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JUNE/JULY 2009
Issue # 60

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1-800-204-1773

CANADIAN WOODWORKING

One year subscription (6 issues) \$24.95

Single-copy price \$4.95

G.S.T. REG. #878257302 ISSN #1497-0023
PUBLICATIONS MAIL AGREEMENT No. 40035186

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ADDRESSES TO CIRCULATION DEPT.

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MAGAZINE DIV. OF SAWDUST MEDIA INC.

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I'd like to welcome you to my first issue as the new editor of Canadian Woodworking. Taking on this job has provided me with many new challenges, and while some days learning all the job entails felt like I was drinking from a fire hose, I feel comfortable with my new surroundings. I'd like to thank my predecessor, Carl Duguay, for all his help during my transition and for never mincing words when giving me sound advice and direction. Carl may not be on the mast head anymore, but he will still be contributing articles from time to time.

In my past life as a studio furniture designer/maker, I was always faced with the challenges of creating and building one-of-a-kind furniture. This magazine is my new challenge and like my furniture, I won't settle for second best. I plan to bring you articles that will guide some of you, challenge others, and inspire most.

One of my goals is to help people become better woodworkers, and in that spirit; do I have some articles for you! In "Wood Movement", Rob Brown is going to continue his series by telling you how to design and build furniture effectively while managing wood's natural tendency to swell and shrink. Jerry Haigh has shared a beautiful chess table that he built, and includes detailed instructions on making

one for your home. This is a truly refined piece of furniture. Michael Kampen is going to heat you up with a tool that is normally found in the craft world; the hot melt glue gun. As well, Michael lets us into his shop to share with you all of his favourite router bits and accessories in "Routing Bits, Jigs and Accessories".

Do you need accurately drilled holes in your next woodworking project? Check out our article "Bench Top Drill Presses" for some sound advice on purchasing one of these machines for yourself. Of course, the hand plane series continues with a comprehensive look at smoothing planes by yours truly. I'll show you how to use them to achieve mirror-like surfaces that are ready for finish. On the topic of finishing, Marty Schlosser will share his tried and true oak finish in "Red Oak Finish". This one-step filling and finishing process will save you time and the usual mess associated with pore filling.

Finally, stay tuned for our next issue. We have just completed compiling all of the data from our reader survey, and will be making some very notable changes to the look, feel, and content of Canadian Woodworking magazine.

Work safe...work proud.



vtesolin@



SPECIAL PROJECTS
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CORRECTIONS

Issue #57, page 8, the divider on the small window should be 1 3/4" long and not 4" as indicated in the Window Schedule.

Issue #58, page 14, the photo 'Use scraper to refine surface' shows a gouge rather than a scraper. It should have read 'Use gouge to refine surface'.

Issue #59, page 36, pin-type meters require an individual species-by-species adjustment of the raw meter reading. The necessary information to do so, for over 200 wood species, is included with all Electrophysics' pin-type meters. The MT270 price was misquoted at \$149.99 CAD instead of its actual price of \$138.00 CAD. And, the electrical resistance of wood increases as the moisture content decreases, contrary to our printed statement.

reader's letters

Source for Hose

On page 34 of Issue #57, December/January 2009, in an article entitled 'Rabbets, Dados and Grooves', the picture shows a Triton router being used with a hose attached to the dust extractor. Do you know where this hose can be purchased? Many thanks.

Luc C., Kirkland, QC

• The hose I use came directly from Triton's Canadian distributor. However, the hoses are available from busybeetools.com.

Tool Pricing

At the recent Hamilton Woodworking Show I purchased a subscription to your magazine and received a bag of back issues. On page 25 of the Dec/Jan '09 issue the price of a Bosch 4100 bench top saw is listed at \$575. The best price I could get at the show was \$589 (and they did not want to sell it without the optional stand). The stand added another \$40 to the price for a total of \$649 (plus tax). I was wondering if you would please tell me the name of the store where you got the price of \$575 so I could purchase the saw from them?

Mike P., Hamilton, ON

The prices we quote in the magazine are 'average retail pricing', typically provided by the manufacturers. The actual price that you pay at the till is usually set by the retailer, and can therefore vary from dealer to dealer within the same province, and from province to province (largely due to shipping costs). Also, we don't add federal or provincial taxes, or any shipping charges that may apply to the price quoted. I wouldn't balk at the \$14 difference; the Bosch is a great saw that is very popular among carpenters and building contractors.



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Model DW735
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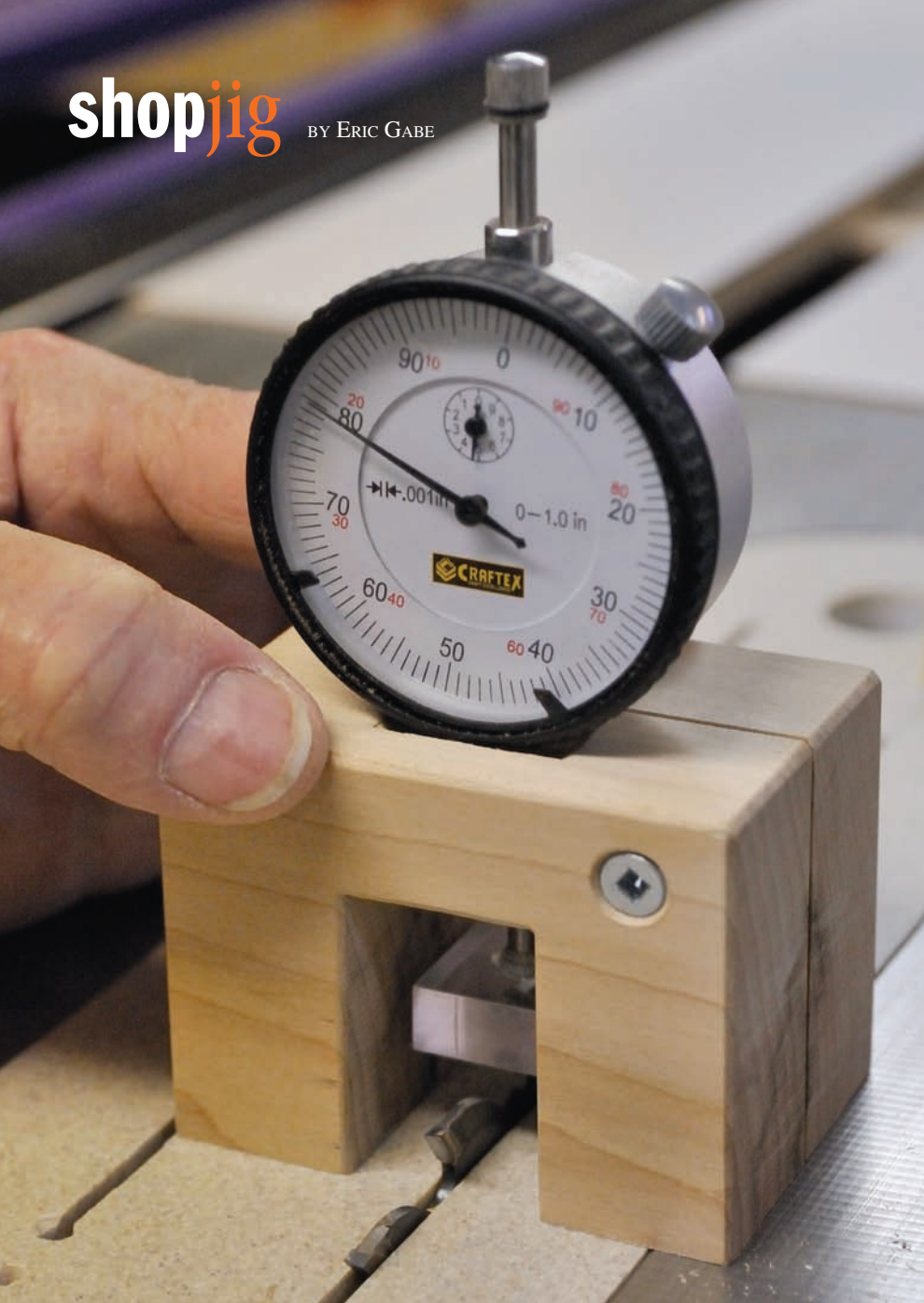
- Motor: 3 HP, 230V, 1 Phase, 60 Hz
- Arbor Size: 5/8"
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- Max Rip To Right Of Blade: 52"
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- Depth Of Cut At 45 Degrees: 2-1/8"
- Depth Of Cut At 90 Degrees: 3-1/8"
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- Max Width Of Dado: 1"
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Height Adjuster

This jig will enable you to make precise height adjustments on your table saw blade or router table bits.

There is often a need to adjust the height of a saw blade or router bit accurately. Using a ruler or small square is imprecise, while specialist devices are somewhat expensive. It seemed to me that it should be possible to use a relatively inexpensive dial indicator with a suitable mounting to give a precise height indication directly as the blade or bit is raised or lowered. The jig

that I made, which is the result of several attempts, is easy to use and accurate to 0.001".

The dial I used has a $\frac{3}{4}$ " long by $\frac{3}{8}$ " diameter extension housing below the dial. If you use a dial of a different size you will have to change the dimensions accordingly.

Make the Support Block

- Cut the wooden support block to size.
- Drill and countersink the hole for the clamping screw in the front of the block, $\frac{3}{8}$ " from the top and $\frac{1}{2}$ " from the right hand side.
- Drill a $\frac{3}{8}$ " diameter hole 1" deep in the center of the top of the block.
- Use a chisel to cut a $\frac{5}{16}$ " x 1" slot in the top of the block about $\frac{1}{8}$ " deep and $\frac{1}{16}$ " in front of the $\frac{3}{8}$ " hole. This will receive the zero-adjust ring of the indicator, allowing the extension housing to be fully inserted.
- Saw out the recess for the indicator rod and Plexiglas pad with a bandsaw. This recess is 1" from either side and is 1" wide by $1\frac{1}{2}$ " deep. The $\frac{3}{8}$ " hole will now go right through the remaining $\frac{3}{4}$ " of wood at the top. If the Plexiglas is more than $\frac{3}{8}$ " thick, say $\frac{1}{2}$ ", the block should be $2\frac{1}{2}$ " high and the recess $1\frac{3}{4}$ " deep.
- Make a vertical cut from the right hand side, 2" across the block, so that the clamping screw can tighten on the indicator extension housing.
- Cut the Plexiglas to size and drill a $\frac{1}{4}$ " deep hole in the center of the top, with a diameter slightly larger than the fitting at the end of the indicator rod. On the indicators that I used this fitting was 0.195" in diameter and I used a #8 bit (0.199"), but a $\frac{13}{64}$ " bit (0.203") would be acceptable.

Attach the Plexiglas Pad

The support block is now complete and should be tested to ensure that the zero-adjust ring is free to rotate when the extension housing is fully inserted into its hole and that the clamping screw does in fact clamp the extension housing securely.

The next stage, attaching the Plexiglas pad to the end of the indicator rod with epoxy, is the only really critical part of the construction. The pad, which rides on the tips of the saw blade or router bit protects the tips from damage, but is hard enough to prevent the tips from digging in. In order for the device to function accurately when the Plexiglas pad is glued in place, its bottom surface must be coplanar with the flat bottom surface of the block. This can be done with a simple jig, which allows both the wood block and the Plexiglas to be clamped in position while the epoxy is setting. The jig is merely a 3"x 8" piece of $\frac{3}{4}$ " MDF with a $1\frac{1}{2}$ " hole, 3" from the end.

Before actually gluing the pad in place, some minor modifications may be necessary. The indicator must register zero when the pad is touching a flat surface. This means that the bottom surface of the pad must be slightly below (0.010") the bottom of the support block when it is not touching anything. In order to check this,

put the indicator into the support block and insert the fitting at the end of the indicator rod into the hole in the top of the pad.

If the bottom of the pad is too far **below** the bottom of the support block, loosen the clamping screw and raise the whole indicator slightly.

If the bottom of the pad is **above** the bottom surface of the support block, note the amount, disassemble the device and remove slightly more than that amount from the bottom of the block with a belt sander or table saw and again ensure that the bottom of the block is flat. Do not cut too much off the bottom of the block as this will restrict

the full 1" range of the indicator.

The pad can now be glued in place using the jig. With the jig held in a vice, position the wood block across the jig, midway between the end and the 1½" hole and clamp it on both sides. Prepare the epoxy and coat the inside of the hole in the Plexiglas pad. Put the pad in place and push the indicator rod down into the glue. Clamp the pad in place with two small clamps, one over the end of the MDF and the other through the 1½" hole.

Using the Height Adjuster

The device is easy to use, but it is extremely sensitive and to get an accurate reading it is essential that the reference surface

(i.e. the saw or router table top) be clean and free of dust. Place the device on the reference surface to check the zero setting and reset if necessary. When setting a saw blade, bring one of the teeth to the top center. Place the device over the saw blade or router bit and use the applicable height adjustment mechanism to raise or lower the blade or bit as necessary.



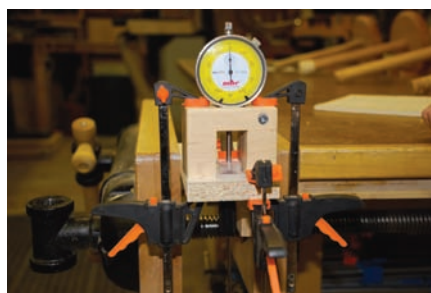
ERIC GABE
ericgabe@rogers.com



Block with the slot, recess, Plexiglas pad and vertical cut



Adjuster on the jig – rear view



Adjuster on the jig – front view



Setting router bit height

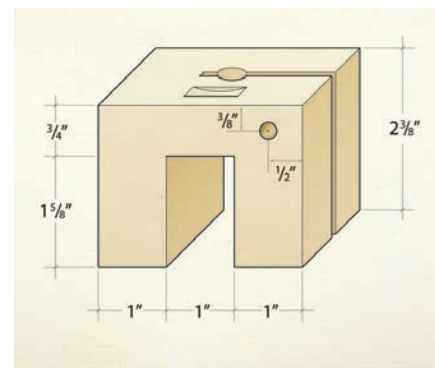


Illustration by: www.JamesProvost.com

SUPPLY CHECKLIST

- ☐ Dial indicator busybeetools.com or leevalley.com
- ☐ 2" x 2 3/8" x 3" close-grained hard wood (maple, walnut, beech)
- ☐ 3/8" x 3/4" x 1" Plexiglas or Lexan
- ☐ #8 - 1 3/4" screws
- ☐ Epoxy glue

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\$599⁹⁵





Mantel Clock

Brighten up a fireplace mantel, hall table, night stand – in fact any room – with this heritage style mantel clock.

Fortunately for woodworkers, the ready availability and variety of electronic movements, clock faces, plastic or glass lenses, and bezels, has greatly simplified the process of clock building. Gone are the days of installing finicky mechanical movements. For those who can't be bothered sourcing the various bits and pieces needed, kits containing everything, including the wood, are available. If you elect to purchase a clock face that's different in size from the one used here you will need to modify the plan to make sure the face fits properly. It looks best if the bezel is centered within the face panel (E).

The mantle clocks I build have three defining features: first, they are sized for today's down-sized furnishings and fireplace mantles. Second, they are made of quality cabinet-grade wood and components. Lastly, they sound terrific when they are chiming.

A heritage style clock, such as the one described in this article, is simple to make, yet elegant. It can be embellished with the addition of mouldings or different hardware than what I have used. Indeed this is an area where you can let your creativity shine.

Begin by jointing and planing all the project pieces to their final thickness. I like to rip the base (A), top (B) and sides (D) to the same width (in this case about 6") and then trim them to their final length. Starting with these pieces the same width greatly simplifies marking and machining the joinery.

Carcase Joinery

There are a number of options for joining the top and bottom to the sides, including dovetails and dowel joinery. I find mortise and tenon joinery to be both accurate and efficient. Mark the locations for the bottom and top mortises. Because I use floating tenons, I also mark the top and bottom of both sides for mortises. Go ahead and cut these mortises now. With these important joints out of the way, rip the two sides (D) to their final width and, using the router table, cut $\frac{1}{4}$ " x $\frac{1}{4}$ " slots in their front inside edges to receive the face panel. Note that if you elect to use $\frac{1}{4}$ " plywood for the face you'll have to adjust the width of these slots to correspond to the actual thickness of the plywood, which will often be 6 mm. The inner side of these slots should be $3\frac{1}{2}$ " from the back of these pieces, so if you're planning to use your router table

for these joints, set the fence up accordingly. Insert the loose tenons and trial fit the joinery you have made thus far.

Using the actual location of the slots in the two sides as a reference, mark the location for the grooves you need to cut in both the base (A) and top (B) to receive the face panel (E), and then go ahead and make these joints. Like the slots in the sides, these need to match the thickness of the plywood, and be $\frac{1}{4}$ " in depth.

With the joints cut in the top (B), you can now cut it to its final width. A decorative edge can really enhance the appearance of any project. On this clock I used an ogee bit on the edges of the sides and front of the base (A), top (B) and cap (C). Machine the face to its final dimensions and then drill a $\frac{3}{8}$ " diameter hole in the dead center. This size is just right for the movement I've recommended, but if you're using another movement you'll have to size this hole accordingly.

The back panel is held in place with magnets. Two are inset into each door stile (G) fastened to the sides and another

two in the back (F) panel. A Forstner bit will cut a clean hole for the magnets, and cyanoacrylate glue will hold them firmly in place.

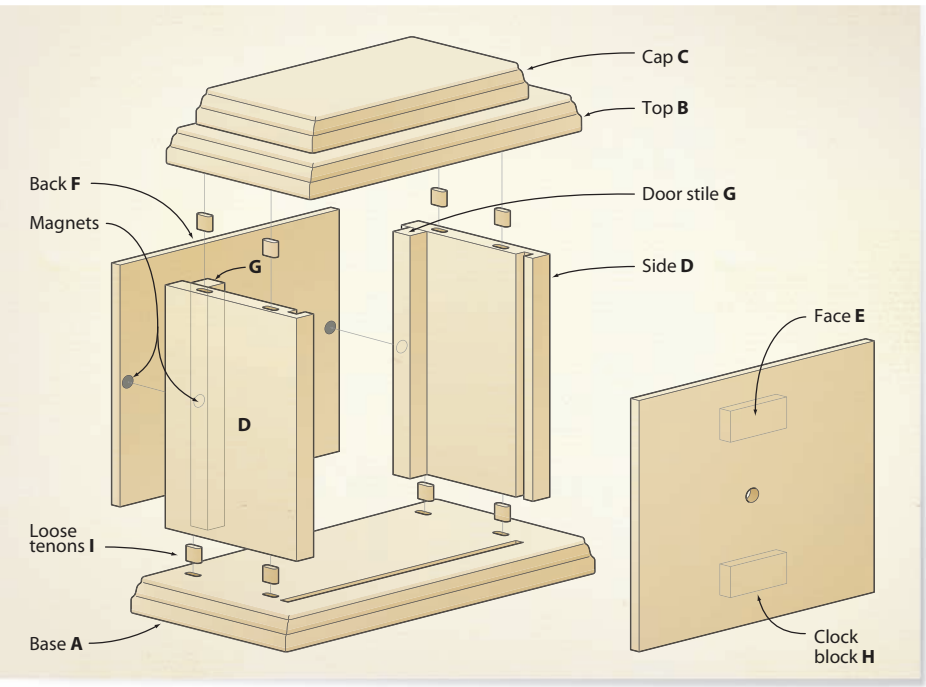
Drilling Handle Holes

Set the cap (C) on the top (B) then clamp them together so you can accurately drill the handle holes. Using a 1/8" drill bit, drill the two holes into the cap (C) and top (B). Because standard sized handle bolts are usually only 7/8" long you won't be able to go through both the cap and the top. You have one of two choices: replace the bolts with ones long enough to go through both boards, or countersink the bolt heads deeply enough to allow the bolt heads to go through. I usually follow the latter route and drill the countersink holes using a 5/8" diameter drill bit. You also need to drill some pilot holes in the top to use in fastening the cap into place when the time comes.

Assembly

Sand everything to 320 grit in preparation for finishing. If you're using solid wood for the face (E), apply the finish to it now so there won't be any unsightly unfinished areas showing whenever the weather causes the panel to shrink. Once done, go ahead and glue the loose tenons into the sides. Don't go overboard with the glue, as any excess will only have to be wiped off with a wet cloth before it dries. Put a small dab of glue in the middle of the slots in the top and bottom, and then set the face panel into the slot in the bottom. Put glue into all mortises, and then go ahead and set the two sides into place. The top (B) comes next, after which you can clamp everything together and set it aside for at least six hours to allow the glue to set. Check the assembly for square and make any necessary adjustments. Before you move on make sure you clean off any glue that may ooze out with a water-dampened cloth.

MATERIALS LIST (All measurements in inches)					
Part		Qty	T	W	L
A	Base	1	7/8	4 11/16	9
B	Top	1	7/8	4 1/4	8
C	Cap	1	7/8	3 7/16	6 3/8
D	Sides	2	1/2	3 7/8	6 1/2
E	Face	1	1/4	6 23/32	6 15/16
F	Back	1	1/4	6 15/32	6 15/32
G	Door stiles	2	1/2	1/2	6 1/2
H	Clock blocks	2	3/8	1	2



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Once the case has dried, glue the two stiles (G) for the back into position, ensuring you have the right side up, otherwise your magnets may not line up properly. The cap (C) can now be fastened into position. Carefully line up the holes in the cap and top (B) so you'll be able to get the handle bolts through the top when the time comes to fasten it. Check the back (F) panel to ensure it will fit properly into position, and then make the holes for the two magnets. Before you glue the magnets into position, set the back (F) into place and mark where you'll need to gouge out the relief hole needed to get your finger under the door to remove it. Make the hole and then once you've checked the magnets' polarity, epoxy them all into position. If you use five-minute epoxy, you'll be able to start finishing the piece very soon.

Finishing

I normally spray my clocks using one coat of Target Coating's water-based shellac, woodessence.com, followed by three coats of their lacquer. The first two coats are gloss and the last one is semi-gloss, which I find

gives the finish good depth without appearing cloudy. For optimal results, lightly sand with 320 grit sandpaper between each coat. If you're planning to use water-based finishes, remember to wet the bare wood with water to raise the grain. Follow that up with a light sanding of 320 grit sandpaper to get rid of the raised grain, then apply your first coats of finish.

Final Steps

Once the finish has cured properly, go ahead and fasten the handle into position. Then, install the clock face and bezel. The set I recommend is held in place with very small nails that are supplied with the bezel. Take great care in aligning the clock face, as you only get one crack at it. To ensure I don't split the face when nailing the bezel into place, I usually place a short piece of 2 x 2 into my vise to nail against. Insert the movement's hand stub through the hole in the face panel using the supplied washers as shown in the directions that came with your movement. I usually glue the movement into place using CA glue, as it sets up very quickly and surely.

Whether you are making this clock for your own home, or as a gift, it's bound to be admired by all.

MARTY SCHLOSSER
Marty'sWoodworking.ca



SUPPLY CHECKLIST

- ☐ Two and one-half board feet of the hardwood of your choice
- ☐ Four 1/4" diameter x 1/10" thick rare earth magnets
- ☐ Clock face, glass and bezel (Murray Clock Craft DB160B, murrayclock.com)
- ☐ One chiming quartz battery clock movement (Murray Clock Craft HQBC5)
- ☐ One brass bail style handle, 2 1/2" between holes
- ☐ Finishing materials of your choice



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Red Oak Finish

There are few woods easier to finish than red oak. Whether you want it stained and sporting a bulletproof topcoat, or have its natural oak glow shining through, you can't go wrong with red oak.

I've been there myself. You've worked hard to get your project to the point where it's looking good, really good, and you don't want to mess it up with a finish that's anything less than terrific. Look no further because here is my tried and proven, easy red oak finish.

Surface Preparation

It almost goes without saying that every project needs to be properly prepared before being finished. In fact, the vast majority of finishes are ruined or less than perfect as a result of cutting corners at this essential stage. This includes ensuring there's no residual glue anywhere and that the surface is free of any machining marks or sanding scratches. Once the surface

has been properly hand planed or sanded, you're ready to begin.

Grain Filling

Red oak is an open-grained hardwood, much like ash, walnut or mahogany. Whether flat-sawn or quarter-sawn, you need to apply grain filler if you're interested in having a pore-filled finish. That having been stated, my easy red oak finish largely negates any need for grain filling, as the stain and the topcoat are thixotropic oil-based gels that act as though they have fillers in them. Now, how's that for a time-saver?

Required Materials

Gel finishes are fortunately now being

Thixotropic

Describes a material which undergoes a reduction in viscosity when shaken, stirred or otherwise mechanically disturbed and which readily recovers the original condition on standing.

made by a number of the most common finish manufacturers. These oil-based gels are easy to use and provide excellent non-blotching coverage on difficult-to-stain woods such as cherry, pine, birch or maple. Instead of rags for applying these finishes, try using durable, long-lasting, lint-free paper towels.



Using gloves will prevent your skin from matching your project when applying gel stain



Use a lint-free, durable paper towel to wipe off excess using strokes parallel to grain direction



If a natural look is desired, skip the gel stain and use the topcoat gel finish

Staining

If you've elected to stain the bare wood, don't sand down any finer than 120 grit, or else your stain won't take as well and you'll be forced to add additional coats. Follow the instructions on the can and thoroughly stir the stain. Fold your paper towel into quarters then dip it into the tin to get a generous amount of stain. Apply the stain using a circular motion then leave it on for approximately four minutes before rubbing any excess off with a clean paper towel, rubbed parallel to the grain.

If the colour isn't dark enough, wait patiently until the stain has set fully before applying a second coat. Note, however that the topcoat will usually darken the stain somewhat, so be careful not to go too dark. If you don't wait for the stain to dry thoroughly, the next coat of stain will act as a solvent and actually lighten the finish instead of darkening it. Patience is a virtue and a necessary component of all finishing tasks.

Because this is an oil-based stain, the application rags need to be fully dried in the open before being disposed of in the garbage. My usual practice is to lay the finish-soaked towels over the lip of the garbage can overnight. Once the stain has completely dried and you are fully satisfied with the colour, move along to applying the protective topcoat.

Staining has been receiving an unfair rap in some circles, and that's unfortunate. One of stain's finest characteristics is its ability to blend in what may otherwise be considered blemishes that would detract from an otherwise beautiful finish. Lighter sapwood areas on a board, or otherwise lighter sections or panels of a project may also need to be stained to even out their colour. In these cases, staining the affected area will help it blend in with the rest of the piece.

Topcoating

Topcoats are applied in much the same

way as stain, using a clean paper towel loaded with the gel finish and moved in a circular motion. Work on only one area at a time or your finish will begin to set before you've had the opportunity to remove the excess with a fresh towel. Once that has been done, take out another fresh towel and buff it with the grain. Continue moving over the entire piece, one section at a time until all areas have been covered. Apply two more coats, waiting patiently for the finish to dry thoroughly between each before seeing if additional coats are required. Let the finish dry at least overnight before subjecting it to use. It should look flawless and inspire you to try your hand at finishing even more complex pieces. Now, that was simple, wasn't it?



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Lidded Jewellery Box

One of the most popular items to make when you decide to take up woodturning is a lidded box. This turned box is an excellent study of different techniques to add to your repertoire.

The most popular use for these boxes is for keeping jewellery. However, they can be used for many different purposes, from holding paper clips, to pills in a lady's purse. They make excellent gifts and usually become a treasured possession of the recipient. An assortment of shapes, sizes and different woods can also make a beautiful addition to a display for a local craft show.

Lidded boxes come in many different styles and configurations. The lid style is often dictated by the end use. For example, the lid can pop off, lift off, or slide off, and it can either fit over the lip of the box base, or it can fit inside. Some even have hinged or threaded tops. You can make a simple little box with straight sides with a flat, curved, or dished top, or you can let your creative juices flow and make your design as intricate as you like. You may even want to add a top finial from a contrasting coloured wood, to add style to the piece.

Design

The billet I used for this project has the end grain oriented from top to bottom, parallel to the ways of the lathe. This is often referred to as an 'end-grain box'. The finished box is approximately 3" high by 2" diameter. The pop-off style lid fits over the lip of the base section of the box. The rest of the design will be created as the project is made, sometimes referred to as 'free-style turning'. If you are making a larger box, I recommend that a design be sketched out ahead of time. Sketching a larger project can save a lot of time and wood.

Choosing the Wood

The wood used to make a lidded box should be dry. Green wood will warp out of shape causing the lid to distort and it will not fit the base of the box properly. You should use dense straight grained hardwood with no inclusions. It should also be at room temperature to reduce distortion. The

piece of wood I chose for this project is maple with light figure. The blank was cut 2 ½" square and 5" long, which is 2" longer than the finished box length. This allows a little extra wood for design and making the jam chuck for remounting the base later. It also allows some extra wood in case an unexpected small crack appears at an end of the blank.

Preparing the Blank

After locating the centers and making a dimple on each end of the blank, mount it between the headstock and tailstock centers on the lathe. I used a special spur center that clamps into my SuperNova four jaw chuck. A regular four prong spur center in the headstock will also work. If you clamp a Morse Tapered spur center into your four jaw chuck, you will damage its taper with the jaws. Do not use that spur center directly in the headstock spindle Morse Tapered socket again because the scratch

marks will damage it and other Morse Tapered accessories will not fit properly.

Round off the blank to an outside diameter (OD) a little larger than the OD in your finished box design. I use a $\frac{3}{4}$ " skew, but a spindle roughing gouge will work just as well. Make a tenon or *spigot* on each end that will fit your chuck. Some chucks require a straight-sided tenon and others require a beveled side. Make sure the fit is accurate and the cut is clean so the piece will run true.

Decide where you want to separate the base section of the box from the lid section. The lid should be a little shorter than the base. Some turners like the lid to be $\frac{1}{3}$ of the total height and others like a 40:60 ratio. Choose your own dimensions here. If you think it looks good, that's what matters. Now you can part off the base with a $\frac{1}{16}$ " narrow parting tool. It is important to use a narrow parting tool for this because the less wood you cut away in this step the closer the grain will match.

Turning the Lid

Mount the lid section in the jaws of the four jaw chuck making sure the shoulders of the tenon fit tight up against the face of the jaws so the piece will be held as firmly as possible.

To true up the blank I prefer to use a skew. Rough hollow the lid with a freshly sharpened $\frac{1}{2}$ " spindle gouge, cutting from the center towards the edge so the bevel of the gouge will be supported and you will be cutting with the grain, minimizing tear-out. Check the inside depth periodically with a depth gauge to make sure you leave enough wood for the lid top design you want. As well, leave plenty of wood near the edge for the lid flange and to accommodate your box wall design.

Cut the lid flange with a square nosed scraper positioned parallel with the ways of the lathe making a straight cut about $\frac{1}{4}$ " deep. This cut must be cylindrical and straight so the lid will fit the base without binding, or being too loose. Measure the inside of the flange with inside calipers and make sure it is cylindrical. Leave a small shoulder to separate the flange from the end grain of the dome. Make sure to leave edges thick enough for your box's wall design.

Refine the inside of the lid with a $\frac{1}{2}$ " round nosed scraper, or a $\frac{1}{2}$ " side radius scraper. I made the inside of the lid dome-shaped with a point in the center as a design feature. You can remove the little nub in the centre with a round nosed scraper if you want to make the inside of the top dome-shaped.



Part lid and bottom



Hollow lid inside



Create lid flange



Mark lid depth on outside



Transfer lid inside diameter to base



Hollow base



Depth groove for bottom



Shape outside profile



Ready for parting off



Base mounted on jam chuck

Measure the depth of the lid with a depth gauge and mark that depth on the outside of the lid. You can also do this by holding one ruler across the surface of the lid and measuring the depth with another one. Continue the mark around the piece by rotating the lathe by hand. This will show you where the inside depth of the lid is so you won't cut through when you're finalizing the shape of the lid later.

Sand the inside of the lid starting with around 180 grit sanding cloth and progress through the grits to 600, or finer if you wish. The grits of sanding cloth required will depend on the wood used and the finish you want to apply. Make sure you leave the edges of the lid flange crisp. There's no need to sand the flange areas as they will be modified later when we do the final lid fitting.

Clean the inside of the lid and polish with your favorite finish. I applied wipe-on polyurethane with a paper towel. I created some friction heat with the paper towel to dry the finish. I don't like using cloth to apply the finish because it can get caught on the piece, or the chuck, and can cause an injury whereas a paper towel will tear away leaving your fingers intact.

It's a good idea to mark the location of chuck jaw #1 on the blank in case you have to remount it. This saves a lot of line-up time. Now you can remove the lid section from the lathe.

Turning the Base

Mount the base section in the chuck the same way as you did the lid section earlier; making sure it is fastened firmly. Now you can proceed with truing up the blank.

Transfer the inside diameter measurement of the lid to the top of the base by using a $\frac{3}{16}$ " parting tool to cut a small tapered flange just so the lid will start to fit on the tip of the base. A peeling cut with a skew can also be used to do this. Take your time with this process, you don't want to make the taper too small. *Do not fit the lid tight on the base at this time*. The base may change in shape when you hollow it out and the lid may not fit properly. Hold the lid against the tip of the base section to make a burnish mark on the taper. This marks the exact inside diameter of the lid on the base.

Mark the location of the inside bottom of your box design on the blank. Mark the depth measurement on a $\frac{3}{8}$ " depth drill with green masking tape. You can also put a $\frac{3}{8}$ " drill bit in a Jacobs chuck in your tailstock

to do this. Cut a V-notch in the center of the blank to align the drill and, with the lathe at slow speed, drill a pilot hole down the center of the blank to the measured depth. Hollow out the base section of the box with a $\frac{1}{2}$ " spindle gouge. You can make the inside walls straight or curved, as desired. If you want to make the inside bottom surface round as I did in this project, refine the inner walls with a curved scraper, the same way you did the inside of the lid.

To make the inside walls straight, I use a $\frac{3}{4}$ " side cutting angle scraper. An angle scraper allows you to make the side and the bottom of the box with one tool. The angle where the end and the side of the scraper meets is less than 90° and there is a small radius there to reduce the tendency of catches and tear-out. These scrapers are available commercially but I made one myself by custom grinding a $\frac{3}{4}$ " square end scraper. A $\frac{1}{2}$ " or $\frac{3}{4}$ " square end scraper will work but you have to be a little more careful of catches, especially when you are forming the square corner at the bottom.

Sand the inside through the grits then clean and polish with your favorite finish. Again, I applied wipe-on polyurethane and used friction heat from a paper towel to dry it. Measure the depth of the base section

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and mark it on the outside. Use a $\frac{3}{16}$ " diamond parting tool to part a groove on the headstock side, $\frac{3}{8}$ " (or the thickness of the bottom) to the left of the mark. The depth of this groove should be approximately $\frac{1}{2}$ ". This step allows you see exactly where the finished bottom of the box will be as the box shape is developed.

Finalizing the Shape of the Base and Lid Together

The outside surface of the box needs to be turned in one piece to get continuity in the design and shape. To refine the base flange to fit the lid, reduce the taper until the lid fits on tightly, but not so tight that the lid splits. Take your time. Use a $\frac{3}{16}$ " diamond parting tool, or $\frac{3}{4}$ " skew lying flat on the tool rest, and take very light cuts. Check the fit frequently. If the lid fits too loosely you will lose the pop-fit effect. If a loose fit is what you want, you can take up the slack for the next step by placing a piece of paper towel over the base flange and jamming the lid over it.

With the lid and the base together, and the grain of the top and base lined up, bring the tailstock live center up for support. You should leave the tailstock in place as long as possible to lessen the chance of the lid coming loose.

Using a freshly sharpened spindle gouge, or a skew, refine the outside shape of the box and lid. Note the location of the inside surfaces as shown by the groove in the base and the pencil mark on the lid. Create your design with those points in mind. You don't cut through to the inside. You're making a box, not a napkin ring! You can make this design as simple or as intricate as you want. However, a simple design is often more desirable than a complicated one. Remember

the old saying, 'less is more'. Now you can remove the tailstock support to refine the top of the lid. Sand and finish the outside surface. Depending on the choice of finish there may be waiting time between coats.

Carefully remove the lid and with very lights cuts, perfect the final fit of the lid, if necessary. As mentioned at the start of this article, the lid can be a pop-off or a lift-off fit. It depends on whether you want to use two hands or only one to remove the lid. Remember to allow a little room for the finish that will be put on the flanges of the box.

Now you can proceed with parting off the base section with a narrow parting tool. Leave a little spigot and make the final removal cut with a coping saw, or some other small saw to prevent a twist from ripping out the center piece as the box comes away.

Completing the Bottom

Using the piece left in the chuck, make a jam chuck to fit the inside of the base section. If necessary, this jam chuck can be made from a piece of scrap wood. It's a good idea to place a piece of paper towel between the base section and the jam chuck (when creating the jam fit) so as to reduce the damage to the inside surface of the base flange.

Make sure the base section of the box is mounted tightly against the bottom edge of the jam chuck. Using a freshly sharpened spindle gouge, nibble away at the bottom surface of the box creating a slightly concave surface so the finished box will sit flat on a table. Create any desired decorative embellishments that you like on the bottom. Sand the bottom to the

same grit as the other surfaces and apply your finish.

The last decision to make in this project is whether to keep it for yourself or give it to some lucky person who will appreciate the beautiful box you've turned.

ALLAN CUSWORTH
acusworth@telus.net



Tools and supplies

Different tools and supplies can be used to make this project. However, these are the ones I used:

- Four jaw chuck
- Spur center
- Live tailstock center
- Spindle roughing gouge
- $\frac{1}{2}$ " spindle gouge
- $\frac{1}{2}$ " round nosed scraper
- $\frac{1}{2}$ " side radius scraper
- $\frac{3}{4}$ " side cutting angle scraper
- $\frac{3}{4}$ " square end scraper
- $\frac{3}{4}$ " skew
- $\frac{3}{16}$ " wide diamond parting tool
- $\frac{1}{16}$ " narrow parting tool
- $\frac{3}{8}$ " depth drill
- Depth gauge
- Inside and outside calipers
- Coping saw
- Masking tape
- Sanding cloth
- Wipe-on polyurethane
- Paper towels

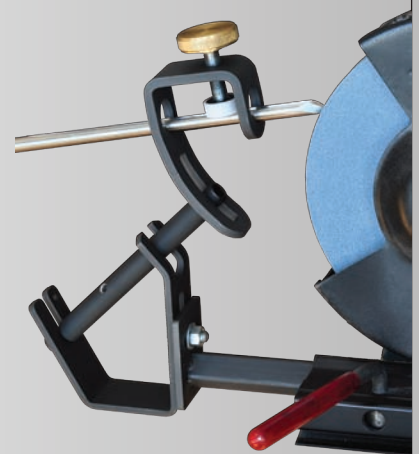
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BY THE EDITORS

Vari-Grind 2

ONEWAY is introducing the new Vari-Grind 2. Changed dramatically from the tried and tested Vari-Grind of which thousands have been sold and even more copies are on the market, this new jig is patent pending. The new Vari-Grind 2 vastly improves the way spindle and bowl gouge forms are generated. This jig is easier to use, quick to set up and gives amazing results whether used by beginners or seasoned professionals. The tool's angular adjustment and restraining features make it a snap to produce and repeat the exact shape tool desired for your turning style.

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Chess Table

Whether looking for competition or an exercise session for the brain, this beautiful chess table will keep your knights and bishops on an even playing field.

Chess is a great recreational game; and no, you don't have to be a mathematical genius either to play or to enjoy the game. An amicable friend, quite background music, a nice glass of your favourite beverage...you get the drift. And what better way to enjoy this 'game of kings' than with a stylish chess table.

The chessboard top consists of an arrangement of eight-by-eight dark and light offset squares. These squares are made of black walnut and maple. The top trim is made of purpleheart while the rest of the table is made of walnut. Begin by milling four dark and four light strips (A, B) to a width of $\frac{15}{16}$ ". Cut them 25" long; the extra length enables you to shift material as you cut it and have enough material left over for an accurate final trim. Follow this by thickness planing the strips to $\frac{1}{2}$ ", and then gluing the strips together, alternating one dark strip with one light strip.

Once the glue has set, remove the clamps and sand or scrape away any excess glue. Set the rip fence to cut $\frac{15}{16}$ " widths. At this point it is prudent to run a piece of scrap through the saw and test it for exact size against the strips. Re-glue the eight pieces together, alternating the strips so that the light and dark squares are offset.

After the glue has set, remove the clamps, square up the board and sand the top flat. Use a drum sander to take the top down to $\frac{3}{8}$ ". If you don't have a drum sander you can use a hand held Random orbital sander. Mill and glue up the pieces for the chessboard backing (C), and glue the backing to the bottom of the chessboard top.

To delineate the walnut on the chessboard from the walnut frame, glue $\frac{3}{8}$ " purpleheart trim pieces (D) around the chessboard, joining them at the corner with mitre joints. To complete the top, mill and glue the table top sides (E) and ends (F) to the chessboard. You can use biscuits to help align the pieces.

The Base

Mill the legs (G) from 1 $\frac{5}{8}$ " x 2" walnut boards. Try to match the grain pattern in the legs so that they help unify the look of the table. The mortises on the legs are $\frac{1}{4}$ " wide, $\frac{5}{16}$ " deep and 2" long. You'll need to cut matching tenons on the ends of the apron pieces (I, J). Note that there will be a $\frac{1}{2}$ " shoulder on the bottom of the apron pieces.

The frame (H, I, J) was designed not only to hold the legs, but to carry two drawers that would hold the chess pieces. The frame, once assembled, is attached to the bottom of the table top. The technique used to attach the base to the table top on this table is mortise and tenon joinery. On the router table mill $\frac{3}{16}$ " wide tenons on the top of the frame pieces, and then rout a matching mortise on the underside of the table top. This makes for a strong, stable assembly. At this stage it's a good idea to do a dry assembly, to ensure that everything fits together.

To lighten the overall appearance of the table taper the inside faces of each leg so that the bottoms are $\frac{3}{4}$ " wide at the floor. This requires some careful measurement and angled cuts using a tapering jig (see Shop Jig: Aug/Sept '07, Issue #49). The top end of the cuts should stop an inch short of where the bottom of the frames will meet the legs, in order to ensure that the aprons and legs will fit snugly at right angles. Follow this up with a light sanding to remove any milling marks. Then use a quarter round bit to rout the sides of the legs, the edges of the frame that wouldn't be glued, and the top edge of the table top. End this with a final finish sanding.

Gluing the legs at right angles is critical if the table is not to wobble when completed. Start by gluing the legs to the end frames (J), making sure that the setting is square. A carpenter's square or large try square comes in handy here, as well as measuring diagonally from the top of the outside top corner to the bottom of the opposite leg. Once the end frame is glued to the legs the rest of the gluing process is pretty straightforward.

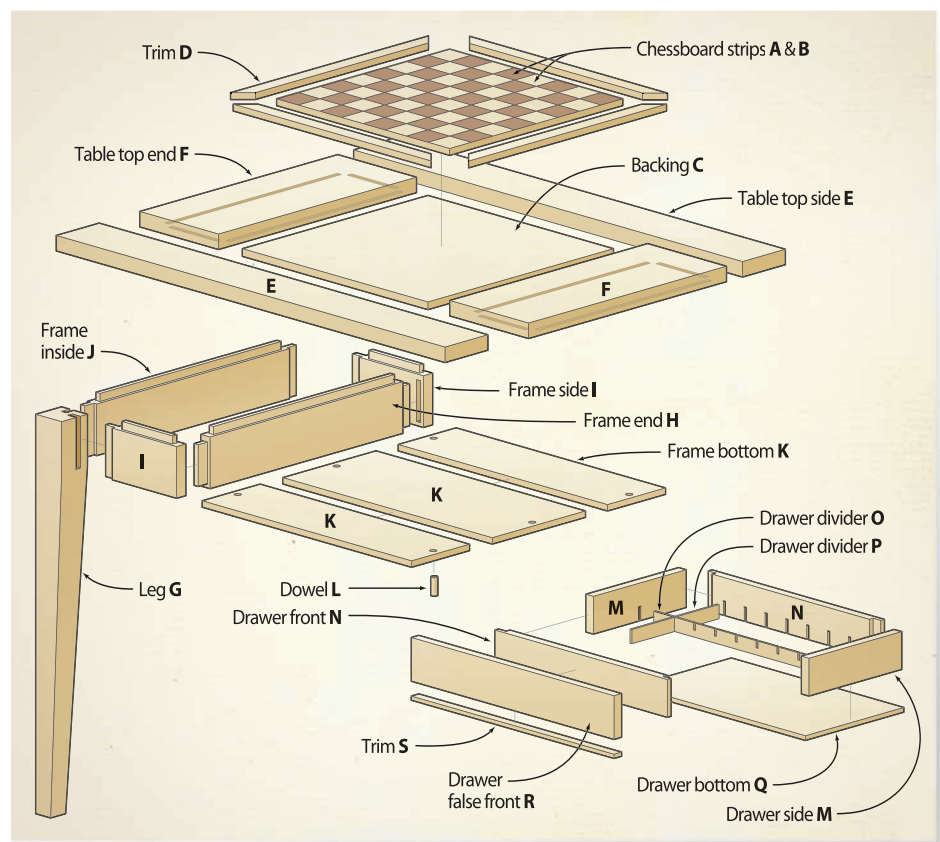
The Drawers

The drawers are designed to hold each chess piece in its own compartment, white on one side of the table, black on the other. The spacing you choose for the compartments will depend on the size of the chess pieces you have; so ensure you've made or bought the pieces before building the compartment. The arrangement that fits best is two rows of eight compartments. To make it easier to remove the chess pieces from the compartments don't have the dividers reaching all the way to the top of the drawers.

The drawer sides (M) and fronts and backs (N) are joined by simple glued rabbets. A false front (R) with a piece of accent trim (S) is attached to the front of the drawer. Thin $\frac{1}{8}$ " dividers (P, O) serve to form the compartments for the chess pieces. The trim

MATERIALS LIST (All measurements in inches)

Part	Qty	T	W	L
A	Chessboard strips (walnut)	4	$\frac{3}{8}$	$15\frac{1}{16}$
B	Chessboard strips (maple)	4	$\frac{3}{8}$	$15\frac{1}{16}$
C	Chessboard backing	1	$\frac{3}{8}$	$11\frac{3}{16}$
D	Chessboard trim (purpleheart)	4	$\frac{3}{8}$	$\frac{3}{4}$
E	Table top sides	2	$\frac{3}{4}$	$2\frac{19}{32}$
F	Table top ends	2	$\frac{3}{4}$	$5\frac{3}{4}$
G	Legs	4	$1\frac{9}{16}$	$1\frac{9}{16}$
H	Frame ends	2	$\frac{9}{16}$	$2\frac{1}{2}$
I	Frame sides	4	$\frac{9}{16}$	$2\frac{1}{2}$
J	Frame insides	2	$\frac{9}{16}$	$2\frac{1}{2}$
K	Frame bottom	3	$\frac{5}{16}$	$1\text{ @ }5\frac{5}{8}$ $2\text{ @ }3\frac{1}{2}$
L	Dowels	6	$\frac{5}{16}$	1
M	Drawer sides	4	$\frac{1}{2}$	2
N	Drawer backs & fronts	4	$\frac{1}{2}$	2
O	Drawer dividers, long	2	$\frac{1}{8}$	$\frac{3}{4}$
P	Drawer dividers, short	14	$\frac{1}{8}$	$\frac{3}{4}$
Q	Drawer bottoms	2	$\frac{1}{4}$	$6\frac{1}{2}$
R	Drawer false fronts	2	$\frac{1}{2}$	$2\frac{5}{16}$
S	Drawer trim (maple)	2	$\frac{1}{4}$	$\frac{1}{2}$



piece serves to clearly identify the colour of the chessmen that the drawer holds. Leave one trim piece in its natural colour, and colour the other one black. While you could apply an ebony stain, a Sharpie® marker pen gives full penetration ensuring that none of the pale colour of the maple shows through the grain.

Set up a stop on a sliding mitre saw and cut seven 1/8" x 1/4" dados on the inside face of two of the (N) pieces and one dado on the inside face of two (M) pieces. Rip all the side, front and back pieces lengthways, and then re-glue a slotted piece to a solid piece.

The dividers (O, P) are somewhat fiddly.



Drawer front/back cut and reassembled

You need to cut matching 1/8" x 3/8" dados on the long dividers (O) that line up with the dados on the back and front pieces (N). The short dividers (P) are easier to do, as they only need a single dado cut in the middle of the



Clamping apron to top



Short divider ready to cut

board. To prevent the inevitable splintering that can occur with such thin pieces of wood use a backer board. Sandwich the dividers between two scraps of plywood, draw an alignment mark on the top of the



Drawer front/back dadoed



Drawer detail

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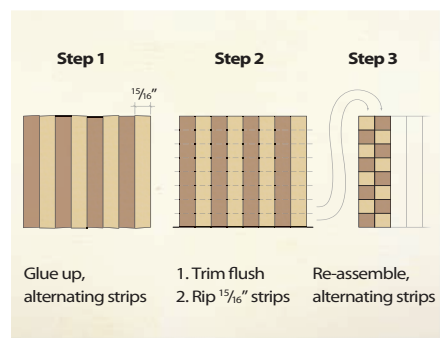
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stack so you will know where to make the cut, and then clamp the sandwich to your mitre fence or crosscut sled – this will keep your fingers well away from the cut.

Once all the pieces are cut, it's time for another dry assembly just to ensure that everything fits together. It's easier to apply finish to the inside of the drawers before



Drawer trim



Cutting the chess table top

glue-up. Use masking tape to cover any areas that will be glued.

The last construction task is to mill the boards (K) that fit under the drawers and form an integral part of the table. These are made and installed last so you can ensure that the drawers fit well and slide in easily. Use 5/16" dowels (L) to attach the boards to the bottom of the drawer frame; a narrow



Frame bottom installed

gap between each board accommodates any seasonal movement.

A final sanding to 220 grit leaves everything ready for finishing. This is the most rewarding part of the project, as the finish brings out the lustre that has been hiding in the wood. For the walnut and maple mix it is especially rewarding, as the glorious contrast is an extra bonus. It is at this point that the grain pattern in the wood really shows up and gives the project its magic.

The finish used on this project is from Jamie Russell, from Vanscoy, just west of Saskatoon. To a pint of Watco Danish Natural Oil add ten to fifteen percent of polyurethane and a tablespoon or two of Japan drier. Apply this with a cotton cloth to all surfaces. According to Jamie, your work will achieve a final wonderful look by, "Giving it a polish with the cloth that you used to apply it every time you walk past it". This means that for about three weeks you can slip into you shop at least twice a day to enjoy that special feel of finished wood. It's a tough life, but worth it.

Whether you're an avid chess player or just like the occasional game of checkers, this chess table will make a fine addition to living room or den.



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Cake Knife

This knife, with its customized inlay, makes a wonderful wedding gift and keepsake.

Several months before her wedding, my daughter asked me to make a decorative knife with which her and her husband could cut their wedding cake on their special day. They had also asked his father, an avid woodturner, to turn the pen that they would use to sign the register.

Both he and I had a bit of a chuckle when we finally got together to examine each other's work, and realized that we had both chosen to work with cocobolo without any prior consultation.

This project can be constructed from any hardwood that you like. I chose cocobolo because it is a relatively dark wood, which makes installing the inlay easier. I also happened to have some leftover pieces perfect for this project.

The center of the handle contains two birch veneers which sandwich the knife blade. The birch was chosen for its stark colour contrast to the cocobolo. Since this knife was ceremonial in nature, to be used once

and then put on display, my wife selected an inexpensive cake knife with a plastic handle that was purchased for a few dollars from our local hardware store.

Prepare the Material

I chose to make the handle slightly longer than a standard knife handle; select a handle length that you are comfortable with.

- Mill stock for the handle (A) and veneer (B). The pieces are fairly small, so be careful when cutting them on the table saw. Remember not to run stock shorter than about 12" through your thickness planer; best to mill a wider and longer piece of stock, and then cut the handle pieces to size. For the veneer, start with a piece of birch about $\frac{3}{4}$ " x 2" x 8". Joint one face and edge, and then rip a piece on the table saw just slightly thicker than $\frac{1}{16}$ ". Use a featherboard and push block. Use a sanding block or hand plane to remove any milling marks.

- Carefully remove the handle from the store bought knife blade. Take special care not to scratch or mar the finish on the blade.

- With a hacksaw, cut a piece of $\frac{1}{8}$ " steel rod, about $\frac{1}{4}$ " long. The rod will be inserted through the hole in the knife blade and pin the blade into the new handle. Steel rod is available from most building supply stores or automotive supply shops.

- Plan the desired inlay and make sure that you have enough material on hand to complete it. I used gold mother-of-pearl for the text and white for the interlocking hearts.

Inset the Knife Blade

The knife blade is inset into the two thin birch center plies. You need to cut a shallow relief in each veneer to accommodate the blade. The fit must be precise so that when assembled, the veneers don't bulge or have excessive play around the knife blade. Cutting the relief for the blade is carried out in the same manner as cutting the cavity to inset the inlay. Decide how much of the knife blade will be inside the handle. Also, pay attention to the angle that the blade enters the handle. You want the handle and exposed portion of the blade to be well proportioned.



Mother-of-pearl provides a striking contrast in most woods

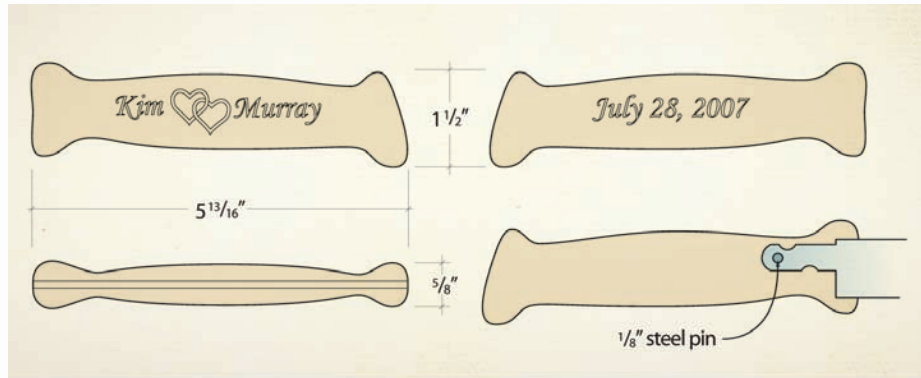


Illustration by: www.JamesProvost.com

- Cut the handle end of the blank square.
- Place the pieces of birch veneer on each side of the blade in the desired position, making sure the edges line up. With a small clamp, press the veneers tightly in place on each side of the blade. The birch is soft enough that the steel blade will leave an impression and perfectly mark the cavity that the blade will fit into.
- Remove the clamp, and use a very sharp X-Acto knife to etch the line around the blade.

Do this to both veneers. Then, using a rotary tool, dremel.com, with a $\frac{1}{16}$ " burr, rout the cavity to exactly one half the thickness of the knife blade.

Be sure that the blade fits snugly in the cavity and that the birch does not bulge where the blade is inserted.

Install Pin and Handle

- Drill a $\frac{1}{4}$ " hole through both veneers. Be sure the hole in the blade lines up perfectly with the holes you drill.
- This hole also needs to be transferred into the cocobolo. Be sure not to drill any deeper than necessary into the cocobolo.
- Install the piece of $\frac{1}{8}$ " x $\frac{1}{4}$ " steel rod to anchor the blade to the handle.
- Test fit the parts before applying glue. I used G-2 epoxy, but any waterproof glue will work. Apply the glue as per directions and clamp with three clamps, and allow it to dry overnight.
- Make a template of the handle shape from $\frac{1}{8}$ " MDF. Place the template on the assembled handle and trace carefully around the pattern.
- Cut the shape out using a scroll saw or bandsaw, and then sand the edges.

Install the Inlay

For this project you will need two pieces of mother-of-pearl shell for the inlay, rescuepearl.com.

- Select the font and size of the text for the inlay. Print the text in the desired size and attach the paper to the cocobolo stock in the proper place with cyanoacrylate (CA) glue. Attach another copy of the pattern to the shells with CA glue.
- Use a jeweller's saw with a 2 – 0 blade and carefully cut the shell.
- Deburr the shell with a small file when the cutting is done.
- Attach the shell to the paper pattern on

the cocobolo with balsa wood cement and allow to dry.

- With a very sharp X-Acto knife etch the cocobolo at the edge of the shell. The pattern helps you stay accurate.

- Using a rotary tool with a $\frac{1}{16}$ " bit, rout the cavity. You want to set the inlay slightly proud of the surface. Make sure the inlay fits in the cavity. Do not force the inlay into place.

When the inlay fits the cavity, insert it and flood the area with CA glue.

- After the glue has dried sand with a block and 80 grit paper.

- Using the X-Acto knife, clean out all the air bubbles. These show up as light spots in the glue. Re-flood these areas with glue, and then allow it to dry again. When the glue is dry re-sand with progressively finer paper, finishing with 220 grit.

Final Tasks

- Shape the handle using a rotary tool with a $\frac{1}{2}$ " sanding drum on the flex shaft, being careful not to sand through the inlay. Once shaping is done, sand the handle to 220 grit.
- Apply a water resistant finish. I use Tru-Oil, which you can buy at most sporting goods stores, though you could use polyurethane. Allow plenty of time for the finish to dry as any oil finish on dense tropical hardwood dries slowly. Once the finish is dry, buff it out with a soft cloth.

This is a fun project that can be completed over a long weekend or a week of long nights.



GLEN FRIESEN
glenf@sasktel.net

MATERIALS LIST (All measurements in inches)

Part	Qty	T	W	L
A Handle (cocobolo)	2	$\frac{5}{16}$	1 ½	6
B Veneers (birch)	2	$\frac{1}{16}$	1 ½	6
C Inlay (white mother-of -pearl)	1	.050	1	1
D Inlay (gold mother-of-pearl)	3	.050	1	1
E Steel pin	1		$\frac{1}{8}$	$\frac{1}{4}$
F Knife blade	1	to suit		



inlaid date is a wonderful reminder



Mortising Mallet

You'll make quick work of chopping mortises with this easy to build mallet.

With practice you can become very adept at chopping out mortises quickly and effectively.

When you are only doing a few mortises, this might be the occasion to slow down and listen to some music rather than whining machines, while chopping away wood with a chisel and mallet.

When you mortise by hand, you need a sturdy mallet to hit the mortising chisel. The head of the mallet should have sufficient mass to be able to drive the thick mortising chisel into the wood without hesitation. No light tapping here. Instead, repeated heavy blows are required.

This mallet was the first one I made, some 12 years ago, with scraps picked up at my first woodworking class. Over a decade later, and with hundreds of mortises to its credit, it is still in good condition.

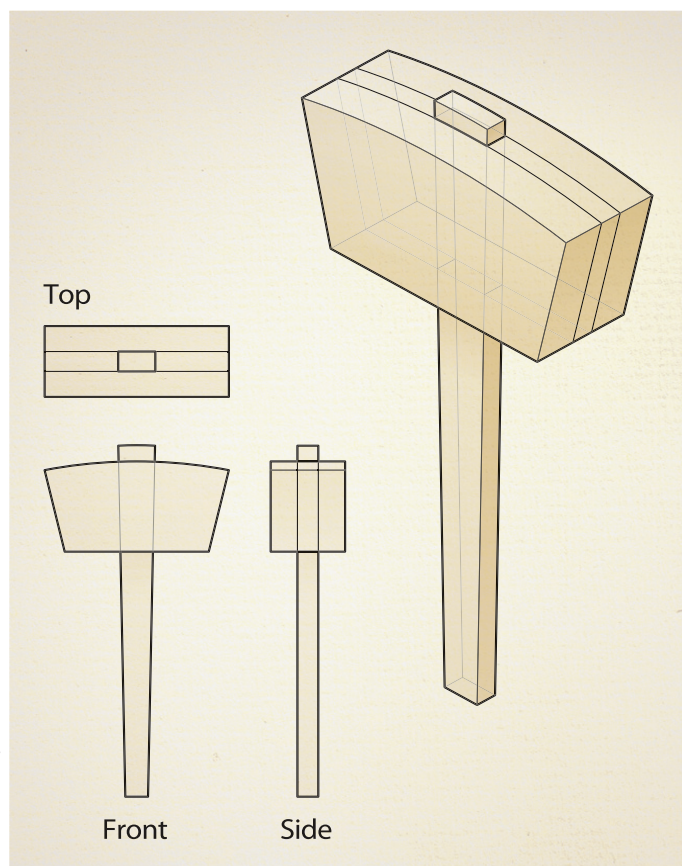
The mallet's mass is concentrated in its head; therefore it needs to be of a reasonably large size. My mallet's head measures $2\frac{1}{4}" \times 3\frac{1}{2}" \times 6"$. The choice of woods is important to create a heavy hammer. Hardwoods such as oak, ash, beech, maple and elm are all good options. Since mine is made of scraps, it has a few different woods in it. The center layer of the head is red oak while the two outer layers are ash. The handle is made of beech.

The handle is tapered so that it wedges into the head. This prevents the head from being projected into space; in fact as you use the mallet, the handle gets wedged more strongly onto the head. The opening in the head is wedged in the same shape as the handle. The wood in the head has its fibres oriented in the direction the mallet is going to hit the chisel. In other words, it is the end grain that will absorb the blow. Since wood is more resistant to

compression in its length, it will be able to absorb the blows much better this way and fibres won't get crushed as much.

Make the handle first. The longer the handle, the more leverage you get and the harder you will be able to strike, which is what counts in the end. However, the longer the handle, the less control over the head you will have and the heavier the mallet will feel in your hand (because of the lever effect). Find a reasonable balance. My handle is 14" long in total with 10" protruding from the bottom of the head. For me, this makes a mallet that is not too hard to handle and drives a chisel into wood without too much effort. The weight does most of the job for me.

The head is made of three layers, which makes it easy to build. Use three layers of $\frac{3}{4}"$ wood to build a total thickness of $2\frac{1}{4}"$. Lay the handle onto the first layer and position the two pieces of the second



layer on either side to create an opening for the handle to fit. Once these are glued, add a top layer to finish the sandwich. You can plane the handle a little if it is too snug. If the handle is too loose, make an appropriate size wedge to squeeze the handle tightly into the head's mortise.

When cutting the head to its final shape, be sure to cut an angle at both ends. This is mainly for comfort. You can get a better sense of the angle that is right for you by standing in front of your work bench and keeping the almost finished mallet in your working hand. You will notice that if the end of the mallet's head would be at a right angle, you would either have to put your wrist or shoulder in an awkward position. Adjust your position by focusing on comfort. With the mallet in position, mark where the head should be cut to strike the chisel more or less perpendicularly in that position.

You can leave the mallet unfinished, or apply an oil. Avoid wax, as it will make the handle slippery.

If you have some exotic wood scraps you can consider making a fancy hammer by adding some colour and contrast. Just bear in mind that some woods are strong and heavy but are very brittle. The woods listed earlier are shock resistant and have been used for tool construction for ages.

You can take this opportunity to be creative and decorate the head's cheeks and the bottom end of the handle with some carving. It only takes a few curves to produce a personalized mallet that will be a joy to use for years to come.



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Dealing with Wood Movement

Wood movement is inevitable. However, there are many design and building options to help a craftsman work with it – not against it.

Woodworkers need to do two things when engineering and building a piece of furniture: (1) machine joinery that will secure different pieces of wood to one another with the appropriate amount of strength, and (2) allow wood movement to freely take place. The first point, joinery, has been discussed at great lengths. The second point is not discussed as often, but it's a very important part of making furniture that lasts. Wood always moves with changes in humidity, so it's important for woodworkers to understand how to make a piece of furniture that will accommodate that movement and stand the test of time.

Remember, wood moves more tangentially than it does radially; approximately twice as much, depending on the species of wood. In the longitudinal direction, wood essentially doesn't move at all. Keep wood movement in mind while you're purchasing lumber and laying out parts. Parts should be made from quarter-sawn material when possible to reduce wood movement. As well, using quarter-sawn lumber will reduce the possibility

of a joint loosening over time or a piece of wood developing a crack. These things happen only when there is too much tension or compression force within the wood. Wood is always on the move, so it's best to understand how to work *with* it rather than *against* it. Here are a few common situations where wood movement has the potential to destroy a piece of furniture, and what you can do to stop that from happening.

Frame and Panel Door

Although there are many ways to machine this type of door, the reason behind its basic structure remains the same. The frame determines the overall dimension and provides the structural strength required, and the panel is allowed to expand and contract within the frame while providing a visual and physical barrier between either side of the door. The overall width of the frame expands and contracts very little because the frame width is kept to a minimum – usually between 2" and 4" depending on the type of door. There will still be movement taking place within the frame, but movement is minimized a great deal. If the entire door

was made by edge gluing boards together, the width of the door would vary drastically from season to season. It would expand into the door opening causing the door to bind during the more humid months, while shrinking during the dry months, leaving a large gap.

When constructing a frame and panel door make sure the joints holding the frame together are strong enough to withstand any stresses acting on it. I find a standard cope-and-stick joint that is machined on a router table doesn't provide enough mechanical strength or glue area to produce a strong joint. Slip joints, mitred joints with splines or keys, half lap and mortise and tenon joints are a few joints that are appropriate for use in a frame and panel door.

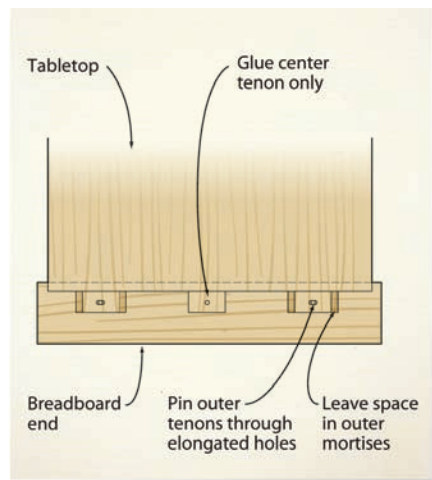
The groove around the inside edge of the frame that houses the panel needs to be made with care. There must be enough material on either side of the groove to provide the strength needed to keep the panel in place. I like to have at least ¼" of material on either side of the groove in a cabinet door, but more is always better.

Making the panel also needs some consideration. The size of the panel must be small enough so when it expands it doesn't bottom out in the groove, forcing the frame apart. The panel also needs to be big enough to not shrink and fall out of the groove or create a gap during dry periods.

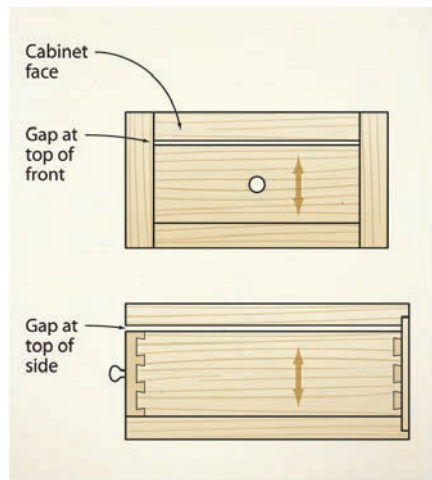
When assembling a frame and panel door don't use glue around the entire edge of the panel to secure it in place, otherwise the panel wouldn't be allowed to move freely. Only use glue in two areas; the top and bottom of the center 2" of each panel end (assuming the grain is running vertically). Make sure the panel is centered in the frame before the glue dries. The glue will keep the panel centered in the frame and the panel will be able to expand and contract within the frame.

Solid Table Top

Solid wood tabletops are beautiful. Solid wood grain is much more durable than veneered surfaces and the scratches and gouges that occur over time can be

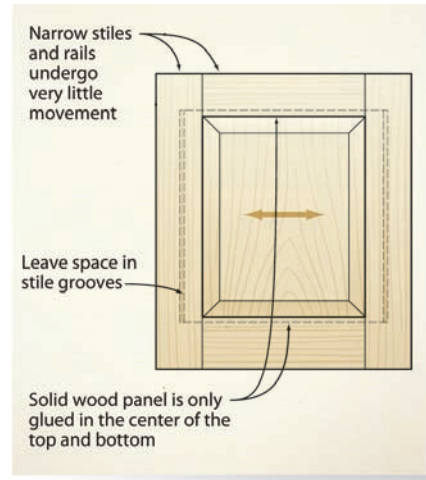


Breadboard tabletop

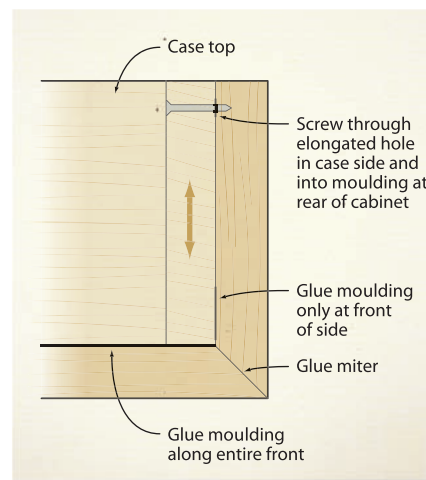


Fitting a drawer

easily stripped and sanded away. The only problem is, it will move quite a bit as the seasons change. If secured directly to a table base with aprons and legs, (a pedestal base doesn't pose the same threat) it will eventually break the base apart. I like to fix the top in one area – usually the center or one end - with wood screws and let the top move on either side of the screws. To make sure the top stays in contact with the base I do one of two things. One method involves gluing and screwing cleats to the apron, drilling oversized holes in the cleats and using screws with washers to hold down the table. The oversized holes give the top some room to move. The other option is to use specially made wood or metal hardware. The hardware is secured directly to the underside of the top with woodscrews and has one end that is placed into a groove or notch in the back of the apron. The groove will allow the top to move but will still keep the top in contact with the apron. There are a number of different hardware styles available for purchase. If I'm securing a large top to a dining table base I tend to make my own



Frame and panel door



Attaching moulding

hardwood blocks. They fit into a groove I route into the apron using a plunge router and edge guide. The blocks I make tend to measure about 1 1/4" x 2 1/2" x 2 1/2" and have a 1/2" tenon to fit into the routed groove.

When laminating a solid wood panel there are two schools of thought. One states that the growth rings should be glued up in an alternating pattern. That is, when looking at the end grain of the boards ready to be laminated the growth rings should alternate up, down, up, down, etc. The logic being when wood movement occurs one board will tend to cup upwards, the board beside it will cup downwards. The tendency will be for the glued-up panel to stay flat overall, and not produce a large amount of internal stress. The downside to this method is being left with a slight washboard effect as you run your hand across the panel. The other method involves gluing the boards with all of the end grain cupped either up or down. The panel will need to be secured to something in order to keep it flat, but there will be no washboard effect. I think there is a time and place for both of these methods. If the panel can be fastened solidly to the rest of the piece of furniture, and the piece of furniture is strong enough to keep the panel flat I usually keep the end grain cupped in the same direction. This is especially true if the top is on the thinner side (about 1" thick or less), because it will have less strength when finished - and be more easily held down. If the solid panel can't be held flat by the piece of furniture then I usually alternate growth rings during glue-up. Also, if the panel is going to finish quite thick - well over 1" - I tend to glue it in an alternating pattern, because the thicker wood will have more strength and build up more internal stress. These are strictly guidelines. When making one-of-a-kind pieces of furniture each decision is made with different issues in mind, depending on the wood and design of the piece.

Attaching Cornice and Waist Moulding to a Chest of Drawers

If you are making a traditional chest of drawers, or a highboy, you'll need to attach a number of different mouldings perpendicular to the grain of the gables. If you glue the moulding directly to the solid gable it will restrict the gable's movement, causing either the gable to crack or the moulding to fall off. Instead, machine an elongated 3/16" wide slot (for a #8 screw) in the gable, about 3" from the back edge of the gable directly where the moulding is going to be placed. Glue the front 3" of the moulding to the case and insert a screw and flat washer through the slot and into a pilot hole in the moulding. The glue

will keep the front edge of the moulding in place while the screw will hold the back end tight to the gable's side while the slot allows movement to occur. If it is a long moulding you can machine a number of slots along the length of the gable to keep it snug over its entire length.

Web Frame Construction

When building a chest of drawers, the wooden rails, also known as a web frame, between each drawer do two main things. They give the drawer a surface to slide on and they allow the solid gable to expand and contract. With web frames there are essentially four parts: a front rail, a back rail and two drawer guides. The ends of the front and back rails as well as the sides of the drawer guides are housed in a groove – usually a dovetail groove. The front and back rails are glued in place while the drawer guides are only glued at one end to allow the gables to expand and contract. A groove on the inside edges of the front and back rails accepts a tenon on the ends of the drawer guides. The between-shoulders measurement on the drawer guides should be shorter than the distance between the front and back rails to allow gable movement to occur. The drawer guide tenon will move in and out of

the groove with changes in humidity levels. If the drawer guide tenon bottomed out in the front or back rail there may be enough force to either split the gable or loosen one of the rails.

Tenons

One of the strongest methods of joining wood is with mortise and tenon joinery. There's a lot of face grain glue surface which increases joint strength and there is also a mechanical aspect to it. Tenons with a small width (2" or less) pose little problem, but when a tenon is over 3" in width wood movement may be problematic. Because the grain of the tenon is perpendicular to the grain of the mortise, movement of the tenon will be restricted. The tenon can't move but the rail it's a part of is free to move. The result is either a split in the rail, or a tenon that loosens over time. There are a few things that we can do to reduce or even eliminate this risk.

The simplest thing to do is to make a tenon no wider than 3", and bypass the problem all together. But for strength reasons, there are times when a wider tenon is required. If this is the case be sure to select quarter-sawn material for the rail. Quarter-sawn wood moves much less than flat-sawn

wood. You will be able to add some width to the tenon without problem.

If a very wide tenon is required, like a breadboard end or headboard, you need to take a different approach. The tenon can be machined as wide as you require it, but only the middle section, or one end in some cases, is glued. The rest of the tenon requires pegs to be inserted through slots cut in the cheeks of the tenon. This locks the joint in place. The slots will allow the solid wood to expand and contract. The slots should be machined with great care and accuracy so they line up with the holes that are drilled through the mortise. The further away from the glued area the pegs are, the more room they need to allow for wood movement.

Understanding wood movement is paramount for a woodworker to be successful in the craft. Without this fundamental knowledge, beautiful projects can self-destruct and become feed for the wood stove. Don't let this happen to you.



ROB BROWN
rob@equinoxinteriors.ca

We spoke to woodworkers from across Canada about their skills, and what they wanted to see in Canadian Woodworking magazine.

94% of readers own their own home

88% of readers are intermediate to advanced skill level

88% of readers completed a home improvement project last year

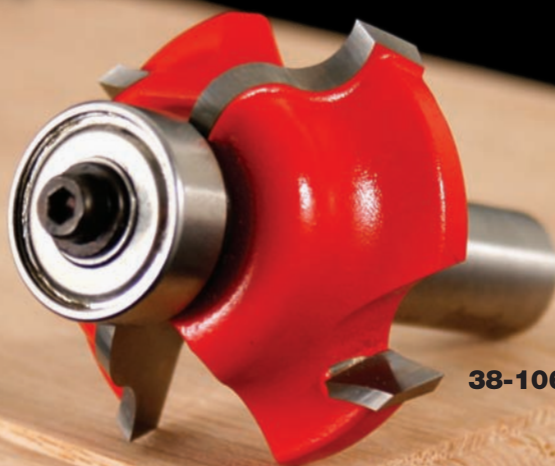
86% of readers say that Canadian content is important

86% of readers are planning home improvement projects in the next year

Watch for your August/September'09 issue to see our BRAND NEW design based on YOUR feedback.

What's The Secret To Flawless Edge Profiles With NO REWORK?

Quadra-Cut™



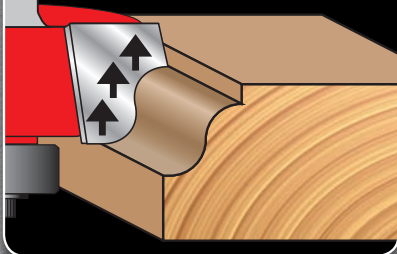
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Freud's New Quadra-Cut™ 4 Cutter Design

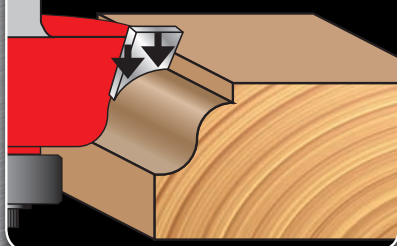


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- Raised Panel Bits



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Routing Bits, Jigs and Accessories

When you buy a router, you are investing in one of the most versatile tools you can add to your shop; but to get the most out of your router you'll need some accessories and a collection of basic router bits.

Essentially, a hand-held motor with a bit holder at one end, the router you brought home from the tool dealer on its own is of little use until you add the various accoutrements that unlock the true potential of this tool. With the addition of a modest collection of carefully chosen bits you can create a wide range of trim and edge profiles, combining various sections of the different profiles for the final result. Add some joinery bits and jigs to turn it into a joint making machine. Remember, until a sharp edge meets wood the router is nothing more than a fancy paperweight and when the cutting starts, controlling the router accurately and safely becomes the order of the day. Consider adding one of the many accessories that make controlling the router both safer to use and easier to control.

A Basic Bit Collection

The first time you take a look at the price of a quality router bit you might feel your heart skip a beat. Router bits can vary considerably in price from one

manufacturer to another and so can the quality. One day I was at the local tool dealer and they had a 20-piece set on a clearance special. Already an inexpensive line, at 50% off the temptation was too strong to resist. Before the manager would ring it up, he questioned my choice knowing that I almost always buy from their other router bit line and pointed out that these bits would most likely be a disappointment. I appreciated his honesty and pointed out that they would be ideal for outdoor projects like fences or, more importantly, as a set of bits to offer on loan when someone came asking. Building a decent collection of quality bits costs money and takes time, but starting off with a basic collection of a few high quality bits can get you off to a good start.

Do the Twist

If I could only have one router bit to use in cutting joinery on the router it would be a $\frac{3}{8}$ " carbide spiral. This is one of the more expensive bits in your collection but also one of the most useful. With the addition

of a jig, this bit can be used to cut mortises and with a guide, this bit will cut grooves and dados in plywood or solid wood. Used on a router table with a split fence, it can joint a rough edge and used in last issue's Shopjig project, it can quickly surface the tricky surface on an end grain cutting board. If you are using the bit to surface and joint stock then I recommend the $\frac{3}{8}$ " version. If you will primarily be using it to cut joinery and predominantly work with $\frac{3}{4}$ " stock, then I would recommend the $\frac{1}{2}$ " cutter for more appropriate tenon sizing. Both bits are available at Lee Valley (#86J02.06 & #86J02.09).

Chamfer Bit

This bit is the one edge treatment bit I reach for most often in my shop. A bearing guided version can be used in either a hand-held router or with one mounted in a table. A chamfer is an excellent way to soften or break an edge and the nature of the chamfer is often used as a design element. When light falls on an object, the various facets on the surface reflect it in different

ways and while a curved surface allows the light to fade to shadow, a chamfered edge will create a definitive surface that will reflect the light in such a way as to help define the outline of a piece. I regularly use mine to rout a chamfer at the bottom edge of fences and jigs as well. Any dust created will then have a place to go without creating interference between the material and the fence. Another regular use for this bit is to chamfer the bottom edges of a leg. This reduces the exposed short grain at the edge, thus reducing the chance of any splintering if the piece is dragged across the floor.

A wide selection of chamfer bits with different cutting angles and sizes can be found at woodline.com.

Box Making Set

This set has become indispensable in my shop. The set consists of two individual bits: a piloted grooving bit for routing the recess that houses the bottom in a box, and a small drawer lock bit to cut the corner joints. This bit designed by award winning furniture designer Don Kondra and sold through Lee Valley cuts the corner joints for the box with one set-up: the first piece is passed by the bit horizontally and the second piece is run along a fence vertically (Box Slotting Bit # 16J83.02 & 16J83.04, and Small Drawer Lock Bit #16J76.72). With the corner joints cut, the box is held together with clamps and then with the slotting bit in a router table, the groove is cut for the bottom. To install the bottom, simply round over the corners of the bottom, apply glue to the box sides and then clamp it up. If you build wooden boxes and use material $\frac{1}{2}$ " or less, this pair is worth its weight in gold.

Slotting Bit

Another versatile bit is the $\frac{1}{4}$ " slotting bit. In addition to being the ideal bit for long grooves close to the edge of the panel for a cabinet back, I use this bit quite often to cut a reveal at the edge of a piece to create a shadow edge or to provide an invisible coped transition from a square piece to an irregular surface. Using a reveal like this when installing built-in furniture makes repainting the adjacent wall a breeze without the need to mask everything off and edge it in. Used on a router table in combination with a fence, the slot cutting bit will allow you to make rail and stile cabinet doors using a couple of simple set-ups.

To make a rail and stile door, use the slot cutter centered on the stock to cut the grooves for the panel and then lower the bit, and using a cross cut sled, cut the tenons on the rails. I've become a real fan of the new



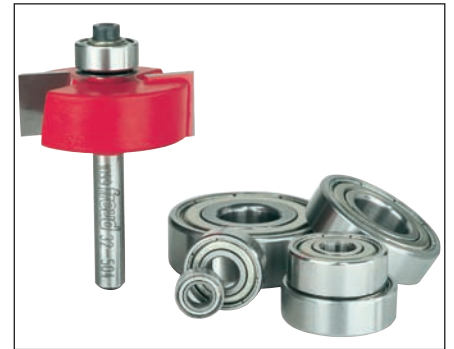
Carbide spiral bits



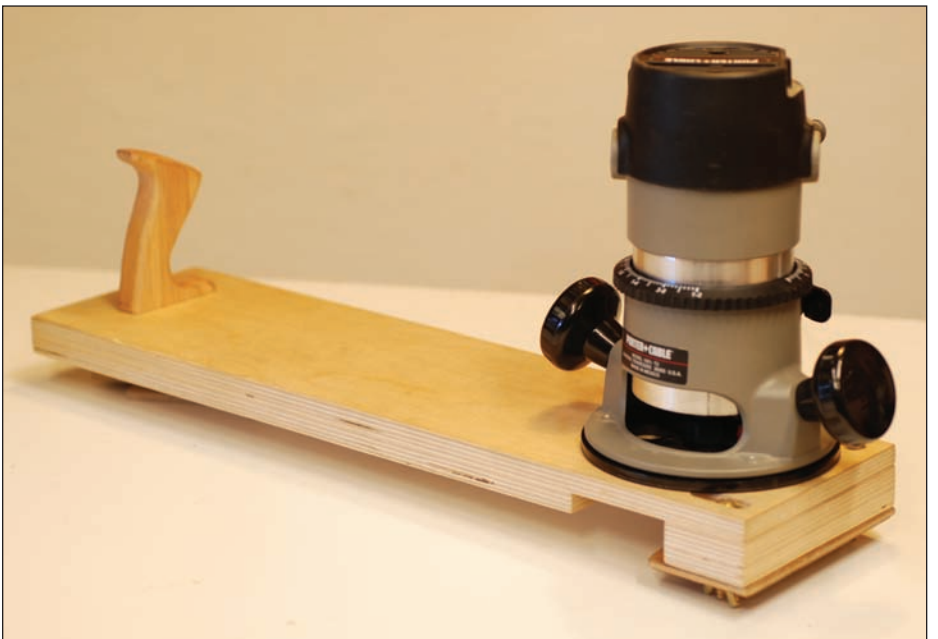
Chamfer bits



3 and 4 wing slot cutters



Rabbeting set



Shop-made flush trim jig

Freud 4-wing cutters (Freud #58-112 & #60-102); they provide a clean, precise cut in all materials. Slot cutters are typically sold as two separate items; a shaft and the cutter. With some shafts you can also fit a bearing to the end making it a piloted cutter.

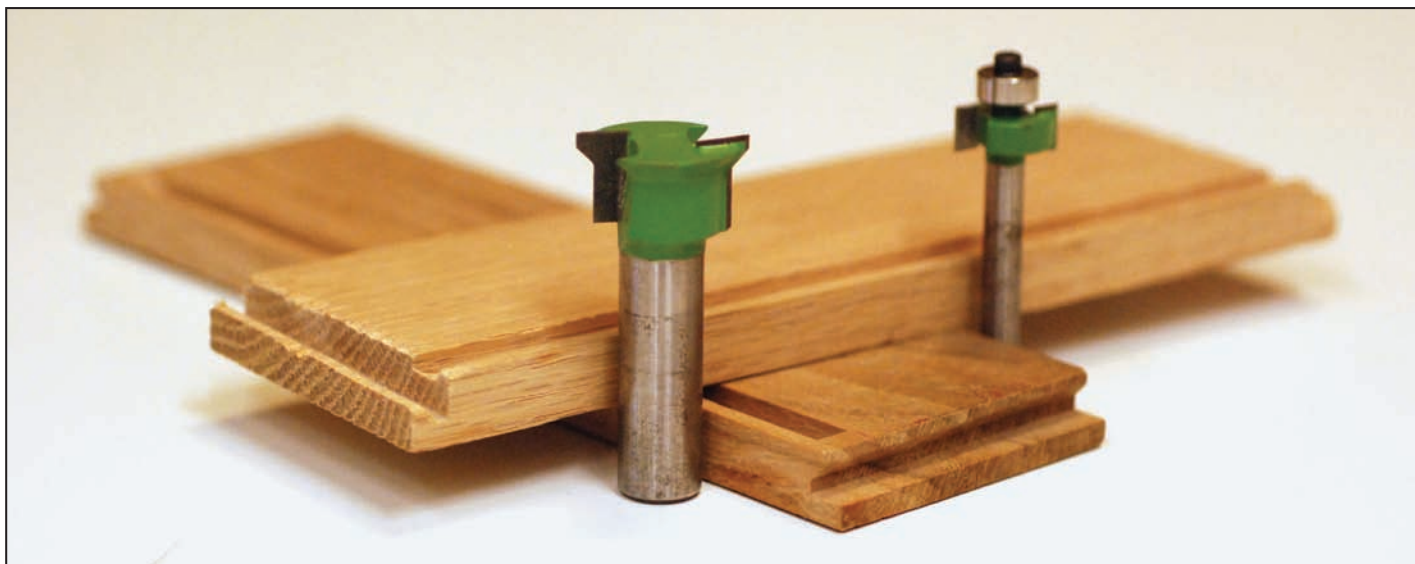
Rabbeting Set

A rabbet is a common element in furniture and investing in a rabbet set early on is a good idea. These cutters are the ideal

solution for cutting all types of rabbets both on the router table as well as with a hand held router. A rabbeting set contains several bearings of different sizes and by changing out the bearings the cutter will automatically cut to a different depth.

Decorative Edge Bits

Routers excel at milling decorative edges but the choice in these bits is largely a matter of personal taste. If you are unsure



Lee Valley small box making bits

as to what type of bits you might use most often, I recommend buying one of those large boxed sets of assorted bits that you often see on sale at large chains or at your local wood show. These certainly are not the highest quality bits. However, they will allow you to sample a wider range of decorative bits. As you use them and they

become dull, simply replace the ones you like with higher quality versions.

Fixtures and Jigs

When shopping around for a router, you'll notice that some routers come with an impressive range of accessories as standard equipment while others simply include

just the basic router. Consider purchasing or making some basic jigs in order to get the most out of your router. The basic purpose of a jig is to precisely control the position of the cutting edge relative to the wood and some of the most useful jigs can be made in the shop. On the other hand, the commercially available jigs will be

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Mortise and tenon jig

much more versatile and precise and worth the additional cost. These are some of my essential jigs.

Edge Guide

Having an edge guide for your router is essential for hand-held use. This is the type of accessory that may or may not be included with your router, but it is a necessity when you want to end up with a straight cut without using a piloted bit. They mount to the router base and can vary in design and capacity. To extend the stability and ease with which the fence slides along the material you can simply attach a length of melamine to the face.

Flush Trim Jig

This is a simple jig, featured as the Shopjig project in Issue #54, it can be easily made in the shop for next to nothing. Using a spiral

bit or a hinge mortising bit, this is the ideal jig to trim plugs and edge banding flush with a surface. Keep the bottom waxed to allow it to move freely.

Mortise and Tenon Jig

Another Shopjig, the mortising jig from Issue #56, can be made in the shop for very little. For a woodworker that has a limited budget this jig can be an entry into router cut mortises. It has the capability to cut very accurate mortises but it requires diligence from the user. For someone who has a more generous budget and is looking for the best mortise and tenon jig on the market, then the Leigh FMT is your tool, leighjigs.com. They have refined this jig to the point where there just is no equal. With a plunge router you can cut virtually any mortise and tenon joint you may need in furniture construction as well as cutting mortises for louvered doors.

Safety

The router is a power tool and all power tool safety precautions should be observed. Over the years manufacturers have worked to reduce the decibel level at which these machines operate and the new multi-speed routers run very quietly at the lower speeds, but make no mistake, you still need to wear hearing protection when using a router. Select a comfortable pair of slip-on hearing protectors to save your ears. As well, whenever a high speed cutting edge meets the material to be cut, you must wear some form of eye protection. Choose a pair that you feel comfortable wearing. If they are uncomfortable, your tendency will be to pass them by, so invest in a quality pair you will use, after all, you only have one set of eyes.

Maintenance

When you invert a router and mount it under a table, it puts the router in an environment that is harder on its health. Mounting a router in a table without adequate dust collection and periodic cleaning will shorten its life. I am in the habit of blowing out all of my tools every few days with compressed air. The reward for this investment of time has been that I have never had any issues with any of my routers.

Whether used as a hand-held tool, or mounted in a table, a router can do more in your shop than any other tool. With the addition of a few jigs and a smart collection of bits, you are only limited in what you can do by your imagination. Explore the possibilities and diversify your work.



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Design/InlayKit

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Bench Top Drill Press

You've probably got a cordless drill in your shop and for heavier jobs perhaps a corded model. But when you need a real workhorse in the wood shop, look to the bench top drill press.

For most of the holes that the average woodworker will need to drill, a hand-held drill is fast and versatile. The drill is portable and comes to the work; they don't take up a lot of shop space and can easily be taken on the road for jobs away from the shop. They will drill a hole in any direction that the drill is pointed. However, the weak link in this chain of events is that the human hand is not very precise in this regard. In certain situations, such as when a hole must be drilled perfectly perpendicular to the surface for mounting hardware for example, even a slight error will result in a sloppy fit. In these cases, what is needed is a drill press.

Woodworkers are a resourceful group and

if they see a different trade using a tool that might be of value in the wood shop it won't be long before that tool has been added to their collection. Such is the case with the drill press. Initially, the drill press was a staple of the metal working shop, but it has quickly found a home in the wood shop. They come in two basic configurations; floor models up to 7' tall and bench models which are generally under three feet in height. We'll take a look at the bench top drill press and check out some of the features of models currently on the market.

The drill press has primarily been a metal working machine since its first incarnation, and subsequent improvements have always

been made with the metal worker foremost in the minds of the designers. It is not surprising that these tools, right out of the box, are still not ideally outfitted for the wood shop.

The models in our survey range in price from a low of \$129 to a high of \$375. With an entry level price of \$129, the Ryobi represents great value for the cost conscious woodworker. Its 10-inch swing makes it a good choice for smaller shops with limited space and its low cost makes it a practical choice when choosing a second machine to dedicate to sanding accessories. You'll also find the Skil 3320-01 a strong contender in the budget priced category. With a slightly smaller

table and the lightest weight of this group, this would be an ideal choice if you found yourself having to move it frequently. At the other end of the price spectrum is the General International 75-030. Compared to the Ryobi and Skil, this one would almost seem to be in a different class. At 46 ½" inches tall, it dwarfs the others and its larger stature naturally gives it a greater swing with a capacity of 15 ¼".

A drill press consists of four basic parts: the base, the column, the table and the head. The base is usually heavy cast iron for stability with holes in the four corners to allow it to be bolted to a work bench. The base must be heavy to provide a solid foundation for the table and the head and to lower its center of gravity which prevents it from tipping over during use.

The work piece to be drilled is supported on a table mounted to the column, and this table moves up and down the column on a rack and pinion system. To adjust the height of the table, loosen a locking lever and then crank the table up and down with a handle. For most woodworkers, the most disappointing part of a drill press is the small table, and to be fair, these are designed to serve the primary users of these tools, the metal working industry. The problem with these tables is that they do not provide many of the features that woodworkers are accustomed to having on their tools, namely fences and guide slots. Over the past several years, some manufacturers have replaced the traditionally tiny round slotted metal tables with larger versions. The King KC-116C comes in with the largest table in our group at 12¹³/₁₆", closely followed by the General 75030M1 with a table measuring 11³/₈" and the Craftex measuring 11¹/₄".

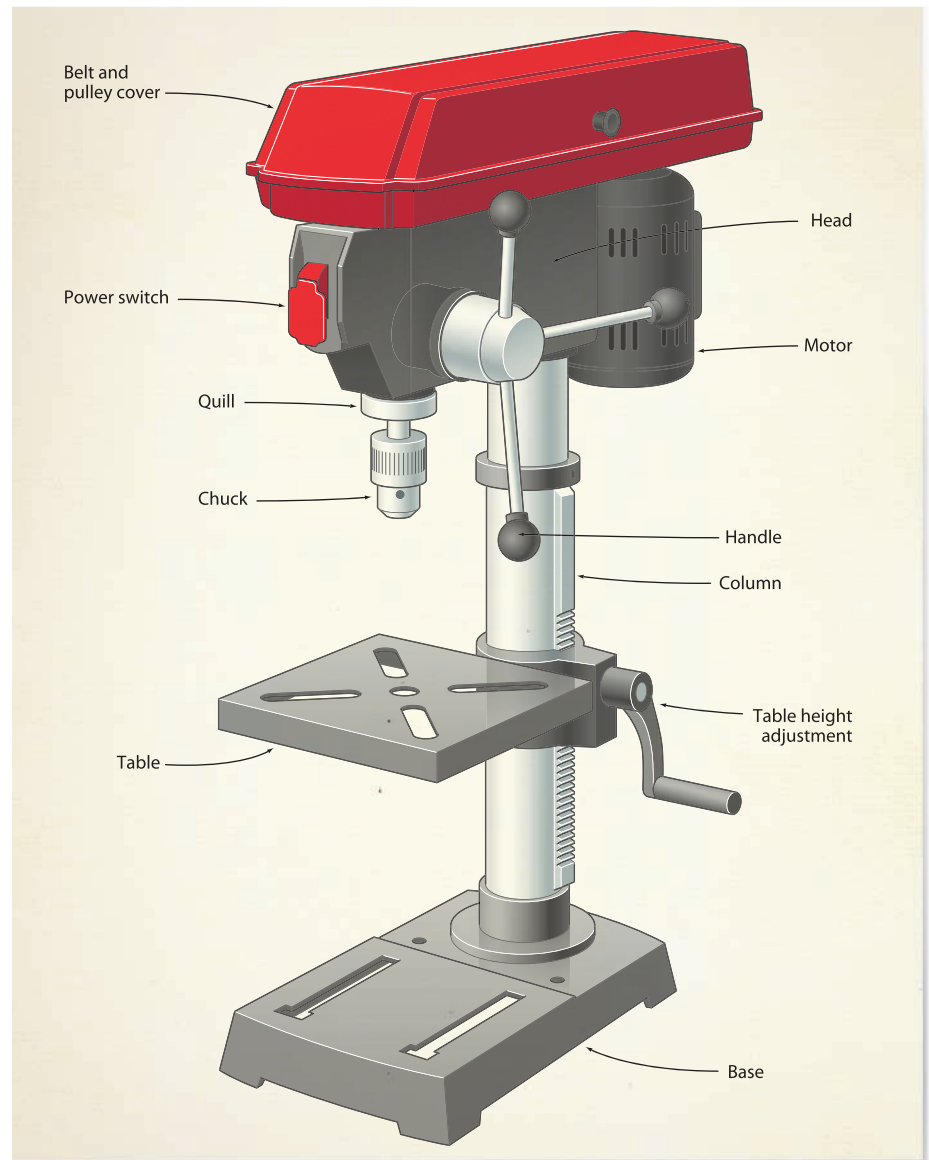
The table on the drill press can be adjusted up and down on the column to allow for various thicknesses of material. The table can also be tilted side to side to facilitate drilling holes at an angle. Adjusting the front to back tilt on the table is more problematic. In most cases there is no adjustment so the easiest method to adjust a table that is not square to the column is to build a custom table suitable to woodworking tasks and shim it level. Use an engineer's square and a drill rod to check to see if your table is square to the bit.

The head of the drill press contains all of the mechanical and electrical elements in addition to the pulleys and belts. All of

these tools offer multiple speeds but the Delta DP-350 is the only one that comes with a variable speed motor. The rest of the pack uses the standard method of swapping the belt on a system of pulleys to achieve the various speeds. The King KC-116C has the lowest slow speed, clocking in at a plodding 210 RPM; it also has the highest rpm of the group, topping out at 3,670 RPM. Speed control is essential. As the outer diameter of the bit increases, the RPM should decrease. This is especially important when using Forstner bits, as the continuous outer rim is prone to overheating. The rest of the machines in this group generally fall in the 500–3,000 RPM range. Within the group the motors range in horsepower; from a low of ½HP for the Pioneer PNR11-100 to the Craftex CT019N with a ¾HP motor. In most situations, these motors have more than enough strength to power a bit through a piece of wood. However, what usually slows the bit down or stops large

bits from spinning altogether is slippage of the belt on the pulleys. Keeping the belts properly tensioned and free of sawdust helps maintain power transmission from the motor to the bit under tough drilling.

The real business of the drill press occurs at the front of the head where the operator's controls are. The device that allows the bit to rotate while moving up and down is called the quill and it is made up of a rack and pinion gear in a sleeve. This makes it possible for the motor to continue rotating the chuck as it is raised and lowered. The amount of vertical travel that the quill is capable of is called the stroke and is usually in the 3" range; among the models we surveyed, the stroke ranges from 2 ¾" to 3 ½". The quality of the quill mechanism can be measured by checking the run-out. Run-out is defined as the amount of radial variation from a true circle, and is the result of a less than exact fit in the quill. This less than exact fit allows the bit to move horizontally ever so slightly as it rotates



Swing

the maximum distance from the column of the drill press to the center of the bit.



Ryobi DP102L



Craftsman 328090



Delta DP350



Skil 3320-01

and if you have a machine with substantial run-out the hole will end up being larger than intended and it will not have very crisp edges and sidewalls.

An integral part of the handle is the depth stop settings. Depth stop settings come in two different forms. On the drill press in my shop, a pair of collars is rotated on the handle shaft and this is what sets the maximum depth of the hole. These collars are locked in place on the shaft with set screws and in practice I have found that under some situations these collars will shift, allowing the bit to overshoot the target depth. A more substantial depth stop system involves the use of a threaded rod

and a couple of nuts mounted to the side of the head. Using the nuts on this threaded rod you set the maximum travel of the bit. When the nut on the rod hits a limit stop, the downward travel of the bit is arrested. If the mechanism is not sufficiently robust or if the lower stop is even slightly flexible then it can be possible to overshoot the intended depth as well.

Drilling a hole to an exact depth is not necessary in every case, but when you are working on a delicate piece with thinner material then accurate depth settings become critical. By overshooting even just a small amount you run the risk of breaking through to the other side. I use a fair amount of thin

material in my work and have developed a more reliable method of setting the maximum depth of the bit. Rather than rely on the depth stops, I have made up a series of spacer blocks in various thicknesses. When I need to drill a hole to an exact depth I select and install the bit I will be using and then lower the chuck to the lowest point in its travel. Before doing this I double-check the built-in depth setting to be sure it is all the way back to the top. With this taken care of, I place the correct spacer block on the table and raise it until the top of the block just barely touches the bottom of the bit. In this way, the quill is already at its maximum depth and there is no possibility of the bit

Model	Ryobi DP102L	Craftsman 328090	Delta DP350	Skil 3320-01	King KC-116C	Hitachi B13F	Craftex CT019N	General 75-030 M1
Price	129.00	249.99	300.00	139.00	219.00-229.00	199.00	298.00	375.00
Swing	10	12	12	10	13	10	12	13 3/8
Chuck size	1/2	1/2	1/2	1/2	5/8	1/2	5/8	5/8
Stroke (spindle travel)	2 3/8	3 1/4	3 1/4	2 3/8	3 1/8	2 1/2	3 1/4	3 1/8
Spindle distance to table	10	19	14 1/8	10	13 3/4	N/A	13 1/4	15 1/4
Table size	8 x 9	10 square	8 1/2 x 9 7/8	7 5/8 square	12 13/16	7 13/16 x 7 13/16	11 1/4 square	11 3/8
Speeds (RPM)	570-3050	500-3000	500-3100	570-3050	210-3670	680-3000	140-3050	280-3000
# of speeds	5	5	5	5	16	5	12	12
Spindle taper	Jacobs 33	N/A	Jacobs 33	JT33	MT2	JT33	MT2	MT2
Overall height	28 1/2	37 1/2	22	28.3	42	28	38	46 1/2
HP (Amps)	N/A (3)	2/3 (6)	1/3 (N/A)	N/A (3.2)	N/A (7.5)	1/3 (3.5)	3/4 (8.5)	1/2 (8)
Weight, lbs(kg)	62 (33.5)	95 (43.1)	78 (35.4)	52 (23.6)	125 (56.7)	61 (27.7)	160 (73)	105 (48)
Lamp/light	✓	LED	✓		✓			built-in
Laser	✓	✓		dual	dual	cross hatch	✓	
Warranty (yrs)	2	2	5	1	2	5	2	2
www	ryobitools.com	sears.ca	deltaportercable.com	skiltools.com	kingcanada.com	hitachi powertools.ca	busybeetools.com	general.ca

Notes: All measurements are in inches unless otherwise noted
All feature a rack and pinion table raising/lowering mechanism; tilting table; depth adjustment system

* The DP350 model offers a variable speed motor
Additional models: King Canada (two 8" and a 10"); Delta (12" variable speed); Ryobi (12").



King KC-116C



Hitachi B13F



Crafttex CT019N



General 75-030 M1

overshooting the depth and drilling the hole deeper than intended.

Drill Press Safety

While not viewed by many as one of the more dangerous machines in the shop, a drill press can still bite the hand that feeds it. The primary hazard is caused from grabbing and climbing. When drilling material, always ensure that it is held down to prevent it from moving. Not only will you end up with a cleaner hole, you'll prevent these dangerous situations. A drill bit can grab the material if it hits a section that is harder than the rest. When it does the bit locks into the material, and the power of the motor must go somewhere. What usually happens is that in an instant, the piece is ripped from the hand of the operator and begins spinning at the same speed as the bit. If the piece is small it will spin freely until the machine is turned off; a larger piece will spin until a part of it hits the column. When drilling thin stock, climbing is a definite hazard, especially with metal. When using a twist drill to drill thin stock or a piece of metal, as the bit starts breaking out the other side, the ragged edges of the hole will catch on the edges of the bit and the material will wind its way off the table and up the length of the bit. If this happens with a piece of metal, it can quickly move up the bit and essentially become an unguarded spinning saw blade. When working with thin metal on the drill press, always wear gloves and use a hold-down.

Support your work

When you add a bench top drill press to your shop, consider making a custom table for it. A simple square plywood table fastened to the metal table will extend its usefulness greatly. By making the table wider you will be able to support longer work.

Many woodworking operations require the drilling of many holes in a row. This

is made much easier with the addition of a fence and adding some 1/4" T-track to the top of the fence which will allow you to mount stop blocks for repeatable accuracy. Adding a couple of pieces of track to the base of the table will allow the use of hold-downs to secure the work piece. If you have an older drill press without some of the modern bells and whistles, consider adding an aftermarket light. No matter how bright your shop may be, a task light affixed to the drill press will direct additional light where it is needed making it much easier to place a drill bit accurately. To reduce the vibration from a stiff belt, change the solid belt to a segmented link belt, stockroomsupply.com.

Drill Press Joinery

The drill press can function as a joinery tool as well. It is one of my favourite tools for cutting the mortises for mortise and tenon joints. The approach I use is to drill out the mortise with a Forstner bit and then to clean up the mortise with a sharp chisel. Another method available for cutting the mortises is to use a mortising attachment which is a combination of a drill bit and a chisel. The drill bit is located inside the center of the hollow square chisel which removes the bulk of the waste and the chisel which follows up the cut to create square corners. While some people report success with these attachments, many report they are very tricky to set up properly. Another downside to using a mortising attachment is the force needed to press the chisel/bit combination into the wood. A dedicated mortiser will feature a long handle to make it easy to apply the force needed. The shorter handles on a bench top drill press are adequate to the task of drilling round holes but they come up short when called upon to deliver the extra force the mortising attachment requires. Having used both methods, the former is certainly faster, cheaper and less frustrating.

Sanding on the Drill Press

In my shop I have two drill presses. One is a floor model that I use for drilling holes and the other is a low end model. This second drill press is used exclusively for finish sanding pieces using a sanding mop. Another great sanding accessory for the drill press is the sanding drum. They allow you to sand curved work in much the same way a spindle sander would. The downside to using sanding drums on the drill press is that unlike an oscillating spindle sander, the drum remains in one place and this can lead to ridges and marks on the work piece as the surface of the drum will tend to quickly load with material, reducing its efficiency. Touching up the drum frequently with a crepe block will quickly restore the grit.

By far, one of the most used accessories in my shop is the sanding mop which has pretty well taken up permanent residence on this drill press. If you use a router to create decorative edge profiles then this is a must have tool. Sanding a complex profile can be a time consuming and frustrating chore. If you don't do a thorough job, you will have finishing issues and if you sand too much you run the risk of destroying the delicate detail within the profile. A sanding mop mounted on a bench top drill press will reduce sanding time exponentially while improving the quality of the result. Simply run the piece through the edge of the mop, once in each direction and you have a silky smooth surface with crisp details ready for finishing.

A bench top drill press is an excellent choice for the woodworker who has limited space in their shop. The convenience of stowing the tool away to make room for others is an ability that is a must in the small shop.



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Smoothing Planes

Looking for an alternative to sanding dust and noise? Look no further...the smoothing plane will peacefully get the job done.

The smoothing plane excels at jobs that power tools can do but with less noise and dust. In most cases, the smoother does the task faster and with far superior results. The key to mastering this plane is in the set-up and some basic techniques that are often not known by novice plane users. There are many types of smoothers on the market, but in this article I'm going to focus on metal type smoothing planes because they are the most accessible to the average woodworker. So let's move towards improving your knowledge and technique.

Choosing a Plane

The first issue to discuss is the equipment. The reality is that not all hand planes are created equal. Generally, the cost of a plane is a good indicator of the quality. Unfortunately, in the world of fine woodworking, you are not going to be able to use a hardware store smoother and get the desired results. These hand planes are typically not machined to high tolerances and lack the adjustability to take the fine cuts that we are looking for. In my opinion, the big three metal hand plane makers are Veritas, leevalley.com, Lie Nielsen, lie-nielsen.com, and Clifton. All of these makers make high quality tools and they are all in similar price points. Lie Nielson and Clifton model their planes after the Stanley Bedrock line of planes, while Veritas has shown some innovation by using a Norris type adjuster to control the depth of cut and lateral adjustment. There are differences between the plane makers but I feel that the most important thing to consider is how the plane feels in the hand. Imagine you are surfacing the top of a dining table to prepare it for finish. The smoothing plane could literally be in your hands for hours. If the plane does not come to the hand easily and with comfort, then that is going to be a miserable couple of hours that may compel you to use a sander instead. As far as vintage planes go, that topic is another kettle of fish entirely. There are many factors involved in choosing a well made vintage smoother, so I recommend staying away from these planes unless you have taken the time to educate yourself.

Another consideration when choosing a plane is the angle that the blade beds at. This is referred to as the frog angle. A standard frog beds the iron at approximately 45°, a high angle frog beds the iron at approximately 50° and the low angle frog beds the iron at approximately 32°. The high and low angle smoothers come in handy when working highly figured woods or some exotics that have difficult grain. However, most of the time



downloaded from www.cro-wood.com

LoneWolf

a standard angle smoother will do the trick. The bevel-up smoother from Veritas is a versatile plane because there are three blades available: a low angle, standard angle, and high angle. This allows you to purchase one plane and three irons to cover all the different planing angles instead of buying three separate planes.

Plane Uses

The smoother is probably the most versatile plane a woodworker can have in their hand tool arsenal. Obviously, as the name suggests, the smoother really excels at smoothing surfaces. However, its use is not limited to smoothing alone. For example, after running the edge of a board over the jointer, you have achieved a square and straight edge from the machine. What you also have is the scalloped surface left behind by the cutter head. If you were to try to use this edge as a glue line with another board you would end up with a less than perfect glue line. If you run a smoother along the edge of the boards first, removing the scalloped machine marks, you will have two perfectly flat surfaces to glue together. These two hand planed edges will give you a glue line that is virtually undetectable.

The smoother can also handle end grain fairly well. It's important to remember however, that the iron must be very sharp in order to not make a mess of the end grain. Where this technique comes in handy is in shaping a bevel on the underside of a tabletop. Instead of switching to a block plane to handle the end grain of this cut, you can simply carry on with the plane you have in your hand. As well, the longer sole on the smoother will provide you with a straighter and more accurate cut than the smaller block plane.

This plane can also handle more strenuous tasks, such as dimensioning lumber by hand. At the moment I don't have a jointer machine in my 170 sq. ft. shop. In a shop this small, space is a premium and I would sooner do without a jointer than purchasing a smaller machine. Having a 12" jointer would be nice, but in the real world, most of us can't afford a tool of this size in our shop, whether financially or spatially. You can easily use your smoother to flatten one face of your lumber which gives you a reference face to use on the bed of your thickness planer.

Setting Up Your Smoother

After reading my last article on prepping plane irons, you know that it is important to have an iron that has been properly

tuned and sharpened to a keen edge. Your success with any type of edged hand tool hinges on this, so take the time to prepare your iron properly. The other adjustment that is important to set properly is the plane's mouth opening. The mouth refers to the opening between the cutting edge of the iron and the plane body. If you are setting up the plane to take gossamer-

thin shavings then the mouth will be only slightly open. Conversely, if the plane will be doing heavier dimensioning work the mouth can be left with a wider opening. Essentially, the mouth opening is just large enough to get the shaving through without clogging the opening, or 'choking' the plane. The type of plane you have will determine how you adjust the mouth. In

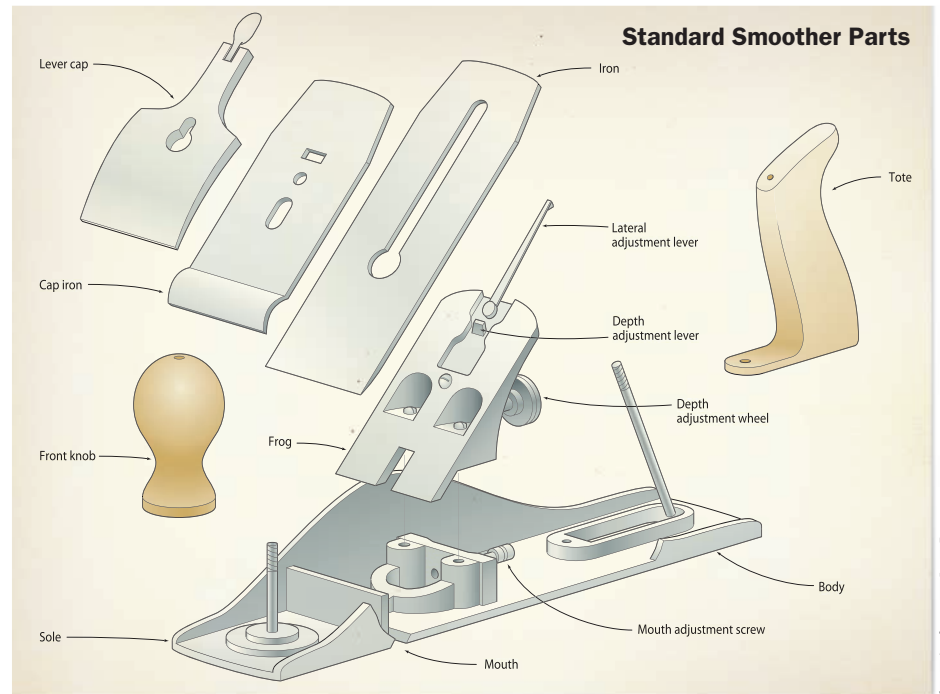


Illustration by: www.JamesProvost.com



Three high quality planes; (top) Veritas low-angle smoother, (middle) Lie-Nielsen No. 4, (bottom) Clifton No. 4

the case of a Bedrock style plane, all of the adjustments can be done with the iron in place. You simply loosen off the two locking screws at the rear of the frog and use the center screw to either increase or decrease the mouth's opening size. If you have a Bailey style plane, then you will need to remove the blade to access the two locking screws and then adjust the frog appropriately. Once the frog is adjusted you'll then have to replace the blade and see if the mouth opening is the correct size. As you can probably deduce, adjusting a Bedrock style plane is much easier than a Bailey style. Veritas again has innovated their planes with an adjustable toe that makes it quite easy to adjust the mouth opening. You simply loosen the front knob, adjust the mouth, and then tighten the knob again.

Now we want the plane to make shavings. To do this, you'll want to ensure that the blade is backed out all the way and place the plane onto the wood to be surfaced. Now, start moving the plane back and forth on the board with your one hand on the tote. Simultaneously, you will start to advance the blade using the depth adjustment wheel until the plane just starts to cut. At this point, you want to pay attention to where the plane is cutting in reference to the center of the iron. Ideally you want the plane cutting in the center of the iron. If the plane is cutting to the

left or right of center, you'll want to adjust the iron using the lateral adjustment lever. You will move the lever into the direction that the plane is cutting. For example, if the plane is cutting right of center, you will move the lever to the right and vice versa for the left. Keep in mind that the adjustments that you make to the plane are very slight. It is easy to overcorrect a problem with gross adjustments. Once you have used your plane for a while you will understand how much adjustment is needed to make the correction. Now that the plane is cutting where you want it, let's talk about the skills you will need to plane effectively.

Planing Technique

Using a hand plane in the beginning feels a bit awkward but with practice it becomes a natural body movement. It's not easy to describe what the body needs to do while hand planing because everyone is built differently; what I may find comfortable may not work for everyone. Generally, you will want to take a wider stance with your feet so that you're comfortable and feeling stable. When you begin moving the plane back and forth across the board you will want to ensure that you are planing with the grain or else you may encounter tear-out. At the beginning of the cut, you should place more pressure at the front of the plane. Conversely, you will place more pressure at the rear of the

plane at the end of the cut. This will prevent you from removing too much material off the ends of the board. Move the plane across the board in a controlled manner and move deliberately focusing on each stroke. Speed will come with practice, so let's worry about honing your skills first.

In the case of planing on the edges or end grain of a board, the trick is to balance the plane on the thickness of the board. You'll want to keep the plane cutting on the center of the iron to keep the edges square to the faces. Again, the technique involved for this skill is very personal. I don't think I've ever seen two woodworkers do this technique the same way so you will just have to do what seems comfortable and effective for you. I tend to place my thumb on the toe of the plane while curling my index finger to the underside of the plane to help guide the cut.

As with any other woodworking skill, it's important to practice to become proficient. Eventually you will get to the point where you will pick up your plane and instinctively guide it across a board taking off beautiful delicate shavings. Your smoother will become your 'go-to' plane for a whole host of tasks. However, your smoother won't pollute the air with dust or create noise that will eventually deafen you...sounds like a better place to work already.

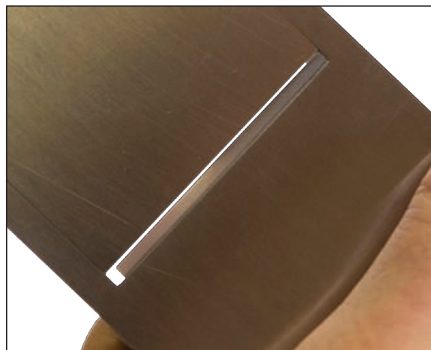
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Bevels are easily shaped by using the smoother on an angle



It's imperative to set a small mouth opening on your smoother to reduce tear out



Jointing a board to remove mill marks can be done by using your lead hand as a guide



Bedrock style frogs are easier to adjust as the blade doesn't have to be removed



Bailey frogs are equally adjustable—they just require more work.

RESOURCES

Preparing Plane Irons

Apr/May 09, Issue #59



The cabinet was designed to match some existing bedroom furniture. It was made with African mahogany, which was left its natural color. The finish is polyurethane which warms the color of the wood. The design included curved door panels laminated with two layers of ¼" re-sawn veneer over ¼" bending plywood. It also has hand-carved appliqué for the corners. The reeded corner pilasters were made on a lathe then split down the middle and applied to the corners. It functions as a TV stand and book case for the guest bedroom. The inside is configured to support the cable box and a variety of general interest guest books. The cabinet took about 46 hours to complete.

Cabinet by Edward G. Robinson, Burlington, ON

This demi-lune table is constructed from American black walnut with a flame birch table-top which is attached with buttons to the aprons. The string inlay is sycamore, the inlaid panels at the tops of the legs are quarter-sawn curly maple, and the cock bead and cuffs at the bottom of the legs are made from ebony.

The legs are a 1° continuous taper that meet the apron at this angle. The flame birch was a tricky wood to finish with a hand plane and many honing angles were tried and rejected before a 32° hone achieved the desired lack of tear-out. The inlay alone took about 20 hours to complete and the table as a whole was a 70 hour labour of love.

Demi-Lune Table by Nick Moore, Almonte, ON



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Hot Melt Glue Guns

If you need an extra hand in the shop for a quick and easy fix, try sticking to your guns.

Glue sticks, and the glue guns they are used in, are most commonly associated with seasonal crafts and children's projects, but if you take a closer look you'll find they can be a useful accessory in the workshop. We normally look to woodworking glues when constructing our projects, balancing off the open time and conditions of use, to select the best adhesive for the task at hand. At first glance, hot melt glue may not seem all that useful, it doesn't provide as strong a connection between two pieces as traditional wood glue and has a very short open time, but you can use this to your advantage.

The Gun

A glue gun is one of the simplest tools out there; it consists of a heater element, a channel to feed the glue sticks through the heater element, and a handle. In most cases they simply plug into a standard wall

outlet and it takes about three minutes for the element to heat up enough to melt the solid glue sticks. When the glue flows easily from the tip, the gun has warmed sufficiently to begin working. For repairs on the road or away from a convenient power source look to one of the butane powered models such as the Master Appliance GG-100, galco.com. The GG-100 heats up in approximately the same amount of time as the electrical versions and will run continuously for two hours on a charge.

The guns on the market vary from basic models, available for less than \$10.00, to professional models designed for more demanding applications, costing upwards of one hundred dollars. When selecting a gun for use in the shop, consider what you will be using it for as there can be considerable variation in control and comfort among

the various models. The butane powered Master Appliance gun is the largest of the guns we use in our shop and it has the most reliable stand of the group; the lack of an electrical cord and the wide stance of the stand make this gun very stable when it is set down. On electrical models, the power cord usually enters the gun at the bottom of the handle with the fold-out stand located at the nozzle end. Unless the gun is equipped with a very flexible power cord (and they very rarely are), tension from the power cord will tend to cause the gun to be unsteady and tip easily when set down on the stand. As an additional safety precaution, wherever we use these tools we take along a 12 x 12 ceramic floor tile to serve as a non-flammable base to rest it on. A small compact gun is our favourite because of its size; it fits in the hand easily and can be used for a longer time without fatigue than the larger guns.

The Glue

The hot melt glue is a thermoplastic adhesive that ships in cylindrical rods or sticks which are inserted and heated in the gun until it melts. When the glue initially leaves the tip it is hot enough to blister and burn skin but it will solidify quickly as it cools. Depending on the glue sticks you purchase, hot melt glue has an open time from a few seconds to over a minute. This variation is greatly affected by your ambient temperature. You'll be able to find glue sticks at most local hardware stores, and normally they have two or three different varieties to choose from. On a recent trip to the local Home Hardware store, I managed to find three different types. One was for wood, metal and plastic, another was for wood, metal, plastic, foam and paper, while the third was labelled heavy duty for woodworking projects. None of these packages contained any specific information on the glue and the performance one might expect.

Glue sticks made by J.E. Moser's are also available from woodworker.com. They offer three versions as well, an economy clear stick that is suitable for porous fabrics with a working time of 30-45 seconds, a General Purpose Clear that is suitable for non-porous surfaces like glass and plastic and a High Performance Tan which is suitable for fabric, leather, and all woods with a working time of 20-30 seconds.

The Applications

The quick set and low strength properties of hot melt adhesive are of great value in the wood shop. When designing a new piece of furniture it can be difficult to visualize the final result, and jumping straight into the construction process can lead to costly mistakes. Using some shop scraps to quickly build a scale model of the project will quickly give you an idea of the volume and proportions of a piece. Hot melt glue is ideal for building these quick models (maquettes). You could also build a full size version of the project using Styrofoam and cardboard. This process will test out your design and further refine a project before beginning construction.

When installing trim on a cabinet, a piece of furniture or hanging trim in a house, use hot melt adhesive in combination with regular woodworking glue. Apply a thin film of glue to most of the surfaces to be joined leaving some bare wood exposed for the hot melt and when the glue has been spread out, place several drops of the hot melt on the open spaces and press the piece into place. Instead of using a brad nailer or 23 gauge pinner which will leave holes that will require filling, the hot melt

will set up quickly holding the piece in place while the slower setting wood glue cures leaving an unmarked surface.

Clamps with large flat faces like the Bessey K-Body are ideal for assembly and glue-ups. Their large clamping pads will not, under most circumstances, mark the work piece. Such clamps are expensive, so most woodworkers will likely have a larger assortment of F-clamps or pipe clamps to work with. However, the smaller bearing surface on these clamps often has a habit of marking softer material like pine and cedar if they are overtightened. To distribute the force of the clamps over a larger area, cut up some MDF into squares and use some hot melt glue to affix them to the surfaces of the clamp. If you are gluing up a large panel with many clamps, use a long caul on either side, and use the hot melt adhesive to fasten the caul to the first and last clamps. It makes it much easier to proceed with the glue-up when you are not trying to juggle all of these sacrificial faces in addition to the clamps. When you are finished, a sharp tap with a hammer will remove the blocks from the clamps.

If you are building a piece that requires multiple parts, such as the corbels on an arts and crafts table, use the hot melt glue to fasten all of the blank pieces together and cut them all at once on the band saw. Use the adhesive sparingly or the pieces may not come together evenly. Also, separate them on completion with a hammer and chisel.

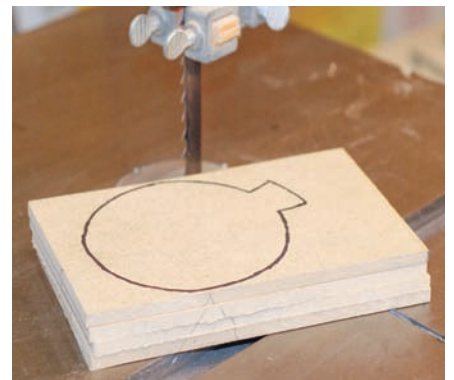
One of the 'make or break' moments in project construction is the mounting of the hardware, as it can be difficult to lay out the pieces for the best appearance. A drawer or door handle that looked perfectly fine when the drawer was sitting alone on the bench might look completely out of place when the doors and drawers are installed on the piece; the spacing may be wrong, throwing off the whole geometry of the piece. To refine the placement of hardware I use a combination of painter's masking tape and hot melt adhesive. I begin by covering the back of the piece of hardware with some painter's tape cut to size and then apply a small piece of painter's tape to the spot on the piece where I think the hardware should be mounted. I then apply the hot melt to the hardware and press it into place to confirm the location. If everything looks fine I remove the hardware and drill the mounting holes. The extra step of using the painter's tape is not entirely necessary as you could simply temporarily tack the hardware in place on the surface of the wood, but it does make it easy to remove the glued-on hardware without any risk of damage to the surface or leaving any residue behind.



Experiment with several positions before drilling holes



There is a type of glue stick for almost any application



Stack and hot-glue many pieces to save time in the shop



Protect your glue-ups from marring of metal clamps



Glue guns typically come in three sizes

Even More Uses

When working with small parts, use hot melt glue to fasten them to larger pieces to make machining them safer. Working with small pieces on power tools places

your fingers in close proximity to the cutting edges, so keeping your fingers away from the cutting edges is the surest way to prevent accidental contact. When possible, shape your pieces while they are

still part of a larger piece of material and sever them after the shaping is complete. If the piece cannot be machined as part of a larger piece, then use some hot melt glue to attach the small piece to something larger to make handling it safer.

Shop jigs can either be elaborate creations that will be used repeatedly or they can be quick and dirty assemblies that are needed for only one operation. For quick jigs that will only be used for one or two operations, use some hot melt glue to fasten the pieces together and then knock them apart when done. When building more elaborate jigs for the workshop, use hot melt glue to hold the pieces in place to confirm their position before fixing them in place permanently with glue and screws.

Once you've used a hot glue gun a few times in your shop you will realise the potential of this crafting tool. I use mine so often that I've build a custom holster under my bench to keep it close at hand.



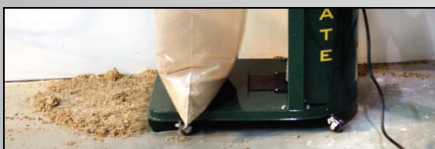
MICHAEL KAMPEN
mkampen@canadianwoodworking.com

productnews

BY THE EDITORS

The Ultimate Dust Collector CT145

This new and innovative dual-function dust collector from Craftex has all the features any serious woodworker would be looking for. Developed by Anil Balolia, the President of Busy Bee Tools, this dust collector would be a great addition to any small shop. Extremely well built, this machine will not only act as a powerful dust collector around your shop, it will also clean your entire shop floor without the aid of any accessories. The unique and patented design by Craftex allows the user to go from a dust collector to a powerful vacuum with the simple open and close of the dual blast gate system. An opening on the base's back end allows air flow to travel up the hose shaft and into the collector body. The vacuum action is very strong and will clean even the messiest of shop floors. The base is tapered so it will not scratch or damage your shop floor. The unit also features upgraded and extremely versatile castors for extra turning capabilities around your shop. By combining a dust collector and shop vacuum in one the CT145 eliminates one more tool from taking up valuable space on the small shop floor. Unfortunately, most small wood shop owners tend to forgo dust collection because of the lack of space. However, this dual-purpose, compact and powerful dust collector keeps the air cleaner in your shop while keeping its footprint to a minimum. The CT145 is available at any Busy Bee Tools location for an introductory sale price of \$299. After late August the CT145 will return to the regular price of \$399. Check it out at busybeetools.com.



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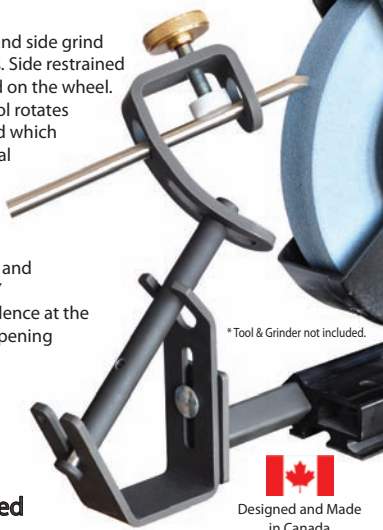
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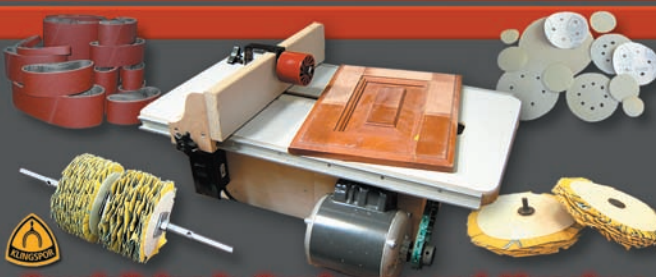
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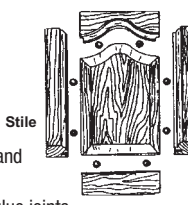
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Carving a Career

The year 1967 was one filled with many important events. The Six Day War began and ended appropriately enough in six days. The Beatles released Eleanor Rigby and the Toronto Maple Leafs won the Stanley Cup for the last time. *Ever!*

Canada celebrated its 100th Birthday and I, a 13 year old Ontario kid, won the Canada-wide, Centennial Totem Pole carving contest. Actually, it may just have been the Ontario division that I won, possibly the York regional. Perhaps just the Aurora, Grade Six Boy's Division. I don't really remember. It was the 60s after all!

Why only boys in the sixth grade were eligible is still somewhat baffling but since I happened to be in that grade (again!) it proved to be very beneficial for me.

As mentioned in my last article, my total carving output to date was an aborted canoe / tank that I had attempted (and failed miserably) to carve when I was just a wee lad. But I figured that since canoes were an Indian invention as were totem poles, I had to be miles ahead in experience. Somehow!

We were given some left over logs from a skating party bonfire for our projects. After careful consideration I chose a log 4' tall and about as large around as me. Roughly 6" in diameter! Once I managed to carry it across the park and up three flights of stairs to the art room, I immediately started work on it. I didn't even consider making plans. Who ever heard of using a design or plans when woodworking? Especially if you're thirteen!

All winter I pounded and hacked away with a hammer and a set of four cheap chisels the school owned. Unfortunately,

no one told me that carving tools needed to be sharpened. Or if they did, I wasn't listening. Again!

Gradually, all of the other boys dropped out until I was the sole remaining carver in the school. At that point I figured I had a pretty good shot at Second or dare I dream? even First place! Math wasn't my strong suit.

Each day after class I rushed up the stairs and pounded and chopped away at that stupid pine log and drove the art teacher crazy. In the evenings I would visit the library to research carving techniques and totem designs and each day I would eagerly put to good use that which I had learned. (In spite of every teacher's predictions, I could be taught). Gradually the carving neared completion and the only job remaining was to cut out the wings and then paint the thing.

A coping saw was purchased by the art department and I was given strict instructions not to break any blades because it was the only blade the school owned. Over the next four days I managed to cut out a set of wings without breaking a single blade, only to be informed that there was an entire extra set in the storeroom. Just in case!

Grade six was the year that tipped me over the top as far as school was concerned and I never fully trusted another teacher again. Thus our lives are formed and moulded

(some say, twisted) by our school years and those who teach us.

I finally completed my totem pole and proudly placed it on the floor and raised it upright for the first time, only to watch as it slowly toppled sideways and snapped off the wings. This was to be my first lesson in leveling, a concept I had never previously needed to consider. I nailed a large board to the base so the pole would at least stand up, if not exactly straight, then re-attached the wings using ever bigger and better spikes.

Needless to say, my little totem pole won and I was presented with a certificate and prize from the Canadian Olympic Committee chairman during an extraordinary and highly prestigious ceremony that my entire family declined to attend. The prize turned out to be a soapstone carving of two Canada geese. Even as a kid I thought it odd to be given a carving considering I was receiving it for carving.

Thus at the ripe old age of 13, I graciously retired from carving with my championship intact. It wasn't until I was 27, married and had a child, that I came out of retirement to once again take up the knife and chisel and reclaim my glory.

And I have never looked back!

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