonized the red oak with two coats of India ink from a local craft store and then top coated with four coats of water-based polyurethane.

To watch a clock like the one in this project being built, log on to the four part series being presented on Gord Graff's blog page at gordgraff.blogspot.com.

GORD GRAFF
gordgraff@rogers.com



Illustrations by: www.JamesProvost.com

MATERIALS LIST (All measurements in inches)

Part	Qty	T	W	L
A Upright *	1	1 ¾	18	44
B Foot	1	1 ¾	3	24 ½
C Body (z)	1	¾	10 ½	73
D Face (o)	1	¾	13 ½	13 ½
E Supports, upper & lower	2	1 ¾	7 ½	7 ½
F Movement cover	1	¾	5	5
G Plugs (w)	4	⅜ x 1		

All stock is red oak except: (z) zebrawood; (o) obeche; (w) wenge
* Laminated from two pieces of 1 ¾" x 7 ½" x 30" and one of 1 ¾" x 7 ½" x 48"

BY CARL DUGUAY

Reference Chart

Varnish – A staple finish: dependable, long lasting and durable

Type	Appearance	Sheen	Durability
Reactive film finish (finish dries by chemical reaction with oxygen)	Amber tinge that darkens with age; polyurethane not as clear as alkyd varnish	Flat to gloss; harder to rub to an even sheen than shellac or lacquer	Excellent wear/water/water vapour/heat/chemical resistance
Application Moderately easy to apply by brush; very easy to apply by rag as a 'wiping varnish' - thinned 25 to 50% with mineral spirits; challenging to spray; thin and clean up with mineral spirits	**Repairability** Difficult to repair and time consuming to strip; use a stripper like 'Circa 1850 Furniture Stripper' followed by light sanding and then wash the wood with mineral spirits	**Dry time** 24 hours (longer in cooler or damper environments); susceptible to dust nibs when drying; moderately easy to sand between coats; minimum 1 month to cure	**Editor's pick** Varathane Diamond Wood Finish (varathane.com) Circa 1850 Polyurethane (circa1850.com)

Notes
Alkyd varnish is the most common; Urethane varnish (polyurethane) is a harder finish than alkyd without the amber tinge

Shellac – A classic finish that develops a beautiful patina over time

Type	Appearance	Sheen	Durability
Evaporative film finish (finish dries as the solvent – alcohol evaporates)	Clear (super blond shellac) to rich darker reddish brown (garnet shellac)	Flat to high gloss; very easy to rub to a high sheen	Fair wear resistance; excellent moisture resistance; poor water/chemical resistance
Application Easy to apply by brush, rag or tampon (for French polishing) thin and clean up with mineral spirits; mix from dried flakes or purchase pre-mixed	**Repairability** Very easy (new layer dissolves into existing layer)	**Dry time** 2 - 3 hours; easy to sand between coats; cures within 1 week	**Editor's Pick** Wood Essence Premium Dry Shellac Flakes

Notes
Use de-waxed shellac: is a superior sealer coat for other finishes and seals in contaminants such as silicone, wax, dirt, oil

Oil/Varnish – Better protection than oils with little film build-up

Type	Appearance	Sheen	Durability
Reactive film finish (finish dries by chemical reaction with oxygen)	Amber tinge that darkens with age (linseed oil/varnish mixtures darken the most)	Flat to satin; (can be buffed to increase shine)	Low to moderate wear/water/water vapour/heat/chemical resistance; (multiple coats increase resistance)
Application Easy to apply by rag or brush; wipe off excess; thin and clean up with mineral spirits	**Repairability** Re-sand before applying a new layer	**Dry time** 6 - 8 hours; cures harder than oil finishes (depending on the blend of oil and varnish)	**Editor's Pick** Circa 1850 Antique Danish Oil

Notes
'Danish Oil' or "Antique Oil Finish" products are typically oil and varnish blends

Lacquer – The ultimate spray finish

Type	Appearance	Sheen	Durability
Evaporative film finish (finish dries as the solvent – lacquer thinner – evaporates)	Colourless; very clear finish	Flat to high gloss; one of the easiest finishes to rub to a high sheen	Good wear, water/water vapour/heat and chemical resistance
Application Easy to spray; not as easy to brush as varnish; thin and clean up with lacquer thinner	**Repairability** Easy to repair and strip (new layer dissolves into existing layer)	**Dry time** Recoat within 30 minutes; cures within 4 - 5 days	**Editor's Pick** Target Coatings Oxford Ultima Spray Lacquer (woodessence.com)

Notes
Lacquers are the most toxic of finishes to apply; use an approved respirator

Oils (linseed, tung, walnut) – Easy to apply with little or no film build-up

Type	Appearance	Sheen	Durability
Reactive penetrating finish (finish dries by chemical reaction with oxygen)	Amber tinge that darkens with age (tung oil much less so)	Satin (can be buffed to increase shine)	Poor wear/water/water vapour resistance; moderate heat/chemical resistance (multiple coats increase resistance)
Application Easy to apply by rag; wipe off excess; clean up with mineral spirits; thinning not required	**Repairability** Wipe on another coat	**Dry time** Overnight; penetrating finishes do not cure as do film finishes, they remain somewhat soft	**Editor's Pick** Lee Valley Walnut Oil Lee Valley Tung Oil (leevalley.com)

Notes
Use boiled linseed oil not raw linseed oil, and polymerized tung oil

Water-based – Non-yellowing finish with good durability

Type	Appearance	Sheen	Durability
Coalescing film finish (finish dries first as the solvent – water – evaporates, then by chemical reaction with oxygen)	Colourless (no 'yellowing' over time); not as clear as varnish, lacquer or shellac	Flat to gloss; harder to rub to an even sheen than varnish ; use a synthetic abrasive, not steel wool, to rub the finish	Very good wear resistance; good, water/water vapour resistance; poor heat/chemical resistance
Application More difficult to brush than varnish; challenging to spray; thin/clean up with water	**Repairability** Difficult to repair; not as difficult to strip as varnish	**Dry time** 4 - 5 hours (temperature sensitive); minimum 1 week to cure	**Editor's pick** Circa 1850 Aqua Varnish; Varathane Diamond Water-Based Polyurethane

Notes
Appears white in the can; dries colourless; levels as it cures

BY WAYNE HOOKS

Hall Table

Tables of one sort or another are often the bread and butter of most woodworking shops. This elegant hall table, based on a design by California woodworker Yeung Chan doesn't require a lot of stock or advanced joinery skills.

I've made this table in several different dimensions, but this one, with a 34" top, is one of my favourites. It's a great design for trying different wood combinations, particularly with the top panel, which is the visual center for this piece. For this version I used a rather striking slab of yellow birch burl for the top, coupled with black cherry for the base. A slim table like this calls out for that special piece of wood that you've stashed away.

Stock Preparation

There are two parts to this table. The top consists of a mitred frame and floating panel; the base is made up of 19 narrow pieces joined together by biscuits, dowels and half lap joints. You could substitute mortise and tenon joinery for the biscuits and dowels. However this table is very light, and isn't designed to hold a lot of weight – perhaps a lamp or vase of flowers.

I find it easier to mill all the lumber to dimension before beginning any joinery. For all the 1" thick pieces I begin with 1 ¼" rough stock, and for the ¾" pieces I start with 1" stock. I mill the stock in three stages – first I mill the panel for the top (from lumber out of my special stash), then the frame (B, C), aprons (D, E) and legs (H) from the 1 ¼" stock, and finally the stretchers (F, G, I, J), cross pieces (K), and center piece (L) from the 1" stock.

I always mill the stock oversized, sticker it, and let it sit for a couple of days to stabilize. Then I mill all the boards to final thickness and width, but leave them a few inches longer. I cut the pieces to final length during the joinery stage and then sand them to remove any milling marks. It is important that all the pieces be accurately machined – square and straight. At this stage I examine each piece and using chalk (you can also use a soft pencil or masking tape) mark the outside faces, as well as the orientation (up, right side and left side). This is especially important for the legs, where you want to ensure the grain orientation complements the overall look of the table. To help eliminate the very real possibility of placing biscuit slots or dowel holes on the wrong face of a leg it's a good idea to mark each pair as "FR" front right, "FL" front left , "BR" back right and "BL" back left, with arrows indicating which sides face 'out'.

Make sure you cut some spare lengths of the 1" x 1 ¼" stock for setting up the dados and tongues. This is not a difficult project, but some precision is required to get the various parts to fit snugly together, so work carefully, measure accurately, and use test pieces.

The Panel Floats in a Frame

The trick to ensure panels don't split is to give them room to move. While you can cut the tongue and groove on the frame and panel with a standard table saw blade (or on a router table), I find it goes pretty quickly with a dado blade set, on the table saw. Because the frame edges are only 1" thick, I chose to play it on the safe side and install a zero clearance insert (see Resources). Set the dado blade to make a ¼" wide by ⅜" deep cut, position the fence ¼" from the blade, and cut the groove on all the inside edges of the frame pieces.

A rabbet on the top and bottom of the panel will create a ¼" tongue to fit into the frame grooves. Again, I cut this on the table saw with a dado blade, set to about ½" wide, and a tall sacrificial board clamped to the table saw fence. The tall fence helps steady the panel as you cut the rabbets. Ensure you lower the dado blade fully and slide the sacrificial fence about ¼" over the blade. Secure the fence and slowly raise the dado blade into the sacrificial fence about ¼" high to create a zero clearance slot. I find it helpful to use a spare piece of ¾" stock to adjust the fence and dado blade height so that it cuts a 3⁄16" wide, ¼" deep dado. Save yourself some grief and cut a rabbet on both sides of the scrap piece – the resulting tongue should be ¼" and fit snugly (slight hand pressure) into the groove on the frame. If all is good, cut the rabbets on both sides of the panel. Some of the panels I use have natural edges on them, often at the corners, and I'm careful not to cut into these edges.

Mitres Join Frame to Panel

Sharp square edges don't belong on furniture. Use a ¼" radius round over bit mounted in a router table to shape the top and bottom inside edges of the frames pieces (B, C), and a ¼" radius cove bit to profile the top outer edges. Using the table saw or mitre saw, cut the frame pieces to final dimension, remembering that the ends have 45º mitres. Mill a single R3 biscuit slot centered on each mitre.

Dowels Join Aprons to Top

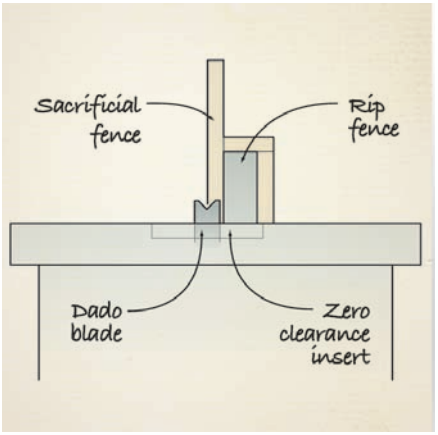
Trim the aprons (D, E) to length, and on the tops of the two long aprons lay out three ¼" dowel holes, ⅝" in from the front. Place one hole in the center (16" from one end) and one hole 2" from each end. Layout these holes with care as the top frame and panel will sit 'suspended' on these six dowels. Drill the holes ½" deep. At assembly time drill the corresponding holes on the bottom of the top assembly.

Biscuits Join Aprons to Legs

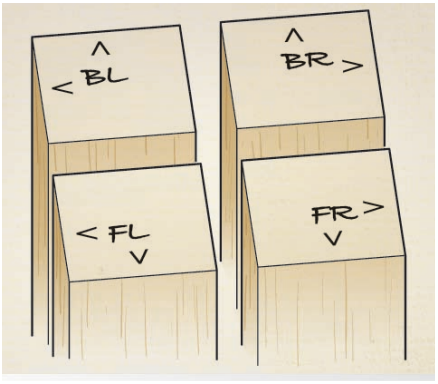
I join the aprons (D, E) flush to the outside of the legs (H) with double R3 mini biscuits. Some cringe at the use of biscuits for joinery on fine furniture. However, I often use double biscuits as they are sufficiently strong, easy to cut once you get the hang of it, and importantly to me, very fast to complete. Of course, if you don't have a biscuit joiner, use dowels. Position the biscuit slot about ¼" from the top edge of the aprons to avoid cutting into the top edge. Mark ⅝" down from the top of the two outside faces of each leg and with the same setting, plunge the corresponding slots on the inside faces of the four legs. Since the legs and aprons are both 1" thick, the pairs of slots should match each other and provide a flush, strong joint. But don't tempt fate – make test cuts on scrap pieces before committing to your project stock.

Dowels Join Stretchers to Legs

I join the stretchers (F, G, J) to the legs with 5⁄16" dowels. The holes on the top of the legs are 3" down, centered on the two inside faces of each leg, and ⅜" deep. The bottom holes



Sacrificial fence



Leg orientation

are 4" up, and ⅝" deep. Drill these holes on a drill press, as you want them to be straight.

Using a center punch or scribe, mark the exact center on the ends of the stretchers, and drill 5⁄16" holes, ⅝" deep in the ends. Drilling the dowel hole in the end of the long stretcher can be problematic, even if you have a floor standing drill press. I use a sharp, 5⁄16" brad bit with the long stretcher clamped in a bench vice, and drill the hole carefully by hand.

Half Lap Joinery for the Bottom Assembly

Half lap joints join the crosspieces (K) and centerpiece (L) to the long lower stretchers (I), and the stretchers (I) to stretchers (J). There are several options for cutting these joints, including table saw equipped with a dado blade, router, or by hand with chisel and hand saw. Aim for a snug fit, testing the fit and adjusting as necessary. An alternative design option is to dispense with the crosspieces and the centerpiece. Such a decision would simplify the construction and avoid any structural problems.

MATERIALS LIST (All measurements in inches)

Part		Qty	T	W	L
A	Top panel	1	¾	7	32
B	Top frame, long	2	1	1 ¼	34
C	Top frame, short	2	1	1 ¼	9
D	Apron, long	2	1	1 ¼	32
E	Apron, short	2	1	1 ¼	7
F	Upper stretcher, long	2	1	¾	32
G	Upper stretcher, short	2	1	¾	7
H	Legs	4	1	1	29 1/4
I	Lower stretcher, long	2	1	¾	33 ¾
J	Lower stretcher, short	2	1	¾	7
K	Crosspiece	2	1	¾	6
L	Centerpiece	1	1	¾	11 ¾

Finishing the Table

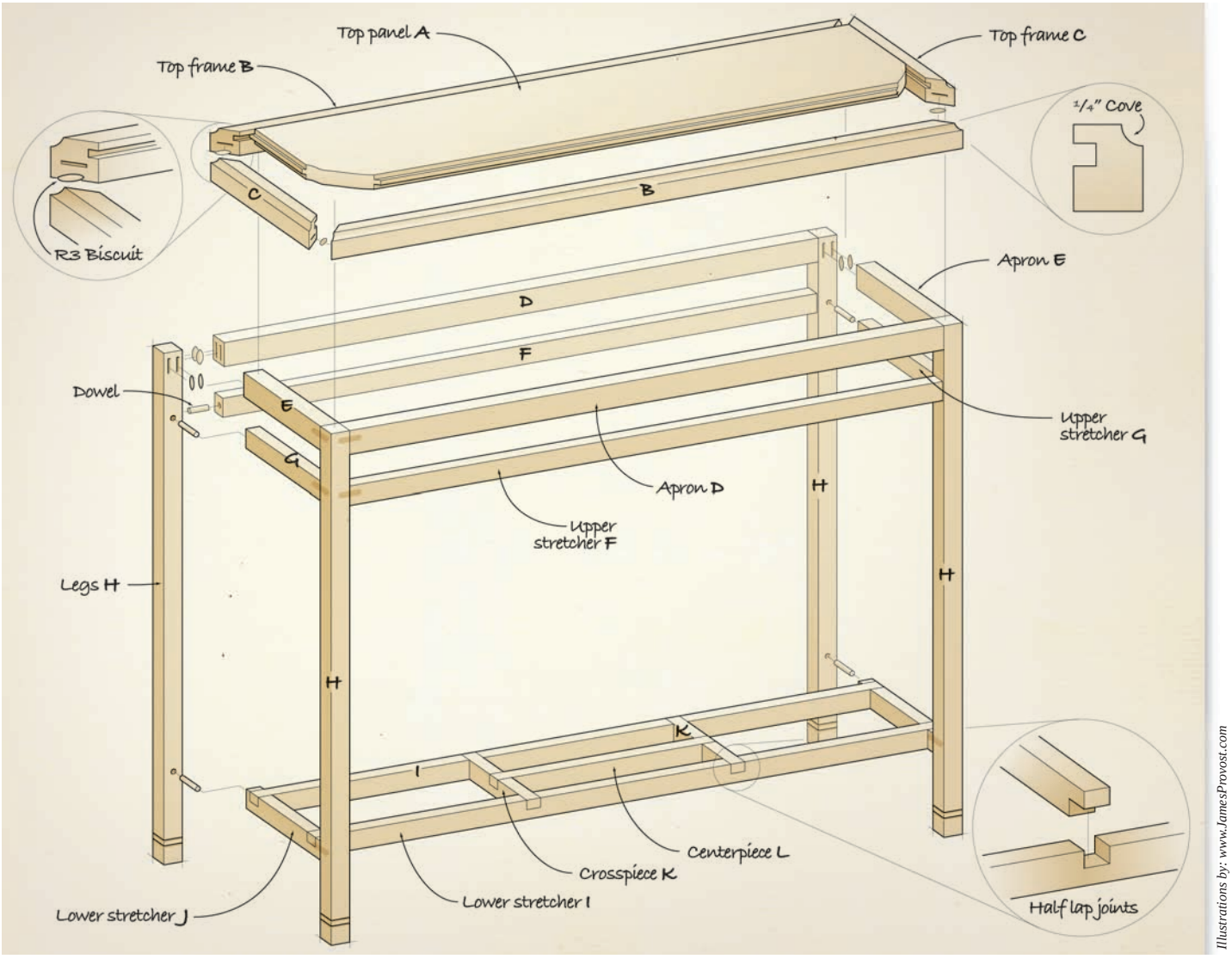
I felt that an unobtrusive embellishment on the bottom legs would add to the visual effect. Using a table saw set up with a ⅛" blade, I first cut a ⅛" deep dado 1 ⅛" up from the bottom of the legs, and a second

SUPPLY CHECKLIST

- 10 BF lumber
- 20 R3 mini biscuits
- 12 dowels: 5/16" x 1"; 6 dowels: ¼" x 1"

RESOURCES

"**Shopjig: Zero Clearance Inserts**", Feb/Mar '08, Issue # 52



Illustrations by: www.JamesProvost.com

1 ⅜" from the bottom. Using a hand plane I cut a chamfer around the bottom of the legs, which helps eliminate chipping when the table is moved around. At this stage I dry fit all the parts, to ensure that everything fits together nicely.

Prior to gluing, do as much finish sanding as possible. Gently ease over all edges, and lightly sand the faces and coves. Pay special attention to the top, easing the edges of the panel and the frame. Typically I work up to 220 grit sandpaper. I apply a finish to the top panel before assembly. Remember to include the bottom side of the panel, being careful to avoid any areas which will receive glue. On a table like this I use a blend of spar varnish, tung oil and turpentine, which I rag on and off several times.

First glue up the sides – the two side pairs of legs and the top short aprons (E), the top short stretchers (G) and the bottom short stretchers (J). Make sure the half lap on the bottom stretcher is facing 'up', as when you're moving quickly little things can be overlooked. Glue up the bottom assembly – crosspieces (K), centerpiece (L) and long stretchers (I) separately. You may have to plane or sand flush any half lap joints that might be slightly proud. It's now a piece of cake to glue up the two end leg assemblies with the top long aprons (D) the top long stretchers (F) and the bottom assembly. If you find that doing three things at once is a bit hectic, hold off on gluing the bottom assembly in place until after the aprons and stretchers have cured.

The last thing to do is to fit the top to the base with six ¼" x 1" dowels. The easiest way to mate the holes already drilled in the top of the long aprons (D) to the underside of the top frames (B), is to use dowel centers (Lee Valley #66J45.01). Drop the dowel centers into the holes, gently lay the top in place, and then apply hand pressure so that the centers register on the bottom of the top.

Same Table Different Look

On an elegant table like this most of the attention is focused on the top, particularly if the table is placed in a narrow hallway. You can easily transform the look of the table by changing the top panel. Generally you'll see a table built entirely out of the same wood, like the black cherry table (top left). Of course, to keep costs down you could also use a more moderately priced lumber, like red oak.

Combining different woods can add a lot of visual interest. In the second photo (top right) is the top featured in this article – yellow birch. The third and fourth photos show the table with walnut legs and frame, and a curly yellow birch top (bottom left) and a flamed yellow birch top (bottom right). The plank of flamed birch had a natural defect which I retained in the top, as I felt that the visual disruption added an element of curiosity and serves to hold attention longer.




Turn the top over and drill the dowel holes, being careful not to drill through. The trick to getting a consistent reveal under the top, so that it appears to be floating on the base, is to first glue the dowels into the apron holes, leaving ½" of dowel protruding. Place strips of 1/16" thick cardboard or plastic close to each of the six protruding dowels, and then apply glue to the dowel holes in the top, and gently set the panel on the apron dowels. Hand pressure should be enough to seat the top to the aprons. Press down until the top just touches each of the spacer strips. Remove the strips and you have a mock floating top frame and panel slightly above the aprons and legs.

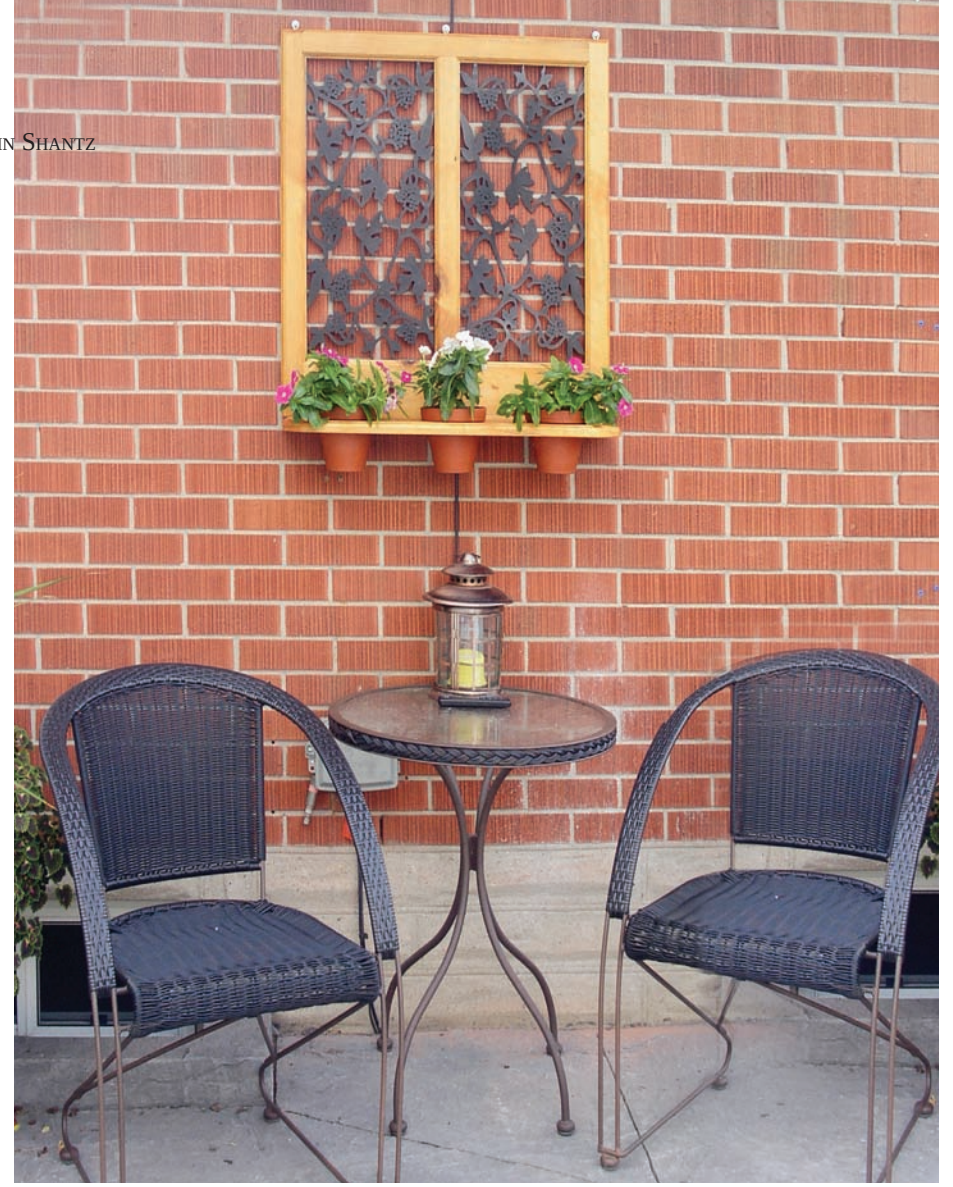
Once the glue has cured you're as good as gold. A lovely hall table like this will look good almost anywhere you need a small narrow table, not just in the hall.

WAYNE HOOKS
www.waynehooks.com

easyproject

Wall Planter

BY KEVIN SHANTZ



This attractive planter can spruce up any wall. Build it in a horizontal or vertical style, and easily modify it to hold more plants. All for under $30!

My wife designed this wall planter from simple materials found at a local building supply centre. Inspiration came from an ad that showed a new plastic lattice fencing material. She thought it would be an economical way of making decorative hanging planters. We chose to make two different styles, a double vertical style and a single horizontal style. Depending on the materials you use, they can be installed inside the house, or, as in our case, outside. This simple design can also be easily expanded to hold more pots.

• Mill all the stock to final dimensions. We purchased 1" #2 common eastern white cedar and milled it ⅞" thick for all parts except the bases (E, I), which we left 1" thick.

• Once all the pieces have been cut to size cut the joinery for the frames. To join the stiles (A and F) to the rails (B, C and G, H) we used a Samona AD409411 reversible rail and stile router bit (samona.com). You could also use dowels, biscuits, half-lap, mortise and tenon or splined mitre joinery. The vertical planter also has a mullion (D), which is joined to the rails. Whatever joinery you use remember that the planter pots will be heavy when filled with soil, so ensure the joinery is well executed.

• Glue and clamp the frame together. Make sure you use a waterproof glue like Elmer's Waterproof Glue (elmers.com). If there is any glue creeping out of the joinery wait for 30 minutes or so and then remove it with a sharp chisel.

• Rout a ¼" x ¼" rabbet along the inside of the frame to accept the plastic lattice. A rabbeting bit set, like the Dimar 114R4-32 (dimarcanada.com) is good value, as it has six interchangeable bearings that enable you to rout rabbets from ⅛" to ¾" deep. You'll have to clean up the corners with a chisel.

• Measure the opening for the lattice, and cut the lattice to fit.

• Bandsaw or jigsaw a pleasing curve on the corners of the bases (E, I). Measure the diameter of the pots you'll be using, and then cut out three holes on the bases. A circle cutter chucked in a drill press works well for circles of up to 6" diameter; for anything larger use a jigsaw. Use a ¼" round over bit on your router table to contour both sides of the circles. We also chose to put a decorative 5/16" roman ogee edge on the top edge of the base.

• Sand all the pieces to 220 grit, and then glue and screw the base to the bottom of the frame.

• We applied two coats of Cabot Clear Solution Natural Cedar Stain (available from most building supply centres), which is water repellent and mildew resistant.

Once the finish is dry, install the lattice, and screw a couple of shelf hangers on the back. We hung our single horizontal style planters along our back yard fence to create a softer look, and the double vertical style planters we attached to the brick of the house for a decorative focal point above our bistro set.

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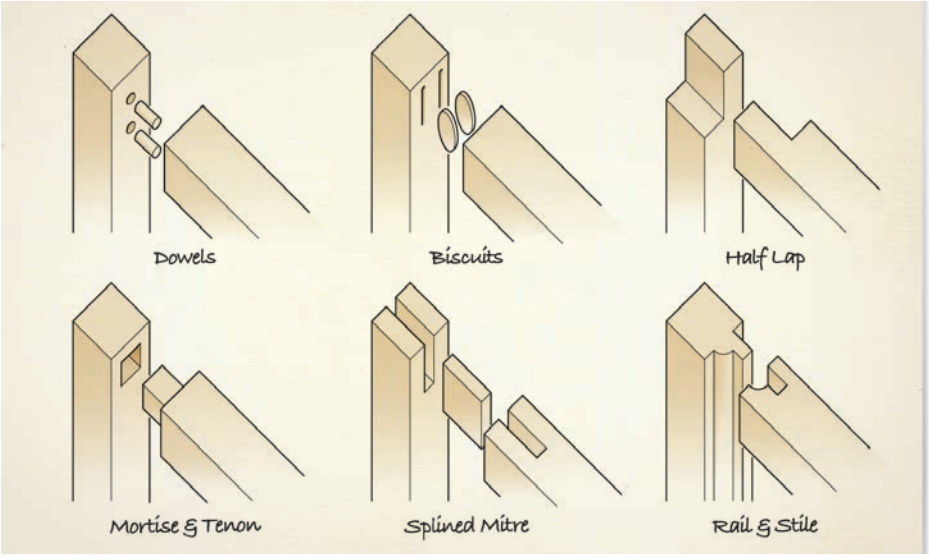
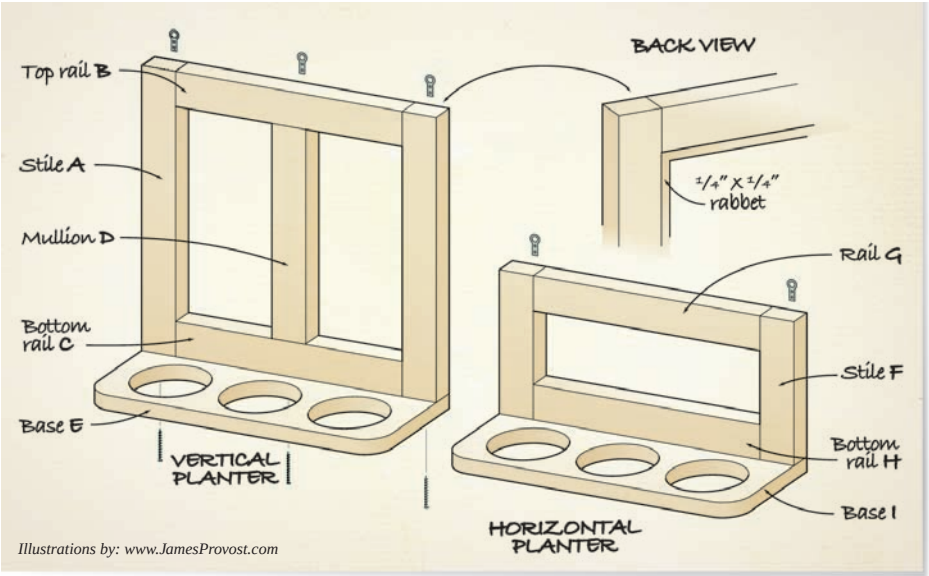


Frame joinery options



SUPPLY CHECKLIST

- 4 BF of 1" thick lumber
- 4 pieces 12" x 24" plastic lattice
- 2 ½" screws
- Shelf hangers

MATERIALS LIST (All measurements in inches)

Part		Qty	T	W	L
Vertical Planter					
A	Stiles	2	¾	2 ¼	30 ⅛
B	Top rail	1	¾	2 ¼	25 ⅝
C	Bottom rail	1	¾	4 ½	25 ⅝
D	Mullion	1	¾	2 ¼	24 ⅛
E	Base	1	¾	8 ¼	29 ⅜
Horizontal Planter					
F	Stiles	2	¾	2 ¼	18 1/16
G	Top rail	1	¾	2 ¼	24
H	Bottom rail	1	¾	4 ½	24
I	Base	1	¾	8 ¼	27 ¾

BY ROB BROWN

3D Models

Save Time and Money

There are many aspects involved in furniture design. Rough sketches and computerized drawings are popular techniques used in the creative process, but they are not the only choices when it comes to designing beautiful, functional furniture.

Models, also known as maquettes, are one of the most overlooked aspects of furniture design. Most forms of design allow you to see a two dimensional view. This is a great first step, but building a model is a quick and easy way to see your new design in 3D. For simple projects you can build models to scale, and for more complex projects, or those that you intend on making again in the future, you can build full size. Using inexpensive materials and basic joinery techniques means that model building won't cost you much, nor will it take a lot of time. Best of all, you'll save time later on during the actual construction stage. Working out crucial details like proportion and size before you commit to milling the wood for your project will help you avoid disappointment when your project is complete. You'll also find that building a model will help you work out joinery issues before you start on the real thing.

This will save you from searching for your 'wood stretcher' after you've cut that last piece of rosewood 1" too short. Models also provide a good idea of how different surfaces will meet and help determine appropriate joinery methods.

While I do my best to keep models as simple as possible, occasionally I go overboard when the model will be seen by a client. Clients sometimes have a hard time making the visual leap from a multi-coloured cardboard and masonite model to a nicely finished mahogany chest of drawers.

Building Materials

Models don't have to be beautiful, but they should accurately portray your project in three dimensions. I make full size models that break down after I've had a chance to study them. This way I can store and reuse the material in another model project. My materials of choice range from plywood, masonite and 2 x 4's, to heavy paper, foam board and cardboard. A model can be made from any combination of these materials. The decision depends on what I have on hand, how strong the material needs to be, its cost and availability. Between the scrap bin in your shop and the local building supply and arts & craft stores, you should be able to find what you need. It's a good idea to pick up a few things before you want to build a model so when the time comes they will be on hand. If they're right there waiting for you, you'll be more likely to use them.

If the different colours of the materials are affecting my ability to see the piece properly, I use a can of spray paint to unify the colours of the model. If I choose the colour properly, I find it helps me clearly see the piece of furniture. Dark brown for black walnut, pale beige for maple, rich rusty brown for Jatoba.

Joinery Techniques

Joinery should be kept simple, yet strong enough to hold the model together. When working with wood products there are only a few ways I join parts together. A groove in the wood (quickly cut on the table saw) will help locate and hold masonite, sheet stock or cardboard, and small L-brackets temporarily fasten particle board and plywood meeting at right angles. A few fluted dowels can add strength; even masking or duct tape will be enough to secure some joints. I don't usually use glue, but if I'm having a tough time keeping a critical joint together, a couple drops of fast drying glue or five minute epoxy will work, yet allow me to take the model apart later. You could also drive a screw or nail through a joint to hold it in place for a while.

Working with cardboard, paper or foam is sometimes a better option. Tape, a glue stick and push pins will go a long way to holding the different parts in place. When choosing materials for your model, take into account how much strength is needed. A piece of heavy paper isn't rigid enough to represent a dining table top in a full size model but is perfect for a jewellery box top.

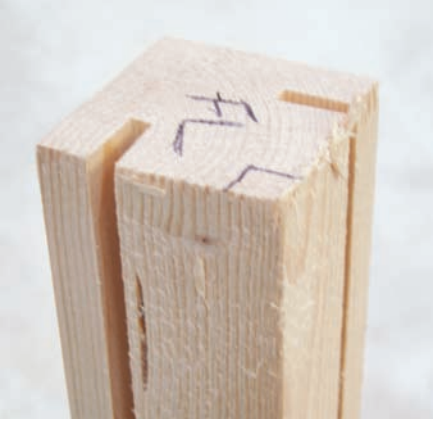
Full Size or Scaled Models

Before I begin cutting any of my project stock I want to have all the information I need to make efficient use of the stock. A full size model gives me that level of comfort. It allows me to see not only proportion, but also how the overall size of a piece will affect its function in its new home. However, there are times when a scaled model is a better choice. For some projects, it is awkward and difficult to produce a full scale model. For example,

Model finished on one side only

Model of pussy willow lamp table

Quick, simple joinery



Simple saw kerfs for quick assembly

Mock-ups of various legs

if I was designing a sofa I'd choose to produce a scaled model using Styrofoam, shaping it to resemble the upholstery, and then add wooden legs. Making a full size model of a sofa is time consuming and does not give you any more information than a scaled version.

Simplicity Is Best

When building a model, remember to keep things simple. Overall sizes and proportions are necessary, but smaller details are not always imperative. A marker or pencil line will often trick the eye into seeing the real thing. For example, instead of using different pieces of material for the stiles, rails and panel of a traditional frame and panel door, simply draw the different parts on a piece of masonite with a marker, and duct tape the hinge side of the door in place so it can swing open. Markers are also great for adding door handles, marquetry or carvings. With a bit of experience you'll learn what details are important to include and what can be left out.

Sometimes I construct a model so it looks finished from only one or two different angles. Proportions can be studied, sizes modified, and a photo can even be taken with half of the model incomplete.

A Detailed Part

There are times when I need to work out the details regarding a specific part or section of a piece of furniture, such as a table or a cabinet leg. Since there are so many options when designing a leg, I find it useful to glue up a couple of 2 x 4's, dimension them accordingly, and use my bandsaw, spoke shaves and chisels to flush out a design. Sometimes, I machine a stretcher or apron so I can see how everything will line up. More often than not, I end up throwing the leg in the firewood box before it's complete because it's not going where I hoped. This is what design is all about, and is the true benefit of modeling; making mistakes on cheap material and honing your hand tool skills in the process.

I write the date and description on each part once I'm happy with it. Now I have a cluster of legs I can look at when I need inspiration or clarification.

Fine Tune Your Design

I constantly readjust proportion and size while building models, as I rarely get it right the first time. Making a model gives me the opportunity to try out different ideas; I can see how a table would look if the overhang is increased by another couple of inches, or if the legs need a stronger curve. Cheap materials allow me to experiment freely on my way to coming up with something I like.

If you keep enough of the right material on hand, making a model will not only be a fun, informative part of the design process, it will save you time and money.

ROB BROWN
www.equinoxinteriors.ca

RESOURCES

"Project Design: The Golden Rectangle", Dec/Jan '07, Issue #45
"Design Review: Telephone Table", Dec/Jan '06, Issue #39
"Furniture Design: Wine Cabinet", Feb/Mar '05, Issue #34

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BY MICHAEL KAMPEN

Dovetail Jigs

Dovetails are the hallmark of finely crafted furniture; they are attractive, strong and can elevate a project from the average to extraordinary. Their limiting factor for most woodworkers has always been the level of skill required to execute them.

While there is obviously a role for hand cut dovetails, particularly in custom furniture, there is likewise a time and place for machine cut dovetails. In a kitchen with 30 drawers there would be 120 corners to cut. That's a lot of chisel and saw work. While it might take you three or four days to cut all the joints by hand, you could easily cut them in a day using a dovetail jig.

There are quite a few dovetail jigs on the market. When most woodworkers think of a dovetail jig, what comes to mind is something similar to the design of the legendary Leigh D4. With this design, the jig is clamped to your workbench, the work piece is clamped to the base of the jig, and a finger guide placed on top of the work guides a hand held router equipped with a bushing. Jigs like the Leigh cut both through and half blind dovetails and those equipped with moveable fingers enable you to cut variably spaced dovetails and with alternate templates, other decorative joints. There are several simpler jig designs on the market as well, which typically cut only through dovetails (see Other Dovetail Jigs sidebar).

In this article we'll look at the top four dovetail jigs on the market: the classic Leigh D4R, the new Leigh Super Jig, the newly redesigned Porter Cable OmniJig, and the recently updated Akeda BC24. These are full-featured dovetail jigs; while they are not what you might consider budget models, they offer good value to the user that prefers not to come up against limitations in what their tools are capable of doing. Though not inherently dangerous, there are several safety precautions you should observe to avoid personal injury or damage to the jig (see Dovetail Jig Safety sidebar).

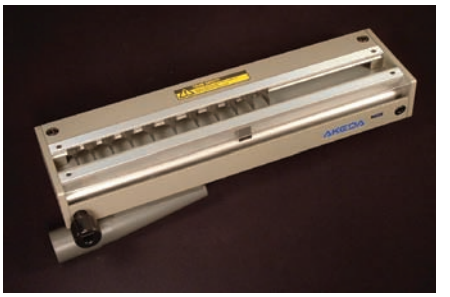
These jigs share similar features: a base with a clamping mechanism that the material is mounted onto, a guide finger assembly, and a guide bushing and bit for the router. The finger assembly provides a guide (fence) that the outer edge of the guide bushing follows, moving the router bit along the correct path to cut the joint. Except for the Akeda, the guide finger assemblies for these jigs rest on a set of arms that project from either side of the jig, and the assembly is slid onto these arms and then must be positioned correctly for each of the various joints you can cut.

The Operational Concept

All four jigs use a finger assembly and guide bushing. No matter which system the jig employs, each type of joint will require a different guide surface. On the Porter Cable and Leigh jigs, the finger assembly is one piece, which is set and moved as a single unit with the pin and tail spacing remaining fixed as the template is repositioned for the various types of joints. Each

Leigh: Super Jig

Porter Cable Omnijig



Akeda: BC2

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SOLID CARBIDE UP SPIRAL ROUTER BIT

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- TOTAL LENGTH: 3"

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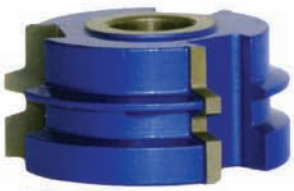
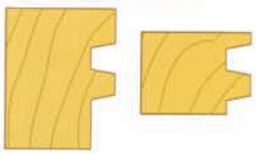


$99.99

MODEL K792667

- DIA - 2 5/8"
- CUTTING LENGTH - 1 1/8"
- BORE - 3/4"



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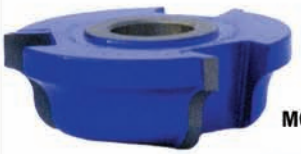
- DIA - 2 5/16"
- CUTTING LENGTH -15/16"
- BORE - 3/4"

Create beautiful door details with this cutter.

ROMAN OGEE SHAPER CUTTER



$74.98

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- RADIUS - 1/4"
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- CUTTING LENGTH -1"
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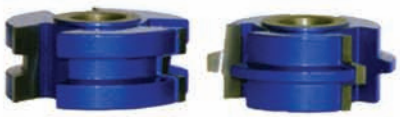

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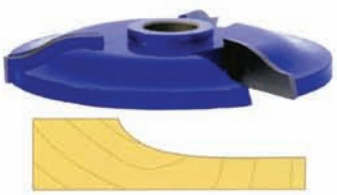
MODEL K792667A1

- DIA – 2 5/8"
- CUTTING LENGTH – 1"
- BORE – 3/4"

Produce strong joints every time.

RAISED PANEL SHAPER CUTTER



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MODEL K8121175A1

- DIA - 4 5/8"
- CUTTING LENGTH -5/8"
- RADIUS - 1 1/4"
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of the templates is used in one of four positions depending on the cut you are making; the templates are simply rotated end for end as well as being flipped upside down. This allows access to four different guide surfaces. The Akeda implements the same concept in a slightly different manner by using individual fingers that are snapped into an indexed guide rail.

The guide bushing is equally important to get a tight fitting joint. It is the guide bushing that runs along the guide surface on the finger assembly and guides the router bit. These four jigs use the ubiquitous Porter Cable guide bushing (which are supplied with the jigs). If your router won't accept these bushings then you will need to contact the jig or router manufacturer to purchase an adaptor to fit your router. When you install the bushing, be sure that it is securely fastened to the base of the router; you don't want it working loose.

Leigh D4R and Super Jig

The D4R and Super Jig are the latest designs to evolve from the venerable Leigh D1258R. In operation, these two jigs are very similar.

The base of the Leigh D4R is CNC machined from a single extrusion of aircraft grade aluminum with all side stops and registration edges machined in place. By machining all of the surfaces on a CNC machine they are guaranteed to be straight and square. The extrusion is then capped at each end with precision cast end caps. The arms that support the finger assembly mount to these end caps and can be easily raised or lowered using large knobs on either end. The clamping surface on the extrusion has been machined to provide a non-slip surface. The Super Jig was designed to be a more affordable jig for the non-professional woodworker. To reduce production costs, Leigh reduced the amount of time the base spends on the CNC machine. The metal end caps and the side stops on the Super Jig are made of nylon and must be installed by the end user. As well, the machined clamping surfaces have been replaced by an applied abrasive surface.

Both jigs feature a guide finger assembly that allow the fingers to be placed anywhere along the length of the work piece. This enables you to use any dovetail spacing that best suits the width of your stock and the scale of your project. The maximum

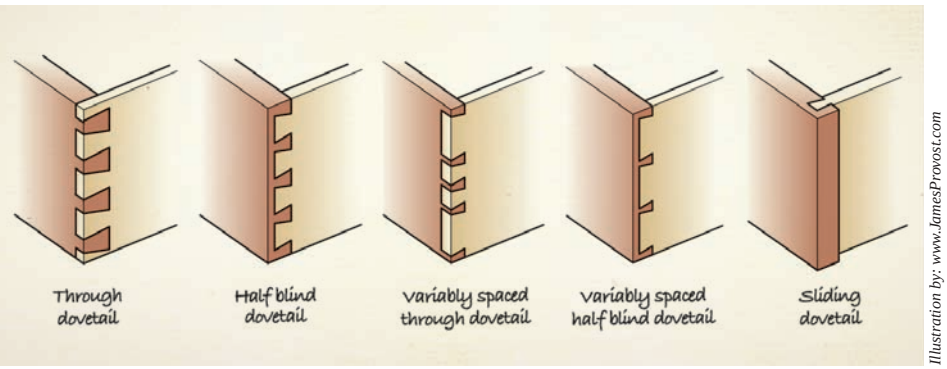

Illustration by: www.JamesProvost.com

Dovetail Jig Safety

- Read both the router and jig instruction manuals before using them.
- Wear safety glasses and hearing protection.
- A smaller fixed base router will be safer and easier to control than a larger top-heavy plunge router. This becomes especially noticeable as you cut along the front edge of the jig where there is typically minimal support for the router.
- Avoid using a plunge router as there is always the possibility of accidentally releasing the plunge lock. This will cause the bit to rise up and contact the bushing, damaging the router bit, bushing, and finger assembly.
- After installing a bit in a router fitted with a guide bushing, spin the bit manually to be sure that it is not contacting the inside edge of the bushing.
- Do not place your face level with the spinning bit; establish a point of reference on the router and the jig which will allow you to operate the router while looking down from above.
- Keep the router level on the guide finger assembly; allowing the router to tilt forward when routing near the edge of the guide finger assembly will ruin the joint.
- Ensure the bit has stopped spinning before you lift the router from the jig.

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stock width on the D4R is 24". There are three models of the Super Jig, in 12", 18" and 24" widths. The fingers on the D4R are split lengthwise allowing you to create tails of varying widths; this feature isn't used by most casual woodworkers and was dropped from the Super Jig as a cost cutting measure. A bonus feature on the Super Jig is that the single piece adjustable fingers provide the correct geometry to allow you to rout finger (or box) joints on the same guide finger assembly.

When using the Leigh jigs, the guide finger assembly can be mounted in four different positions by rotating it or flipping it end for end. On both ends of the fence, a graphic indicates the mode you are working in. The active mode will always face the operator and be upright, and the inactive mode will be displayed upside down from the operator's position. A graphic of the joint being cut is displayed which makes it easy for the user to ensure the fingers are in the correct orientation for the joint being cut.

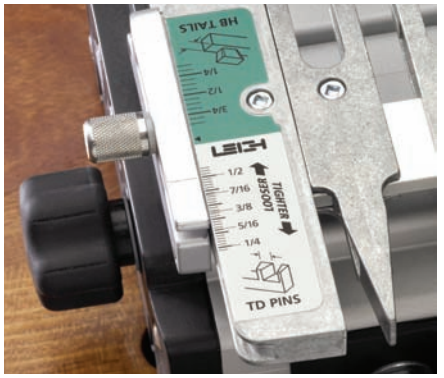
The finger assembly moves back and forth on the two support arms and is positioned using registration lines that have been machined into the arms. For the various operations, moving the finger arm forward or backward on the arms controls the fit. Router tolerances, runout, and guide bushing tolerances make it difficult to cut a perfect fitting joint the first time, so for each combination of bit and guide bushing combination, you need to make a test cut to fine tune the fit. After working through the process to arrive at the perfect setting, record it in the operators manual for future reference. It's a good idea to make a couple of set-up pieces and label them with the router bit number. To set the bit depth with the same bit in the future, clamp the set-up pieces into the jig and use them as guides.

The D4R uses a standard 7/16" guide bushing for all cuts. The bushing that ships with the Super Jig (the e-bush) has been redesigned slightly to provide a fine adjustment mechanism when cutting box joints. The e-bush is elliptical in shape, and there are a series of numbers around the outer edge on one quadrant. When the bushing is set to the maximum setting of #10, the bushing functions as a standard 7/16" guide bushing. Each increment on the e-bushing provides a change of .002", which makes it simple to attain perfectly fitted box joints.

The Super Jig comes with a nylon spacer that serves two functions. It is used to set an even spacing between each finger, and then when routing the second board it snaps into a holder on the clamp mechanism to off-set the second board the correct distance from the first one. This is a handy little bonus feature that doesn't require the purchase of additional guide finger assemblies. When the bushing is used to cut box joints, the e-bush is set to the middle of the scale at position #5. As the outer diameter of the bushing gets narrower, it allows the router to remove more material from between the fingers, as the bushing gets wider, router travel is more restricted and consequently, less material is removed.

Both Leigh jigs easily cut sliding dovetails. A plastic insert that is attached to the front of the guide fingers provides a guideway for both the tail and socket pieces. Getting a perfect fit on a sliding dovetail is a matter of trial and error but the process is laid out clearly in the manual. To adjust the fit on a sliding dovetail, the socket is first routed in one pass and then the tailpiece is prepared. The initial cuts on the tailpiece are made to produce a tail that is intentionally larger than required which is then reduced in width with subsequent passes until a perfect fit is achieved.

Leigh: Infinitely variable guide fingers



Leigh Superjig: Through dovetail scale

Troubleshooting and Tips

• Tear-out usually occurs on the top left corner where the bit exits the wood as a result of short grain and a lack of support. When possible, back up vertically clamped boards with a horizontally clamped back-up board, which can be left in place for successive cuts.

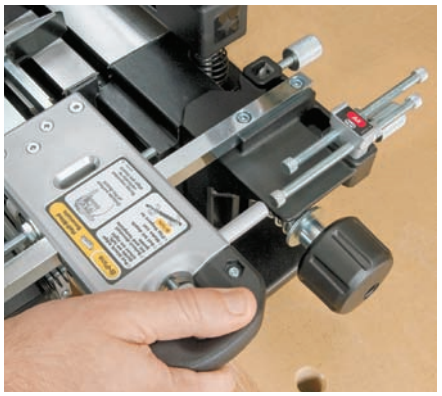
• In most situations you move the router from left to right, with the bit cutting upwards out of the wood. However, when making your first cut in side grain, use a shallow 'climb cut', by moving the router right to left (see "Routing Basics Part II", Aug/Sept '07, Issue #49). The router will have a slight tendency to move out of the cut and pull the router along the edge of the work, but with a little practice, making a climb cut on the outside surface will give you a perfect edge without tear-out.

• Ensure your router bits are sharp, and set your router speed between 18,000 and 24,000 rpm for optimal results.

• When test fitting dovetail joints, keep the pieces square to each other. If the joints are wiggled to assemble or separate them, the fibres will be crushed and the fit will not be as precise. The joint should come together easily; a firm push with the smaller joints, and a light tap from a mallet for larger ones.

• A router bit for half blind dovetails has a specific depth that it is designed to cut at, and must be set precisely. Refer to your manual for the depth. Only very minor adjustments are possible to fine tune the fit. As the angle on the dovetail bits increases, the amount of adjustment available falls considerably; adjusting the depth by the same amount on a 9º bit will not provide as great a change as the same adjustment made on a 20º bit.

• When making a joint that you are likely to repeat in the future, make a spare sample of the joint. To recreate the joint, clamp the spare into the jig and use it to set the finger location and router bit depth.



OmniJig: Self aligning template

OmniJig: Setting bit depth

OmniJig: Dust chute helps support router

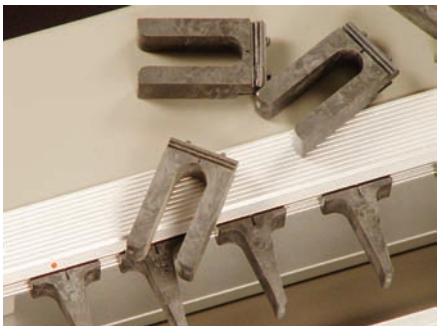
OmniJig: Setup for tails

Other Dovetail Jigs

There are several other approaches to dovetailing with a router. The first dovetail jig designed for use on a router table was the Keller jig (kellerdovetail.com). It features a machined guide finger assembly that is fastened to the work piece; the dovetails are then cut on the router table. This same process is used by the Woodline Route-R-Joint system (woodline.com). The Woodline system also allows the creation of various joints in addition to dovetails. Like the Keller jig, joints are cut on the router table.

The Craftex CT052 is a budget level jig ($99) that does both through and half-blind dovetails (busybee.com).

The Prazi chessmate dovetail jig (praziusa.com) is fastened to the work piece and the joints are cut with a hand held router. The jig consists of a guide with several different inserts that are mounted to a layout stick you make in the shop. To make the layout stick, you mark out the center of each tail on your work piece, transfer these to the layout stick, and then use your table saw to cut a saw kerf on each mark. A ridge on the jig will then register in this kerf to locate the jig correctly. The advantage to this system is that you can dovetail a piece as long as your guide piece.



Akeda: Guide fingers snap into indexed guide rail

Akeda: Half blind dovetails

Dust collection has always been an issue with dovetail jigs. An optional accessory, the Leigh Vacuum Router Support (VRS), connects to any shop vacuum, and serves both to siphon dust away from the jig and to provide additional support at the outer front edge of the jig. This is the spot that the router will tend to want to tip forward and the additional surface of the VRS provides an edge to support the router. A pair of wire arms that attach to either side of the router move the collection chute back and forth as you use the router, and when the cut is complete, the router can be quickly parked on the right side of the jig without the need to lift it off the jig and place it on your bench. I was sceptical about the efficiency of this accessory, but in use it has far surpassed my expectations and I consider the VRS a must have accessory. It really does capture almost all of the material the router generates. The convenience of being able to park the router to the side really makes production work a breeze.

Porter Cable OmniJig Joinery System

The newly redesigned OmniJig has a lot of improvements over the previous version. The 24" model (a 16" model is also available) comes in at a substantial 43" wide and weighs in at a robust 66 pounds. The bulk of this is the aluminum base, which has been machined with a textured non-slip surface where the work pieces are clamped, ensuring that they remain solidly in place during the routing process. While the OmniJig incorporates many of the same features found on the Leigh D4R jig it has several distinctive features of its own.

The clamping mechanism is very nice, in that once it has been set for the thickness of the material you are working with, it is engaged by simply pulling one lever. As on the Leigh, the guide fingers are infinitely adjustable. The finger guide that slides onto a pair of arms mounted on the jig is perfectly positioned by an innovative improvement over the Leigh. The OmniJig includes several different guide stops that are placed into a hole in a wing on either

Akeda: Installing guide fingers

Leigh: Through dovetail pin mode

Leigh: Through dovetail tail mode

Leigh: Sliding dovetail socket board

Leigh: Sliding dovetail tail board

side of the jig and this accurately locates the finger assembly correctly on the arm. It also features factory preset depth stops to help you set the bit depth. Most of these are located in the router depth pod, a box containing 12 stations to set the heights for twelve different cut types. The settings in the pod are used to set the bit depth for single-pass half blind dovetails, sliding tapered dovetails and four user defined settings. This box is mounted to the back of the jig where it is readily accessible while keeping it out of the way. There are two other depth stops located on the left side of the jig under the guide finger assembly. These are used to set the bit depth for through dovetails. They are fine tuned right from the factory to provide perfect results when used with the proper bit and following the procedure as outlined in the manual.

There are several additional guide finger assemblies planned for this jig, one for small dovetails and one for finger joints. There is also a mortise and tenon attachment in the works that will allow you to cut mortise and tenon joints of various sizes.

Akeda Jig

The Akeda BC24 requires few adjustments and is very intuitive to use. Unlike the previous jigs, the guide fingers on the Akeda snap into an indexed rail mounted to the jig. There are three types of guide fingers; through dovetail pin guides; half blind pin guides and tail guides. Also included are Tail Guide Spacers that you cut into strips and snap in between the tail guides for sliding dovetails; this prevents routing in the wrong places. The guide rail these snap into is indexed in ⅛" increments, which means that you can snap the fingers into the same location for precise, repeatable cuts. After designing your layout, place a small pencil mark on the rail behind the fingers to note their location. When it comes time to switch to one of the other guide fingers to complete the cut, line the new fingers up with the pencil mark, snap them in and rout the joint. If you find the joints are slightly too tight or slightly too loose, replace the standard guide bushing with one of the optional oversized (.442") or undersized (.434") to correct the fit.

This simple system reduces the bulk of the jig but it also means that for your joints to be laid out evenly, your material will have to be sized in ⅛" increments. This is a small sacrifice when you consider the simplicity this brings to the jig. The method of clamping the work piece is different on this jig. The other three jigs clamp the material either vertically or horizontally against the body of the jig. The Akeda uses three different clamping positions – against the jig horizontally, vertically between the clamp bar and the jig body, and vertically between the clamp bar and the front of the jig. These three positions will line the board up with the correct portion of the guide fingers.

The Akeda features a clear window across the front of the jig which remains in place for all operations, other than sliding dovetail sockets. It keeps material from blowing back at the operator and focuses the debris into the snap-in dust collector. A separate dust collection kit is available on its own, or as part of the complete accessory package, and like the one on the Leigh jig, it is a must have accessory. I use this jig hooked up to my shop vacuum and it catches virtually every speck of dust the router kicks up. To rout sliding dovetail sockets, the clear window pops out so the board can be mounted horizontally through the opening. The window is reversible as well, which narrows the opening, concentrating the suction from the dust collector – handy if you are using a shop vacuum instead of a dust collector. To rout narrow boards, I place a strip of wood against the opening on the other end of the jig to increase the pick up at the active end. The front of the jig provides a second surface on which to register the router. This is very helpful as it keeps the router perpendicular to the jig and allows you to park it off to the right when not in use.

The Akeda jig uses proprietary router bits with 8mm shanks. They require the use of a router with a ½" collet and a reducer, or a router with an 8mm collet. An 8mm shaft contains twice as much material as a ¼" shaft with a corresponding increase in strength and rigidity and this results in a smoother cut. The bits, coated with Teflon to

help reduce pitch build up, come in a variety of sizes and angles to suit the stock thickness you are using.

When cutting sliding dovetails, the adjustment process is the reverse of the Leigh jigs. Rather than cutting the pin board to fit the tail, the socket is enlarged to fit the tail board. Again, this is a matter of trial and error until you have achieved a perfect fit. Sliding dovetails can be notorious for seizing before they have been driven fully in place and I've developed a system that I use with the Akeda to slightly taper the socket. I place a couple of small pieces of painter's tape on the front edge of the work piece where it hits the side stop at the back of the jig. This angles the material just enough to provide additional clearance for the glue as you slide the pieces together. There is a small edge on the end cap that a small piece of metal could be clipped to as an alternative to the painter's tape.

In the Final Analysis

These four jigs are capable, professional quality products. They all deliver what they promise and are exceptionally well made. The OmniJig would be ideally suited to a professional shop that has the space for a machine of this size. The integrated depth stops make it easy to adjust the finger assembly and get into production without wasting time and material to cut a test joint. The Leigh jigs are superbly designed and manufactured (in Canada) and will provide the woodworker with the capacity to create a wide range of dovetail based joinery, but in a smaller package than the OmniJig. The Super Jig provides most of the same functionality as the D4R, but changes were made in materials and the manufacturing process to bring this jig in at a competitive price point that would appeal to budget conscious woodworkers. The Super Jig also allows you to cut 5/16" and 5/8" box joints with the same guide fingers. The Akeda is the result of the designer taking the original concept of a variable pitch dovetail jig to the next level. By giving up some minor flexibility, in that you need to work within the 1/8" increment structure provided by the guide rail, you get a compact easy to use jig with the ability to cut finger joints.

MICHAEL KAMPEN
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RESOURCES

"Wood Joinery: Dovetails", Jun/Jul '04, Issue #30

"Canadian Tools: Akeda Dovetail Jig", Jun/Jul '03, Issue #24

MATERIALS LIST (All measurements in inches)

	Leigh D4R	Leigh Super Jig	Porter Cable OmniJig	AKEDA BC24
$	479.00	359.00	629.00	480.00
Max width	24"	24"	24"	24"
Min/max thickness	1/8"/1 1/2"	1/8"/ 1"	1 1/2"	1/8"/ 3/4"
Variable spacing	Yes	Yes	Yes	Yes*
Half blind (HB) dovetails	Yes	Yes	Yes	Yes
Through dovetails	Yes	Yes	Yes	Yes
Finger joints	1/4" **	Yes	Opt. Template	Yes
Mortise & tenons	Opt. Template	No	No	No
Rabbeted HB dovetails	Yes	Yes	Yes	Yes
One-pass HB dovetails	No	Yes	Yes	No
Asymmetrical layout	Yes	Yes	Yes	Yes
Sliding dovetails	Yes	Yes	Yes	Yes
Ease of set up***	10/10	8.5/10	9/10	10/10
Ease of use***	10/10	9/10	8/10	10/10
Quality of manual	The Best	Excellent	Good	Excellent
Source	leighjigs.com	leighjigs.com	deltaportercable.com	akeda.com

Notes: * in 1/8" increments. ** refer to the Leigh Technical Bulletin (www.LeighJigs.com/support.php).
*** Scale of 1 (very poor) to 10 (excellent)
The Leigh Super Jig also comes in a 12" width ($219) and 18" width ($289). The Porter Cable OmniJig also comes in a 16" width ($459).

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Patrick T. Hankard–South Windsor, CT

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- **Contact our internet store:** www.ForrestBlades.com

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Code CWW
* As seen in Fine Woodworking's 2004 Tool Guide, pg.121.

Woodworker II Fine Woodworking* — Editor's Choice Best Overall
Woodworker II Wood Magazine — Top Tool
Woodworker II Woodshop News — 2007
Chop Master Woodshop News — 2007
Dado King Wood Magazine — Top Tool
Dado King Woodshop News — 2007
Duraline Hi-AT Woodshop News — 2007
Custom Woodworker II Woodshop News — 2007

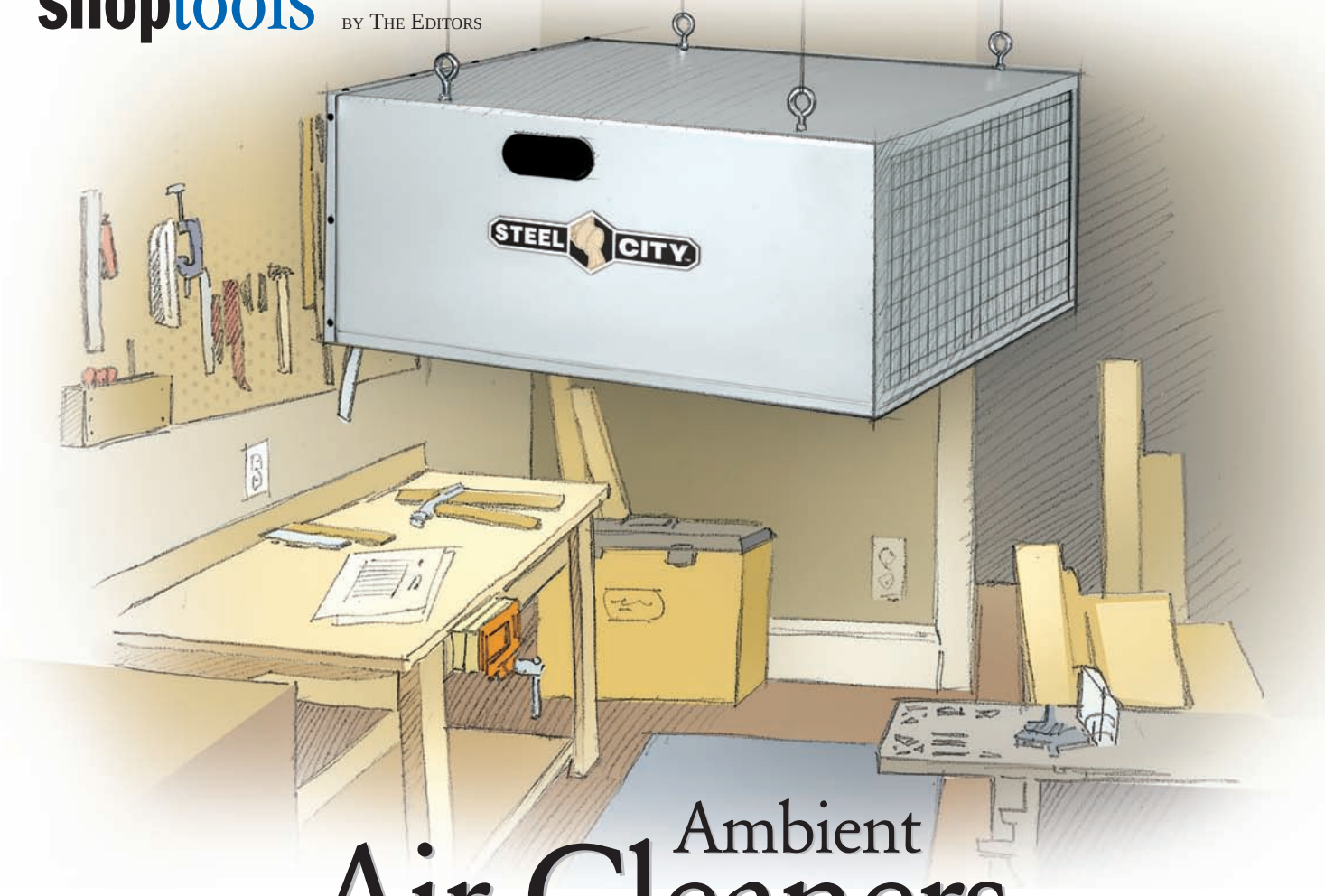


Illustration by: Mike Del Rizzo

Ambient Air Cleaners

It's a simple fact. The more time you spend in your shop, the more dust you inhale. For maximum dust control we recommend using an ambient air cleaner in conjunction with a primary dust collection system, supplemented by personal dust protection when appropriate.

When setting up or expanding a workshop, the purchases that are often at the top of a shopping list are likely to be machinery or power tools. Nothing wrong with these choices, after all, these are the tools that turn our dreams into reality – we quickly see the results of our labour. However, it is important to give more than cursory thought to the by-product of woodworking (chips and dust) and how to effectively deal with them.

A primary dust collection system, whether a portable shop vacuum, a stationary bag collection dust collector, or a high efficiency cyclonic collector, is fundamental to all shops. Running hoses to your machinery and collecting chips and dust at the source can go a long way to preserving peace in the home and safety in the shop.

Regardless of how efficient your primary dust collecting system is, it won't pick up all the dust in your shop. And, of course, it will only pick up chips and dust when it's turned on. But what about those activities, like sanding, that we usually undertake when the dust collector is turned off? Remember, dust will not only play havoc when it comes time to applying finishes,

> A lot of dust collectors still come equipped with 5 micron bags. A 5 micron dust particle can remain airborne for up to half an hour – plenty of time to end up in your lungs. However you can purchase high performance bags that filter material down to 1 micron in size. That's a 500% increase in protection.

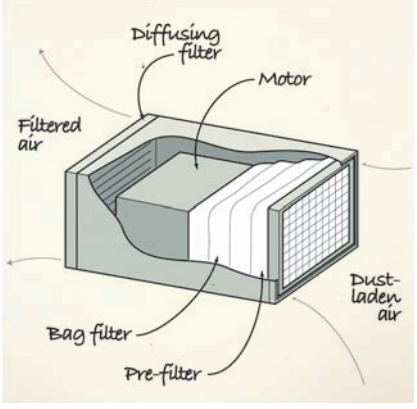


Illustration by: www.JamesProvost.com

it also takes a toll on your health. Even if your power sander is hooked up to a shop vacuum, a fair amount of dust will fill the air, and that dust is not a friend to your lungs. Dust particles work their way into the tiniest recesses of your lungs, and because of their minute size, they are not expelled through the normal respiratory processes. This can lead to a range of health problems. The solution is an ambient air cleaner, which you can run intermittently throughout the day to filter the small, suspended air particles out of the air circulating in the shop.

Choose the Right Size

Air cleaners are designed to be hung from the ceiling and will filter the air in your shop on a continual basis. There are two criteria you need to factor in when sizing an air cleaner for your workshop - the number of times you want to be able to completely filter the air in the shop, and the capacity of the air cleaner. In most home workshop situations, you will want to filter the air between six and eight times per hour. To calculate the volume of your shop, multiply the length by the width by the height. Multiply this number by the number of times per hour you want to filter the air (6 – 8) and divide the result by 60. This will give you the CFM required for your workshop. Match this to the output of the various air cleaners on the market to find one sized adequately for your shop. For example, a 20' by 22' shop with 8' high ceilings has a volume of 3,520 cubic feet (20 x 22 x 8). An air cleaner with at least a 352 CFM rating would be required to circulate the air six times per hour in this shop (3520 x 6 ÷ 60).

Simple Machine – Important Function

Air cleaners are very basic machines; a metal or plastic box with a pre-filter at one end, a bag filter and motor in the middle and an diffusing filter at the other end. The pre-filter on the Delta 50-875, JDS A750ER and Steel City 65100 and 65105 are electrostatically charged. This creates an attraction between the filter media and the dust that helps trap small particles that would normally travel through the larger openings in the outer filter. If you place your hand over the filters you won't notice a lot of suction. These units require the dust to be suspended in the air, and rely on the air currents to bring the dust to the filters. As a result, placement of the unit is critical for it to function at peak efficiency. While there isn't much suction at the input, the output air is moving fairly quickly. Correctly positioning the air cleaner will help to establish a circular airflow pattern that will help deliver the suspended particulate to the filters.

In a rectangular shop, position the air cleaner along one of the long walls, about one third of the way along the wall to the intake filter. Hang the unit from six to 12 inches out from the wall. Some of these models come with mounting hardware; with others you will have to source the lag screws and hooks yourself. In a square room, place the unit along any wall using the same criteria, and if your shop is irregular in shape as some basement workshops are, you may need a second unit to provide adequate circulation and

A micron is roughly 1/25,000". Which is *very* small. About the smallest thing we can see is 50 microns. Large dust particles of around 100 microns are heavy enough to quickly settle; it's the fine dust, around 1 micron and smaller in size, that you want to avoid breathing in. Along with dust, many woods, particularly exotic species, contain allergens and toxins that can be under 1 micron in size. Finishing compounds found in many shops contain volatile fumes, in the .01 to 3 micron size, that can be dangerous to breathe as well. If you use a shop vacuum consider installing a HEPA (High Efficiency Particulate Air) filter, which removes particulate matter down to .3 microns.

	**Craftex B2055 –** $208.00 **www.BusyBeeTools.com**
	**Craftex CT051 –** $348.00 **www.BusyBeeTools.com**
	**Delta 50-875 –** $449.00 **www.DeltaPorterCable.com**
	**Delta AP100 –** $339.00 **www.DeltaPorterCable.com**
	**Delta AP200 –** $299.00 **www.DeltaPorterCable.com**
	**General 10-550 –** $329.00 **www.General.ca**
	**General 10-600 –** $459.00 **www.General.ca**
	**JDS AT750ER –** $321.00 **www.JDSTools.com**
	**King KAC-650 –** $289.00 **www.KingCanada.com**
	**Steel City 65100 –** $ 229.00 **www.SteelCityToolWorks.com**
	**Steel City 65105 –** $359.00 **www.SteelCityToolWorks.com**

To find the name of your local retailer visit the suppliers' web site. Go to **www.CanadianWoodworking.com/data** for more detailed product specifications.

filtration. Try to locate your dust producing activities close to the intake side of the air cleaner for the most efficient operation.

Early models came with a simple on/off switch on the end of a pull chain, but modern electronics has caught up in the workshop and some of these now sport infrared remote controls. Models like the Steel City 65105 can be turned on remotely from anywhere within the shop; the remote control also allows you to select the fan speed as well as set the automatic timer.

The larger stationary air cleaners offer multiple fan speeds to suit different situations. When you are involved in very dusty operations like sanding, the top speed provides maximum air filtration but in the process it also generates a fair bit of noise. This may be okay when you are already wearing hearing protection for a power tool, but it can be a bit too much when you are concentrating on hand work, and the cleaner is operating in the background. Having the ability to switch to a lower setting when maximum speed is not required can be a valuable feature.

Maintenance Is a Must

To maintain the efficiency of the filter media, it should be cleaned on a regular basis. As the media clogs up with particulate, its resistance to the passage of air increases. The filters are designed to be cleaned and reused. At the end of every dusty woodworking session use a shop vac to clean off the dust that has accumulated on the outside of the pre-filter. After a while, the bag filter will also be coated with dust. Remove the pre-filter and use a vacuum with a crevice tool to get into the inside of the pleated filter bag. Turn the air cleaner on to inflate the bag which will make vacuuming out the inside much easier as the bag will be open and expanded to its full size. Vacuum the diffusing filter as well.

A few models (Steel City 65105, Delta 50-875) have an air flow gauge to indicate the flow of air through the unit. This is accomplished by placing a vane in the output airflow that is tied to a pointer on the outside of the unit. These gauges are designed to indicate the efficiency of the unit. As the filters get blocked with particulate the flow of air is reduced and with a quick look at the indicator you can tell if the filters need to be cleaned. A timing feature found on a number of models (Craftex CT-051, Delta 50-875, JDS AT750ER, General 10-550 and 10-660, King Canada KAC-650, and Steel City 65105), turns the machine off after a specified period of time. After cleaning up the shop at the end of the day you can set the timer to run anywhere from 1/2 hour to four hours after which it will automatically shut off.

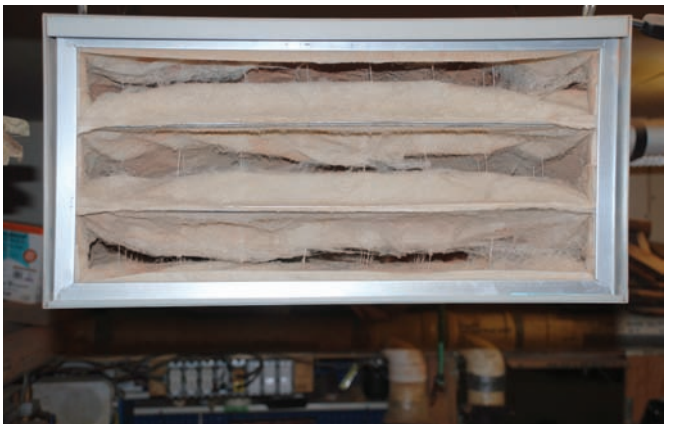
If you do any amount of sanding in your shop, then you owe it to yourself to consider installing an ambient air cleaner. It will keep your shop dust free and your lungs healthy.

So, which air cleaner to buy? For the budget conscious shopper, the Craftex B2055 or Steel City 65100 offer good value. The hobbyist woodworker might want to consider the Delta AP200 or King KAC-650, which cost only a few dollars more, but have a wider range of features. The woodworking enthusiast or professional woodworker has the widest range of models to choose from, including the Delta 50-875, General 10-600, Steel City 65105 and JDS AT-750ER. At the higher price range you can get a unit that offers the convenience of a remote control, multiple speeds, and an electrostatically charged pre-filter.

THE EDITORS

Left side dust free; Right side showing three days of accumulated padauk dust

Dust laden bag filter



Bag filter inflated and cleaned

If you do a lot of power sanding you know how much dust can end up in the air. A downdraft sanding table, like the General 10-710 (general.ca), connected to a shop vacuum, will significantly help reduce air borne dust.

If you have a very small shop and don't run a lot of machinery, or you do a lot of on-site work, then consider a small portable air cleaner, like the Shop Vac 103-00 (shopvac.ca). It's designed to be taken to the source of the dust and can be placed directly on a work surface, or on the floor, in close proximity to the dust source.

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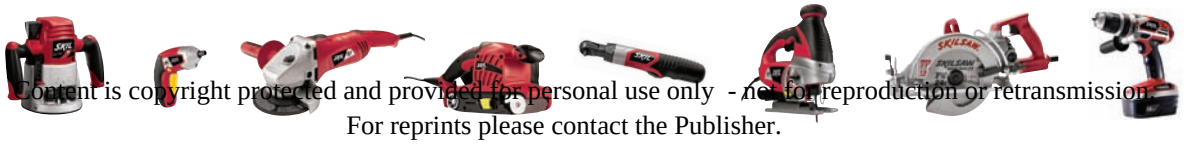


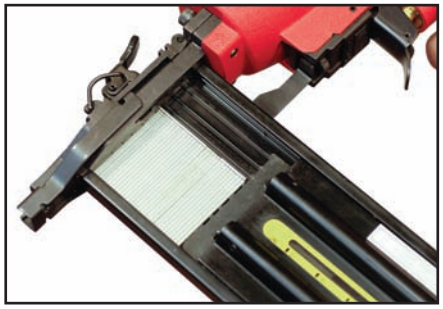
BY MICHAEL KAMPEN

Nailers

Driving nails with a hammer has its time and place. But when you need to drive a lot of nails quickly and efficiently, there's nothing quite like a pneumatic fastener.

Nails have been around for as long as there has been metal to make them. The first nails were all custom forged and were made one at a time by a craftsman, and as you might well imagine, were rather expensive. With advances in technology brought about by the industrial revolution, machines were developed to shear these nails from a sheet of steel, making mass produced, inexpensive nails, widely available. Later advances in manufacturing resulted in machines that could stamp out nails at extremely high speeds from a continuous roll of wire. Additional investments in research saw the addition of ridges and rings on nail shanks for better holding power and coatings to improve nail penetration and reduce corrosion.

Just as the nail has evolved and improved over the years, so have the tools used to drive them home. Early hammers were essentially a heavy metal weight, flat on one face and mounted on the end of a long handle, which was swung to strike the nail. We've come a long way from those days with the new generation of anti-vibration hammers constructed of space age materials. While these hammers are a marked improvement over earlier models, they still rely on the operator for the energy to drive the nail, and this can easily lead to repetitive strain injuries. Using compressed air to drive fasteners is not new; they have been used in the manufacturing and construction sectors for decades. Fortunately, anyone with a portable compressor can take advantage of one of the many varieties of pneumatic fasteners on the market.



Nails loaded in magazine

Toolless drive way clearance

Two piece trigger and depth adjustment

Same Basic Features

Pneumatic fasteners, or 'nail guns' as they are more commonly referred to, all share the same basic features, including a magazine to hold the nails, an air fitting through which compressed air enters the nailer, a piston that powers the firing head, a lock lever that enables access to the firing head to remove jammed nails, and a trigger (some incorporate safety features).

When the tool is connected to an air source, it is armed and ready to fire, so do not connect the tool until you are ready to use it. A two-way trigger controls the compressed air. When the trigger is pulled, it passes compressed air on to the top of the piston. The piston is connected to a driver blade and the blade drives the nail into the wood as the compressed air forces the piston down. As the trigger is released, the second half of the valve is activated and the compressed air is passed to the underside of the piston, which then cycles it back to the start position ready for the next nail. Some nailers offer two modes of firing the nails – trigger mode (which is the standard for most nailers) and bump mode. These modes are user selectable and may require fitting an alternate trigger on some models. In bump mode the firing action is activated by pressing, and quickly releasing, the push lever onto the work piece. Bump mode is favoured by carpenters who want to fire a lot of nails quickly.

Using air to drive a nail or a pin offers several distinct advantages, especially for the commercial market (for which these tools have been developed). You can certainly drive a lot more nails in eight hours with compressed air than you could with a hammer. This may not be as important in a home workshop situation, but when faced with a renovation involving a lot of trim, it can be well worth it to invest in one of these nailers. The real advantages to the woodworker with these tools are the increase in precision and quality.

A nail or pin placed with a nailer yields a structurally stronger connection than one driven with a hammer. When using a hammer to drive a nail, the pointed tip of the nail will tend to sever the fibres in the wood, which increases the risk of it splitting. The repetitive blows from the hammer will also create a looser joint as everything is repeatedly struck and shaken.

Using a nailer to fasten two pieces of wood also results in a more accurate joint. It can be a challenge to hold two pieces in the proper place as you start a nail and then drive it in. Before the pieces are locked in place, the blows from the hammer will likely have caused the pieces to shift relative to each other. When using a nailer you hold the piece in place with one hand and then place the tip of the nailer where you want the nail, applying downward force to push the pieces together, and then pull the trigger. The nail is driven into the material full depth instantly in one stroke. The relatively dull end of the nail pushes its way between the fibres instead of severing them and this results in superior holding power. To maximize the holding power, some nails are coated at the factory with a polymer that melts as the nail is driven into the wood and then hardens when it is fully driven into the piece.

The Frame-Up

Nailers come in several different sizes and configurations, each suited to a specific task. The big boys are the framing nailers. These nailers aren't likely to see enough use with the average woodworker to justify purchasing one, but if you are contemplating a major renovation or the construction of a shop, or if you do carpentry work on the side, it could very well be a worthwhile investment. Framing nailers are used for everything from house framing, and sheathing to pallet and crate making. They come in two different styles, **stick nailers**, like the Hitachi NR90AD (hitachipowertools.ca), and **coil nailers**, like the King 8245R (kingcanada.com). Stick nailers use nails that are collated by strips of paper, plastic or thin wire. Nails come in various lengths up to 3 1/2", and there are generally no more than 100 nails on each stick. Coil nailers use nails that are collated in rolls of up to 400 nails. Both have their advantages and disadvantages. Nailers that use stick nails often have a better balance but they hold fewer nails and are physically larger. Coil nailers are smaller, which means you can get into tighter areas and they hold a lot more nails, which means less time spent reloading.

The original clipped head nails, named for the section of the head that is clipped off so that it can rest flat against the next one in the magazine, remain popular in much of the country. However, there are various jurisdictions in North America which have restricted their use. In areas prone to hurricane force winds or in earthquake zones, concerns about clipped head nails being overdriven have required that full round head nails be used instead. Because these nails cannot sit next to each other, they are either collated in a coil with wire or in a strip with plastic. One of the issues with plastic collated nails is that pieces of the plastic do have a tendency to get imbedded in the wood, caught under the head of the nail.

Nailers In the Workshop

The remaining four variations on the nailer are worthy contenders for space in any shop. Each is specifically designed to serve a different purpose and each uses a different type of fastener. These nailers don't require large compressors; they typically operate at 90 PSI, and consume from around two SCFM (Standard Cubic Feet per Minute) for the smaller pin nailers and up to six SCFM for the larger finish nailers.

For most woodworkers, a **finish** nailer, such as the Craftex CT124 (busybeetools.com) is the largest nailer they would need. This tool is ideal for cabinet carcase assembly, interior trim, large crown mouldings, face frames, baseboards, door jambs and casings. The nailers come in two formats – straight or angled, and they shoot either a 15 or 16 gauge brad nail from 3/4" to 2 1/2" long. The nails are bound into a stick of 100 and the coating that binds them together melts as the nail is fired into the wood. It then hardens, locking the nail in with a tenacious grip. While this may provide a structurally superior connection, it can make the nail virtually impossible to remove if you make a mistake. For areas where corrosion is a problem, these are also available in aluminum and stainless steel.

The next step down in size is the **brad** nailer, as exemplified by the Hitachi NT50AE2. They are smaller than finish nailers and use an 18 gauge nail. Brad nailers are ideal for door trim at the jamb edge as well as assembling and installing mouldings, fastening cabinet backs and other situations where you require an inconspicuous nail with a small head. These can often be hidden effectively in a quirk or where a fillet

meets a cove. When looking for a brad nailer, pay attention to the size of the nosepiece. Some nosepieces can be large and bulky which will obstruct your view and make placing the brad accurately more challenging. A nailer with a small, easily seen nosepiece makes precision placement of the nail a breeze.

In areas where the fasteners will be hidden (on a cabinet back or on a carcase behind some applied trim) or when attaching upholstery, a **stapler** such as the Samona 12020 (samona.com) will provide considerable holding power. For most woodworkers, either a smaller stapler that uses 18 gauge ¼" narrow crown staples, from ⅜" to 1" in length, or a mid size unit that shoots 16 gauge 7/16" medium crown staples, from about ¾" to 2" in length, will suffice. The small heads on brad nails don't provide a lot of resistance when being driven into thin cabinet backs or into upholstery fabric, and can often be shot right through the material. Staples have thinner shanks than the brad nails which reduce the chance of splitting your material when nailing near ends and edges, while still delivering great holding power.

If your budget will only cover a single nailer, then consider a combination tool that uses both nails and staples, like the King 8210NS. This tool shoots 18 gauge brad nails from ¾" to 2" in length, and 18 gauge ¼" narrow crown staples from ⅜" to 1 ⅝" in length. A tool like this will likely cover the majority of your fastening requirements.

The Cadex CPB2350 (cadextools.com) is an example of the most recent addition to the nailer line, the **pinner**. The Cadex is a combination 23 gauge headless pinner and brad nailer. Pinners range widely in price and quality, from inexpensive models that cost less than $50 to professional models costing upwards of four hundred dollars. One of the advantages of these nailers is that they are very light (around two lbs), and they fit into tight spaces much easier than larger brad nailers. They also shoot very thin pins, from ⅜" to 2" long, that won't split even the hardest wood. Tolerances on these pinners is critical, and professional quality pinners make all the difference between an enjoyable experience and one that is frustrating. Features that are not readily noticeable can make a huge difference over the life of a tool.

The driver blade is a key component of the pinner. It's the part that pushes the pin into the work piece. Driver tolerances run from well under .001" to over .005" (a factor of over 5X). Pinners manufactured to tight tolerances will operate reliably without jamming while those with a looser tolerance will be much more prone to jamming. Lower quality pinners have drivers made of mild steel, which not only have a short life span, but in many cases can't be replaced. A pinner with a driver made of hardened Swedish steel will last for upwards of 50,000 shots before needing to be replaced.

Pinners have gained increasing popularity with woodworkers because of the very tiny hole that they leave in the surface of your material. These are easily filled with finish and sawdust or wax, making them almost impossible to detect. If one of these pins were to be deflected and blow out the side of a piece, they can be removed by working them back and forth until they break just below the surface, and then the small hole can be easily filled.

Because these small pins are headless, they provide limited holding power. In most cases they are used to hold delicate parts in place until glue dries, but they can also be used to hold pieces without glue, particularly where clamping is impossible. To provide the maximum holding power, alternate the angles of adjacent nails by toeing them in to each other. Angling the pins has another advantage as well; one half of the small holes left behind by the pins will be almost invisible when the work is viewed from any particular angle.

Convenience Features

Among the various types of nailers there are several common features worth considering. Some of these are minor, but others can make a big difference in daily use.

An adjustable exhaust port can be a very nice feature when working inside dusty cabinets. A sudden blast of exhaust air shot into an inside corner filled with sawdust can potentially cause an eye injury; some models with the exhaust port on top of the housing allow you to direct the exhaust into the open space away from adjacent surfaces.

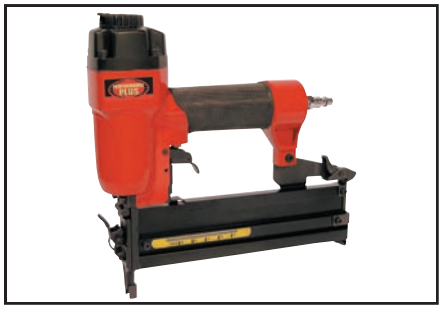
How you adjust and set your depth of cut is another consideration. There are two ways to adjust the depth of set (how deep the nail is set into the wood) on nailers. Different wood

Framing (stick): Hitachi NR90AD

Framing (coil): King 8245R

Finish (angled): Craftex CT124

Brad (straight): Hitachi NT50AE2



Combination nailer/stapler: King 8210NS

Stapler: Samona 12020

Pinner: Cadex CPB2350

species will offer more resistance in nailing. Some models come with an onboard dial that allows you to adjust depth of set at the nailer without adjusting the pressure at your compressor. If the nail is not setting just slightly below the surface at the maximum setting you will have to increase the pressure available at the compressors regulator. If the nailer doesn't have an onboard adjustment then all adjustments will need to be made at the compressor. Be sure not to exceed the pressure rating of the nailer as stated in the owners' manual.

It is an inevitable fact that your nailer will jam at some point. When this happens you will need to remove the drive-way cover to clear the jam. On some models this is accomplished by simply releasing a lunch box clasp and flipping the cover aside. Other models require an Allen key to remove a number of set screws; this can be a time consuming chore. When the contact safety mechanism is on the front of the nailer it may also interfere with the removal of the front guard.

Other convenient features include a simple one-handed magazine cover release, and a magazine cover with a clear window to allow you to see the number of nails remaining. A small number of nailers lock out the trigger when the magazine is empty, which can be a very handy feature.

Maintaining the Nailer

While some nailers are constructed with materials that do not need the addition of any lubricant (these are referred to as *oil less nailers)*, most must be oiled every time they are used. A couple of drops of pneumatic tool oil dropped into the air inlet is all it takes. If you have a dedicated air line to your nailer, you could add an oiler to the line instead. If your nailer won't fully set the nails at the maximum pressure then it may be time to replace the seals and O rings in the nailer. Most manufacturers offer kits for this procedure that includes a full set of the commonly replaced pieces. Replacement is pretty straightforward.

Nailer Safety

When using these tools, safety is paramount, both for the operator as well as for other people in the vicinity. Safety glasses are crucial; there is always the chance of material being dislodged or the exhaust blast blowing dust and debris. Although it doesn't happen often, it is possible that a nail being driven close to the edge can break through and fly across the shop.

Many nailers have a trigger safety that requires the nosepiece to be in contact with the wood before the trigger will release the air. Other nailers have a two-part trigger, both of which must be pulled for the air to be released. The down side to the two-part trigger is that it does not guarantee that the tool is in contact with the material.

Nails and staples are driven at high speed in a single stroke and if they encounter an obstacle inside the wood they can do a complete 180º turn and come directly back at you. They won't break free of the wood, but you should never hold the material with your hand close to the point of nailing or you will risk it penetrating your finger should the nail emerge unexpectedly.

Finally, you'll want to wear a proper set of foam earplugs or a muff-type hearing protector, as nailers generate a loud, sharp noise when they discharge.

MICHAEL KAMPEN
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RESOURCES

"Tool Reviews: Air Nailers" , Oct/Nov '03, Issue #26
"Jacpac CO_2 Power System",
www.canadianwoodworking.com/newsletters/reviewindex.htm

Airless Nailers

You'll find that most nailers require you to have an air compressor. If you don't have a compressor, there are a couple of options to consider. Gas fired nailers, pioneered by Paslode, have been around since 1987. The Paslode 901000 (paslode.com) contains a disposable fuel cell and rechargeable battery. Gas is injected into the combustion chamber above a piston and an electric charge from the battery ignites the gas, which explodes and drives the piston, dispensing a nail. You can shoot about 1,200 nails per fuel cell and about 5,000 nails per battery charge. A very light tool that finish carpenters love.

Battery powered nailers, like the DeWalt DC608K (dewalt.com), are somewhat newer on the market. You can expect to shoot up to 500 nails on a full charge. The newer generation of cordless nailers offer greater power in a lighter package.

The Jacpac CO_2 Power System (supplierpipeline.com) provides a unique approach to cordless nailers. A cylinder charged with CO_2 supplies pressure through a regulator to the nailer. With a fully charged cylinder you can shoot about 350 brad nails. For the home hobbyist or woodworker who has only occasional use for a nailer, this makes a good choice. The cylinder can be charged at most sport supply stores.

BY CARL DUGUAY

Entrance Gates

A well designed and constructed entrance gate can add appeal and style to your home, while showcasing your woodworking skills.

Most often a gate will be installed at the same time you install fencing. If this is the case, you'll design the gate to harmonize with the fence. In other situations you might build a free standing gate, which could serve as an entrance to a garden area, a walkway, or to provide a visual boundary in between two structures, for example a house and detached garage. There are four key considerations when planning a gate – the material, the design, the foundation, and the finish. The actual construction process is not complicated; you can choose a simple hammer and nail assembly or a more elaborate mortise and tenon affair.

The Right Materials

Typically a woodworker will choose from among three materials when building a gate – a naturally decay resistant wood, a pressure treated wood, or a composite wood. For a classic gate choose a domestic decay resistant wood like redwood, western red or eastern white cedar and white oak, or one of the popular exotic species – ipe, meranti, mahogany or teak.

Pressure treated (PT) lumber is an economic alternative to decay resistant wood, though at the cost of appearance, and the presence of chemicals that do leach into the soil. PT lumber used for residential applications no longer contains Chromated Copper Arsenate, which was suspected of leaching arsenic into the soil. Today's PT lumber is treated with a solution of chromate and other chemicals, including Alkaline Copper Quat, Sodium Borate and Zinc Borate, along with fungicides and insecticides. As long as it's not used in or near vegetable gardens, PT lumber is a reasonable choice for gates or fencing. It can also be painted or stained, though you have to ensure it is dry before doing so.

Composite wood, such as the Trex brand (trex.com) consists of recycled wood and plastic, and has become a popular choice

Cedar

Trex composite wood

for decks and fencing because of its perceived low-maintenance and long-life characteristics. Bear in mind that composite wood can't be re-finished like real wood, it is subject to colour fading, and it lacks the strength for large structural members such as gate posts. While hollow composite posts are available, neither should they be used for gate posts; they won't support the weight of the gate doors. You won't have to bother with applying or maintaining a finish, but you will have to regularly clean the product, paying special attention to mold growth.

For lasting results, use sturdy heavy duty latches and hinges that are galvanized or enamel coated (stanleyhardware.com). Gates can weigh quite a bit, and a set of poorly made hinges won't stand up to the stress of constant opening and closing.

Design Variations

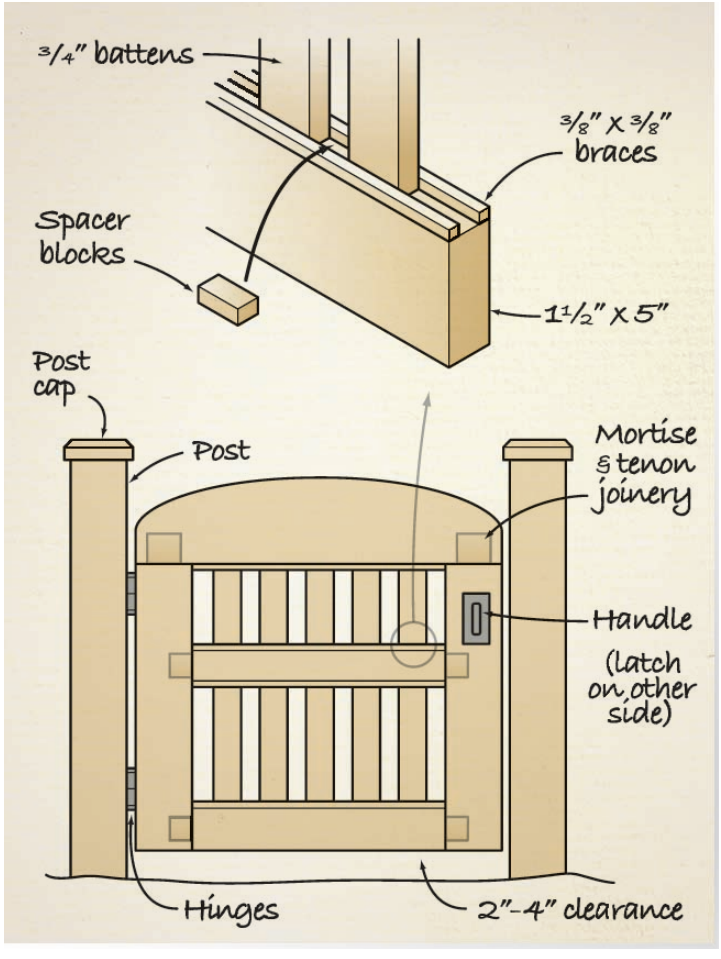
The simplest gate is essentially a board and batten construction; two horizontal boards connected by a diagonal brace, on which vertical battens are attached by deck or stainless steel screws or galvanized nails. A similar, and somewhat more robust version consists of a frame, often made of 2 x 2s or 2 x 3s, nailed or screwed together. A diagonal brace helps to keep the frame from sagging. The classic version is a framed gate made with mortise and tenon joinery – strong, sturdy and handsome.

A mortise and tenon gate made from a decay resistant wood makes a statement about your home, and your woodworking skills. A typical M&T gate will be constructed on 2 x 6 stock for the framing, and ¾" stock for the battens. As an option you can peg the M&T joints. Cutting the mortises by hand with mallet and chisels is not overly difficult. You'll save time by removing the waste with a Forstner or saw tooth bit and drill press. Aim to keep the sides of the mortises plumb and square. The trick is to use sharp chisels and take thin cuts; no need to rush things. You can cut the tenons with a handsaw, but I prefer using a tenoning jig on the table saw. Make the tenons a tad larger than the mortises, and then fit them precisely during assembly. Remember to use a waterproof glue like Elmer's E741 when assembling the gate (elmersrebuilt.com). Leave at least a ½" clearance for the latch and hinge, and two to four inches clearance above ground.

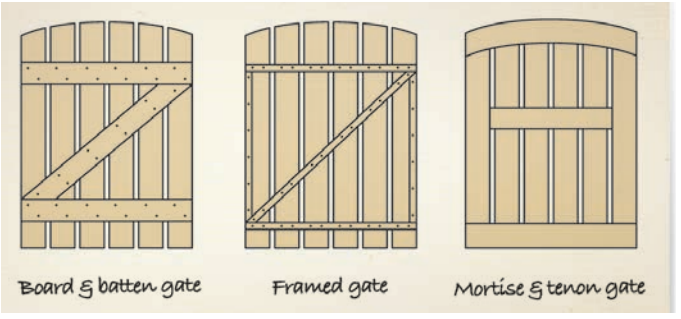
The two key areas where you can really express your creativity in gate design are the top stiles and the battens. Some common shapes for the top stiles are flat, arched, concave (reverse arched) and cathedral. Likewise, you can arrange the battens in a wide variety of configurations, or even replace them with metal lattice or other materials.

A Solid Foundation

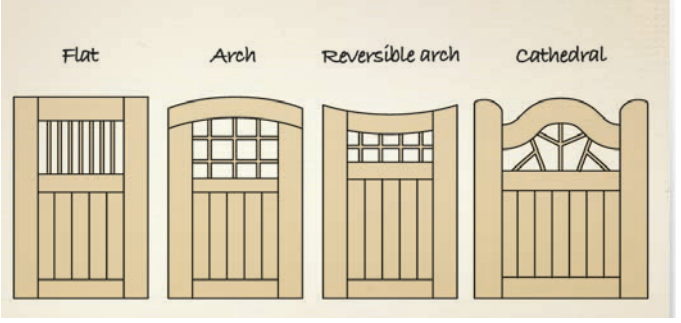
The success of your gate will be directly related to how good a job you do installing the gate posts. Strong, rigid and plumb gate posts will result in gates that swing open easily and close securely, year after year. Dig the post holes to the frost line, cover the



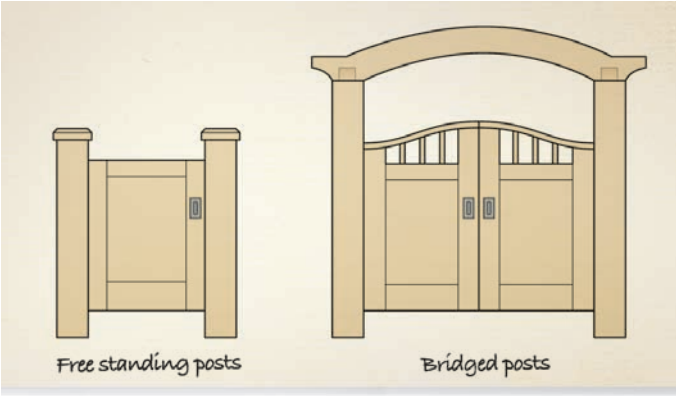
Gate structure



Gate door variations



Variations in top stiles and battens



Free standing and bridged posts

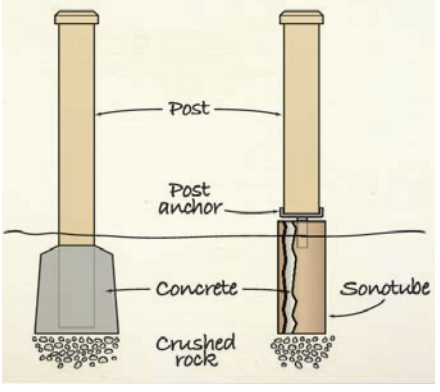
Stanley Hardware # 760850 gate set

bottom of the holes with crushed rock (to facilitate drainage), install the posts plumb, and pour concrete to hold the posts in place. As an alternative you can install a concrete pier. Place a sonotube (a tubular cardboard form) into the post hole, brace the tube so that it's plumb, fill the tube with concrete, and insert a galvanized post anchor into the top of the concrete filled tube. Ensure that the concrete has fully cured before you install the post on the anchor.

For a light gate (one made of ¾" stock) you can use 4" x 4" posts; however for a heavy gate, or a double gate, it's a good idea to go with 6" x 6" or larger posts. Gate posts can be free standing or they can be bridged to provide extra support against racking, ensuring that the gate doesn't bind. You'll need longer posts on a bridged gate, as the bridge (header piece) will need to be above average head level (at least 6' 8"). A bridged gate is often incorporated into an arbour and trellis. While you can use galvanized framing plates to hold the bridge onto the posts, mortise and tenon joinery will give a cleaner, more professional look.

The Right Finish

Unless you select a composite material for your gate, it makes sense to apply some kind of finish. Harsh winter conditions; sun, heat and rain, all contribute to the degradation of the finish over time. However, it is moisture and UV radiation that are the two major factors that contribute to wood degradation. An annual inspection of the gate and prompt attention to any deteriorating sections of the finish is a good habit to get into.



Post foundation options

Select a finish that is easy to maintain, repels water and has ultra violet (UV) inhibitors. Remember that the gate will be subject to continuous seasonal shrinking and swelling as moisture levels change. As a consequence, a finish that forms a film when it cures has the possibility of cracking and peeling, particularly if the surfaces are likely to receive a lot of use (or abuse). It's imperative that the surface be completely dry and quite smooth before applying a film finish. A popular film finish is Circa 1850's Exterior Varnish (circa1850.com).

A penetrating finish is absorbed more readily into wood pores (particularly on end grain) and is very easy to apply. Popular finishes for gates and other outdoor wood products include Cetol (sikkens.com), Penofin (penofin.com) and Flood (flood.com). These products are available as clear and coloured stains. For an eco-friendly product consider the Canadian product Lifetime Wood Treatment (valhalco.com). Penetrating finishes can be easily applied with a brush; many can be sprayed on, and touch-up of deteriorating surfaces is quick and easy.

If you do intend to paint the gate, then choose a premium outdoor paint, like Rust-Oleum's Premium Door Paint (rustoleum.com). This oil based paint has good chip and fade resistance, and dries fast. It's critical that your wood is dry before applying paint, as any moisture will be trapped under the cured paint surface. You should expect to get from six to eight years before having to repaint.

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RESOURCES

"Building Outdoor Structures",
Scott McBride, Taunton Press, 2007,
ISBN: 1561589395

"How to Build Wooden Gates and Picket Fences: 100 Classic Designs",
Kevin Geist, Fox Chapel, 1994,
ISBN: 0811730068

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woodworkersgallery

BY BRENT SMITH

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

This Greene & Greene style table was made by Chris Delaney, from Pickering, ON.

Chris first became interested in Greene & Greene style furniture after reading Darrell Peart's "Greene & Greene: Design Elements for the Workshop" (Linden Publishing, ISBN: 0941936961 lindenpub.com). The solid and proven construction techniques are what initially attracted him to this style. According to Chris, "You don't have to be a professional to do this type of work but if Greene & Greene is about anything, it is about the details".

This 14" D x 30" H x 52" W table was made with quarter-sawn white oak and ebony accents. The top construction has traditional breadboard ends with a floating ebony spline that is glued to the long grain only, and floats within the breadboard end to allow for expansion and contraction. The ebony plugs and splines can take some time to fit properly. The relief detail near the bottom of the legs is unobtrusive, yet eye-catching. The table was finished with several coats of Danish Oil and wax. Chris tells us that this hall table was a Christmas present for his wife Jennifer and, incidentally, his first Greene & Greene piece. We doubt it will be his last.

Visit **CanadianWoodworking.com** and join our woodworking forum. That way you'll be able to show your work to the world, and vote for our next featured project.

BRENT SMITH
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Continued from page 2

save on floor space I've been considering a combination machine. However, they are pretty expensive, and I'm not sure if they are good value for the money.

Do you have any advice?

Hector M., Toronto, ON

• Combination machines are very popular in Europe among woodworking enthusiasts and professional woodworkers; you'll also find them in a lot of production shops.

While not so popular in North America, they are garnering a lot of interest. In general, combination machines offer a much higher level of quality (and often a lot more features) than conventional stand alone machines. And like much in life, better quality does cost more.

Lately, we have been receiving quite a few queries regarding 'combo machines' from our readers, so we will be looking at them in more detail in our next issue (Aug/Sept '08).

The Well Dressed Board

It was great to see Vic Tesolin on the cover of the Feb/Mar issue. Equally as pleasing is to see the "Well Dressed Board" article photos taken in the Rosewood Studio. Many woodworkers are happy to see Rosewood back in operation with Ron Barter at the helm. As a Rosewood student I was taught to rip using the bandsaw for safety purposes. The photo shows this as step four on page six. However, the milling sequence, step four on page five, indicates to rip using the table saw. In the article you assert that the bandsaw or the table saw can be used. I assume that is why the two versions are indicated. I know that Vic and Ron Barter at Rosewood and many others would say that the bandsaw is a much better and safer choice. The edge can be easily cleaned up by a hand plane or thickness planer, as mentioned.

Keep the good articles and ideas coming.

Ron T., Toronto, ON

• Thanks for pointing out that discrepancy. Indeed we would have been more consistent to use 'bandsaw' rather than 'table saw'. The bandsaw is indeed a safer machine for ripping operations, especially when ripping thick stock, and particularly for novice woodworkers. However, when you use proper safety procedures, you can with the utmost confidence, rip stock on the table saw up to the maximum cutting capacity as recommended by the table saw manufacturer. By the way, you'll be pleased to know that we will be featuring a furniture project, and an article on hand cutting dovetails, by Vic Tesolin later this year.

Flush Trim Router Jig

When working with sheet stock, thick solid wood edge banding will give you greater design flexibility than thin commercially available iron-on veneer tape. Use this jig and your router to trim edge banding flush with the surface of your sheet stock.

When using a router to flush trim the edge banding on sheet stock, you have two options: balance a router equipped with a flush trim bit and fence on the narrow edge of the plywood, or run the router on the face side of the plywood using this jig and a mortising bit. We think you'll find this jig much more stable than trying to balance the router on the edge. The extended length and extra handle make it extremely steady and easy to control. This version is sized to fit a Porter Cable 690 router (deltaportercable.com) so you will have to adjust the width to suit the router that you will be using.

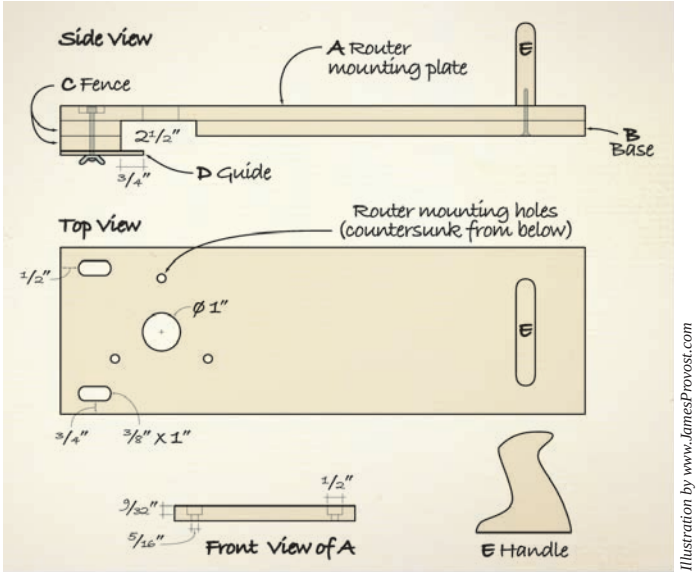

Illustration by www.JamesProvost.com

Making the Jig

• Cut all the pieces for the jig to dimension. Install a ¼" spiral bit in your router table, and adjust the fence to rout a 1" slot, ¾" in from each edge of the router mounting plate (A) starting ⅜" at one end. Cut one slot with the material on one side of the bit and then flip it over to cut the slot on the opposite edge. Mark the position of the fence before removing it, and then switch to a ½" bottom cutting bit. Replace and run the piece through again to create a recess for the screw head.

• Carefully line up the base (B) with the mounting plate and glue them together. If you have an air nailer, shoot a couple of brads to help keep them aligned. Clamp the two pieces and set aside to dry. Glue together the two pieces for the fence (C). Line these up and clamp them in your bench vise to dry.

• Remove the base plate from your router and position it on top of the router mounting plate and mark the location of the mounting holes and the center of the bit opening. Drill out clearance holes for the router mounting screws and counterbore the holes from below. Use a 1" Forstner bit to drill the router bit clearance hole.

• Place the glued-up fence block under the jig, mark the location

MATERIALS LIST (All measurements in inches)

Part		Qty	T	W	L
A	Router mounting plate	1	½	6	22 ½
B	Base	1	½	6	18
C	Fences	2	½	6	2
D	Guide	1	⅛	6	2 ¾
E	Handle	1	¾	3 ½	4 ½

of the bolt holes, and drill them out using a 5⁄16" bit.

• Place the guide plate (D) between the fence (C) and a sacrificial block of wood, line everything up so the bottom edge is even and clamp this with your bench vise. Use the existing holes as a guide to drill the holes through the guide plate.

• Shape the front edge of the guide plate on a disk sander to give the two corners a softer rounded profile that will easily ride over small obstructions, like saw dust.

• Sand all pieces and give them a coat of paste wax to reduce friction.

• Assemble the pieces with the wing nuts facing down.

• Trace out the shape of a handle (E); a plane handle serves as a good template. Cut it out on a bandsaw, and then sand the surfaces with a drum sander and round the edges over with a ¼" round over bit. Attach the handle to the far end of the jig to provide a stable handhold to control and counterbalance the router.

Using the Jig

Install a hinge mortising bit or other bottom-cleaning bit like the Samona AD106455 (samona.com) in your router. Line up the edge banding with the center of the bit, set the fence and guide against the edge banding and tighten the wing nuts. Place the router and jig on a piece of plywood and lower the bit until it is just ever so slightly above the veneered surface. Carefully run the router over the overhanging edges of the banding to trim them flush and follow up with a light sanding.

Adjustable guide plate

THE EDITORS

SUPPLY CHECKLIST

- 10 x 24 x 1" flat head machine screws (2)
- 10 x 24 x 1 ½" flat head machine screws (1)
- ¼" x 20 x 2" Brass bolts (2)
- ¼" Brass washers (4)
- ¼" x 20 Brass wing nuts (2)

COMING EVENTS

WOOD 08 SASKATCHEWAN WOODWORKER GUILD ANNUAL SHOW
May 24 through June 1
University of Saskatchewan Campus
Saskatoon, SK
www.saskwoodguild.ca

PEI WOODCARVING COMPETITION AND SHOW
July 11, 12, 13
Stratford Town Hall
Charlottetown, PE
solutions1@eastlink.ca

WELBECK WOODCRAFTERS EXPO
August 8, 9
Welbecks Sawmill
Durham, ON
www.welbecksawmill.com

SHUSWAP CARVERS & WOODWORKERS SHOW
August 16, 17
Sorrento Memorial Hall
Sorrento, BC
www.shuswapwoodshow.com

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The Great Canadian Invention

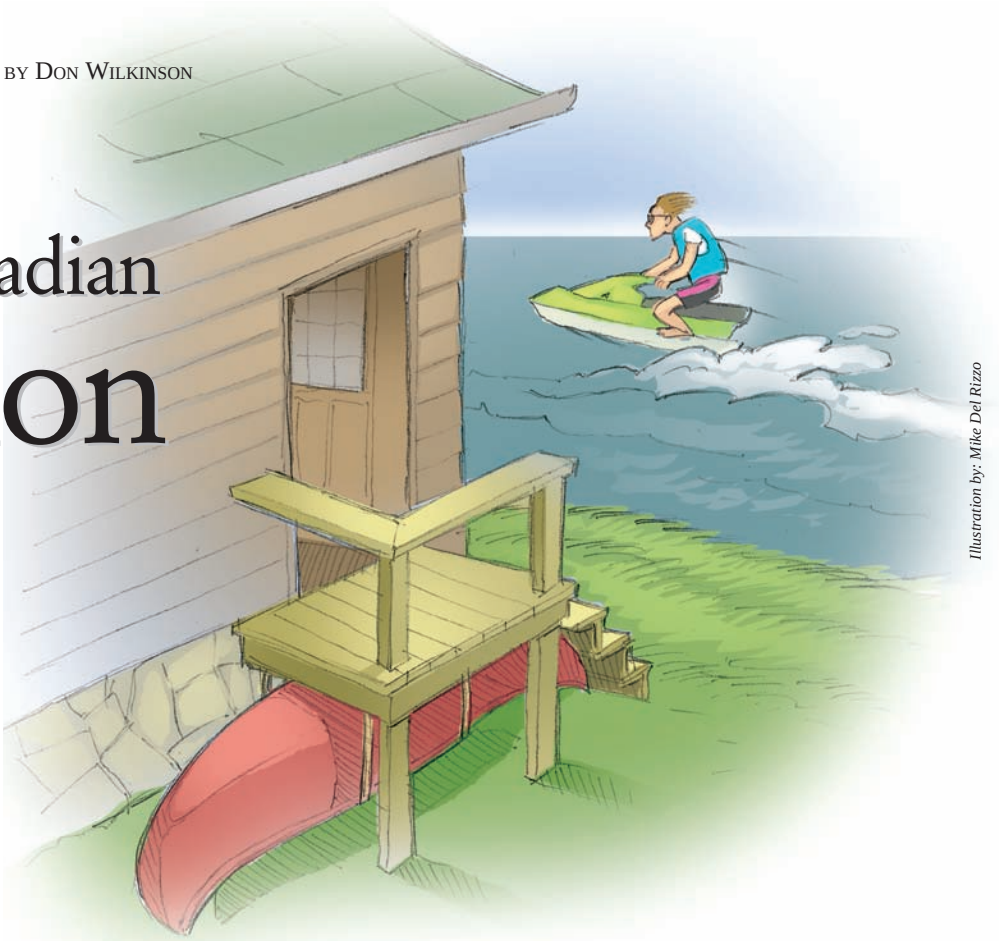

Illustration by: Mike Del Rizzo

Over the course of man's reign on earth he has managed to create several fairly decent items to make his living a little easier or more enjoyable. Most of these creations have been made from at least one of four major material groups: stone, metal, plastic or glass.

With deepest apologies to our esteemed National Rodent, other than the few dams scattered across this country, there are remarkably few inventions in the lexicon of the world that have been made of wood. The paper this magazine is written on comes immediately to mind, as does the pencil stub used to write the first draft of this article. (For those of you who enjoy trivia, the cedar pencil is not made of cedar at all, but of juniper, which is of the cypress family).

The same goes for the tables, chairs, beds and other wood-like furniture scattered throughout our houses. Most of it isn't even real wood but a mixture of glues, resins and powdered sawdust that has been squeezed, shaped and terraformed into a reasonable facsimile of a real wood product.

I know someone will be saying right about now, "But what about log cabins? Aren't they made of wood?" Yes, they are. But is a log cabin a true invention or simply a modification on a proven design? Even the world's largest log structure, the Chateau Montebello, is just a slightly larger version of a log cabin. The world's largest wooden airplane, the Spruce Goose, was simply a larger variation of earlier planes. To further your confusion, it wasn't even made of spruce, but Ontario birch. However, I suppose calling it the Birch Bufflehead wouldn't have quite the same ring to it.

No, when you look at it objectively, with the exception of the tree itself, of all the world's great inventions, there is really only one thing that can stand tall as being a true wooden invention.

Most often it is found lying picturesquely upside down beside a dock or stashed beneath the front porch of a cottage. It's remarkable how seldom you actually see it in its natural habitat, the water. Yes, I am talking about that greatest of Canadian inventions, the humble canoe. Oh sure! Maybe some other person in a far off country has also used a hollowed out old tree for the same purpose, and maybe someone else even went so far as to stretch animal skins across a few bent branches to create something similar. But those boats are crude objects of derision in comparison, and none can hope to measure up to the grace and beauty of the Great Canadian Canoe.

Originally, canoes were made by sewing large sheets of birch bark onto a curved wooden frame using willow roots and then sealing the resulting cracks, seams and holes with pine tar, thus instantly making the birch bark canoe one of the few worthwhile inventions created solely from the excess parts of a tree. Unfortunately, this was very messy, time consuming and really hard work, so it was immediately followed by the invention of the bead-and-cove shaper bit, palm sanders, the table saw, and fibreglass cloth and resin.

In this manner, we can directly attribute the growth and development of today's woodworking industry to man's yearning to more easily recreate the canoe so that it too may languish beneath some cottage stoop while the canoe builder roars across the lake in his jet-ski.

DON WILKINSON
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ashmantools@bellnet.ca

BERG WOODWORKING SUPPLY
21 King Street E.
Powassan, ***(705) 724-2207***

BRETTWOOD MACHINERY WORKS
15138 Hwy 62 N
Madoc, ***(613) 473-4122***
1-800-799-2199
www.brettwood.com
brettwood@sympatico.ca

COBOURG HOME HARDWARE
764 Division Street
Cobourg, ***(905) 372-3381***

FEDERATED TOOL SUPPLY
1581 Oxford St E.
London, ***(519) 451-0100***
1-800-387-0608
www.federatedtool.com
sales@federatedtool.com

LEAMINGTON HOME HARDWARE
114 Erie St. N.
Leamington, ***(519) 326-9088***

LEVAC SUPPLY LTD
330 Laurier Blvd
Brockville, ***(613) 345-1991***
25 Railway Street
Kingston, ***(613) 546-6663***
www.levacsupply.com
info@levacsupply.com

MARKHAM IND. & TRADE SUP.
7634 Woodbine Avenue
Markham, ***(905) 477-5192***
1084 Salk Road Unit 6 & 7
Pickering, ***(905) 420-2448***
www.markham-industrial.com
mits@newwebmail.com

NORTHFAST LTD
261 Regent St S.
Sudbury, ***(705) 673-1449***
northfast@on.aibn.com

TAURUS CRACO WOODWORKING MACHINERY INC.
282 Orenda Rd.
Brampton, ***1-800-386-5222***
905-451-8430

TEGS TOOLS & MACHINERY
1104 Barton Street E.
Hamilton, ***(905) 545-5585***
1250 Upper James Street
Hamilton, ***(905) 388-0784***
www.tegstools.com

TJV WOODWORKING MACHINERY & TOOLS INC
6660 Kennedy Road Unit18

NORMAND
2895 Argentia Road Unit 6
Mississauga, ***(905) 858-2838***
www.normand.ca
info@normand.ca

TOOLS WOOD
319 Victoria Avenue E.
Thunder Bay, ***1-866-248-9663***
(807) 475-8333
www.toolswood.com
toolwood@tbaytel.net

VARTY (JH) MACHINERY
112 Saunders Road Unit 7
Barrie, ***(705) 726-0091***
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www.jhvarty.com

WELBECK SAWMILL LTD
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sk@bmts.com

WILLIAM KNELL & CO.
199 Victoria St S., P.O. Box 760
Kitchener, ***(519) 578-1000***
42 Arthur St. S.
Elmira, ***(519) 669-1664***

TJV WOODWORKING MACHINERY & TOOLS INC.

During the boom of the late 1980's, three seasoned veterans of the woodworking industry plotted to bring a medium to high-end woodworking tool and machinery store to the Greater Toronto Area.

Ted, Joe and Vic opened their doors in a small 1600-sq-ft facility in Mississauga and T.J.V. was born.

Together, the three built a strong presence in their market by showing a great selection and offering above-average service to the woodworking community.

In 1991, they moved the business to their present 6500-sq-ft location. They later added Joe's father as the company's road representative and filled their showroom with one of the area's largest selections of woodworking related machinery and accessories. All their hard work earned T.J.V. the reputation of being one of Toronto's most exciting woodworking specialty shops.

T.J.V. is a principal supplier to factories, schools and cabinet shops throughout Ontario, offering a large selection of power tools and machinery from Canada's foremost suppliers. Ted, Joe and Vic invite you to drop by and share the T.J.V. experience. You will see why their attention to the customer and after-sales service is the formula for T.J.V.'s success today and in the future.

Brettwood Machinery Works Ltd.

We are a family owned business giving personalized service to the central Ontario region for over 25 years. Family owned and operated by Grant and Mariel Brett and their son Jeff, the 5000 sq. ft. store and warehouse facilities are set on a fabulous country acreage offering all the charm and beauty that central Ontario has to offer.

Brettwood has a wide selection of wood and metal working machinery as well as power tools and accessories in stock and ready for delivery. They cover all provinces as well as a strong following in the U.S. Customers range from the hobbyist to schools, colleges, universities, government and contractors.

Brettwood's history as commercial woodworkers gives them extensive product knowledge and the ability to help you make the choice that will meet all your woodworking needs.

Come and visit us, you will be delighted with our friendly, knowledgeable service and well-stocked showroom.

NORTHFAST Limited
Construction Tools & Fasteners

Northfast Limited - Tools and Fasteners was established in 1981. Our main focus in business was to supply the construction, mining, and pulp and paper industry with a complete line of construction anchors, fasteners and tools.

In the mid 1990s, we started to get a demand for woodworking equipment, tools, accessories etc.

Presently we stock a complete line of woodworking machinery, power tools and air tools.

Northfast Limited services all of the equipment we sell on and off site, from warranty to after warranty service. We are presently developing two websites (www.northfast.com & www.discounttools.com) which will have all current tools, accessories and promotions updated constantly.

For the north's largest selection of machinery, power tools, accessories and fasteners, contact Northfast Limited in Sudbury, where service and selection is our