

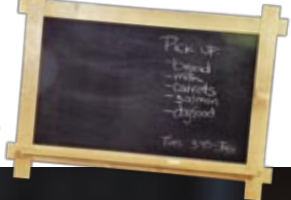
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AUGUST/SEPTEMBER 2009
ISSUE #61

CANADIAN **Woodworking** & HOME IMPROVEMENT

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**6
Secrets**
to installing
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RAISED PANEL DOORS
3 sets of bits to suit your style



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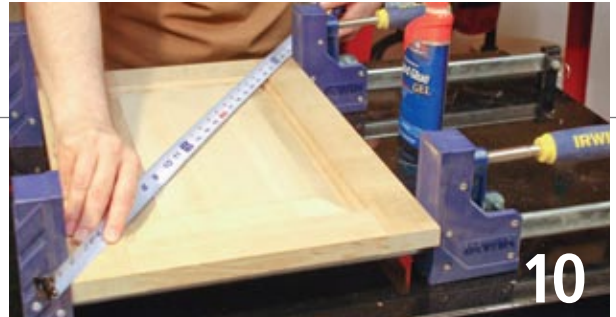
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FEATURES

10 Raised Panel Doors

There is more than one way to build this common woodworking element.

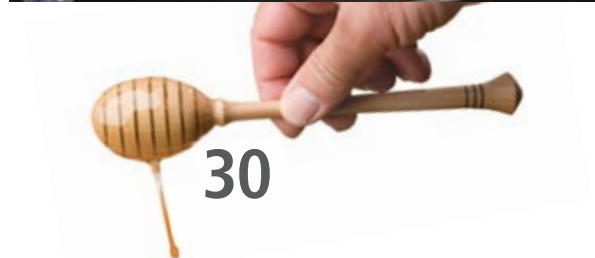


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This handy chalkboard will help to ensure that important messages don't get lost.

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Make your honey more accessible and less messy with this turned project.



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Take a look at these six woodworkers' secrets for a great flooring installation.



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vtesolin@canadianwoodworking.com

There is a proverb that says "You can't leap a twenty-foot chasm in two ten-foot jumps." This is painfully true for reasons that don't require explanation. In the spirit of this proverb, we have made a big leap. We've spent hours looking over survey results. We've had countless discussion about how to give you, our readers, what you are looking for.

Now we present to you the results of our 'twenty-foot leap.' If you've read the cover, you will see that the magazine is now called *Canadian Woodworking and Home Improvement*. The new home improvement sections of the magazine will focus on wood-based home improvements; not tubs, tiles or plumbing. Not that there is anything wrong with those topics, we just prefer to focus on the topic that we all are enamoured with – wood.

You'll see that the cover of this issue features a typical home improvement project – installing click flooring. It is projects of this nature that will be featured in the magazine to provide you with ideas and guidance for your home improvement needs that are wood centric.

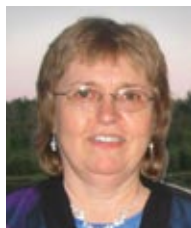
I have been very busy recruiting writers who are fine craftspeople and who are at the top of their game. I've found carpenters, fine home builders, and accomplished do-it-yourselfers to write articles about a whole range of projects and techniques that will satisfy the novice and the advanced woodworker. As for the woodworking side, we will continue offering articles on techniques and projects that you will find very useful in your shop and home.

I hope you enjoy the first issue of our new format. Work safe... work proud.

Vic Tesolin



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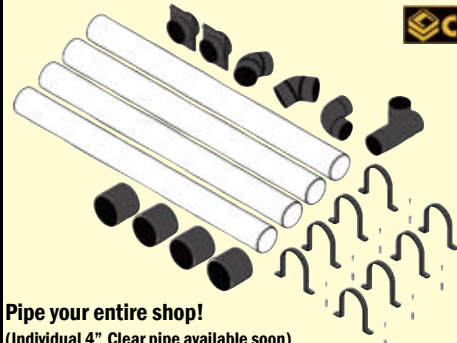
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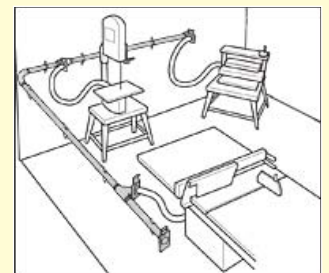
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Informative Magazine

Enclosed you will see that I have decided to once again subscribe to *Canadian Woodworking*.

I did not renew my subscription a year ago, and instead purchased a subscription to *Fine Woodworking*.

However, because of your interesting and informative articles (like the chess set series), I found that I was purchasing most of the issues at the newsstand, so decided I would enjoy the savings and not have to find a location to purchase a copy. Also, your eNewsletters would alert me to up-coming articles, which piqued my interest. Thanks to you and Vic and other contributors for an informative and entertaining magazine.

Sincerely
Brian M
Surrey, BC

Variation on a Theme



On receipt of your April/May 2009 issue, I liked the look of the Cedar Garden Bench. I was going to make a cedar deck/coffee table to match some planter benches and thought the look of the curved legs was very stylish. I really enjoy the valuable ideas and information in each issue as well as the "Woodchuckle".

Sincerely,
Mel Burchill



Correction

In the Dec/Jan 2009 issue, we ran an article entitled "Wall Beds". In this article, regrettably, we provided the incorrect web address for Murphy Wall-Beds INC who provided the photos for the article. The correct address is murphybeds.com. We apologize for the error and any confusion this caused.



Vanity

by Marc Prévost
Gatineau, Québec
marc-prevost.com

On this piece of furniture, I wanted to mimic the strip of slate mosaic installed on the wall around my bathroom. For the grout line I used walnut and for the tiles I used a selection of woods including: apple, cherry, padauk, khaya, ebony and rosewood, of various lengths glued into a 5 1/2 inch wide dado. The sides are scraped to avoid the color from oily woods bleeding into the maple. The top is made from jatoba, the sides from maple, and the doors are made from bird's-eye and curly maple glue-ups. It took me about forty hours to complete this piece.



Extreme Bird House

by John Looser
extremebirdhouse.com

This bird hotel is 7' wide, 5' tall and 4' wide, and weighs about 350 pounds. It has 60 rooms designed for sparrows and swallows and features a wrap-around balcony made from 1/4" steel. The 1" logs are made from reclaimed hemlock and regular barn steel for the roof. The insides are made from reclaimed shipping plywood and are all removable for easy cleaning. A house this size will be mounted 8-10 ft in the air on a single post about 12" diameter.

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Rockler Box Joint Jig

The Rockler box joint jig lets woodworkers cut notch after notch continuously with almost no measuring, minimal set-up and incredible precision — all with a standard router bit and table.

Capable of producing $\frac{1}{4}$ ", $\frac{3}{8}$ " and $\frac{1}{2}$ " wide joints —the jig secures to any router table with a standard $\frac{3}{4}$ " mitre slot. From there, set-up simply requires attaching the desired bit and indexing key (the jig includes three keys; one for each joint width), fastening a sacrificial face to the pre-drilled backer sled and adjusting the jig into position. The Rockler Box Joint Jig works with stock up to $\frac{3}{4}$ " thick and for best results, Rockler recommends using spiral up-cut router bits, sold separately. The jig retails for US\$79.99 and is available at rockler.com or call 1-877-ROCKLER.



Veritas Small Scraping Plane



The new Small Scraping Plane by Veritas is a unique plane that has an adjustable palm rest to allow for an individual user to customize the setting for comfort. As well, the palm rest can be adjusted to allow clearance when working close to adjacent surfaces. A set screw allows fine depth-of-cut adjustments to dial-in a light shaving. The fixed frog beds the 45° ground, full width blade at 20° ; the optimal angle for fine scraping. The $5\frac{1}{4}$ " long ductile cast iron body weighs $1\frac{1}{2}$ lb and features chamfered gripping surfaces for comfort. The Small Scraping Plane is available at leevalley.com and retails for \$129.00.

Big News from the West

Recently, KMS Tools took over all three former House of Tools locations in BC: Langley, Victoria, and Campbell River. KMS will retain most of the former House of Tools product lines but at lower pricing. They will also be adding welding equipment and gas, automotive tools, auto restoration and even hot rod parts, to these new locations. KMS has also hired some of the House of Tools outside sales staff in Calgary and Edmonton who are based out of the KMS Red Deer store. Locations are now open and have new stock arriving daily. For more info, visit their website kmstools.com



Subscription Winner!

I've been doing DIY carpentry and woodworking for quite a while and have sold my lathe work in local craft shops. With retirement and more flexible hours I began courses at Fanshawe College in London, Ontario. I am currently completing the requirements for their Cabinet Maker Certificate and hope to make custom furniture (doesn't every home handyman?). Winning the **Freud Router Table** with its super accurate fence couldn't have come at a better time! Thanks again.

Trev Kellar



CROWNING ACHIEVEMENT



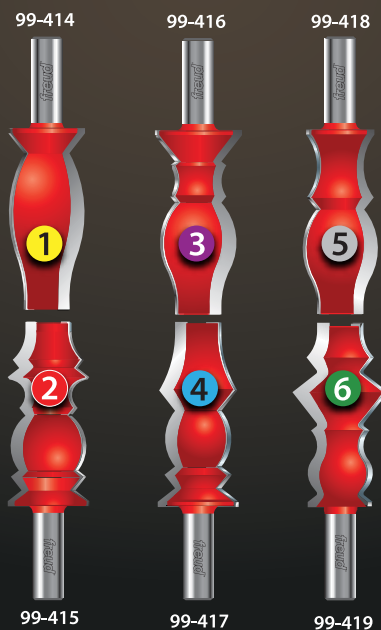
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Click Floor TRICKS

Take a look at these six woodworkers' secrets for a great flooring installation.

BY STEVE MAXWELL

Click flooring has taken off in popularity since it was introduced about a decade ago because it's fast and easy to install. Interlocking edges of neighboring boards snap together, forming a continuous, floating floor that just about anyone can install. Although the click concept is usually found on laminate flooring products, that's starting to change. It's now appearing on prefinished solid wood, prefinished engineered wood and even bamboo flooring. But regardless of

exactly what material you choose, there are important things you need to understand to get the best possible click floor installation. The six critical points you'll discover here work alongside standard manufacturer instructions to create a great floor.

Ask About AC Rating

Laminates are the largest part of the click flooring sector, but the durability of different products varies tremendously. To determine exactly how tough a particular laminate is, you need more than fancy advertisements and a friendly

salesperson. You really need numbers, and this is where something called the abrasion class (AC) rating can help.

Click flooring with an AC rating of 2, for instance, is for light residential use only. Anything more challenging than an elderly couple with no pets and this stuff will scratch and wear out. AC-5 is on the other end of the durability spectrum. It stands up just fine even in commercial applications involving lots of foot traffic and gritty street shoes. AC ratings are not often shown on product packaging, but it's an industry-wide system that you should be able to find if you ask. An AC rating of 3 is generally considered the minimum acceptable for typical residential installations.

Can't find an AC rating for the flooring you're interested in? Buy a bundle, assemble it temporarily on your floor and see how it stands up in your household. Create your own informal abrasion class testing by putting a random orbit sander to the samples and watch what happens.

Make Your Floor Flat

Any kind of click floor depends on a very flat subfloor to perform properly. In fact, it's essential. Since these floors aren't attached to anything underneath, gaps beneath the flooring will feel spongy underfoot. It's also possible that bumps or hollows may even prevent the click edging from interlocking properly.

So how flat is flat enough? The maximum height difference between two high points and a low spot between them is $\frac{3}{16}$ " over a 10-foot span. Cut a straight piece of wood this long, and then slide it around your subfloor with a ruler in hand to check.

Undercut Trim

One of the reasons click floors are so easy to install is the way they go down directly on top of most other existing floors. But this also means you'll need to trim door casings so the new flooring slips underneath.

Lay a piece of the click floor that you're using tight against the door trim, where it meets the floor. Next, take a flexible, fine-tooth Japanese flush-cut saw and rest it on top of the click floor as a guide. Carefully saw the trim off from this position. Your new floor will fit perfectly underneath the old trim.

Photos by: Steve Maxwell



Abrasion test – If you can't find the AC numbers you can conduct your own tests with a random orbit sander.



Tackle the trim – Use a thin kerf flush-cut saw registered on a piece of the laminate to cut the door trim perfectly.

Crosscut With a Jigsaw

Although you may naturally reach for your mitre saw when it comes to cutting pieces of click flooring to length, there are two reasons this is not a good idea. The first is dust. Each cut you take with the mitre saw is going to send a plume of fine, troublesome dust blasting out the back of the machine and all over everything else in your house. And even if dust doesn't bother you, rapid dulling of your mitre saw blade probably will. The protective coating on laminate floors is particularly abrasive, and it'll dull a good carbide crosscut blade in less than a dozen cuts. And if all this isn't enough, the precision offered by a mitre saw is completely pointless when it comes to installing click floors anyway. Most of your cuts have to happen on the ends of boards where they meet walls, in order to preserve the factory-milled, tongue and groove ends. These cuts will be hidden under baseboard and quarter round, so any kind of square, jigsaw cut will do fine.

Glue End-of-board Joints

Although click flooring is quite solidly connected to neighboring boards along its length, that's not necessarily true where boards meet each other on their ends. The ordinary, non-click tongue and groove joints on the ends of floor boards can (and sometimes do) slide apart in time under foot traffic. Although it's easy enough to tap them back together again before the baseboard goes down in your room, it's not nearly so simple when the edges of the flooring are hidden under quarter round.

This is why it makes sense to apply a tiny drop of glue to secure end joints as the boards go down and get tapped together end-to-end. It just takes a second to guarantee that gaps never open up.

Secure Flooring at Top of Stairs

If the ends of your click floor end up at the top of the staircase, there are two tricks you need to know about. The first is to temporarily screw a straight length of wood to the subfloor, along the edge where the stair nose will go later. (As a woodworker, you'll be able to make a much nicer nosing for this location than any of the ready-made stuff offered by click flooring manufacturers off the shelf.) This piece of scrap wood protects the edges of the laminate where they'll meet the nosing, while also providing a straight edge against which you can butt the ends of your click flooring as they go down. Unlike most cuts on a click floor installation, the few here are critical, so you'll need to make a nice neat job of them.



Don't bust your chops – Laminate materials are hard on saw blades so use a jigsaw and save your expensive blades.

Where You Can Put It

Click flooring is now made from a number of different materials, but most are suitable for installation in nonstandard locations. Laminates are now water resistant enough for safe installation in dry basements, bathrooms and laundry rooms. Most click flooring is also warranted for installation above hydronic and electric radiant in-floor heating systems.

DEFINITION

Hydronic: the name for the use of water as the heat-transfer medium in heating and cooling systems



A closer look reveals multiple layers that keep the floor from moving with the seasons.

Since click flooring installations are free-floating, and any movement of the finished floor where it meets the stair nosing would create an ugly gap, it makes sense to glue the ends of these boards down to the subfloor with small blobs of construction adhesive. The flooring still remains free to expand and contract along the rest of its length; it's just that you need to be certain the flooring won't pull back from the edge of the stair nosing as time goes on.

Click flooring is revolutionizing the do-it-yourself world, and that's an especially good thing for woodworkers who like to venture out and make good things happen beyond the shop.

STEVE MAXWELL
steve@stevemaxwell.ca





Raised Panel Doors

There is more than one way to build this common woodworking element – here are a few techniques to try in your shop.

BY MICHAEL KAMPEN

Wood is a hygroscopic material that will expand and contract as the relative humidity changes. This movement must be taken into account when constructing furniture.

Fail to account for this seasonal expansion and contraction and your panels will split and your joinery will fail. You may remember the article ('Dealing with Wood Movement', Jun/Jul '09, Issue #60), where the dangers of wood movement were discussed.

There are three elements in a frame and

panel door: the center panel, the rails, and the stiles. An easy way to keep the rails and stiles straight is to remember that 'stiles' and 'sides' both start with 's'. Each of these components can be made on the router table with the correct selection of bits. In this article I will outline the three methods I use most often in my shop.

Photos by: Michael Kampen

The Rails and Stiles

Rail and stile bits are available in two forms, matched and reversible. When making a rail and stile door with a reversible bit, the end grain is cut first and then the cutters must be removed from the shaft and then reinstalled in a different orientation for the long grain cuts. With a matched bit set, each profile is a separate bit and both have been perfectly matched to each other at the factory. One of the major advantages of a matched bit set is that all of the pieces are routed face down on the router table, which helps improve alignment. Any 1½ HP router can be used to machine the rails and stiles.

To machine the rails and stiles you will need a router table with a solid fence. Ensure that you mill some test pieces to use when setting up the router bits. As with all router table operations, the end grain surfaces are routed first and any blow-out or chipping is then routed away when the long grain edges are machined. To avoid any confusion, I have used a felt tipped pen to mark a number 1 on all of the end grain rail and stile bits I have.

With the cutter mounted in the router table, raise the bit until the top edge of the end grain cutter is even with the top edge of the material. Set the face of the fence so that it is even with the surface of the ball bearing. You can place a ruler against the bearing and then move the fence forward until the ruler sits flush against both sides of the fence as well as the bearing.

To rout the end grain you will need some form of a cross slide that will run along the face of the fence and keep the material perpendicular to the fence. Some router table fence systems have an elaborate cross slide that runs very smoothly and flips out of the way when not needed. Before you throw your hands in the air in frustration at the prospect of needing to purchase yet another expensive piece of equipment to complete a project, rest assured that while these cross slides are nice, they do nothing that a simple piece of

plywood can't do just as well. To make your own cross slide, cut a 12" x 12" square of ¾" plywood and sand the bottom and the edges. Fasten a handle to the top and apply a coat of paste wax to the base to keep it sliding smoothly on the router table. Place the cross slide against the fence and then register the material against the front edge of the cross slide. Move the whole assembly past the bit to make the cut. The



bit will cut into the leading edge of the cross slide, acting like a sacrificial back-up block, preventing the material from blowing out at the end of the cut. Measure the shoulder and the lip. The shoulder should be approximately ¼" with the lip being approximately ⅛". When you have set the correct height, rout all of your end pieces. Be sure to rout a spare piece to use as a set-up guide for future sessions.

Rout the Stiles

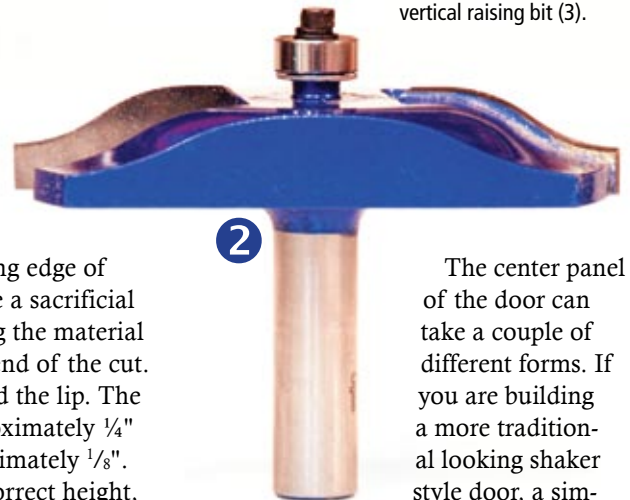
Use the set-up guide to set the correct height for the long grain cuts. With the bit installed in the table, line the groove cutter up with the shoulder on the set-up piece. Make a test cut to confirm that the height of the bit is correct. If there is a slight difference between the faces of the two pieces, it can be easily sanded out. If you are not achieving consistent results, add a set of feather boards to the fence on your router to maintain a consistent downward pressure on the material.

The Center Panel

Unlike machining the rails and stiles which can be done with a 1½ HP router, raising panels on the router table will require a little more power. You'll need to run a 2HP or greater router if you plan on spinning these large bits. For the large horizontal bits you'll also need a router with speed control because large diameter bits should not be run at full speed.



Panel raising options – You can choose from a back-cutting bit (1), a regular panel raising bit (2), or a vertical raising bit (3).



The center panel of the door can take a couple of different forms. If you are building a more traditional looking shaker style door, a simple flat plywood panel will be the

most appropriate option. A solid wood raised panel might be more appropriate if you're building a traditional kitchen cabinet door. A flat plywood door is the simplest, most stable option. Simply rip the material to length and width to fit the frame. A door with a solid wood raised panel involves a little more work on the router table before the panel is ready for the door.

When gluing up the boards for the raised panel, arrange them so the grain forms a pleasing pattern. When using solid wood, keep in mind that the curved edges of the panel will expose grain that will run in different



Rail and stile, matched set options – You can use a commercially made set of bits or you can make your own set that are just as functional.

directions than the face of the panel once it has been raised.

The procedure you use to rout the center panel will depend on the type of bit you are using. Whether the bit has a back-cutter or not and whether it is horizontal or vertical, will dictate different methods. I'll describe the method I use in each case.

If you only have a single speed router, then you will need to use a vertical panel raising bit. With this type of bit, the panel is run vertically against the fence and you'll need to use a second bit to cut the rabbet on the back edge of the panel.

The more common panel raising bits are the large horizontal type. To rout the

center panel with a bit with a back-cutter, set up the panel raising bit in your router table so that the top of the tongue on the rail is lined up with the bottom of the back cutter. You'll likely need to make a test cut or two because it's impossible to set the height of the bit using the rail directly. Because of the back-cutter, the bit will be cutting on both sides of the panel at once and it has to be at the correct height right from the start. To make incremental passes with this kind of bit, you will need to increase its projection from the fence in successive cuts until you have reached the full depth.

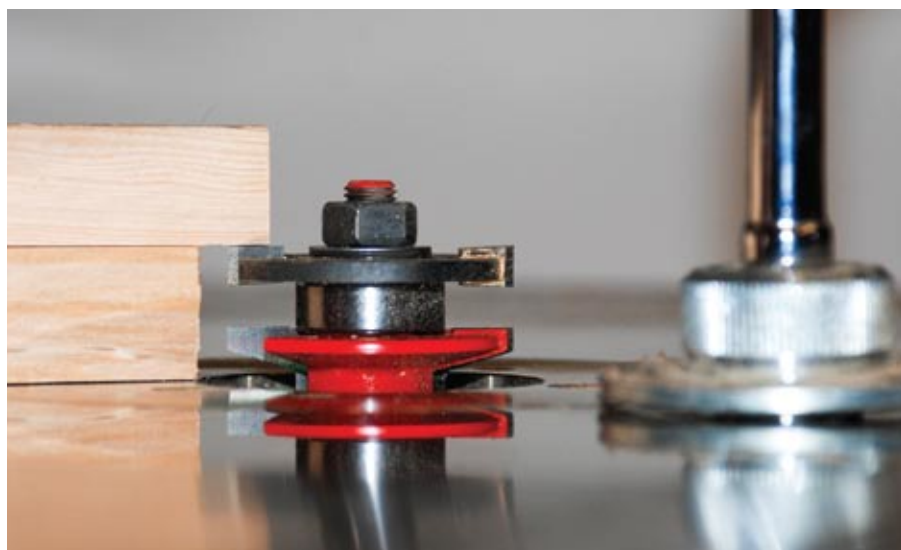
When using just a basic panel raising bit without a back-cutter, you will need

to change your approach. Because the bit doesn't have a back-cutter, you will need a separate slot cutting or rabbeting bit to relieve the back edge. If you are using $\frac{3}{4}$ " stock and you only raise the front of the panel, the surface of the panel will sit proud of the frame or the edges will not fit into the grooves. Before setting up the panel raising bit, use a slot cutter or a rabbeting bit to rabbet the back edge of the panel. Set the depth of the rabbet equal to the distance from the edge of the groove to the back of the rail/stile. With the rabbet routed in the rear face of the panel, set up the panel raising bit and raise the front of the panel. Because this bit doesn't have a back cutter, this cut can be made in increments by raising the bit after each cut. Make one or two rough passes to hog off the bulk of the material and then make a final light pass for the best quality cut so that you have a tongue on the edge that fits snugly into the grooves in the frame.

No matter which method you use to raise the panel, make an extra piece to use as a set-up guide for future operations.

Variations On a Theme

Most of the frame and panel doors I make are more like a shaker door and feature a flat panel with rails and stiles without an edge treatment on the inner



Forget the numbers – Set the height of the bit using the thickness of the material to start.



Two cuts in one – The back-cutting bit removes one step from the machining of the panel.

edge. As most of the matched rail and stile sets involve some sort of an edge treatment, I ended up making up my own matched set from slot cutter components. Simply mount a $\frac{1}{4}$ " slot cutter on one shaft and a $\frac{1}{4}$ " and $\frac{5}{16}$ " cutter on another shaft. Use some washers and shims between the $\frac{1}{4}$ " (top) and $\frac{5}{16}$ " cutter (bottom) to ensure they are exactly $\frac{1}{4}$ " apart. This set is the equivalent of a matched rail and stile set and can be used the same way. Set the top of the cutter equal to the top of the material and then rout all the pieces face down on the table.

Many of the doors I use in my work feature a flat panel in a plain frame, so I have developed my own method of making this type of door that is even simpler than using a raised panel set. As with the other methods, prepare all of your rail and stile material ahead of time and then set up a $\frac{1}{4}$ " spiral bit or a slot cutting bit on the router table. With the rail and stile pieces cut to size, I use a dowelling jig to place two dowels in each of the four corners and then I move to the router table to cut the grooves. If you use a slot cutter, run the material horizontally on the table, face down. The slot will need to run into the first of the dowel holes but this poses no problem. On the rails, the groove will run the full length of the edge, but on the stiles it will need to be stopped or it

will show on the top and bottom of the finished door. If you are using a $\frac{1}{4}$ " spiral bit the procedure is similar but the material is run on the vertical against the fence. Since vertical spiral bits are more fragile than the slot cutters, use a slower feed rate or make multiple passes to reach the full depth.

Assemble the Door

Before moving to the assembly stage, the center panel must be finished first. A panel that is finished after the door is assembled may leave an unfinished edge exposed when the panel shrinks. As well, finishing the panel separately before assembling the door means there are no corners to create areas where finish can pool.

The pieces, especially the routed profile, must be sanded before applying any finish. Without the right tools for the job you can spend considerable time trying to sand the profiles and by sanding them by hand you run the risk of distorting the profiles. If this happens it will be most apparent in the corners where the rails and stiles meet. One tool on the market to sand routed profiles is the Sanding Mop (stockroomsupply.com), and a bench top drill press. Mount the sanding mop in the drill press and run each of the rails past the spinning mop, first in one direction and



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Fine tuning – Adjust the bit after the first cut so the lip is 0.125" thick.

then in the other for a perfectly sanded edge that maintains its crisp details.

To assemble the doors, lay out some clamps and get your material and adhesive organized. The center panel should float in the frame to allow for the seasonal movement that will occur. If the panel is glued into the frame, the reason for building the frame will be defeated as the panel will not be able to move freely and it will most likely crack the joints in the frame as it expands or crack the panel as it contracts.

The panel should fit snugly to keep it from rattling as the door is opened

and closed. If the panel fits somewhat loosely, it can be held tight using one of several commercial products. Panel barrels or Space Balls from spaceballs.com, are small rubber cylinders and balls that are inserted in the slots before the panel is installed and they keep it from rattling while allowing it to expand and contract. You can make your own 'rattle snakes' to serve the same purpose in the shop using waxed paper and a tube of silicone caulking. Simply draw out a 1/4" bead of silicone on the waxed paper and when it has cured cut the snake into short sections and insert it into the grooves.

If you wish to glue the panel in, place a small amount of glue in the center of the two rails and then center the panel in the frame when assembling it. This will lock the panel in place while still allowing it to expand into the frame at the sides.

To assemble the door, use a brush to apply a thin layer of glue to the rails and then clamp everything up. Check the diagonals to be sure the door is square and examine each of the four corners to be sure that the end of the stile is even with the edge of the rail. There is nothing to lock this joint in place, so it may shift slightly as the clamps are tightened. Assembling the door style that I use is the easiest of the bunch. Simply use a brush to apply glue to the dowel holes, insert the dowels, the panel, and clamp it up. In this case the corners are locked in place and there is no need to check either the diagonals for square or the corners for alignment.

Used everywhere, for the sides, the doors and even the back of a cabinet, the frame and panel is one of the most common elements in woodworking. Using these techniques will provide you with many options for their construction, depending on the equipment you have in your shop.

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Tues 3:45-Joe

This handy chalkboard will help to ensure that important messages don't get lost.

BY MICHAEL KAMPEN

Sticky notes just add to the clutter in my office and computer-based 'to do' lists don't work for me either; it is just too easy to ignore all of those warning bells and alarms by hitting the snooze button. Writing these lists on a chalkboard keeps them up on the wall and visible, acting as a constant reminder to get the items on it done. I also have one in the shop that I use to work out construction details on during the build process and when I need to make a copy of the drawing, I simply take a photograph with a digital camera and transfer it to the computer. Placed in the kitchen, it can serve as a message centre for the whole family and a handy drawing surface for young children, giving them an outlet for their creative energies, reducing the chance they will redecorate your walls with crayons.

One of the basic constructs in wood-working is the rail and stile door. In the Router Techniques article in this issue I cover three methods of making a rail and stile door using a router table. Any of those methods would work equally well for a basic frame such as the one used in this project. I've chosen the hybrid method I use for basic flat panel doors for this project. The grooves for the writing surface are cut on the router table and the rails, stiles and rail extensions are assembled using dowels. I used the Dowelmax jig (dowelmax.com) for all the dowelling in this project.

Milling the Lumber

When milling material it is best to break out all of the parts from the rough stock first. Look at the material you have on hand and then choose which pieces of wood you want to feature as the visible

face of the pieces. Mark these slightly oversize and cut them from your stock. It's important to work with the smaller pieces cut out of the large rough plank as opposed to milling the entire plank and then cutting out the parts as you will lose less material in the milling process as a result of any twist and warp on the board. This is especially important when you are working with S2S lumber that has been milled to $15/16$ " thick before being sold.

Mill the top and bottom rails (A) to the correct thickness and width and cut them to length.

Mill the stiles (B) to the correct thickness and width and cut them to length.

Mill the rail ends (C) and chalk ledge (D) to the correct thickness and width and cut them to length.

To provide some additional visual interest, I used two different thicknesses of wood on the frame pieces. The stiles are

slightly thicker than the rails giving the frame extra visual complexity and a more traditional Arts & Crafts look. Because all of the joinery is referenced off the back surface of the board, the rear faces are all perfectly aligned. Mark the outer edges of the two rail extensions and drill dowel holes in the stiles as well as in the ends of the rails and rail extensions. As a precaution against mistakes in the next step, assemble the frame with a few dowels and then run a piece of chalk around the inside edge of the frame. Doing this will prevent you from routing the groove for the writing surface on the wrong edge of the material when it is disassembled.

Get Into the Groove

Cutting a groove for the writing surface is a two-step process. If you make the mistake of assuming that the writing surface is actually a full quarter of an inch thick and use a 1/4" cutter to make the cut, the panel will fit into the groove very loosely and will rattle as plywood is always undersize. Special undersize plywood bits are available for routers but you needn't go to the expense of buying extra bits if you only use plywood occasionally. I used a four-wing slotting cutter from Freud and then made two passes to arrive at the correct depth. Set up the bit so it projects 3/8" from the face of the fence. Be sure to cut all of the grooves



Notch the tray – Slight differences between the rails and stiles require a notch in the ends of the tray so it will sit flush.

with the back of the pieces on the table. If you don't, your grooves will not line up because of the difference in thickness between the rails and the stiles. Cutting the grooves in the rails is a simple matter of making two passes along the full length of the inside edge. The grooves in the stiles will need to be stopped or they will show where they project above and below the rails. Use a pencil to place a line across the material, 3/8" in from the corner where the rails and stiles meet. Place a pencil mark on the fence as well to mark the center of the router bit.

To rout a stopped groove, line up the two marks and start the cut at this point. When bringing the material into the bit,

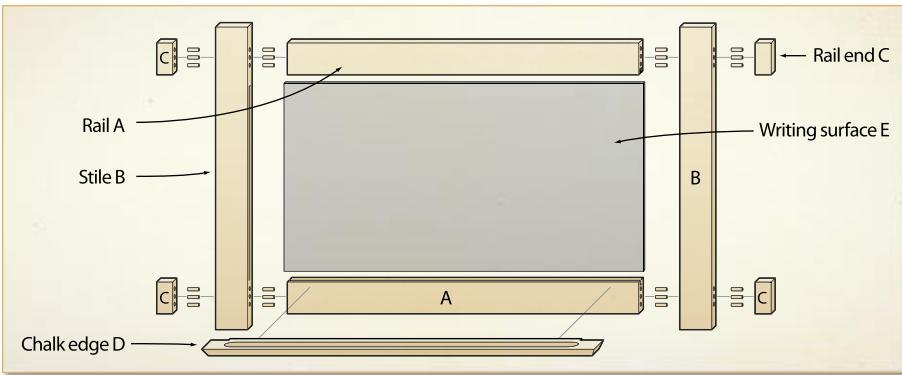
hold the material firmly and ease it into the bit. Run the material along the fence until the mark at the other end lines up with the mark on the fence and then pull it away from the fence. Make the four cuts at the same time before adjusting the height of the bit to widen the groove to fit the plywood. Repeat the cuts until the plywood fits into the groove snugly. Using a test piece in this instance will allow you to get the right groove width without risking the actual project pieces if you make the groove too wide. I usually make one of my rails or stiles intentionally long so that when they are cut to size, I have a test piece that I can use for all machine set-ups. The groove will run into the first of the dowel holes but this is not a problem. Assemble the chalkboard frame and measure the opening (including the grooves) to confirm the exact size of the plywood panel and cut it to size on the table saw.

Don't Get Stuck on a Ledge

Mill the material for the chalk ledge to the correct width and length. To give the ledge a less blocky appearance, use a jointer to bevel the front of the ledge. Use a crosscut sled on the table saw or a mitre saw to cut a similar bevel on the two ends. Set up a dish carving bit on the router table to rout the recessed area to hold the chalk. This will be a stopped cut as well, so use the same procedure, as on the stiles, to cut this. Cut the recess to a depth of 1/4" in a couple of passes. Because the large surface area of the dish carving bit will likely cause some

Materials List

Part		Qty	T	W	L
A	Top & bottom rail	2	3/4	3	37 1/2
B	Stiles	2	7/8	3	33 1/2
C	Rail ends	4	3/4	3	1 1/2
D	Chalk ledge	1	7/8	2	41
E	Writing surface	1	1/4	23 1/4	38 1/4



burning, turn the speed of the router down a little and as soon as the material is flat on the table begin moving it along the fence. This will reduce your burning to a minimum. Once you have made the first cut and have a feel for the process, raise the bit by $\frac{1}{32}$ " and repeat it to remove any visible burn marks. If you still have some burning, sand it out with sandpaper or a sanding mop. Set up a bottom-cutting mortising bit in the router table to cut the notches in the end of the ledge to accommodate the thicker stiles. I used a 1" wide bit, available at freudtools.com, in combination with a fence for this cut and set the projection to the difference in thickness between the rails and stiles. A stop block limited the length of the cut on each end. To square up the round edges of the cut, use a sharp chisel or a utility knife.

Fade To Black

When the plywood panel has been cut to size, sand the surface through to 150 grit, using a random orbit sander and remove all sanding dust. Use a roller to apply the chalkboard paint to the plywood. I applied several coats to ensure a smooth and durable writing surface. Be sure to use the chalkboard paint in a very well ventilated area, as this paint gives off a very strong smell. Allow the paint to dry completely before moving on to the assembly stage.

While you wait for the finish on the writing surface to dry, sand and finish the frame pieces. A coat of satin polyurethane will provide a tough, long-lasting finish for the oak that will stand up to the abuse it will receive over the years and will make wiping up the chalk dust a breeze.

Bring It All Together

If your grooves were very snug on the plywood before you painted the writing surface, the addition of the paint may make it difficult to slip the plywood into the groove. If this is the case, turn the writing surface over on a towel and use the random orbit sander to sand the outer edges of the panel. Use a light touch as you'll only need to remove a small amount of material to make the panel fit again.

Gather all of your pieces: the dowels, the glue, and your clamps before beginning the assembly. Glue the dowels into the ends of the rails and then glue the two rails to one of the stiles. Slide the writing surface into the grooves, making sure it is properly seated and then close the frame off with the other stile. Before moving on to the rail extensions, clamp up the frame to ensure that the dowels have been driven in completely and that there are no gaps where the pieces meet. After about 30 minutes, when the parts have been locked in place, remove the clamps and add the rail extensions. Mount the ledge using countersunk screws driven in through the rear of the rail.

Install the Hardware

Using a shop-made French cleat would have made the chalkboard stand out from the wall a little further than I had envisioned and using a router to cut a keyhole slot across the top rail would have allowed for some movement of the chalkboard after installation. Instead I opted for a couple of aluminum Z-clips from leevalley.com (00S18.55) to do the job. To fasten these to the rail, drill some holes into the clips and then screw



Hanging on the wall – This simple hardware allows the blackboard to be easily mounted to the wall.

one to the back of the rail. The other part of the fastener is then attached to the wall. These clips will lock the chalkboard firmly in place. Apply a couple of felt bumpers the same thickness as the Z-clips to the bottom edge of the chalkboard to keep it parallel to the wall.

The only thing left is to fill the ledge with chalk and start making notes to yourself or others. If you're feeling especially bold...try some coloured chalk.



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Dining Table

Every dining space is unique – learn to make a dining table that fits your space.

BY ROB BROWN

This dining room table will stand up to daily use, but also look elegant enough to host holiday gatherings and evening get-togethers. An important feature to consider is the material for the top. There are lots of options when it comes to choosing material for a solid wood top. Some wood features mineral streaks, sapwood/heartwood combinations, or natural figure that looks great highlighted as part of a table's surface. Some lumber is soft, like Douglas fir or pine, and will change quite a bit over the years as it picks up character. While other lumber is much more durable, like white ash or hard maple, and will stay crisp for a long time. Whatever wood you select don't be afraid to use material with interesting, natural features to make a truly one-of-a-kind table.

Dimensions for a Dining Table

When building a table there are a few dimensions you should keep in mind for function and comfort's sake. The most important one is the overall height of the table. A dimension between 29" and 30" is standard. This height will not only be very comfortable and familiar for the vast majority of people, but it will also work well with the standard chair height.

Another dimension to keep in mind is the distance from the floor to the underside of the apron. If this dimension is too small there will not be enough space for people to put their legs underneath the table. If it's too large you may have trouble making the table strong and stable. A height of 24 ½" to 25 ½" is standard.

The final measurement that you should consider before making any sawdust is the overall dimensions of the top. If the table is going to go into a small room you

don't want people to have difficulty sitting down and getting up from the table because a wall is interfering with a chair. A comfortable minimum space between the table and a wall is 36". This will allow everyone to have access to the table easily and whoever is serving can have full access to the table. If space is really tight you can reduce this distance to no less than 24", but realize that it will not be as comfortable and welcoming for everyone. Dining tables are usually between 36" and 45" in depth, while the length can vary to suit the room or the number of guests you expect to host.

Begin with the Legs

Although I always try to avoid gluing up a blank for each leg, finding a piece of wood thick enough isn't always possible. If you have to glue up legs, take great care in matching wood for grain and colour so any glue joints don't stand out. Before I broke out the legs I glued a few 2 x 4s together and came up with a leg design that looked right for the table. Using such designs and models help me make decisions about how to construct the table. Questions like "Where do I cut

the mortises in the leg?" "How much of a reveal looks good between the leg and the apron?" and "How do I know what curve looks good on the leg?" will be answered with this model leg.

Now you can begin to mill the material for the four legs. When doing so, keep the end grain in mind. If the legs are to have curves cut into their outer faces the annual growth rings should be oriented so they travel on a 45° angle from the inside corner of the leg to the outside corner. When the curves are cut into the legs the grain lines will mimic the curve and produce a balanced, beautiful leg. For now, machine the legs to final width and thickness while leaving them 1" long in their length. This extra inch will make it easier to machine the mortises.

Cut the Mortises

The mortise and tenon joints that will secure the apron to the legs need to be strong to keep this table together. The mortise in this case, should be 3" in length and needs to stop at least ½" from the top of the leg (don't forget about the extra 1" we left on the top of each leg when planning to cut this joint). Each tenon should have a shoulder of at least ⅛" so when assembled it can seat itself against the side of the leg. This is where the model leg comes into play. By using it, and a model apron, you can get a better idea of where the mortises need to be. Start by drawing the top view of one of the legs, with both mortises.

I use a plunge router equipped with a spiral bit and a brass template guide. The template guide runs in a groove I machine into a piece of ¼" plywood. I attach a couple of cleats to the plywood so the groove will be positioned directly over the mortise location and I clamp the plywood to the leg. The template guide fits the groove with absolutely no sideways movement, so the router can move back and forth to create a perfectly straight mortise. The mortise depth is limited to the length of the bit. That's the reason I use thin plywood. Anything thicker would just take away from the depth, and therefore strength, of the mortise.

When you're confident about location and depth, machine the eight mortises on the inside top faces of the legs. Now you can cut the legs to their final length of 28".

Cutting the Tenons

Determine the overall length of the aprons. Add double the depth of the mortises to the

between shoulders measurement of the aprons, then subtract ⅛". You subtract the ⅛" to make sure the tenons don't bottom out in the mortise during assembly (⅛" per mortise). Machine the aprons to overall size.

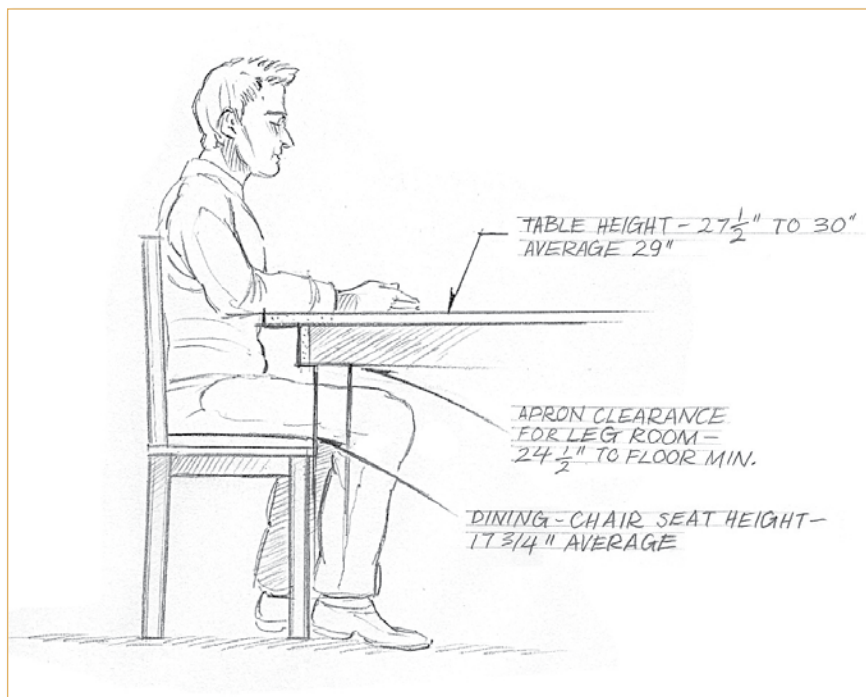
I machine the tenon on the ends of each apron with a dado blade in my table saw, but there are many ways to cut them. Start with the outer face of the apron face down on the table saw. Adjust the dado blade to cut the first cheek of the tenon and adjust the fence so the tenon will be ⅛" less than the depth of the mortise. The depth of the first tenon cheek will determine the location of the apron in relation to the leg, so make sure the face of the apron finishes where it's supposed to. Cut the first



Mortising legs – Using a guide bushing is a simple and effective way to get accurately placed mortises.

Materials List

Part	Qty	Material	Description	T	W	L
1	4	Black cherry	Legs	2 13/16	2 13/16	28
2	2	Black cherry	Long aprons	1 1/8	4 3/8	61
3	2	Black cherry	Short aprons	1 1/8	4 3/8	30
4	2	Black cherry	Long beads	3/8	1	62
5	2	Black cherry	Short beads	3/8	1	31
6	1	Maple	Top	1 1/4	36	80
7	1	Hardwood	Cross brace	1	3	"To suit"
8	10	Hardwood	Table top clamps	1/2	16 15/16	3 1/8
9	3	Hardwood	Cleats	1 1/4	1 1/4	10





Drawing the arc – This low-tech method of marking arcs is perfect for this application.



Hand planing a curve – A flat-soled small plane can be skewed to work a gentle inside curve. However, the first choice would be a compass plane.

cheek on all of the tenons. Now carefully adjust the height of the dado blade to cut the other side of the tenon cheek. It doesn't have to be a perfect fit right away – you can always use a shoulder plane to shave the tenon down to a perfect fit later. After all the cheeks are cut, use a handsaw to notch the top portion of the tenon so it will fit each mortise. With a file, round the corners of the tenon and test fit the joint. If it doesn't fit, use a shoulder plane, chisel or file to make some minor adjustments. You are looking for a fit that doesn't require a mallet to force it together, but it also doesn't just fall together without any force at all.

Graceful Curves Add Beauty

The arc on the underside of each of the four aprons can now be drawn onto the aprons with the help of a flexible straight-edge, three blocks and clamps. The arc is 1" narrower in the center of the apron than it is at the edges. Cut the arc with a bandsaw or jigsaw, but leave about $\frac{1}{16}$ " of material on the apron to work with. Because there are only two aprons of each size, (two long aprons and two short



Clamping the bead – Don't be afraid to bring out all your clamping power when gluing on a curve – in this case, more is better.

aprons) I don't go to the trouble of making a pattern for my router table. I find it easier and quicker to use an assortment of planes (depending on how tight the radius is) to take the high spots down and fair the curve by hand. The ideal tool here would be a compass plane but, by skewing a flat-soled hand plane, you can plane to a slightly tighter curve.

Joint and plane a blank to obtain the four $\frac{3}{8}$ " thick beads. The blank should be at least 3" longer than required. Rip slightly oversize strips from the blank, then send them through a planer to bring them to $\frac{3}{8}$ " in thickness. To create the bead, use a $\frac{3}{16}$ " round-over bit in the router table and cut a quarter round in two adjoining edges. Always use feather boards and push sticks to protect your hands from the bit when machining smaller pieces on a router table. It takes a bit of time to set up but it's much better than nicking one of your fingers.

Before gluing the beads, sand the front underside corner of the aprons to break the edge. You will need a caul long enough to cover the entire length of the apron and all the clamps you have...maybe more. Apply glue judiciously to the underside of the apron – any excess glue will squeeze out and may cause problems down the road. You can use a finishing nail to tack the bead in place, then, with the caul, start applying the clamps. I routed a quarter round in the back of the apron. This cove will feel a bit better on the hand if someone reached under

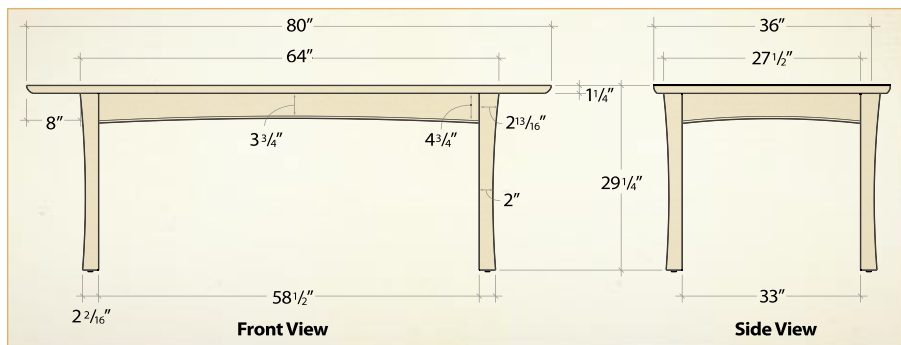
and grasped the underside of the apron. Remove any glue squeeze-out with a sharp paint scraper. Cut the overhanging bead to length using a fine handsaw so it's flush with the shoulders of the tenons.

Refer to your leg model before you cut the curves of the legs. Trace lines directly onto the legs and use a bandsaw to cut them out. The first cut in each leg will be simple, but the second one will require you to tape the off-cut back onto the leg in order to bandsaw the second curve. The off-cut will hold the leg parallel with the bandsaw's surface. Use a hand plane to even out the surfaces and then sand the surfaces smooth.

Wooden Blocks Allow Movement to Occur

Using hardwood, machine a blank about 5" wide and $1\frac{1}{4}$ " thick. The blank should be fairly long – at least 20" is good – so you have a lot of material to hold on to during machining. Cut a rabbet along the end of the blank with dado blades in the table saw. This leaves a $\frac{3}{8}$ " thick x $\frac{1}{2}$ " long tenon. With a mitre saw, crosscut the blocks (including the tenon you just machined) to about $2\frac{1}{2}$ " long. This piece can be cut on the bandsaw to final size. Repeat this process until you have enough blocks, or continue to make blocks for your next project. Drill two holes in each block so they can be secured to the underside of the table.

The grooves in the aprons that will accept each tabletop clamp block are



machined with a router. The groove has to be larger than the tenon on the clamp blocks, so choose an appropriate router bit. When the tenon on the clamp block is secured against the upper portion of the groove, the upper surface of the clamp block should be flush with the top of the apron. You can't have the clamp block protrude above the top edge of the apron because then the tabletop will not be fastened securely to the base. With an edge guide attached to the router, make a test cut in a piece of scrap. When the location is perfect, cut all the grooves on the insides of the aprons. I used ten clamp blocks in total, to go along with a solid wood cleat glued to the center of each short apron.

Assembling the Base in Stages

Now it's time to assemble the base. Dry fit everything, because you don't want any surprises after you apply glue to the mortises and tenons. Rather than assemble the entire base at once, break it into three different subassemblies. First, glue one short apron to its two mating legs while the rest of the base is dry assembled around the first subassembly. Make sure everything is square while the glue dries. Next, glue the other short apron to its mating legs and lastly, glue the two long aprons to the two subassemblies.

You should apply glue blocks in the corners for some additional apron-to-leg strength. Glue blocks go a long way to adding strength to an integral joint.

Gluing Up the Solid Top

Before you start to glue up the top make sure the wood you're using is at the proper moisture content. There are a number of problems that come with using wood that is too wet, but glue failure and excessive warping are the main ones.

Cut the boards to rough length then joint and plane them to within 1/8" of their final thickness. Lay the boards flat so you can see what grain and colour you're dealing with. You will want to orient each board so it looks good beside its neighbor. You also want to keep growth ring orientation in mind. With a large solid wood top it's important to alternate the growth rings to help keep warping to a minimum and to ensure that your top stays together for years to come.

Once you're happy with how the boards look and the growth rings are oriented properly it's time to glue them together. If you have a 36" planer, you're in luck. Glue the boards together and send them through the planer to flush the surfaces. If you don't have a 36" planer, don't feel bad...there's still hope. After jointing the edges to get a straight, even glue joint, glue boards together to form blanks that will still fit through the planer you have. I glued everything into 13" widths, and then sent them through my planer to bring them to final thickness. These 13" wide blanks were jointed then glued together to form the top. During this final step use a lot of care to align edges and keep the panel as flat as possible. I find people tend to under clamp during this sort of operation. I use as many clamps as possible, alternating them below and above the panel to keep the panel flat. It's also easier to keep everything straight and aligned if you clamp just two blanks together at a time. Once the glue is dry, rip the top to final width.

A 9' radius needs to be cut at both ends of the top. To do this, attach a board to the underside, middle of the table top. Attach a long circle cutting router jig to this board. The jig can be made of a couple of pieces of 3/4" plywood that are attached together. Simply secure a router to one end with the bit protruding

through the jig. Make sure you attach the jig to the first board so the center of the arc is aligned with the center line of the table. Also make sure that there is 9' between the inside of the bit and the center point of the arc. With small passes rout the arc into the end of the top. Repeat the same process to cut the arc on the other end.

Feel free to use your own imagination to come up with an edge profile. I used a large round-over bit (about 1 1/2" radius) with a bearing to rout the underside of the top and a small round-over bit (3/16" radius) to rout the top edge.

After some hand planing and lots of sanding with a belt sander and sanding block you are ready to attach the top to the base. Flip the top upside down on a workbench. Make sure something soft – some carpet works great – is between the top and the bench so you don't scratch the top surface. Center the base over the top. Secure the base to the top by inserting some #10 screws through the solid cleats. You will have to drill a pilot hole in the top to avoid splitting the top. When driving screws into the top make sure the screws are the right length. You don't want a screw to poke through the top, ruining a beautiful surface. You also don't want to use a screw that's too short, as it will not provide enough holding power. Aim to have the end of the screw stop between 1/4" and 3/8" away from the top surface. Last, but not least, install an adjustable leveler foot centered on the bottom of each leg.

Applying an Appropriate Finish

This table will be subject to a lot of use so I wanted a finish that will stand up to everything from liquid and heat to stains



Laying out boards – It's important to strike a balance between esthetics and wood movement – choose the position of the boards carefully..



Routing the table top arc – Take small bites with the router to ensure a clean and burn-free cut.

and scratches. There are pros and cons associated with every finish. There's no such thing as The Best finish. The best you can aim for is the best finish for this piece. Varnish, although it dries slowly and is harder to apply, is a great choice for all around protection, cost and availability. With a brush, apply the first coat thinned 25% with paint thinner. When



Attaching the top – Choose your screw length carefully to avoid breaking through or telegraphing the screw tip.

dry, give it a light sand with some 320 grit paper. Apply additional coats full strength – two coats are fine for the base, while three will protect the top – sanding between coats to get rid of any roughness. Often I will wipe on the last coat with a rag to get a nice, smooth finish. If you are having troubles applying that last smooth coat, thin it 25% to allow it to flow out a bit better. While finishing, make sure that

Resources

Dealing With Wood Movement

June/July '09, Issue #60

the area you are working in is as dust-free as possible. A few days after you apply the final coat, rub the surface with #0000 steel wool and wax. You will be rewarded with a beautiful smooth surface that repels liquids - perfect for a dining table.

This dining table is sturdy, elegant, and built to take the punishment that will be thrown its way for years to come. I'm sure it will earn many scratches and dents, during boisterous family gatherings, weekend craft sessions, or spirited dinners with friends that roll late into the night. After years of use, the patina will become a big part of its character, and memories of those events will be the highlights.



ROB BROWN
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Alan Holtham
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Low-Angle Block Plane

While the smoothing plane excels at preparing face grain, the block plane with its special set of features, is a necessity for working on the toughest cuts of them all...end grain.

BY TED BROWN

The low-angle block plane is a fine tool used for cleaning up end grain after cutting a board to length, for removing the aris, for shaping of outside curves, and for cutting angles such as an under-bevel on the bottom side of a board.

It differs from the more common smoothing plane in that it has an adjustable mouth, no cap iron, and the blade is installed bevel up. The iron has a primary bevel of 25° and a bed angle of about 12°. The attack angle, that is to say, the angle at which the blade enters the wood, is the total of the bevel angles,

plus the bed angle, or roughly 37 to 39°.

The relatively low angle is well suited to cutting end grain. Hardwood fibres are aligned longitudinally with the length of the board like a bundle of straws. If you try to cut the end of the bunch of straws with a plane bedded at a higher angle, the blade tends to dive between the straws and into the work. The 37° attack angle of the low-angle block plane attacks the stack of straws from the side, which reduces tearing, and provides a clean cut.

Tuning Your Block Plane

These days the machining on modern block planes is incredible. If you

purchase a Veritas or Lie Nielsen plane, you may proceed with confidence that the tool arrives flat, and square. If you have an older plane, check the flatness of the sole with a machined straight edge, and a 0.001" piece of shim stock. If you have a good quality 12" ruler, you can make a quick sole check using it as your flat reference. Invert your plane, place the flat shim on the sole, place the rule, on edge, on the shim, and then try to remove the shim. Try this at several locations along the length of the sole. If you can remove the shim without moving the rule, your plane sole requires flattening.

Assuming the body of the plane is flat and square, your next task is to tune the

Photos by: Ray Pilon

plane iron. The block plane setup is different from that of the smoothing plane. Unlike the smoothing plane, we keep the leading edge of the block plane iron square to the iron sides. We purposely avoid creating a camber when grinding and honing the tool. (To refresh yourself with sharpening, see Apr/ May '09, Issue #59).

End Grain Applications

It is important to note that we take very thin, see-through shavings with this tool when cleaning up end grain. It is not so much about shaping, but rather just cleaning up tool marks. If you cannot take a continuous shaving off the end grain of your board, then the iron is dull, and requires honing. Your tool must have a keen edge – anything less, and the process will be frustrating, as the iron will bounce up out of the cut.

The adjustable mouth of the plane is a very handy feature. I find it useful to open the mouth to about $\frac{1}{8}$ " when planing end grain. You do not need the sole ahead of the cutting edge to be close for end grain work, since the cut does not tend to split ahead of the blade. Having the mouth wide open allows me to see through the mouth while cutting, which is useful when starting the cut.

The short toe section of the block plane makes starting the cut somewhat challenging at first. We want to avoid chatter to maintain a smooth cut, so it is essential that you place the toe of the plane flat on the board before proceeding into the cut. When shopping for your plane, have a good look at toe length. The new Veritas low-angle block plane features an enclosed toe

section to ensure that your plane runs dead flat. The toe is also longer than other designs, which is a bonus when you are establishing registration flat on the board before entering the cut. When working end grain, I actually use a two handed grip. To reduce the occurrence of chatter, your grip on the tool is firm, with both hands, throughout the cut.



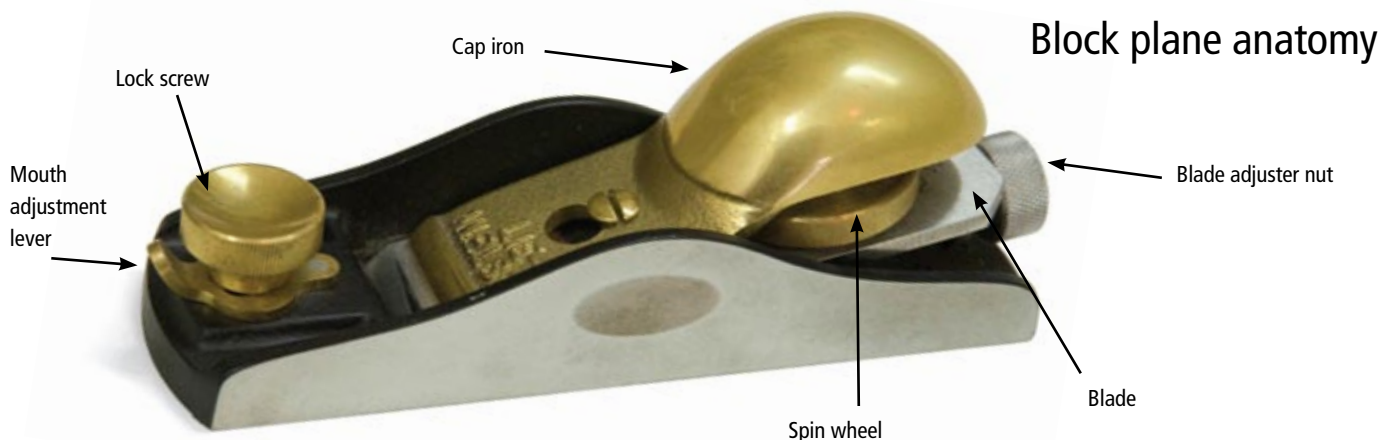
Excelling at end grain – A properly tuned block plane should take thin shavings of end grain with ease



Custom bevels – You don't have to be locked into using standard bevel angles offered by router bits. Simply scribe your lines and work to them for a custom look.



Thin shavings – The block plane should make shavings thin enough to read through.



Setting Up for a Fine, Chatter-free Cut

You may wish to set up your plane on a test board before planing that exquisite piece of cherry that will soon be part of your coffee table. Cut a fresh piece of cherry or other moderately hard wood, of a similar thickness to your actual work piece. Open the mouth of the plane wide open, and then tighten the front knob to lock in that setting. Skew the plane about 5° and place the toe of the plane on the end of the board, ensuring that you have the plane sitting flat on the board. Reduce the tension on the lever cap wheel to allow for depth of cut, and lateral adjustment. Retract the blade so that you initially have zero cut – a good habit to ensure you do not dive into an important piece of work. Move the plane back and forth on the wood while slowly advancing the blade until it just starts to cut. At this point, read the shaving to determine whether the shaving is of the same thickness from side to side, or if it is thicker on one side, and fading to nothing on the other. Adjust the blade with the lateral adjustment to achieve a shaving of equal thickness across the width of the cut. You will note that the lateral adjustment also affects the depth of cut, so you may have to readjust the blade depth to get the optimal thin shaving.

Planing End Grain

The left hand takes a firm grip of the front knob, and applies significant downward pressure. Maintain pressure on the front of the plane throughout the cut to reduce chatter. I tend to skew the plane very slightly from 90°, which makes it easier to start the cut because the blade does not catch the leading edge of the board all at one time. The skew also reduces the effective attack angle, thus improving the cut. The other reason for skew is comfort; I am right-handed, so I skew the plane with the heel to my right side, allowing for a more comfortable grip. The left hand provides most of the forward force. Refrain from applying downward pressure with the right hand until the heel of the plane is on top of the board.

The technique I use for planing end grain is to plane half-way across, and then reverse the board and plane from the other



Faster and quieter – A block plane is often times the faster way to remove the arris from a board.



Easy clean up. – Using a block plane to clean up bandsaw marks on an outside curve is simple and quick.

direction to reduce the probability of tear-out at the end of the cut. We do not want to create what we refer to as a “flapper”; a massive splinter on the far edge of the board created by planing across the unsupported edge. When you plane from either side, you will see a colour difference in the end grain since you tend to fold over the end grain slightly in either direction. We will correct the colour difference later by a light sanding with 400 grit sandpaper. You will feel that the finish off the plane on end grain is not nearly as smooth as a flat grain surface cut with a smoothing plane. This happens because you still have the ends of the fibres sticking up like straws.

Using a square, verify that you have maintained a square relationship between the edges of the board and the end, as well as the face of the board to the end. If one side is slightly high along the length of the surface, correct this by varying the skew of the plane. If the left side is high, skew the rear of the plane slightly left. Do not try to apply more weight to the left side, simply hang the rear of the plane over toward the high side of the board and take a normal stroke. The bias created by the skew will remove more wood on the high side.

Shooting End Grain With a Shooting Board

For cleaning up end grain on smaller parts, I prefer to hold the work on a shooting board. Shooting boards are simple to make in your shop, and together with a block plane, you have a solid, repeatable system to clean up end grain. A



Shooting end grain – It is very easy to square the end of a small board in two dimensions by using a shooting board with the block plane.

consideration when purchasing your block plane then becomes: how often will I use a shooting board, and how well can I hold the tool when I use it on its side? The height of the sides of the plane body will affect the stability of the tool. Short sides may lead to an unstable condition when using the plane on a shooting board.

Removing the Arris

The block plane is a wonderful tool for removing the arris; the sharp edges formed by two flat surfaces meeting on the edge of a milled board. Increase the cut from the setting used for planing end grain. Place the plane at 45° to the end of the board, and make three light passes. Change the angle of the plane to 22° to the end of the board, and take one pass. Move the plane to 22° to the face of the board, and take your fifth pass along the first edge of the board. I call this the 123-4-5 method. It results in a very clean, faceted edge that we refine later with 400 grit sandpaper. You have now rounded over the arris on the first edge. Use the same technique on the far end of the board, then work your way around the end of the board counter clockwise until you have removed the sharp edges. We eliminate small amounts of tear out at the end of each cut by moving to the next set of cuts in the counter clockwise pattern. After removing the arris, use a block and sand lightly with 400 grit paper, leaving a wonderfully smooth end, ready for finish.

Shaping

I regularly use a block plane for shaping outside curves. The grain varies from flat grain, to various angles depending on the curve. The important point to remember is to plane downhill. That is to say, we always plane with the grain. To keep tear-out to a minimum, adjust the mouth of your block plane to a minimum opening for the thickness of shaving you are removing. The key in shaping is to keep the cut light, the mouth setting tight, and the balance of the plane on the curve, keeping the cut continuous.

The block plane is also a great tool for creating bevels on the bottom side of tabletops. Keep the mouth tight when working with the grain to reduce tear-out. I often will put a bevel along the underside of a tabletop to visually lighten the weight of a tabletop. Simply strike a line along the edge of the tabletop, and along the bottom, and plane until you meet the layout lines. The low-angle block is ideal for quickly selecting an angle by eye, and then creating an under-bevel.

Fine hand tools allow you to make any variations you want in a short amount of time. They allow you to enjoy the art of working by hand and eye while keeping the dust and noise level down in your shop.

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Honey dipper

Make your honey more accessible and less messy with this turned project.

BY ALLAN CUSWORTH

A honey dipper is a great turning project for new turners. It gives you a great opportunity to practice spindle turning techniques with the blank mounted between centers on your wood-turning lathe. It is also a good project for practicing your skills using a skew.

Since this is a useable utensil, the wood selected to make it must be non-toxic and it must not add any unwanted taste when it is used. Two such woods are birch, and maple. There are others but a study on that issue is beyond the scope of this article. The finish you use must also be food safe. I appropriately used beeswax for this project.

Basic Design

A honey dipper is made by making some deep grooves at one end of

a round piece of wood, and creating a smooth, curved handle on the other. Decorative touches such as beads, coves, burned-in or captive rings, etc., can be added as desired. This project will yield a finished honey dipper about 1 1/4" in diameter by 8" in overall length. The grooved section will be about 2" long and the handle will be about 6" long to get into those deep jars of honey. These dimensions can be modified as long as the basic proportions are maintained.

I used a billet of straight-grained dry maple 1 1/2" x 1 1/2" x 9" long with no inclusions. This will help prevent the utensil from breaking during use and not allow unwanted holes to trap honey. I did not draw a plan for this project since it is not a complicated design; turning it "free style" is a much more practical method, in my opinion.

Suggested Tools and Materials

- Four-prong, or spring loaded spur center
- Live tailstock center
- 1 1/4" spindle roughing gouge
- 1/2" spindle gouge
- 3/4" skew
- 1/16" narrow parting tool
- outside calipers
- sanding media
- beeswax
- paper towels

Preparing the Blank

Inspect the billet and choose which end will have the grooves. Sometimes the grain pattern will dictate which direction looks the best. Locate and dimple the centers of both ends of the blank. With a 4-prong, or spring type spur center in the headstock, and a live center in the tailstock, mount the blank between the lathe's centers. Place the end where the grooves will be located at the headstock end. This is not critical but I feel it is a little safer this way.

Round off the blank using a spindle roughing gouge. The outside diameter (OD) should be a little larger than the finished OD of the honey dipper to allow for finishing cuts and sanding later.



Make your mark – Once the blank is rounded off, mark some key areas to guide you.



Getting your groove on – If you are comfortable, use a skew to make the grooves at the end of your blank.



Another way to groove – Using a $\frac{1}{16}$ " parting tool will yield similar results if the skew is not for you.

Laying Out the Dimensions

Mark the locations of the ends of the project. Then mark where the end of the grooved section will start becoming the handle and finally, mark the location of the smallest diameter of the handle. These dimensions are not critical but will provide a sight line when you start to cut into the blank. As you progress and have made a few honey dippers, these marks will probably not be necessary.

Turning the Project

Now let's start making some wood chips fly! Reduce the OD of the grooved section to its finished size with a sharp $\frac{1}{2}$ " spindle roughing gouge. There are two ways to make the grooves. The first method uses a $\frac{1}{16}$ " narrow parting tool. Leave $\frac{1}{4}$ " space from mark at the headstock end of the piece and make seven grooves $\frac{1}{4}$ " apart and about $\frac{3}{8}$ " to $\frac{1}{2}$ " deep. Keep the bottoms of the grooves the same depth; the finished honey dipper will look better this way. The other method uses a $\frac{3}{4}$ " skew to cut the seven grooves. Use whichever tool you are the most comfortable with. Perhaps you could make your first one with a parting tool and progress to a skew as you get more familiar. The pictures taken for this article show the results from both methods of cutting the grooves.

Create a rounded shape at the grooved end and follow the same curve towards the handle. Shape the handle with long flowing cuts with a spindle gouge, or a skew, to yield a gentle curve with its narrowest OD about two-thirds up from the end of the handle. You may need to place your finger behind the handle as you cut to steady the little bit of vibration you can get as you turn it down to the desired diameter. You can also add decorative beads, coves, and rings etc., as desired. If you want to add burned-in rings make small starter grooves with the point of a skew to guide the burning wire. I feel that decorations and embellishments should not get over complicated. Sometimes a simple design just looks better.

Round off both ends of the piece leaving a $\frac{1}{4}$ " diameter joining tenon.

Sand the honey dipper with sanding cloth starting with 180 grit, or whatever grit is needed to remove your tool marks. Progress through the grit sizes to 320 grit. Do not sand too smooth; the beeswax finish will apply better if the surface is not shiny.

Applying the Finish

Apply beeswax to the piece by rubbing the block of wax against it, or if you are using a paste form of beeswax, use a piece of paper towel. Use a piece of clean paper towel to melt



Turn down the handle – Use long flowing cuts to shape the handle – using your fingers behind the piece to help stabilize it.



Turn the handle end – This simple flared-out end helps hold the dipper securely in your hand and adds a nice decorative touch.

and burnish the wax into a low lustre finish.

Completing the Honey Dipper

Reduce the tenons at the ends to about $\frac{1}{16}$ " diameter. Do not part the piece completely off the lathe. Sometimes the little nub end will twist out and leave an annoying little hole that is not attractive. Remove the honey dipper from the lathe and cut the little nub ends off with a sharp knife. I have used my skew to do this very carefully.

Rub a little sanding cloth over the ends and put on some beeswax and your honey dipper is finished. Now all that's left is to brew up some tea and add a generous drizzle of fresh honey.

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Mill-it-yourself HANDRAIL

Simple tools and techniques for routing this traditional architectural feature will make it too simple not to try.

BY STEVE MAXWELL

Great as it is to build cabinets, tables and shelves, woodworking skills offer more than this. Your workshop know-how can also be used to create valuable, wood-related,

built-in features for your home – features that add beauty and elegance in ways that would otherwise cost big bucks. Stairway hand railings are a case in point. Few woodworkers realize how simple it is to make spectacular shop-milled railings in traditional profiles

using ordinary workshop skills and a router. You don't even need a shaper. If you've got a need for hand railing, milling it yourself might just be the most satisfying – and cheapest – way to get what you need while making the most of your woodworking skills.

Photos by: Steve Maxwell

Milling a handrail involves preparing blanks, adjusting router bit height, routing finger grooves, routing a bottom profile and routing a top profile. Don't worry if all this is new to you. You'll feel like a pro in no time.

Prepare Railing Blanks

Traditional handrail profiles require wooden blanks that typically measure somewhat less than 3" x 3" in cross section. The exact size depends on the router bits you choose, but regardless of the profile, aim to begin with rough blanks that are at least 1/4" wider and thicker than required. This allows room for jointing, planing and sawing to create square corners, flat surfaces and an accurate final size. You've got to have accurate blanks if you expect precise handrails that are easy to install. It's unlikely you'll find lumber thick enough to make a full size handrail without lamination, but that's okay. Gluing together a couple of layers of wood goes a long way to prevent warping and cracking of the finished railing.

Start by sawing your wood to rough width. I cut both 1" and 2" thick pieces of ash to 3 1/4" wide for the railing featured here. Joint one face of each piece, then an adjoining edge before dry-fitting parts together. If the joints

don't look tight, run the troublesome piece of wood over the jointer again. As you work, prepare enough wood for an extra length of hand railing or two. Besides giving you another shot at installing the railing correctly if you mess up, an extra railing blank also gives you something to work on as you're tweaking router bit height later on.

I find it best if you arrange the 2" thick material on top of the handrail profile, with the thinner wood underneath. This locates the joint line somewhere around the bottom of the finger groove, where it'll be virtually invisible if you've created a gap-free glue line. When it comes time to apply glue, don't just squirt out squiggly beads of the stuff. There are two reasons why you need to do better.

Besides the fact that you need an absolutely reliable glue joint with no dry areas, beads of glue can actually hold large joints like this apart, even under clamping pressure. That's why I use a small roller to apply a thin but even coat of glue on both halves of each railing blank. Just pour a line of glue onto one board directly from the jug, and then spread it around with the roller. It's fast and easy.

When it comes time to clamp up the railing sandwich, I find wooden hand screws work best. Apply clamps to the ends of each pair of blanks and then



Many clamps – Don't be afraid of using too many clamps for this glue-up... in this case more is better.

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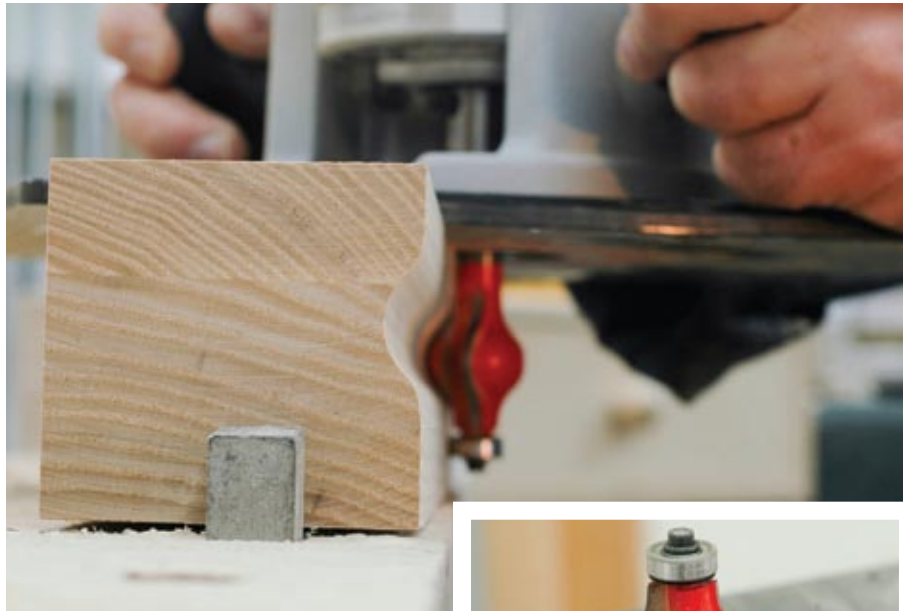




Apply the glue – Using a roller will ensure that every inch of the surface gets covered with glue.



Joint the blank – When working with such long blanks on the jointer, ensure that you keep the work against the fence the whole time.



Finger groove – You can test various router bit heights to achieve different looks.

use clamps if necessary to align bowed parts in the middle before adding more clamps across the entire length of the blank. Let the assembly sit for one full day before removing clamps and heading back to the jointer. Gluing operations have probably introduced some kind of bow or twist to the wood, and now's the time to correct this.

Joint one face, then an adjoining edge, before ripping the blank to width on your table saw and planing to final thickness. It's essential that the completed blank have absolutely square corners and be of a consistent size along the entire length. Take all the time you need to get machine settings correct beforehand. I find a steel engineer's square an essential tool for



tweaking the position of jointer and table saw fences so they're perfectly square.

Tweaking Router Bit Height

Most handrail profiles are made with two main router bits that create adjoining profiles, one mills a curved recess to accommodate fingertips, and another makes the rounded, top edge of the railing in two passes – one on each side. A third bit (usually a 45° chamfer or ½" radius round-over bit) performs the



Routing the top profile – This bit will give the rail its decorative appearance.

more minor role of easing the bottom corner of the hand rail.

It's one thing to have the router bits you need to create a handrail, but you still need to exercise a certain amount of creativity. Adjusting router bit height is the reason why. Depending on how far the bits stick out beyond the router base, you can create substantially different handrail profiles.

Start by taking your best guess of where you'd like the top profile and finger grooves to be located on the blank. Adjust router bit height accordingly. You may also need to reduce the width or thickness of the blanks a little using your thickness planer.

Take short, trial passes along one end of the extra handrail blank you prepared. If you've got a couple of routers in your shop, put one bit in each. This way once you've homed in on ideal router bit height you won't have to remove the bit for any reason to complete other operations. I used a 2 1/4 HP router to mill finger grooves in the handrail you see here. The same size router could be used to rout the top profile, though I opted to use a 3 1/4 HP model.

Routing the Railing

Clamp your railing to the workbench, bottom side up; with the finger grooves arranged one on each side. Next, run a chamfer or round over profile, also along the bottom edge of the railing. Next you'll need to flip the blank over and rout the top profile, but before you do — a word of caution.



Ease the underside – This step can be done with a chamfer bit or a 1/2" round-over bit for slightly different esthetics.

Routing the first round-over pass accurately will be easy because the top of the railing is still flat and able to support the router. Routing the second pass is riskier. That's because the router will have a tendency to rock back and forth because it doesn't have much of a flat surface on which to rest. If you're concerned, sidestep the wobbly router problem by placing a second hand rail blank (or previously completed handrail) on the far side of the blank you're working on. Place the second rail close enough to the first that it provides an additional support surface for the router as you push it along. It's especially important to prevent your router from rocking since any unwanted movement translates



into a wavy handrail surface. If you do run into a bit of trouble, don't panic. It's surprising how much waviness you can smooth out using a piece of 60 grit sandpaper wrapped around your fingers. Finish up with 80, 120 and 180 grit sandpaper and you're ready for installation and finishing.

Milling your own handrail looks difficult to the rest of the world, but if you're a woodworker, it's just another one of those amazing things you get to do in the shop.

STEVE MAXWELL
steve@stevemaxwell.ca



Coming Events

WELBECK WOODCRAFTERS EXPO

August 7, 8
Welbecks Sawmill, Durham, ON
www.WelbeckSawmill.com

WOODWORKING MACHINERY & SUPPLY EXPO (WMS) TRADE SHOW

September 24, 25, 26
International Centre, Mississauga, ON
www.WoodworkingExpo.ca/index.html

THE WOODSTOCK WOODSHOW

October 2, 3, 4
Fairgrounds, Woodstock, ON
www.WoodstockWoodShow.ca

TOOLS OF THE TRADES

October 4
Pickering Recreation Complex
Pickering, ON

VANCOUVER & THE VALLEY WOODWORKING TOOL SHOW & SALE

October 16, 17, 18
Tradex Centre, Abbotsford, BC
www.WoodandToolShow.com

WOODCARVING SHOW AND COMPETITION

October 17, 18
Kingsville, ON
www.WindsorWoodCarvingMuseum.ca

LA FOIRE DU BOIS 2009

October 16, 17, 18
Centre des Congrès de l'Hôtel des Seigneurs
Saint-Hyacinthe, PQ
www.FoireduBois.com

THE EDMONTON WOODWORKING MACHINERY, TOOL SHOW & SALE

October 30, 31, November 1
Mayfield Inn, Edmonton, AB
www.WoodandToolShow.com

For more woodworking events: www.CanadianWoodworking.com — List your club and event FREE.



Delta reinvents the **UNISAW**

70 years after the Unisaw's debut, Delta completely redesigns their flagship table saw to put the controls front and centre.

BY GRAHAM MCCULLOCH

After much anticipation, the Delta Unisaw is finally appearing on showroom floors. More than a year has passed since the first hyperbolic ads started appearing in the trade magazines. These ads promised a brand new Delta Unisaw, re-built from the cabinet floor on up.

For those not familiar with the Delta Unisaw, it is the standard from which all other table saw manufacturers have based their products. The world's first tilting arbor table saw was produced over 70 years ago, in 1938. The woodworker's world was turned upside down with the introduction of this extremely accurate cabinet

saw. Since then, hundreds of thousands of Unisaws have found their way into home and cabinetmaker's woodshops around the world. Delta has tweaked the Unisaw in those seven decades but they never made a major overhaul.

The Think-tank

In 2002 the corporate heads of Delta got together and decided that it was time for an entire re-make of the Delta Unisaw. A think-tank was formed and the decision continued even through the company's sale to Black & Decker in 2005. This think-tank also decided that the new Unisaw would be manufactured on this side of both oceans with almost all American parts. The new Unisaw

would be totally re-engineered with features never before seen in a table saw.

The first and most formidable task would be to engineer new controls for the blade raising and tilting function that would place them on the front face of the cabinet. This meant the total re-design of the trunion, the heart of the cabinet saw. Many prototypes were tried and rejected for one reason or another. After much testing and fine-tuning a totally new one-piece, cast iron trunion was developed. This one feat of engineering and design weighs just 97 pounds.

The new trunion allows the blade height and bevel controls to be mounted up front on the cabinet with an easy-to-read bevel dial accurate to 1/4°.

Photos courtesy of Porter Cable/Delta

The Power Behind The Unisaw

Delta decided at the outset that the new Unisaw, would be made in the USA at their Jackson, Tennessee facility and they strived to maintain this.

Delta has had excellent results with the totally enclosed, fan-cooled (TEFC) electric motors made by Marathon Electric in Missouri. They couldn't prove that all of the motor windings are US made so Delta labels the new Unisaw as "Proudly made in the USA of domestic and foreign components".

A Totally New Saw

A very quick glance at the appearance of the new Unisaw and older models may perhaps seem to be the same; a closer inspection should impress even the most stoical woodworker. Aside from the up-front controls there are at the least, a dozen or more new and innovative features incorporated into the new tool.

One often heard complaint was the constant dropping of the arbor nut into a pit of sawdust when changing blades. Delta addressed this problem by providing an access door just below the blade controls and a new, larger throat opening. Your knuckles will suffer no more.

Sawdust Control

Delta increased the efficiency of their sawdust removal. There is a split 5" dust



Much larger throat – The larger throat size and arbor lock gives your knuckles lots of clearance for getting blades in and out of the saw.



Up front controls – The stand-out new feature is the easy to use and read controls on the front of the saw.

port at the rear of the cabinet that takes sawdust from a blade shroud as well as dust from the cabinet interior. Should the dust collector miss something then there is a large door on the side of the saw for easy access. Delta includes a 5" – 4" reducer for convenience.

Safety

The heavy US-made cast iron table top is different as well. The new table top has a full 15" of clearance in front of the saw blade. This is a big advantage when handling large sheets of plywood and other sheet goods.

The user will be quick to notice the new split blade guard that is a European standard and soon to be a safety requirement in the US and Canada. The blade guard allows you to clearly see what you are cutting and the new riving knife prevents jamming. The riving knife raises,

lowers and tilts in concert with the blade. The riving knife can be manually lowered for non-through cutting. The new anti-kickback pawls as well as the blade guard may be quickly removed without tools and a lever in front of the cabinet releases the riving knife.

Extension Table

The new side table has been beefed up with 2" aluminum tube legs for stability along with a steel frame. The black plastic laminate top has other new features as well. For example you will now find a cradle on the cross-braced legs to store the rip fence and a bracket to store the mitre gauge. Delta has improved the fastening system to provide a seamless transition between the saw table and the extension.

Neatly tucked under the extension table you will find a fitted drawer. The drawer has sloped pockets for storing blades, riving knives, the blade guard and more.

The new saw is shipped with a full kerf, 10", 50-tooth carbide-tipped saw blade that is US made. Delta will be offering a full line of 18 blades made in Kentucky.

The new Unisaw is available in three models all with the new Biesemeyer fence. The price of the new Unisaw will reflect this new standard of precision and these impressive changes, but one must remember that this is a quality-built tool.



A home for everything –

Under the extension table you will find a fitted drawer to hold blades, riving knives, blade guard and much more.

GRAHAM MCCULLOCH
shortcuts.ns.ca





Milk Paint

Milk paint has been around since the time of the pharaohs, yet it is only recently receiving attention due to its environmental friendliness and host of unique properties.

BY MARTY SCHLOSSER

What Is Milk Paint?

Milk paint is a highly durable, breathable coating that never peels or chips. Unlike conventional topcoats and oil-based paints, it is absorbed deeply into the fibres of the wood. This paint's basic ingredients include milk, limestone, clay and natural pigments such as berries,

seeds, minerals and coal. Because of this, it is non-toxic, non-polluting and is virtually fume-free. On the downside, because it has a natural milk base, any unused product must be discarded after two days. Depending on how thickly it is mixed, it can be used as paint, a coloured wash, or as stain. It is used by antique furniture refinishers and those with an interest in producing furniture

that has a timeless look about it. There is a wide range of colours, all of which are colourfast (won't fade) and which can be blended together to create a wider palate of colours. With all of this going for it, it's not surprising that milk paint is making a resurgence.

Preparations

Like most finishes, milk paint requires that surfaces be prepared properly. However, because this paint gets absorbed so fully into the wood, surfaces need to be completely free of waxes, any other finish, and stain. Starting with 80 or 100 grit sandpaper, progressively work your way all of the way down to 220 grit. Lightly mist the panel with water to raise the grain and then cut the raised grain down with another light sanding, using 220 grit sandpaper. According to Loree Wallace of Homestead House Paint Company(homesteadhouse.ca), Canada's leading producer of milk paint, there are certain special effects such as crackled or distressed finishes, which require these preparation rules to be broken.

Fortunately for us, manufacturers have made milk paint very simple to mix. Unlike our forefathers who had to gather all of the ingredients themselves, all we need do is simply add water to the powdered paint and mix thoroughly. Best results are achieved by vigorously mixing the paint using a high-speed mixer for 10 minutes, followed by allowing things to settle for another 10 minutes, then thoroughly mixing a second time. The paint will thicken considerably during this three-step mixing process. If it's too thick, add water and mix again. Conversely, if too thin, add more paint powder.

Application

Apply the finish in three steps, using a brush designed for water-based finishes. Your first coat will usually look quite faded and inconsistent, with pronounced leading and trailing brush marks. This is normal and is largely caused by the speed with which this finish dries, so don't be discouraged. According to Wallace, many finishers prefer this effect and will often stop at this point and apply the protective topcoating. If you wish to apply a second coat of milk paint, wait until the first one



Prepare the panel – Sand the panels starting at 100 grit through to 220 grit.



Mix the paint – An electric mixer is the most efficient way to mix the milk paint to achieve great results.

has thoroughly dried to the touch then lightly sand the finish using Scotch Brite pads or 220 grit sandpaper and dry brush or vacuum off the powdered residue. Regardless of the number of coats of milk paint you apply, always work from wetted areas to dry ones and try to be consistent with the amount of finish laid down with each stroke. Because milk paint is a water-based finish, it will readily bleed into adjacent areas. To avoid this problem, try to paint components wherever possible prior to assembly. Where this is impractical, be especially vigilant and start first in transition areas, using only a very lightly wetted brush. Always pause to stir frequently, as the heavy pigments and natural fillers rapidly sink to the bottom.

Apply the protective topcoat of your choice. Hemp oil and also gel urethane (see 'Easy Red Oak Finish', Jun/Jul '09, Issue #60)



Apply a clear coat – You can apply the top coat of your choice – in this case, gel urethane is easy to apply and produces a great finish.



Before and after – You can see the dramatic difference between the milk paint and natural finish.

are highly used. Some finishers prefer beeswax, either on top of, or in lieu of the top coatings already mentioned.

Special Effects – Cracked Finish

To achieve crackled finishes, Wallace recommends the wood be stained first using a lighter shade of paint. Again, the stain is nothing more than thinned milk paint. Apply hemp oil or crackle medium, either of which will seal the first coat and prepare the surface for the next paint layer. Lightly distress-sand the dried finish, then go ahead and mix up a thick batch of paint, of a somewhat lighter shade than desired. Apply the paint quite thickly, noting that it will have somewhat dry, muddy sections that crackle. Pick away any obvious clumps that appear likely to fall off, then apply your final topcoating, which will both darken and stabilize the finish.

Once you've tried your hand at this traditional finish, you'll be amazed how easy it is to apply and wonder why you hadn't already tried it. Besides, what could be more Canadian than milk, eh?

MARTY SCHLOSSER
martywoodworking.ca





Adjustable Circle-Cutting Jig

This jig will cut any circle you need for those special curvy projects.

BY MARTY SCHLOSSER

Those of you who have made large table tops and similar projects requiring circles or arches know the value of an adjustable circle-cutting and routing jig. Although it is possible to cut a large circle using a bandsaw, it is much easier doing this task with a jig-mounted power tool. This article will show how you can make yourself a very precise, adjustable circle-cutting jig that will accept jig saws and routers alike. It will also cover using this jig to cut out circles where you don't want to drill an unsightly pivot hole in the top of the piece you're cutting.

Making the Tool Saddle

Start by first determining the size of the tool saddle (A) you will need to properly mount your jig saw or router. The leading edge of the jigsaw blade lines up with the centre line of the tool saddle and the edge of its base is perpendicular to that line. This location allows the blade to track most efficiently.

Making a mounting template that is custom-made for your jigsaw is as easy as placing your jigsaw onto a stiff piece of paper and pushing the blade through until the base plate bottoms out. Trace the outline of the base plate onto the template, ensuring you indicate clearly the location of the blade. Transfer the location of any

mounting holes you'll be using to securely mount the tool, then go ahead and remove the jigsaw from the template.

You can also do the same thing with your router. However, this time make sure to align the centre of the bit with the centre line before tracing the outline of the base, the location of the bit and the mounting holes. It's a good idea to use different colours for these two separate tracings, to account for the unique size base plate mounting holes of each tool.

Transfer your mounting template information to the tool saddle plywood using carbon paper, then using a certain amount of artistic license, go ahead and draw in the full outline of

the tool saddle. Err on the side of having the tool saddle at least 1/2" larger all around than required to securely mount the tool, as you may eventually end up replacing your original tools with larger ones.

Proceed to cut out the tool saddle, then drill out the mounting holes, being careful to use the correct size diameter bits. In all likelihood, you'll have to buy longer mounting bolts in order to get completely through the 1/2" thickness of the tool saddle and firmly engage the threads in the base plate. These hardware items are available through most specialty hardware or fastener suppliers.

Two 5/16" holes must be made in the tool saddle, however, countersink them with a Forstner bit before drilling these holes. These holes are for the two bolts (E) used to join the tool saddle to the bridge (B).

The Bridge and Arm Parts

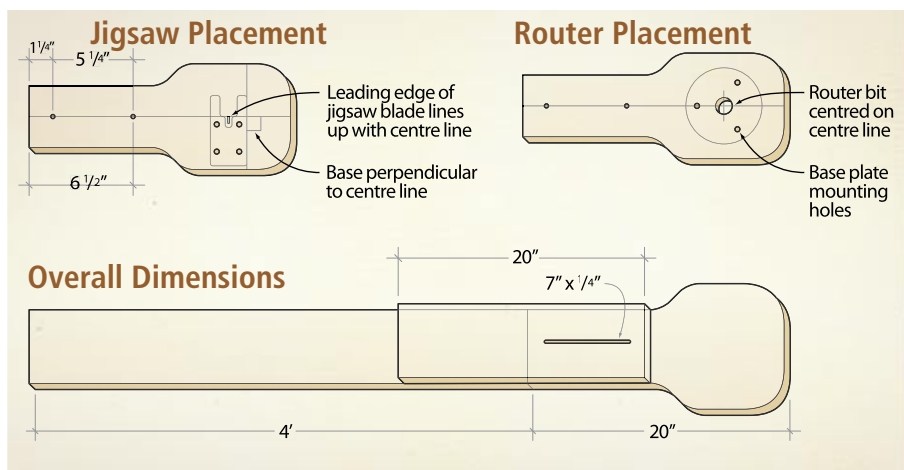
The two remaining plywood components are relatively easy to make. The bridge has a 7" x 5/16" wide slot machined down the one end that clamps to the tool saddle. Used in concert with the bolt holes, this 7" slot allows up to 1 1/2" of travel for fine-tuning the radius of the circle or arc, which is usually much more than necessary. Drawing a line right down the middle of the arm (C) will provide you a point of reference for drilling pivot pin holes.

The arm is by far the simplest plywood component to produce. Aside from cutting it out and slightly chamfering its edges, it is simply fastened to the bridge using glue and screws (F). Now

that you've completed the two main components, all that is needed to assemble your jig is to insert the two bolts (E) into the tool saddle, with their heads set flush into the Forstner drill holes.

Materials List

Part	Qty	T	W	L
A Tool saddle	1	1/2	8	20
B Bridge	1	1/2	4	20
C Arm	1	1/2	4	48
E Bolts (5/16" – 18 tpi)	2			1 1/2
F Screws 5/8"	6			
G Auxiliary pivot pin plate	1	1/2	8	8
H Support blocks	2	1/2	1 1/2	8
Cam clamps (5/16" – 18 tpi)				
Lee Valley 05J51.05	2			1 1/4



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Protect the surface – Using the auxiliary pivot pin plate will allow you to rout a circle without putting a hole into the good surface.

Align the bolts with the slot in the bridge (B) and screw on the cam bolt clamp. Depending on the length of the bolts, you may need to cut them shorter so they don't interfere with action of the cam clamp arm.

Test Driving Your New Jig

Let's start off by cutting a simple circle. After mounting your jigsaw so that everything lines up properly, set the cam clamps so there is approximately $\frac{3}{4}$ " of space between the ends of the arm and that of the tool saddle. Select a test piece of $\frac{1}{2}$ " or $\frac{3}{4}$ " plywood, then carefully measure along the arm and mark the location of where the pivot pin should be located. Careful is a relative term, for as mentioned above, you'll have quite a bit of travel to play around with. Err on making the circle somewhat larger than required, that way, you can be sure that you don't cut the radius smaller than the plans call for.

Many use a 10-penny, 1" common nail for a pivot pin, however you could use an awl just as easily. Rather than



Trim it up – You can rough out the curved cut on the bandsaw and then clean it up with a straight bit.

measuring carefully for the proper size drill bit to make the pivot pin hole in the arm, simply chuck the nail into your drill and use the nail to drill the pilot hole. Remove the nail, then push the pivot pin through the hole until it bottoms out enough so that you can clearly see it. Position the pin over the center of where you want the radius to be and tap it in approximately $\frac{1}{4}$ " with a hammer before proceeding to cut out the circle. If your test piece is wider than the given radius, reposition the pivot pin so the blade has a starting point that just barely scrapes one edge of your test piece of plywood. Now, go ahead and cut out the circle. Be careful that you don't cut into your workbench top, as few things in woodworking make you feel as silly as that.

Cutting or Routing Circles Without Making a Pivot Pin Hole

Some projects require you to rout from above the top, which usually means you can't nail your pivot pin into the top surface of the tabletop or whatever piece you're machining. In such cases, you'll need an auxiliary pivot pin plate (G). This plate is held firmly in place on top of the piece by two-sided tape, and then a pair of support blocks (H) are screwed to the underside of the tool saddle to bring everything to an even keel. Be careful not to exceed the maximum depth of cut for your blade or bit, and if this is the case, make the auxiliary pivot pin plate and support blocks of $\frac{1}{4}$ " material.

As you can see, this jig provides you with many options to cut or rout circles of infinite sizes. Cutting circles in your shop doesn't need to be a source of aggravation. Using this jig will make it easy as π .

MARTY SCHLOSSER
martywoodworking.ca



This Just In...

Busy Bee Tools has just announced the opening of their 11th store in Saskatoon, SK. This will be their first store in Saskatchewan. Busy Bee

will be offering their outstanding selection of tools, along with additional great deals to the woodworkers of Saskatoon. The new facility will be open in September, with a Grand Opening set for sometime in October. Watch for more details re: dates and times for the opening in the July/August eNewsletter. As well, keep a look-out on busybeetools.com for more details.





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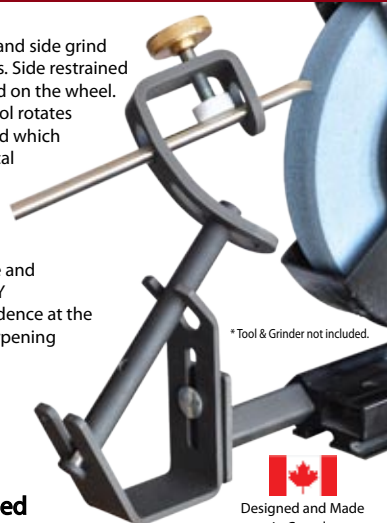
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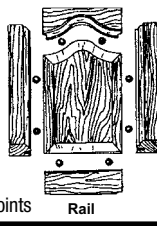
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Goosing My Career

This is my third and final article relating to my career in carving.

BY DON WILKINSON



After my triumphant win during Canada's Centennial, I hung up my tools and went on to other things, the thought of carving never once entering my little mind again. At least not for another fifteen years, by which time I was a man and should have known better.

One evening while shopping with my wife Kelly and our Number One Daughter in Whitehorse, I picked up a copy of either *Popular Science* magazine or *Popular Mechanics*. Either way, it was a strange magazine to contain an article on woodcarving. Maybe it was *Chatelaine*.

Having returned to our log home in the woods outside of town, I was sitting beside the woodstove leafing through the magazine when I came across an article titled, "How To Carve A Miniature Goose." The article sparked a long suppressed memory and I glanced around the living room for something — anything in need of carving. A choice piece of pine fairly cried out from the wood-box as the twinkling gleam along the razor sharp edge of my wife's favorite paring knife smote my eye. And I knew I had to pick up my mantle and carve once more.

While my wife safely nursed our daughter upstairs where she couldn't catch me using her kitchen tools, I sat up late that evening, huddled near the woodstove and whittled out a lovely little Canada goose. The carving bug had struck once again.

The little goose turned out quite well, all

things considered, and I rushed upstairs to show the carving to my wife. Once she had fully awakened and was a little less grumpy, she glanced over and got nearly as excited as me. Unfortunately her excitement was due more to the fact that I still held her paring knife in my hand and less than nothing to do with my precious goose. In a feeble and somewhat self-serving attempt at appeasement, I formally presented the goose as a loving gift to her, the love of my life.

I don't think she bought it, given that a couple days later I found the little goose in the firebox from whence it came. I suppose one could say, "The goose was cooked." Much like mine was when she discovered just how dull her knife was.

A few days later we stopped in to see my parents-in-law. Kelly must have mentioned the incident to Mom-in-law, Leona. Every time I wandered into the kitchen she would jump up and follow me in and count her knives. I suppose she had a justifiable concern considering the lovely number of choice blades she owned. For years after, whenever she saw me she would idly muse about a particular missing butcher knife and I would plausibly deny all knowledge of its whereabouts.

(Leona, to set the thirty year record straight, I must confess that I did indeed take it. And you're welcome to it if you wish. Although it's a little dull and the tip is broken off and I once used it to scrape gunk off my engine block. Sorry! P.S. Let me know!)

That Christmas, in a belated pre-emptive strike to save the kitchen knives, the in-laws presented me with a fine selection of carving tools. They were a great set and I still use them, but, as every carver, woodworker, and spouse knows, there is always another tool needed that will do the exact same job; only faster and maybe even better. Although for hobby woodworkers, the idea of doing your hobby faster really should go against the grain — pun intended.

Since then I have amassed a vast collection of chisels, gouges and knives, some of which I actually use. I've discovered that like so many other woodcarvers, that the more you learn, the fewer the tools you need. I'm sure we all have just one or two cherished gouges or knives that do 90% of the carving, while the rest sit in racks just waiting to catch us unaware. Like all carvers, I quickly learned how to properly sharpen my tools, usually to the point where they were scary sharp and I'm almost afraid to pick them up.

We've all heard the wise old adage, "You're less likely to cut yourself with a sharp tool than a dull one?" Well, that may be true but when you do, it's going to be a lot worse than with a dull one. Just ask my surgeon. I have him on retainer!

P.S. I lied; there will be a Carving, Part IV.

DON WILKINSON
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Illustration by: Mike Del Rizzo

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