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DECEMBER /JANUARY 2008
Issue # 51

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Linda Fulcher

Grandpa where are you going? Can I come?
Grandpa what are you doing? Can I help?

This is when you want to be ready in the shop with a small workbench and an assortment of basic tools. A hammer, of course, some nails, scrap wood, hand drills are always a hit, screwdrivers, screws, glue, clamps and a tape measure or ruler, pencil, and paper.

You have two wonderful opportunities when your little ones want to come to the shop with you. One is to let them see the project you are making, especially if it is a toy for them. If they are a future woodworker, it will mean more to them if they can see it in all its stages. They will appreciate the finished product more, when they see it being made.

However the little ones don't just want to watch, do they? They want to do. We all know that a wooden toy can't compete with the colourful plastic, battery operated truck with lights and sirens. On the other hand, the manufactured toy can't compete with an adult who will spend time with us and and let us use some tools. Take advantage of this.

Have an area set up ahead of time with things you won't mind them using. Don't worry about completing a finished product with them, at first. Keep it very simple and be satisfied knowing they are being introduced to tools, simple skills and safety. Have them help you pick wood out of the scrap pile. Tell them the name of the wood. Alternate telling, or showing, and letting them do something. Get some nails started and let them finish. Have them help you clamp the wood so they can keep their fingers well away while hammering. Have them measure the wood and write the measurement down. Just opening and closing a tape measure is fun when you are very young.

Keep your time in the shop short, and quit when they are having the most fun. Let them know there will be time to come back again. And by that time you will have another stage of the toy you are making ready to show them.

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Paul Fulcher

When Marty Schlosser contributed this issue's 'Heirloom Dresser', I was curious to see what it was about his dresser that warranted the status of 'heirloom'. Knowing that an'heirloom' is something of special value, handed on from one generation to another, I wondered why this particular dresser was labeled an heirloom before it ever got passed on.

Well, it didn't take long to figure it out. This dresser is not just built to store clothing and other personal belongings – this dresser is built to last. And I don't just mean for your kids. This dresser is built to last generations! With Marty's choice of materials, joinery, and hardware, lasting a few generations will only be the beginning. This piece could end up in a distant future's historic museum. Check it out (page 4): the joinery itself is as impressive as it is varied: half blind dovetails; sliding dovetails; mortise and tenons; double through mortise and tenons; stepped mortise and tenons; and half laps. And that's just the joinery. When you see the material and hardware used, you'll be struck, as I was, with the impression that this dresser is going to be around for a long, long time.

Building projects like Marty has built, with future generations in mind, can only help when it comes to choosing the quality of materials, hardware, and joinery. When you're building something for yourself you might be tempted to take a 'good enough' attitude. But, when you start thinking about your children, and your children's children, all of a sudden 'good enough' isn't good enough. All of a sudden 'only the best' will do. It's an attitude that will benefit you as well as your family.

So as you look to try your hand at some of this issue's projects, like the layout square (page 16), the jewelry box (on page 18), or even the toy train (on page 14), look to the future. You may not know it now, but your kids will be glad you did.

pfulcher@canadianwoodworking.com

Looking for Maple Veneer

I'm a subscriber to your magazine and plan on building Trish's bar stool design in the June/July issue. I'm having a hard time finding the 1/16 maple veneer. I was wondering if you knew a source.

Rob P.,
N. Vancouver, BC

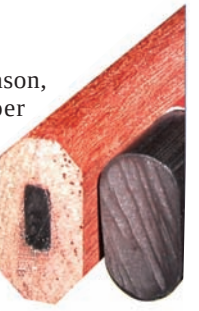
- You can get 1/16" veneer in several domestic species from A&M Wood Specialty (800-265-0624, www.forloversofwood.com). While a visit to their warehouse (357 Eagle St. N, Cambridge, ON) is in order – they have one of North Americas broadest inventories of domestic and exotic lumber and veneer – you can have your order shipped direct to your door at very reasonable rates.

Can't Find a Super Pencil

I am not able to find a source for the Super Pencils which were featured in your August '07 eNewsletter.

I guess I will have to just be patient until things travel out west by dog sled. Great Magazine by the way, keep up the good work.

Rick H., Castlegar, BC



- I contacted CH Hanson, the makers of the Super Pencil, and here is their reply: "We are please to announce that Home Hardware will be carrying the Super Pencil chain wide. While we can never be sure of exactly when it will be

continued on page 46

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BY MARTY SCHLOSSER

Heirloom Dresser

Building a dresser can be a challenging undertaking, if only because of the numerous pieces and the variety of joinery techniques involved. However, if you take it 'one joint at a time', it's a relatively straightforward project, within the scope of any woodworker with intermediate level skills.

Some Design Considerations

When I set out to build this dresser, there were two things I wanted to achieve. First, I wanted to provide for plenty of storage while retaining pleasing proportions. To achieve this I incorporated fewer, yet larger drawers than is typical for similar sized dressers, and I used the Golden Ratio to establish the drawer sizes so they would appear balanced. Second, as with all my projects, I wanted this to be an heirloom piece that would last for generations. I chose to use materials of the highest quality, incorporating proven joinery and taking the utmost care in assembling the project. However, I departed from tradition on a few points. I used full-extension, self-closing drawer slides rather than wood-on-wood slides. Metal slides are very reliable and the style I chose stay unobtrusively hidden underneath the drawers. If you elect to use different slides, you may need to adjust the drawer box dimensions accordingly. I also used a water-based finish, as the impact upon the environment and my health is minimal in relation to their oil-based counterparts.

Some Practical Considerations

The primary wood for this project is cherry, which I elected not to cover with a stain. I carefully selected boards whose hues and shades would go well together when finished. For the secondary wood I chose yellow birch because of its lower cost and similar characteristics to cherry. Other good secondary woods include alder, poplar and

beech. When I am not using stain on a project I purchase about 20% more stock than my materials list calls for. This allows me to use only the most interesting and visually pleasing sections of the boards. I also use the less desirable pieces of the primary wood as secondary wood. Whenever possible I purchase the wood a few weeks before I begin working on the project, to allow the wood to acclimate to my workshop's relative humidity. I also purchase all the hardware that I will need before I begin construction.

A day or two before I begin work on the project I check my machinery and hand tools to ensure they're cutting accurately and cleanly. I have a collection of high-quality set-up tools and sharpeners to deal with this important task, but will have my sharpening service look after those blades and knives that I can't deal with myself.

This project calls for a number of different joints: sliding dovetails, half-blind dovetails, mortises and tenons, and half-lap (bridle) joints. You could substitute some of the joinery techniques I used, but make sure that you don't compromise the structural integrity of the piece, and that you allow for seasonal movement of the members. In building up the three panels I used biscuits; not a traditional joinery technique, but one that is both practical and effective.

The most frequent joint I used was the mortise and tenon. I milled all the mortises 5/16" deep, and the tenons 7/8" long. This provides compression room for the glue. Remember that tenon length is not as critical as tenon width, as you want a lot of gluing surface. Make sure the tenons are about 1/32" thicker than the mortise width. That way you can hand fit each of them individually to account for any variances that inevitably creep into the equation. To fine-tune the tenons I use a router plane, which is easy to use and helps ensure that tenon faces are parallel to their board's faces. This goes a long way to ensuring tight-fitting mortise and tenon joints.

There are two schools of thought for dealing with the inevitable excess glue that will ooze out of joints: carefully wipe it off with a water-dampened cloth right away, or scrape it off with a chisel or knife once it's set up a bit. I use a damp cloth, as I find it very difficult to get everything scraped off, once the glue starts to set up.

Careful Stock Preparation Pays Big Dividends

On most projects I cut and plane all boards oversized – about 1/8" thicker and 1/4" wider and longer than called for. I then leave them at least overnight to allow any stresses inherent in the boards to show themselves before milling them to their final dimensions. To ensure all like pieces will be the same sizes, mill them at the same time before readjusting your machine settings. Make sure that you sticker the pieces to allow for adequate air flow, and don't leave them on a concrete floor, place them on a workbench or table. I also use chalk or pencil to mark which sides will be facing 'in' and 'out'.

You may find it useful to make spares for those pieces that have complicated joints. The spares will not only come in handy if you make a mistake, but provide you with stock on which to practice your joinery before committing to your final project pieces.

Legs and Rails Provide Rigid Structural Support

I use high-quality layout tools and a knife to precisely mark my layout lines. Highlighting the knife-cut lines with a mechanical pencil that has a .5 mm lead will cause the lines to show up better. I also find that good task lighting and magnifying binoculars are helpful. To cut the sliding dovetail joints I use a light-duty shaper armed with a 1/2" shank dovetail bit, but you could accomplish the same on a router table. Remember that tear-out can be a problem with dovetail router bits, so you may wish to either use a backer board, or to pre-score the cut lines with a sharp knife.

- Cut the pieces for the six legs (A, B, C) and rails (D, E, F) to dimension.
- Lay out and cut half-blind dovetail pins on the top of the corner legs (A) and matching tails in the top rails (D).
- Lay out and cut sliding dovetail pins on the inside face of the corner legs (A) and matching tails in the lower rails (E, F).

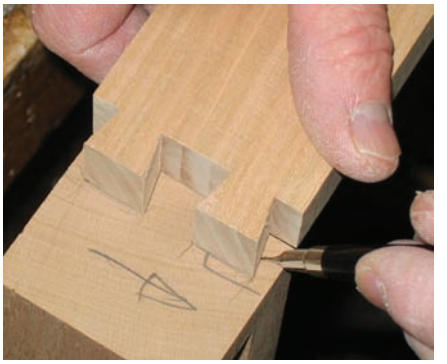
Dovetail joints excel at preventing the sides from racking. I cut the tails in the top rails using the same router bit height setting I used for the sliding dovetail tails on the lower rails. This helps everything line up correctly when assembly time comes around. I hand cut the mating pins in the top of the corner legs. Although this is a time-consuming task, if your tools are sharp and you take your time, it's relatively straightforward. If you are uncomfortable cutting dovetails, you can mortise the rails into the legs, and then reinforce them with brads or dowels. However, the resulting joint would not be quite as solid.

- Cut double through mortise and tenon joints to join the top rails (D) with the center legs (B, C). I prefer to cut the mortises first, and then make the matching tenons. You can cut these by hand, or use a router.
- Cut half-lap joints on the center legs (B, C) and lower rails (E, F). A bridle joint is good at supporting heavy loads and it's relatively easy to cut. You'll be glad you made extra pieces so you'll have something to help set up your saw to cut the joint

Cut taper on bottom of legs

Half-lap joint – rail and leg

Routing tails on drawer sides



Mark out half-blind dovetail on corner legs and rails

precisely, because it's very easy to make these joints too loose.

• Cut a taper on the bottom of the legs. I used a tapering jig on the table saw for this, but you could do it by hand or on the band saw.

Stretchers Serve to Unify the Leg and Rail Assemblies

• Cut the pieces for stretchers (G, H, I, J, K). They support the drawer sliding hardware. Put the top stretchers (K) aside for now.

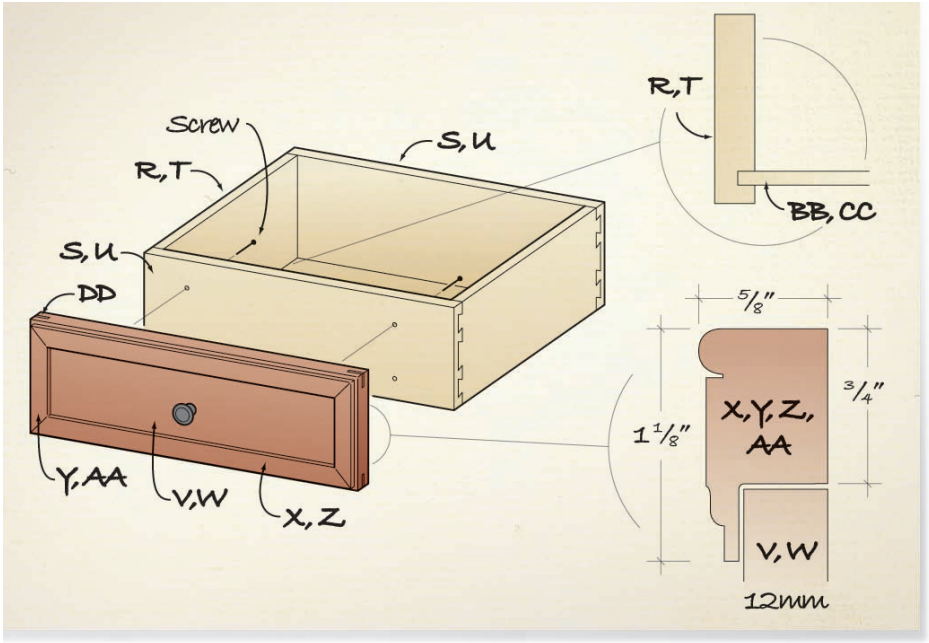
• Lay out and cut the mortises on the corner legs (A) that accept stretchers (G). The mortises are centered on the width of the legs.

• Lay out and cut mortises in the corner legs that accept stretchers (H). Position the mortises so that the stretchers will end up flush with the inside faces of the legs.

• Lay out and cut the mortises in the center legs (B, C) that accept the center stretchers (I, J).

• Lay out and cut the tenons on the stretchers (H, I, J).

• Rout a ¼"deep rabbet on the inside bottom edge of the lower side panel stretcher (G), and the top inside edge of the lower rails (E, F) to accept the dust panel (P).



Glue Up the Solid Wood Panels

The two side panels (N) and the top (O) are relatively straightforward to glue up. Be sure to use creep-resistant glues, such as West System Epoxy or Titebond III. I also prefer to use biscuits, spaced about 8" apart, between each of the boards that make up these panels.

Biscuits not only help to align any wayward boards during glue-up, but contribute to panel integrity throughout their life. I mark biscuit locations on the side edges of the panels when I glue them up, just to ensure I don't cut through any biscuits when I cut the panel to final length.

Apply a finish to the solid wood side panels (N) before gluing them into their framing, as it's next to impossible to ensure that finish will find its way to the innermost reaches of the panel edges once they're inside their slots. Failing to finish the panel edges could result in unsightly unfinished

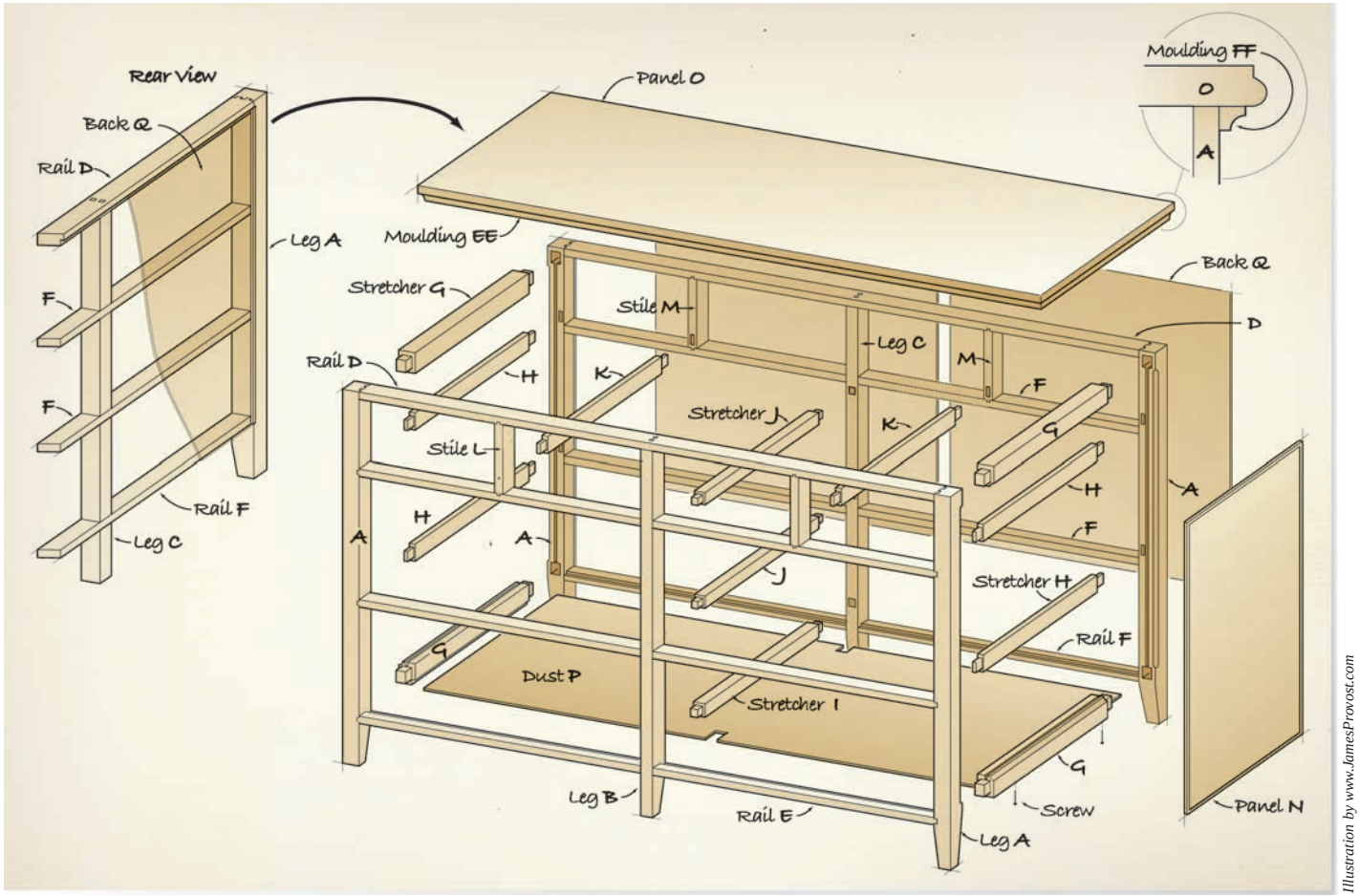


Illustration by www.JamesProvost.com

edges showing when the panels shrink during the drier times of the year.

Deep Grooves Accommodate Solid Wood Panel Expansion

• Dry assemble and clamp both sides – corner legs (A) and stretchers (G). Using a roman ogee bit with a bearing guide and rout a decorative edge on the outside of the assembly.

• Using a ¼" wing slot-cutting bit with bearing guide, rout 17/64" x 1" grooves in the corner legs and 17/64" x ¾" grooves in the side stretchers to accept the side panels. Tear-out can be minimized by making a shallow climb cut first, being careful the router doesn't get away from you. Once this preliminary slot has been made, you can proceed with plowing the rest of the slot without much likelihood of tear-out occurring. Solid wood panels will expand and contract in relation to changing humidity levels throughout the year, and the grooves in the legs need to be deep enough to provide ⅜" of expansion depth on each side, once the panels are in place.

• Dismantle the side assemblies and square up the corner sections with a chisel to ensure the side panels will have the expansion space they require.

• Mill a tenon on all four sides of the panel (N). I used a roman ogee panel raising bit with guide bearing to mill the outside face and a straight bit to mill the rabbet on the inside.

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
Legs					
A	Corners	4	1 3/4	2 1/8	35 3/8
B	Center, front	1	1 1/4	2 1/8	35 3/8
C	Center, rear	1	1 1/4	1 7/8	35 3/8
Rails					
D	Top, front and rear	2	3/4	2 1/8	60 7/8
E	Lower, front	3	3/4	1 7/8	60 7/8
F	Lower, rear	3	3/4	1 3/8	60 7/8
Stretchers					
G	Side, top and bottom	4	1 3/4	2 1/8	20 1/2
H	Side, middle	4	5/8	1 3/4	20 1/2
I	Center, bottom	1	1 1/4	1 3/8	20 1/2
J	Center, uppers	3	1 1/4	2 1/8	20 1/2
K	Top, center	2	7/8	1 3/4	20 1/2
Stiles					
L	Top drawers, front	2	7/8	2 1/8	7 1/8
M	Top drawer, rear	2	7/8	1 7/8	7 1/8
Panels					
N	Sides	2	3/4	19	25 7/8
O	Top	1	13/16	24	66
P	Dust (ply)	1	6mm	18 3/4	60 7/8
Q	Backs (ply)	2	6mm	29	30
Drawers					
R	Lower and middle sides	8	1/2	9 3/4	19 5/16
S	Lower & middle fronts & backs	8	3/4	9 3/4	28 3/4
T	Upper sides	8	1/2	5 1/4	19 5/16
U	Upper fronts and backs	8	5/8	5 1/4	13 5/8
V	Lower panels (ply)	4	12mm	7 1/16	27 1/16
W	Upper panels (ply)	4	12mm	4 1/32	12 1/16
X	Lower horizontal moulding	8	7/8	1 1/2	14 3/16
Y	Lower vertical moulding	8	7/8	1 1/2	6 3/16
Z	Upper horizontal moulding	8	7/8	1 1/2	29 5/16
AA	Upper vertical moulding	8	7/8	1 1/2	10
BB	Lower bottoms (ply)	4	6mm	28 1/2	19 5/8
CC	Upper bottoms (ply)	4	6mm	13 1/8	19 5/8
DD	Drawer front frame feathers	32	1/8	1 1/4	2
Moulding					
EE	Front	1	5/8	1 1/8	65 5/16
FF	Sides	2	5/8	1 1/8	23 11/16

Stiles Separate Top Drawers

• Rout dovetail tails for the front and rear drawer stiles (L, M). Practice cutting these joints first on spare pieces, if you milled some, otherwise cut the rear stiles first. That way you'll have the settings dialed in by the time you do the front ones, which showcase your craftsmanship – for the life of the cabinet.

• Rout matching pins on the bottom face of the top rails (D) and topmost lower rails (E), into which the stiles are housed.

• Cut mortises in the inside of the stiles (L, M). These stiles are joined by stretchers (K) that serve to support the drawer slides. (If you elect to use traditional wood-on-wood slides, you'll also need to incorporate a stretcher to join the front and rear rails below each drawer slide.)

• Cut matching tenons on both ends of the stretchers (K).

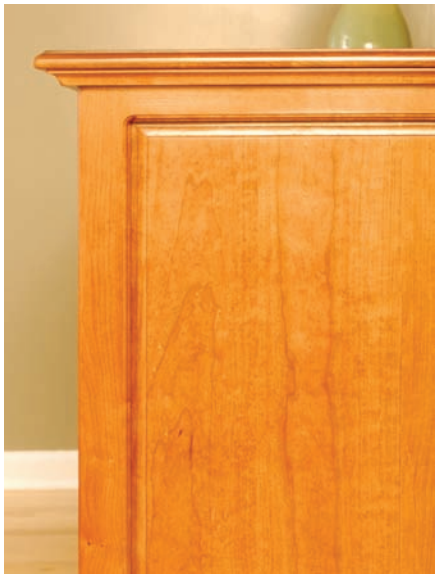
Dust and Back Panels

A test fitting of the carcass will both confirm that everything's going to fit properly when it comes time for the glue-up, as well as enable you to establish and mark the exact locations for the rabbets that will accommodate the back panels and the bottom dust panel. Take your time and document the process so things will go more smoothly when the final assembly happens.

• Rout rabbets on the inside edge of the two back corner legs to accommodate the back panels (Q). Don't forget to stop the cuts in the legs and finish them off with a chisel.

• Cut the back panels (Q) and bottom dust panel (P) to their final dimensions. Don't be surprised if, despite your attention to detail, the two back panels' widths are slightly different. Such is life when working with large, solid-wood framed cabinets.

Gluing up the carcass



Dresser side

Assembly Is Where It All Comes Together

In preparation for gluing, make sure you have all the clamps you'll need on hand and set to their approximate widths. Also get a container of water, some rags and a dull knife at the ready, to help clean up any excess glue that'll surely ooze out of these tight-fitting joints. Make sure your glue bottle is full enough to see you through to the end of the glue-up. Get the framing pieces arranged in some semblance of order, so you won't be scratching your head when you should be proceeding with the glue-up. With a project this big you might want to have a helper assist you.

• Start by gluing up the front framing. Glue the three lower rails (E) into the center leg (B), then glue the dovetail tails into the front leg (A) matching dovetail pin slots. Work on one corner leg at a time until you're happy with everything to this point.

• Glue the upper rail (D) into place next, followed by the two upper drawer stiles (L). If you're dry-fitting went well, this should proceed without difficulty. Remember to deal with any glue squeeze-out as it comes along. Check your diagonal measurements to ensure the frame is square, and then check it for flatness by sighting along the edges of one leg to the next. While the glue is still setting, check for any discrepancies.

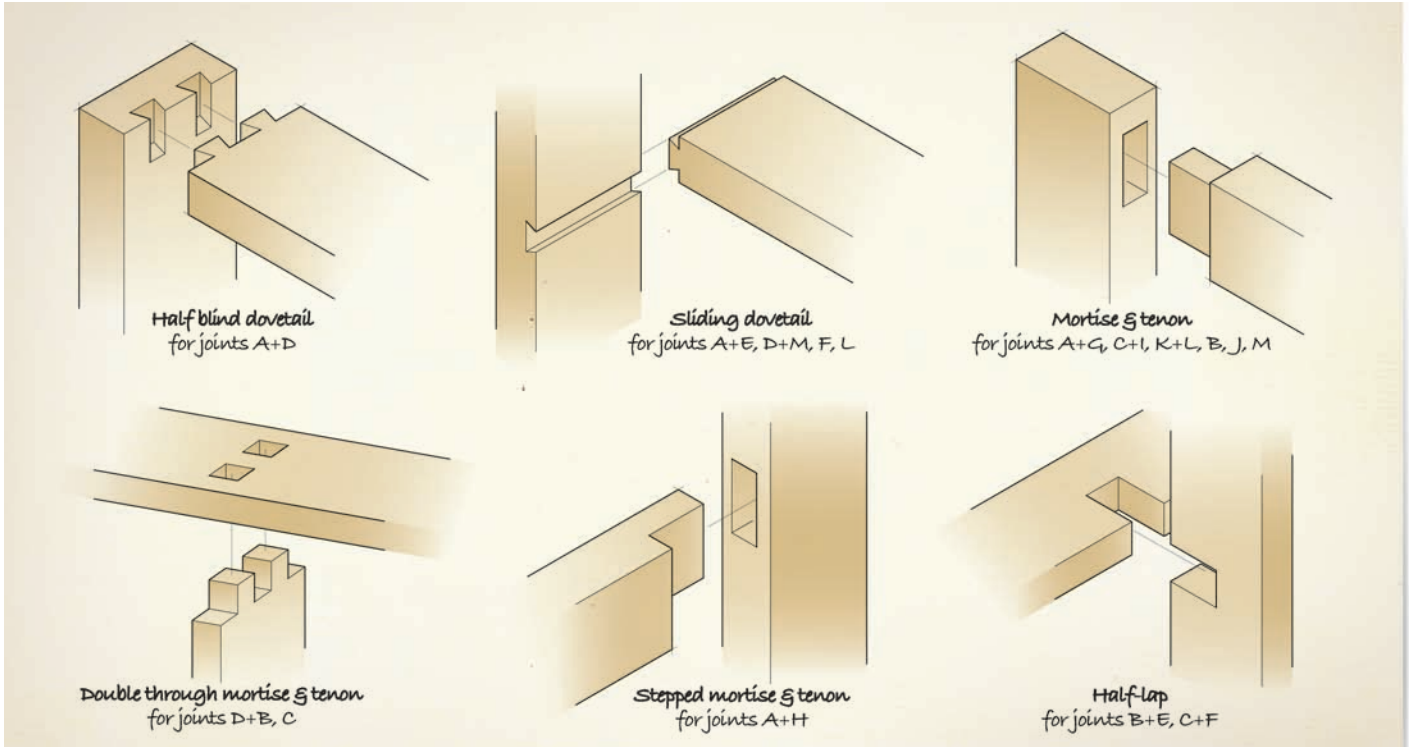
• Once the front frame is dry, glue up the back frame.

• Place the front frame face down on the glue-up table. Working on each side separately, place stretchers (G) part way into their mortises, then set the side panel (N) into position. Ensure you have the panel oriented correctly as you insert it. You should be able to push the stretchers fully into their mortises without too much difficulty. But if things balk, be willing to use a clamp to move things along.

• Insert the two side stretchers (H) into their respective mortises.

• Follow the same process for the other side, and then set the center stretchers (I, J) into their mortises. Stretchers (K) are the last ones to be put into position.

• Position the bottom dust panel (P) into its rabbet in the lower stretcher of the front frame before setting the rear frame over the upright stretchers. Once things look like they'll line up, with the assistance of someone else, turn the frame onto its top so you can more readily work things together. Working deliberately, yet patiently, from one side to the other, push the frame slowly into position until all of the tenons are fully seated against the shoulders of their corresponding mortises. Don't become frustrated if the glue-up requires you to use clamps to bring things together: the tight-fitting mortise and tenon joints you so carefully fine-tuned by hand can take a bit of 'English' to bring them together. I put a bar clamp near every stretcher to ensure everything stays together, and then I take the time to check the diagonal measurements - in both planes – to make sure things are square. Go over every joint and deal with any glue squeeze-out that shows its ugly face.



Fasten the Cove Moulding to the Top Rail

The cove mouldings (EE, FF) that fit underneath the edge of the cabinet top lend an air of substance to the top, without making it appear overly heavy.

• Plane a wide, straight piece of stock to 5/8" thickness, then machine the cove using a 1/2" cove bit in your router table or shaper.

• Rip the moulding to its final width of 1 1/8" then cut the required three pieces a bit oversize so you have enough length to fine-tune the mitred corners until they fit perfectly.

• Fasten the moulding into place using glue and brad nails.

Drawer Boxes

For this project I built the drawer fronts separately from the drawer boxes. This greatly simplifies the whole process – from construction to insetting them into the cabinet frame. Although I elected to use dovetail joints to make the boxes, you could substitute rabbet or locking joints at the corners. If you've decided to go with the dovetail option, make sure to place the lower pins so they'll cover the slots that will accept the drawer bottoms.

• Mill the drawer sides (R, T) and fronts and backs (S, U).

• Mill the drawer bottoms (BB, CC).

• Cut the dovetails.

• Dry fit the drawers to make sure the bottoms fit. Cut the drawer bottoms only after you've made sure the measurements will work.

• If you've elected to use the same hardware slides as I did, you'll need to cut the drawer slide clearance slots and drill the hole they need in the drawer backs (S, U). Refer to the manufacturer's instructions.

• Finish sand the interior of the drawer box pieces. Be careful not to sand where the joints come together, or their tight fit could be compromised.

• Glue up the drawer boxes, but don't put any glue in the slots that house the drawer bottoms. I like to round over the top of the drawer box sides and back, and the inside top of the drawer box fronts with a 1/8" round over router bit. This simple touch makes the drawers look more finished.

• Sand the outsides of the drawer boxes and screw on the underside locking catches designed to affix the drawer boxes to the hardware drawer slides.

Make the Drawer Fronts

The drawer fronts consist of a plywood panel (V, W), rabbeted into a mitred frame (X, Y, Z, AA). The inside edges of the frame pieces are machined using a roman ogee bit, and the bead is also routed out. I do these operations before ripping the rabbets on the table saw.

• Mill sufficient moulding stock for the drawer frames (X, Y, Z, AA), and the feathers (DD).

• Measure all the drawer front openings on the cabinet frame so you'll be able to make whatever adjustments in the frame lengths as may be needed to have the drawer fronts fit precisely.

• Cut the mitre joints.

• Dry fit all the drawer front frames and measure the exact sizes you will need for the front panels (V, W).

• Mill the front panels. Mark the drawer number and an arrow showing which edge is up, on the back of each panel. This way there'll be less likelihood of getting the panel order mixed up when it comes time to place them with their respective framing members.

• Glue the frame pieces together around their matching panels. Once dry, cut the

HVLP Finishes

If you only need to apply a finish occasionally, or if your projects tend to be quite small, then the standard methods of application – brush or rag – should do perfectly well for you. However, if you produce a lot of product, or if you make your livelihood woodworking, then a HVLP spray system, like the Fuji Mini-Mite 3 (www.fujispray.com), is well worth considering. Environmental and health concerns, as well as the desire to save money by reducing industrial overspray, lead to the development of HVLP (High Volume, Low Pressure) technology. A HVLP system is affordable enough for the small shop owner, the serious hobbyist and the casual builder. Essentially this system works in the opposite way a standard compressor driven gun works. A turbine provides a high volume of air at a low pressure to the gun. HVLP systems are portable, so you can use them anywhere and they are easy to store, they significantly reduce the problem of overspray, they make efficient use of your finishing supplies, and they reduce the time required to finish a project. For more information see the Resources listing below.

finishingtips by Circa 1850

What are the real benefits of using water-based finishes?

One of the biggest advantages of water-based finishes is that they have a **very low odor** and are therefore the only choice for many people who are very sensitive to chemicals.

As they require only **warm water and soap** for cleaning up, water-based finishes are easy and convenient to use.

Water-based finishes are formulated to be **crystal clear** and will therefore not cause the wood to change colour in any way.

Water-based finishes **dry very quickly**, allowing the end user to apply more coats in a single session. However, this may cause overlap problems when applying them to large surface areas.

As with any new finish, there is a bit of learning curve. Make sure to **test** various preparation techniques — from dampening to sanding the wood prior to application.

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

slots for the mitre joint reinforcing feathers (DD), then glue them into place. It's amazing how such thin pieces of wood will keep mitre joints from opening up due to fluctuating humidity conditions.

Finishing and Fitting the Drawers

Apply the finish before the assembly goes any further; it's easy to get inside an unassembled cabinet with a brush or spray gun. Finish everything, including the drawer boxes and fronts, as well as the back panels. Laying down the same number of coats on both sides of everything will do much to keep warping at bay. I apply most of my finishes with a HVLP spray system. I can apply the finish quicker and get a much better look than with brush or rag (see HVLP Finishes sidebar).

• Install the sliding drawer hardware. These slides should be placed approximately 1 ¾" back from the front of the cabinet and fastened to the stiles with #7, ⅝" flat head screws.

• With the slides in position, install the drawers, one at a time, beginning with one of the bottom drawers. Slide the drawer box into position until the latches underneath the drawer boxes engage and the drawer is at its back-most position.

• Select the matching drawer front and place it inside the drawer opening. Hold the drawer front centered in the opening; there should be approximately 3/64" of space on every side. Lightly clamp the drawer front and the drawer box front together (the clamp should fit over the framing above the drawer you're working on). Readjust the drawer front position until it's centered as closely as possible, then tighten up on the clamps. The drawer fronts are fastened into place with a pair of screws from the inside of the drawer box. Remember to countersink the holes and make sure you use a screw that's the proper length, as you don't want to have them go through the front of your drawer.

• Drill the hole for the drawer knob from the outside and put the knob into position.

• Continue working your way across and up, until all eight drawers have been properly fitted into position.

Attach Top and Back Panels

The top (O) is fastened to the cabinet with three rows of screws: front, middle, and back. The front ones are meant to keep the front firmly in position, even when the top changes dimension over the seasons.

• Drill countersunk pilot holes for these six screws from underneath the top front rail (D). The middle row of screws is held in place with brackets that allow for about ½" of movement, to keep the cabinet top from splitting. I made these brackets using some heavy brass sheeting that I keep on hand for such purposes. Use either pan-head screws or put a washer under the tapered head of the screw, so the screw can slide as necessary, yet hold the top firmly in position.

• Set the back row of screws so as to allow the top to move about ⅝" . Rout five slots approximately ¾" long and ¼" wide in the top rear rail (D) to accept these screws.

• Drill holes for the #6 - ⅝" screws, and then fasten the back panels (Q) into place.

Congratulations, you've made what should become an heirloom quality dresser. Now, sign and date the back of the cabinet so that your great-great-grandchildren will know who made it for them.

MARTY SCHLOSSER
martyswoodworking.ca

SUPPLY CHECKLIST

- 5 BF 8/4 , 2 BF 6/4,18 BF 5/4, 24 BF 4/4, 2 BF 3/4 cherry lumber
- 24 BF 4/4, 25 BF 3/4 yellow birch lumber
- Two sheets 6mm ply
- Three quarter sheet of 12mm ply
- Eight 18" drawer slides
- Finish

SOURCES

LUMBER

www.BCWLumber.com
www.HomeHardware.ca
www.WoodShedLumber.com

FINISHING SUPPLIES

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

HARDWARE

www.Cabinetmakersdelight.com
www.HomeHardware.ca
www.LeeValley.com

RESOURCES

Tapering Jig, Aug/Sept '07, Issue #49
Portable Spray Booth, Jun/Jly '07, Issue #48
Golden Rectangle, Dec/Jan '07, Issue #45
Basics of Spraying, Oct/Nov '06, Issue #44
Wood Finishing: High Quality HVLP, Jun/Jly '06, Issue #42

HITACHI

www.hitachipowertools.ca

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

Pocket Business Card Holder

If you sell the woodworking products that you make, it's a good idea to always carry your business cards with you. After all, you never know when you will meet someone who could be a potential client. And, what better way to wow them than with a sample of your work.

These business card holders also make wonderful gifts, whether for family or friends, or as tokens of appreciation given to clients. The design for this project is simple yet flexible. You can use any single wood, or a combination of several different woods. It is sized to store approximately 25 standard sized (2" x 3 ½") business cards. It's just as quick to mill pieces for half a dozen card holders as it is to mill the pieces for one.

Bear in mind that the pieces for this project are quite small, so take care when cutting them on the table saw or band saw. With a band saw there is less chance of kick back on small stock, and it does an excellent job of re-sawing thin pieces, thus conserving those precious scraps of wood. Whichever tool you use, it's always best to use oversized stock from which to cut the smaller pieces. You may also want to make a small crosscut sled to safely handle these parts (see "Crosscut Sled", Feb/Mar '07, Issue #46).

Prepare the Project Pieces

• There are two parts to the holder, a top cover assembly and a bottom assembly. You will need some 1/8", 3/16", 3/8" and 1/2" thick stock. Assemble your stock, ensuring that the pieces are sufficiently large to be safely cut to final dimension on the table saw or band saw.

• Optionally cut all the project pieces from one piece of 1/2" stock at least 6" wide and 12" long (see Single Piece Cutting Diagram). Rip off the bottom rail (B), then thickness or hand plane the stock down to ⅜" thick, and cut off the top rail (G). Thickness plane the stock down to 3/16" and cut off the bottom base (A), bottom sides (C), top lid (E), and top back (F). Finally thickness plane the stock down to ⅛" thick and rip off the bottom support (D) and top sides (H).

• With small pieces like this you will want to smooth the milled edges by hand using a block plane or sandpaper. Do not attempt to smooth the edges on a jointer.

• If you are using various discards for the project pieces, matching the bottom base (A) and top lid (E) will give your project a more refined and balanced look.

• Once all the pieces are milled drill a #50 hole (or .07") centered and 3/16" in from the end of each of the sides.

Assemble the Holder

• Apply glue to the sides of the bottom base (A) and the bottom and ends of the bottom rail (B). If the wood you are using is porous, pre-apply a light coat to the ends of the rail, allow it to dry for 15 minutes, then apply a top coat of glue.

• Place rail (B) on one end of the bottom base (A) and align the bottom sides (C) flush with it. The base should be arranged so that when the holder is complete the grain will match with the top lid (E).

• Clamp and allow the glue to dry.

• Wrap a 2 1/2" x 2 1/16" x 1/4" spacer with packing tape.

• Apply glue to the top, bottom and ends of the top rail (G); pre-glue if required.

• Place the top rail (G) on either end of the top back (F).

• Apply glue to the edges of both top sides (H) and place them along the sides of the top back (F). Use the spacer to help hold them upright.

• Align the top lid (E) over the whole and clamp the sandwich using spring clamps. Again make sure to arrange the top lid so that its grain matches the bottom base (A). Be sure to remove the spacer and clean up any glue beads before they harden.

Assemble and Finish

• Attach two spacers (H) to the bottom sides (C) and trim with a chisel, so that the top assembly sits on them and is flush with the bottom sides.

• Position the top assembly and bottom assembly together so that a small space (about the width of a playing card) is left between the bottom base (A) and top lid (E).

• Using the #50 holes in the top sides (C) as a guide, drill two #55 holes (.052") 1/4" deep into the top rail (G).

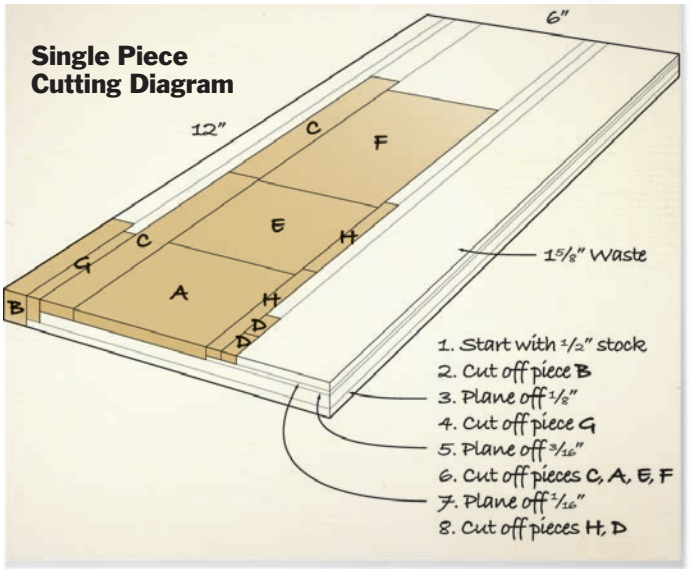
• Insert two 3/8" #16 solid brass escutcheon pins to act as the hinge pins.

• Round over all of the edges and the ends and finish sand to 180 grit. You can leave the pin heads on or sand them flush.

• Soak the wood in Danish oil, wipe dry, and allow to sit for a week or so. This pops the grain out. Then apply two coats of wiping polyurethane followed by a coat of wax rubbed in with #0000 steel wool.

Now all that's left is to stock the card holder with your business cards. A bit of practice in front of a mirror and you'll quickly master the art of nonchalantly flicking open the holder and thumbing out a card or two.

GARY GUNTHORPE
garysworkshop.com



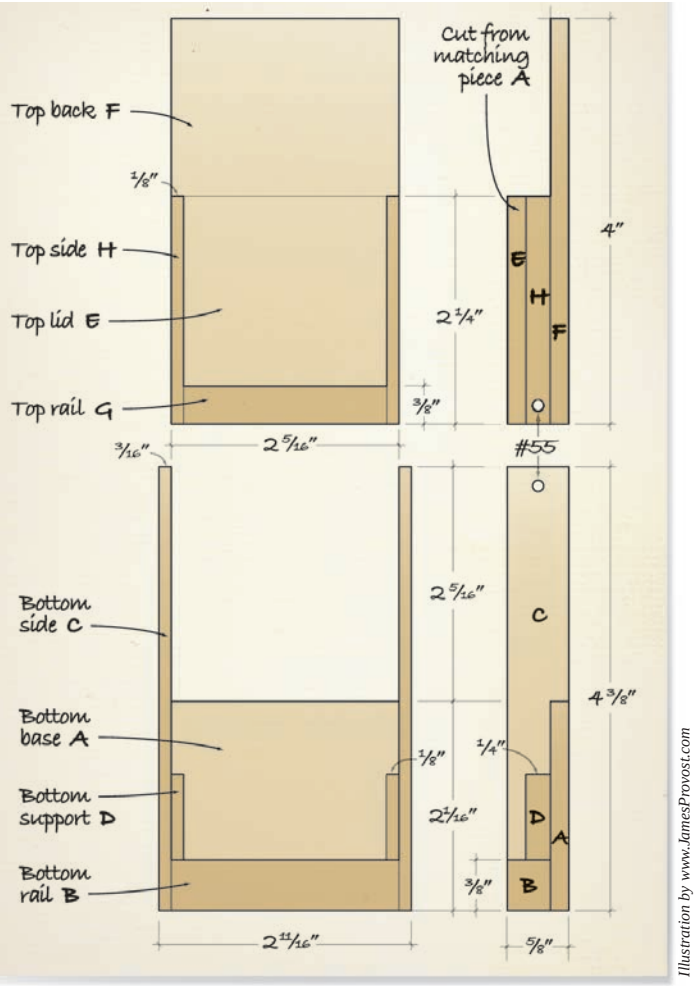


Illustration by www.JamesProvost.com

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Bottom base	1	3/16	2 1/4	2 1/16
B	Bottom rail	1	1/2	7/16	2 5/16
C	Bottom sides	2	3/16	5/8	4 3/8
D	Bottom supports	2	1/8	1/2	5/16*
E	Top lid	1	3/16	2 1/4	2 1/4
F	Top back	1	3/16	2 1/4	4
G	Top rail	1	3/8	1/4	2 1/16
H	Top sides	2	1/8	1/4	2 1/4

* adjust in place

SOURCES

DANISH OIL – www.HomeHardware.ca

DRILL BITS, ESCUTCHEON PINS, POLYURETHANE
www.LeeValley.com

toyproject BY DAVID E. RICKETT

Toy Train

Trains, boats and planes seem to fascinate both young and old. Perhaps as a child you received a train as a Christmas gift. Or you may remember your first train ride – the sound of a chugging locomotive is one not soon forgotten. With that in mind, here is the locomotive end of a train that can either be a toy, part of a Christmas display or something to put on your fireplace mantle.

This is a great project to do with the young woodworker in your life. All you have to do is cut and assemble five main pieces, and then add on a bit of hardware. You can use almost any wood, and the hardware is available from most building supply or hardware stores.

• Begin by cutting a piece of wood for the chassis (A). I suggest you cut the cowcatcher before you cut the chassis to length as sometimes the compound cuts don't meet in the middle on the first try. The cowcatcher is the compound bevelled front of the locomotive, which serves to push aside snow, fallen branches and the occasional cow, off the tracks. You also need to cut a 30º angle halfway through at the other end of the chassis. Cut a saw slit in the bottom of the chassis 3 7/16" from the front end.

• Cut pieces for the cab (B) and the tender (D). A 3/4" Forstner bit will cut a clean hole through the cab for the windows.

• Cut pieces for the roof (C) and the wood box (E). Cut a 45º on one edge of the roof leaving a 1/8" flat. This will become the back of the roof.

• Drill a hole in the tender for the water filler (J) and eight holes in the chassis for the wheels. Then glue all the pieces together.

• Sand the rings off the bottom of the boiler (F). Keep sanding until you have a small flat about 1/8" wide all along the bottom. This will provide a glue strip.

• Drill a 1/4" hole in the centre of the front end of the boiler for the headlight (I).

• On the top of the smoke box, halfway between the first two rings drill a 1/4" hole for the smokestack (G). I drilled all the way through. After gluing the boiler into position, I drilled through the hole into the chassis and glued in a short piece of dowel for additional strength.

• Drill a second hole for the whistle (H) for which I used a cribbage peg. Remember that the peg is tapered so choose

your drill size carefully. You might want to wrap a 1/8" strip of masking tape around the tip of the peg. It will help keep the peg centered when you glue it in. Note: You will have to trim either the headlight or the smokestack as the bases will probably interfere with each other during assembly. Glue everything into place.

• Trim the axles so they just about meet in the middle. The axles for the two big wheels should be about 1/16" longer than the ones for the six small wheels as the big wheels are thicker than the small ones. To prevent gluing the wheels to the axles or chassis, cut an axle wide slot in a thin piece of cardboard and place it between the chassis and wheel when gluing the axle in place. Turn the wheel occasionally while the glue is drying and remove the cardboard before it becomes a permanent part of your locomotive.

• Apply your preferred finish to the locomotive. You could paint or stain it, following with a coat of oil or varnish, or leave the wood a natural colour.

Now that you've seen how easy it is to build the locomotive, stick Glenn Miller's "Tuxedo Junction" in your CD player and start cutting.

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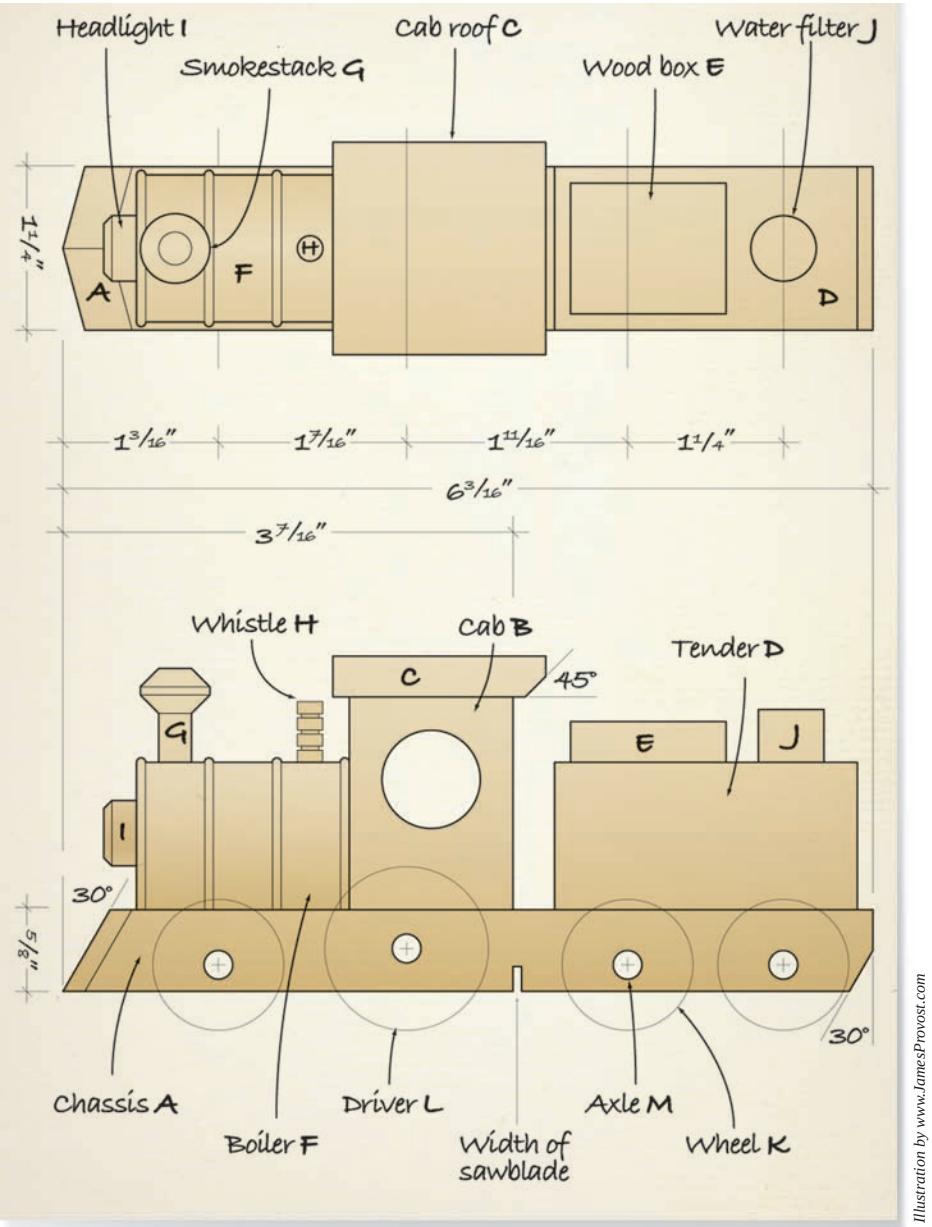


Illustration by www.JamesProvost.com

SOURCES

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

RESOURCES

Tiny Toy Box, Aug/Sep '07, Issue #49
Airplane, Dec/Jan /07, Issue #45
Turning Classic Tops, April/May '03, Issue #23
Wooden Puzzle Series:
June/July '00, Issue #6 to Dec/Jan '05, Issue #33

MATERIALS LIST (All measurements in inches)

A	Chassis	1	5/8	1 1/4	6 3/16
B	Cab	1	1 5/8	1 1/4	1 1/8
C	Cab roof	1	5/16	1 5/8	1 5/8
D	Tender	1	1 1/8	1 1/4	2 5/16
E	Wood box	1	5/16	1	1 3/16
F	Boiler (41K01.35)	1	-	1 1/8	1 5/8
G	Smokestack (41KO1.20)	1	1/4	1 1/2	5/8
H	Whistle (41KO1.57)	1	Cribbage peg		
I	Headlight (41KO1.03)	1	1/4	1/2	1/2
J	Water filter (41KO1.03)	1	1/4	1/2	1/2
K	Wheels (41KO1.26)	6	1	5/16	1/4
L	Drivers (41KO1.42)	2	1 1/4	3/8	1/4
M	Axles (41KO1.02)	8	7/32	11/16	3/8

Parts numbers are from Lee Valley

BY MICHAEL KAMPEN

Layout Squares

You won't realize how useful these squares can be around the shop until you have a few at hand.

For any square to be of use as a layout or marking tool it must, of course, be square. The most dimensionally stable material to use for this project would be a manufactured sheet goods such as MDF or Baltic Birch plywood.

This version is made of three different species: the arm is wenge, the edge guide is makore and the straight surfaces have been edge-banded with quarter-sawn white oak. Not only does the while oak provide a durable long lasting guide surface, but it also contrasts nicely with the other two species.

Square Stable Stock

While you can choose from a wide range of wood to use in your square, it's important to select dimensionally stable wood, preferably quarter-sawn, else your square may be, seasonally out-of-square. When milling your stock accuracy is important – you want all of the parts to be flat and square.

It is easier, as well as safer, to make two squares at once – this lets you work with larger pieces when preparing the initial stock on the jointer and thickness planer. The dimensions in the materials list reflect this. Of course, you can easily modify the dimensions to suit the kind of work you do. You might want to make one large square for use on cabinetry and sheet goods, and a smaller one that would be more manageable on your workbench.

• Use a jointer and thickness planer to prepare your stock. For the square to be of any use, it will need to be accurate, so be sure to begin with flat, square stock.

• Prepare the pieces for the arm (A), edge guide (B) and the edge banding (C, D). Check them with an engineers' square to be sure the sides are 90º to both faces.

• Glue the two pieces of edge banding to the arm and set it aside to cure. The banding blanks should be just a little bit larger than the edge they will be glued to; it's not critical to center the banding on the edge, but it must cover the whole piece.

• Decide which side of the edge guide will get the banding, and glue it in place. Be sure it covers the entire edge and doesn't move out of place as you apply clamping pressure.

• After the glue has set, remove the clamps from the pieces and use a fine hand saw to trim the edge banding back on the ends. If there is an overhang here, it is likely that your router bit will catch it and tear the edge out at the end of the cut.

• Set up a piloted flush trimming bit in your router table and trim the banding flush on the arm and edge guide blanks.

• Use your band saw to re-saw the blank for the arm. You will end up with two pieces, each slightly less than ½" thick. As necessary, re-joint each piece and then thickness plane them to ⅜" .

• Square up the edges with a light pass on the jointer.

• Thickness plane the edge guide blank to a finished thickness of ⅝" .

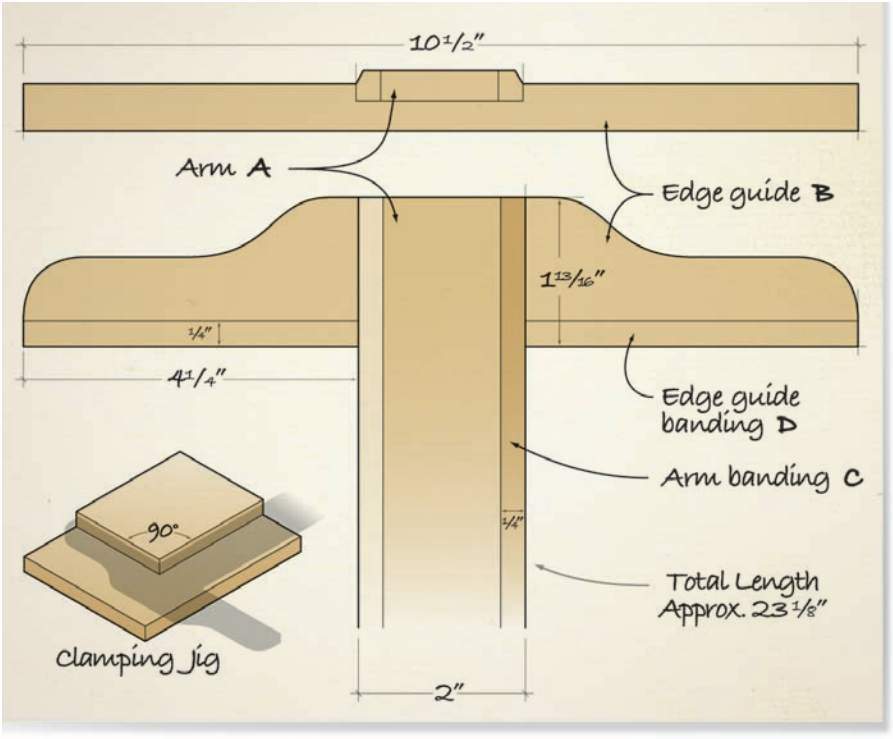


Illustration by www.JamesProvost.com

• Use a cross cut sled on your table saw to cut the two arms to the finished length of 10 ½" (see 'Cross Cut Sled', Feb/Mar '07, Issue #47).

• As the cross cut sled has already been optimized for making accurate 90º cuts, it makes sense to use this jig to cut the dado for the arm. Measure the width of the arm and set a couple of end stops on the back fence of the cross cut sled. Set these to limit the cut to slightly less than the required width.

• Raise the blade to take a ¼" cut. Cut the dado using multiple passes over the blade.

• Place the edge guide on the sled, against one of the end stops. Loosen the other stop and slide about ten pieces of paper between the end stop and the part. Tighten up the end stop, remove a piece of paper and make the cut. Test fit the arm and repeat this until the arm fits without any play.

• Pencil a pleasing curve onto the top of the edge guide and cut it out with a band saw. Use sandpaper to smooth the curve.

• Set up a 45º chamfer bit in your router table. Chamfer only top edges of arm. Do the ends first and the long grain cuts will remove any tear out from the first cuts.

• Sand all of the parts and apply a coat of Watco Natural Oil. Be sure not to get any finish in the area to be glued.

• To make gluing up this project easier, build a little jig using some melamine off-cuts. Cut two pieces of melamine, one about 12" square and the other about 4" square. Be absolutely certain that the corners on the smaller square are exactly 90º. Screw the smaller square to the larger one, and then use this to align the arm and edge guide during the glue-up.

• Apply glue to the dado and use the jig to align the two pieces. Clamp the edge guide to the jig, and then apply clamps to hold the arm in place until the glue cures.

• After the glue has cured, give everything another coat of Watco Oil and then follow this up with a few coats of paste wax.

These layout squares are sure to be some of the most useful accessories in your shop. Make some in several lengths and you'll always find a use for them, from laying out full size drawings to a fast and accurate clamp down fence for your router.

MICHAEL KAMPEN
mkampen@canadianwoodworking.com

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Arm	1	1	1 ½	24
B	Edge guide	1	¾	1 ⅝	22
C	Arm banding	2	¼	1 ⅛	24
D	Edge guide banding	1	¼	⅞	22

Dimensions are for rough stock

SUPPLY CHECKLIST

- ½ BF hardwood, minimum 24" long

SOURCES

FINISHING SUPPLIES

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

craftproject BY GLEN FRIESEN

Inlaid Jewellery Box

A finely handmade gift is itself a statement, saying as much about the maker as it does about the receiver. And like the act of gift giving, the making of a gift is an intimate activity, requiring time, patience, and thoughtfulness.

My wife's family has a Christmas tradition that I really enjoy. At the conclusion of the season's festivities we put our names on small cards, which we toss into a hat. Everyone then draws a card from the hat, for whom they will make a handcrafted gift the following Christmas. Deciding on the 'perfect gift' for some special person and then making the gift can sometimes cause a bit of anxiety, but it is eminently more satisfying than struggling to find that elusive mass-produced gift in the pre-Christmas shopping rush.

Last year I pulled my teenaged niece's name from the hat. After careful consideration I decided to make her a small inlayed jewellery box. I especially enjoy constructing small boxes as they provide the perfect canvass on which to inlay custom designs. As well, it provides me with an opportunity to incorporate species of wood that I have not used before and to experiment with different forms.

I selected lacewood for the corners (because of its lovely intricate flecks), padauk for the top, sides and base (because of its fiery red-orange colour), and jet black ebony for the legs and trim. You could of course, make this box using a single wood species or mixing two or more complementary species as I did. The overall dimensions of the box are 2 ½" x 6" x 9 ⅞".

Prepare the Material

- Mill stock for the lid top (A), lid base (B), and bottom (J), and cut to finished dimensions.
- Mill a piece of 1" x 2 ½" x 26" stock.
- From this piece cut the back (C) and front (D) pieces with 22 ½° angles at each end, 7 ¼" from long-point to long-point, and the side (E) pieces with 22 ½° angles at each end, 3 ½" from long-point to long-point.
- Mill a piece of 1" x 1 ½" x 12" stock.
- Rout a ¼" x ¼" groove along the center of one face.
- Cut 22 ½ ° angles along each side of the piece.

• Trim the stock into four 2 ½" corner (F) pieces.
• Mill a piece of ⅛" x ⅜" x 24" stock.
• Slightly round over the edges of one side of the piece. You can do this with a hand plane, or with a ⅛" radius router bit on a router table.
• Cut the piece into eight 2 ½" lengths for the corner accents (H).
• Mill a piece of ¼" x 1 ¼" x 18" stock.
• Cut this piece into four 4 ¼" lengths for the legs (G).
• Mill a piece of ⅛" x ⅜" x 12" stock.
• Cut the stock into four 2 ½" lengths for the splines (I).
• Mill a piece of ¼" x 6 ½" x 10" stock for the bottom (J).

Shape the Sides

• Draw an arch on both sides of the top edge of front piece (D); you'll want to ensure that ½" of stock remains.
• Cut the curved shape on a bandsaw.
• Using piece (D) as a template, transfer the curve to the side pieces (E), and cut them out on the bandsaw.
• The back remains straight; re-saw it to ½" thick, removing waste from the 'short' side.
• Sand all the surfaces smooth.
• Using piece (D) as a template, transfer the curve to the corner pieces (F). I used a

MATERIALS LIST (All measurements in inches)

	Part	Qty	T	W	L
A	Lid top	1	3/8	3 5/8	7 1/2
B	Lid base (e)	1	1/4	5 1/2	9 1/2
C	Back	1	1/2	2 1/2	7 1/4
D	Front	1	1/2	2 1/2	7 1/4
E	Sides	2	1/2	2 1/2	3 1/2
F	Corners (l)	4	1/2	2 1/2	1 1/2
G	Legs (e)	4	1/4	1 1/4	4 1/4
H	Corner accents (e)	8	1/8	3/8	2 1/2
I	Splines (e)	4	1/8	3/8	2 1/2
J	Bottom	1	1/4	5 3/4	9 5/16
K	Tray sides	2	1/4	1	4 3/8
L	Tray back	1	1/4	1	5 7/8
M	Tray front	1	1/4	1	5 7/8
N	Tray dividers	2	1/4	3/4	4 1/8
O	Tray base	1	1/4	4 5/8	5 3/4
P	Tray front support	1	1/4	1	6
Q	Tray rear support	1	1/4	1	6
R	Mirror	1	1/8	3 3/8	6

All wood is padauk except: lacewood (l) and ebony (e).

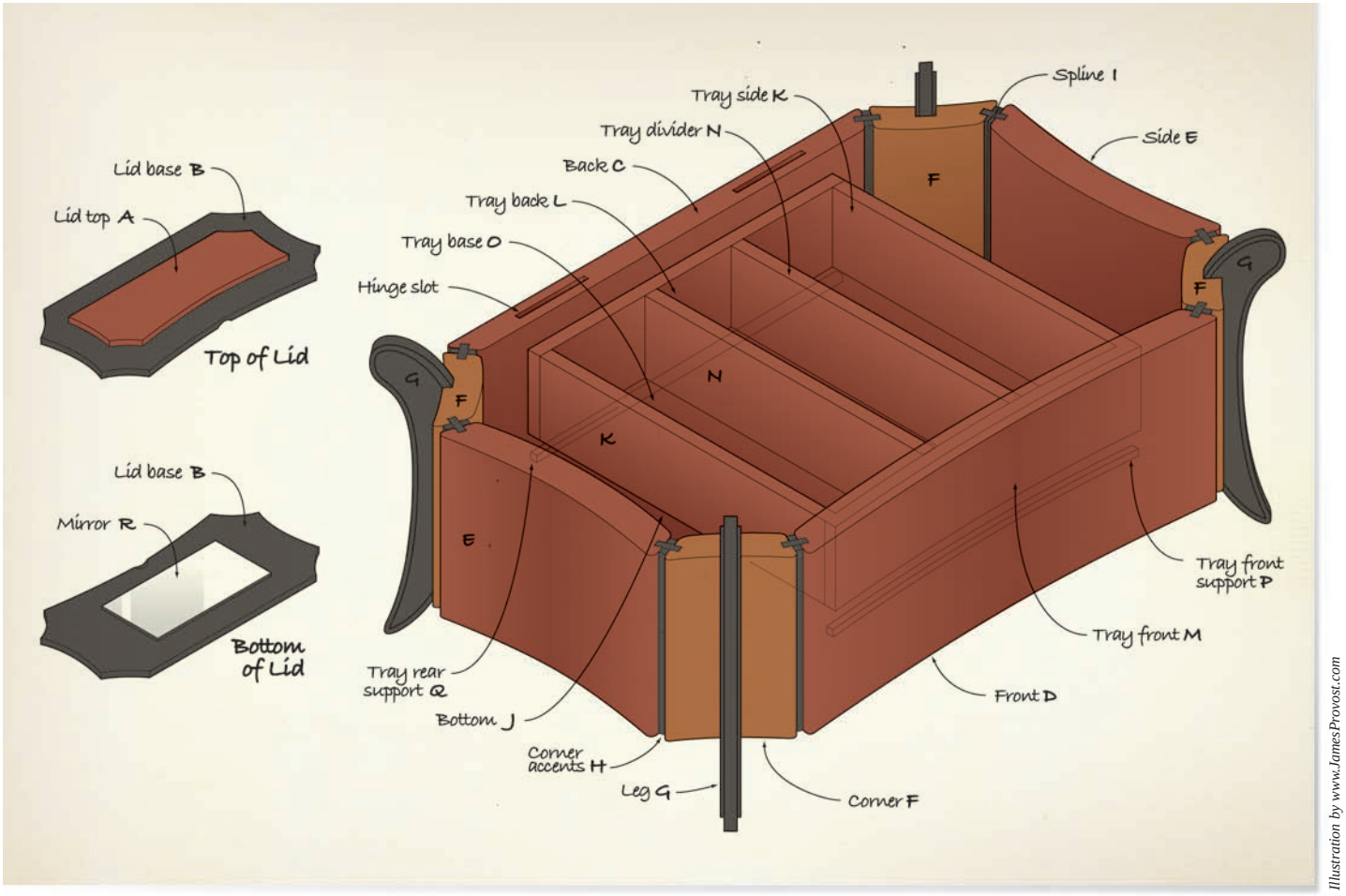
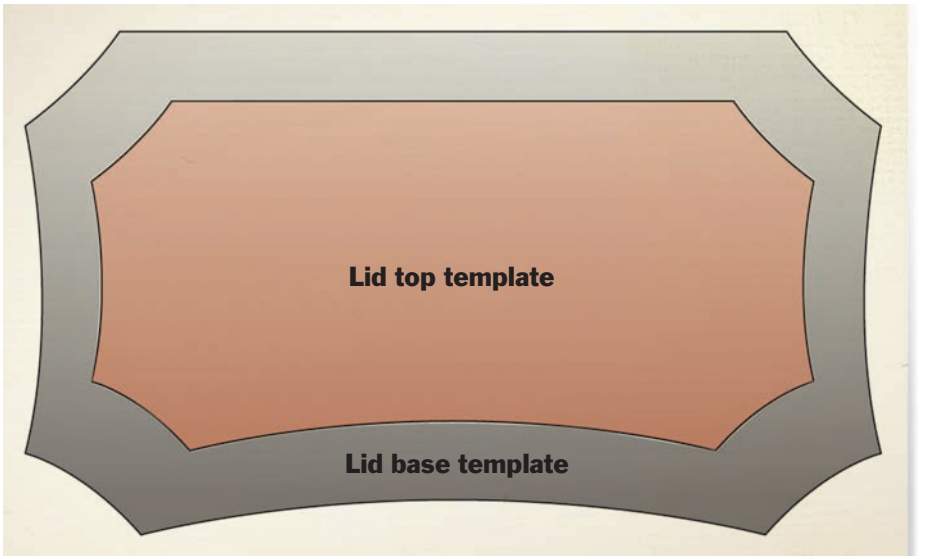
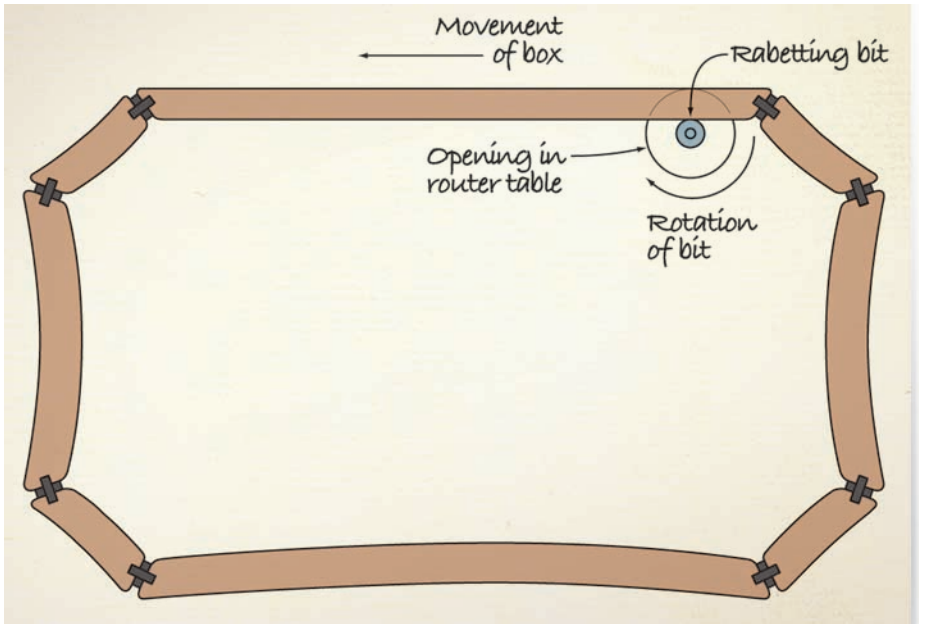


Illustration by www.JamesProvost.com



Enlarge lid top and lid base template 34%



Routing groove for bottom piece

shop-built jig to speed the sanding process for these pieces (see Sanding Corner Pieces sidebar). The corners are held together with a spline that is visible at the top and bottom of the box sides. It is helpful to have a full-size drawing of the assembled sides to guide your progress.

• Slightly round over the outside corners of the front (D), back (C) and sides (E).

• Using yellow glue and spring clamps, attach the corner accents (H) to both sides of each corner piece (F). I set the corner accents flush with the *back* of the corner pieces.

• Once these are dry, use a table saw to cut a ⅛" groove on each side of the corner (F), back (C), front (D) and side pieces (E). Cut the groove about ¼" deep in the corner pieces and ⅛" deep in the other pieces.

• Apply glue to all the mating surfaces, insert the splines (I) and glue the corners, sides, front and back together. A band clamp or surgical tubing (available from Lee Valley) works well. Make sure the box stays square during this procedure.

• Once the glue has dried, remove the clamps and using a piloted rabbeting bit and a router table, rout a ¼" x ¼" rabbet in the bottom of the box to accept the box bottom (see 'Routing groove for bottom piece' illustration).

• Place the bottom of the glued-up box on a sheet of paper or piece of cardboard, and trace out the profile of the bottom (J) along the inside edge of the rabbet.

• Cut out the bottom on a bandsaw and sand the padauk bottom to fit.

• Glue the box bottom into place.

Cut the Legs to Shape

The legs are curved to complement the scalloped sides of the box.

• Transfer the leg template onto a sheet of cardboard or stiff paper and cut it out.

• Use the template to draw cut lines on each of the legs (G). The back edge will remain straight.

• Bandsaw the legs to shape and sand them smooth.

• Using a ⅛" radius cove bit, rout a cove on both sides of each leg piece, leaving about ⅛" flat along the front edge. Don't rout the straight edge.

• Glue the legs into the ¼" groves in the corner pieces (F), being careful to avoid squeeze-out.

Build the Tray

The tray is a simple box divided into three compartments with the center having a ring storage area.

• Mill stock for the tray sides (K), back (L), dividers (N), and bottom (O) and cut to finished dimensions.

• Select a piece of ½" x 1 ½" x 7" stock for the front piece (M).
• Transfer the curve from the front piece (D) onto the tray front piece.
• Bandsaw the tray front piece to shape and sand it smooth.
• Rout a ¼" x ⅛" rabbet in the bottom edges of the sides, back, and front tray pieces.
• Glue and clamp the tray together. I simply butt jointed the pieces. Optionally you could reinforce the butt joints with mini dowels or splines.
• After the glue has dried, glue and clamp the tray bottom into the rabbet.
• Sand everything thoroughly.
• The ring holder was constructed of light cardboard covered with soft leather and folded into the cavity. It was fastened in place with hot glue after the finish was applied.

A Two Part Lid

• The lid is comprised of a top (A) and base (B), which follow the shape of the box. The base only covers half of the top edge of the sides. To save some ebony I cut a void in the base. The void is covered by the mirror (R). Make sure to retain at least 1 ½" of stock around the outside edge of the void.
• Make a template for the top and another for the base.
• Tape the templates to the top and base, cut them out on a bandsaw and then sand the edges smooth.
• Glue the top to the base.
• Optionally inlay a design onto the lid (see Personalize Your Project With Inlay sidebar).
• Install two small hinges and a brass chain to prevent the lid from opening too far. I located the hinges approximately ¾" from the edges of the back. Be careful that the screws do not penetrate the top of the lid. To attach the hinges

Enlarge leg template 50%

Sculpted leg and corner assembly

SUPPLY CHECKLIST

- One piece 1" x 3" x 24" (sides, front, back); one piece 1" x 3" x 14" (corners)
- One piece ½" x 1 ¼" x 7" (tray front and tray front support)
- One piece ⅜" x 4" x 8" (top)
- One piece ¼" x 6" x 15" (lid base, legs), ¼" x 6" x 16" (bottom, tray base), ¼" x 1" x 36" (all other tray pieces)
- One piece ⅛" x ⅜" x 33" (accents, splines)
- Two hinges
- Chain and two end anchors
- Mirror
- 1 ¼" ring holder
- Four square inches of .05" inlay (optional)
- One square foot soft leather

SOURCES

HARDWARE
www.HomeHardware.ca
www.LeeValley.com

INLAY
www.RescuePearl.com

RESOURCES

Woodtips: Inlay in Minutes, Issue #15 , Dec/Jan '02
Book Review: 'The Art of Inlay" by George Stevens at:
www.canadianwoodworking.com/newsletters/reviewindex.htm

Personalize Your Project With Inlay

Inlaying is a great way to personalize any woodworking project, and it isn't as difficult as you might think. If you haven't done it before, the key is to begin with a simple inlay. Inlays with straight lines and angles are much easier to do than inlays with curves. Begin with a few simple geometric shapes, and as your skill builds, move on to more complicated images.

The butterfly on the lid consists of several colours of mother of pearl and abalone, with the lettering for Kirsten's name in white mother of pearl. The inlay materials are approximately .05" thick. The text chosen for the name is a Japanese stylized font gleaned from the Internet. Photocopy the inlay pattern (and any text) onto paper. Then glue the inlay material onto the paper with cyanoacrylate (CA) glue. Cut out the inlay using a jeweller's saw with a 2-0 blade. Once the cutting is done, file the edges smooth to ensure a good fit between the pieces. Glue the pieces into place on the lid using balsa model glue. Once the glue is dry, use a razor sharp X-acto knife to incise around the inlay pieces. This outlines the cavity that needs to be removed. Using a razor blade, carefully remove the inlay pieces, and then rout the cavities. A Dremel rotary tool is ideal

for this task. The depth of the cavity should allow the shell to fit in slightly proud of the surface. When the inlay fits in the cavity, install it with cyanoacrylate glue and allow it to dry. Sand the inlay flush with the surface.

to the box, I cut a slot with a small burr used for routing an inlay cavity, and then inserted the leaf of the hinge in the groove. Put a dab of polyurethane glue on the leaf before inserting it into the slot. Use a #4, ½" screw, installed from the outside of the back piece, to hold the hinge in each slot.

• Drill holes to accept small screws to attach the ends of the chain to the lid and the side of the box.

• Cut an appropriate length of chain, install chain ends and attach to the box (remove before finishing).

• Mark the center of the front edge of the lid. With a 1" sanding drum, carefully sand a semicircular recess on the bottom of the lid to allow room for a finger to open the box.

Finishing

I applied three coats of wipe-on polyurethane, allowing for sufficient drying time between each application. If you use dense woods like I did you may need to allow for longer drying times. Once the finish has thoroughly dried you can add a mirror to the back of the lid (securing it with a bead of silicone), and a ring holder to the removable tray.

I enjoyed constructing this jewellery box. It is an elegant piece and adding the inlay personalizes it for the recipient. When I construct a project like this, it is my hope that the user enjoys it for many years, and that it becomes a treasured heirloom passed to future generations.

GLEN FRIESEN
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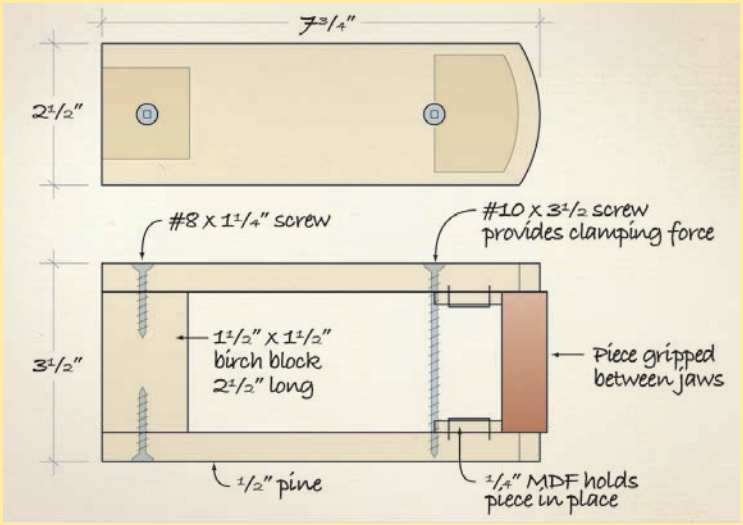
Sanding Corner Pieces

I made a jig to help me quickly and safely sand the small corner pieces (F). The corner pieces are clamped vertically between the two 'jaws' by tightening a #10, 3 ½" wood screw. The ¼" MDF pieces glued to the ½" pine jaw sides keep the corner pieces properly aligned. Scribe the outside and inside radius profile on the top edge of each corner piece. Tighten the #10 screw to securely hold a corner piece between the jaws, set the jig on the drill press table, and using a sanding drum that matches the curve of the outside of the corners, gently sand to the scribed pencil line. Once you've finished sanding the outside profiles, sand the back (convex) profiles.



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BY CARL DUGUAY

Classic Wainscoting

Add charm, character and visual appeal to any room with the classic look of wainscoting.

Courtesy of Elite Trimworks

Wainscoting is a wood covering that is applied to the lower portion of a wall. In the past, wainscoting provided a practical way to help keep warmth in and dampness out, as well as to enhance the look of the ever present stone walls. Wainscoting was even used in state rooms on trains and boats. Today, you can use the rich look of solid wood wainscoting as a decorative element to dramatically transform just about any room in your house into a warm, inviting space.

The Anatomy of Wainscoting

A wainscot wall consists of a frame that is made up of a *top cap* (also called a chair rail), an *upper rail*, at least two *stiles* and a *lower rail*. The rails and stiles enclose one or more *panels* or an arrangement of *vertical boards*. Three pieces of optional trim: a *cornice*, *bottom cap*, and *shoe*, serve as additional design elements.

Wainscoting is fastened to the underlying stud wall frame. If the wainscoting is constructed entirely of hardwood it has to be attached to the wall studs by means of nailing strips. If the wainscoting is made of a combination of hardwood and paneling, or entirely of an engineered wood product like MDF, then it can be attached to the wall studs directly on top of the drywall. Typically a wainscot wall will be from 36" to 42" high.

Solid Wood Wainscoting

You can mill all the lumber you need for a wainscot project by yourself. This, of course, was the traditional way of making wainscoting. While this provides you with the greatest amount of design flexibility and allows you to use whatever species of lumber you want, it is quite time consuming and expensive. If you go this route, an industrial shaper equipped with a power feeder is the ideal machine to use for milling the decorative edging. However, you can also use a router table – it will just take longer, particularly to rout all the vertical boards.

There are a range of edge forming router bits (see 'Basic Routing' article in this issue) and tongue and groove paneling bits that you can choose from to mill the profiles for the frame components. Freud also has a reversible wainscoting bit that cuts perfectly matched profiles. You will have to use tongue and groove or shiplap joinery for the vertical boards in order to accommodate changes in seasonal moisture content of the wood.

It's much easier to apply a finish to all the pieces before you install the wainscoting. Remember to finish the back of each piece as well.

Panel Wainscoting

Using plain or framed panels is probably the most common method of installing wainscoting today. It's more economical than all solid wood wainscoting, and easier to install. For the panels you can use MDF, high density fiberboard, hardwood plywood or beadboard. You could use a combination of solid wood for the wainscoting frame and veneered ply or beadboard (in the same wood species) for the panels; or you could use MDF for all the wainscoting components, which is probably the best choice if you plan on painting the wainscoting.

In fact you can even dispense with panels altogether and simply install a wainscoting frame over the existing drywall.

SOURCES

ROUTER BITS

www.BusyBeeTools.com
www.HomeHardware.ca
www.LeeValley.com
www.MLCSWoodworking.com
www.Sharpco.com
www.Woodline.com

WAINSCOTING KITS & BEADBOARD

www.EliteTrimworks.com

RESOURCES

'Trim Carpentry and Built-Ins', Clayton DeKorne, ISBN: 1561584789
'Trim Transformations', Tim Snyder, ISBN: 1561586714
'A Simple Approach to Raised Panel Wainscot', Gary Striegler, Fine Homebuilding 165, September 2006, pp. 82-87

If you go this route you'll want to ensure that the drywall is flat and blemish free. Paint the drywall before you apply the framing.

Beadboard is a sheet product, typically 3/8" thick, with beaded grooves that simulate the appearance of tongue and groove paneling. It's available in a paint grade MDF and as a wood-laminated veneer core, which is very stable and less conducive to warping than MDF core sheet stock.

While milling solid wood components for the wainscoting frame isn't difficult, it can be somewhat time consuming, and may necessitate your purchasing additional router bits to make the edge profiles. Fortunately, most building supply centres carry some solid wood moulding, though typically in oak. Custom manufacturers, like Elite Trimworks, carry a much wider selection of moulding and trim. They also offer customized wainscoting kits, which contain everything you need to install a hardwood-veneered wainscot wall or a paint grade MDF wall.

Installing Wainscoting

If you are installing solid wood wainscoting then you'll have to anchor the wainscoting to the wall. You will first need to locate all the wall studs. Screw 1" x 2" nailing strips to the finished wall surface, directly into the underlying studs. Attach one strip at the bottom, one near the top and one in the middle. Screw or nail the wainscoting frame and vertical boards to the nailing strips, don't glue them. It's best to install box extenders to bring the electrical receptacles out flush with the front of the wainscoting. You'll find box extenders at any electrical supplies outlet. Remember to exercise caution when working around electrical outlets.

If you are installing panels in place of vertical boards then you can attach the wainscot frame (whether the frame components are solid wood or paint grade stock) and the panels directly on the drywall.

It will be easier if you apply a finish to the wainscoting before installation. Remember to apply a finish to the back of each piece as well. Careful stock preparation will pay dividends in the final look of the wainscoting. Nail holes in the top cap and lower rail will be most visible, so you should fill them, using a product like Elmer's Tinted Wood Filler.

Wainscoting really is a wonderful way to enhance the look of any room, and it's not as difficult to install as you might think.

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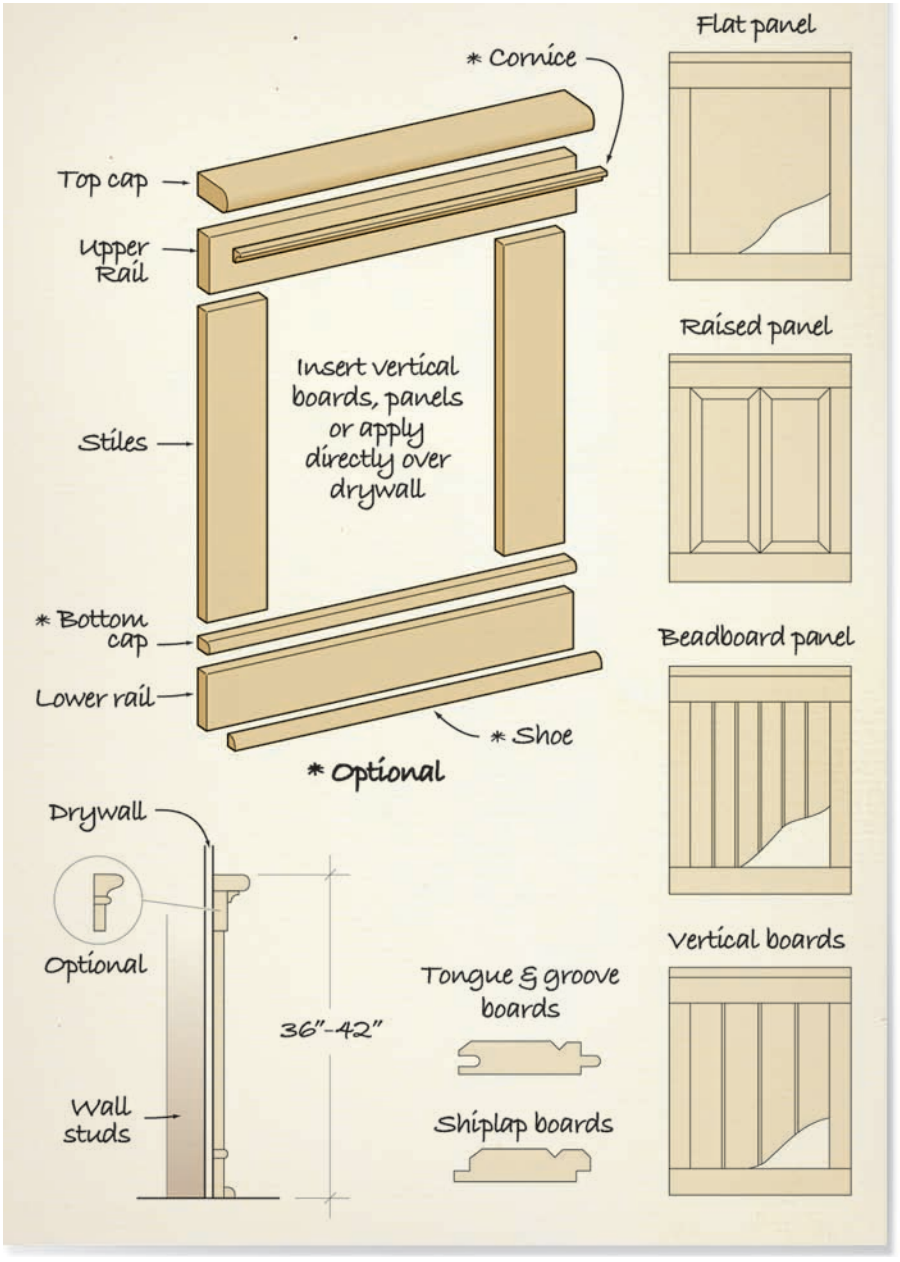

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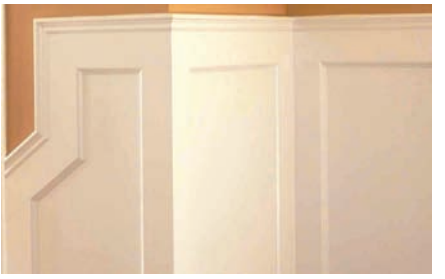


Flat panel

Raised panel

Beaded panel – paint grade MDF

Beaded panel –- veneered

Photos Courtesy of Elite Trimworks

BY TONI BURGHOUT

Segmented Butterfly

Intarsia and segmentation – two words often synonymous with creating mosaics with wood. For many of us, our first tastes of these two styles of scrolling came with Patrick Spielman's work and his many books on scroll sawing.

There are some similarities between intarsia and segmentation, with the most noticeable being that the same patterns may be used for both styles. The assembly procedure is also remarkably similar, but there are some distinct differences between the two styles that serve to make them each unique.

If you have tried intarsia before, then you should have no difficulty doing a segmentation project. If you are relatively new to scroll sawing, then I recommend you try both intarsia and segmentation styles to see what suits you the best.

Segmentation Is Distinct From Intarsia

Intarsia is a style of scroll sawing that relies solely on the natural properties of the wood to define a picture. Each part of the pattern is positioned separately on a piece of wood using grain direction, texture and colour to create a one-of-a-kind piece of art. After the initial cutting is complete, each piece is contoured with sanding equipment to add depth. The pieces are then re-assembled on a backer board. Using several species of wood, with each piece of the pattern cut from wood that best suits that particular part of the picture, is what makes the most remarkable intarsia projects.

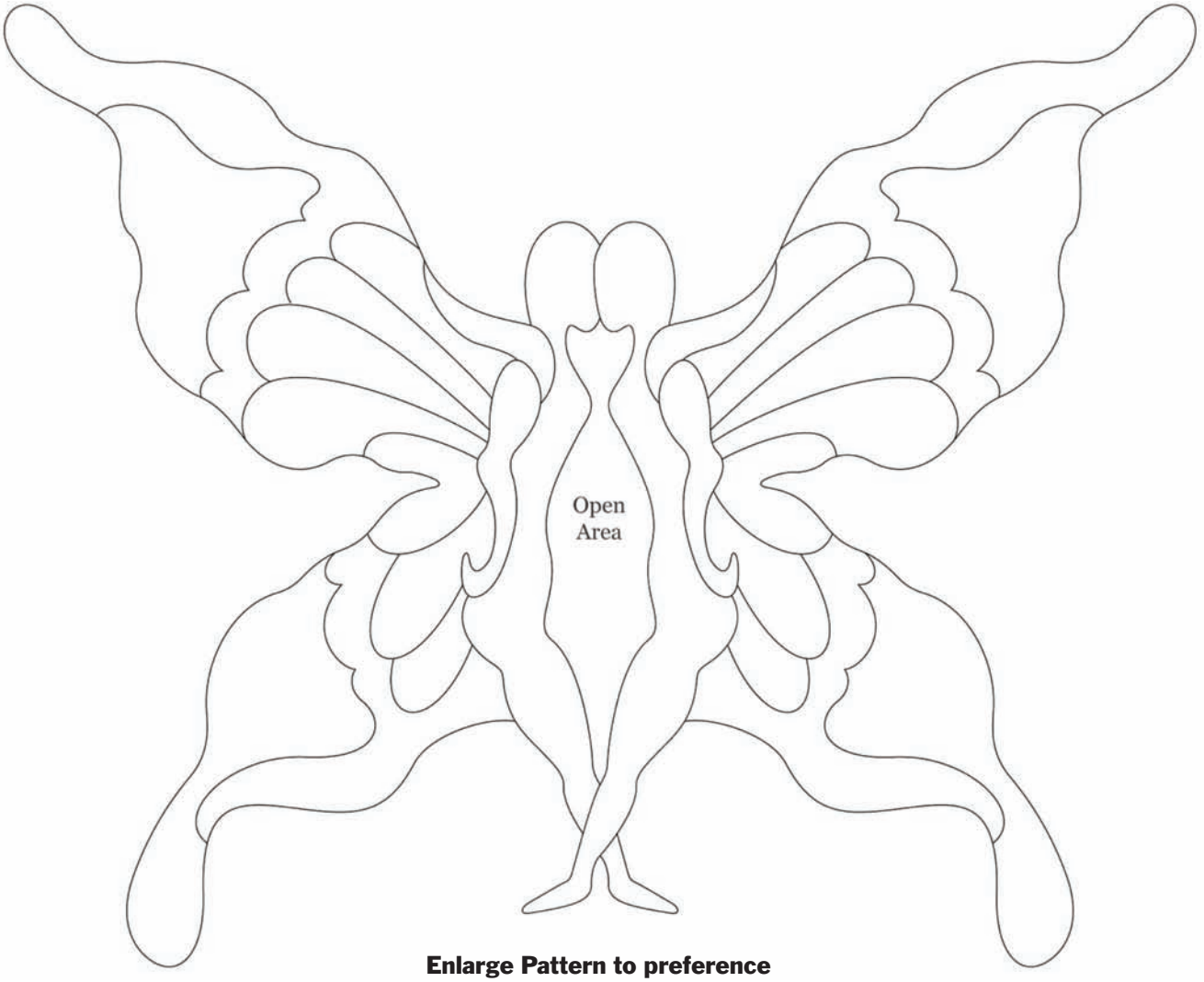
While segmentation is often considered the beginning step in learning intarsia, I suggest that it should be recognized as it's own unique style. Segmentation projects are cut from one board, making it more forgiving for beginners who may deviate from the pattern line. This allows the use of what is most economical and readily available to the scroller. It provides for much more creative freedom since most segmentation projects are coloured with paints, stains or dyes to define the picture. Contour sanding is not necessary because projects can either lay on a flat surface or be shimmed from underneath to add depth and dimension. This is ideal for scrollers who have sensitivities to the dust generated from the extensive sanding and contouring of intarsia.

Wood and Skills

Since segmentation is cut from one board, the pieces will typically fit beside each other more easily. If you waiver off the cut line, the joining piece is automatically altered to fit. Having an eye for selecting wood can add a great deal to any project and is very important when it comes to segmentation. You will need to have patience in sanding and contouring each piece if you choose to define your project with depth.

Equipment and Safety

Basic equipment for segmentation, as for intarsia, includes a scroll saw, a drill or drill press, palm sander, and a rotary tool with a variety of attachments. Using attachments such as a drum sander and mop wheel on your drill press are effective ways to deal with contouring and sanding. Although a



Enlarge Pattern to preference

scroll saw is not the most intimidating saw in the workshop, it is important to remember it is still potentially dangerous. Use caution and wear the necessary protective equipment such as a dust mask and safety glasses. Keep your workshop clean and free of debris. Since contour sanding generates a good deal of dust, work in a well ventilated area and use a dust collecting system.

Basic Steps to Segmentation

• Decide on which method of pattern transfer you are most comfortable with – tracing or gluing.

• If tracing the pattern onto the wood, make three copies of your pattern, one for tracing, one for assembly, and a back up copy. When tracing, use a coloured pen or pencil so you can easily see the lines you have traced on the pattern.

• If gluing the pattern onto the wood, make three copies of the pattern, since the entire project is cut from one board. You will also need one copy to cut your backer board, plus one as a master copy to use for re-assembly of the project.

• Number each of the pieces of the pattern to help you re-assemble your project as you cut. Put this pattern aside.

• Since segmentation is usually coloured with paints, stains, dyes or other mediums, the grain direction may not be as important as it would be with intarsia. Once you have one board that will accommodate the entire pattern, transfer your pattern onto the wood.

• If using the tracing method to transfer your pattern, position your tracing copy of the pattern over the wood. Tape the pattern in place, and slide graphite paper or carbon paper under the pattern. Using a coloured pencil, trace the entire pattern onto the wood, including all interior parts of the pattern. While tracing, remember to trace the entire outline of the pattern onto 1/8" plywood to cut out a backer board to use in assembly.

• If you decide to glue your pattern onto the wood, apply a light coating of temporary spray adhesive to the back of the pattern and firmly press onto the wood surface. While gluing, adhere a copy of the complete pattern to 1/8" plywood to cut out the backer board to use in assembly.

• As is the case with intarsia, you must begin cutting by checking to make sure your saw is square with the table. With your blade tensioned, make sure your blade is 90º to the table. Take your time and cut directly on the lines.

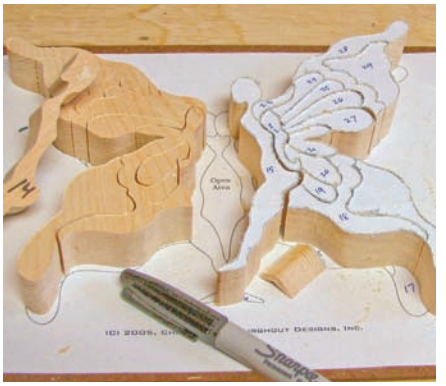
• As you work your way through the pattern cutting each piece, remember to number each piece on the bottom and mark the position on your assembly copy of the pattern.

• Cut out the backer board and set aside.

• Lightly hand sand away any burrs from the bottom side of the cut edge. Using your sanding equipment, sand, shape and contour each individual piece to your preference. Wipe off any dust from your contoured piece.

• Contour sanding is not necessary if you wish to have all your work lie flat. To elevate some pieces higher than others, you can cut a small shim by outlining the pattern piece onto a thin piece of plywood. Make sure the cutline is slightly inside the outline so the pieces alongside will not be obstructed from fitting together with the shimmed piece. Cut the shim and glue it to the bottom of the

Excess wood cut off



Number the bottom of each piece

Ready to colour

pattern piece. When gluing up your project, glue the shim to the back of the pattern piece first, before gluing the pattern together.

• Using whatever colour method you prefer, colour each of the sections of your pattern as you would like them to appear. This step allows scrollers the most creativity because of the variety available. Acrylic paints, paint wash, wood burning, sand shading, staining, or the use of dyes can all make each segmentation project a one-of-a-kind creation.

• After your coloured pieces are all dry, position all the pieces of the pattern on the backer board. Glue one piece at a time in place on the backer board, clamp and allow each to dry completely. Continue working through the entire pattern.

• When assembled, apply the finish of your choice.

This project was cut on 1" x 10" x 12" clear pine and stained with leather dye. There are no shims in this project, but using your imagination, you can make your [illegible] soar.

TONI BURGHOUT
www.chrestensenburghoutdesigns.com

SOURCES

PLANS

www.ChrestensenBurghoutDesigns.com
www.SawBird.com

SUPPLIES

www.LeeValley.com
www.SawBird.com
www.StockroomSupply.com

MAGAZINE

www.Scrollsawer.com

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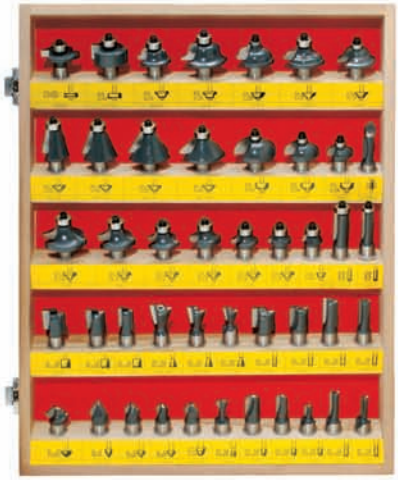

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Part IV Routing Basics Edge Profiling Bits

While square edges on furniture projects are commonplace, they don't have to be the first or the last choice in edging. A decorative edge can add considerable visual appeal to any project. The choices for edge forming bits are almost endless and the bits relatively simple to use; following some straightforward guidelines will guarantee success even for a first time user.

When most woodworkers first pick up a router, chances are it will be to profile an edge, whether for a table leg, drawer front, tabletop or cabinetry. Using edge-profiling bits can be the least intimidating way to learn how to use this versatile tool. Like most router bits, edging bits can be used freehand or on a router table. Remember that large bits shouldn't be used freehand. Fortunately manufacturers will always stipulate which bits should be used in a router table and the top speed the bit should not exceed; it is in your interest to follow their advice. When you are routing small pieces of stock it also makes good sense to use a router table, push blocks, and feather boards, regardless of the size of the bit.

Primary Edge Profiles

Almost every trim profile can be reduced to one of five basic shapes: **chamfer**, **cove**, **round**, **bead** and **flute**. (Note: The word 'flute' is also used to refer to the cutting edge of a router bit). These are the basic shapes that have defined various furniture styles throughout history. Originally these profiles were scraped or cut into the wood using sharpened metal blades. The blades were shaped with a negative of the desired profile by means of scratch sticks or beading tools, and then more elaborate hand planes. Industrial shaping of wood has been done using machines for well over a hundred and thirty years, but it wasn't until the portable router became widely available in the 1970's that the hobbyist woodworker had access to such powerful edge shaping capability.

These five basic shapes will see you through most of your woodworking needs. Builders of Arts & Crafts style furniture will find the chamfer bit the most useful of this group while those that build pine country style furniture would be best served with a selection of round over and cove bits. Beads and flutes are used to add decorative detail to many different furniture and architectural styles. Single bead and flute bits are also used to make the planking for strip built canoes.

You are, of course, not limited to these five basic shapes. Manufacturers combine these shapes to produce hundreds of complex edge designs, with just about every possible profile that you can imagine. You can use the five basic edge-forming bits in combination to create a multitude of edge treatment possibilities. For example, combine a cove and a round over to rout a Roman Ogee or a bead and cove to rout a Classical Bead and Cove. However, in most cases you will find it easier to simply purchase a complex edge bit

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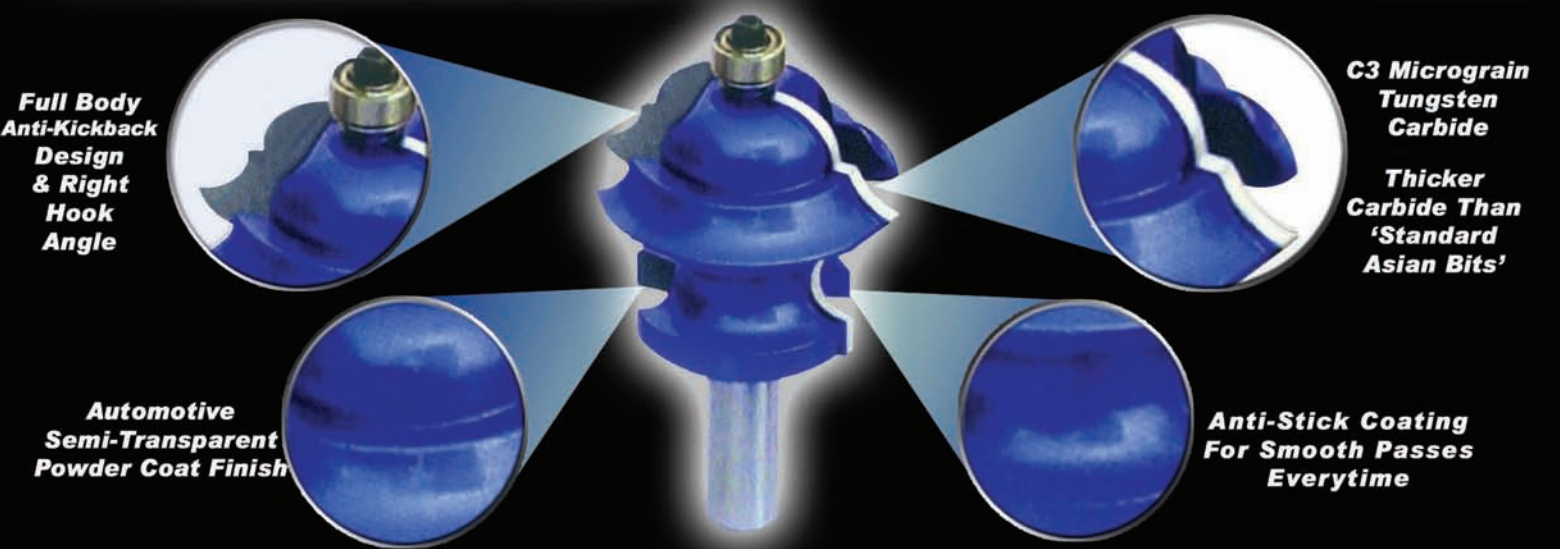

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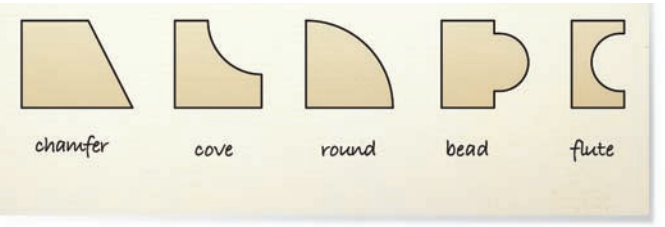
to suite your particular need. You can also purchase a 'multi-profile' bit, which enables you to rout dozens of different profiles from a single bit. You simply adjust the height of the bit to use the portion of the profile you need.

As with all tooling, better quality bits cost considerably more than the hobbyist starter sets many outlets sell at discount prices. These low priced starter sets are a great place to begin a collection though. Obtain a starter set when you purchase a router and then, as your experience with the machine grows, replace the bits that you find yourself using most often with higher quality professional bits.

MANUFACTURERS

You can get more detailed information on a full range of edge forming bits at the following manufacturer web sites:

www.Bosch.com
www.DimarCanada.com
www.Freud.ca
www.MLCSWoodworking.com
www.Woodline.com



Above: Basic edge profiling shapes
Below: Complex edge profiles

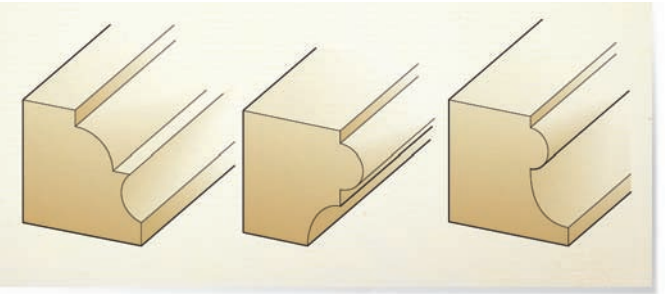
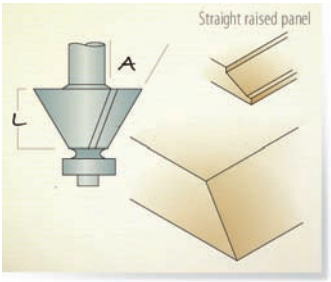


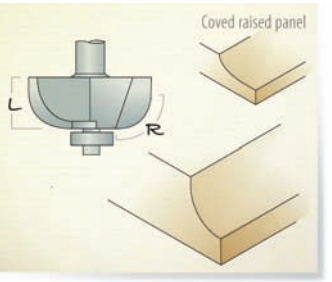
Illustration by www.JamesProvost.com

Chamfer



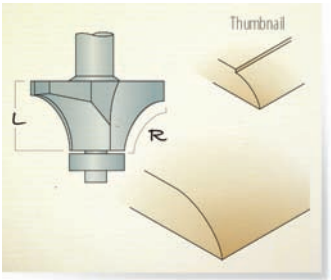
Uses: Alone or with other bits to form complex edges
Bevel angles:
11.25° – 60°
Cutter lengths:
3/8" – 1 1/2"
Available as: Two flutes with bottom bearing
Similar bits: Straight raised panel

Cove



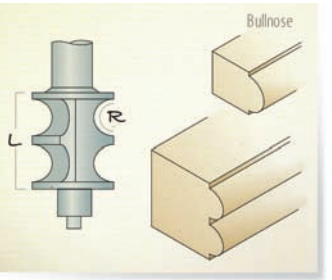
Uses: Alone or with other bits to form complex edges; for the rule joint of a drop leaf table
Cutting radius:
1/16" – 1"
Cutter lengths:
3/8" – 1 1/4"
Available as: Two flutes with bottom bearing
Similar bits: Classic cove, coved raised panel

Round Over



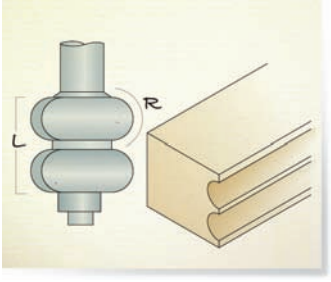
Uses: Alone or with other bits to form complex edges; for the rule joint of a drop leaf table
Cutting radius:
1/16" – 1 1/2"
Cutter lengths:
3/8" – 1 13/16"
Available as: Two flutes with bottom bearing; non-piloted
Similar bits: Thumbnail, door lip, no-drip edge

Bead



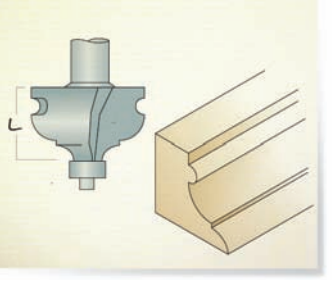
Uses: Alone or with other bits to form complex edges
Cutting radius:
1/16" – 3/8"
Cutter lengths:
5/16" – 1"
Available as: Two flutes with bottom bearing; single bead or multiple beads
Similar bits: Bullnose

Flute



Uses: Alone or with other bits to form complex edges
Cutting radius:
1/8" – 1 1/4"
Cutter lengths:
1/4" – 1 1/2"
Available as: Two flutes with bottom bearing; single flute or multiple flutes

Complex Edge Profiles



Uses: Alone
Cutting radius and lengths: wide ranging – consult manufacturer specifications
Popular Designs: Roman Ogee, Double Fillet Ogee, French Provincial, architectural moulding, crown moulding

Legend: L = Length; A = Angle; R = Radius

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Introducing Freud's New Ultimate Portable Router Table System. This contractor-grade router table is built to last and has the versatility to be used on the jobsite or at home in the workshop. The system features a sturdy powder coated steel stand with ergonomic side grips for easy storage and portability. The table top has a larger center opening to allow the router to be removed from above the table and features a ¾" T-track for infinite adjustability. The thick body aluminum fence has Shaper/Joiner capabilities and can be quickly and easily adjusted or removed from the table to accommodate many different types of tasks. Also included is a universal power switch with safety key. Rounding out this router table system is Freud's FT1700VCE 2¼ HP Variable Speed Fixed Base Router with its 'knuckle-saving' above-table height adjustment and bit change features.

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Bit guided by ball bearing guides

Lining up bearing with router fence (photo shows double exposure)

Guiding the Bits

Edge profile bits must be accurately guided along the edge of the work piece for a controlled cut. You will find that a lot of edge-forming bits have a ball bearing guide mounted on the top of the bit (often referred to as piloted bits). These guides act as a fence as the bit rolls along the non-routed portion of the edge. This will only work when there is enough of a ledge for the ball bearing guide to ride on. When the entire edge of the piece is to be profiled then this edge will not be present and the bit cannot be guided by the bearing; these pieces will have to be routed using an external fence on the router base, or with a fence on the router table. As a general rule, when buying a router bit that is available with or without a guide bearing, choose the one that has a bearing.

When using a router bit in a router table, a ball bearing guide, a fence, or both, can guide the work. Using a two-part fence with sacrificial faces will allow you to close up the opening around the bit resulting in far greater effectiveness with dust control, an important consideration as any errant shavings or sawdust that comes between the work and the bearing or fence will affect the final cut. To use a ball bearing bit with a fence, use a steel ruler to ensure the bearing and fence are perfectly lined up. Having the bearing recessed slightly behind the fence will not affect the cut but having the bearing set proud of the fence will result in snipe similar to what you would see from a jointer.

Five tips for successful edge routing

- Use a trim router on narrow edges. Trim routers are lighter than all other hand held routers, which makes them easier to control during handheld edge routing, especially when there is minimal support.
- If you don't have a trim router use a fixed based router, which has a lower center of gravity than a plunge router, and is less top heavy, making it easier to control.
- Take several shallow passes rather than a few heavy cuts for a superior finish with less chipping and tear-out.
- Adjust your feed rate and bit speed to suit the material you are using.
- Keep your bits clean, and when they are dull, replace them.

The Possibilities Are Endless

Profiling an edge is all about adding visual detail to your project, and those details are created using light and shadow. Arts & Crafts furniture is very rectilinear and fancy curved profiles would seem completely out of place. Using a chamfer on edges results in finely defined visual lines as the two crisp edges that define the chamfer catch the light. On a more casual piece of furniture a round over provides a less distinct transition from one surface to the adjacent surface as there are no sharp edges to catch the light and the light changes gradually as it is reflected around the curve. To create a slightly more defined look, raise the bit a little higher to cut a fillet at the same time. This creates a sharp edge to catch the light. Use a cove to lighten the look of a thicker top by removing some of the material from the underside.

Now you're ready to dress up any edge on your next project.

MICHAEL KAMPEN
mkampen@canadianwoodworking.com

SOURCES

www.BusyBeeTools.com
www.HomeHardware.ca
www.LeeValley.com
www.MLCSWoodworking.com
www.Sharpco.com
www.Woodline.com

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Tape Measures and Straight Rulers

The ability to take accurate measurements for precise stock preparation is the foundation for good woodworking. Your accuracy will be a function of the tools you use, and how well you use them. Two of the most popular measurement tools are the tape measure and the straight ruler.

Carpenters' Tapes: Tough and Durable

Essentially there are two kinds of tape measures – carpenters' tapes and woodworkers' tapes. A 25 foot carpenters' tape with a 1 inch wide blade and a durable belt clip is just what you need when framing that addition to your house. These tapes need super sturdy cases and stiff blades that will withstand the rigors of a construction site. The scales are usually clearly laid out and easy to read, though the blades tend to be heavily bowed (which makes the blades much stiffer). While tapes are available with both imperial and metric scales, those with just one scale printed across the entire width of the blade are easier to use and read, particularly in less than ideal lighting. The Irwin Straight Line tapes have the scale printed on both sides of the tape, a very handy feature, while Stanley's Fat Max Extreme have a 13 foot stand-out with a 1 ⅛ inch wide blade. In the woodworking shop a carpenters' tape comes in handy for quick measuring of rough lumber prior to milling, or for laying out the cut lines on sheet stock.

Woodworkers' Tapes: Light and Flexible

A carpenters' tape is, however, much too bulky to use for precise measurements on most woodworking projects, and it's darn heavy to carry around in your apron pocket all day. When making cabinets and furniture, it is very unlikely you'll be called upon to measure parts longer than 10 feet. You'll also find it much more convenient to be able to press the blade almost flat on the piece you are measuring. A tape with a shorter and flatter blade is far more appropriate to the task. Shorter tapes have narrower blades and this translates into a light compact package that you can carry in your apron all day without discomfort. Woodworkers' tapes are also available with tapes that read from right to left making it easier for right handed people to hold the tape in their left hand while accurately marking the length with a pencil in the right hand.

It's All In the Hook

For a tape measure to be accurate in use, it must have a hook on the end that automatically adjusts for inside and outside measurements. This is accomplished by anchoring the hook to the tape using rivets in a hole that has been elongated enough to compensate for the thickness of the hook. Do not let a tape retract completely into the housing at full speed, this will stress these holes and the tape will lose its accuracy. To check for hook accuracy, cut a piece of wood around 10" long, hook the tape over the edge of the board, and note the exact length. Then place the board on your table saw against the rip fence and butt the tape hook against the fence. Measure the board again – it should be the same as your initial measurement. If it isn't, time for a new tape.

Straight Rulers Excel for Short Measurements

In our shop, tape measures are only used for pieces longer than three feet and for laying out rough stock. For everything

else the ruler is king. They are available in various lengths and configurations, and in stainless steel, aluminum, plastic and wood. We prefer stainless steel for durability. They also tend to be a bit thicker with sharper edges, which means they do double duty as small straight edges. You can run a marking knife along the edge without fear of damaging a steel ruler.

When choosing a ruler, avoid any that have the graduations printed on them; these will wear off in time and the graduations are too wide to be truly accurate. Instead, select one that has the graduations laser engraved or etched. These allow for much more precise marking and are also easier to read.

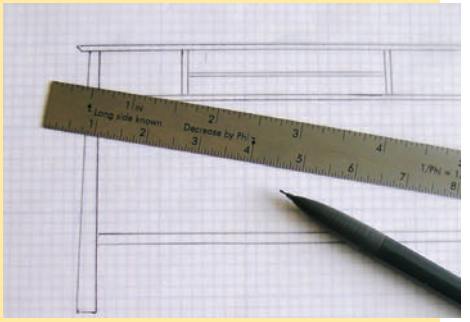
When using a ruler, it is always best to use one that is just long enough to measure your item. Trying to measure something five inches long with a 24" long ruler is awkward. While you are concentrating on the short end of the ruler, the other end can easily dent and ding other parts, resulting in damage you will have to repair. We have found that a set of four rulers, 6", 12", 18" and 24", will cover the majority of your shop measuring needs.

Woodworkers' rulers, also known as 4R rules, have four scales marked on them. On one side they are graduated in 1/8" and 1/16" increments, and the other side in 1/32" and 1/64". Hook rulers have a single or double hook on one end of the blade, and are used when the piece you are measuring has a profiled edge. Sliding the hook into place allows you to reference the edge of a board accurately and transfer a measurement to the surface of the piece.

To find the center of a piece easily, use one of the specialty rulers made for the purpose. These come in one of two types. One type has a zero mark in the center with graduations increasing outwards to either edge. To find the center, lay the ruler on the piece so the same number falls on the edge on both ends and mark the center at the '0' point. The other style has a regular scale on one edge that is used to measure the piece normally. The other

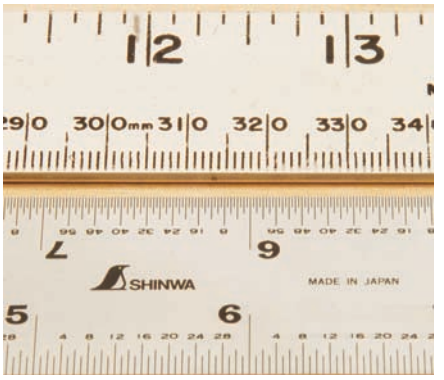
Hail the New Ruler

Over time, as furniture design has evolved, objects whose dimensions follow the 1:1.618 relationship (the Golden Ratio) between the length and width of a piece have been found to be most pleasing to the human eye. This ratio can be applied to portions of a project such as the arrangement and sizing of doors and drawers as well as to the overall project itself. Designing a project using these ratios usually involves determining the length of one side and then calculating the length of the other using the ratio. To avoid the need to use any math, Lee Valley has introduced a set of Phi Rulers ranging in length from 6" to 24". These two sided rulers have scales printed on both sides. Use one side if you know the length of the short side and the other if you have a known long side. Using the ruler is simplicity itself. It functions very much like a center finding ruler; use the ruler to measure the known length using the full size scale and then find that measurement on the adjusted scale on the opposite edge of the ruler to mark the length at the correct ratio. A set of these rulers will quickly allow you to explore various design options based on the Golden Ratio. They also function as handy general purpose rulers.

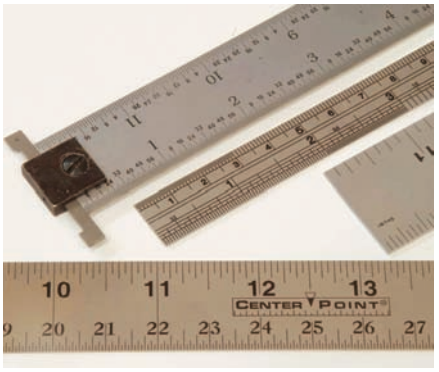


Lee Valley Carpenters' tape and Stanley Woodworkers' tape

Tape hook allows for accurate measurements



Printed graduations (top) and laser etched graduations (bottom)



From top: hook ruler, 4R (narrow), 4R (wide), center ruler

Using center ruler simplifies finding the middle

Veritas Ruler Stop makes an excellent marking guide

Accessorize!

If you've ever tried to use a tape measure to check the diagonals of a cabinet during assembly you will realize how hard it can be to get into and around corners accurately, and above all, repeatedly. The new Lee Valley Tape Tip is an ingenious little device that solves this problem. It is a plastic tip fitted with grooves and magnets that attaches to the hook on a tape measure and provides you with a pointed tip that easily fits into a tight corner. On the underside is another set of notches for measuring inside and outside diagonals. The tip is reversible as well and in this position it provides a notch that centers a pencil point 1" from the end of the tape allowing it to be used to draw lines. An integrated screw hole in the tip also allows it to be used as the center point with a tape measure to draw arcs or complete circles.

A fence can improve the utility of a tool dramatically. The Veritas Ruler Stop is a fence that fits steel rulers from 7/8" to 1 1/8" wide and up to .05" thick. It converts the ruler into a handy marking gauge allowing it to be used as an accurate, repeatable layout tool. We find it to be almost indispensible in the shop.

SOURCES

MEASURING TAPES
www.BusyBeeTools.com
MEASURING TAPES, RULERS
www.HomeHardware.ca
INCRA RULERS, IRWIN TAPES
www.HouseOfTools.com
INCRA RULERS
www.KMSTools.com
TAPES, RULERS, RULER ACCESSORIES
www.LeeValley.com

RESOURCES

See review of the Irwin 25' Strait Line Tape at:
www.canadianwoodworking.com/newsletters/reviewindex.htm

edge of the ruler is printed at half scale and you simply need to locate the first measurement on the other side to mark the center.

Specialty Rulers

A new type of ruler, made by Incra, incorporates a series of 1/32" perforations along the face of the ruler. Insert the tip of a .5 mm mechanical pencil to make precise measurements. These rulers come in a straight and a corner format.

Folding wooden rulers, usually in six foot or eight foot lengths, have been around for a long time, but we've never found them to be as convenient or accurate as a steel straight ruler – but they sure look good on a workbench.

Everything you build starts with a measurement. Invest in a good set of rulers and take care of them, they will be a pleasure to use and serve you well for many years

THE EDITORS

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www.BusyBeeTools.com

Makita 4.8V Cordless Screwdriver Kit, 6722DW - $49.95
www.HouseOfTools.com

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www.EuropeanHandTools.com

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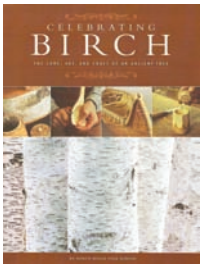

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www.ChippingAway.com

Abralon Finishing & Buffing Intro Bundle - $27.50
www.WoodEssence.com

Veritas Micro Adjust Graduated Wheel Marking Gauge, #05N35.20 – $39.50
www.LeeValley.com

toyproject BY MICHAEL KAMPEN

Woodshopasaurus rex

As daylight grows shorter at this time of the year, you're apt to find a lot of woodworkers gravitating to the shop much earlier than usual, with thoughts of the fast approaching festive season milling around in their heads.

Christmas, children and toys seem to go together naturally. You could wait until December 24, and then rush all over town looking for that last minute gift you'll never find, or you could make a splendid, but very friendly, Woodshopasaurus rex for that special child (or adult) in your life. In fact, with this project you can get twice the pleasure, by involving an older child in making 'dino' for a younger sibling – or quadruple the pleasure by making both of the dinos.

This is a simple and fun project to make, and it can easily be completed in a Saturday afternoon. You could use softwood for this project, but hardwood is a better choice, as dinos are known to be rather rambunctious. While you could cut out these parts on a bandsaw or by hand using a coping saw, we suggest that you use a scroll saw, as it's a safe tool for any young apprentices to use (under careful and constant supervision of course).

• Prepare enough blanks of the proper size for the body and leg sections.

• Print out the dinosaur pattern using your computer and use some spray adhesive to fasten the pattern to your blanks. You may have to photo enlarge the patterns.

• Use the scroll saw to cut out the pieces. This is a great operation for your young assistant, just be there to help guide them at first and then stand back and watch as they complete the pieces.

• Use files and sandpaper to shape the pieces and soften some of the edges on the legs.

• Smooth out any curves and sand away any saw marks. Mark the location of the axle hole on each leg and drill this on a drill press. Do not drill all the way through the leg.

• Trace the location of the legs on the body. Mix up some five-minute epoxy and fasten the legs in place. Do the front legs first and when the epoxy has set, do the rear legs. Place the wheels on the axles and insert them in the holes without glue. Ensure all four wheels rest on the ground. While the epoxy cures go for milk and cookies.

• Draw in the various features (big eyes and a mouth, of course!) and, if you've a young apprentice or two working with you, select a bunch of acrylic paints and turn them loose with a paintbrush for the finishing details.

• When the paint has dried, mix up a little more epoxy and fasten the four wheels to the legs using axles; these are available through most woodworking and craft outlets.

If this is a free-range dinosaur, leave it as it is, but if this is a house dinosaur you might want to install an eyehook and a leash. And remember, let the younglings play with it once in a while.

MICHAEL KAMPEN
mkampen@canadianwoodworking.com

SUPPLY CHECKLIST

- 1 BF of 4/4 hardwood or softwood
- Two 2" diameter wheels (Lee Valley # 41K01.14) for each dino
- Finish of your choice

SOURCES

SCROLL SAWS AND BLADES

www.BusyBeeTools.com
www.HomeHardware.ca
www.HouseOfTools.com
www.KingCanada.com
www.MorleyMillerMachinery.com

SCROLL SAW BLADES, WHEELS

www.LeeValley.com

SCROLL SAW BLADES

www.WorkshopSupply.com

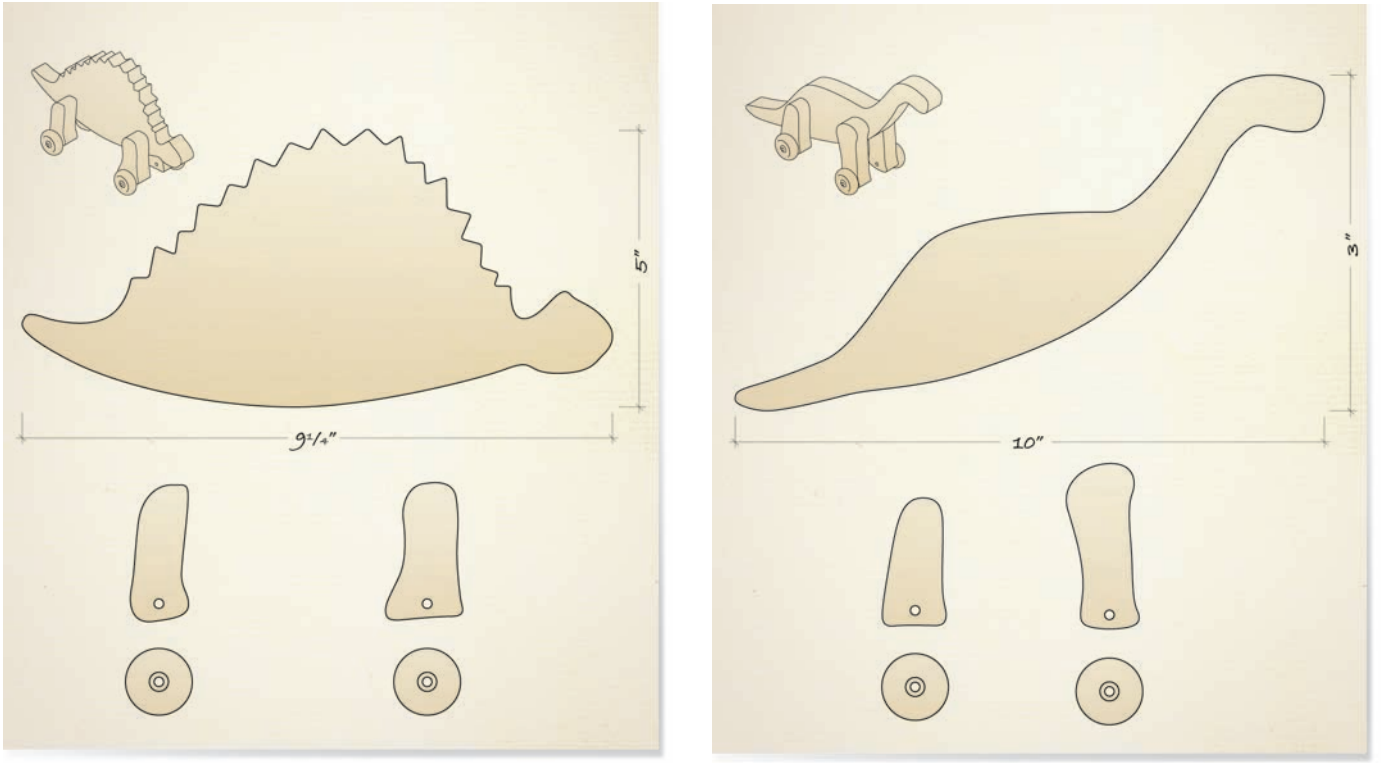

Illustration by www.JamesProvost.com

woodworkersgallery

BY BRENT SMITH

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

John Jarrett's butternut blanket chest, replete with lap desk and a hidden compartment, features a curved frame and panel top.

The chest is a fairly straightforward box joined at the corners with through dovetails. The end panels are extra tall, and the bottom is housed in a groove that allows it to float. The stiles are laminated from eight 1/10" veneers. The panel groove was cut on a router table with some jigging derived from the bending form cauls, and the tenons were cut on a home-made router mortise/tenon jig. John used 3/4" material for the top panel that was to end up 1/2" thick. Once glued up, a block plane was used to fair the outside, and a home-made round bottom plane was used to smooth the inside. The panel was raised using a combination of a 1" core box router bit, some straight bits and a variety of fixtures on the router table. The result is a well designed project superbly executed.

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

BRENT SMITH
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8" Bench Grinders

When it comes to putting a new bevel on a chisel or repairing a chipped plane blade, most woodworkers will gravitate to the bench grinder.

You will find four basic types of grinders on the market today. In this article we will be looking at the conventional **dry grinders** (you don't apply water to the wheel). These grinders use an abrasive wheel to shape metal. The other types of grinders include: **wet grinders**, which use an abrasive wheel that is constantly lubricated by water; **belt grinders** that use a one to two inch flexible abrasive sanding belt to remove metal quickly, and are commonly used by knife makers and carvers; and the recently introduced **turntable style grinders** that use adhesive backed micro abrasives discs.

Conventional bench grinders are simple machines that have an abrasive wheel attached to each end of a motor shaft. A set of wheel covers and protective shields which contain the sparks generated during grinding, and a tool rest, complete the basic package. The motor is mounted on a heavy base that also contains the on/off switch, and helps to dampen any vibrations in use. There are holes provided in the base for fastening the grinder to a bench; if you have the space to permanently mount the grinder, it is a good idea to fasten it down to reduce vibration.

Bench grinders are really 'all purpose' grinders that the home handyperson, DIY'er, and home hobbyist will find useful for a wide range of uses. However, most woodworkers will likely find that a few modest enhancements will make the grinder a much more functional tool.

Grinding Speeds

Rubbing an abrasive material against a piece of metal causes the two materials to wear away through heat and friction. Obviously, the faster you rub the two together the more material you wear away, and the more heat you produce. Most bench grinders run at 3,450 RPM, which is pretty darn fast. If you're grinding gardening tools or shop tools with a lot of mass, like axes, cold chisels, or heavy wood turning chisels, you shouldn't have too much trouble getting a sharp edge without ruining your tool.

But if your sharpening requirements are for plane blades, bench chisels and carving tools, grinding at high speeds can quickly build up enough heat to take the temper out of a tool, and it's very easy to over-grind and disintegrate the tool tip. There are two things you can do to overcome these grinding dilemmas – upgrade to a set of wheels specifically designed for woodworkers or

reduce your speed. The Steel City 15420 and Delta GR450 have variable speed motors running from between 1,725 and 3,450 RPM, while the General 15-825 runs at 1,725 RPM. A lower grinding speed will considerably reduce the amount of heat generated. And you'll be less prone to grinding away more steel than you really mean too.

Variable speed adds considerable grinding flexibility

Grinding Wheels

Almost every grinder on the market ships with fairly coarse, hard, grey aluminum oxide wheels – typically you get one 36 grit wheel and one 60 grit wheel. Only one grinder (Steel City 15420) has wheels in a finer grit – one 60 grit and one 120 grit. While coarse hard wheels are great for rough metal shaping such as sharpening the edge of a shovel, touching up an axe or shaping metal parts before welding, they are not the best choice for putting a fine edge on your woodworking tools. On coarse hard wheels the particles on the surface will tend to round over when they wear and the surface will begin to clog (referred to as glazing). This generates additional heat that can take the temper out of a tool very quickly. As the wheels glaze over there is a tendency to apply more pressure on the tool being ground, which only produces more heat. Upgrading to a higher quality wheel is recommended.

Oneway Precision Wheel Balancing System

Regardless of the grinder you purchase, it is imperative that you inspect the wheels before using them. Look for loose sections or cracks, as damaged wheels can come apart at speed and cause injury. You'll also need to 'prepare' the wheel using a dressing tool. Wheels can be out of round, vary in their side-to-side thickness, and vary in their densities. Unbalanced wheels put greater stress on motor bearings, increase wheel vibration, and more importantly, make it very difficult to achieve a fine edge on your tools. Dressing the wheel after it is mounted to the grinder will remove much of the eccentricity in the wheel, leaving it true to the center of the arbour. Additionally it will, when used properly, leave the surface of the wheel flat across its width. To

8" BENCH GRINDERS		
MODEL	**PRICE**	**SUPPLIER**
Craftex B2248	$55.00	www.BusyBeeTools.ca – 800-461-2879
Force FRV BG8	$59.99	www.HouseOfTools.com – 800-661-3987
Ryobi BGH827	$69.95	www.RyobiTools.com – 800-525-2579
King KC-890	$79.99	www.KingCanada.com – 514-636-6474
General 15-825	$149.00	www.General.ca – 514-326-1161
DeWalt DW 758	$159.00	www.DeWalt.com – 905-338-7600
Delta GR450	$169.00	www.DeltaPorterCable.com – 905-695-7131
Steel City 15420	$179.00	www.SteelCityToolWorks.com – 877-724-8665
SHARPENING SYSTEMS		
Delta 23-710	$239.00	www. DeltaPorterCable.com - 905-695-7131
Veritas MK.II	$410.00	www. VeritasTools.com – 800-267-8761
Tormek T7	$559.00	www. Tormek.us

To find the name of your local retailer visit the suppliers web site or contact them by phone. Go to ***www.CanadianWoodworking.com/data*** *for information on these bench grinders.*

Grinding Wheels For Woodworkers

There are a lot of factors that go into the production of grinding wheels. Manufacturers have to consider, among other things, the hardness or softness of the material being ground, the area of grinding contact (size of the surface being ground and diameter of the grinding wheel), the amount of material that is to be removed, the smoothness of the finish, and the speed of rotation.

Basically, grinding wheels consist of a mixture of abrasive grains in various sizes, which do the actual cutting, and a bonding agent that holds the grains together while they cut. The grade of a wheel is determined in part by this grain-to-bond ratio, the size of the grains, and their density (grain spacing). Like cookie makers, each manufacturer has its own recipe, and they vary the recipe depending on the kind of grinding the wheel will be doing. A 'soft' bond is designed so that the grains fracture (break off) easily and works best on harder metals, while in a 'hard' bond the grains require more force to break off, and work best on softer metals. Grit size refers to the actual size of the abrasive grains. A coarse 36 grit wheel is best used for quick removal of material where the surface finish isn't important. A finer 120 grit is more appropriate when you want a smoother finished surface.

For grinding bench chisels, plane blades and small carving tools, what you want is a finer grit wheel (80 - 120 grit) with a soft bond. Unfortunately, most grinders come with coarse grit wheels in the 36 – 60 grit range, that have a hard bond. Which is why so many woodworkers upgrade their wheels. Upgrading wheels is comparable to replacing the stock blade included on your table or band saw with a professional model. Premium wheels, such as the Norton 3X ($44.95) or those made by Oneway ($70.35) have an open structure with a soft bond. As the tool is applied to these friable wheels the abrasive surface starts to fracture and small particles break away from the surface. This constantly exposes new cutting edges that are always sharp, and the surface never loads up with the material being ground. Since the tool is constantly exposed to fresh cutting edges, not as much pressure is required during the grind and as a result heat doesn't build up as quickly. We use the Norton 3X wheels on a low RPM grinder and find the tips of chisels barely warm to the touch after grinding.

Large tool rest and spark shield are preferable

Bolts and set screws require more fussing

Grinder equipped with Veritas tool rest and grinding wheels

obtain the maximum in wheel balance install the Oneway Precision Balancing System, which uses gravity to rectify inconsistent weight distribution in wheels.

And of course you'll have to use the wheel dresser on a regular basis to remove the glaze that will invariably build up over time. Surprisingly, not all grinders come with a wheel dresser. The dressers for the Steel City 15420 and Delta GR450 are cleverly stored on the back of the grinder, where they are likely to be easily found, unlike so many of those little tool accessories that inhabit our shops.

Tool Rests

Tool rests are the part of the grinder you will interact with every time you use it. Some are robust and solid while others can often look and function like an afterthought. Unless you plan on replacing the tool rests immediately, select a model that has solid tool rests that are easy to adjust and are made of metal that is thick enough not to deflect in use. Cast iron is a good choice. A large tool rest, such as found on the DeWalt DW758, is desirable. We also like tool rests that can be adjusted by knobs, such as on the Steel City 15420, rather than having to use an allen key or wrench.

When setting the rest, keep it as close to the wheel as possible, a distance of 1/8" is best for most situations. Setting the rest too far from the wheel increases the risk of the tool getting caught between the rest and the wheel. Some grinders have a set of serrations at the point of attachment, the purpose of which is to prevent the rest from shifting in use. However these serrations can also make it impossible to set the rest to an accurate angle setting.

Some grinders (Craftex B2248, King KC-890, Ryobi BGH827) incorporate an angled guide-way in the rest to allow the sharpening of drill bits, and while it may seem like a good idea, it is not a feature we have ever used on any grinder so equipped. While this type of arrangement will grind the surface of the bit, it cannot establish the proper relief angles needed to make the bit function properly; at best it could help to rescue a badly damaged tip in a pinch. If you intend on using the grinder to grind chisels, this guide-way will actually reduce the surface area supporting the chisel making it more difficult to get a good grind.

None of the tool rests provide an edge to register a tool against. Woodworkers often improvise by clamping a piece of wood or metal to one edge of the tool rest (if it's large enough). The second most dramatic improvement you can make to a bench grinder (along with replacing the wheels) is to replace the tool rest. There are several high quality after market tool rests that have features to make grinding edge tools easier and more precise.

Aftermarket Tool Rests

You only have to use the tool rest that came with your grinder a few times to realize its deficiencies. These tool rests are typically small, lack a support to align your tool square to the wheel face, and are limited in their adjustability. Fortunately there are several aftermarket tool rests available. If most of your sharpening is on bench chisels, plane blades or other small tools, then you'll love the Veritas Basic Grinding Set ($74.00). It consists of an anodized base with a 2 5/8" x 4" platform that bolts to a workbench (or a plywood base). There is a channel in the platform along which you can slide the grinding jig (which securely holds chisels and plane blades). A brass pin on the grinding jig enables you to align your tools at

Using Wheel Dressers

When a new wheel has been mounted on a grinder, before its first use, it should be dressed. In most cases the wheel will be off center slightly; dressing the wheel will true it to the arbour. Wheel dressers come in several different types, with the most common being dressing sticks, star wheel dressers, single point diamond dressers, and our favourite, multi point diamond dressers. Check with the wheel manufacturer for specific recommendations for the particular wheel you are using. To dress a wheel, set the tool rest so the dresser meets the wheel at 90º, stand aside, and turn the grinder on. Let it spin for a minute or so to ensure that it is sound. Move the dresser back and forth across the front of the wheel until it has worn away all high spots. You don't need to apply a lot of pressure. Periodically, as the wheel is used, dress the surface to expose fresh abrasive and true the surface to correct any uneven wear.

precisely 90º. You can quickly lock the rest in position at any angle to the wheel edge. A cleverly designed and very effective enhancement for any grinder.

Wood turners have a special affinity for the Oneway Wolverine Grinding Jig ($99.75), and with good reason. It comes with two bases that mount on a plywood base under each grinder wheel. The bases have a cam lock clamp that enables you to quickly move the large (3" x 5") tool rest from one wheel to the other. An adjustable speed handle lets you set the tool rest at any angle to the wheel edge. There is no feature to accurately position tools square to the wheel face, but you can easily clamp a small wood fence to the tool rest. The system includes a V-arm that greatly facilitates sharpening long turning tools. You can also purchase several other accessories specifically designed for sharpening turning tools. A rock solid grinding jig.

Spark Guards

It's very important to protect your eyes when using a grinder. We recommend that you always wear protective eyewear and use the spark guards (a.k.a. eye shields) on the grinder. We prefer a large, clear guard like on the Craftex B2248, made from a flat piece of plastic that can easily be replaced from common materials when it becomes dirty or damaged. As with the tool rests, a plastic knob to adjust the guards is preferable over set screws.

Other Features

Some grinders have lights, some don't; this is a feature that should not be considered a deal breaker. An on-board light can be a nice feature for those of us whose eyesight is faltering, or if you plan to place the grinder in a dark corner of your shop. We do find they often vibrate quite a bit and rarely have enough range of motion to be useful. The Ryobi BGH827 has lights under each spark guard, and a magnifying lens on the left side spark guard, so you can get a closer look at the item being sharpened. It's always handy to have a bit of water at hand when grinding, and some unit, notably the Steel City 15420 and Ryobi BGH827, have cooling trays. We can't think that they would be of much use, as they don't hold much water and it would warm up pretty quickly. A one litre container of water placed beside the grinder is what's called for.

And don't forget that you can add other accessories to your grinder, including wire wheels, which allow for quick removal of rust or paint from metal without damaging the surface, buffing wheels for polishing metals, and felt wheels for honing tool edges.

A Different Approach to Grinding

Running upgraded wheels on a low RPM grinder with an aftermarket tool rest is about as far as you can take this tool, and it will

RESOURCES

CANADIAN WOODWORKING MAGAZINE

"Sharpening For Carvers", Dec/Jan '06, issue #39

"Bench Grinder Upgrade", Oct/Nov '06, issue #38

"Oneway's Precision Balancing System", June/July '04, issue #30

Reviews Available At:
www.canadianwoodworking.com/newsletters/reviewindex.htm

Steel City Tool Works Variable Speed Grinder (15420) Norton 3X Premium Ceramic Grinding Wheels

Knobs make it easy to adjust tool rest and spark shield

Magnification lens for close up work on small tools

Veritas Mk.II

Angled guide-ways are of limited utility

Targeted lighting can be helpful

Tormek T7

likely handle most of your sharpening needs. For those who want the ultimate in powered sharpening machines it is worth looking at a complete sharpening system such as those made by Veritas, Tormek and Delta. These are designed from the ground up with the woodworkers sharpening needs in mind. These über sharpening systems do come with a premium price tag but the fast, accurate and repeatable results they provide can be well worth the additional cost, particularly for the serious home hobbyist or professional woodworker.

These three units feature larger abrasive surfaces than a standard bench grinder, allowing you to sharpen wider items like plane irons easily. With optional accessories some will handle jointer and planer knives as well. The Delta 23-710 ($239) and Tormek T7 ($559) systems are water cooled to reduce the risk of overheating edges during grinding. In addition to the larger 8" horizontal wet wheel, which has a 2 1/2" grinding surface and spins at 400 RPM, the Delta has a smaller aluminum oxide wheel with 2" of grinding surface spinning at 3,450 RPM. Like the Delta, the Tormek has an 8" wet wheel, with a 2" grinding edge, but it is mounted vertically, as on a conventional grinder.

It also has a second wheel, but in this case it is made of leather and is used for final honing to a mirror finish. The Tormek spins at a mere 75RPM, which makes it virtually impossible to ruin the temper on your tools. It also offers the widest number of accessories of any grinder on the market. If you prefer not to bother with the fuss of having a water-cooled system, the dry Veritas Mk.II Power Sharpening System ($410) uses modern abrasive papers in grit sizes from 80 to 1200, on a horizontal turntable system that spins at 650 RPM.

Using two double-sided 8" discs provides four different grit levels that will see you through from basic edge shaping to a final honing. The tool is secured in a holder designed to set the correct projection and angle, and differing platter thicknesses automatically establish a 1º micro bevel when using the two higher grits.

THE EDITORS

Continued from page 2

available, I think it's safe to say that it will be available within 60 days."

That's straight from Phil Hanson himself, so I'd be pretty confident to make the trek to your local Home Hardware any time now.

Canadian Dealers For Earmuffs

The radio type earmuffs that you show in your August '07 eNewsletter look great! Where can I buy them in Canada?

Robert B.

• Bilsom products are available in Canada from Acklands Grainger (www.acklandsgrainger.com). They have outlets in most major cities, or you can order from their website.

Forrest Blades

Quality Blades for Serious Craftsmen

Dedicated woodworkers demand perfection. That's why so many of them choose Forrest saw blades.

Forrest quality is legendary. Our proprietary manufacturing process, hand straightening, and unique grade of C-4 micrograin carbide give you smooth, quiet cuts without splintering, scratching, or tearouts. In fact, independent tests rate our blades as #1 for rip cuts and crosscuts.

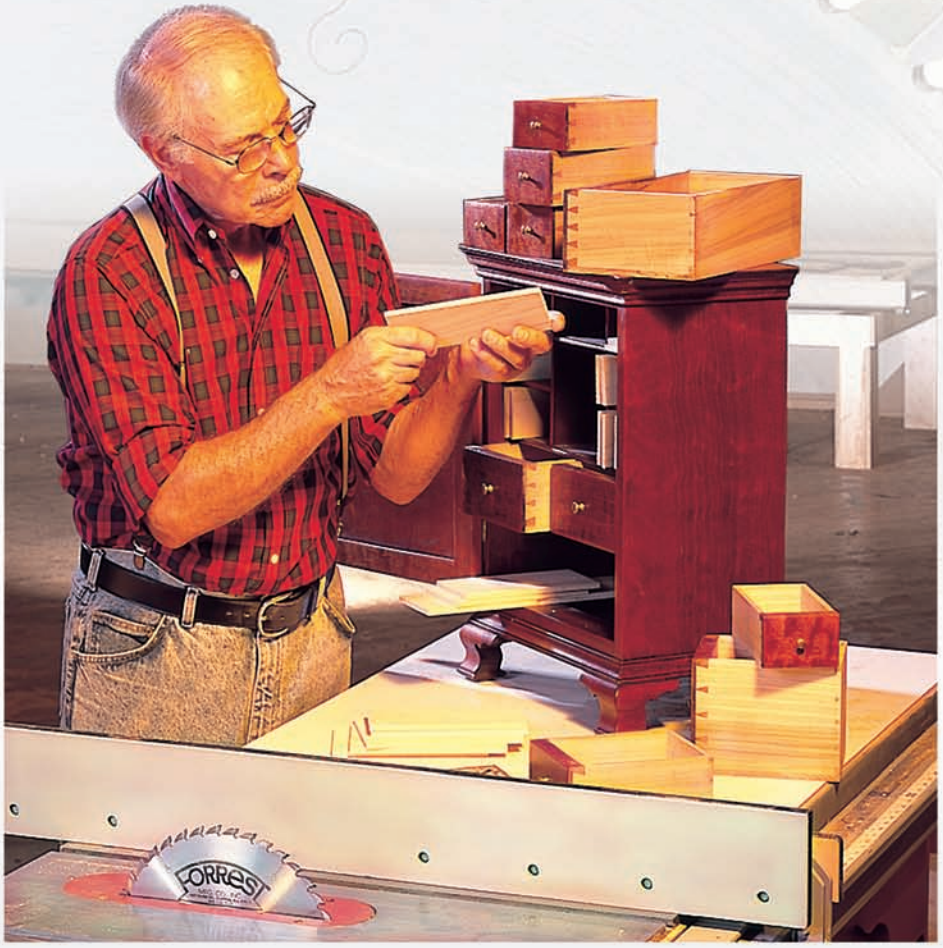
Forrest saw blades are simply the best that money can buy. They're made by the same family-owned business that's been producing and sharpening them for over 55 years. And they're backed by a 30-day money back guarantee. It's no wonder that serious woodworkers give them such high praise!

"Your blades are without question the best by miles, and I have tried them all."
Bob Jensen–Fridley, MN

"These are the finest blades I have ever owned and you should be proud of your quality product."
Patrick T. Hankard–South Windsor, CT

"[Forrest blades] cut true, with no vibration. I was a carpenter by trade for over 60 years and continue to be an active woodworker. So, I can say with confidence that Forrest blades are the best."
Carl Stude–Burbank, CA

The message is clear. If you're looking for quality, performance, and value, it pays to choose Forrest blades every time.



Our Most Popular Blades:

Woodworker II – This award-winning, all purpose blade is the finest of its type. It turns big jobs into easy-to-handle ones.

Dado-King – The world's finest multi-tooth dado set. It works effectively in all directions—with the grain or across it.

Chop Master – Produces perfect miters every time—with no bottom splinters. You get smooth edges on all types of wood.

Woodworker I – Great for table and radial saws. It trims and crosscuts all woods up to 2" and is ideal for plywood.

Duraline Hi A/T – Our best blade for birch and oak ply veneers. It also delivers a clean cut on melamine and vinyl over particle board.

Forrest blades come in a wide variety of sizes and are available for practically every application. Call or send for our complete list of products.

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Tools We Love

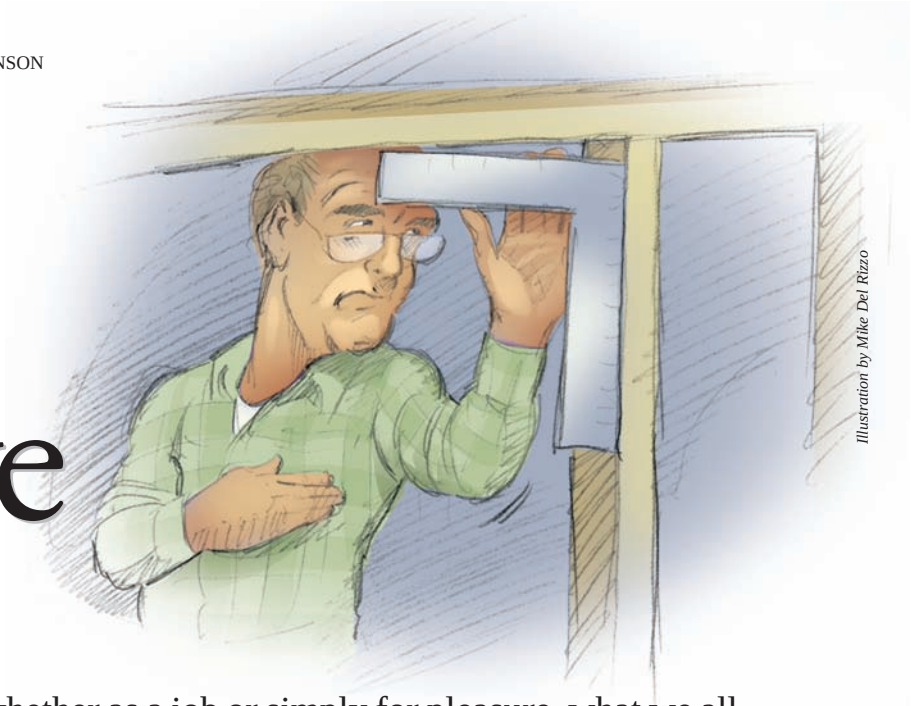


Illustration by Mike Del Rizzo

For those of us who work with wood, whether as a job or simply for pleasure, what we all seem to have in common is at least one particular tool that is a favourite, a tool that we reach for more than any other. A tool that may not be the best one out there, but seems to fit our hand better or does the job better than any other we have tried.

For a few years when I had my shop in Whitehorse, every summer an elderly gentleman would fly all the way from Germany to rent my shop to build a houseboat in which to float down the Yukon River to the Bering Sea. That had been his lifelong dream and who am I to get in the way. Each year he would haul his chest of tools from Frankfurt and was clearly enchanted with them, no matter that he hadn't a clue as to how to use them properly.

His clear favourite was an ancient, beech and brass folding ruler, which he was inordinately proud of. Every day he would carefully extract it from its little drawer, reverently unfold it and gently rub his thumb over the polished brass strip. Some days he even managed to take an actual measurement which he would carefully transfer to his board or sheet of plywood. He'd stare at the mark for a while and then erase it and happily start all over again.

In the meantime, I had whipped out my trusty Larkin tape, taken 376 different measurements, crosscut, ripped, jointed and planed 200 board feet of quarter-sawn white oak and built a roll-top desk, two hutches and a prairie settee. Admittedly he had more fun, but I didn't care. He was renting my shop by the hour and as far as I was concerned he could take years to build his boat. As it turns out, that was exactly what he did. But, he loved that folding ruler and that's all that mattered to him.

Before setting up my shop, I had briefly worked for an Italian gentleman who built custom houses. He was slow, he was meticulous and he was completely inaccurate in everything he built. From my first day of working for him, I had noticed that nothing he did was straight. It was always beautifully crafted but it wasn't square and I wondered how anyone could be so careful and yet end up with crooked shelves, cupboards, walls, and even complete houses. He owned a large wooden tool chest that was a marvel to behold and which he clearly treasured above all else. Nestled carefully inside was a vast assortment of every hand tool known to man, and a few I still have no clue as to what they were. The chest had been passed down from generation to generation, until finally to him when he left the old country to move to Canada.

At the end of each day he would carefully gather the tools, count them, wipe them down lovingly with a linseed oil soaked cloth, and precisely place each and every tool reverently into its custom built drawer, pocket or slot. On my last day of working for him, I had propped up a wall to check if it was square before hammering home the braces. My framing square was across the house so I picked up his. He never minded me using his tools as long as I put them back afterwards. I straightened the wall and nailed down the braces and stepped back.

Something wasn't right. The wall looked crooked. I went and got my own square and placed it against the wall. Nope, I was right. I got my six foot level and checked again. Definitely crooked! I checked my head, but for once it was on straight. My boss had been watching all this and came over, but clearly did not like my explanations. There was no way his poppa's and his grandpa's and his great, great, great grandpa's square wasn't accurate. I had shamed not only him but had also insulted and dishonoured his entire family lineage, all his ancestors and every Italian there had ever been or ever would be… forever. I must leave the house forever and never could I work for him again.

I was sad to leave his employ but also strangely ecstatic. I had just solved a mystery that has baffled mankind for centuries: I alone, now knew why the tower of Pisa is crooked.

DON WILKINSON
yukoners@rogers.com

crosswood

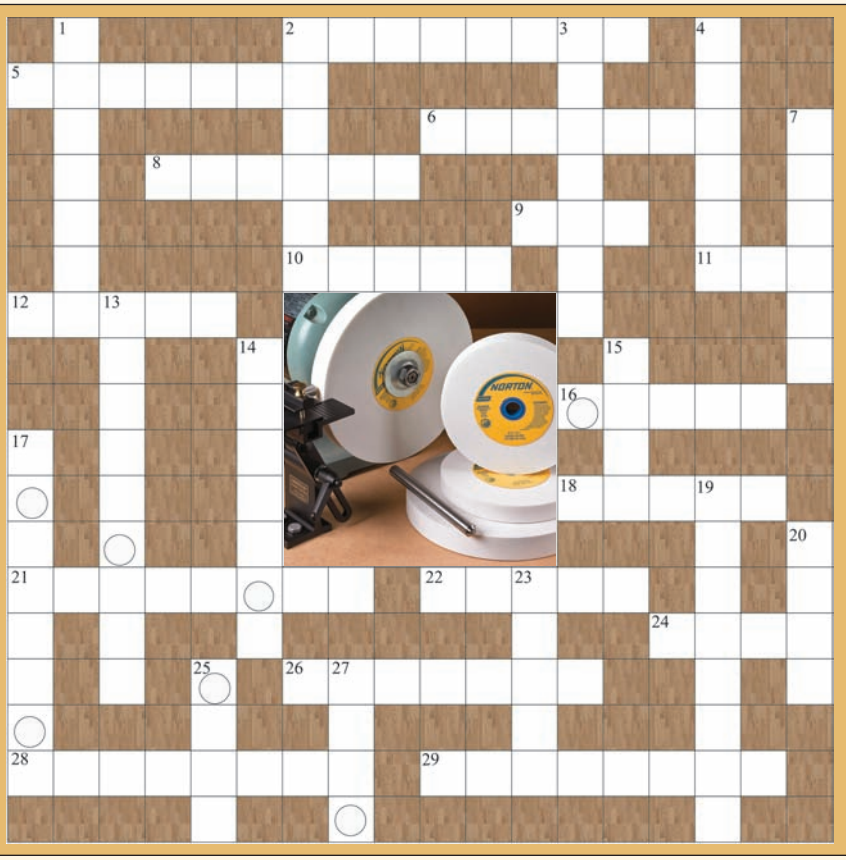
BY MEL SEVINDIK

ACROSS

2 Any type of machined woodwork
5 Cavity or hole cut to allow a tenon to pass through to make a joint
6 The frame part of a panel construction
8 Trim work around any opening
9 __cut, cut made with the grain of a board
10 Angled cut made across the face of a board from edge to edge
11 Means a little below the surface
12 The horizontal ground level of a building or structure
16 Long narrow, tapering wood cell closed at both ends
18 When two adjoining surfaces are perfectly even with one another
21 Extremely strong joint
22 Covered platform
24 Grade of particles in sandpaper or sharpening stones which determines the aggressiveness of the cut
26 Instrument for drawing circles consisting of two legs joined at a pivot hinge
28 Process of gluing material together
29 Marking a piece of wood to provide for fitting

DOWN

1 Woodworking machine designed to straighten and square a board's edge
2 Density fiberboard
3 Force exerted that twists the components of a joint in opposite directions
4 Splits or cracks in a board ordinarily caused by seasoning
7 Oil based coatings used in a wide variety of protective coatings
13 Chemicals which are added to coatings of the finish
14 Resin flakes dissolved in alcohol used as a finish for wood
15 Alter a board with a cutter, blade or bit
17 Drilling pilot holes for screws before running them, to avoid splitting the work piece
19 Joint between two pieces of wood allowing them to be spliced lengthwise
20 Soft core in the center of a log
23 Vertical board between two treads of a flight of stairs
25 ___ saw, saw with a looped blade running around two or three wheels
27 S shape that is made by making one cut to produce two identical pieces



WORD SCRAMBLE: A wheel's propensity to fracture under pressure: __ __ __ __ __ __ __

COMING EVENTS

THE OTTAWA WOODWORKING SHOW
NOVEMBER 30, DECEMBER 1, 2
Aberdeen Pavillion, Lansdowne Park
Ottawa, ON
www.woodshows.com

CHRISTMAS OPEN HOUSE
DECEMBER 7, 8
Morley Miller Machinery
196 Industrial Blvd, Hwy #5
St. George, ON
www.morleymillermachinery.com

THE HAMILTON WOODWORKING SHOW
JANUARY 25, 26, 27
Canadian Warplane Heritage Museum
Hamilton, ON
www.hamiltonshows.com

THE CHATHAM WOOD SHOW
FEBRUARY 1, 2, 3
Kinsmen Auditorium
Chatham, ON
www.woodworkingshows.com

THE LONDON WOODWORKING SHOW
FEBRUARY 8, 9, 10
Western Fairgrounds
Rectory and Florence Streets
London, ON
www.woodshows.com

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WANTED
Original woodworking projects and articles for publication.

CONTACT THE EDITOR:
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Canadian Woodworking

Push Block System

Safety is all about putting some distance between your body parts and the sharp metal bits that shape wood.

This push block is comfortable and easy to use, and incorporates a carriage that rides on the rip fence so you can rip narrow pieces safely.

A series of notches cut into the leading edge of the carriage serve as hold downs for common stock thicknesses. One side has 1/4", 1/2", and 1" graduations while the opposite side has notches for 3/4" and 1 1/2" stock. Change these dimensions to suite the stock thickness you normally use. This version is made from 1/2" Baltic birch plywood and is sized to fit a Biesemeyer fence. Adjust your measurements accordingly to fit the fence on your saw.

Making the Jig

• Cut the pieces for the base (A) and the stop block (B).

• Raise the table saw blade about 1/8" above the table and use a series of cuts to create a ledge to mount the stop block in. Glue and clamp the stop block in place.

• Use a scroll saw to cut the handle (C) from some scrap hardwood, and smooth it with files and sandpaper.

• Mark the centerline of the base, position the handle on the base, and drill countersunk holes from the underside. Screw the handle in place using #8 - 1" brass screws.

• Cut the pieces for the fence carriage top (D) slightly oversize and glue them together to form a 1" thick block, trim to final size, and sand it.

• Cut the fence carriage sides (E) to size, cut out the graduated notches, and sand the pieces. Assemble the top and sides and drill countersunk pilot holes for #8 brass screws. Apply glue to the sides of the top piece and drive the brass screws in by hand.

• Sand everything and apply a coat of wax so that the carriage will slide smoothly.

Assembling the Jig

• Clamp the push block to the top of the carriage and using a drill press, drill 3/8" dowel holes being careful not to go all the way through the carriage.

• Reverse the push block on the fence carriage and clamp it in place. Use the first set of holes in the push block as guides and drill a second set into the other end of the carriage.

• Place two 3/8" dowels in the first set of holes you drilled in the carriage and a set of dowel centers in the second set. Place the push block on the carriage and mark the location of the second set of holes.

• Remove the handle from the push block, turn it over on the drill press, and using a sacrificial backer, drill the holes. Glue the four dowels into the carriage and give them a coat of wax.

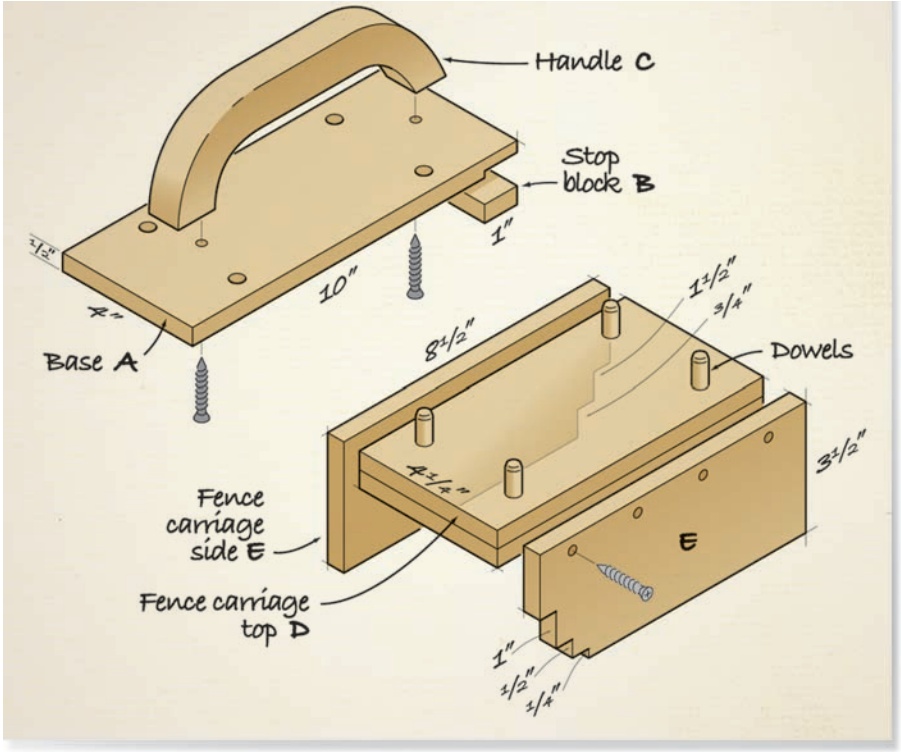

Illustration by www.JamesProvost.com

EDITORS

SUPPLY CHECKLIST

- 1/2" Baltic birch ply approximately 9" x 28"
- Scrap piece of 3" x 10" hardwood
- Ten #8 – 1" brass screws
- Four 3/8" x 1" dowels
- Paste wax

EXTRA SPECIAL REDUCED PRICING!

Limited time offer, limited quantities available – while supplies last.

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