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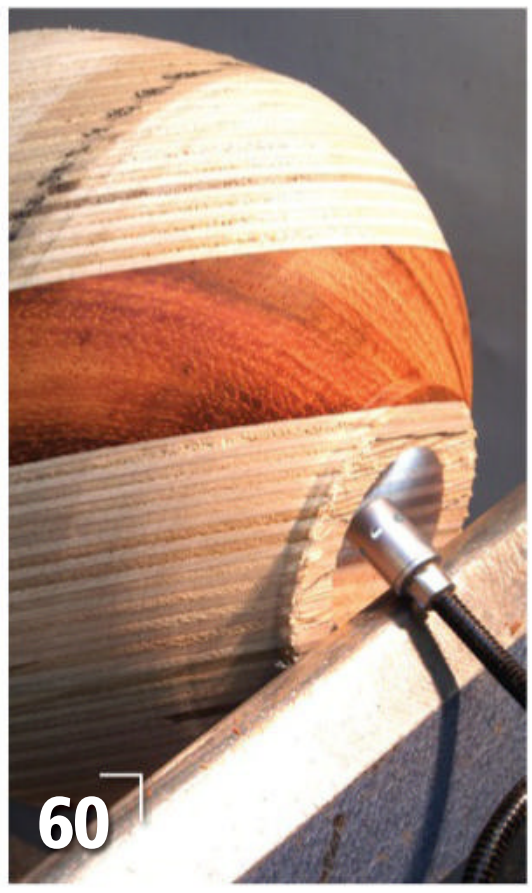

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Go to www.australianwoodsmith.com.au and follow the prompts to register. Each week you'll receive a new e-tip directly to your inbox. It's free, but don't worry, we won't bombard you with advertising or pass your details on to anyone else. We just hope you'll tell your friends about *Australian Woodsmith*.

from the editor

Sawdust

Recently I visited The Wood Room factory in Sydney and spent the morning enjoying the creative vibe and productive industry on show in the vast Brookvale workshop. The Wood Room employs 12 cabinetmakers and apprentices who craft fabulous contemporary furniture from solid wood. Most of the tables and chairs they make are crafted from American white oak. The blonde tones of this hard and easily machined species match the present interior design mood of the Northern Beaches.

What was interesting was appreciating how the American white oak is allowed to rest in the workshop for a couple of weeks before it is processed into furniture. The company buys their stock from several importers, the slings arrive wrapped in plastic and seasoned to a US standard of 10% moisture content. The equilibrium moisture content around Sydney and the coast of New South Wales averages 12%. This means that the oak needs to acclimatise for a couple of weeks, drink in some more moisture and expand a little before it can be machined and assembled into furniture.

In a past life, I was a picture framer. We would make perfect mitres on our frames and send them, via the train, to Broken Hill. They would be rejected when they arrived because the mitres were open. By the time they returned to us the mitres had closed! We thought for a while and realised the frames baked in the train on the way out and closed up again on the way in. The solution was to send framing stock to Broken Hill and have the frames cut there. Wood moves!

Happy woodworking!

Chris

Chris Clark, Editor

Australian Woodsmith GO On-Line Extras

This symbol lets you know there's information online at: www.australianwoodsmith.com.au. There you'll see bonus cutting diagrams, articles on techniques, jigs and a lot more. If you don't have access to the internet, contact us on (02) 9439 1955.

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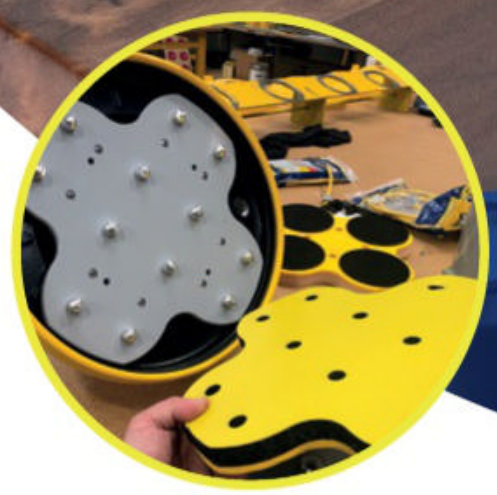

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Brushless Motor
Discs: 4 x 150mm (6") hook & loop discs (no holes recommended)

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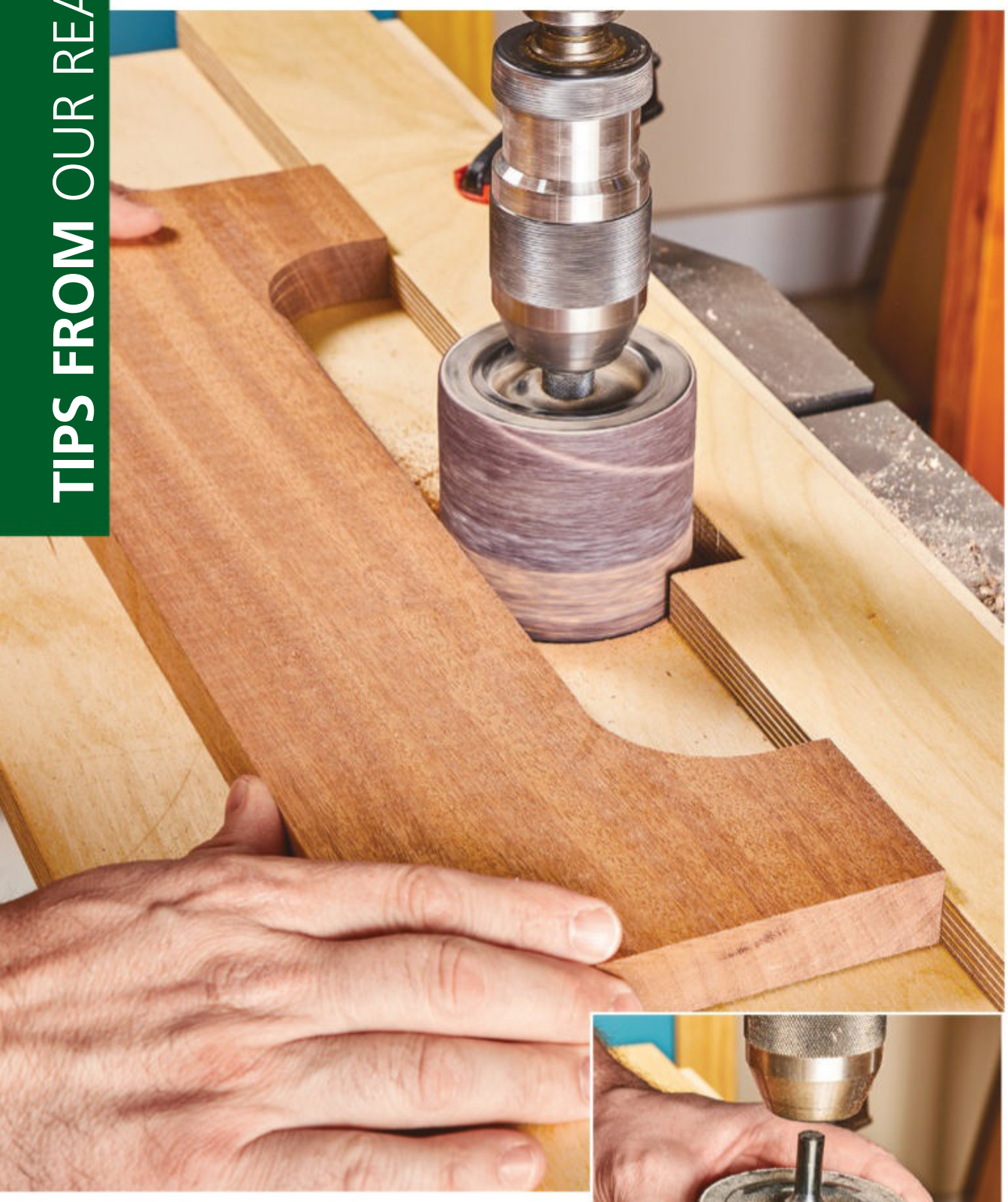
Tips & Techniques



STRAIGHT-UP SANDING

If you've ever tried to sand a straight line with a sanding drum, you know it's easy to go past the line. Recently, I came up with a simple solution for this problem.

FENCE. As you can see in the photo, I added a fence behind my sanding drum. I position the fence so that it only allows the drum to sand up to the line. The key is making sure the fence is long enough for the workpiece feet to contact the fence the entire way.

Alex Whitten

▲ The drum is buried in the table and also in a notch in the fence. This allows the fence to be adjusted for different recesses.

AUSTRALIAN Woodsmith

No. 164 July / Aug 2021

PUBLISHER Ian Brooks

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SUBSCRIPTIONS

1 year, $A59.00 (NZ: $A59.00) + 1 free issue

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ISSN 1441-0311

Distributed by Ovato Retail Distribution Australia

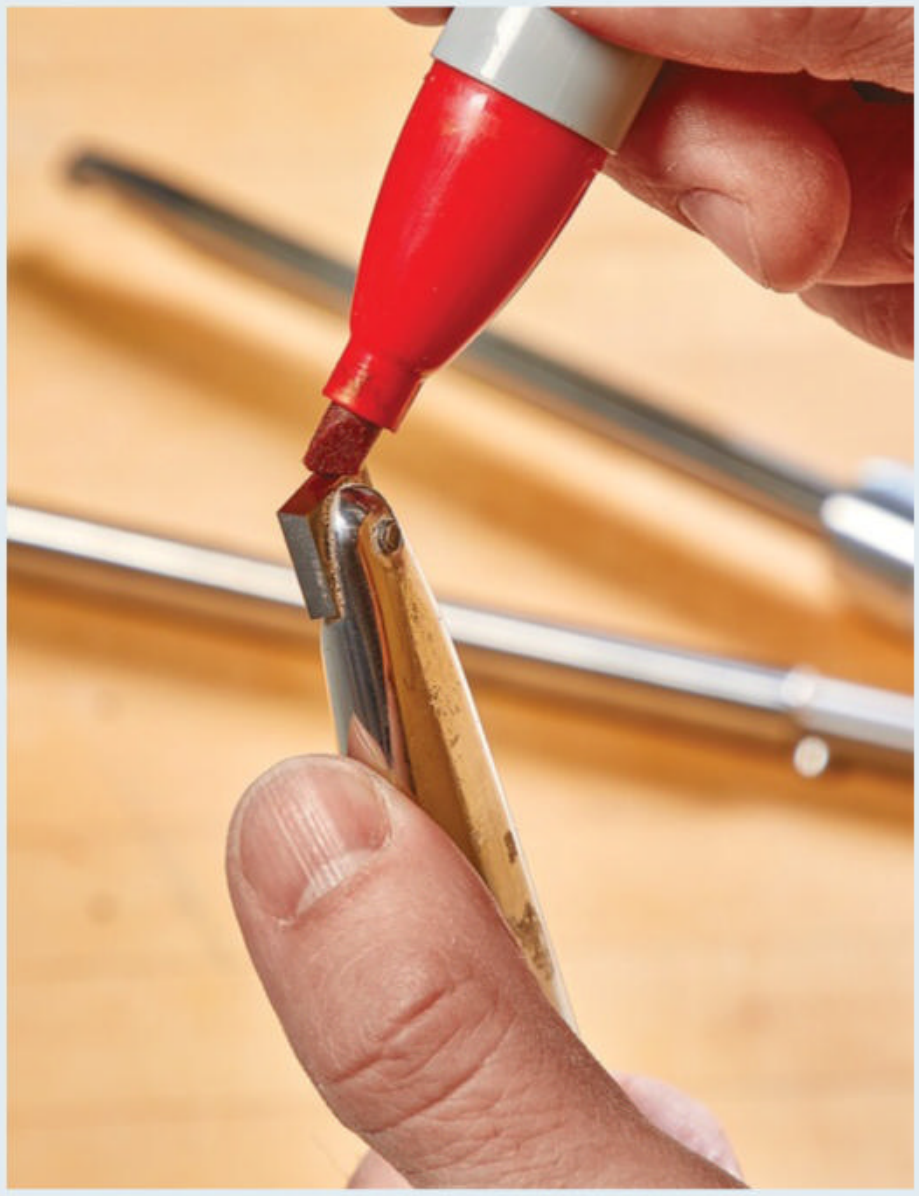
Proudly Printed In Australia

SAFETY IN THE WORKSHOP

Safety devices, such as riving knives, guards on table saws and guards over router bits have been deliberately left out of the line drawings in Australian Woodsmith projects in order to make them easier to follow. It goes without saying that where safety devices have been supplied by the manufacturers you should use them. We encourage the use of push sticks as good work practice.

Exercise vigilance and the greatest of care when using power tools, whether stationary or portable. Keep all your tools sharp and well maintained. Wear protective eyewear, a dust mask and a hearing protector when appropriate. By limiting distractions and developing safe work practices you will go a long way to avoiding workshop accidents. So, work safe fellow woodworkers. -Editor

QUICK TIPS

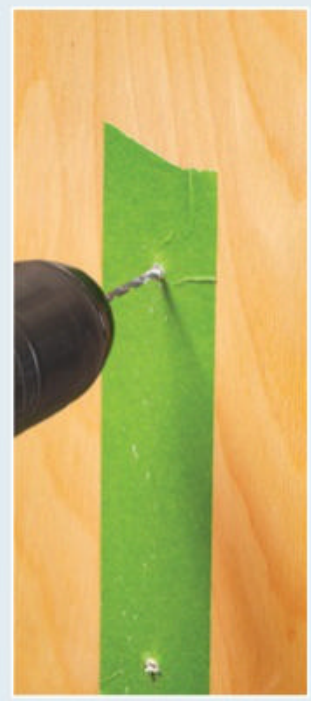


DULL EDGES

Larry Hilton was having a problem remembering which edges of his carbide turning tools he had used. To leave himself a reminder, Larry now colours the dull edge of the carbide tool before he rotates it. That way, when he needs a fresh, sharp edge, he knows which edges he's already used.

POWER STRIP MOUNTING

Sarah Vallient found it frustrating to get screws correctly spaced for the slots on the back of power boards. As a simple solution, Sarah discovered that she could cover the strip with a piece of masking tape and use a marker to mark the slot locations. Then, she can peel the tape off and put it on the mounting surface. The marks on the tape make it easy to drill and drive the screws in the correct spot.



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SPRAY PAINT STORAGE

Storing spray cans in my workshop has always been a headache. While I've seen a lot of different storage ideas, a recent mission to use up some of the small scraps in my workshop led me to the can holder you see here.

SLANT SHELVES. As you can see from the photo and drawing at right, the can holder is a wall rack. Three slanted shelves hold the cans in place. The holes are drilled with a hole saw, and each shelf is the same, with the exception of holes in the upper two shelves. The great thing about this design is that you can expand it to hold as many cans as you need by simply making more shelves and lengthening the sides.

WALL MOUNTED. The rack hangs on the wall with a couple of screws through the back. A Masonite cleat holds the bottoms of the cans. Now, I can store all my cans of paint and lubricant where they're easy to access.

John Doyle

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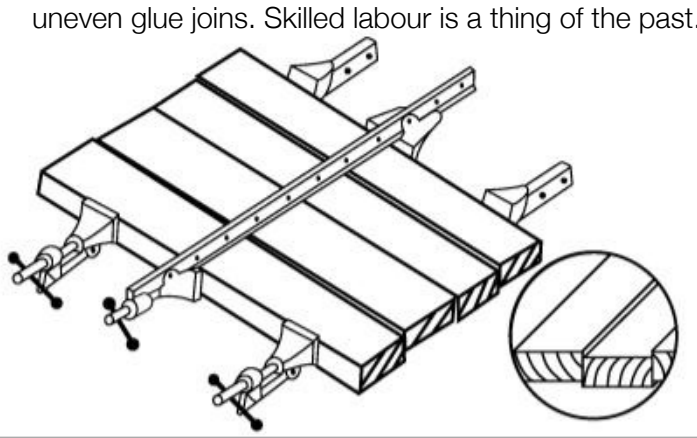

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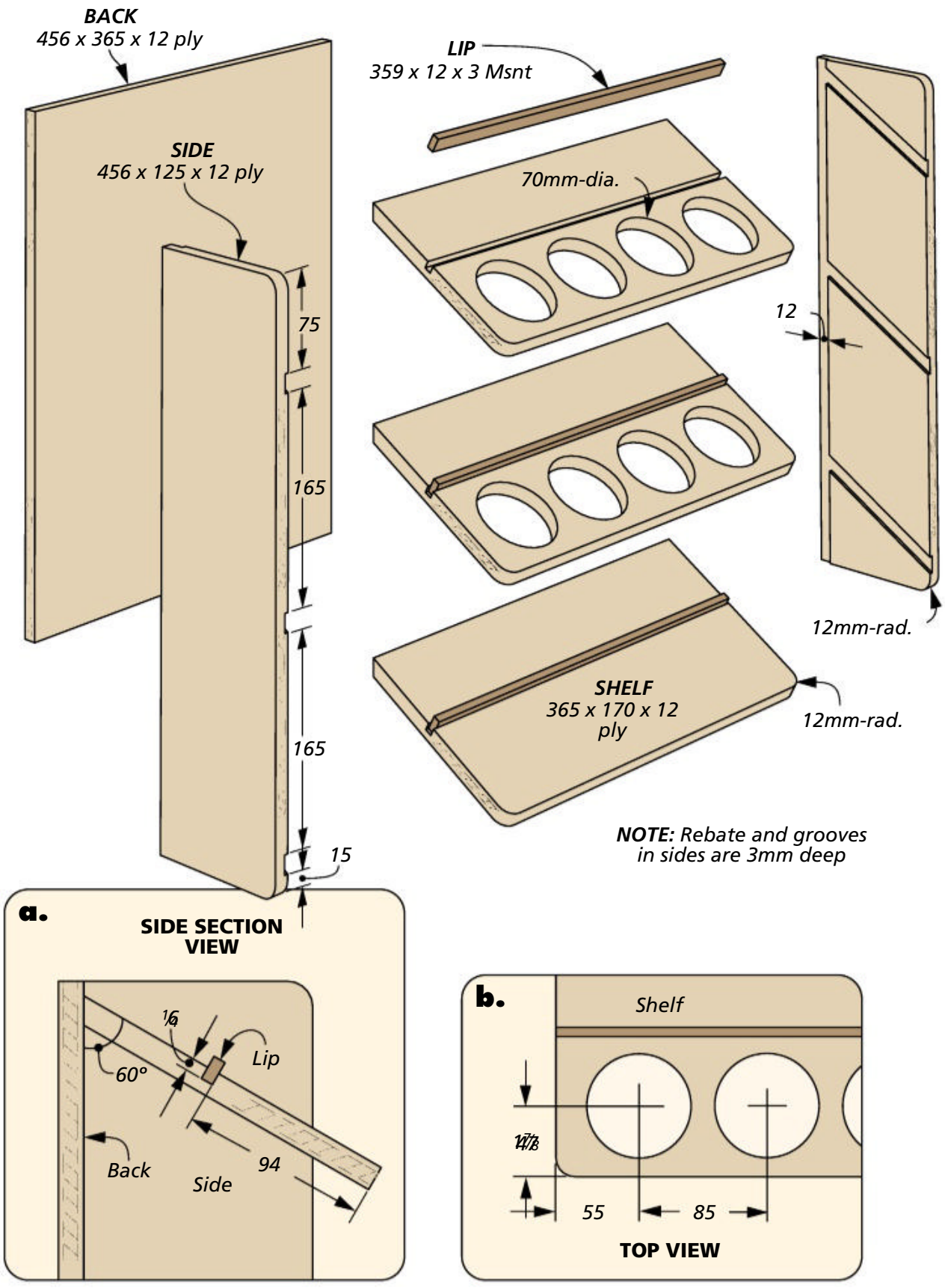
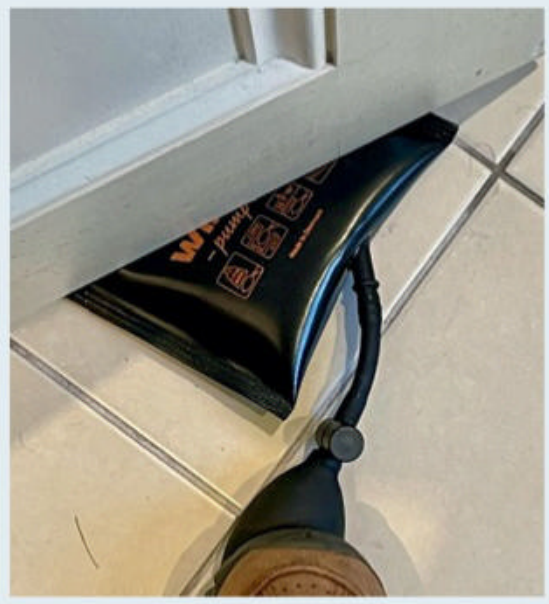


QUICK TIP



A THIRD HAND

In the last issue of *Australian Woodsmith* the WINBAG was reviewed as a clever tool that could help when swinging doors. I was in the process of renovating the bathroom and needed to remove the door so I could paint the jamb. In the past I have used wedges to hold doors in place. The WINBAG did a much better job. Pumping the bulb with my foot allowed me to use one hand to steady the door and the other to remove the hinge screws. Putting the door back in place was just as easy. The clever air bag allowed me to pump the door to height (with my foot acting as a third hand) so I could pop the hinges back in place.
Chris Listle

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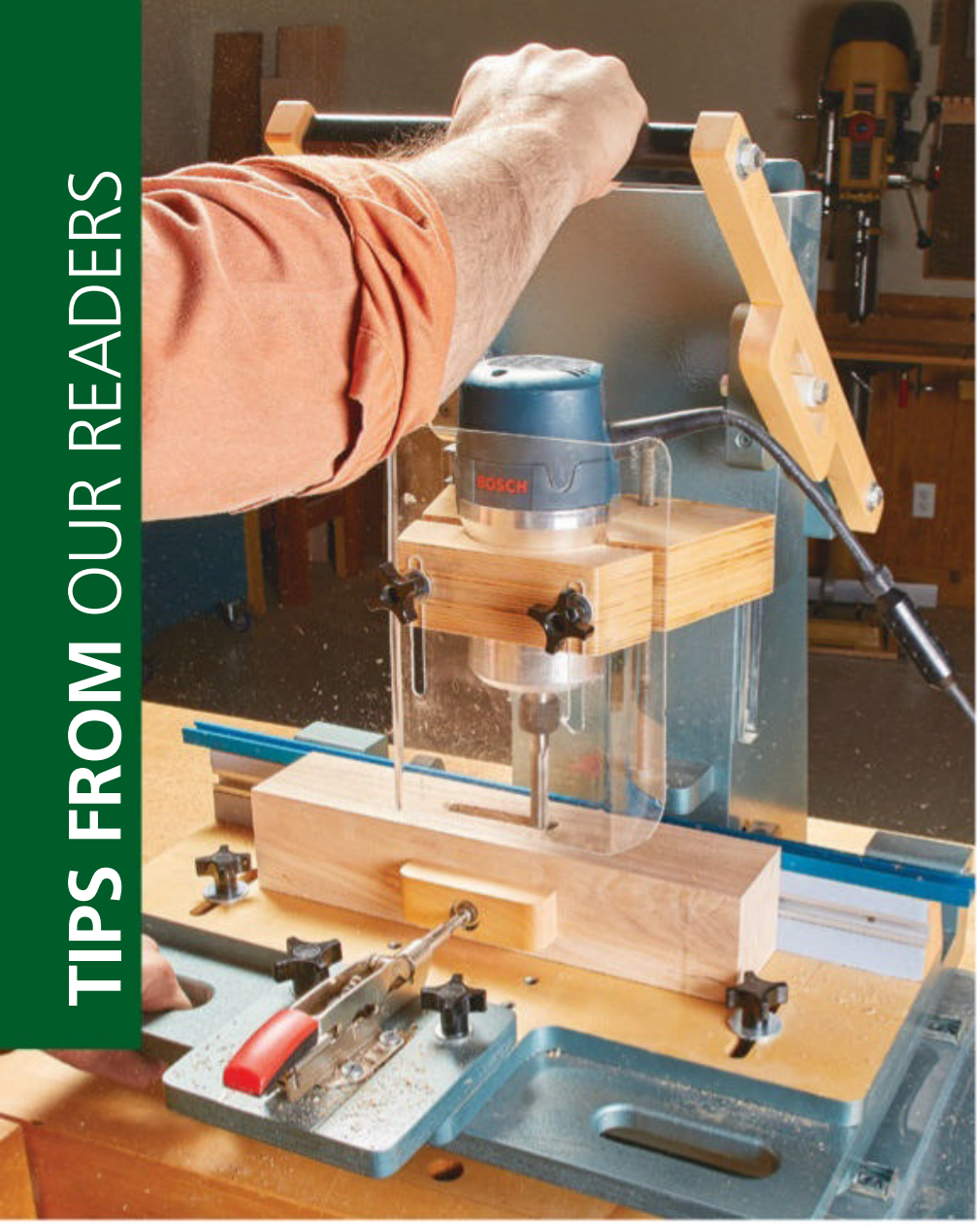
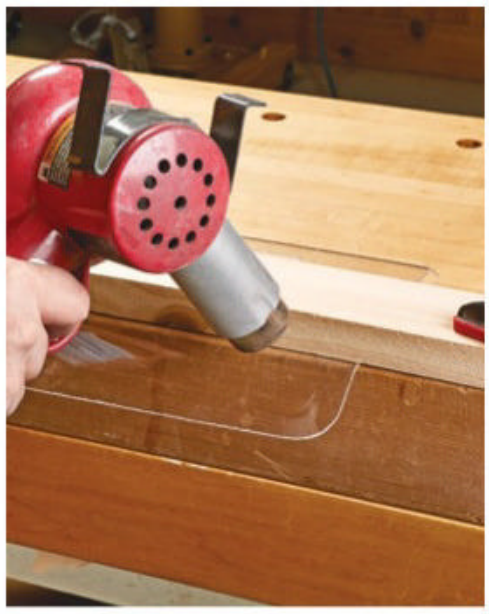


MORTISING MACHINE DUST COVER

One of my favourite tools happens to be a mortising machine I built around a Bosch router. The chips the mortising process created needed to be contained. The solution was a clear safety shield in front of the router.

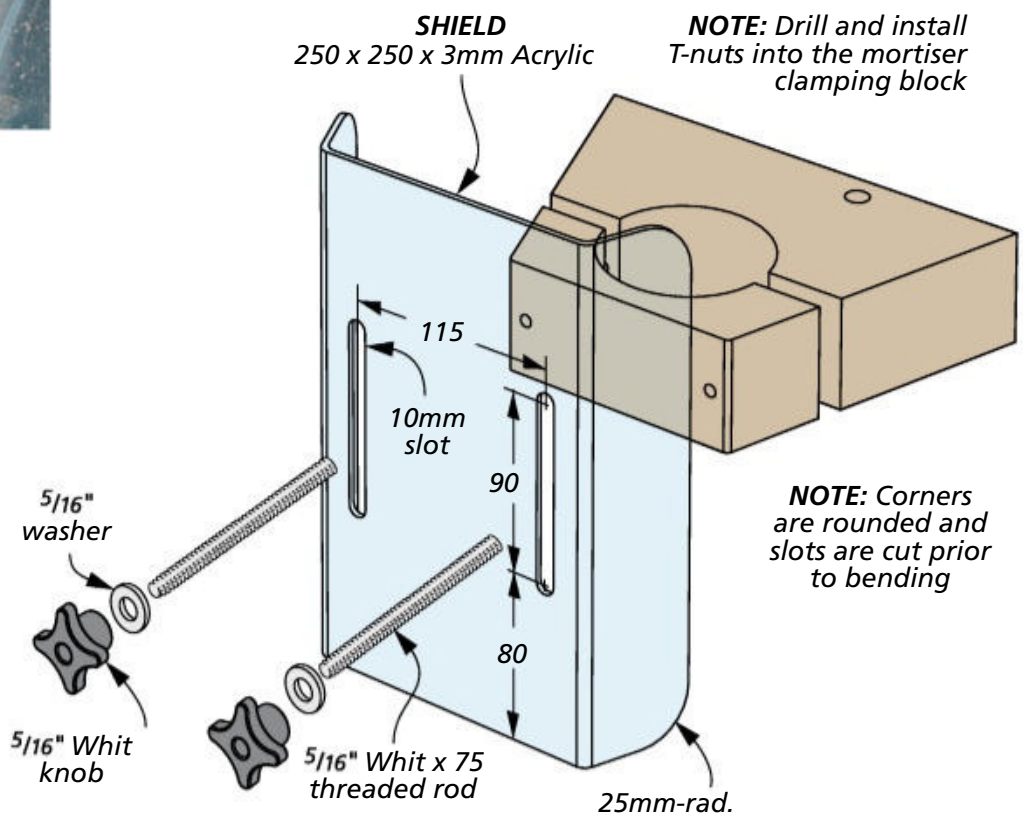
FORMED ACRYLIC. Moulding a piece of acrylic into a shield is pretty straightforward. I started with a flat piece of stock, and drilled the end locations for the mounting slots. Then, I routed the slots at the router table. After rounding the corners, I sandwiched the plastic between a pair of wood blocks and used a heat gun to soften the plastic enough to form the shape. Then, it's a simple matter of mounting it to the router clamping block.

Regis Volesky



Heat. After clamping the acrylic in between a pair of boards, use a heat gun on low heat to slowly soften the plastic along the board.

Bend. When the plastic starts to droop, use another board to bend the warmed plastic down, making an even bend.



Next issue of *Australian Woodsmith* on sale 5th August 2021 - Issue 165

In our next issue we review flexible abrasives in the workshop, we profile beading bits and show you how to use them in the construction of a handsome waterfall bookcase. We also show you how to replace the handles on old chef's knives with cutler's rivets. The weekend project is a series of clever bandsaw boxes, while the workshop project is an all-in-one workstation that incorporates a table saw, an inverted router and a thicknesser. Just right for a small workshop. The turning project is a couple of wooden ladles. As usual we feature clever tips and techniques from our generous readers.

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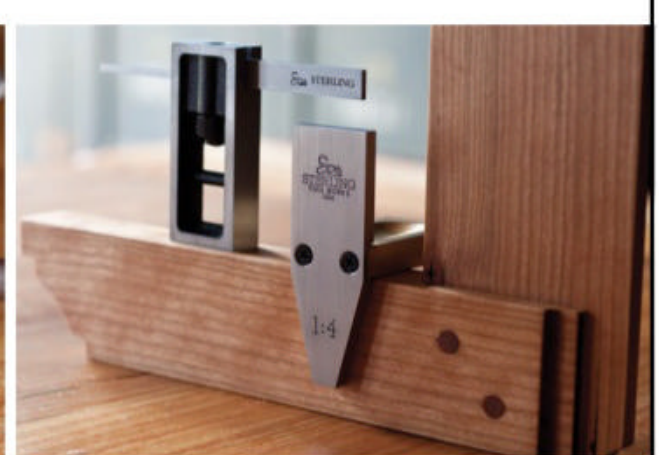

Sterling Tool Works - Fine Tools That Inspire!

BEAVERCRAFT COMFORT BIRD CARVING KIT

This new carving kit introduces the novice to the art of whittling. The comfort part of the kit is the fact that carving wood can be a relaxing exercise. It takes your mind off any stress that you might otherwise be feeling and allows you to focus on the challenge at hand. The end result is a tactile wooden bird, sanded smooth and waxed to bring out the grain.

Fondling the bird relaxes the hands and releases the aroma of the bee's wax and pine turpentine finish. What you get in the kit is a razor-sharp whittling knife, a leather strop and the honing compound to charge it.

As you can see, the kit also comes with two 43 x 43 x 120mm blocks of cherry and a paper template that is cut to size and glued onto the blocks. The carving instructions are simple, however there is a QR code on the back of the booklet that allows you to access a video tutorial.

Also, in the kit you get a roll of cut-resistant tape for your fingers (plus some Band-Aids for when you slip). When the bird emerges from the block, you sand it smooth with the papers supplied and then rub on the wax finish.

This is an excellent kit that opens the door to the world of whittling. Once you have carved your first bird you can make your own templates and carve your cat or your dog. Available from CWS Online (cwsonline.com.au).

Boys' Toys, Books & Gear

SCHEPPACH HF50 ROUTER TABLE

Table routers free up your hands and allow you to do so much more with a router. Stile and rail doors, box pin joints and Gifkins dovetails are just some of the processes a table router gives you access to. The Scheppach HF50 is an entry level router that is designed with woodworking enthusiasts in mind. It has a small footprint and is designed to sit on a bench.

The German-designed and Chinese-made router table comes complete with a 1500W 240V integrated variable-speed router. The router itself can be run at 24,000rpm when armed with a small cutter, or slowed down to a safe 11,500rpm when handling larger bits. The router comes with ¼" & ½" collets and a stepped ring table insert system that you remove so you can lock the collet and change the bits. The cast iron table gives the machine heft and rigidity, while the height spindle allows the router to travel 40mm vertically. As you can see, the table comes with an adjustable aluminium fence, guides, a cross slide and two table extensions. The biggest challenge that this machine presents is assembling it out of its box. There are lots of fiddly screws that need patience to assemble, however when you are done, benchtop routing will become a standard practice in your workshop and you will wonder how you got on without one!

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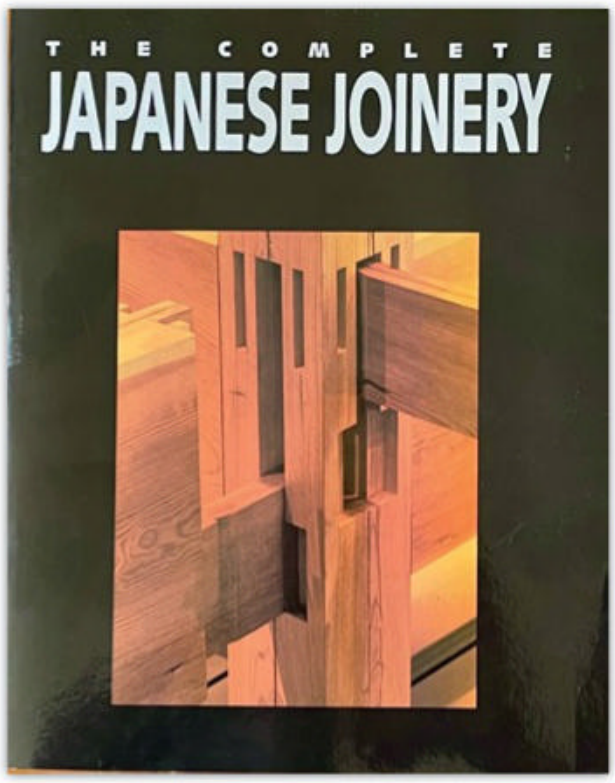

THE COMPLETE JAPANESE JOINERY

This classic of Japanese woodworking was first published in Japanese in 1967. The English translation arrived 20 years later in 1987. The book is an encyclopaedic review of everything a Japanese apprentice would need to know about the life he is about to embark on.

The first paradigm shift western woodworkers learn to appreciate about Japanese woodworking is that it uses a centre line struck with an ink-soaked string as the datum for all marking out. In the west, we plane an edge and use it as the datum for the rest of the marking out. The advantage of using a centre line is that it can be snapped onto wood in the round (trunks or branches) as well as dressed timbers. This allows a Japanese woodworker to build with poles, logs and branches just as easily as with milled timbers.

The 390-page book is really two textbooks in one. The first book deals with Japanese woodworking, introducing tools and their care, characteristics of wood, laying out, working with wood, the function of frame members and framing and securing. There are so many gems of insight in this section of the book. Two that come to mind are "killing the wood", the process of cutting tight joints and then using a metal hammer to crush the grain in the tenon so it will slip into the mortise and then expand a day later and lock the joint. The second is the traditional spirit levels that were just a narrow trough with mortise wells either end, cut in a dressed piece of wood, half filled with water.

The second part of the book has a focus on Japanese joinery. For the last 1500 years family guilds of woodworkers have developed their own local techniques and tools to cut amazing joints. My favourite in this vast world of joints is the kanawa tsugi. Roughly translated it is a scarf joint that features symmetrical tapered blind trenches and rebates that lock together with the aid of a wedge.

The framing joint is amazingly strong and can be dismantled with the deft strike of a mallet. The illustrations throughout the book are clear, concise and always informative. No wonder this classic is still in print 54 years on. Available from Japanese Tools Australia (japanesestools.com.au).

KAMIWAZA GOTOKU PLANE

On a recent visit to the Japanese Tools Australia workshop, I was mesmerised by the elegance and efficiency of these amazing rebate planes. I was so smitten I bought the smaller of the two and am still amazed at how versatile and minimalist the plane is.

These rebate planes have just three parts - the white oak body, blue steel blade and a chipper that acts as a cap iron. On page 20 you can read about the rebuild of a 1964 vintage Stanley No 10 ½ rebate plane. When I reassembled the Stanley, I counted its parts: it is made up of 30 different components!

Gotoku can be translated as meaning five virtues. The five virtues that these planes have is that they can be used as smoothing planes, left and right-handed rebate planes and left and right-handed trench planes - five planes in one.

The rebated sides of the smaller plane allow it to be used to trim the sides of a 13mm-deep trench. The blade and chipper add 3mm to the height of the rebate, meaning that the trench that the plane can trim needs to be a minimum of 17mm wide. The larger of the two can trim the side of a 21mm-deep trench and can be used in trenches wider than 19mm.

Both the chipper and the blade are made from laminated blue steel. It took me 10 minutes to hone and set my plane before I had the pleasure of cutting the first shaving. The sculptural symmetry of the plane is enhanced by the curved cutaway under the spine. Shavings exit the mouth of the plane and are guided to the right and to the left when they hit the relieved spine. For more information I recommend you visit Japanese Tools Australia and enjoy Mitch's enthusiast YouTube presentation (japanesetools.com.au). W

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English Oak

Oak, acorns, charcoal and empire.

Oak trees have historically provided a food source for ancient peoples, charcoal for the Romans to make iron, and the timbers required to build boats and navies.

MAKING NAVIES

It was while visiting the National Maritime Museum in Falmouth, Cornwall that I saw my first logboat. As you can see on the opposite page, it is more like a canoe than a boat and uses Bronze Age technology to create a mode of transport that tamed the waterways. I spent some time counting the growth rings on this boat and decided that the tree was about 200 years old when it was felled and carved into its present form.

A visit to the Portsmouth Historic Dockyard had me in awe admiring the wreck of the Mary Rose and the majestic splendor of HMS Victory.

The Mary Rose was Henry VIII's flagship and did sterling service for 33 years until it was sunk after the Battle of the Solent (against the French) in 1545. Six hundred oak trees were hewn by hand to make this mighty vessel.

An extraordinary 5000 oak trees were used to build HMS Victory (plus 1000 elm, spruce and yellow pines).

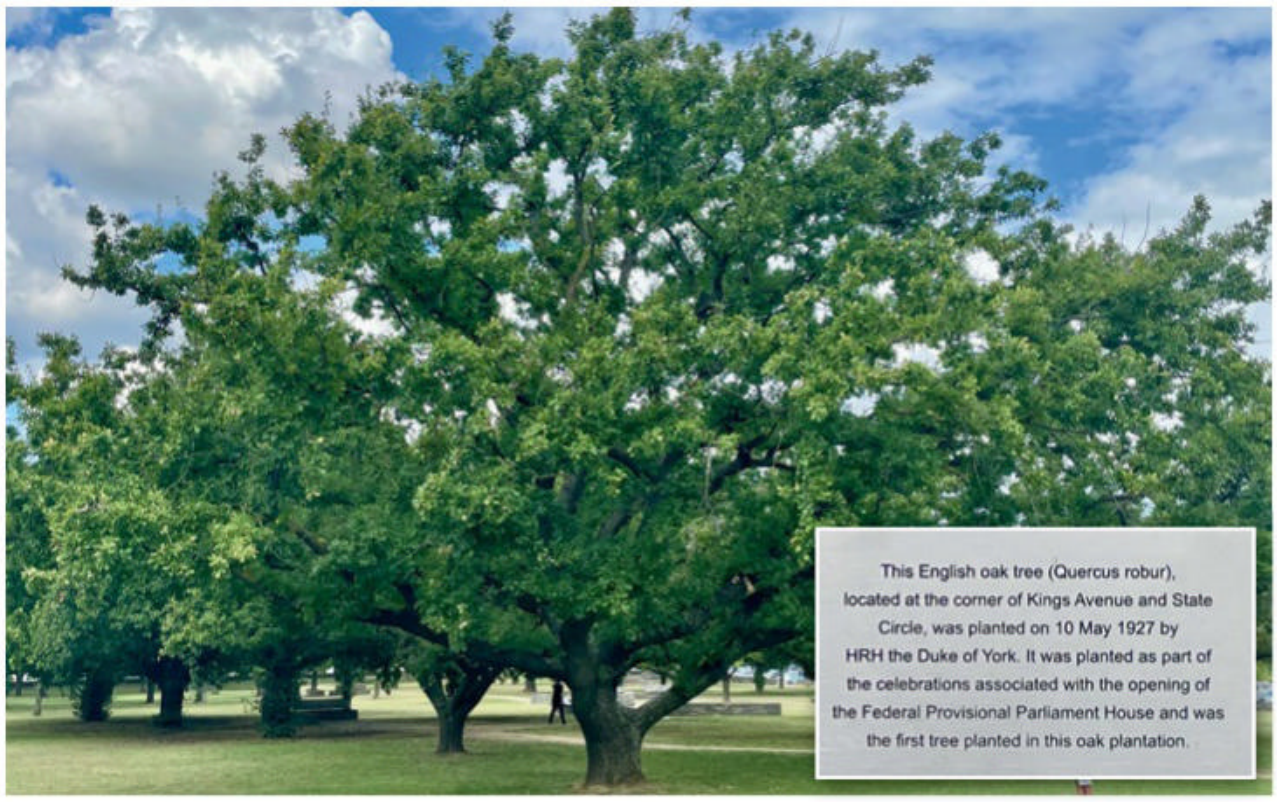
The curved knees that fasten the decks to the hull were made from oak crotches, branches and root intersections. What is interesting about oaks is that their root system is just as broad and complicated as the branches above ground.

HMS Victory is an amazing assembly of oak frames, boards and knees. It is extraordinary that she is still a commissioned naval vessel 243 years after she was laid down and that lots of the original timbers are still intact and doing the job they were designed for.

SLOW GROWING OAK

The magnificent English oak on the facing page was planted by HRH the Duke of York in 1927. The tree is a child in terms of the 1000-year life span of an oak.

▼ Before oak trees were felled, shipwrights toured the forest and selected crotches and branch intersections to be used as frame futtocks and knees.



▲ The oak in the foreground was planted by Queen Elizabeth's father when he opened parliament in 1927. It is now 94 years old. Just a child in oak terms!

▲ Acorns as a food source is one reason why the oak migrated out of Thailand and into Europe.

When I visited "The Duke" in Canberra in March, a carpet of acorns was spread throughout the "young" forest floor. While I sat at the base of the tree, I heard acorns falling like rain. Acorns as a food source is the main reason why oaks migrated from Thailand 65 million years ago (in the Paleocene Epoch) throughout Asia and beyond. Today oaks have morphed into more than 250 different species.

Acorns have been ground for meal by humans long before corn and other ancient grains entered our diet. The high fat content of acorns and their easy storage helped ancient tribes survive winters. A mature oak can produce 90,000 acorns in a good year! This harvest made the tree a reliable food source for migrating peoples.

CLEAVING OAK BOARDS

The medullary rays that make quartersawn oak such a figured timber also is a reason why the Norsemen were able to build an empire. The Vikings learnt how to cleave boards from oak logs with wooden wedges, creating waterproof and flexible clinkers for their longboats. These narrow boards could then be bent green on frames, allowing a warrior class to colonise Europe and Russia.

OAK AND IRON

Today iron is made by coking metallurgical coal and feeding it into a blast furnace. In the past, Roman Carbonari would cut oak into firewood, make piles in the forest and cover them with damp soil. A chimney would be created and the oak ignited so that it burnt slowly, forming charcoal. This premium oak charcoal would then be used to provide the heat needed to smelt iron. The Romans decimated the oak forests of Europe and England. It took a thousand years for them to regrow, just in time to be harvested again to provide the timbers required for the ships and navies that heralded in the age of empire and conquest. W

▲ Oak has been used to make boats since the Bronze Age.

▲ The log used to make this boat is from a 200-year-old adolescent oak.

Surcare SMF-V4

This clever Australian designed and manufactured sander is revolutionising solid surface finishing around the world.

The Surcare sander is the perfect machine for sanding benchtops.

Surcare is a quiet achiever in the field of surface finishing. Their sanding system has set the benchmark for table, counter and benchtop sanding and micro finishing.

The name of the company is a shortened version of "Surface Care" and the abbreviation SMF stands for Sander & Micro Finisher.

JIM RILEY

Surcare was founder in 1998 by Jim Riley. Jim was a solid surface fabricator and cabinetmaker who was not impressed with the quality of the finish produced by even the best 150mm-dia random orbital sanders on the market. Jim realised that the solution was to make the sander larger so that it didn't bob around like a dinghy in a storm when sanding uneven surfaces.

Thinking outside the box and producing a clover-shaped platten that could accommodate four abrasive discs was just the beginning. The next step was to develop a dust extraction shroud that would efficiently remove fine particles before they started to clog the abrasive disc. The end result is a robust and powerful sanding system that not only sands surfaces flat, it also produces a micro finish free of swirls, ready to be oiled or polished.

Jim's background as a solid surface fabricator gave him insight in the practical needs of fellow tradesmen. Sanding can be tedious, tiring and time-consuming. The weight of the machine means that the operator just has to glide the sander over the surface, no pressure or effort required. The quick-change system allows the operator to switch out one sanding grit size for another in less than a minute. The hook and loop papers that the machines use is off the shelf and can range from 40-grit all the way to marble polishing 3000-grit.

The Surcare SMF-V4 has a quick grit change system that allows you to swap out the clover-shaped disc pads in moments.

The foam-backed clover pads distribute the 12kg weight of the sander evenly over the 340mm width of the sanding head.

The efficiency of the machine means that time is saved, dust is kept at bay and surfaces end up true, flat and silky smooth.

SANDING THE OLD BENCH

The new tool in our workshop is the Surcare SMF-V4 sander & micro finisher. I decided to take it home for the weekend and use it to refurbish the top of my old corner bench. The bench itself was made in 1958 and had a previous life in a high school woodwork room.

Ian Brooks (the publisher of *Australian Woodsmith*) dropped in and helped me wrangle the bench out from its corner and position it in the middle of the garage.

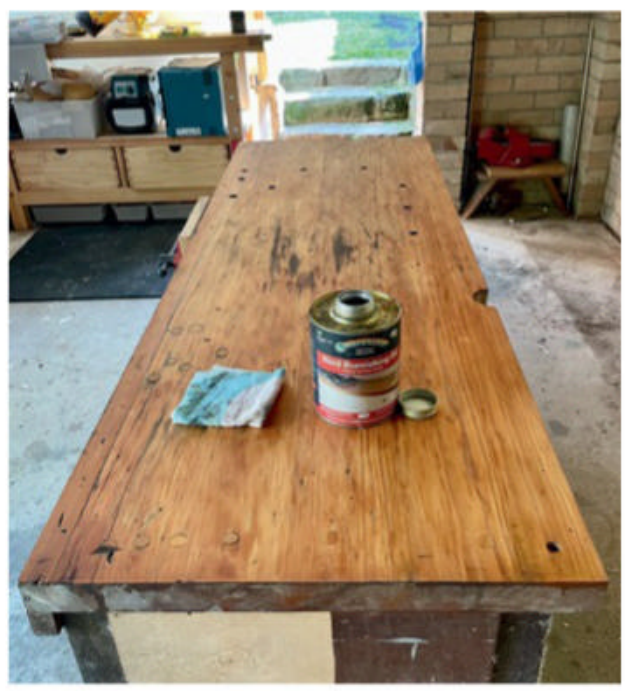
I spent five minutes with a Veritas flush cut plane removing 63 years' worth of accumulated glue and finish before Ian popped the sander in place and switched it on. We soon realised that the machine was so well balanced it could operate one handed. We stopped the machine and installed the extension handle and then let the sander glide over the bench from end to end doing its job.

After an hour of sanding the bench was flat in all directions. When we swapped out the platten to move up to 80-grit discs we noted that the 40-grit abrasive discs were still surprisingly sharp and that there was very little dust in the air or on the garage floor. The dust extraction system was obviously working well. With the sanding flat phase complete, it was time to move onto the micro finishing phase with 80 and 120 grit discs. An hour later the benchtop was silky smooth to touch.

A wipe-down with Organoil Hard Burnishing Oil sealed the surface. We wrangled the bench back into position and admired the glow of the finish and the amazing flatness of the top. The only challenge that we had was finding 125mm-dia abrasive discs without holes punched in them! (See sources page 72.)

The 63-year-old bench was in good condition, however the surface was no longer flat.

Two hours later the Surcare sander had the bench flat and smooth in all directions.

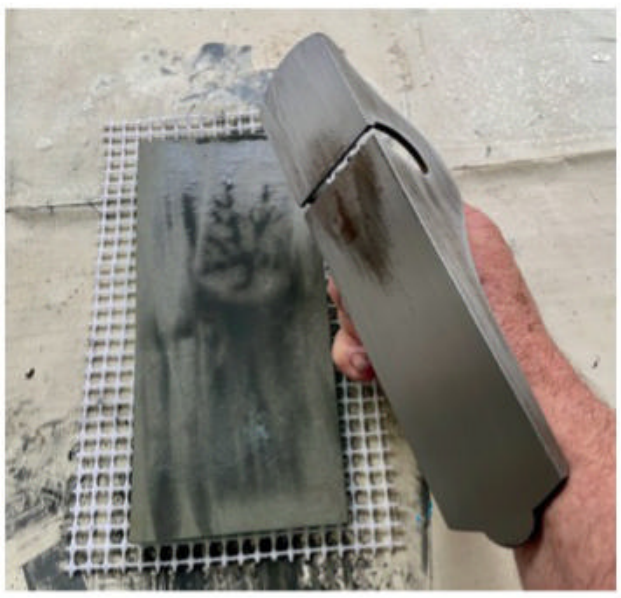


The flat datum in the workshop is now a billaird table true, ultra-smooth old benchtop.

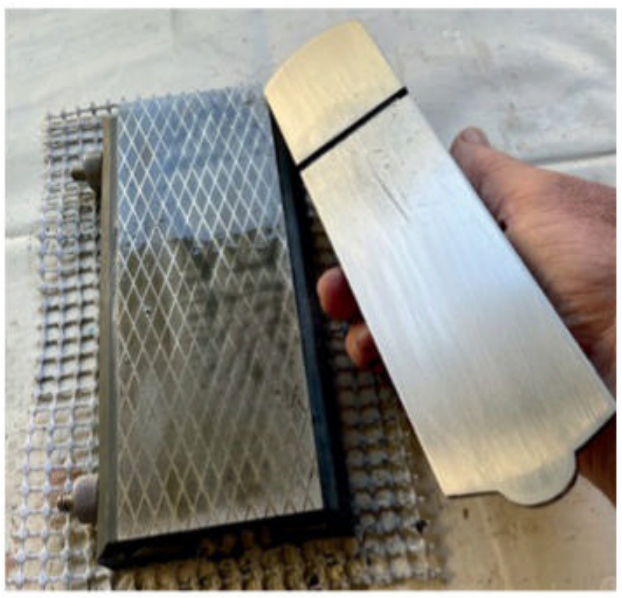
Rebuilding a Stanley No 10½

Stanley No 10½ Carriage Maker's Rebate Planes feature a 54mm-wide blade that spans the width of the sole.

The Stanley Tool Company manufactured carriage maker's rebate planes from 1869 to 1964. As you can see, the mouth of the plane spans the width of the sole. The scallops cast into the sides of the body allow the blade and cap iron assembly to be removed for sharpening and adjustment. These scallops create a weak point in the design and, if the plane slips off the bench, is where the casting will crack. The Stanley No 10 series of planes (there is a 14" No 10 and a 12" No 10¼ in the same stable) are collectable and relatively hard to find. The plane is designed to shave flush to an edge and is used to clean out housing joints, shave tenons and lap joints, as well as cutting rebates. The No 10½ on these pages was bought at the last Traditional Tools Group tool sale (in 2019) and has been on the shelf waiting for a rebuild for the last two years.



Distortion and wear around the mouth was quickly revealed as the sole was linished.

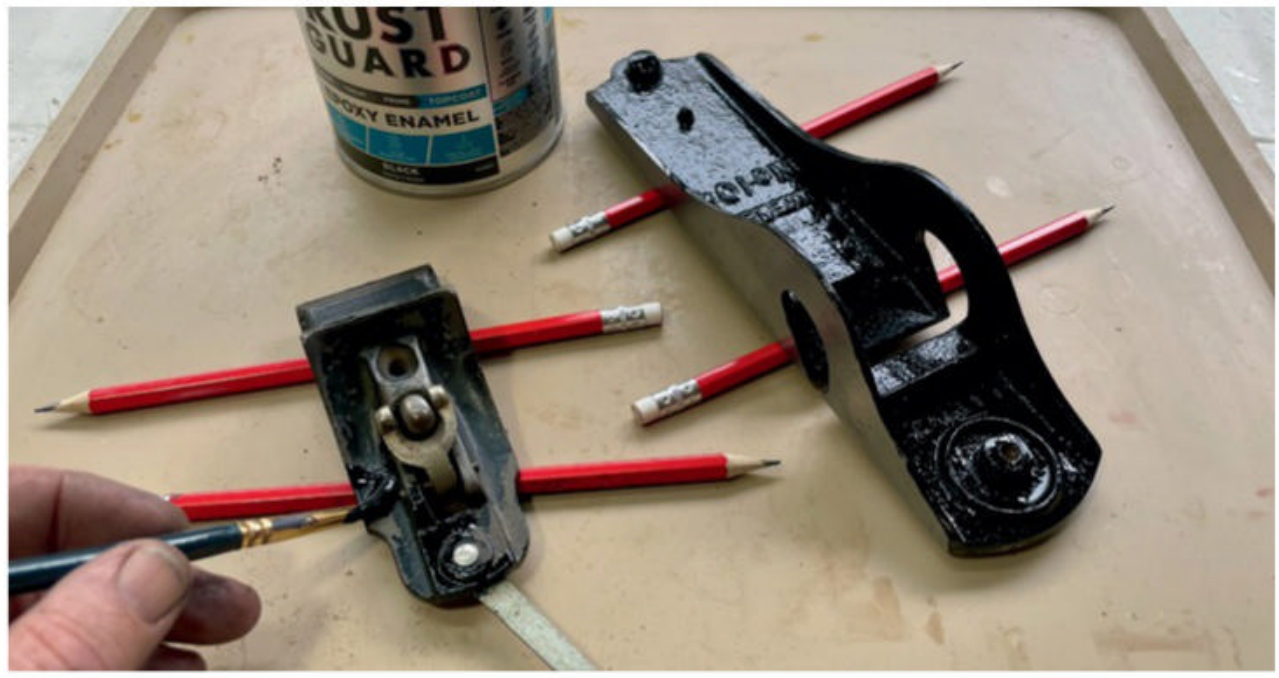


After linishing on 240-grit paper, the sole was lapped on a 1000-grit diamond plate until it shone.

A FLAT SOLE

Premium planes are expensive. Lie-Nielsen and Veritas leave their castings to season for months (like vintage wine) before they are machined, linished and lapped flat. Cheaper planes have castings that "season" after they are manufactured. Most new planes need to be "fettled" before they are used, the sole needs to be lapped, the blade honed and the whole plane dismantled and reassembled.

▲ The rust and glue marks on the sides of the plane were removed with an abrasive block.



▲ The plane must be at least 56 years old. It was obvious that it had never been dismantled. After cleaning each surface I brushed on a matte coat of black enamel.

This is the approach I took when "fettling" the Stanley rebate plane. As you can see, the sole was worn around the mouth and may well have always had a casting defect at this point. I mounted adhesive 240-grit paper on a glass plate and spent two hours getting the sole flat. Ten minutes lapping on a diamond plate had the sole shine!

THE REBUILD

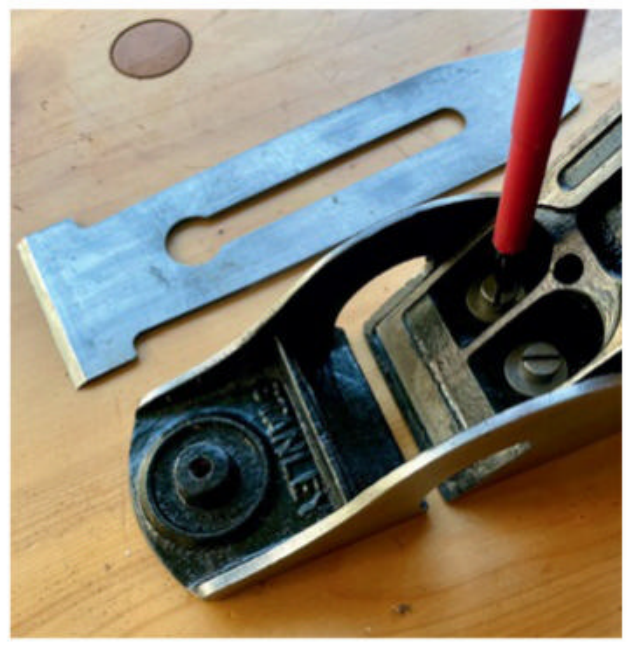
After the sole of the plane was linished and lapped it was time to address the rust and glue stains on the side of the body. This was a much easier task than flattening the sole! I used a 120-grit Schleiffix flexible rubber abrasive block to remove the stains and the rust, and then a 240-grit block to polish the final surface.

After cleaning the frog and the inside of the body with mineral turps and a toothbrush I applied two coats of matte black enamel.

The blade needed to be ground and honed. This was the next step. It appeared to me that the rebate plane had been used mostly as a smoothing plane (most of the wear was in the centre of the sole). I ground a 25° bevel on the blade and then mounted the blade in a Veritas honing guide and returned to the 1000-grit diamond plate. The last step was to adjust the guide to 30° and hone a micro bevel on a black Arkansas stone.

The key point when assembling a plane is to place the frog so that it is slightly forward of the mouth. This allows the blade to cut "chatter free".

The rebuild was a success. The plane is a pleasure to use and better than new. (See page 73 for sources). W



▲ The frog needs to sit just proud of the mouth. This allows the blade to cut "chatter free".

▲ I used a Veritas honing guide on the diamond lapping plate to create the 25° primary bevel. The stone cut the 30° micro bevel.

▲ The rebuilt Stanley No 10½ better than new! Two hours' worth of elbow grease removed the defect in the sole. The plane is "fettled" and ready to go!

Moisture Meters

In my experience, most of the problems that arise with a wood project are due to moisture, in one way or another. Moisture causes expansion and contraction. It can also lead to finishing issues, along with general movement and warpage.

With that in mind, it amazes me how few woodworkers own a moisture meter and check their stock before beginning a project. A moisture meter, in simple terms, reads how much moisture is present in the wood. Even a difference of a few percentage points in moisture can cause issues during building. Ensuring that your wood is at the correct moisture content helps get your projects off on the

right foot. So here, I want to take a look at a couple of different types of moisture meters, and explain the benefits of each.

PIN METER

In the world of moisture meters, you'll find two styles — pin and pinless meters. Pin meters tend to come in at a lower cost (however, there are high-end models) and are often easier to find.

RESISTANCE IS FUTILE. Pin meters, like you see at right, have a pair of pins. The pins look like small nails and are usually six to 10mm long. Pin meters work by pushing the pins into the wood. Then current is passed through the pins and the resistance is measured between them.

One of the most common brands is the Crommelin moisture meter (right photo). This is actually the first meter I purchased. The thing I really like about this meter is that it's cheap. I paid less than $50 for this model, and for the money, it has some decent uses. But first, let's talk about some of the drawbacks to a pin meter.

LITTLE HOLES. With a pin meter, you have to push or pound the pins into the wood to get a reading. That means that you're left with two little holes that you'll have to deal with. Second, the pins only take a reading where they touch the wood. So, if you want to check the moisture in a thick board, you'll need to cut into it to take a measurement.

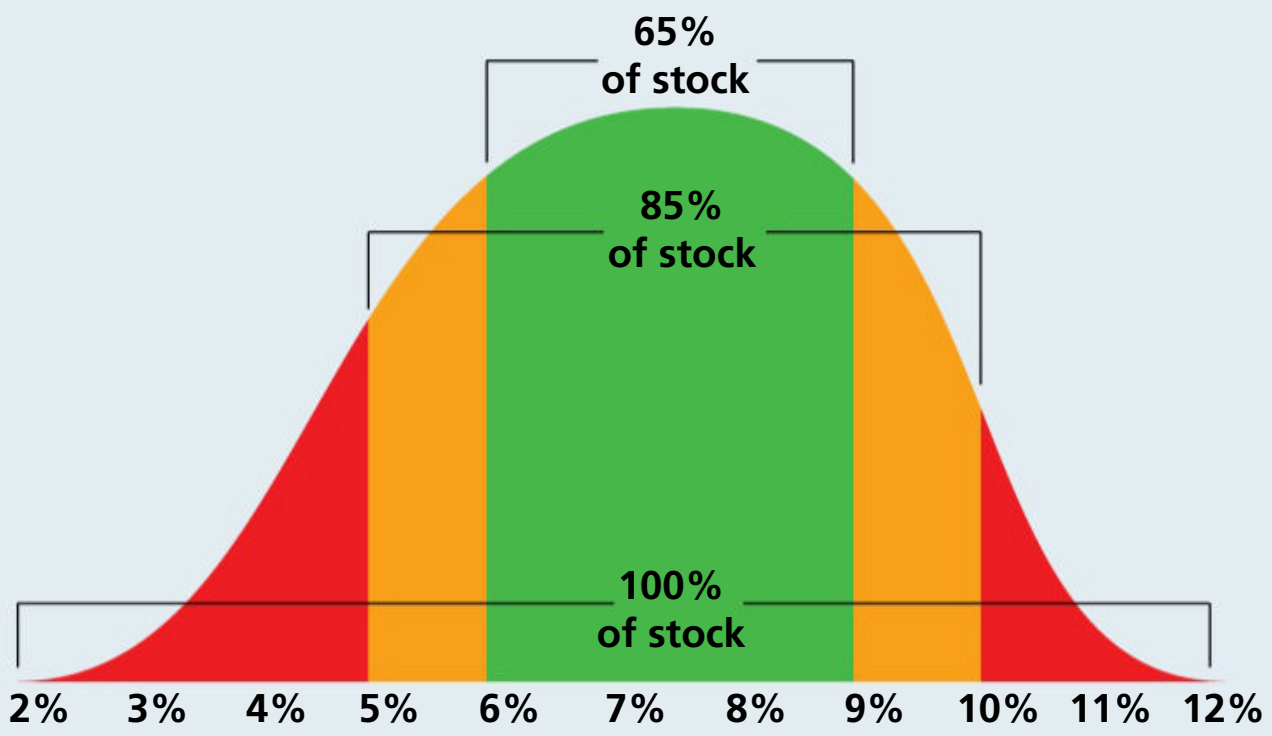
▲ Pin meters measure moisture with the use of two pins, and Crommelin claims their pin meter is accurate within two percentage points.

Another downside with pin meters is what they read, which is resistance. Resistance is easy to measure, but it can easily be skewed by a tree's chemical make-up. If a tree grew in an area with a high concentration of minerals, it could cause the wood to be more, or less, conductive, which skews a resistance reading.

GREEN TIMBER TURNING. Turning green timber into a bowl can take just a day if you know what you are doing. The key to the process is a microwave (set to defrost) and a moisture meter. Turning the bowl to a rough final size and then microwave seasoning for five minutes on defrost will start the process. Resting, seasoning and resting again will have the moisture content come down from 20% to 10%. The final cut and sand will remove the pin marks left by the moisture meter.

WHAT ABOUT KILN-DRIED TIMBER?

You may be wondering if you need to measure the moisture in kiln-dried timber that you purchase from a dealer. The short answer is yes. When commercial timber producers are drying timber, they monitor the moisture content of an entire stack of timber. The goal is to have the average moisture in the 6-9% range. But, as you can see in the graph to the right, that average leaves some timber still slightly wet, or overly dry. So it's still a good idea to verify kiln-dried timber's moisture content.



PINLESS METERS

In contrast to their pinned cousins, pinless meters do not have pins to measure moisture. Instead, they rely on taking a reading through a sensor pad that is usually located on the back of the meter.

They measure moisture by transmitting an electromagnetic wave and then reading the electrical impedance within the magnetic field. This is done by setting the moisture meter to the specific density of the wood you're measuring. You can see this in the lower illustration on the next page.

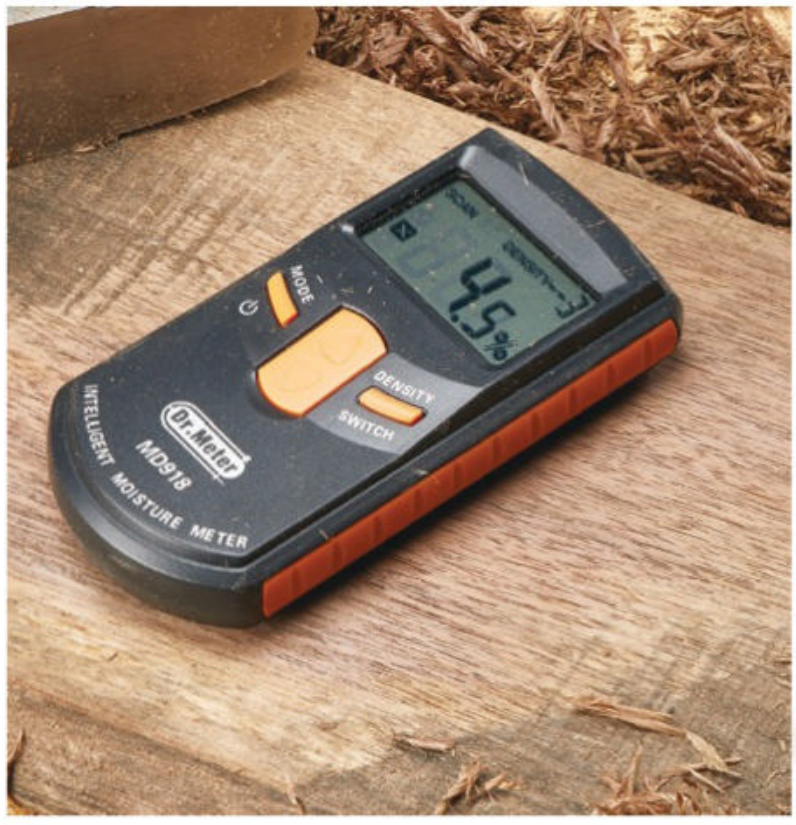
MY PREFERRED METER. Pinless (sometimes called scanning) meters are available in a wide range of price points. They are my preferred style for taking moisture readings for a couple of reasons.

First, I find they tend to be more accurate. The chemical composition of the tree doesn't affect the moisture reading, and higher end models compensate for temperature as well.

Second, I find they're faster to use. You can even use them on a finished piece of furniture without leaving telltale pin holes.

DR. METER. My first scanning meter was the Dr. Meter (bought online). It runs about $100 and has 10 programmed settings for different wood species.

ACCURACY. Dr. Meter claims that their scanning model will measure moisture content between 4 - 80%, with a variance of +/-1.5%. The meter comes with a carrying case as well as a reference chart for the preset densities.



▲ Scanning meters need a clean, flat surface in order to take a reading. Simply plane down a section of rough sawn stock to clean fresh wood.

The Dr. Meter is a passable moisture meter for most woodworking needs. However, with only 10 preset densities, there's quite a bit of room for inaccuracy. Not to fear, there are more accurate meters available.

WAGNER'S ORION LINE. Wagner has long been a respected name in the moisture meter industry. Two of their most popular models are shown here — the Orion 910 (lower photos) and the professional-grade Orion 950 (photo on the next page). When I started digging into the Orion line of moisture meters, I discovered some features that I really found useful.

CALIBRATION. All of the Orion line of meters come in a plastic carrying case, equipped with a calibration platform. This high-density plastic platform basically allows you to zero out your meter to achieve an accurate reading every time.

In addition to calibration, the Orion line of meters compensates for ambient air temperature and moisture and can be set for densities ranging from a specific gravity of .2 up to 1. This means you'll get an accurate reading for every species from balsa to lignum vitae.

THE 910. Wagner's consumer-grade meter, the 910, reads moisture up to a depth of 19mm. The 910 also features what Wagner calls IntelliSense technology. In short, this allows the meter to ignore light surface moisture and measure deeper in the wood. This means a piece of wood that was just rained on won't give a false reading because of the surface moisture. (It may read a touch higher, but not drastically like other meters.)

For everyday workshop needs, the 910 fits the bill perfectly. It's more expensive than other models, coming in at about $499, but you're paying for accuracy.

PROFESSIONAL GRADE 950. If you want just a little more from your meter, the next

▲ After calibrating, the Orion 910 reads the moisture on this walnut at nearly 7%. That's 2.5 percentage points higher than the lower cost Dr. Meter version shown in photo at top of page.

The scanning meter from Wagner come as a kit. It includes the meter, carrying case, reference charts for wood species and a high-density plastic calibration platform for on-site zeroing of the moisture meter.

step up from the 910 is the Orion 950. It's a professional-grade meter that can read two different depths — 6 and 19mm. Not only does it have all the functions that the 910 has, but it has a few more bells and whistles that the tech nerd in me loves.

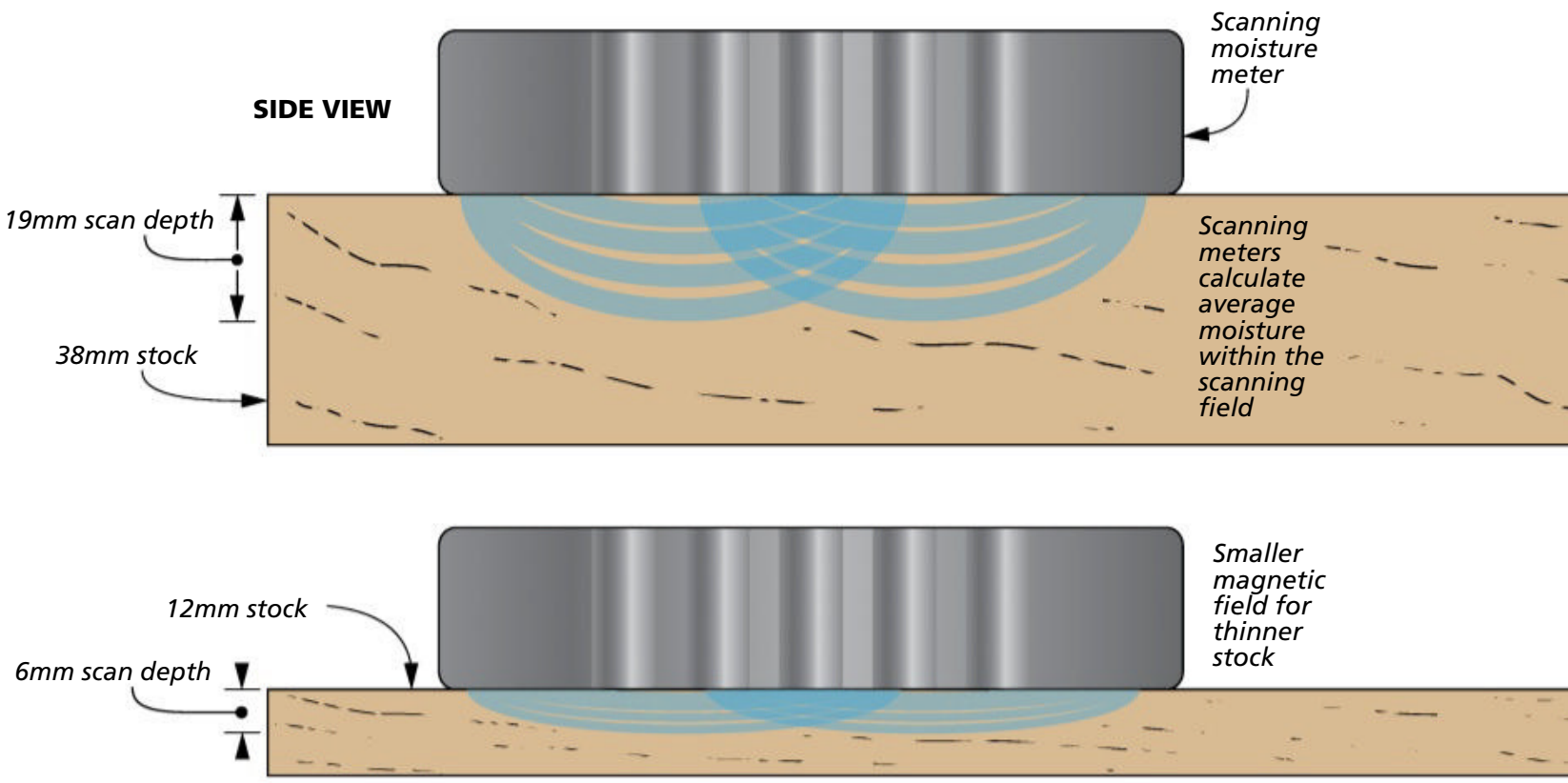
BLUETOOTH. You read that right — the 950 is bluetooth enabled to hook up with a smart phone. This means that the 950 can take measurements and chart moisture over an extended period of time. This isn't something that most of us would use every day, but if you're drying timber on a large scale, or like to provide documentation to clients on the material you use when building furniture, it's valuable.

EQUILIBRIUM MOISTURE CONTENT. As much as I like the bluetooth feature, there's one single feature of the 950 that would push me to make the investment and purchase one (it sells for $750). And that is the equilibrium moisture content mode. In this mode, the 950 will measure the temperature and moisture in a room and calculate at what moisture percentage a piece of stock will stabilise at. This allows you to know when a board has fully acclimated to its environment, and won't continue to lose or gain moisture.

MOISTURE METERS IN YOUR WORKSHOP. Moisture meters may not be the tool that everyone dreams of when they're planning purchases for their workshop. However, a quality project starts with the material that you're using. And making sure that stock is dry, acclimated and ready to use lays an important foundation for you to be successful.

So, if you don't have a moisture meter on hand, use this information to select one that suits your needs. For retail information for all of these meters, check out Sources on page 73. W

Scanning Depth.
Scanning meters work by transmitting an electromagnetic field to a set depth in the stock. Combining a user-set density with the magnetic field reading, the meter can calculate how much moisture is present in the wood. Scanning meters are unaffected by chemical composition of the stock, instead only relying on the specific density, which is relatively uniform across different trees of the same species.



Forging a Blade

NORDIC EDGE

Forging a blade from a billet is a fabulous journey. For me it opened a door into an ancient world of craft and the artisan skills of a clever blacksmith.

When Bjorn Jacobsen from Nordic Edge invited me to spend a day with master blacksmith Jamie "Sausage Man" Bishop forging a chef's knife I had to say yes.

A bit of background first.

Bjorn was born in Norway and has grown up in a culture that carries knives and whittles pieces of wood at a moment's notice. Making knives from scratch and from kits is a Nordic tradition. Bjorn knows the "creator's joy" you experience when you make something with your own hands is infectious and addictive!

In 2015 Bjorn set up Creative Man and started to import cutler's hardware and knife kits. He recently changed the name of the company (women hold up half the sky!) and is keen to get more Australians involved in this rewarding hobby.

Nordic Edge not only imports cutlers' hardware and knife kits, they also run blacksmithing and spoon carving workshops out of their Brookvale industrial unit.

This is where Jamie and his amazing blacksmithing skills come in. Four lucky souls met Jamie on a bright Saturday morning, did a safety introduction followed by an overview of the day's activity. As you can see above, Jamie had each of the eight steps set out as a tactile display on the bench. The 500 x 50 x 3.5mm bar of 1084 carbon knife steel had already been cut to size for us. Our billets were sitting on an anvil waiting for us to test our mettle on.

What followed was a noisy and hot day on the tools and at the belt grinders transforming the cold metal into gleaming razor-sharp chef's knives.

The day finished at 4pm. Jamie cooked up some sausages and Robert, Timothy, Jeremy, Bjorn and I sat about admiring our creations and pondering what the next blacksmithing challenge could be.

1 One bar of 1084 carbon knife steel yields two knife billets. The billets were cut to size with an angle grinder. The reason why 1084 steel was chosen is that it is quite forgiving, just right for beginners.

2 The first skill we all had to master was using the long-handled tongs to extract the white hot billet from the furnace. Extending the tang was the next challenge. As you can see, the edge of the anvil was used to deepen the bolster and define the heel. This process naturally extended the tang. The aim was to produce a tang that was thicker than the blade and only 20mm wide.

3 The distal taper was created by hammering the front half of the blade. This process dropped the nose and thickened the spine. Hammering the bevels lifted the nose and lengthened the blade. The blade needed to be returned to the furnace many times. The challenge was to get the blade edge 1-1.5mm thick. We quickly learnt that a loose hold on the hammer reduced wrist fatigue.

4 Two hours of hammering puts a lot of stress into the crystal structure of the steel. Soaking the blades in a furnace at 875°C normalised the steel and refined its grains. The blades were removed one at a time and flattened in a press.

5 Hardening the blade is a delicate process. Trained eyes can measure temperature by the colour of the steel as it heats up. The steel needs to soak at 815°C for several minutes to reach its austenitic phase. We used a digital thermometer connected to a probe to track temperature, however a quirk of carbon steel is that it is not magnetic at 815°C. The blades were quenched in warm canola oil. This process keeps the steel grains hard and small.

6 Tempering reduces brittleness and improves toughness in the blade. The process we used was to pop the blades into an electric oven set at 200°C and let them bake for an hour and a half. A convenient time to have lunch.


2


3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6

7 Grinding the profile of the blade introduced us all to a wonder of Australian engineering and invention, the Shopmate 48. This clever machine allows you to quickly change belts as you move up the abrasive grades. A bucket of water below the bottom roller captured the sparks and scale.

8 With the profile resolved, it was time to remove the scale from the faces of the blade and to grind the bevels. The aim was to refine the distal taper so the blade got narrower from the handle to the point and from the spine to the cutting edge. The blade needed to be constantly moved so that the temper was not upset. A finger of wood was used to finesse the spot where you needed the belt to remove material. When all the pits and marks had been removed and the shape judged to be right, it was time to change belts and move up the grades. The final buff was achieved with a Scotch Brite belt on the Shopmate 48.

9 The tang needed to be expertly ground so that it could slip into the handle. This was achieved by locking a collar 10mm forward of the heel and using it as a stop to grind to.

10 The day was not long enough to allow us to make our own knife handles. Bjorn had a selection of pre-made handles for us to choose from. Once we had made our selections we filed out the mortice so it matched the tang, masked off the handle and used 5-minute epoxy glue to lock the two together.

11 The end of the day had us honing a razor-sharp edge on the knives we had crafted. It was just wonderful seeing the transformation of a billet of tool steel into a finished and functional knife. The final photoshoot could have been of five dusty and crusty blokes in their leather aprons grinning from ear to ear. Instead, I decided to make the knives the hero image (mine is second from the top).

Cutler's Hardware

The ScaniChef 205 stainless steel knife kit above is just one of the 59 kits that Nordic Edge has on offer. The razor-sharp blade is already made for you. All you need to do is drill and counterbore the rivet holes in the handle stock, sheath the blade and then rivet the handles in place. Next step is to whittle and sand the handle so it fits your hand.

Dishwashers corrode the rivets in chef's knives. In our next issue we will be showing you how you can renovate your old knives by popping on a new handle. The clever cutler's rivets to the right can breathe new life into old knives.

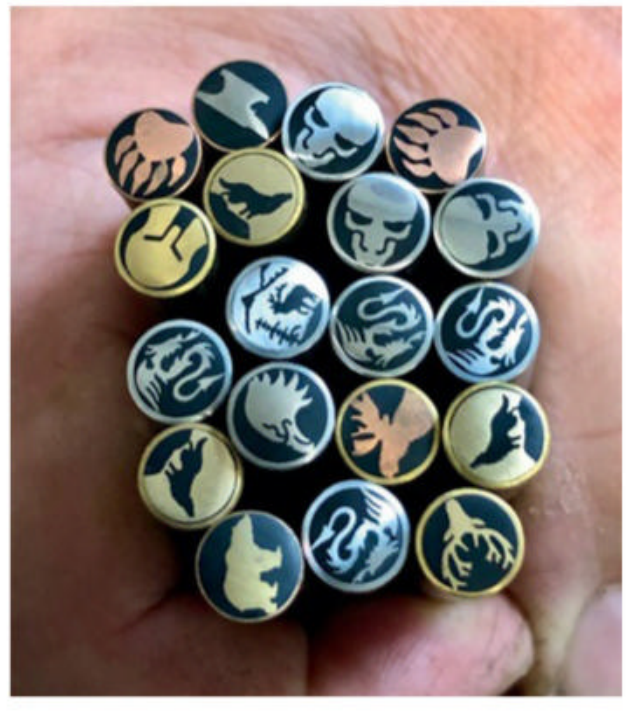
There is an amazing variety of materials that knifemakers use to make handles out of. Mammoth ivory and molars from Siberia are just some options. I chose the Finnish Curly Birch Extreme Grade for the handles of the ScaniChef knife. This amazing timber is curly all the way through the trunk (not just in a burl).

The mosaic pins below right allow knifemakers to personalise their craft. The pins feature an extruded solid metal motif embedded in black resin. W

▲ The cutler's rivets to the left are a friction fit, while the rivets to the right are screwed together. Old knives can be rehandled with the help of these clever rivets.

▲ Matched handle options include mammoth tusk ivory impregnated with resin.

▲ Matched mammoth molars, impregnated with resin are also available as handle options.

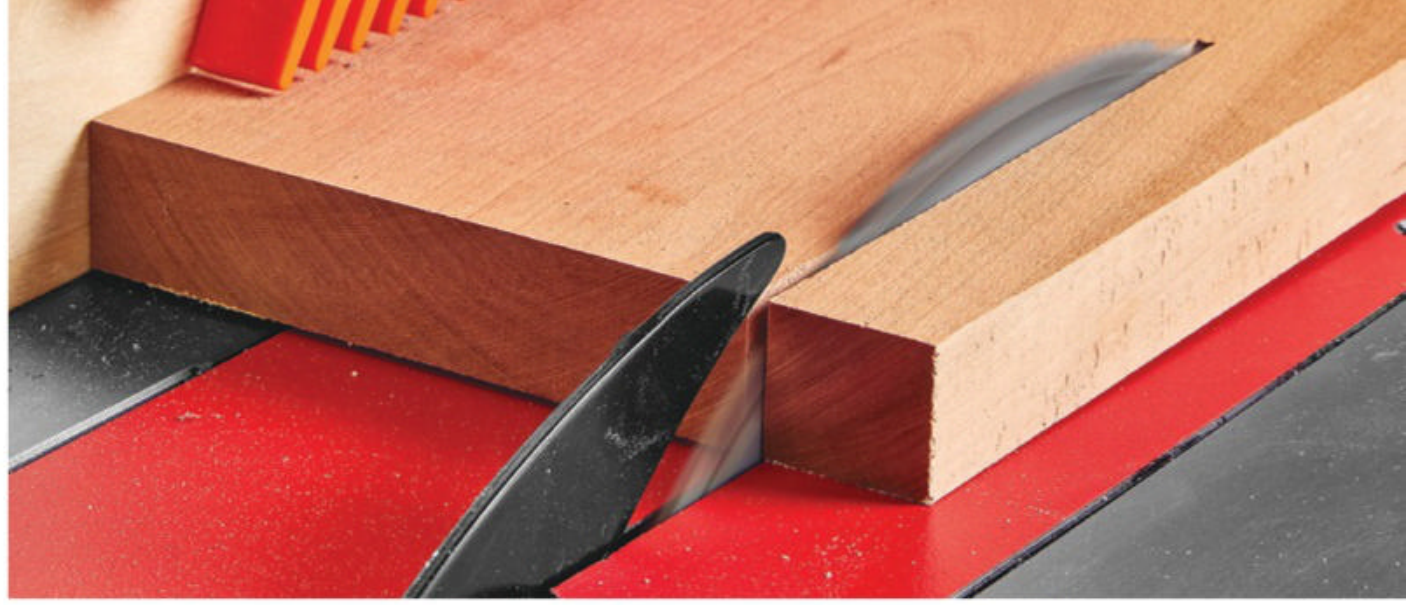


▲ Mosaic pins feature 120mm solid metal extrusions embedded in black resin.

Avoid Kickback

Every woodworker fears being cut by their table saw. We know we must stay alert whenever the saw is on. We would never put our hand in the path of the blade.

But while it is possible for a distracted woodworker to inadvertently push his hand into a spinning saw blade, amputations and injuries are more commonly caused by the workpiece pulling your hand into the danger



A riving knife is the number one preventer of kickback. When cutting a board with stresses in it, a riving knife will prevent the kerf from closing around the blade. It's worth noting that thin-kerf blades may not work with every style of riving knife.

zone through a process known as kickback. Table saw kickback may also eject a workpiece from the saw with tremendous bone-breaking force.

Fortunately, the risk of table saw kickback may be greatly reduced and the chance of injury all but eliminated if you learn how kickbacks occur and what simple rules you should follow every time you use your saw. This article will examine six common causes of kickback and how to avoid them.

KICKBACK #1- THE CLOSING KERF

CAUSE. As a tree grows, internal stress may develop within the wood fibres. Poor drying techniques or conditions may also lead to case-hardening which can also create stresses within the board. These are usually undetectable until you begin to rip it. During the cut, that stress is released and this may cause the kerf to close, pinching against the rear of the spinning blade.

SOLUTION. Install a splitter. If a splitter or riving knife is installed behind the blade the kerf will pinch against it rather than the blade itself. Splitters and riving knives are the number one way to prevent table saw kickback.

In addition, many saws will come with a set of pawls, as you see in the main photo. These toothed "feet" only allow the workpiece to be fed forward and can help prevent kickback.

Often, riving knives have a set of pawls on them. These teeth allow the workpiece to be pushed through the cut, but won't allow it to go backwards, reducing kickback.

KICKBACK #2- THE SHIFTING BOARD

CAUSE. Rough timber that is not flat and straight can perform in unpredictable ways. A cupped board may collapse downward as it is cut. A warped board may rock from one side to another as it's fed. And a crooked edge may cause the trailing end of a board to shift as the leading end begins to clear the fence. All these situations may result in pressure against the side of the spinning blade and potential kickback.

A simple sled like this one will help cut a straight edge on rough cut boards. The hold-downs keep the workpiece secure and a mitre bar on the bottom side of the sled guides the workpiece.

SOLUTION. Don't cut rough timber on a table saw unless you have a straight edge against the fence, and one flat surface on top of the saw. If your board is too wide for your jointer, rip it with a bandsaw or hand-held jig saw rather than a table saw.

If the table saw must be used for cutting rough timber, you can use a sled like the one shown in the lower left photo. It holds the workpiece firmly to a base. The base slides in the mitre slot and allows you to cut a straight edge with the workpiece held tightly down.

Another helper for boards that may shift are featherboards. You can see these in the main photo. These help hold the workpiece firmly against the fence and down to the surface of the table saw. These are particularly useful if you're cutting thin, floppy stock (such as moulding), or for helping guide big, heavy boards.

KICKBACK #3- THE TWISTING WORKPIECE

CAUSE. If a workpiece turns towards the blade during a cut, the rear teeth may lift and pull the workpiece (and possibly the operator's hand) on top of the blade. This is most common when working with small pieces of wood that lack enough edge length to be kept straight against the fence. A sure sign that this type of kickback has occurred is a curved cut mark left in the surface of the board as it turns over the top of the blade.

SOLUTION. Always use a push-stick or push-block when your hand is near the blade, and position it near the centre of the workpiece to ensure a straight feed. Protect the blade's rear teeth with a riving knife or splitter.

KICKBACK #4- THE MISUSED FENCE

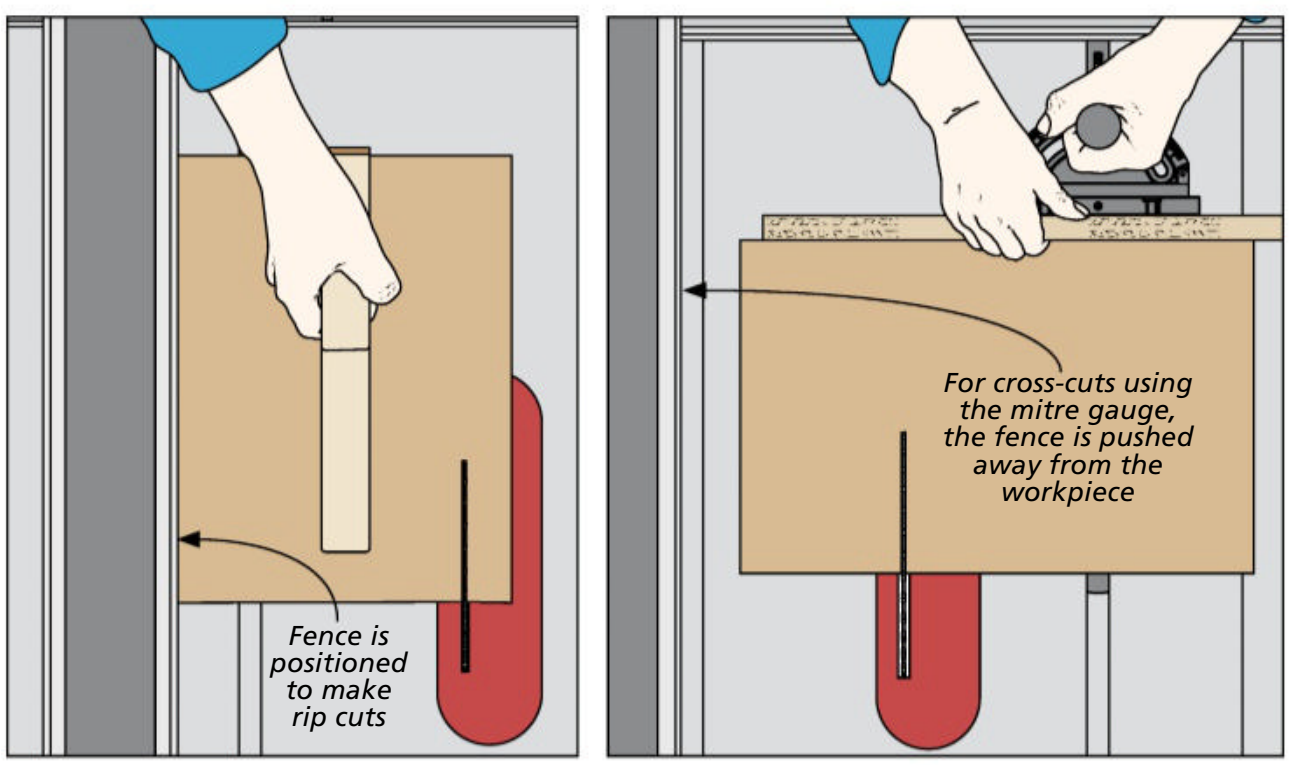
CAUSE. If used improperly, a rip fence can trap an offcut against the blade, causing a kickback. This may occur if, while attempting to make a crosscut with a mitre gauge, the end of the board is placed against the rip fence, perhaps as a stop for making repeated cuts of the same length. The loose offcut is all but certain to turn and wedge itself against the spinning blade.

Another dangerous situation may involve attempting to make a crosscut without a mitre gauge by holding the short end of a rectangular board or panel against the rip fence. If the workpiece twists during the cut, kickback is most likely to occur.

SOLUTION. Rip fences are made for ripping, mitre gauges and sleds should be used for crosscutting. The two should not be used at the same time. (Exception — when cutting a rebate or tenon on the end of a workpiece where no loose offcut will be produced.)

As a general rule for small and medium sized panels, check the distance between the blade and the rip fence. If that is greater than the length of the edge that must be held against the fence, use a sled or mitre gauge rather than a rip fence to make the cut.

▲ The push-block keeps the operator's hand a safe distance away from the blade. A longer push-block allows more control of the workpiece as you make the cut, allowing you to keep it tight against the fence.



Pinched Pieces. Rip fences and mitre gauges are not meant to be used together. Use the fence to make rip cuts (left illustration). When using the mitre gauge, as seen in the right illustration, make sure the fence is pushed away as to not pinch the offcut.

KICKBACK #5- THE MISALIGNED RIP FENCE

CAUSE. If a rip fence is nearer to the rear of the saw blade than it is to the front, it will produce a wedging effect on your workpiece. This often causes scorched edges with blade marks and increased resistance during rip cuts, but it may also lead to a board being ejected towards the operator.

SOLUTION. Both the saw blade and the rip fence must be parallel to the mitre slots so you may be sure they are also parallel to each other. You can see this in the photo at right. Some may choose to angle the rear end of their rip fences away from the blade by a small amount, perhaps 1mm. Either solution is acceptable.

Take some time to verify that your rip fence is aligned with the blade. This elimates "drift" during the cut that can cause kickback. Some people prefer for the outfeed side of the fence to be slightly farther away from the blade.

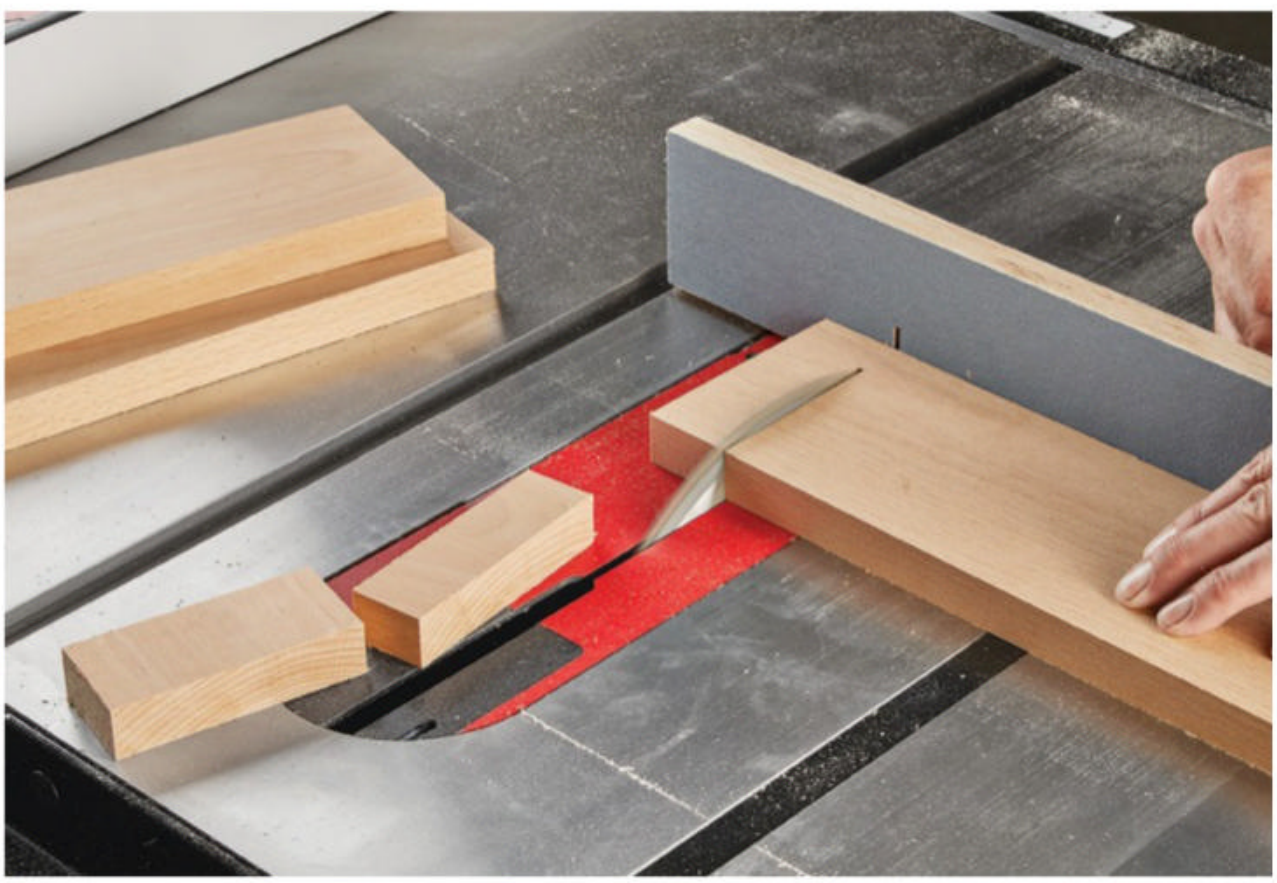
KICKBACK #6- LOOSE OFFCUTS

CAUSE. When making repeated crosscuts on multiple workpieces, such as trimming workpiece ends square, the loose offcuts may begin to accumulate next to the blade. Saw vibration can cause one or more of them to work their way towards the blade. If the offcuts get close enough and do contact the blade, a tooth may catch it and eject it towards the operator.

SOLUTION. Do not let offcuts accumulate on top of the saw. A sacrificial fence on your mitre gauge that extends past the blade will push the offcuts clear of the danger zone with each cut. You can see an example of this mitre fence below.

The common theme with most table saw kickbacks is that they are initiated by the rear, rising teeth of the saw blade. The most effective preventive measure you can take is to install a riving knife or a splitter for every cut.

If your saw is not equipped with such a device, you may make your own insert from plywood or MDF with an integrated homemade splitter. If your saw is a newer model, more than likely it came with a riving knife. If it's missing, you can often call the manufacturer and purchase a replacement. It's money well spent. This will protect the rear of the blade and significantly reduce many common causes of kickback.



Using a sacrificial fence on a mitre gauge has two main purposes. First, it helps reduce tearout by backing up the cut. Second, when you make a cut it will push any small offcuts past the blade.

FINAL ADVICE

Additionally, always use a push stick or push block if your hand will be anywhere near the blade. If kickback does occur, it's better for the push stick or push block to take the damage rather than your hand.

Finally, when making rip cuts, position your body on the side of the blade opposite your rip fence. If a board is ejected it will be more likely to go past you rather than directly towards you.

Table saw kickbacks should be understood more than they are feared. The safety-minded, proactive woodworker can all but completely eliminate the risk from a table saw and enjoy many years of injury-free woodworking.

Wine Rack

This wine rack goes above and beyond with the simple addition of a shelf. A shelf that houses a drawer perfect for the accessories that you need to have close at hand.

Louis Pasteur said "A bottle of wine contains more philosophy than all the books in the world." If that's the case, then you'll have quite the library at the ready with this project. Not because of its size, it's more due to good design.

The parts for the rack, back and dividers are all made from 12mm plywood. This was a perfect compromise when designing the look of the rack. Using 19mm material just felt and looked unnecessarily thick. Plus, using the 12mm ply for the back added a lot of rigidity to the case. To keep the scale properly proportioned, the drawer is made of 9mm material. But let's start with the rack that stores the bottles first. That means sizing the case parts.

MITRES. The sides, top and bottom are joined to each other with mitres and splines. The box on the next page provides you with insight about what I'm sharing here. Cranking the blade to 45° is the first order of business. A handy way to control the length of the parts is to use an auxiliary fence on your mitre gauge, with a stop block attached to it (Figure 1). This is the best way to ensure the parts are exactly the same length and that the mitres are perfectly square.

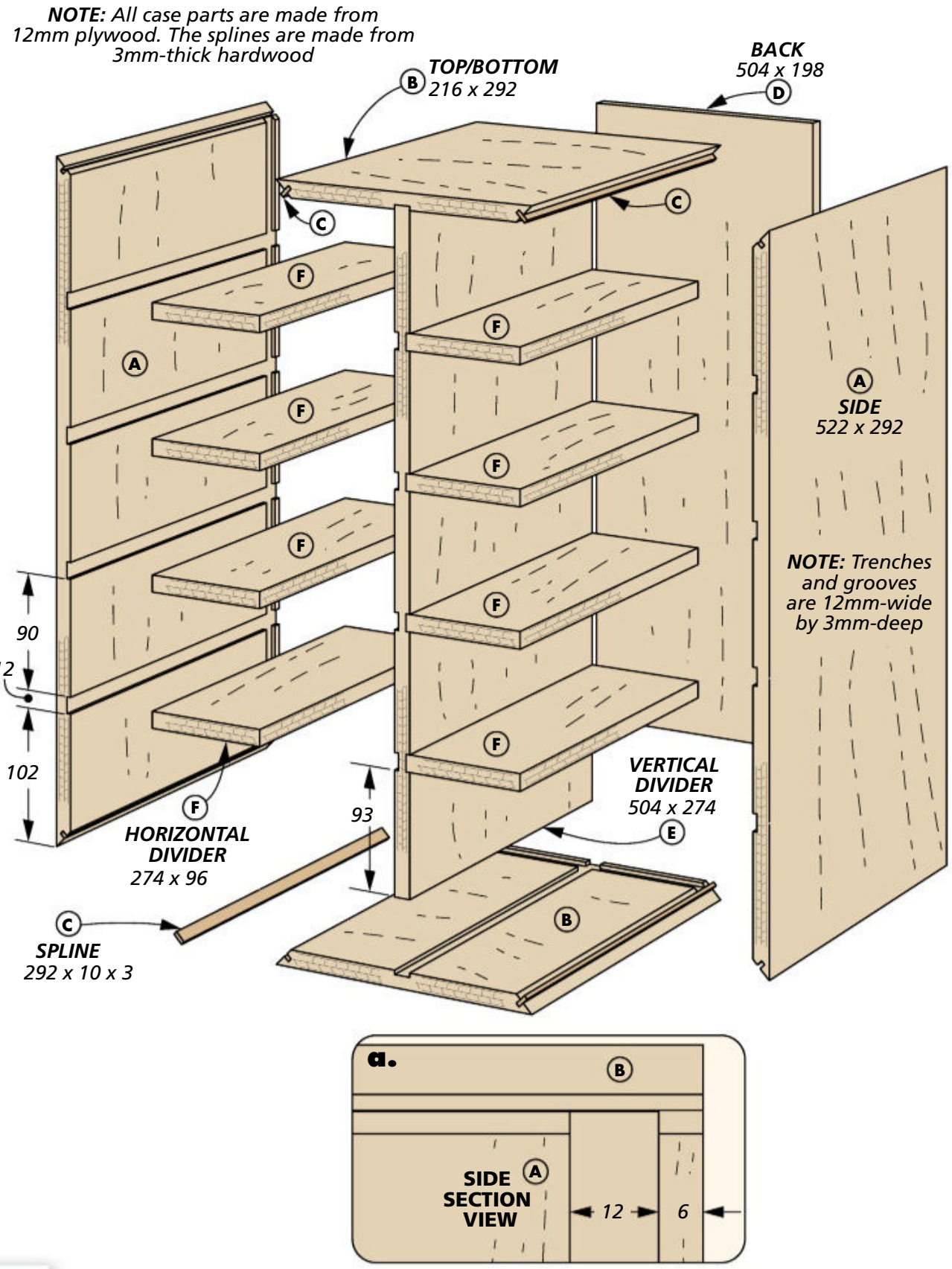
SLOTS IN MITRES. The mitres alone wouldn't be a very strong joint. So, as you see in the main drawing, the joints between the mitres are reinforced with splines. Figure 2 shows how to do this. Once the slots are cut (and the splines are made) you can focus on the grooves and trenches.

TRENCHES FIRST. The easiest and strongest way to make the ten compartments in the rack for your wine cache is to join the dividers to the sides and top with housing joints. The housings aren't deep — just enough to hold the dividers securely in place. Then you can cut the groove on the rear edge of the parts for the plywood back (detail 'a') at the table saw as well.

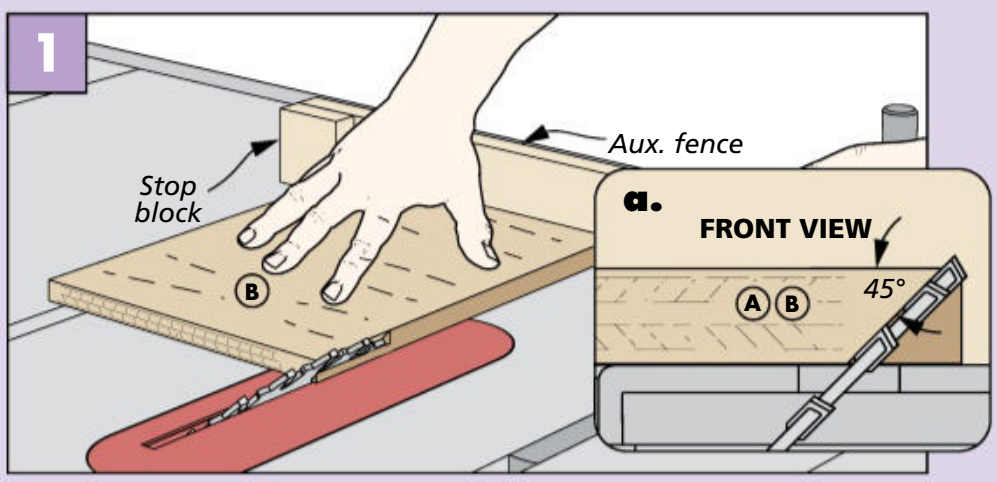
ASSEMBLY. I glued up the parts that make up the shell of the rack (the sides, top, bottom, back and splines). While the glue was drying on that assembly, I cut the dividers to size.

DIVIDERS. The vertical divider has trenches that align with ones in the sides of the rack. These trenches hold the horizontal dividers that are the shelves for the bottles, once those are cut in the divider, you can glue it in place in the rack.

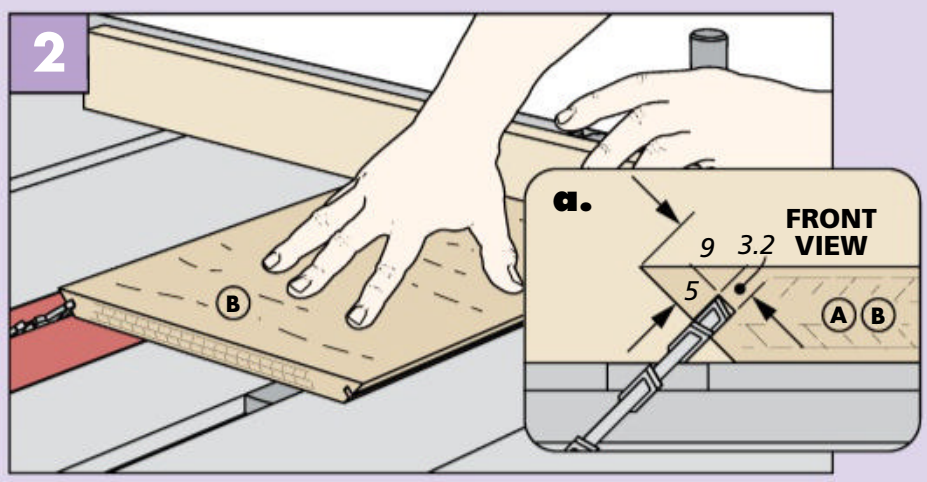
Follow that with installing the horizontal dividers. After a warm water clean-up of glue at the joints, you can turn to the finishing touches on the rack — the edging and a hardwood top.



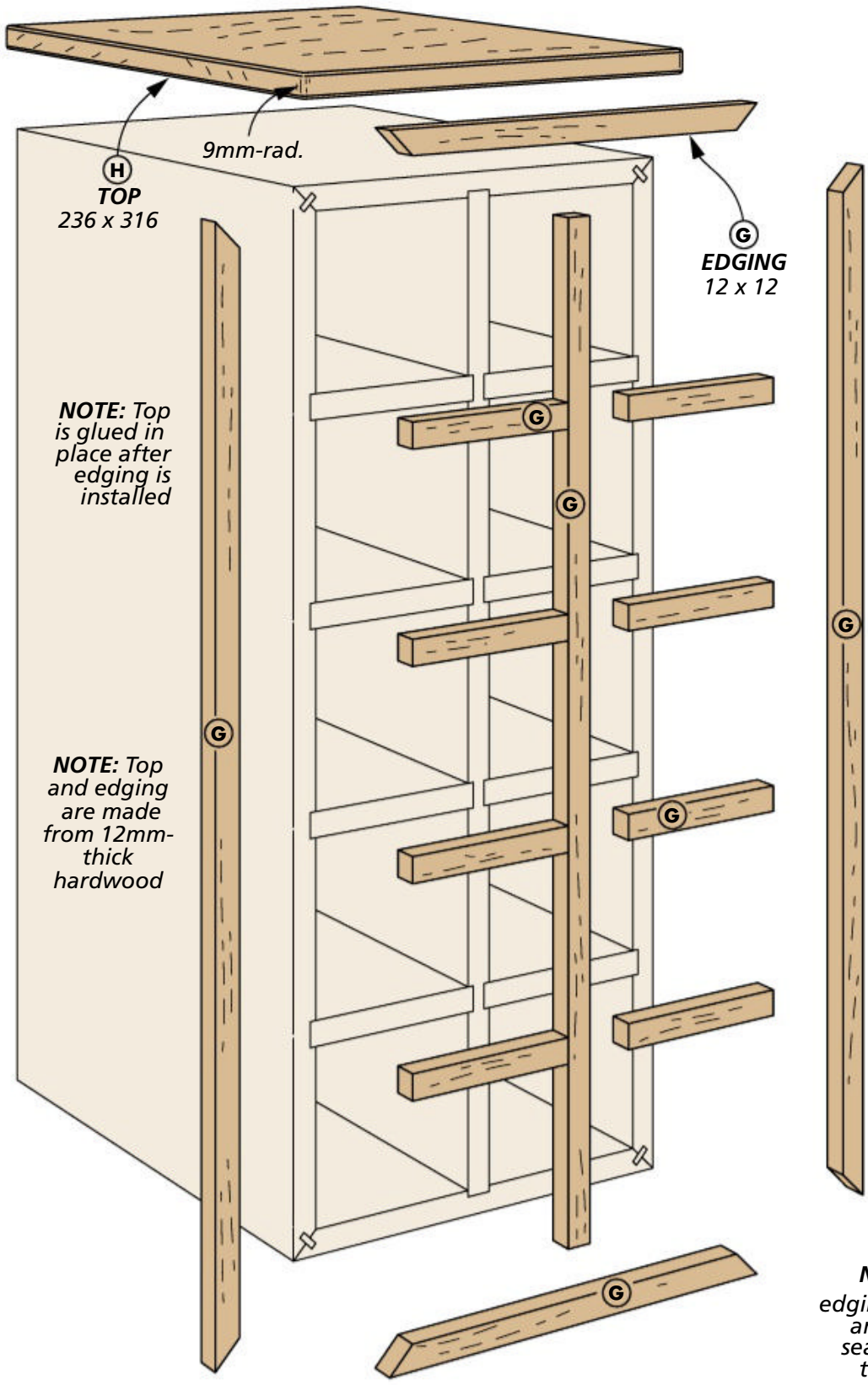
MAKE THE SLOTTED MITRES



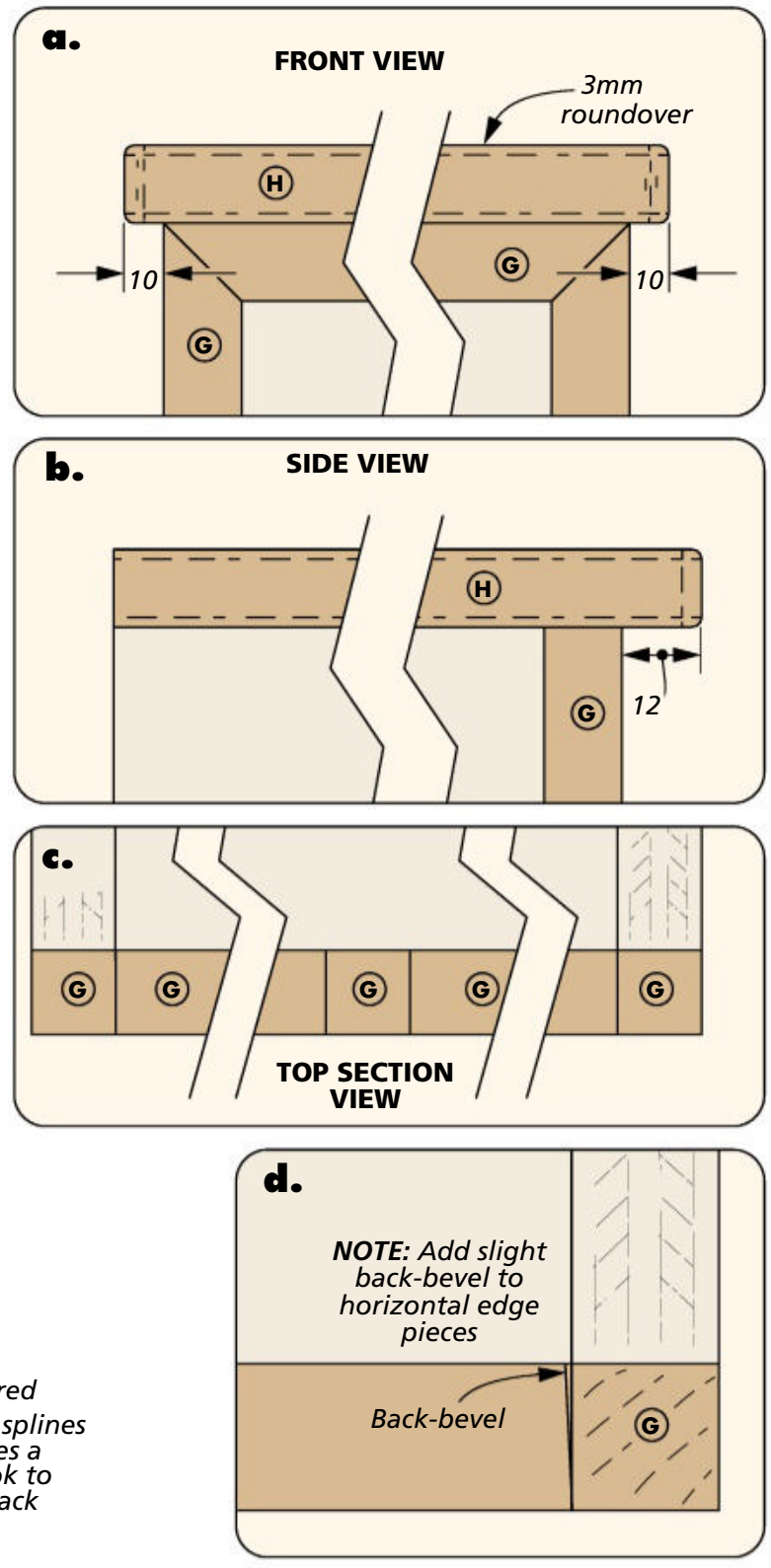
Mitres First. The table saw, with assistance from your mitre gauge, an auxiliary fence and a stop block guarantees mitres that are squarely cut on all four pieces.



Slots Second. First, flip the stop block to the other side of the auxiliary fence. Now you can cut the slots in the mitres of sides, top and bottom.



NOTE: *Mitred edging covers splines and provides a seamless look to the wine rack*



Next, the EDGING & SHELF

Simple strips of hardwood dress up the front of the wine rack by hiding the raw edges of the plywood and the ends of the splines in the mitres. The parts that cover the sides, top and bottom are mitred in the corners like the case frame that it's covering. I started with those pieces that make up the rim.

MORE MITRING. Cutting and fitting each piece is the best way to ensure tight, almost seamless mitres. I glue each tailored workpiece in place as I go along. The glue sets quickly enough to work on the adjoining piece without fear of knocking it free. Fitting the pieces that cover the dividers is next on the docket.

TIGHT FIT. The long vertical edging and the short horizontal pieces are butted to each other. And they butt against edging you just installed.

There's a little trick that I use to fit butt joints that's a carryover from my trim carpentry days. Detail 'd' above shows this in action. What you're going to do is put a tiny bevel on both ends of the piece. Start by cutting a 1° bevel on one end of the workpiece. Now hold the short edge of that bevelled end in its opening and mark a line at the opposite junction. Then cut the small bevel flaring out from that mark. This back-bevel tactic leaves you with snug-fitting butt joints.

THE TOP. The top, like all the other parts to this point, is 12mm thick. The grain runs from side to side. The top is flush to the back but overhangs the front and sides (details 'a' and 'b'). The sides and front edges have a gentle roundover, while the front corners have a modest radius easing them.

THE SHELF

Attached to the right side of the wine rack is a shelf with a drawer underneath for storing accessories that are handy to have

close by when enjoying a glass of wine. The shelf is a convenient place to pour that wine, and stow the open bottle.

The curved front on the outer edge of the shelf looks good and won't inflict a bruise on a person that happens to pass close by. We'll start over at the table saw making a framework that supports the shelf and drawer.

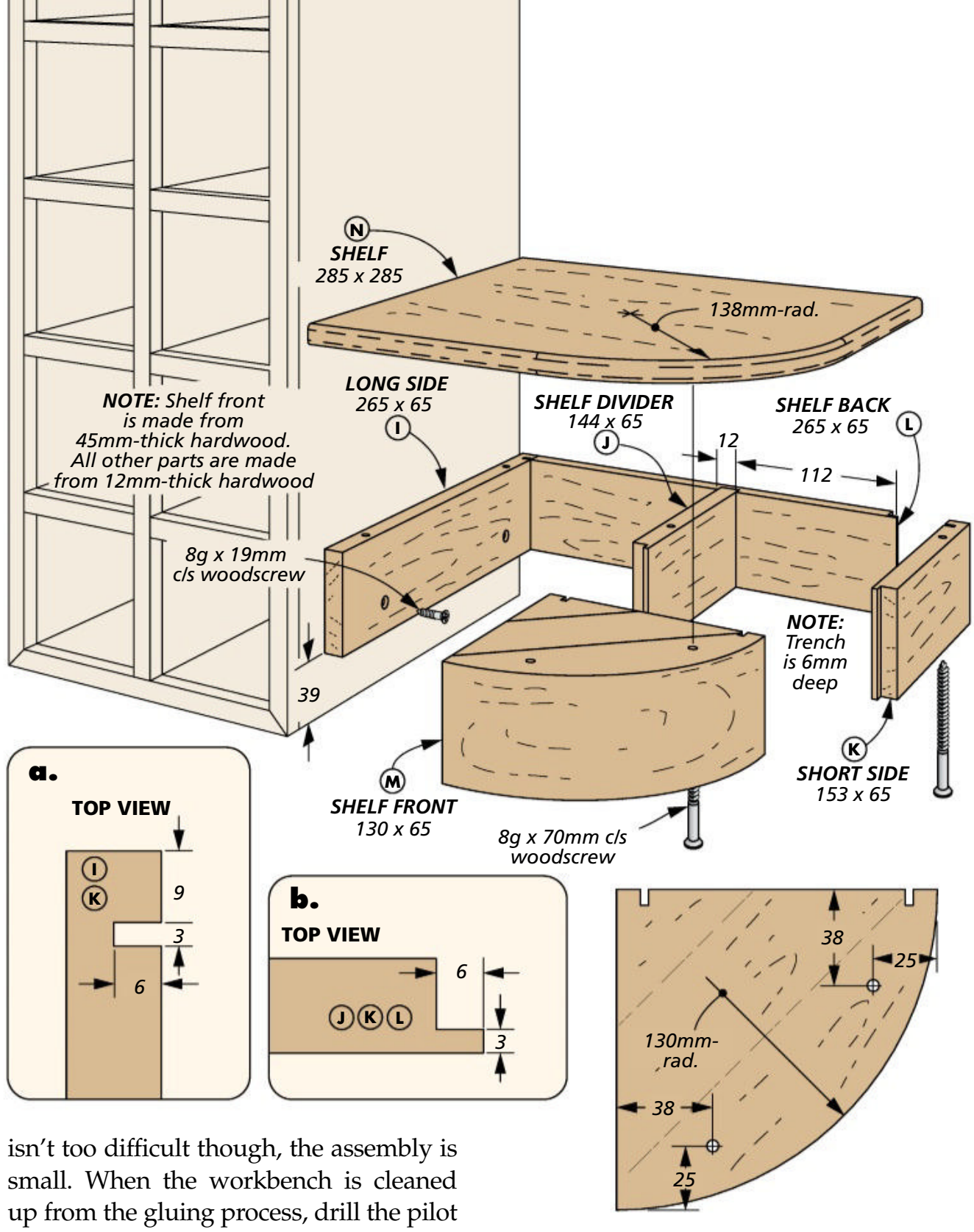
The frame of the shelf consists of four pieces and a block. The block gets shaped into a large arc that is the shelf front on the outer edge of the project. To keep the process efficient, I started by gluing up the blocks that will be for the curved front. While they were drying, I focused on the other parts. It's standard tongue and groove joinery on the frame.

TONGUE & GROOVES. With all the pieces cut to final size, I went about cutting the grooves in the long and short sides (detail 'a'). Next was to fabricate the tongues on the short divider and side, as well as the back (detail 'b'). Finish with a groove in the middle of the shelf back.

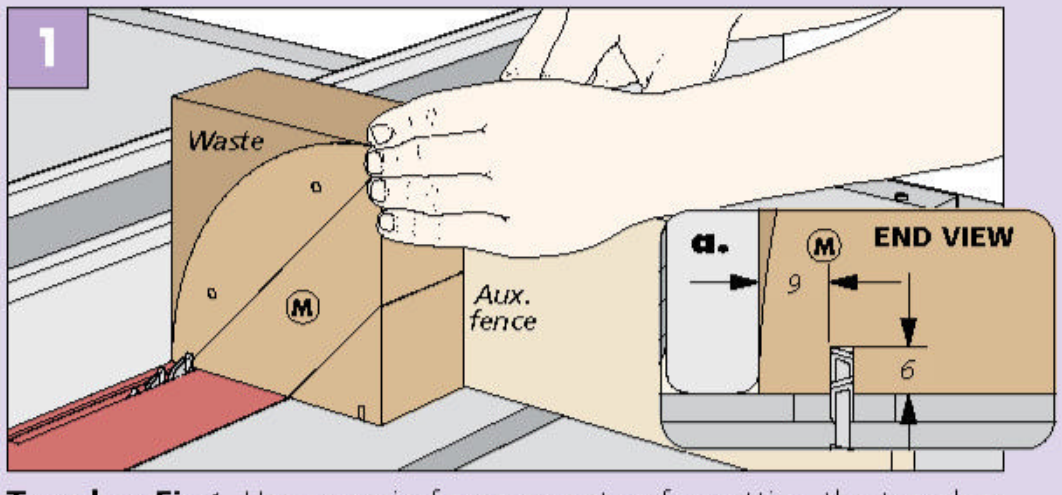
SHELF FRONT. Returning my focus to the block for the shelf front, I trim the square inside portions at the bandsaw and sand them smooth. As the box below shows, start by cutting the trenches needed to glue the front to the frame of the shelf. Then, at the bandsaw, shape the front.

GLUE UP. Make sure everything is flat and flush while gluing up the frame. This isn't too difficult though, the assembly is small. When the workbench is cleaned up from the gluing process, drill the pilot holes and countersinks for the screws that hold the top in place.

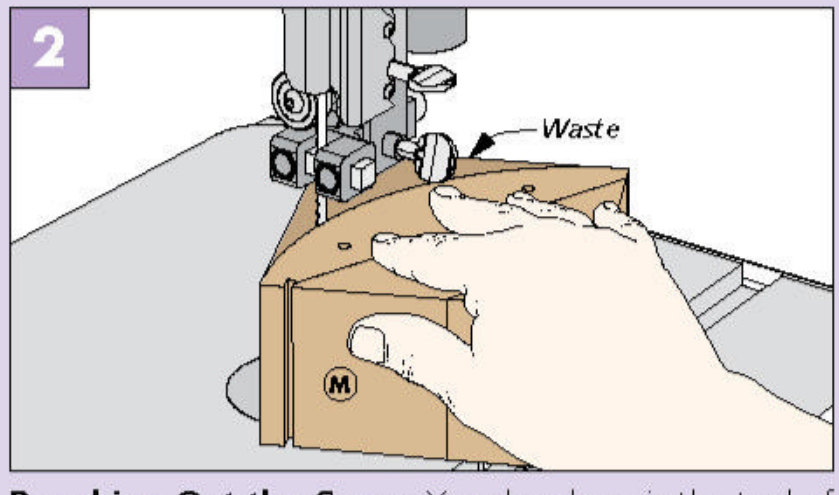
THE TOP. To finish the shelf it's pretty straightforward stuff. The top is flush to the back and echoes the shape of the frame with a slight overhang. Ease that edge with a roundover bit. Then screw it in place on the frame. Now it's on to the drawer.



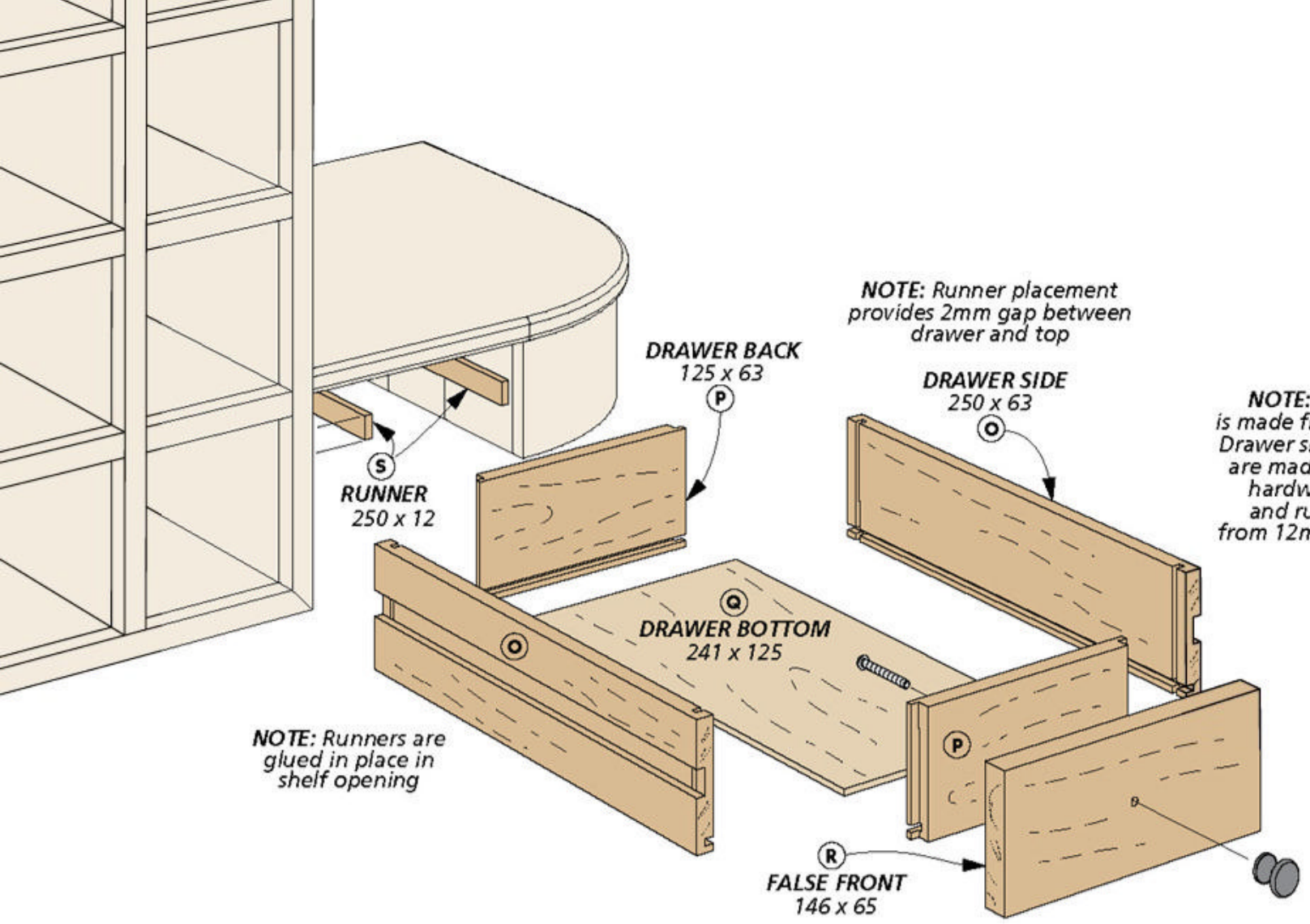
SHAPING THE CORNER

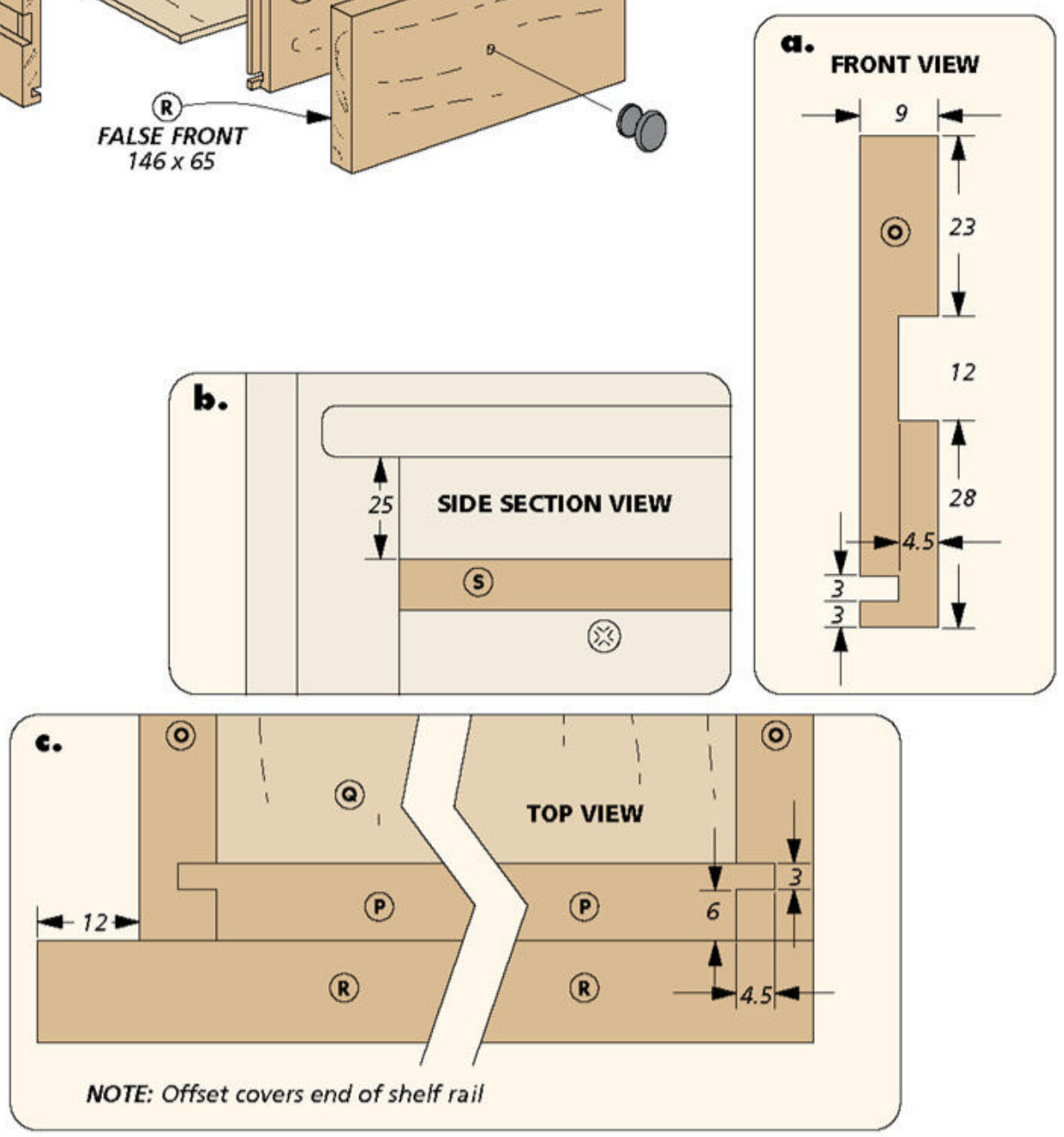


Trenches First. Use your rip fence as a stop for cutting the trenches in the shelf front. They're symmetrical on the shelf front so just flip the piece end-for-end to make the second trench.



Roughing Out the Curve. Your bandsaw is the tool of choice for rough-shaping the curve. Stay on the waste side of the line and sand it smooth afterwards.





Finish with the **DRAWER**

Well, this little project is winding down. What's left is to make the drawer and decide where and how you want to hang the rack. First things first, the drawer.

The drawer that is tucked underneath the side assembly is a stout but simple drawer. There's no hardware holding it in the assembly. As you see in the drawing above there are grooves in the sides of the drawers. The grooves will ride on runners that you're going to glue to the sides of the drawer opening.

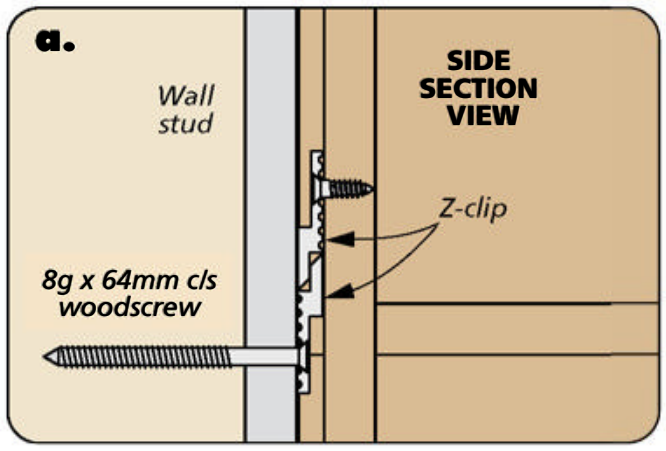
The false front is offset to the left side of the drawer. This is to hide the end of the long side of the case. The drawer box is 9mm-thick hardwood with a 3mm-thick plywood bottom. As usual, I'm getting way ahead of myself, so let's back up and cut some boards for the drawer.

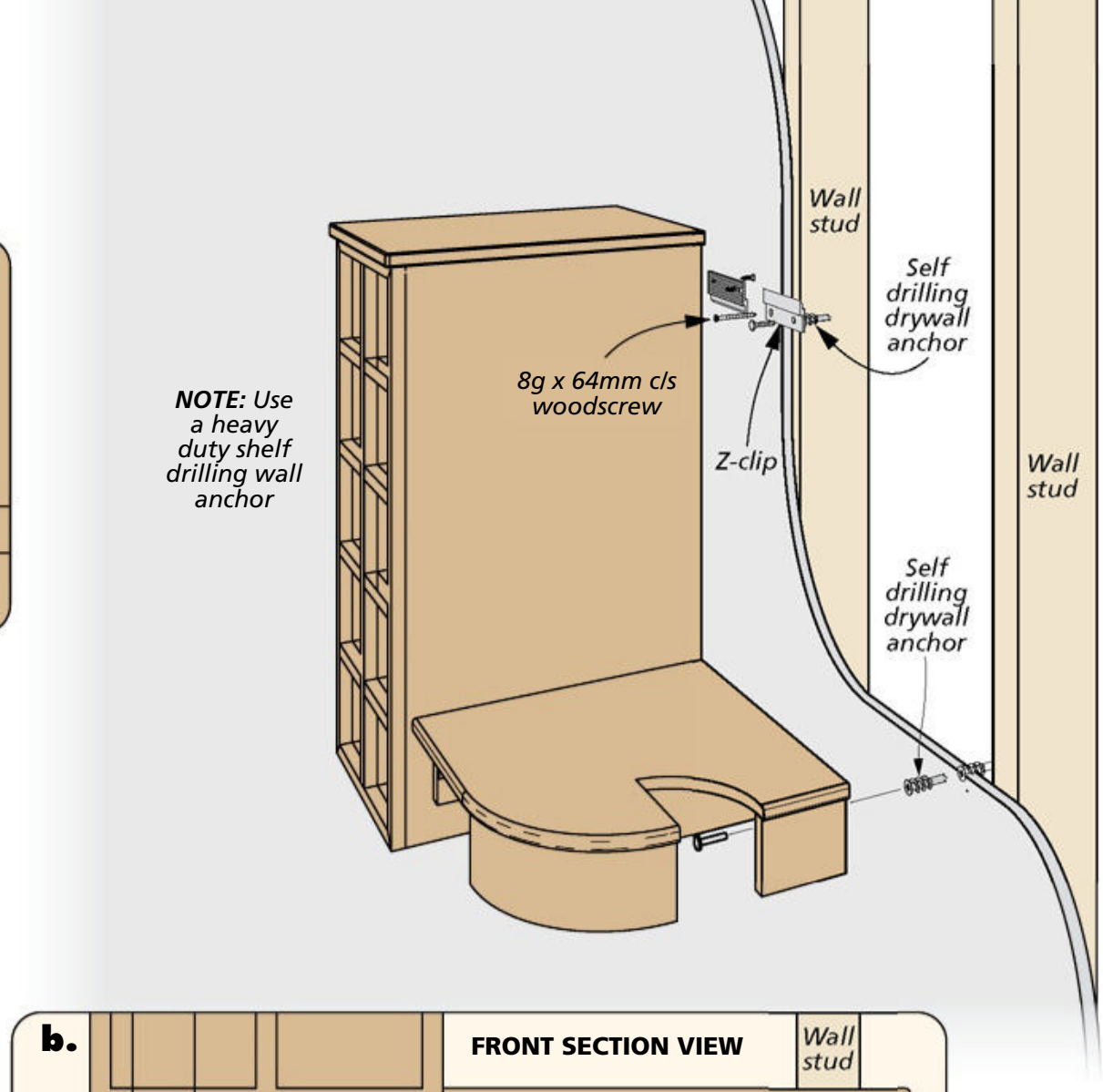
SIZE THE PIECES. Cut the sides, back and plywood bottom — the false front is sized now, but set aside for the moment. As I mentioned a moment ago you'll see in detail 'a' above, that the sides, front and back of the drawer are only 9mm thick. You could easily leave them the same thickness as the rest of this rack and not spend extra time at the planer. But for my money the effort of making thinner parts gives the drawer a better feel, for what it's worth.

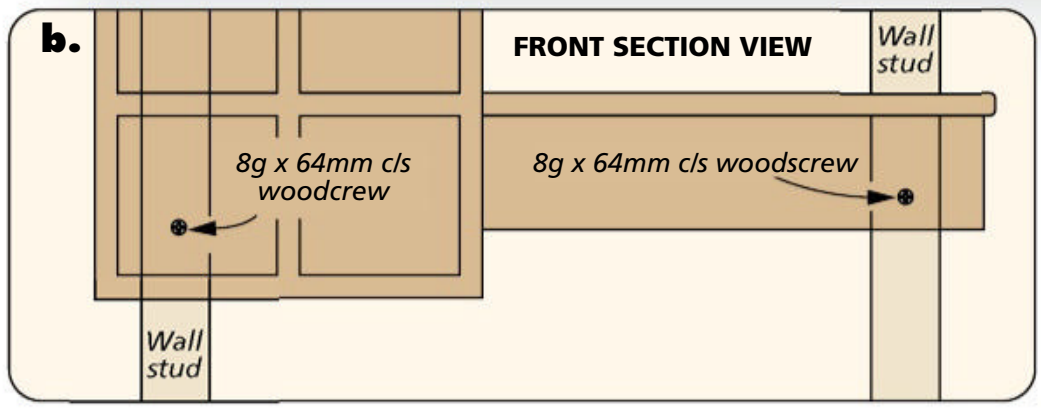
GROOVES NEXT. The grooves for the drawer bottom are first up. No need for a dado set here, in fact all the joinery on the box can be done with a standard blade.

TONGUES & GROOVES. Dejà vu? Sorta. Like on the shelf frame earlier, do the grooves first, then the tongues. Then you can glue up the box of the drawer.

BIG GROOVE. I lied. You do need a dado blade, but not for joinery. You have to cut a groove in the sides of the drawer. Then you can make the runners and glue them in the opening for the drawer. Detail 'b' shows the placement of the runner. I used a spacer to position it in the opening. To complete the drawer, glue on the false front and drill a hole for the pull.







HANGING THE CABINET

As you know the cabinet sitting before you is not that big. But the ten bottles that it can store probably doubles the weight of the cabinet. So you definitely want the wine rack to be securely attached to the wall. There are two ways to do this.

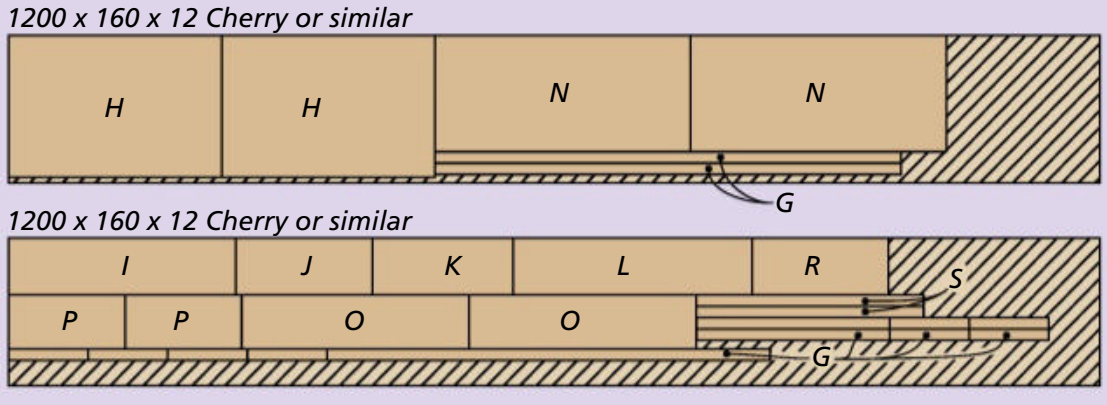
Z-CLIPS. Detail 'a' above and the main drawing shows the hardware in action. It's simply an extruded aluminium profile that has mounting holes drilled into it. They work in tandem, one is attached to the rack. The other to the wall. This method lets you install the rack safely, but remove it fairly easily.

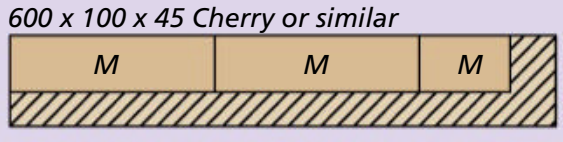
The other option is more permanent — screwing the rack directly to wall studs. Detail 'b' shows how this looks. Here though, placement will be limited by stud location. Either way, you'll have to attach the shelf to a stud or with a wall anchor.

Now, at the end of the day, you can open the drawer and exchange your car keys for a corkscrew. As for being philosophical, that's your choice. W

Materials, Supplies & Cutting Diagram

A	Sides (2)	522 x 292 x 12ply	**I**	Long Side (1)	265 x 65 x 12	**Q**	Drawer Bottom (1)	241 x 125 x 3ply
B	Top/Bottom (2)	216 xx 292 x 12ply	**J**	Shelf Divider (1)	144 x 65 x 12	**R**	False Front(1)	146 x 65 x 12
C	Splines (4)	292 x 10 x 3	**K**	Short Side (1)	153 x 65 x 12	**S**	Runners (2)	250 x 12 x 4.5
D	Back (1)	504 x 198 x 12ply	**L**	Shelf Back (1)	265 x 65 x 12	•	(6) 8g x 70mm c/s Woodscrews	
E	Vertical Divider (1)	504 x 274 x 12ply	**M**	Shelf Front (1)	130 x 130 x 65	•	(6) 8g x 19mm c/s Woodscrews	
F	Horizontal Dividers	(8) 274 x 96 x 12ply	**N**	Shelf (1)	285 x 285 x 12	•	(1) Drawer Pull	
G	Edging	3m x 12 x 12 rgh.	**O**	Drawer Sides (2)	250 x 63 x 9	•	(1) 900mm Z-clip	
H	Top (1)	236 x 316 x 12	**P**	Drawer Front/Back (2)	125 x 63 x 9			





ALSO NEEDED: *One 1200 x 1200 Sheet of 12mm Cherry Plywood. One 300 x 300 Sheet of 3mm Plywood*

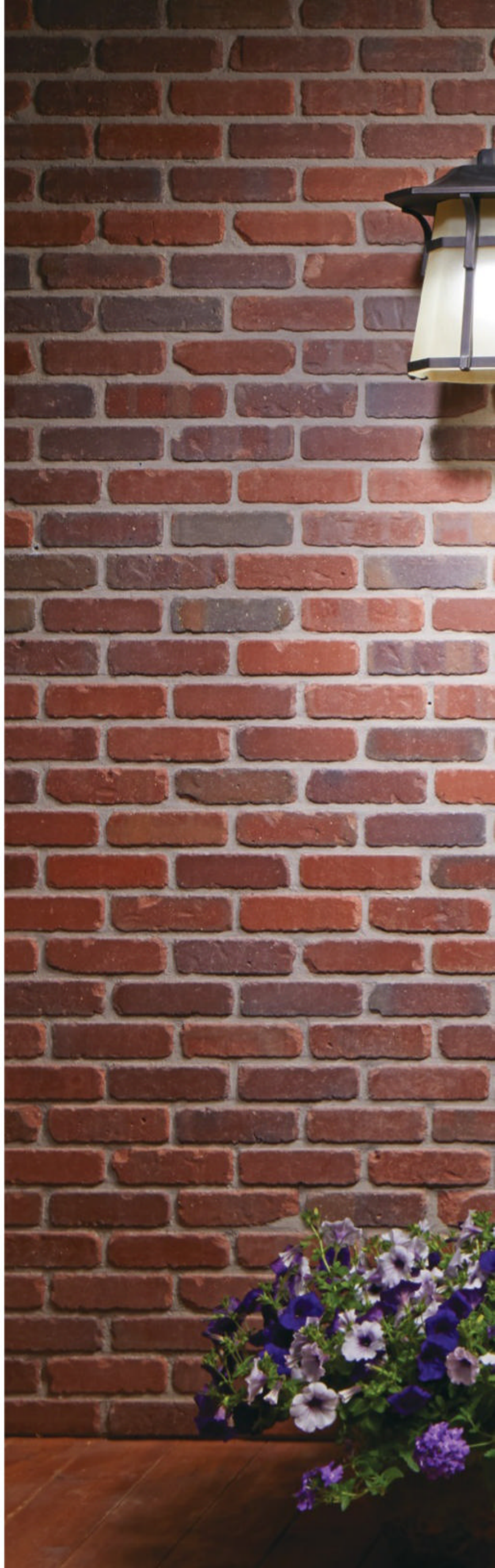
Arts & Crafts Entry Door

First impressions do count. There's nothing that will add character to the entryway of your home like a custom-made door. This Arts & Crafts-styled door is a classic that will be around a long time.

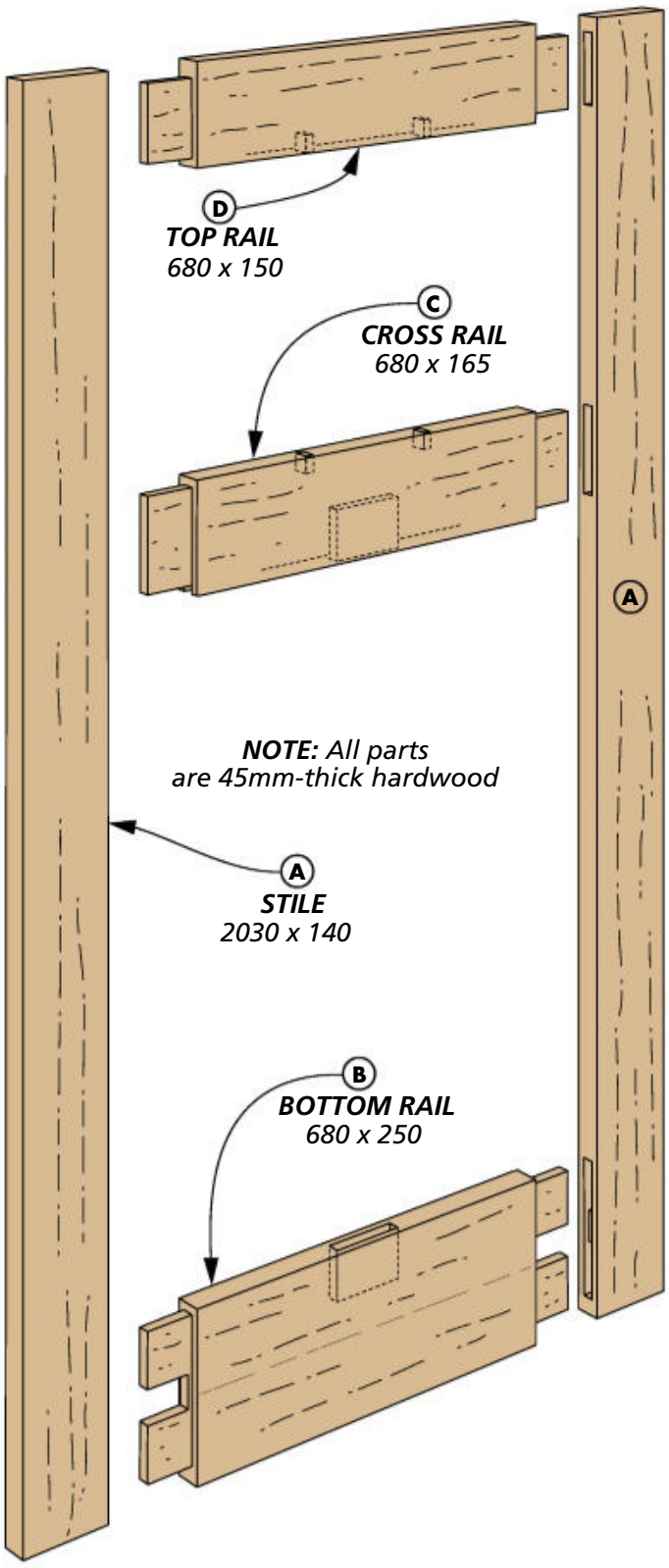
Of all the architectural styles to choose from for your home, the look that arose from the Arts & Crafts movement is one of the most enduring. The entryways of these homes were often adorned with the no-nonsense elegance of what's known as the Federation style. The well-proportioned parts that make up the door you see here are a perfect example of the whole being greater than the sum of its parts. You know — less is more.

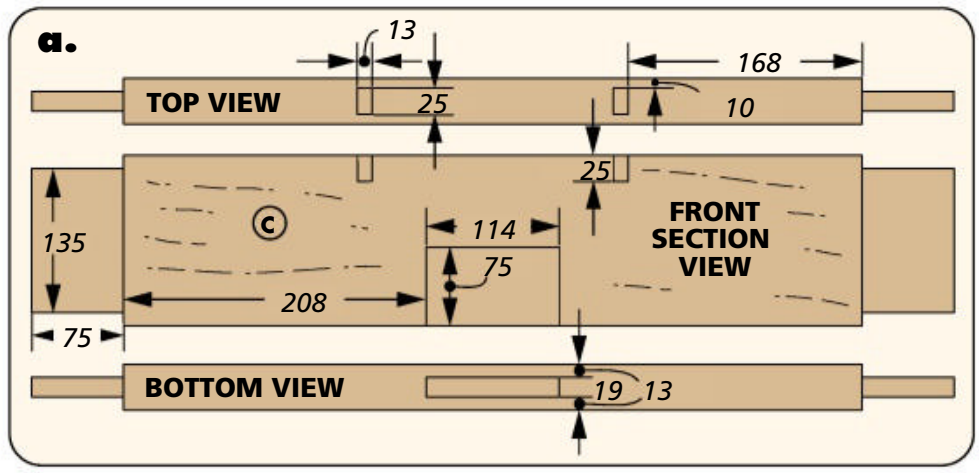
But you can't live on understated looks alone. A lot of thought and planning has gone into making this solid-wood door. So outfitting it for a graceful life in the outdoors, as well as indoors, is the next concern.

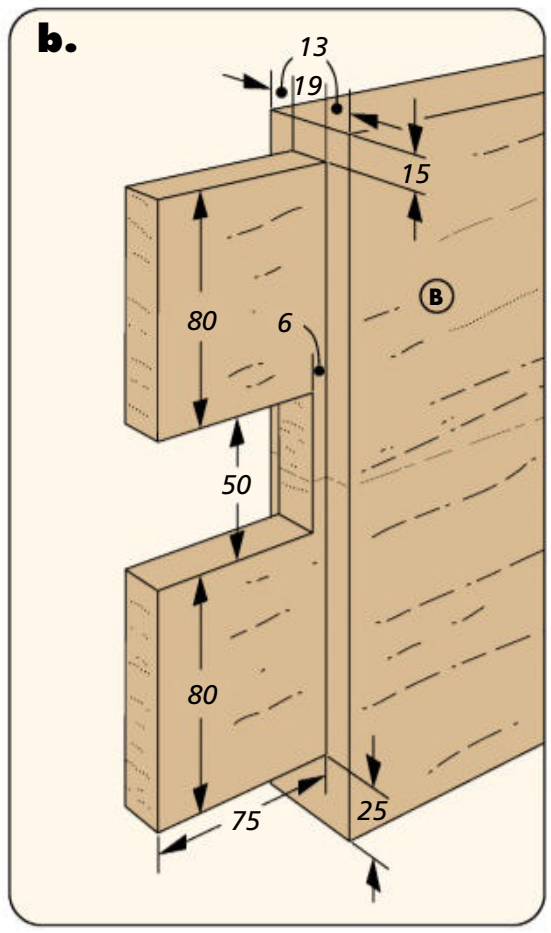
You have to keep in mind the stress and temperature trauma that this elegant barrier has to go through when guarding your home from the elements. Equipping the light openings with insulated glass is a wise decision. As for a wood that would be worthy — white oak seemed to be the clear choice. It doesn't have to be quarter-sawn, but take your time selecting the material. What you see here is a standard 2025 x 810mm example of an entry door. If that size works for you, then let's get building.

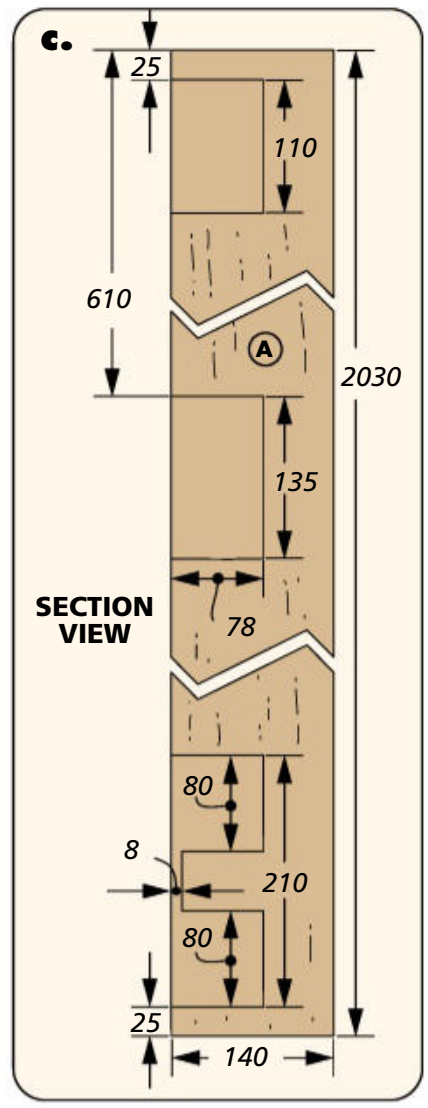



WELCOME









Making the STILES & RAILS

The bones of an entry door, like most cabinet doors, are comprised of stiles and rails, as you see above. Here though, the scale is much larger. So different factors are in play, starting with wood selection.

Machining the stock for the stiles and rails from rough sawn boards is the cheapest option. When shopping for the wood for this door, look for material as close to 50mm-thick as possible. (The panels are made from 19mm stock.) To make this project a success, the stiles that run the length of the door need to be straight and stable. So when you're picking out the material, look for wood that's close to quarter-sawn.

ACCLIMATION. After the shopping was done, I stored the boards on edge in the workshop for several weeks before starting to work with it. Doing this gives the wood a chance to acclimate to the humidity level in your workshop.

BE PATIENT. The ultimate goal is to end up with stable stock that is 45mm thick. This is the standard thickness of exterior doors. But getting to that final thickness takes some patience and planning. Planing a small amount off both sides of all the material is the first order of business. And then, you need to wait some more.

It's best to let all the material rest for at least another week before repeating the planing process. Let the wood rest again. When proper thickness is achieved, you can cut all the parts to size.

MORTISE FIRST. Each stile has three mortises to hold the tenons in the rails. As the drawing and details above show, the mortises get incrementally shorter from the bottom up.

SADDLE JIG. These mortises could be done at the drill press with some outfeed support. But I chose to use a plunge router and the jig you see on the next page.

The jig slides over the edge of the workpiece and clamps in place. It's designed to be used with a plunge router and a roughing end mill bit.

BIG MORTISE BEHAVIOUR. Here's the next hurdle when doing joinery on a large scale. Due to their size, the cheeks of long mortises can become unstable and start to open up, especially when exposed to varying temperatures like entry doors are.

Detail 'b' on the previous page shows the tenon and the remedy to this problem. By splitting the long, lower mortise into two smaller mortises, you'll strengthen the walls of that area without compromising the joint. Detail 'c' shows the mortise that's needed for this tenon.

This mortise isn't hard to do. First, rout the long shallow portion of the whole mortise. Then reset the jig stops and rout the two smaller mortises at either end. Now you can set aside the stiles and focus on the rails.

RAILS

The stiles are connected with three rails. Each rail is narrower as you go from bottom to top. Speaking of the bottom rail, you'll need to glue up a blank for that. Take a little time to match the grain in these two boards.

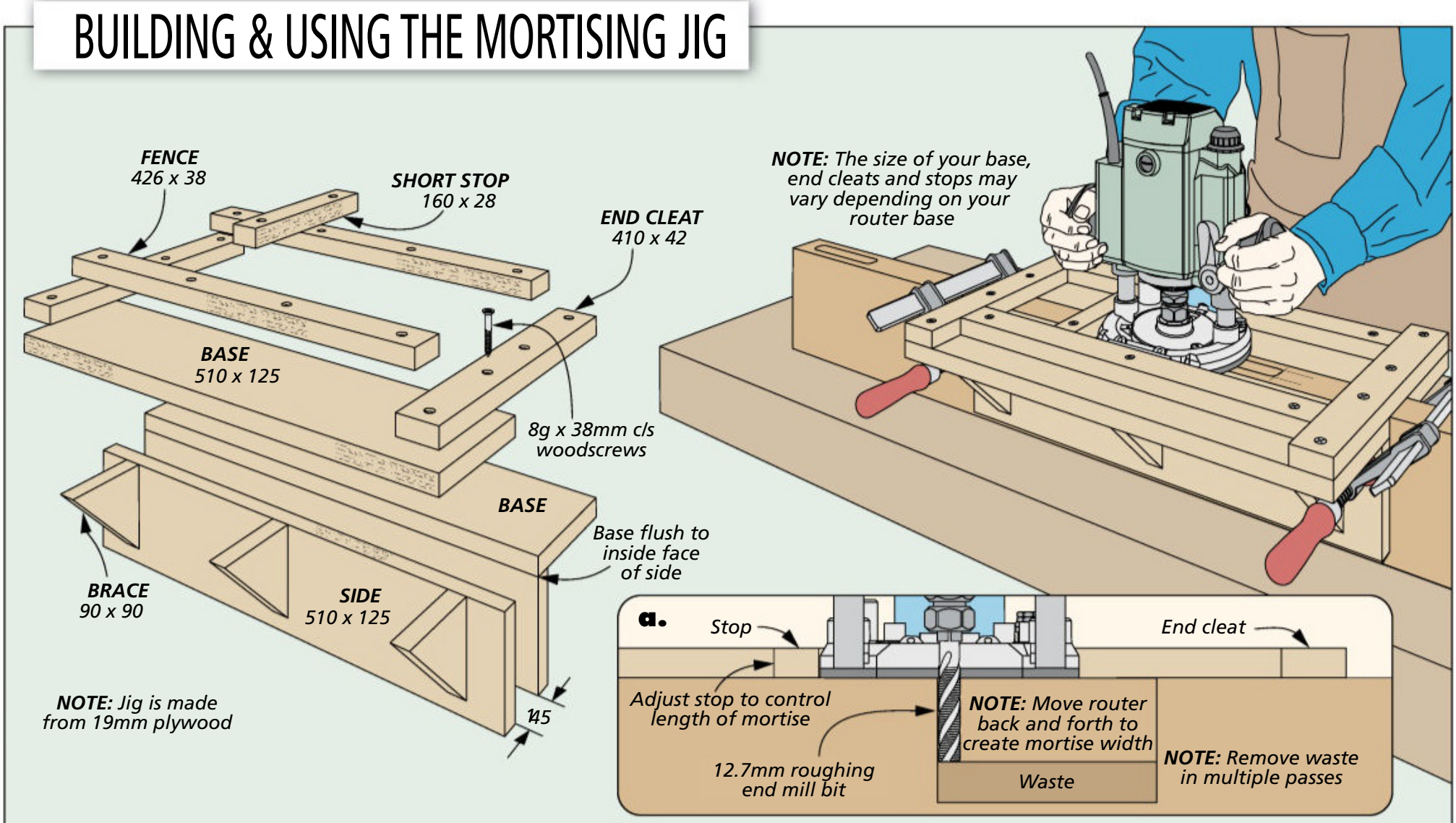
TENONS. I cut the tenons over at the table saw using a dado blade. With the mitre gauge supporting the rails, use the rip fence as a stop to cut the shoulders for the tenons.

To allow for the split mortise you made earlier, you have to notch the tenon on the lower rail. Use a jig saw to do this. Sand and clean the corners of the notch when the cutting is done.

MORE MORTISES. The rails need mortises for the centre stile and mullions that you're going to make shortly. Start with the large mortises in the bottom and cross rail for the centre stile.

The mortises for the mullions are wider than they are long. To accomplish this, you need to first adjust the fences on the jig. Then set the stop to hold the router bit in place. These mortises are routed in the cross and top rail. With that, you're ready to move on to making the interior parts of the door frame.

BUILDING & USING THE MORTISING JIG

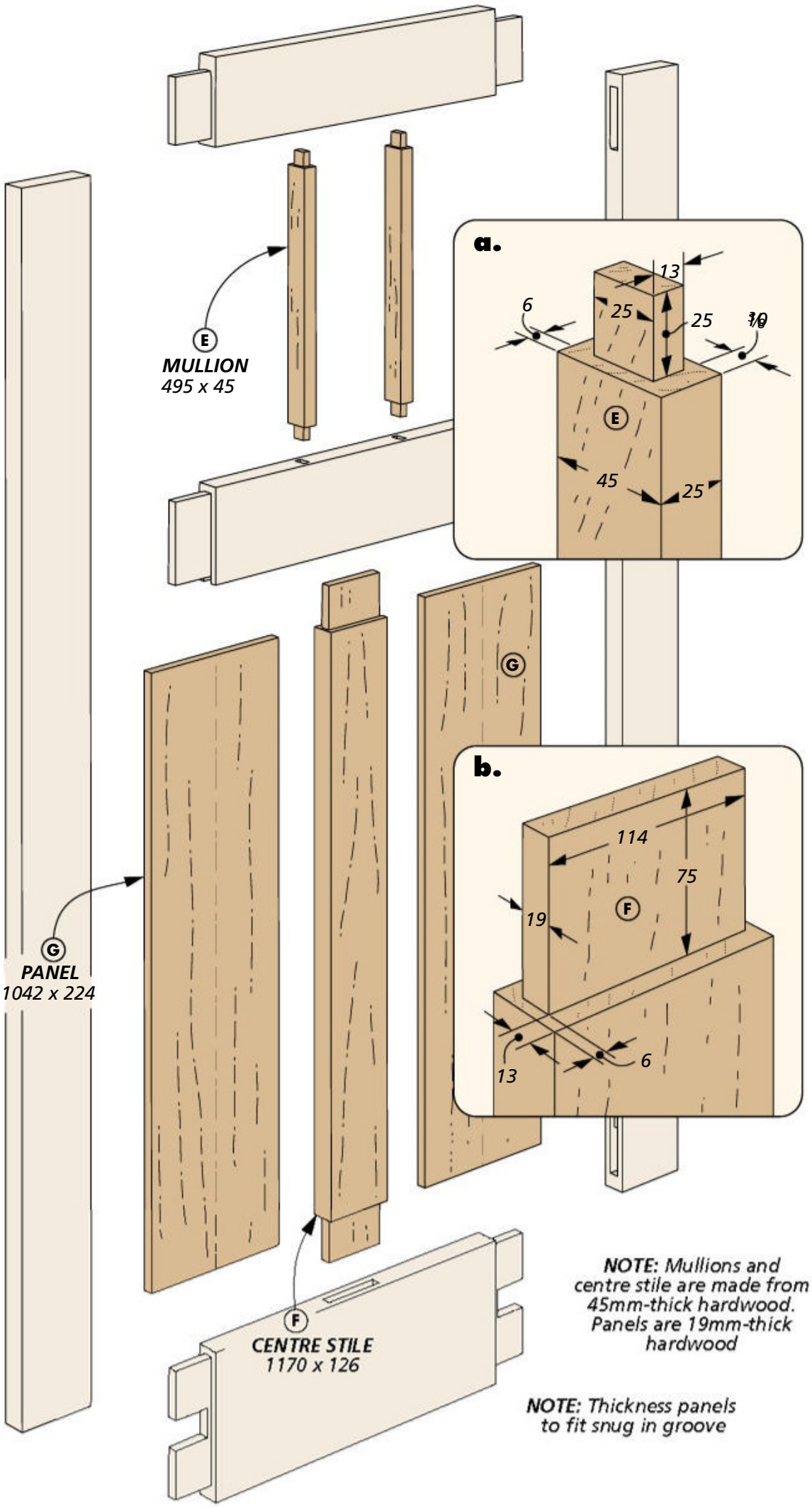


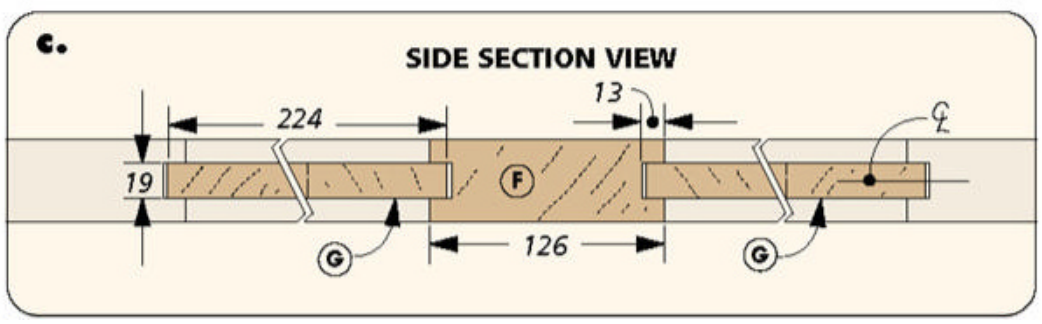
The length of your jig is determined by a combination of the longest mortise, and the base of your router (upper left drawing). To control the length of the mortises, move the position of the short stop as needed.

To make the narrower mortise for the mullions, adjust the fence and the short stop.

The Router Set-up. A plunge router and a roughing end mill bit (detail 'a') is what I used here. Due to the depth of the mortises on the stiles and rails, it's best to rout them in multiple passes.

Before moving on, I squared up all the mortises with a chisel at the end of the milling session.





Next up:

INTERIOR PARTS

At this point, you've got a strong frame made for your door. It's time to fill out the space within that frame. This involves a pair of mullions, a centre stile and two panels. The panels that you see here are thinner than the stiles and rails. This will provide subtle visual depth to the door. You'll make grooves in the stiles and rails to house the panels in a little bit. For now, let's look closer at the mullions and centre stile.

MULLION. A mullion is a vertical member in a door that adds rigidity and divides the space between the two upper rails. They can also support decorative elements of the door. Here, the two mullions are dividers for three insulated glass panes that are held in place with stops (or stained glass if you feel like trying your hand at leadlight).

CENTRE STILE. The other vertical part is the centre stile. The centre stile is joined to the cross rail and bottom rail with tenons. The stile holds the inner edges of the wood panels.

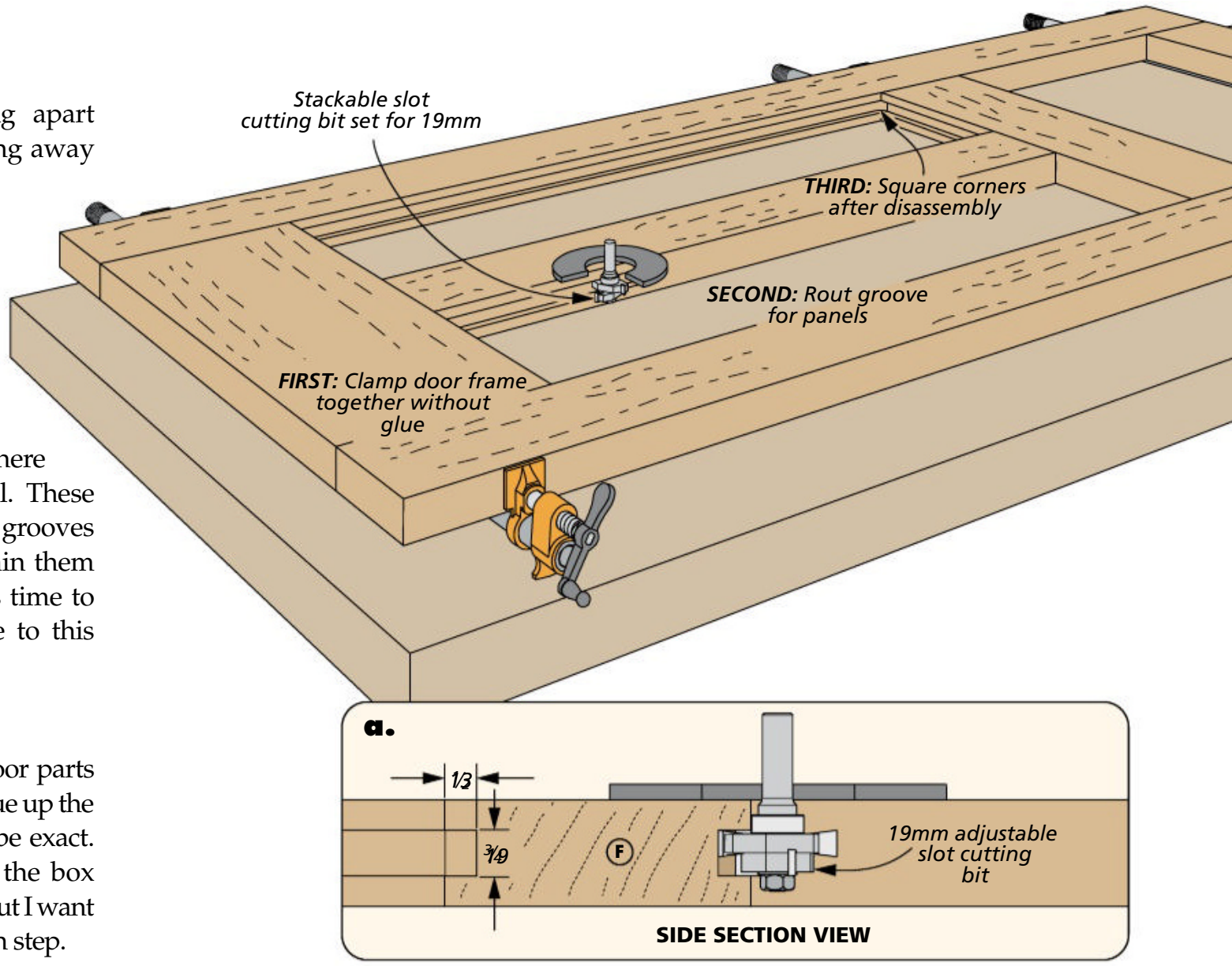
SIZING THE PARTS. As with the stiles and rails, the mullions and centre stile should be fully acclimated by this time. So, you can jump right in by cutting them to size. Over at the table saw, make the tenons on each end in the same manner you did on the rails. When you're finished with that task, the panels are the next order of business. As I mentioned, the panels are held in place in grooves in the stiles, rails and centre stile.

DRY ASSEMBLY. To make this groove, you have to dry assemble these parts, holding them together temporarily with clamps. The drawing at the top of the next page (and detail 'a') shows this in action.

I used a stackable slot cutting bit with the bearing on top, in a hand-held router. Like everything else with this door, this is a big groove. So make the groove in shallow cuts. If you don't have a bit this big, you can make multiple passes with a narrower bit.

SQUARE THE SLOT. After knocking apart the frame of the door and stowing away the clamps, take a moment to square the round inside corners of the groove with a chisel.

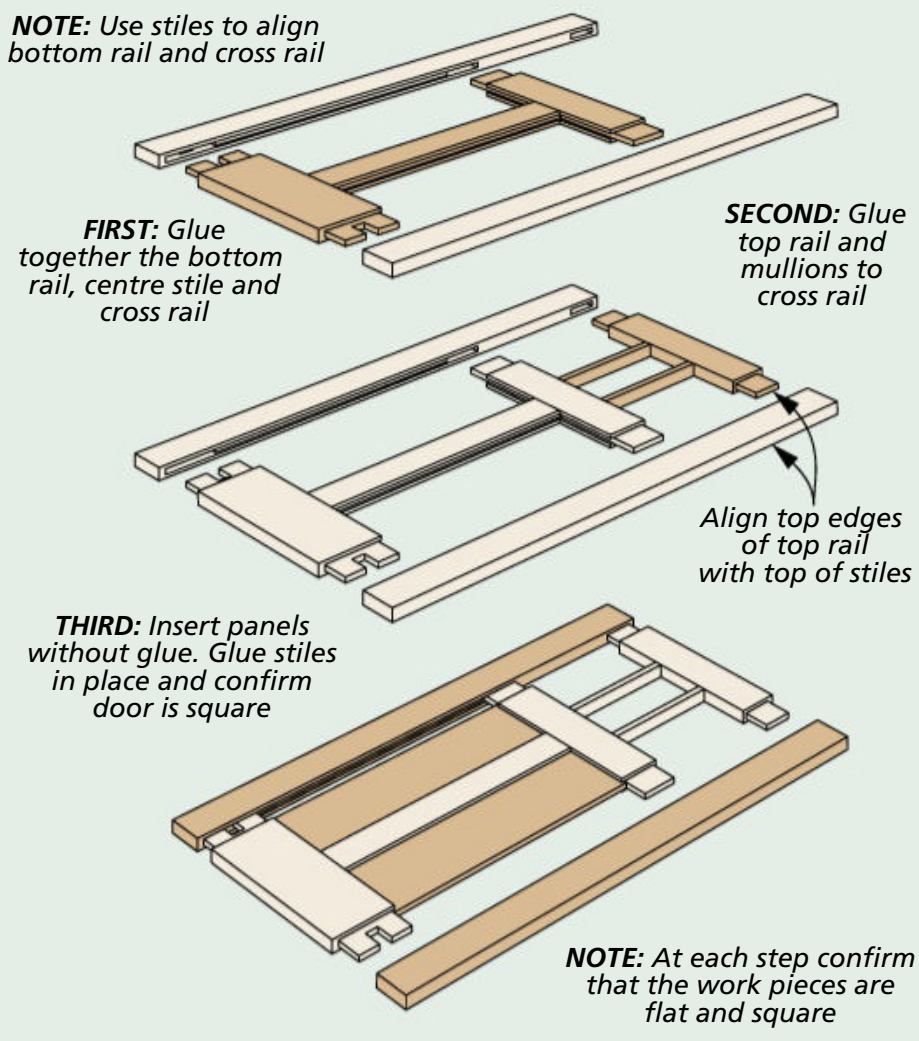
PANELS. The panels you see in the drawing and detail 'c' are wide enough that they need to be glued up from two pieces of 19mm stock. Match the grain here like you did for the bottom rail. These panels are going to float in the grooves of the door, so you'll want to stain them before installation. With that, it's time to bring all the parts you've made to this point together.



ASSEMBLY

Because of the large size of the door parts and joinery involved, it's best to glue up the door in stages — three stages to be exact. You can see this being done in the box below. It's pretty straightforward, but I want to mention a few things about each step.

ASSEMBLING THE DOOR

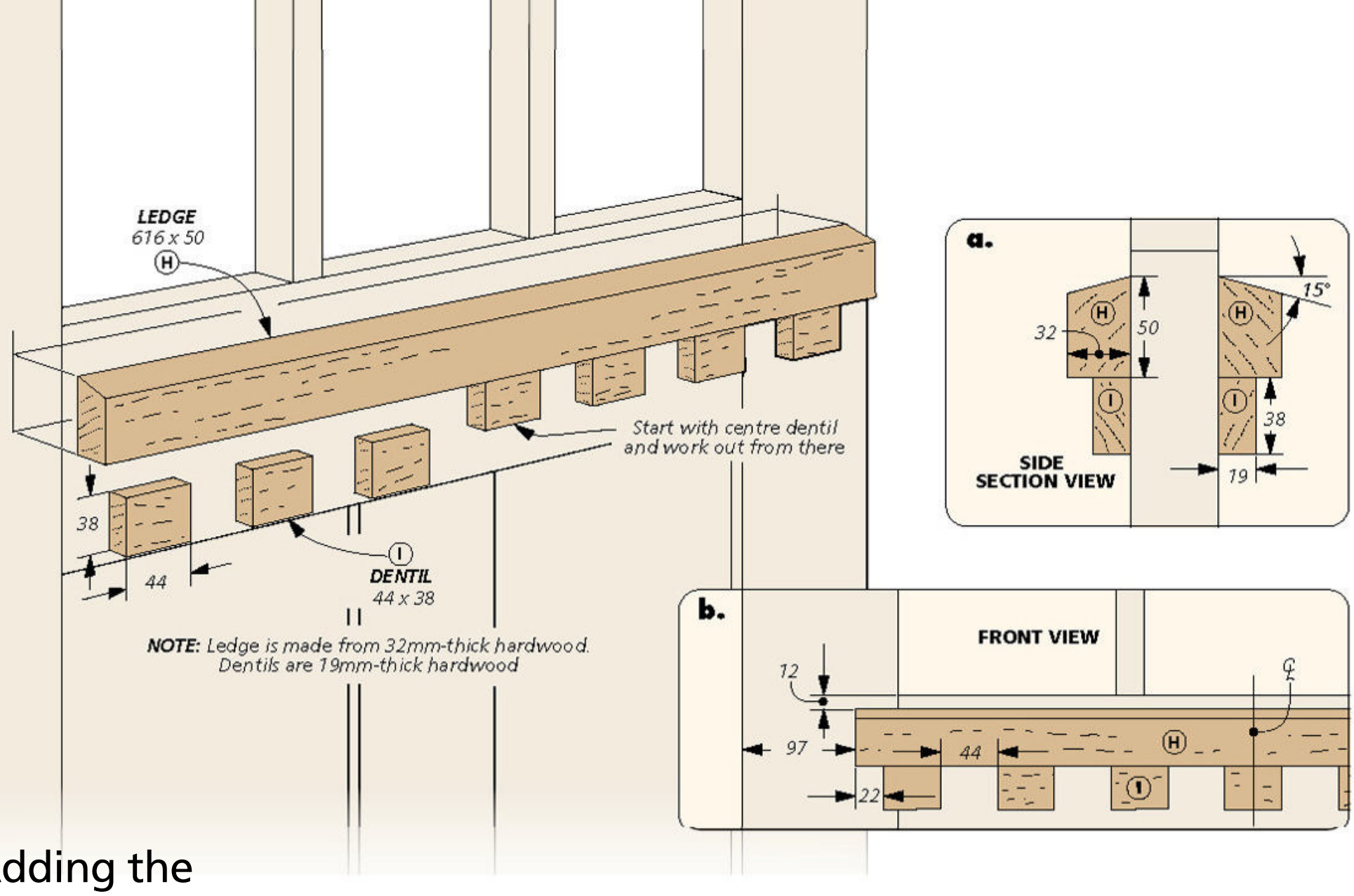


RAILS & CENTRE STILE. Working from the centre out, I started by gluing the bottom rail, centre stile and cross rail together (using a waterproof glue). A good way to ensure that the parts are square and spaced properly is to use the stiles to confirm that the rails are aligned properly (top drawing).

TOP RAIL & MULLIONS. Next, glue the mullions and top rail to the cross rail. Again, use the stiles to ensure everything stays aligned. It's critical that the parts ultimately join to the stiles perfectly.

It's time to bring the panels and stiles together with the parts you've just glued up. Start by sliding the (stained) panels in place. I didn't use any glue in the groove for the panels. Letting them float is okay.

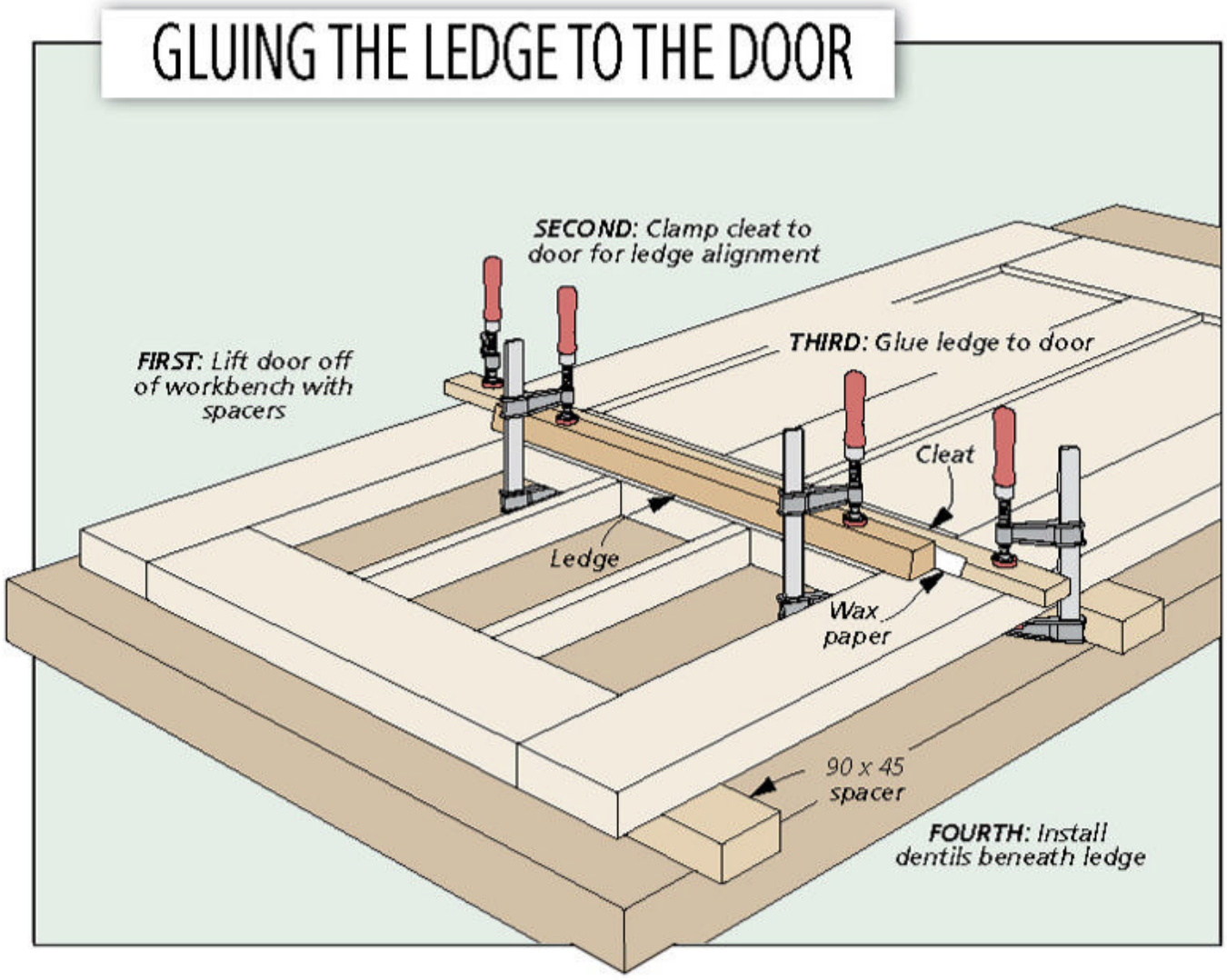
Finally, glue on the stiles. This should be no trouble at all since the stiles have been used all along to align the rails. For good measure, confirm that the door is flat and square. With that, you're ready to add some final details and insulated glass to the door.



Adding the
LEDGES, DENTILS & STOPS

You've finished all the heavy lifting of joinery and assembly on this project (other than installing the door). So now you can focus on dressing out the door.

This starts with bevelled ledges that act as decorative accents. These are glued to each face of the door (drawing and details above), along with a supporting cast of dentils beneath each. You'll follow this up with stops that hold insulated glass panes in the openings.



LEDGES. The most efficient way to start is with the ledges. After cutting them to their overall size, I tilted the saw blade to make the bevel that runs along the top. When the bevel was cut on both pieces, I set them aside and cut the blocks needed for the dentils to size.

The box to the left shows the best way to install the ledges and dentils. You're going to glue all the parts to one side of the door at a time. To begin, I raised the door off the surface of the workbench with some spacers. This provides plenty of clearance for the clamp heads on the underside of the door.

As you can see in the drawing, I clamped a cleat to the door to position the ledge. Next, slip a piece of wax paper under the cleat to prevent any glue squeezout causing trouble.

Now you're ready to glue the ledge to the door with clamps through the window openings. This allows you to get direct clamping pressure.

DENTIL DETAILS. There are seven dentils that are glued to the door underneath the ledge. As you'll notice in detail 'b' above,

the gap between each dentil is the same as its length. So while cutting them to size, make an extra one to use as a spacer.

Starting from the centre, I glued and clamped each dentil in place. This doesn't take long to do and when the dentils are dry, you can repeat the process on the other side of the door. When you flip the door, you'll need to double-up the spacers this time to compensate for the ledge you just installed.

GLASS & STOPS

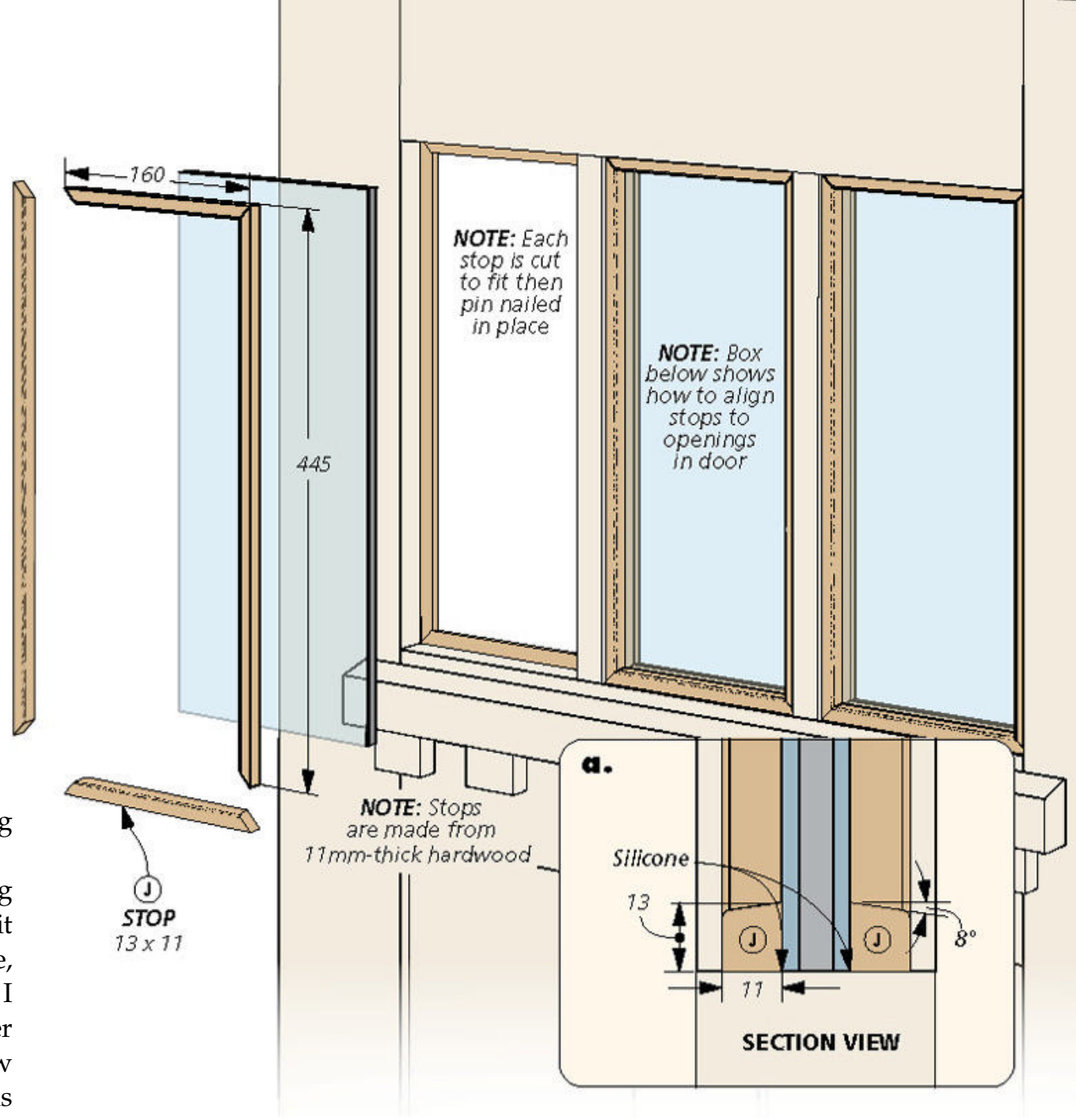
The last bit of work to be done on the door is to install the glass. To hold the glass in the door, I made the bevelled stops you see in the drawing to the right.

THE BEVEL YOU SAY? Yeah, I know bevelling the top of the stops is a small detail. But it does play well with the bevel on the ledge, don't you think? To make this bevel, I started by planing the stock to the proper thickness (detail 'a'). Then I tilted my saw blade to rip the stops. A little sanding was in order, and I decided to stain all the stop material ahead of installing it.

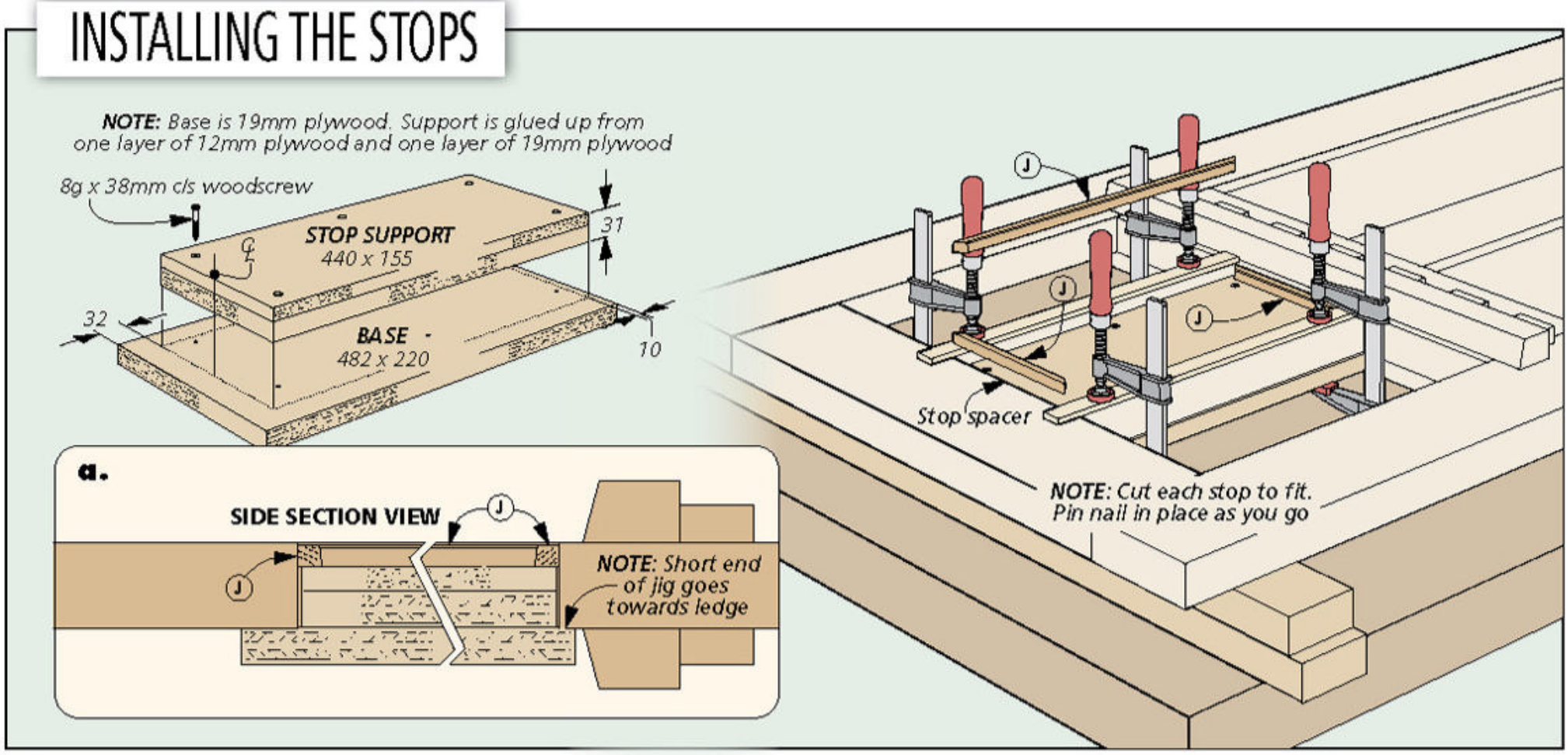
To mark, cut and install each stop, I made a simple jig. The jig is just a plywood base that has two layers of plywood attached to it. These additional layers locate the stop evenly in the opening.

Now you can flip the door and install the glass. First, place a bead of silicone on the inside of the stops. Then insert the glass in the openings. Another series of well-placed beads of silicone is in order. Follow this up with cutting and nailing the remaining stops to hold the glass in place.

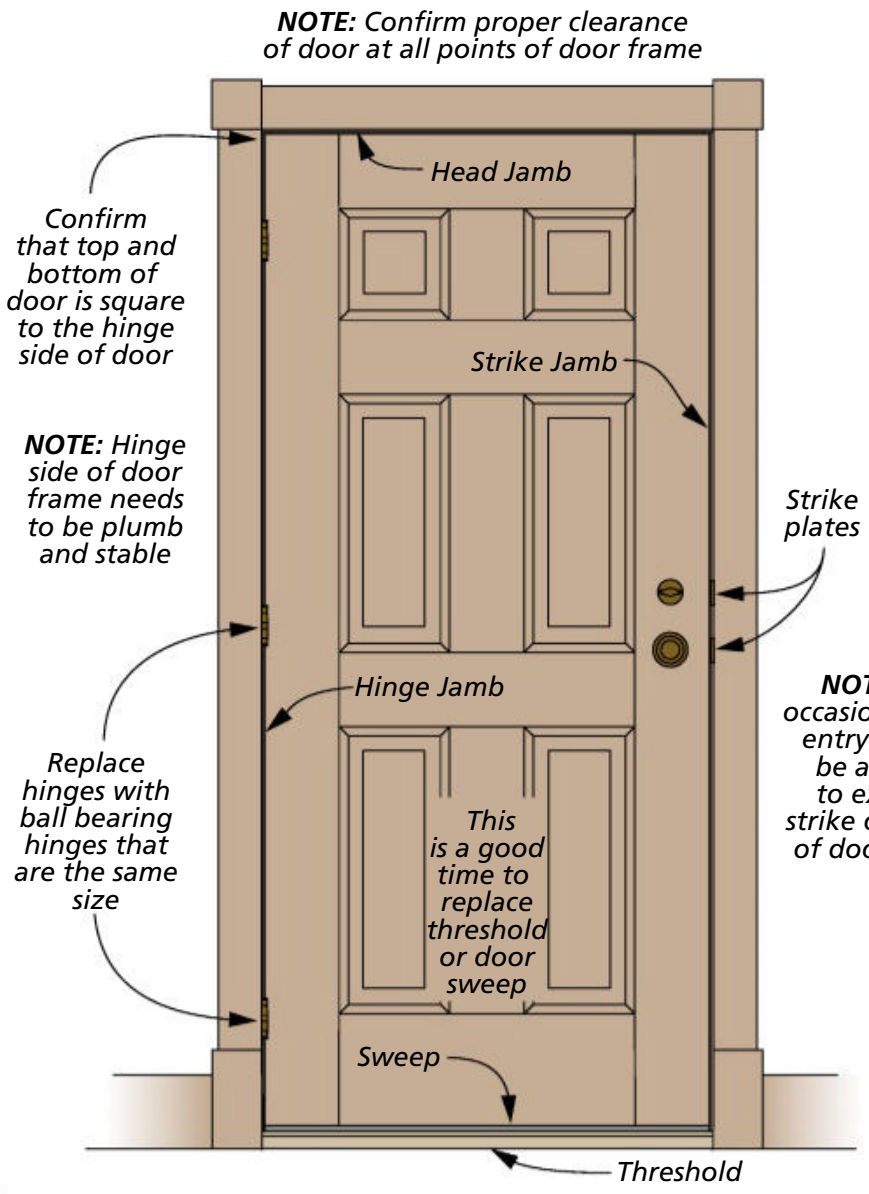
This is a perfect time to finish the door. I used an oil-based gel stain and a top coat of polyurethane. Now it's time to hang your door.



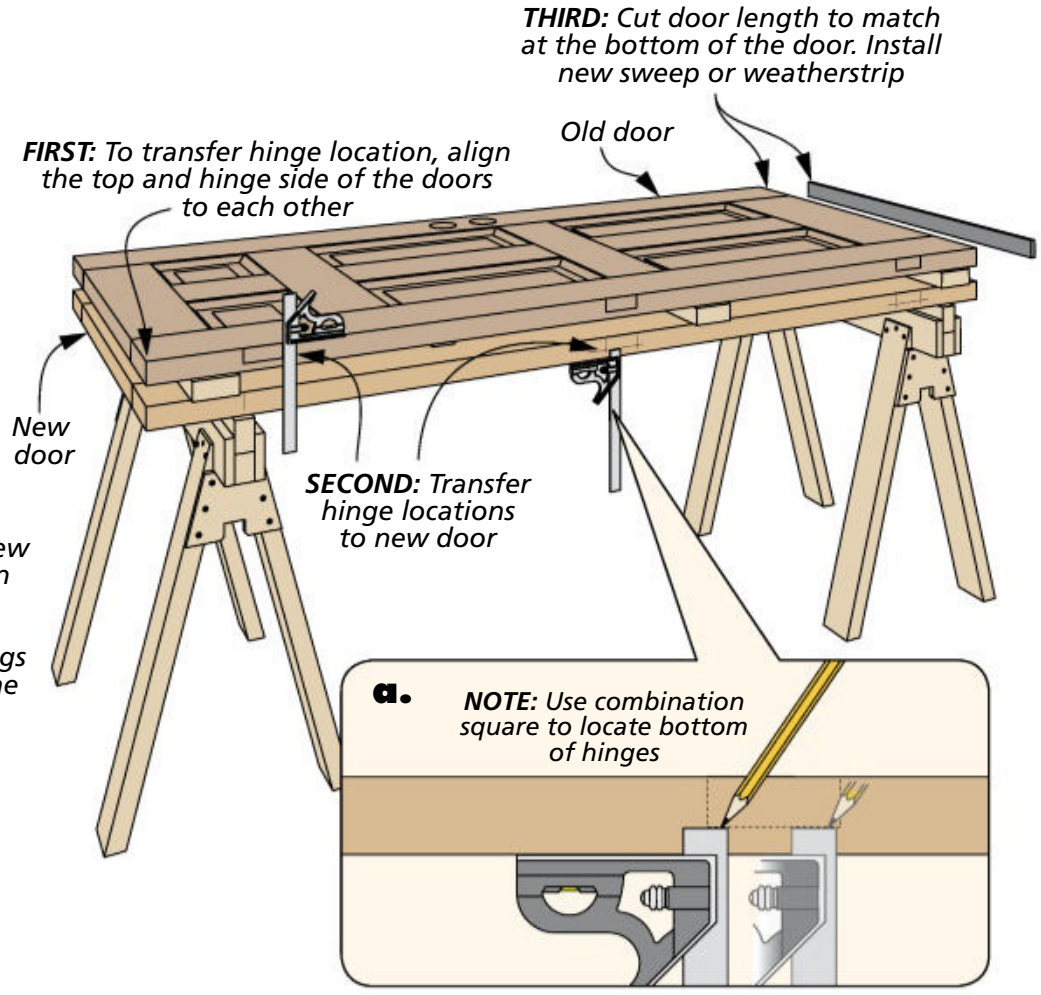
INSTALLING THE STOPS

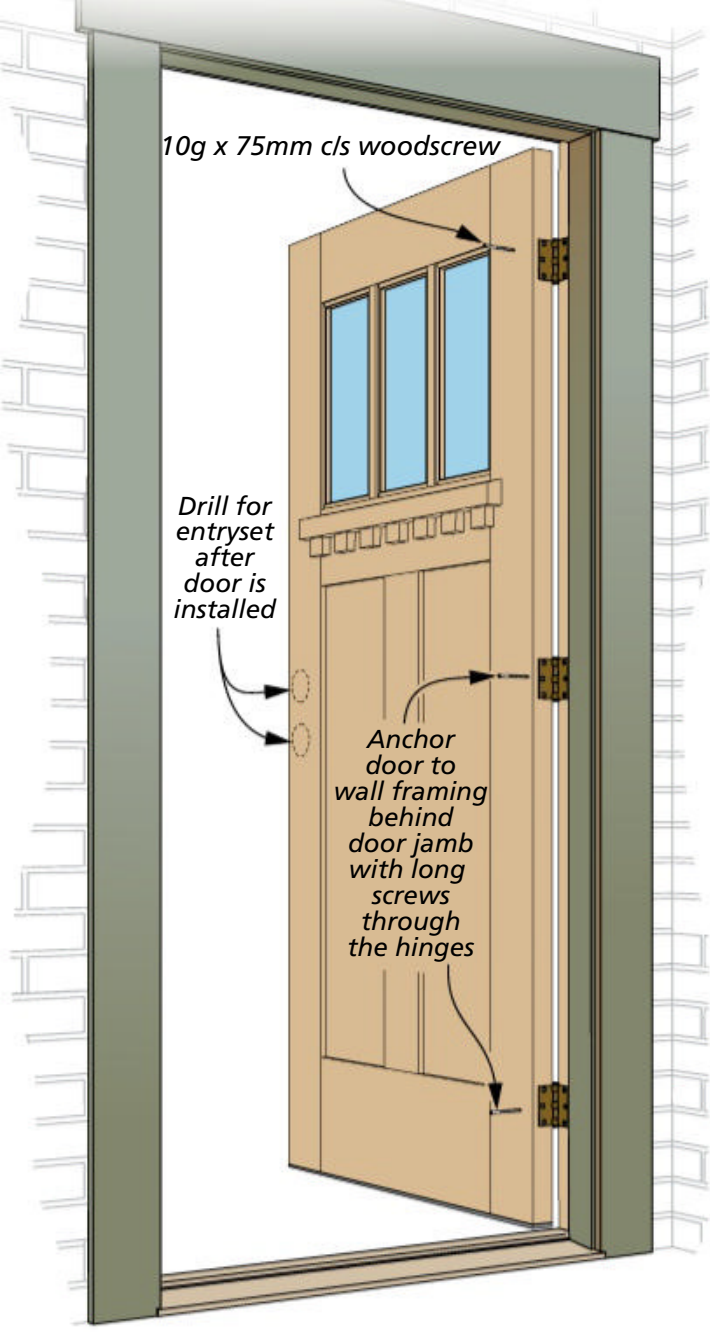


FRAME INSPECTION



SIZING THE NEW DOOR





Installing the DOOR

The existing door I'm replacing works just fine in its door frame. I came to that decision based on the inspection that is shown in the left side of the drawing above. The steps shown here are done with the old door still hanging in the frame.

FRAME INSPECTION. The inspection always starts at the hinges. When working with doors and their frames, the backbone of the operation is the jamb that the hinges are attached to. So you need to confirm that the hinge jamb is plumb and stable enough for the new door.

Next, you'll want to examine the gap between the door and the other three sides of the frame. The gap should be consistent between the head and strike jamb. Not only when the door is closed, but as you open it, the door shouldn't touch the frame. The threshold at the bottom of the door is a different matter.

The types of thresholds in entryways can vary greatly. You'll have to do some homework to make sure you have an air-tight fit for your new door.

Now you can remove the old door, along with the hinges and handset (dead bolt also). Use it to transfer the door size and shape to the new door.

SIZING THE DOOR. As the drawing above shows, the top corner on the hinge side of the door will be the point of reference for all measurements. Confirm the length of the door on the hinge side. If the new door needs to be trimmed, you'll most likely do it at the bottom of the door. But wait to do that until confirming a few more things.

DOOR PROFILE. You'll want to use a framing square to confirm the old door is square at the top and bottom. If not, transfer the angles to the door (again, this will most likely be on the bottom of the door). Once those are confirmed, compare the lengths of the two doors on the handle side of the door.

BEVEL CUTS. Use a circular saw and straightedge to trim the door to size. Scoring the cut line with a utility knife first helps reduce chip out. And adding a slight bevel (5°) to the cuts will allow the door to open and close without binding.

When making the bevelled cuts, you want the outside of the door to be smaller. To finish this phase, ease any of the edges you've cut and seal them with stain and top coat.

HINGES. The ideal way to transfer the location of the hinges to the new door is to use a combination square to lay out the width and depth of the hinge on the edge of the new door.

For simplicity, I chose new hinges the same size as the old ones. I replaced the hinges with high-quality, ball bearing hinges. Use the square to transfer how far in the hinge sets on the door edge. Then use a chisel (or small router) to cut the mortises so the hinge sits flush.

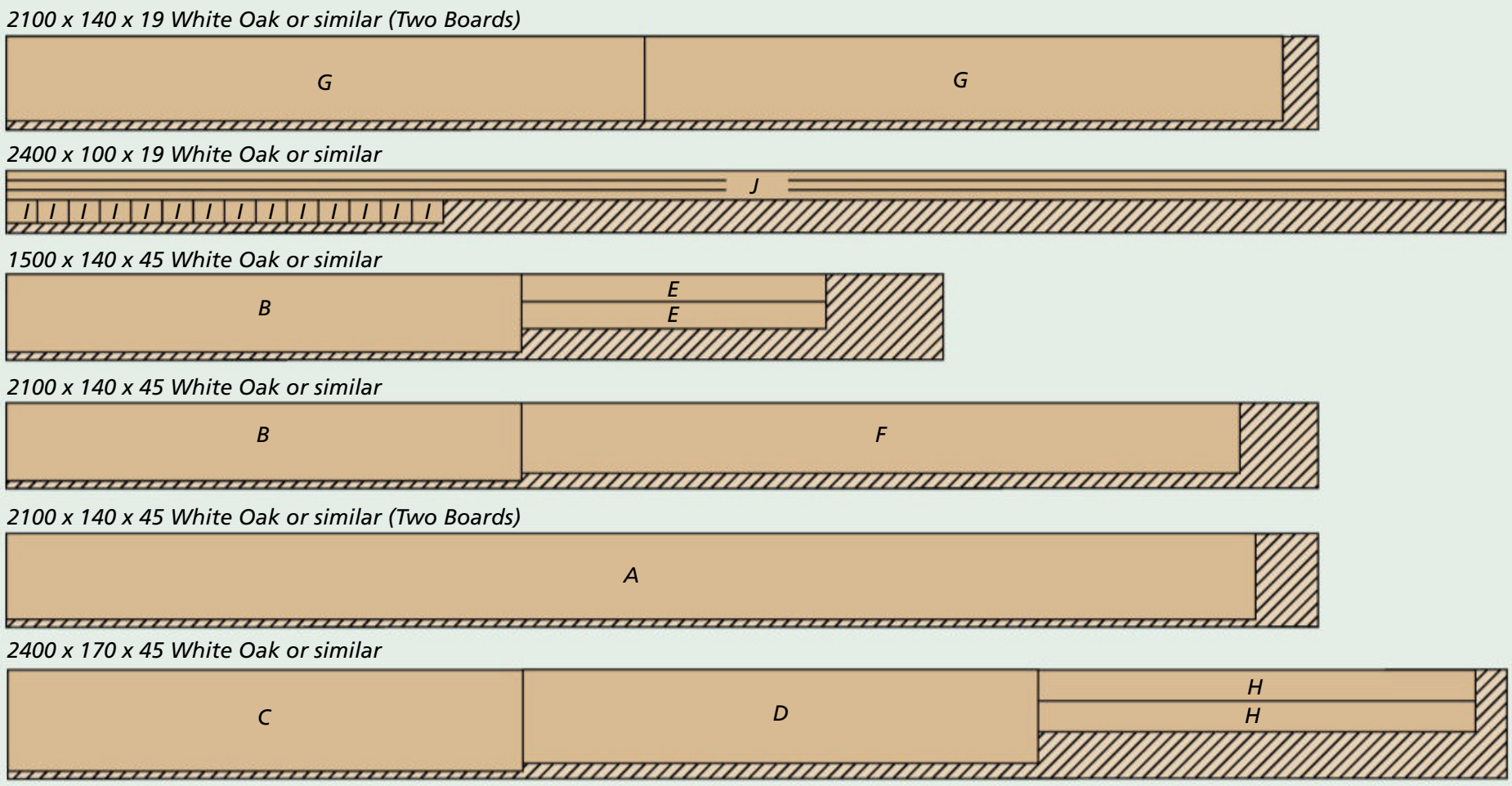
▲ The sky is the limit when it comes to the hardware you select for your new door. The entry set shown here requires a jig to drill the mortise in the edge of the door.

HINGES. To avoid stripping out the screws, you'll have to predrill the holes for the hinges in this white oak door. Moving to the door frame, use one of the hinge leaves to confirm that they set flush in the jamb. Then you can install the hinges. Use at least one long screw in each hinge leaf to secure it to the jamb framing.

MOMENT OF GLORY. Have a friend help hang the door. If it rubs anywhere, a little planing or sanding should remedy that problem. To finish this fine project, install the entry set using the manufacturer's instructions.

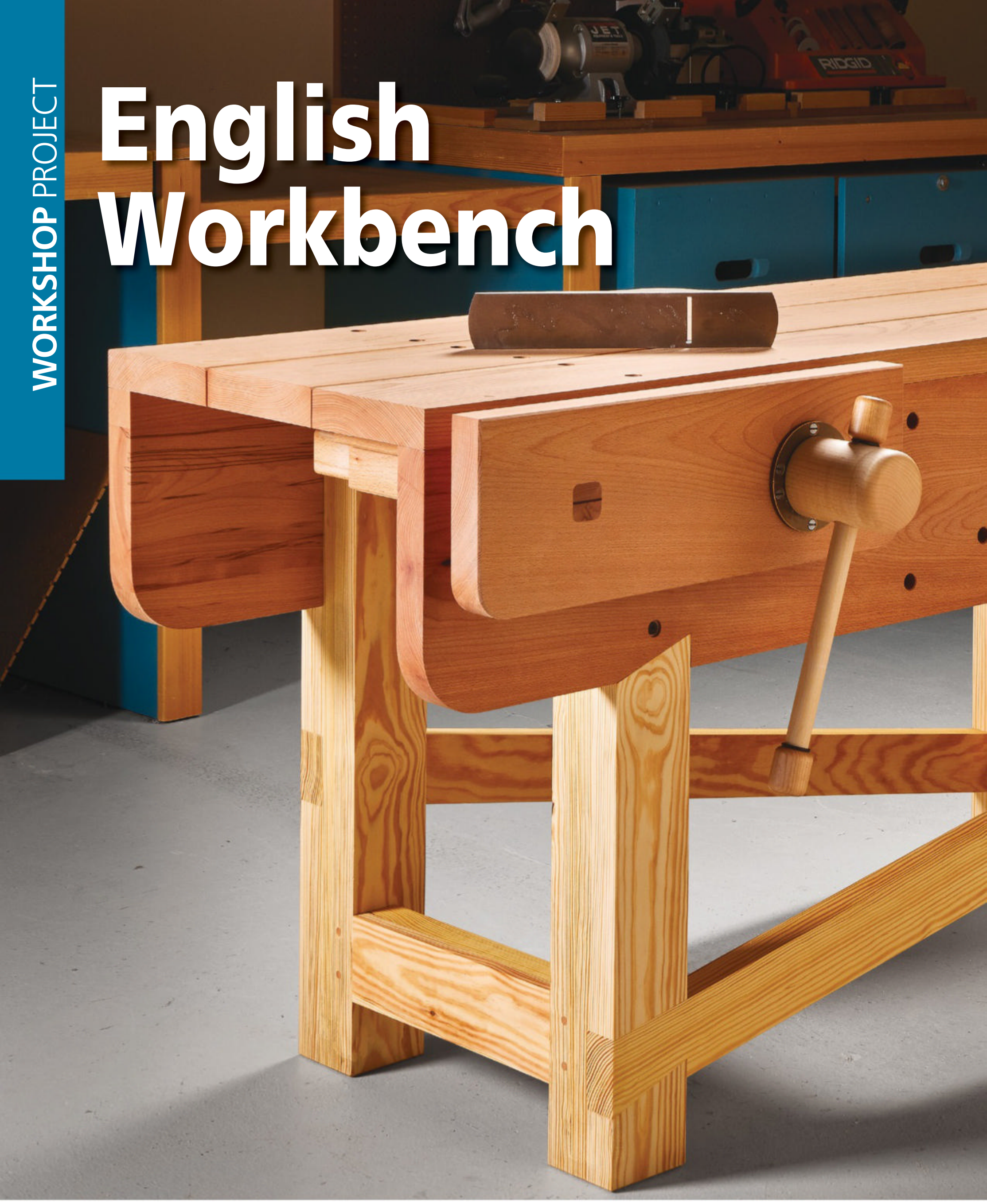
Materials, Supplies & Cutting Diagram

A	Stiles (2)	2030 x 140 x 45	**F**	Centre Stile (1)	1170 x 126 x 45	•	(3) Insulated Glass 445 x 160
B	Bottom Rail (1)	680 x 250 x 45	**G**	Panels (2)	1042 x 224 x 19	•	(3) Ball-Bearing Hinges w/ screws
C	Cross Rail (1)	680 x 165 x 45	**H**	Ledges (2)	616 x 50 x 32	•	(1) Exterior grade Entry set and Dead bolt
D	Top Rail (1)	680 x 150 x 45	**I**	Dentils (14)	44 x 38 x 19		
E	Mullions (2)	495 x 45 x 25	**J**	Glass Stop	13 x 11 x 8m		



WORKSHOP PROJECT

English Workbench



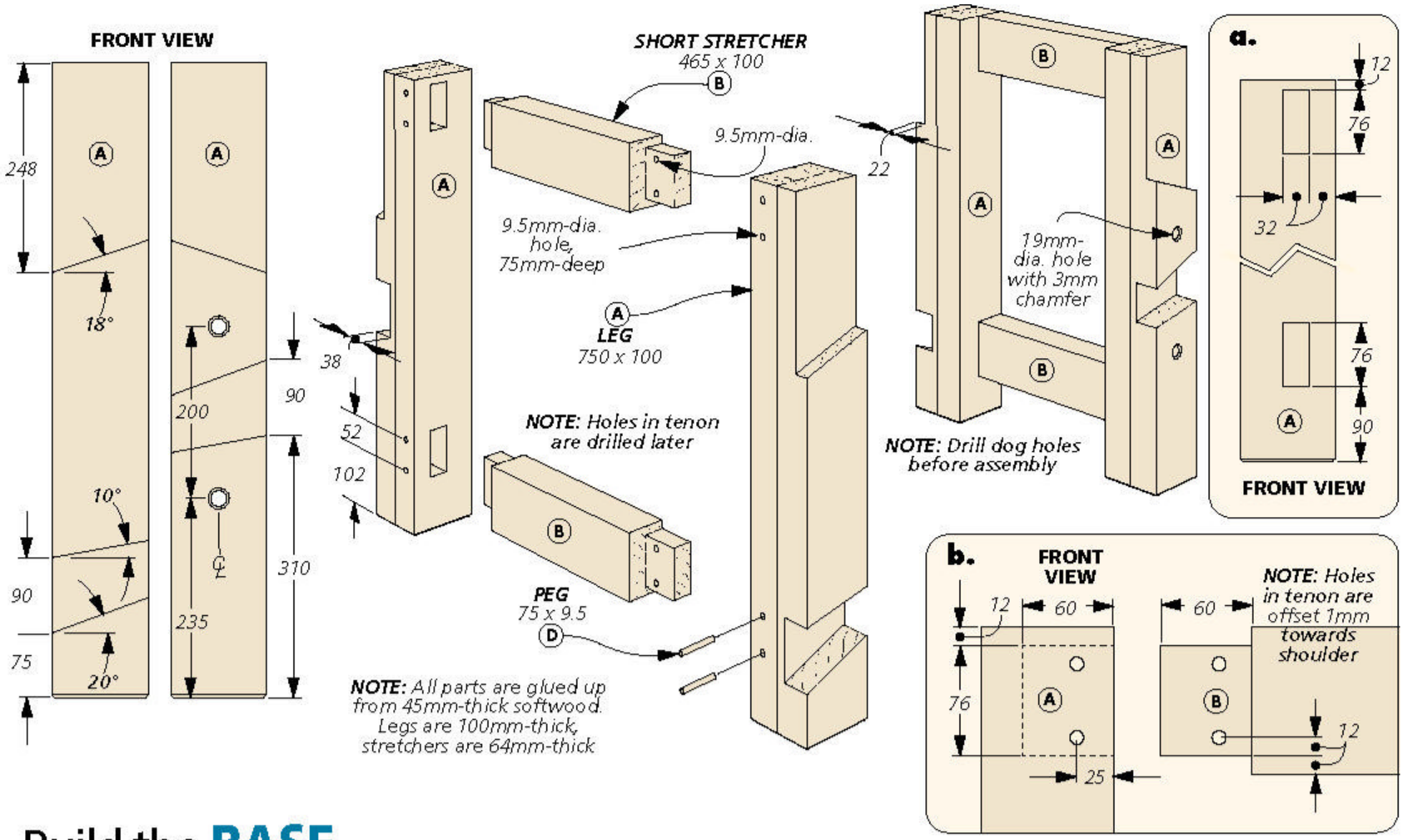
Historically, mobile woodworking was the main function of this workbench. When done, the bench was dismantled and moved to the next job. You'll want this one to stay put in your workshop.

Back in the day, there was a wrist watch made by a company named Timex. The main selling point of the watch was its modest price and toughness. The slogan was "It takes a licking and keeps on ticking." True to its word, I had several of those watches that served me faithfully for decades. Well, the bench you're looking at here easily meets and surpasses those qualities.

The modest-sized bench might lead you to think that it could be pushed around if you attempt any aggressive joinery work on it. Not so, the thick top planks and massive aprons that are let into the base with half-laps (and angled on the ends) means this bench won't budge no matter what you throw at it.

Those aprons have more going for them than just size. As you see here, the front apron works in tandem with a large wood-threaded vice that you purchase online. This dynamic duo plays well with the dog holes that are drilled in the apron and legs. The holes welcome holdfasts, wood pegs and whatever jig your imagination can conjure up for the sake of controlled joinery. Convinced? Inspired? Well, let's get cracking.

▲ The base of the bench takes the task of providing rock-solid support for your woodworking duties seriously. The angled half-laps in the legs lock the stretchers and top firmly in place.



Build the BASE

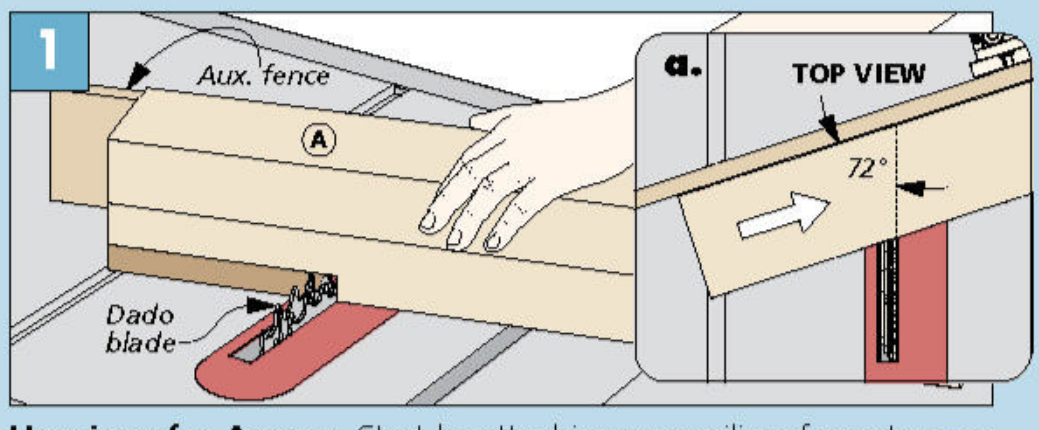
As you see in the drawing and details above, the thick legs sport mortises that are cut into the inside faces. To seal the joinery deal, the tenons that fit in the mortises are drawbored in place. On the opposite faces of the mortises, there are housings that will hold the long stretchers and aprons. It all starts with gluing up the blanks for the legs.

BIG TRENCHES. Kick off this phase by trimming the legs to their final length. Now you've got some big trenches to cut. The box below shows two ways to attack this, first at the table saw (Figure 1). Here, you're making a lap that will join with the apron. The angled shoulder on the leg, and the one on the apron lock together and prevent racking.

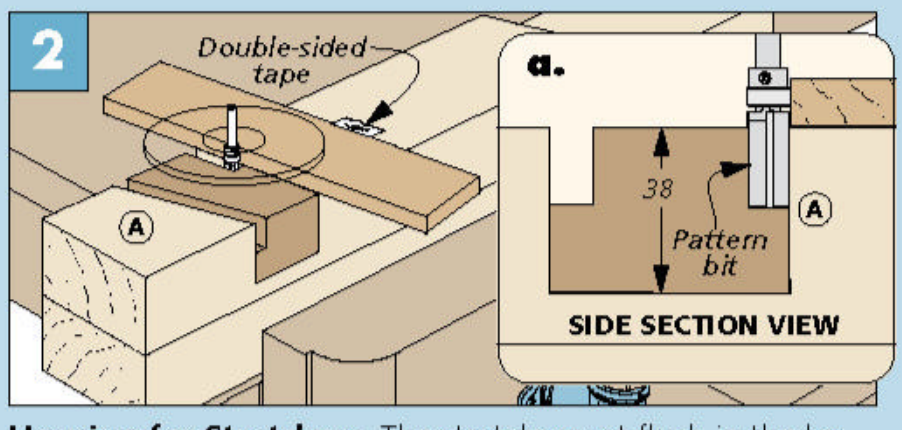
Figure 2 addresses the trench for the long stretchers that angles across the front and back in opposite directions. As you see in the detail, it's a much deeper housing than the one you just finished. So I used a router, pattern bit and a straight edge to make it a clean and crisp joint.

MORTISES. Mortises for the tenons on the short stretchers are a job for your drill press and a Forstner bit. A Forstner bit makes quick work of removing the waste and leaves a fairly flat bottom.

LEG HOUSING JOINTS

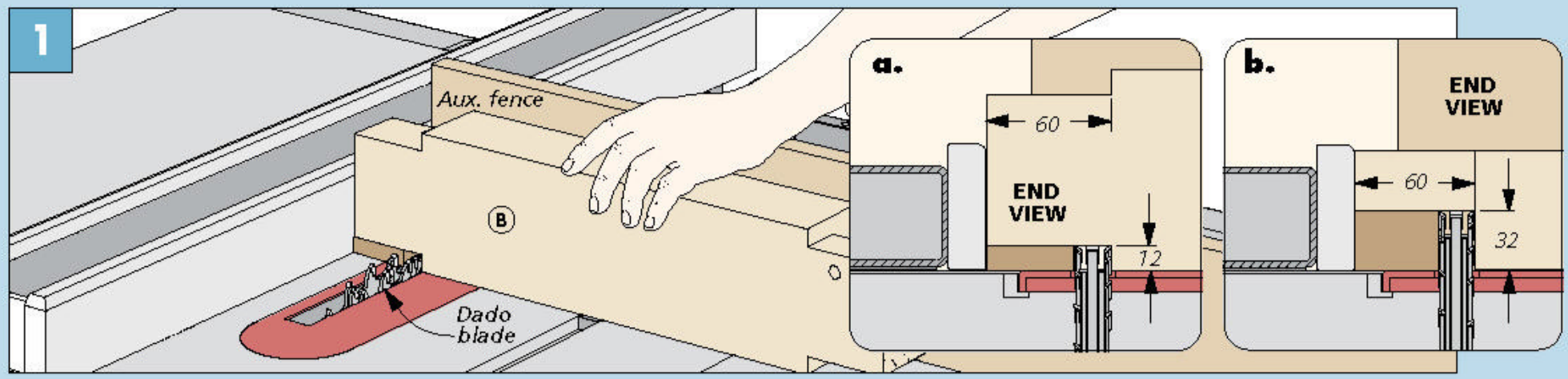


Housings for Aprons. Start by attaching an auxiliary fence to your mitre gauge and set it at the proper angle. After making the shoulder cut, nibble away the rest of the waste.



Housing for Stretchers. The stretchers set flush in the leg. I used a straight edge to guide a pattern bit in my router. Multiple passes were required to make the housing.

TENONS ON THE SHORT STRETCHER



Shoulders First. Use the fence of your table saw as a stop to establish the shoulders of the tenons on the short stretchers. Raise the blade to offset the tenon.

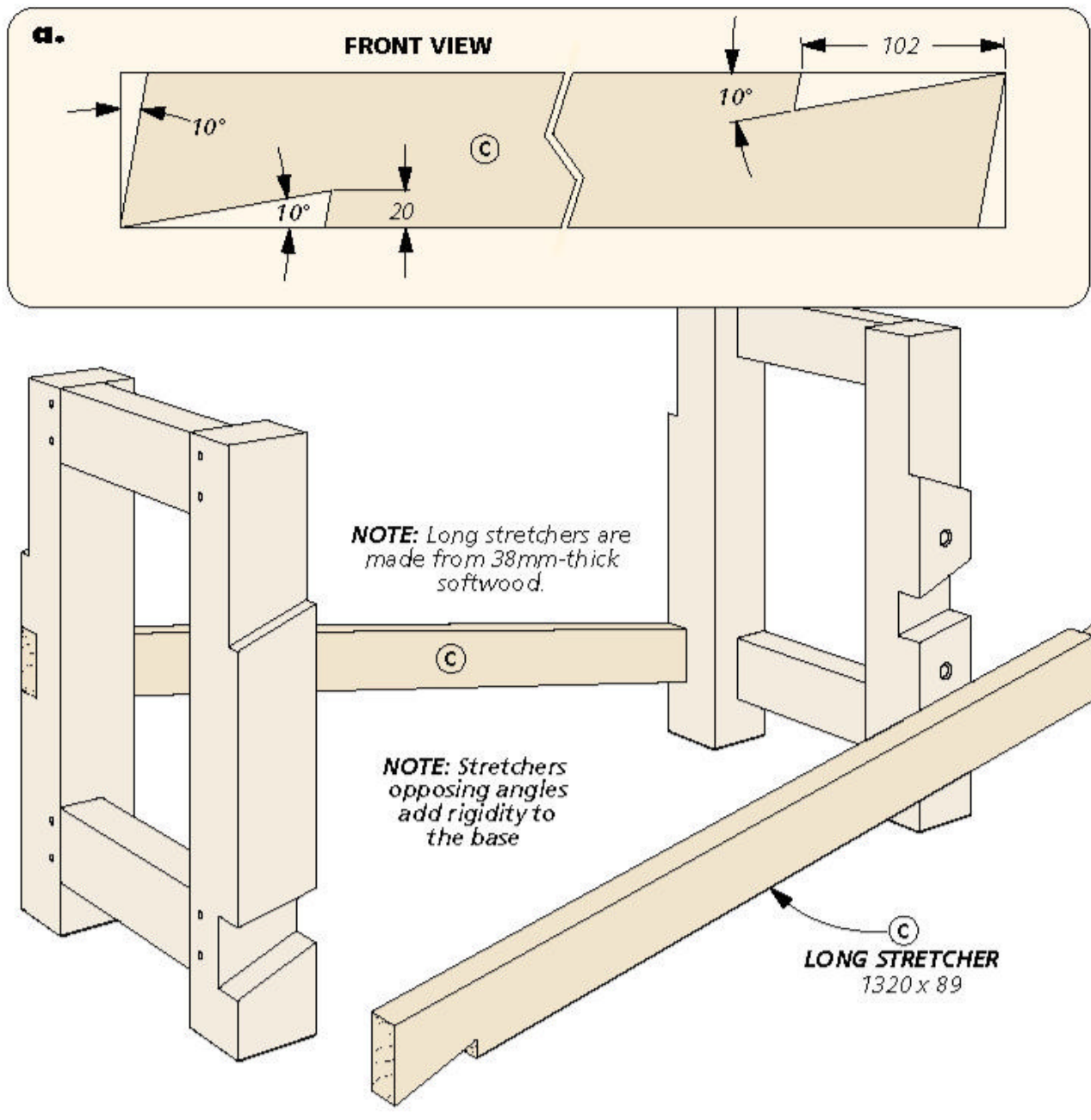
A chisel will clean up the corners and walls just fine.

The main drawing on the previous page and detail 'b' shows that there are holes to drill into the legs for some pegs, go ahead and do that now. These are the holes that you'll use along with the drawbore technique to tie the stretchers tightly to the legs. Now it's on to making the stretchers, starting with the short ones.

SHORT STRETCHERS. As you see in Figure 1 to the right, the tenons are offset and flush to the inside face of the stretchers. This makes the opposite face flush with the outside of the legs, as shown in the drawing at right.

LONG STRETCHERS. The long stretchers that are opposite angles to each other on the front and back of the bench further guarantee that no racking or "walking" will be done by this bench. The dovetail-like notches in the ends of these stretchers nestle into the notches cut into the leg. Detail 'a' shows the angles and dimensions for the ends.

When the layout was done, I used three saws to shape them. The angle cuts on the ends were done at the mitre saw. Then the shoulders are cut at the table saw. Follow this with the bandsaw to make the long cheek cuts.

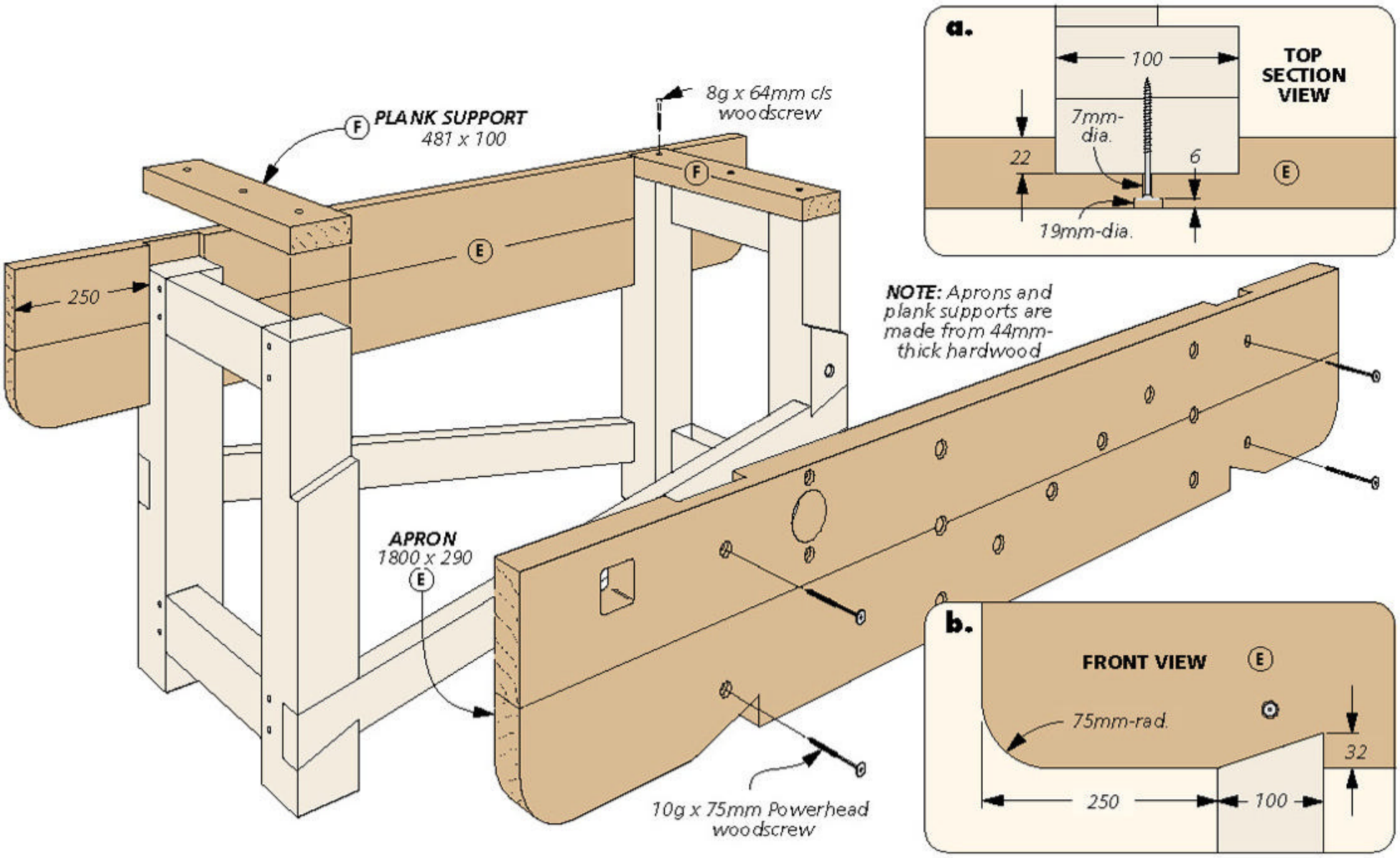


ASSEMBLY

All the heavy cutting and chopping of these big parts is about to pay off. I started by assembling the ends. This meant bringing the front and back legs, the short stretchers and the pegs that tie them together to the workbench.

DRAWBORE. Note that I didn't mention glue and clamps. The main merit of drawbore joinery is that you don't need glue to create a long-lasting joint. Start by dry assembling the side. Then, with a brad-point bit the same size as the hole, mark its location on the tenon. Tap the members apart and make a new mark based on the old, *towards* the shoulder. The distance doesn't have to be much, 1mm or so will give you a tight joint. Now re-assemble the sides, and drive the pegs through the legs into the tenons. Then trim and sand them flush.

Finish up by gluing the long stretchers in place with several F-clamps, checking the base for square as you go along. With that done, you can turn your attention to the aprons.



Addressing the **APRONS**

▲ Powerhead woodscrews do a great job of locking the aprons and planks in place.

The material for the aprons (and the planks that make up the top for that matter) are all derived from 290 x 45mm hardwood. The aprons are pretty wide so you'll probably have to glue them up from narrower boards.

As you see in the main drawing above, the aprons on the front and back of the bench start out identical up to and including the holes for the mounting hardware (photo at left) that fasten them to the base. At that point, the back apron is done and can be set aside. Also, there are two plank supports that are screwed to the top of the base.

The front apron, on the other hand, has quite a bit more work before it's ready to be screwed to the base. There are a lot more holes to drill. Some to hold the vice, and some to hold the accessories that work with the vice. But lets start at the beginning.

TRENCHES & NOTCHES. The back side of the aprons have two trenches that join the half-laps on the legs. A straight edge, pattern bit and my router are called into duty to make the trenches. Figure 1 on the next page provides the details on how to do this.

At the bottom of these trenches is an angled notch (Figure 2). A jigsaw made short work of the angled part of the notch.

When that mess is cleaned up, you can use your back saw to cut the shoulder. A quiet moment with a little dust flying is always a nice break during a project.

THE BIG EASY. The bottom corners of the aprons have an arc cut into them because pointy parts at thigh height can be painful. The radius is shown in detail 'b' on the previous page.

Then it's back to making noise, I used a jigsaw and belt sander to shape and smooth the corner. The front edges of the aprons need to be knocked back just a little bit with a sanding block.

MOUNTING HOLES. The long Powerhead screws are what draw the aprons tightly against the legs. The screws have a large head that you'll need to make a counterbore for (detail 'a' on the previous page).

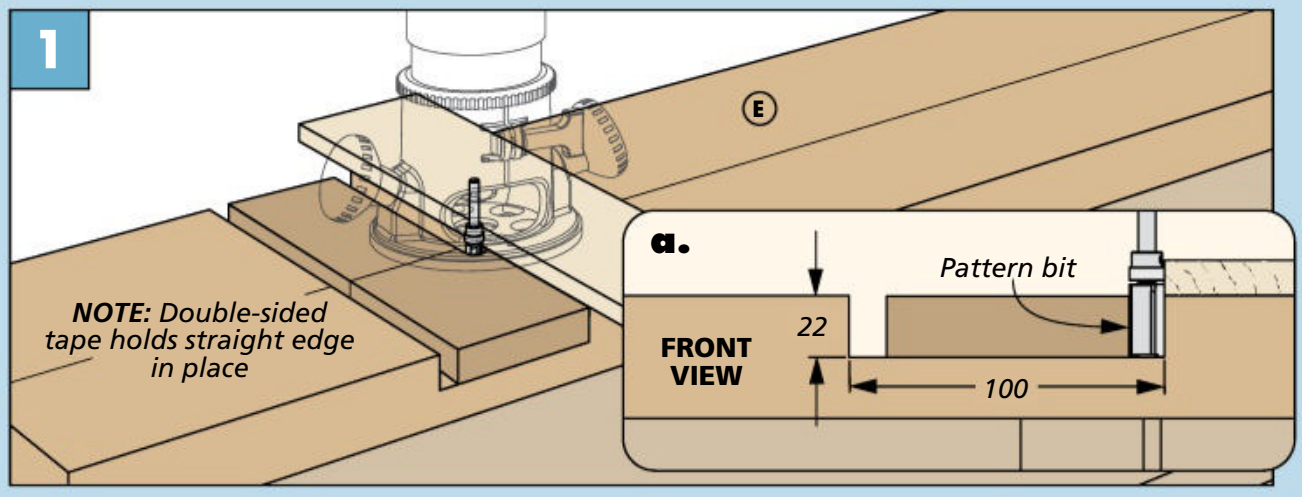
Now you can install the back apron. You can set the apron in place and drill the pilot holes in the legs. This step is really important. If you don't drill the pilot holes deep enough, and the screws bottom out, it's pretty much a guarantee that you'll snap off the head of the screw.

VICE OPENINGS. To accommodate the vice, you need to make two openings in the front apron. The large circle you see on the previous page is for the wood screw of the vice to pass through (a hole saw works well here). The mounting holes you see above and below it are for the vice nut that you'll install later.

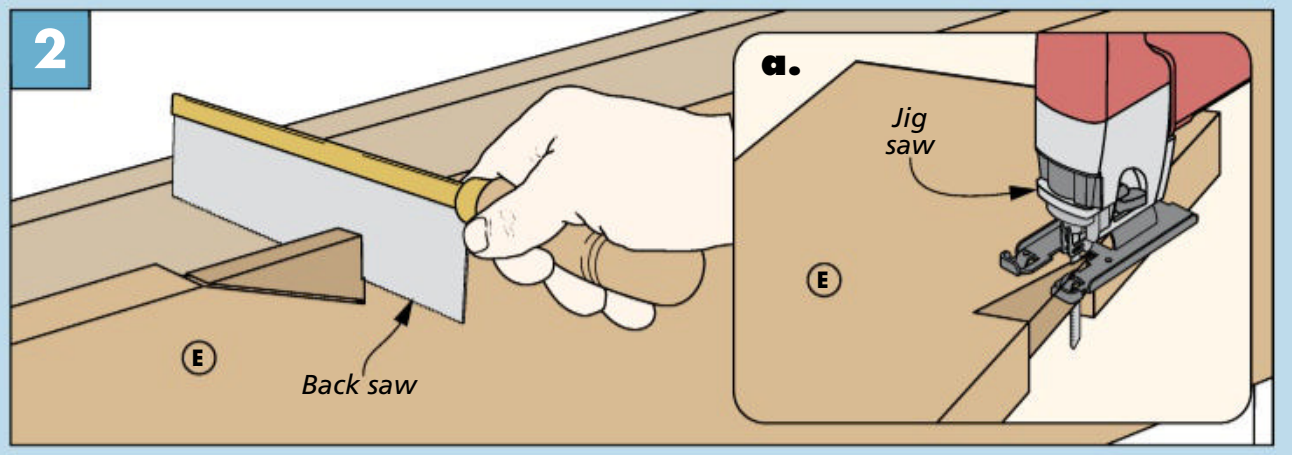
The other hole isn't a hole, it's a square with rounded corners. The parallel guide of the vice passes through this opening. Figures 3 and 4 to the right show how to make this.

MORE HOLES. The last thing to address on the front apron is the holes needed for hold-fasts, or bench dogs. These accessories will support the different sizes of workpieces that you'll want to work on. To keep the holes square to the apron, I mounted the drill into a drill guide. A chamfer bit in my palm router tidied up the edge of the holes. (Earlier I drilled the two holes in the right front leg of the base.) Now it's time to install the vice.

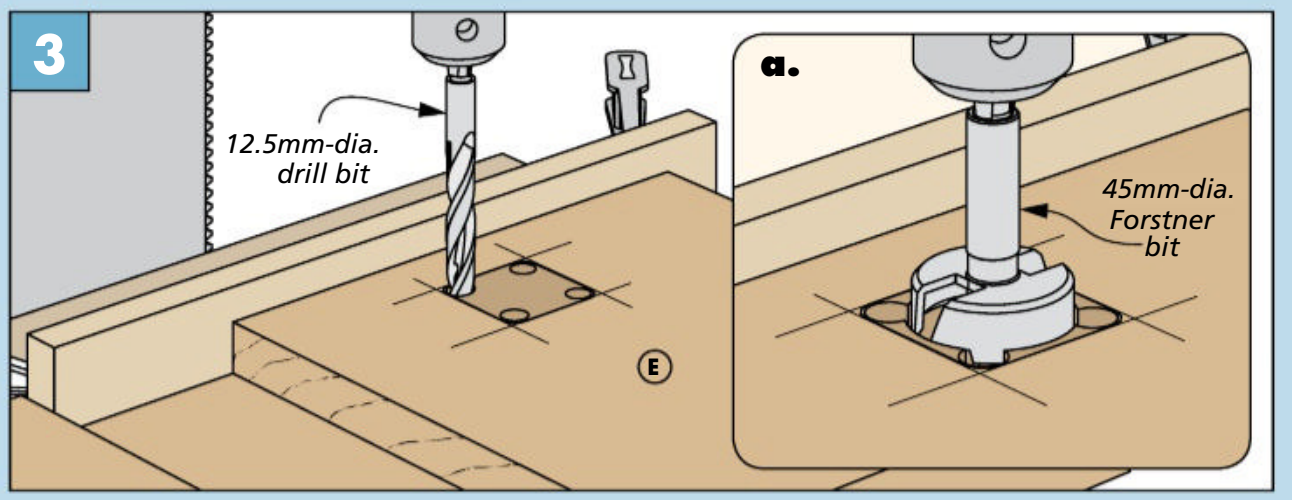
APRON DETAILS



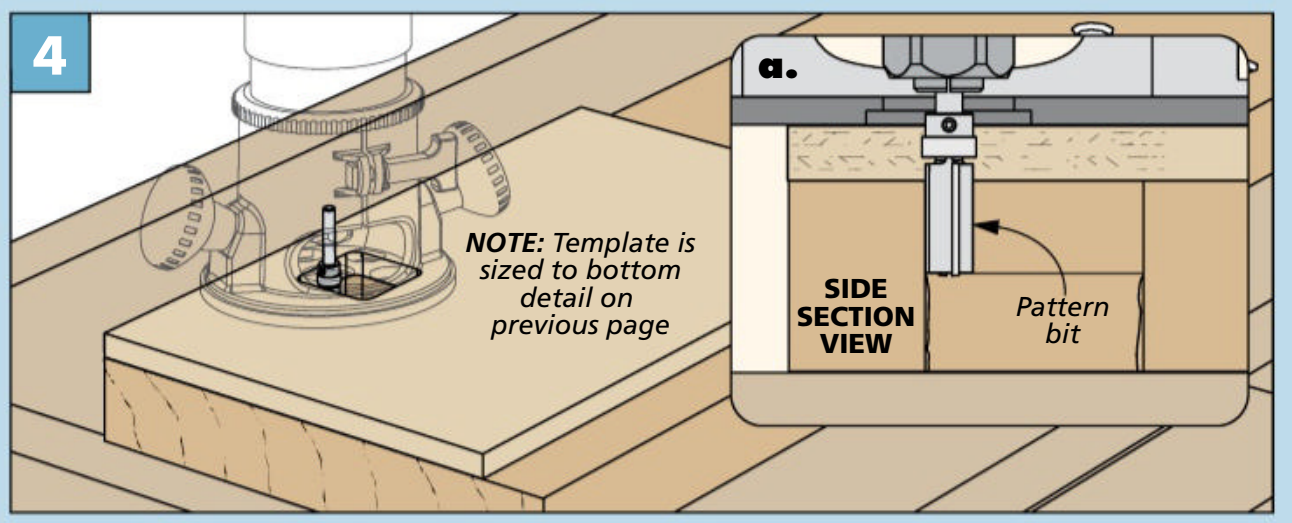
Large Trenches. A straight edge combined with a router and pattern bit takes all the stress out of making the trenches in the apron that mate with the base.



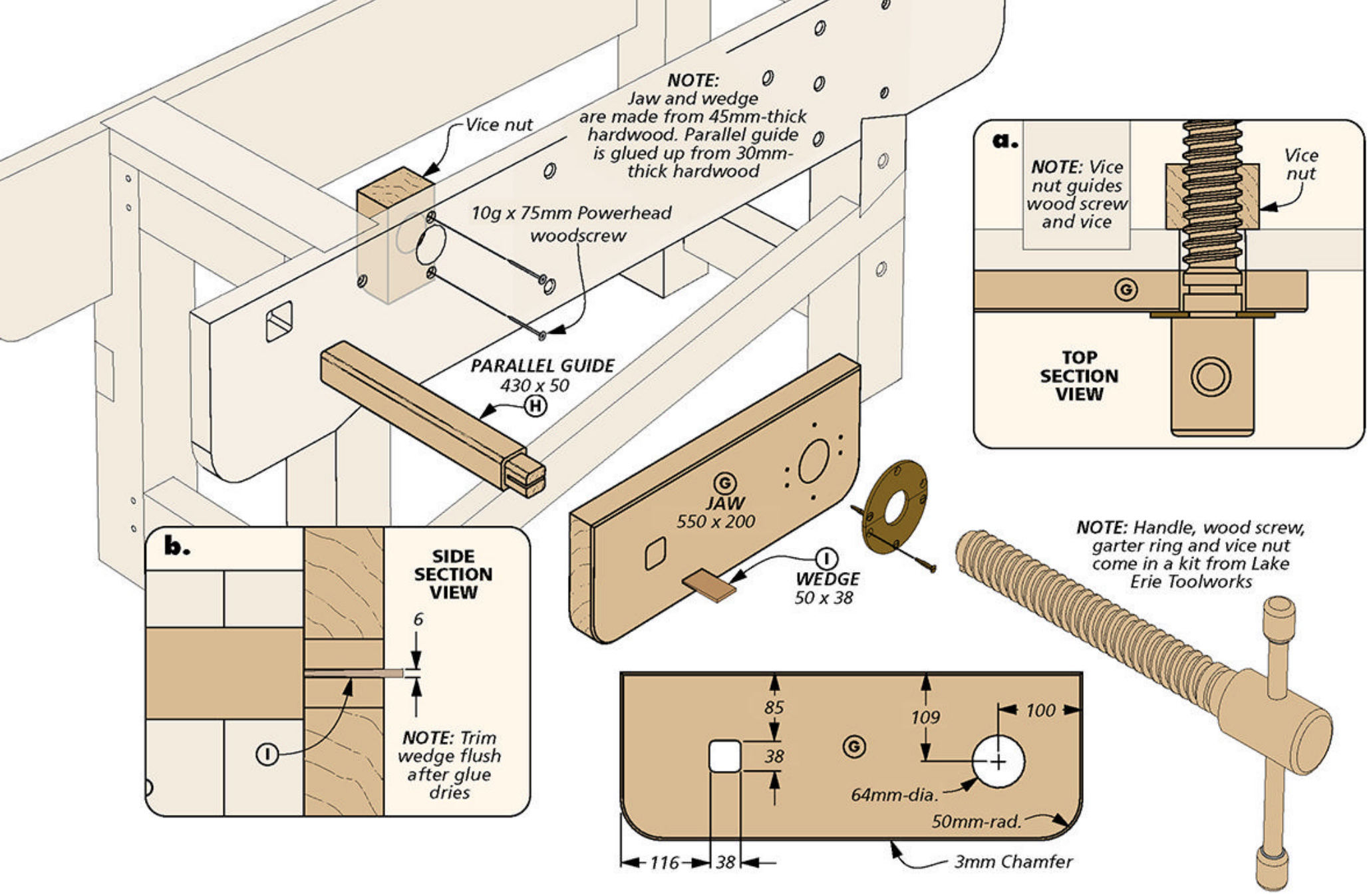
Angled Notch. The notches that lock the aprons to the base are made with a combination of two saws. A back saw for the shoulder, and a jigsaw for the angle.



Guide Opening. A combination of drill bits are needed to rough out the opening in the apron for the parallel guide. Then use a router and pattern bit to clean up.



Tidying Up. To clean up the opening, your router and pattern bit are called for. The template gets you started, then the walls of the opening guide the bit.



Add the VICE

The vice at the left end of the workbench is something to behold. It's a beast indeed. The upside to it is that most of the parts come from a kit that you can purchase online. Lake Erie Toolworks made the version we used for this bench.

For the sake of a uniform look, the jaw is made from the same hardwood you're using for the aprons and planks. To keep this big jaw from binding when operating it, we've added a parallel guide to the left side of the jaw. It runs through the apron and is stabilised by a mounting guide that you'll add at the very last. First up is making the jaw.

MAKING THE PARALLEL GUIDE

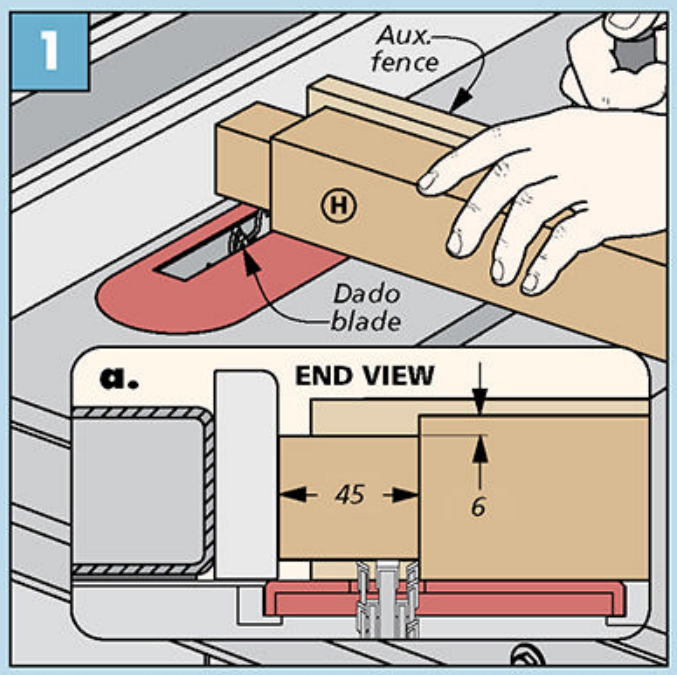
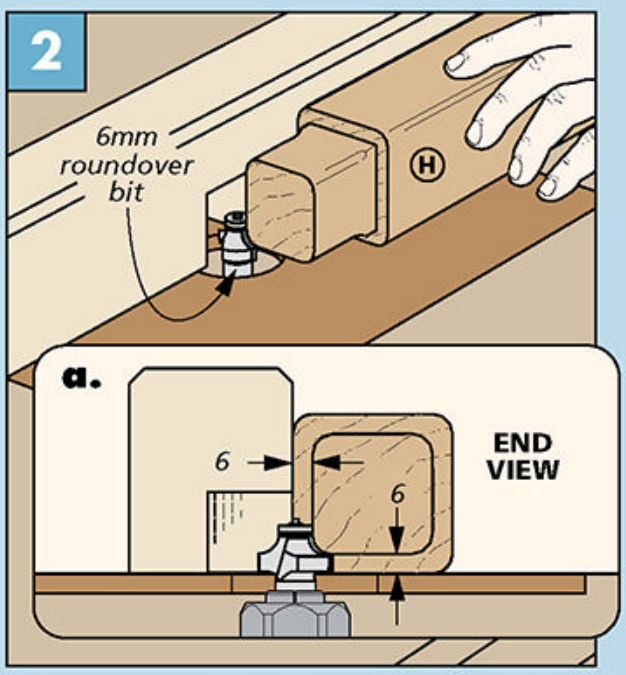


Table Saw. The rip fence is the stop when cutting the shoulders on the parallel guide. Nibble away the rest of the waste.



Router Table. A roundover bit eases the edges of the tenon and body. A little handwork remains on the tenon.

THE JAW. The drawings above give you the details for making the jaw. The holes are similar to the ones in the apron. But, the opening for the parallel guide is smaller than the one in the apron. So you'll have to make a new template to accommodate this. The hole for the wood screw is the same size as the one in the apron. Don't drill this hole yet, that happens later.

THE JAW PROFILE. The arcs on the bottom corners of the jaw are made with a jig saw and sander like you did on the aprons. To complete the jaw, chamfer the front edge with your router.

PARALLEL GUIDE. As I mentioned, the long block that is to be attached to the left end of the jaw is going to help the vice travel smoothly. It's

just a square piece of hardwood that has a tenon on the end to join with the jaw.

After sizing the guide, I cut the shoulders of the tenons at the table saw (Figure 1, previous page), then nibbled away the cheeks. Cutting the slot for the tenon wedge was done quickly at the bandsaw (detail 'b', previous page). I made the wedge for the slot while at the bandsaw.

To complete the guide, I rounded over the edges at the router table (Figure 2). Go ahead and glue the guide in place and tap the wedge into the slot.

INSTALL THE VICE

Installing the wood vice screw properly involves several steps, these are laid out in the box to the right. Figure 1 shows the vice clamped in place, aligned to a spacer. The spacer is used in each step. This accounts for the fact that the top of the jaw is flush with the planks that make up the top of the workbench, not the apron. With that in place, you can mark the location of the wood screw opening on the back side of the jaw.

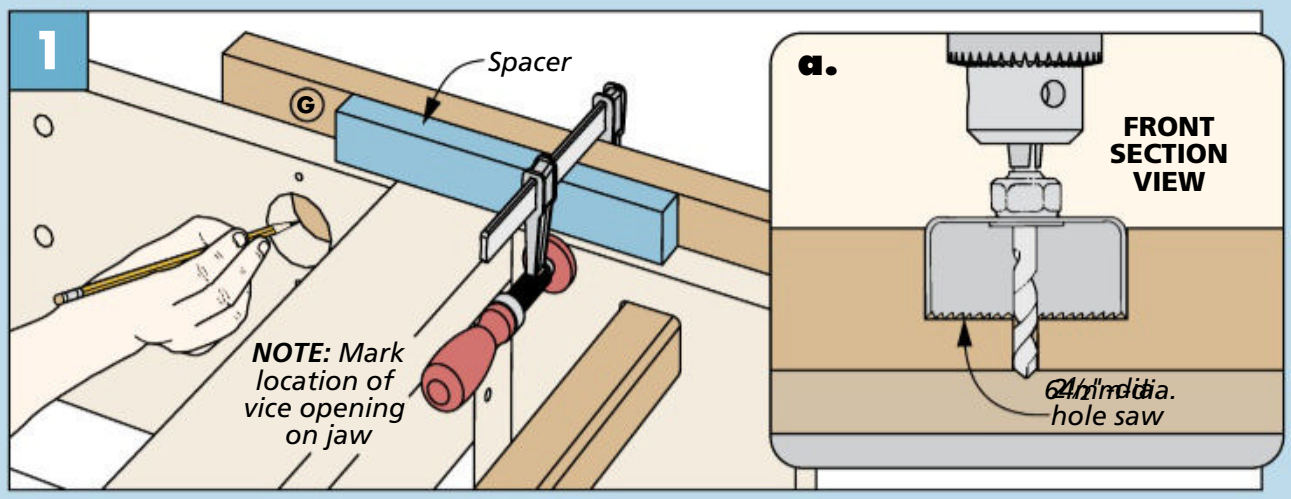
VICE NUT. After the hole is drilled, slide the jaw back in place on the apron. Figure 2 shows installing the vice nut. The vice nut guides the wood screw (and the jaw) in and out of the apron.

For the last time, slide the jaw back into the apron. Then thread the wood screw through the nut and draw the jaw to the apron. The garter rings hold the screw to the jaw. Mark and drill the pilot holes (Figure 3). Then screw the rings in place.

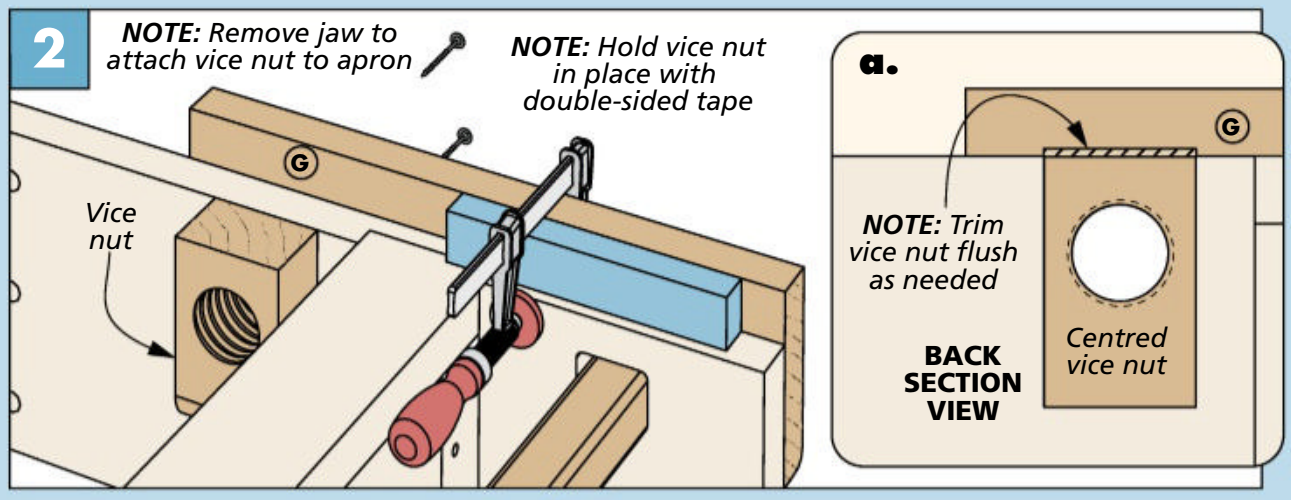
That task completes the fussy part of this project. And it leaves you with just a couple more things to do, then this bench will be ready for action.

ALIGN THE JAW & INSTALL THE VICE

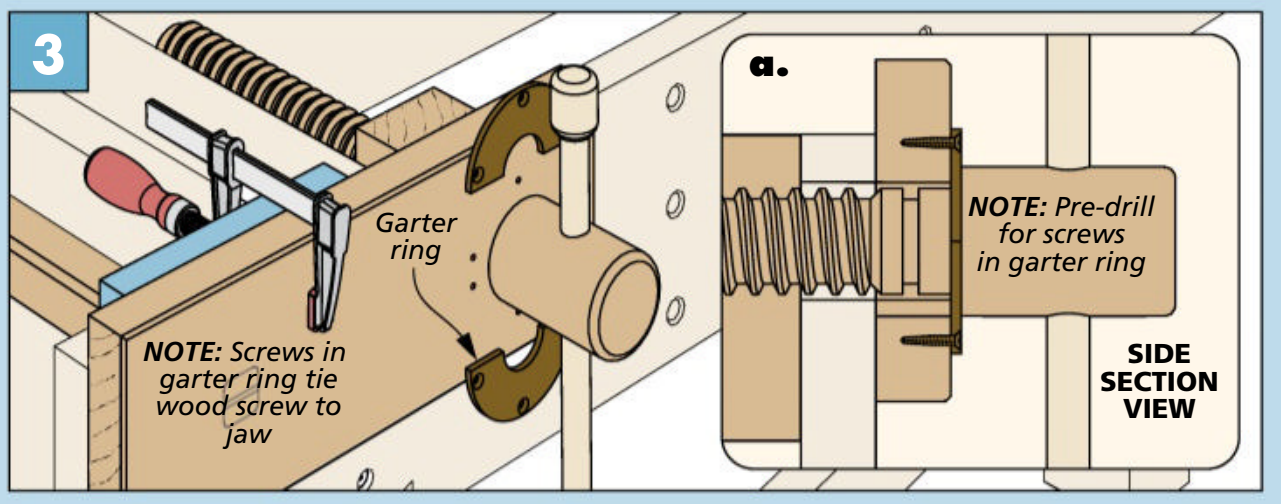
- The wood vice screw premium kit from Lake Erie Toolworks comes with everything you need but the jaw. A hard maple screw, nut, handle and brass mounting hardware (called garter rings) are included in the kit.



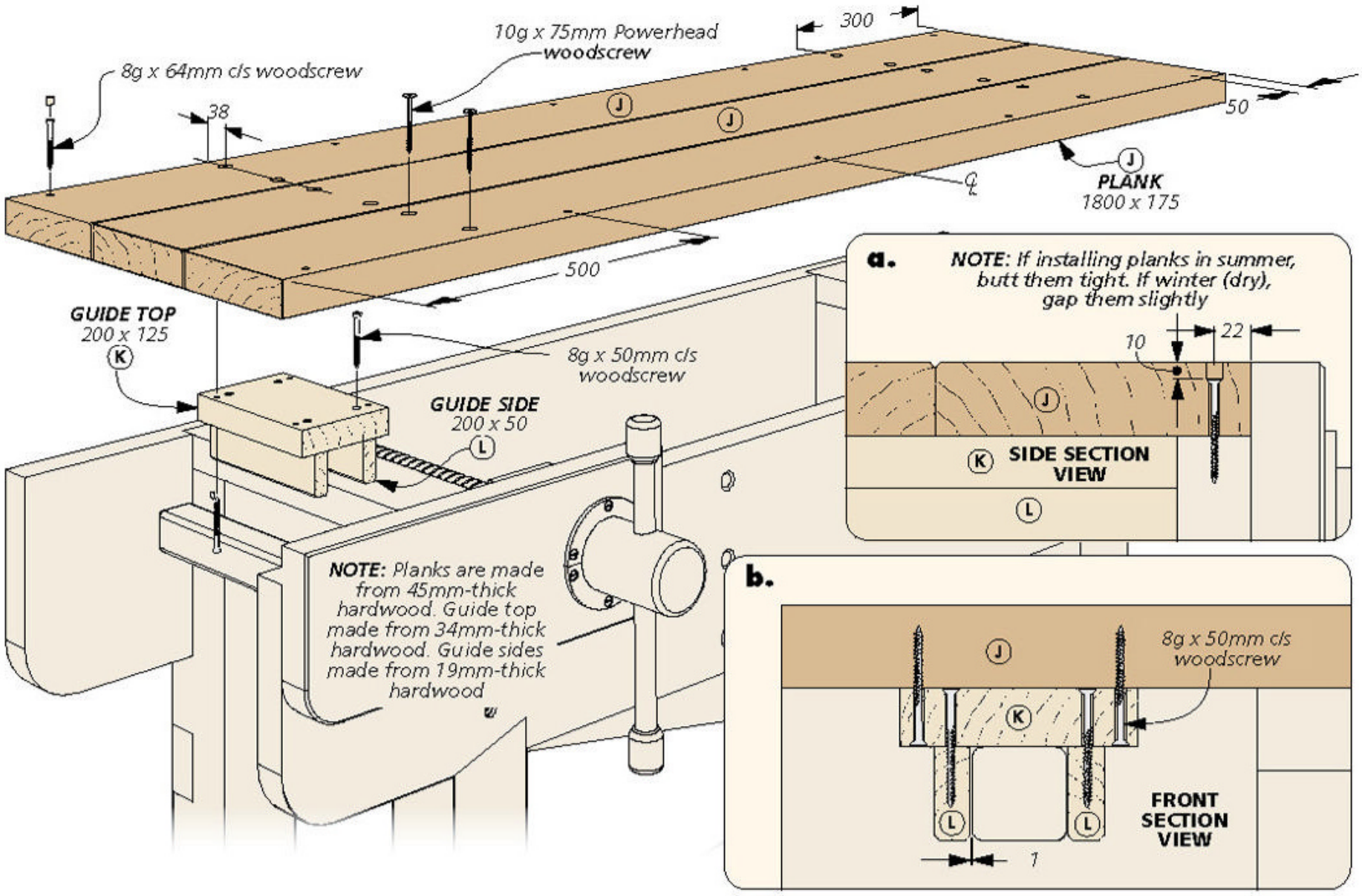
Wood Screw Opening. To accurately align the jaw to the apron use a spacer block the same thickness as the top. Then mark the location of the hole through the apron.



Vice Nut First. Centre the vice nut on the opening to see if it needs trimming. Then hold it in place with double-sided tape, remove the jaw and screw it to the apron.



Attach Wood Screw. Feed the wood screw through the vice nut and draw it tight to the apron. Mark screw locations through garter ring and drill pilot holes.



Finish with the **TOP**

You're in the home stretch on this project. All that's left are the planks for the top, and a guide that screws to the underside of the planks. This three-part guide ensures the parallel guide of the vice operates smoothly.

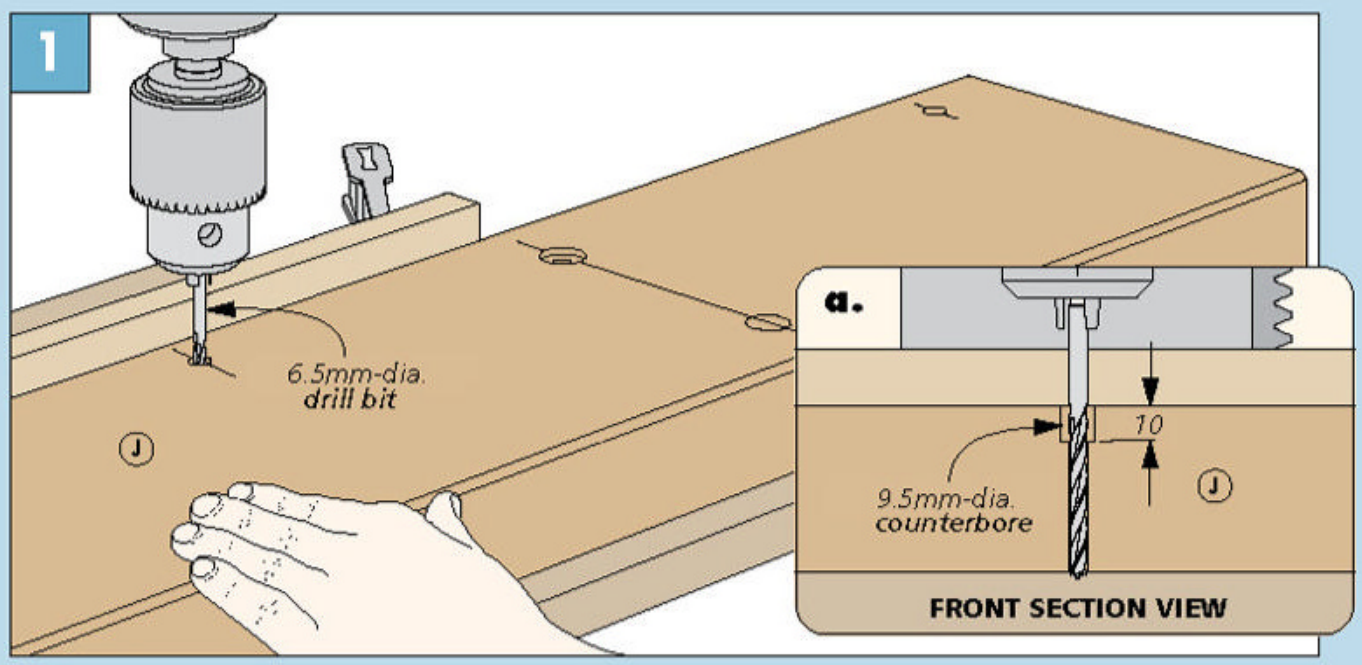
The planks are all the same size, but the front and back planks have additional holes for fasteners that tie them to the aprons. But before we get to that, sizing the three planks is the first order of business.

PLANKS. As you see in the drawing above, the planks have mounting holes that are drilled in them, identical to the holes used to tie the aprons to the legs. Here, the screws will tie the planks to the plank supports that you screwed to the top of the base. Go ahead and drill these counterbores and pilots now (you'll need outfeed support at the drill press to do this).

Now you can focus on the other holes I mentioned earlier. These counterbores are a little deeper than the previous ones (they're going to be plugged). The box to the left shows you the details. The five screws on either side of the top are closer to the edge of the bench.

These extra fasteners tie the top and apron tightly together. I chose to make the deeper counterbores and plug them for the sake of having a clean, smooth surface along the front edge.

COUNTERBORES & PLUGS



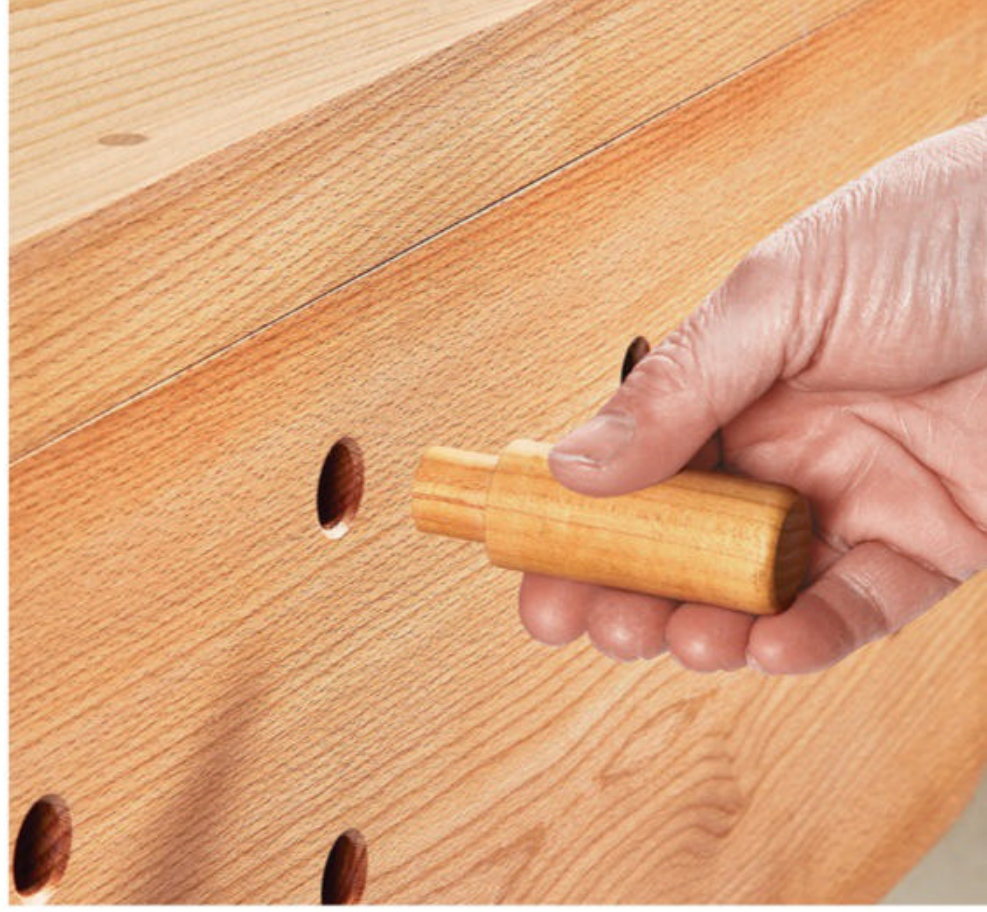
Pilot holes First. As with the earlier work on the aprons, you'll need outfeed support to drill the counterbores and pilot holes on the outer edges of the planks.

EASY DOES IT. Before you screw the planks to the base, note chamfers on their edges. Not all the edges are treated the same though. The front edge of the bench is left crisp, just a light sanding to prevent splinters. The same treatment goes for the ends of all the planks. The remaining long edges get a clean 3mm chamfer to finish them off. With that, the planks are ready to be attached to the base.

ATTACHING THE TOP. To make the junction of the front apron and the first plank a seamless vertical worksurface, start with the edge screws in the front plank and work your back. You want the front plank to be flush with the front of the apron, not protruding at all.

GUIDE MOUNTING PLATE. The guide mounting plate is a modest component to the bench. It's hidden away on the underside of the front plank quietly doing its job of making the vice track parallel. Once it's screwed in place you've built yourself a fine bench that's going to give you decades of solid service.

FINISH. To give the surface some tooth it was only sanded to 100 grit, then oiled with butcher block oil. Penetrating oil followed by paste wax made operating the vice a joy. W



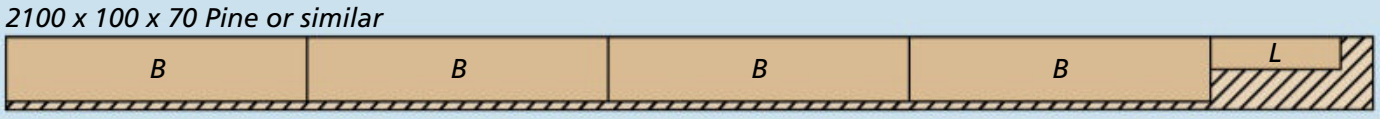
▲ The holes in the apron provide you with many ways to hold your workpieces. From jigs, holdfasts, to the simple peg you see here, they're all ready to give you a hand.

Materials, Supplies & Cutting Diagram

A	Legs (4)	750 x 100 x 90	**G**	Jaw (1)	550 x 200 x 44
B	Short Stretchers (4)	465 x 100 x 64	**H**	Parallel Guide (1)	430 x 50 x 50
C	Long Stretchers (2)	1320 x 89 x 38	**I**	Wedge (1)	50 x 38 x 6
D	Pegs (16)	75 x 9.5 x 9.5	**J**	Top Planks (3)	1800 x 175 x 44
E	Aprons (2)	1800 x 290 x 44	**K**	Guide Top (1)	200 x 125 x 44
F	Plank Supports (2)	481 x 100 x 44	**L**	Guide Sides (2)	200 x 50 x 19

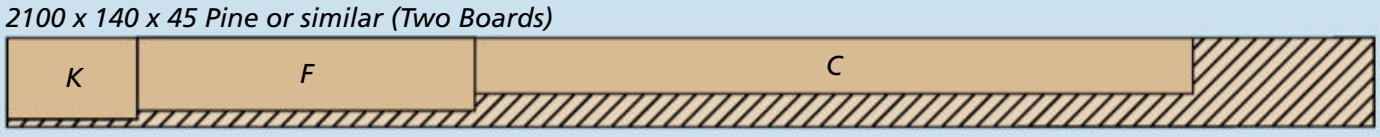
- (22) 10g x 75mm Powerhead Woodscrews
- (16) 8g x 64mm c/s Woodscrews
- (8) 8g x 50mm c/s Woodscrews
- (1) Premium Wood Screw Vice Kit
- (1) 9.5mm-dia. x 900mm Dowel

2100 x 100 x 70 Pine or similar



2400 x 100 x 45 Pine or similar (Four Boards)

2100 x 140 x 45 Pine or similar (Two Boards)



2400 x 290 x 45 Hardwood

2400 x 290 x 45 Hardwood

1800 x 190 x 45 Hardwood (three Boards)

Birch

Bob Chapman turns hollow forms in birch ply.

Birch (Betula pendula) trees will thrive in a very wide variety of habitats and are fast growing, but relatively short lived – around 60–90 years, although some may survive to almost twice that age. They are well known as 'pioneer' trees and are often found on the outer fringes of more mixed woodland, colonising open ground left behind by retreating glaciers or the effects of bushfires. They are able to survive in poor soil because their deep roots find nutrients and they improve the soil when their leaves decompose into humus. In this way birch trees prepare the ground for the later growth of other species.

Birch is a prolific deciduous hardwood that spans the northern climes of Europe, Russia and North America. Many different species thrive in these inhospitable semi-Arctic zones away from the warming influence of the oceans. Forests in this temperate zone are often referred to as boreal. What sets them apart from other forests are the short growing seasons truncated by long and bitter winters.

An unusual form of birch is 'Masur birch', which has very attractive dark brown markings, often giving a flame-like figure to the wood. The origin of the markings is a matter of debate, but one theory is that they arise when the tree heals itself from damage done to it by the Agromyzia Carbonara beetle whose larvae bore into the trees. Also known as Karelian birch from the province in Finland where it grows, it is quite rare and much sought after.

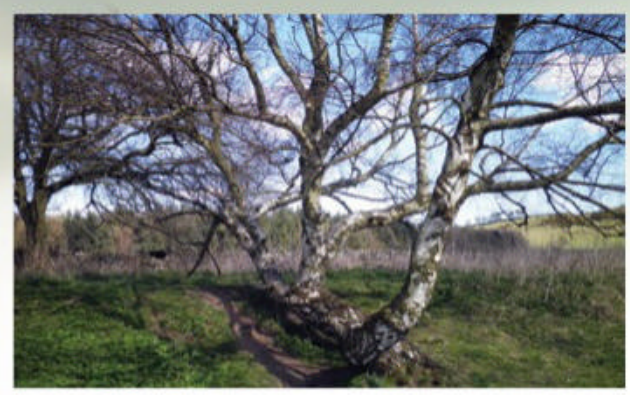
Slow-growing birch trees rarely grow to any size, with trunks around 400mm diameter when mature and the timber has an even pale yellow or white colour with a fine straight tight grain.

BIRCH PLYWOOD

Converting birch logs into plywood is the most efficient way to produce the panels required for furniture and interior decorating.

Since the late 19th century one of the main uses of birch has been for high quality plywood that is widely used for furniture, construction, toys and aircraft building. Howard Hughes designed and built the H-4 Hercules (the world's largest wooden aircraft) out of birch plywood!

Birch logs (harvested in winter) from the boreal forests of Russia and Finland dominate the plywood market.



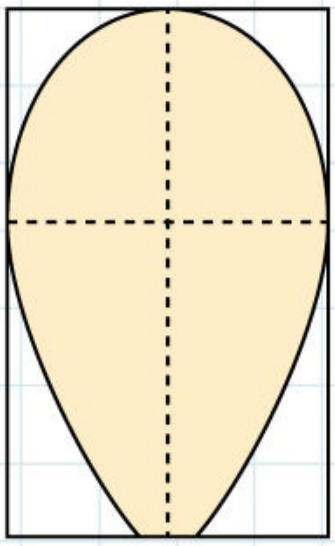
▲ Birch trees do not grow tall alone. In the open they grow out and not up.

▲ When birch trees grow together they compete for light and grow tall.

▲ The Cyrillic script on the edge of this plywood indicates that it is from Russia.

PHOTOS: BOB CHAPMAN, UNLESS OTHERWISE STATED. PLYWOOD: CHRIS CLARK

Construction Overview / OVERALL DIMENSIONS: 150mm x 130mm x 130mm



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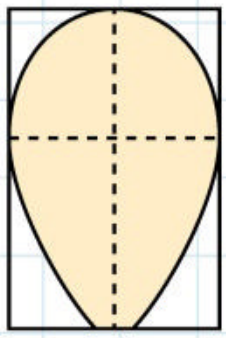

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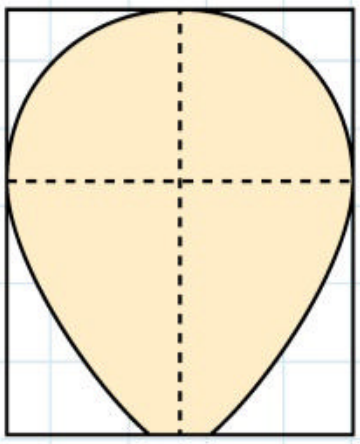

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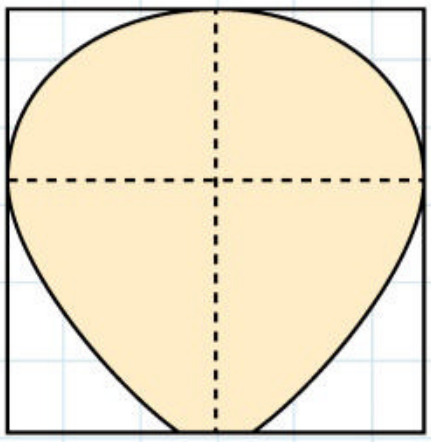

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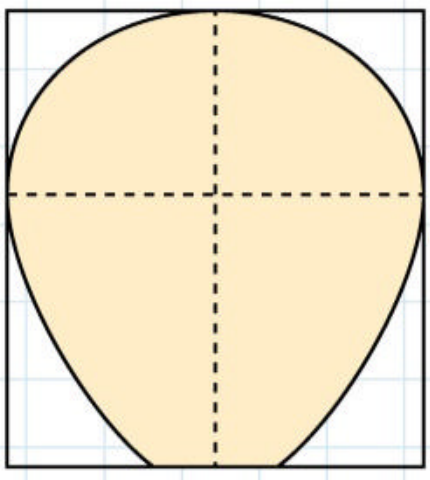

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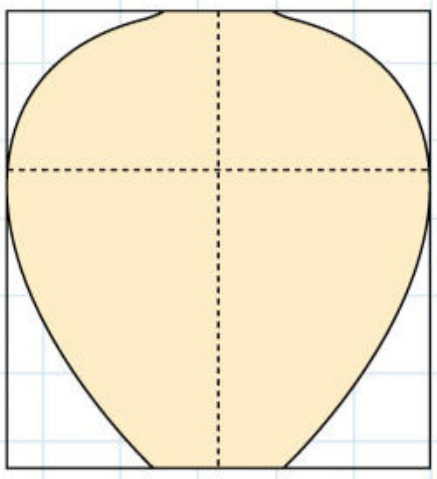
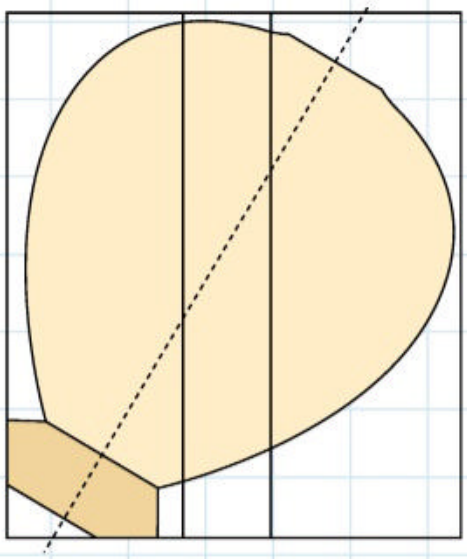


(a)



(b)

INFORMATION

EQUIPMENT USED

- Abrasives
- PVA adhesive
- Bandsaw
- Steb centre
- 13mm bowl gouge
- Four-jaw chuck
- Forstner bit
- LED lamp
- Mini hollowing tool
- 3mm parting tool
- Hacksaw
- Power sanding disc
- Buffing system

A BIRCH PLYWOOD HOLLOW FORM

As solid birch timber is not readily available, I decided to use birch plywood as the material for this project. Plywood has the advantage that pieces may be glued together to form a blank of any desired size and the arrangement of the layers in the finished piece provides a range of design opportunities.

DESIGN

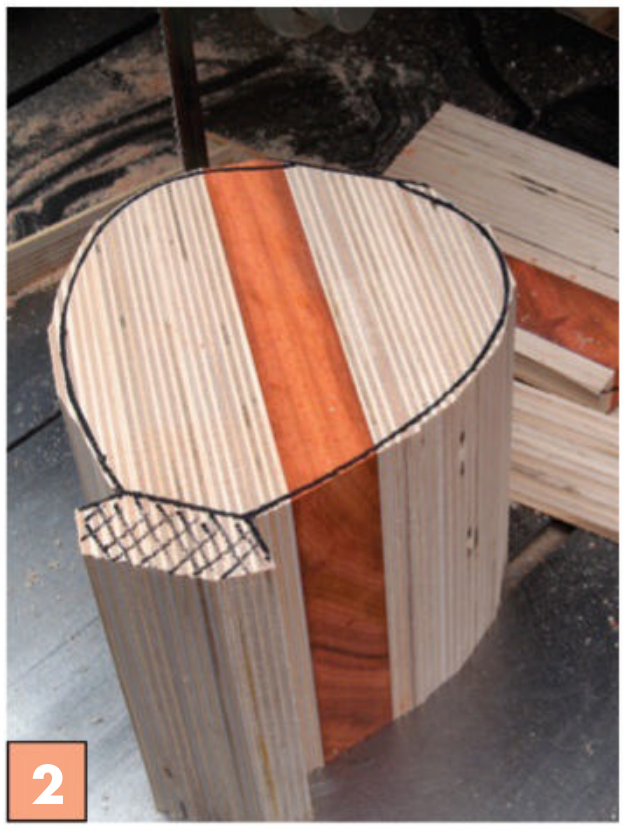
Hollow forms lend themselves to a very large number of different shapes, from small and squat to tall and narrow, and the first task was to decide on the actual shape I wanted. I began by sketching shapes of differing proportions. The designs were drawn on squared paper and this allowed the proportions to be changed fairly systematically.

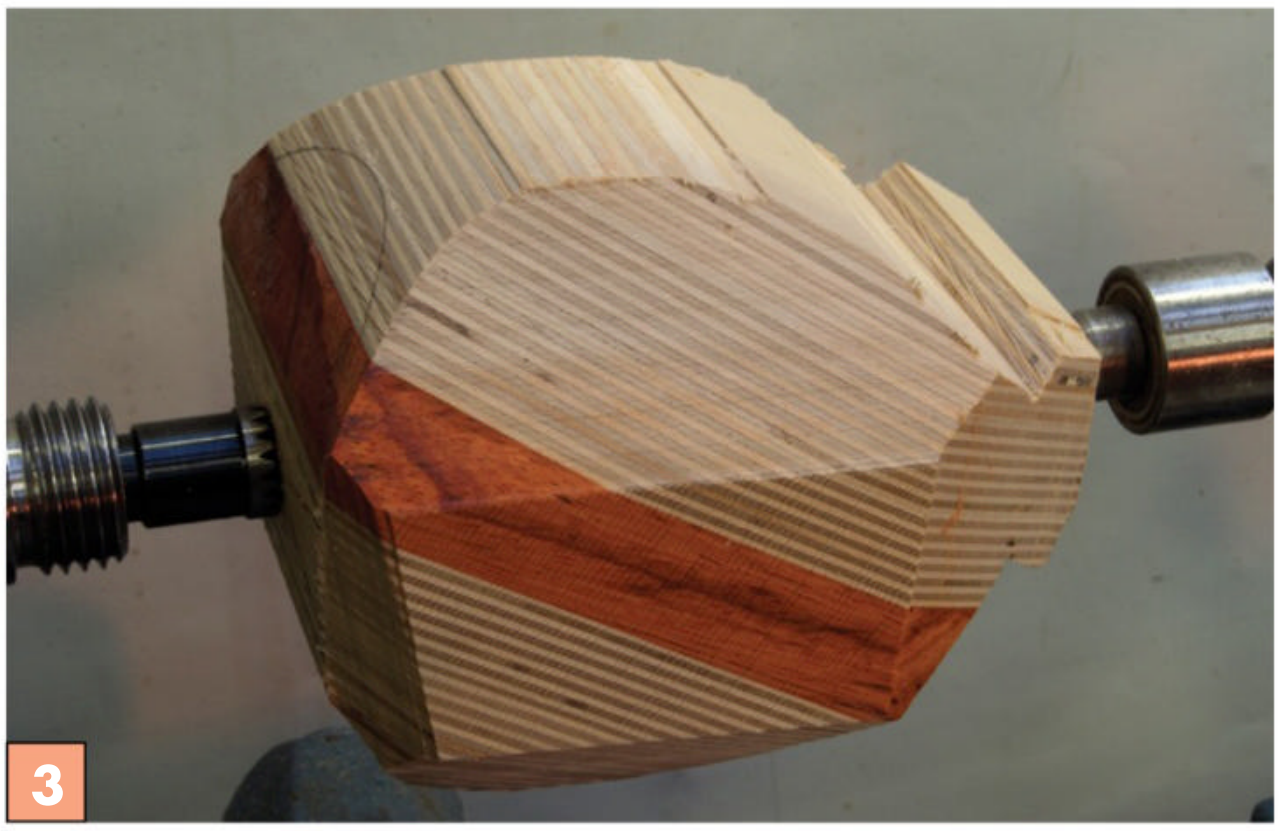
Although some of the differences in the proportions are small, they make noticeable differences to the outlines. I considered ‘e’ to be the most pleasing and its proportions, 12:13, are the ones used for this project. As 130mm seems a convenient height for a hollow form, it will be 120mm in diameter.

The orientation of the plywood layers was also to be considered and I wanted to get away from simple horizontal or vertical arrangements. However, if I wanted to mount the blank diagonally in some way, how could I calculate the size I actually needed to start with, and how would I mount it on the lathe?

I overcame both of these problems by drawing the hollow form full size on squared paper. I then cut round this outline, arranged it at the desired angle and drew a second rectangle showing the size of the blank required. These steps are shown in (a) and (b) respectively. The drawings show that a block 130mm square by 150mm tall would accommodate my hollow form, with sufficient waste at one end to form a spigot to hold it by.

At this stage I also decided to incorporate a ‘sash’ of wood of a different colour, coming over the shoulder of the hollow form. This was drawn onto the diagrams, which were then used to decide where this layer should come in between the layers of plywood. The sash would be made from 25mm-thick padauk (Pterocarpus soyauxii), which would show a good contrast with the plywood. The plywood is 19mm thick and it soon became apparent that the design required three layers each side of the padauk. This would form a block rather larger in one dimension than strictly necessary, but fewer layers would make the block too small. I found the diagrams invaluable at this planning stage, and don’t think I could have worked this out without them.





Constructing the blank

1 Cut six pieces of 19mm plywood 130 x 150mm on the bandsaw, together with a piece of 25mm padauk the same size. Lightly sand the pieces before gluing them into a block using PVA adhesive. Lightly clamp the block and leave overnight to cure. It is essential that glued-up blocks are secure before turning begins. Use a good quality glue and allow adequate time for it to cure thoroughly before beginning work on the assembly.

2 Once set, draw the shape of the hollow form onto the block, using a paper template as a guide. Then, cut the block close to the line using the bandsaw – remember to retain the waste at the narrow end of the block.

3 Next, remove further corners on the bandsaw before mounting the rough block between centres on the lathe. I find that a steb centre is ideal for mounting this sort of work and is very 'forgiving' if a catch does occur.

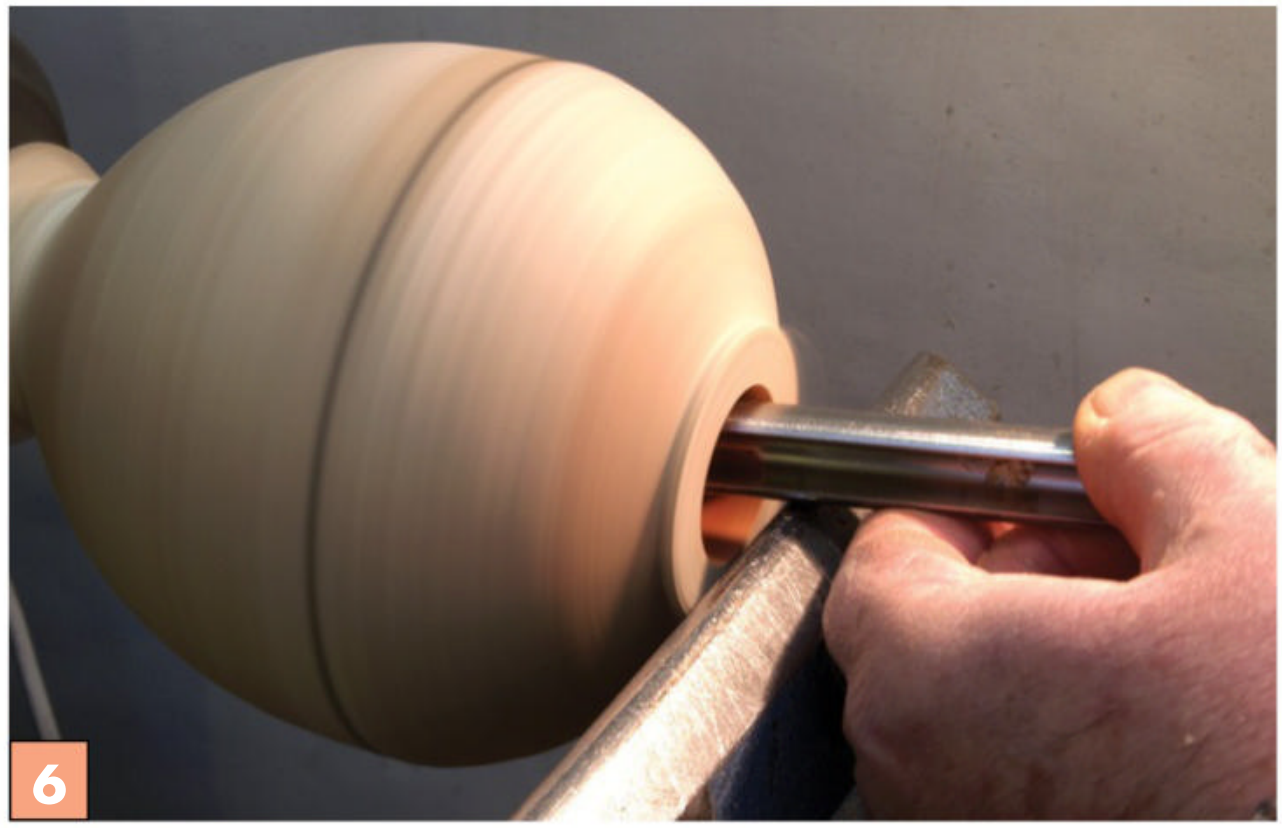
Roughing down

4 Tidy up the waste end of the form and cut a dovetail spigot so the piece can be held securely for hollowing. The long point of the skew is already the correct shape for cutting a dovetail and I usually employ it for this purpose. Before reversing the form, use a 13mm bowl gouge to remove the corners and turn the piece to something resembling its final shape. This helps the piece to turn true and reduces vibration which might otherwise cause the spigot to break up. Leave plenty of wood at the end of the form near to the spigot as this will form a strong support for the piece. Reducing this end of the form to its final diameter will be one of the last tasks carried out.

5 Reverse the blank and grip the dovetail spigot in the standard jaws of a four-jaw chuck. This enables a 30mm hole to be bored to a depth of approximately 115mm. A good quality Forstner bit will make this job much easier, so it is worth investing in quality cutters. Note the thick pencil line marking what will be the widest part of the hollow form as a reminder not to remove material from the outside in this area.

Hollowing

6 Begin hollowing with the 13mm bowl gouge. Feed the gouge into the hole with the flute downwards. In this position the gouge cannot cut and you can feel your way down the wall of the hole. When you are a little way in, start to rotate the gouge slowly clockwise. This will bring the lower cutting edge of the gouge into contact with the wall. Continue rotating the gouge until you get a satisfactory cut. Don't over-rotate the gouge or you are very likely to get a dig-in which will not be pleasant, at best.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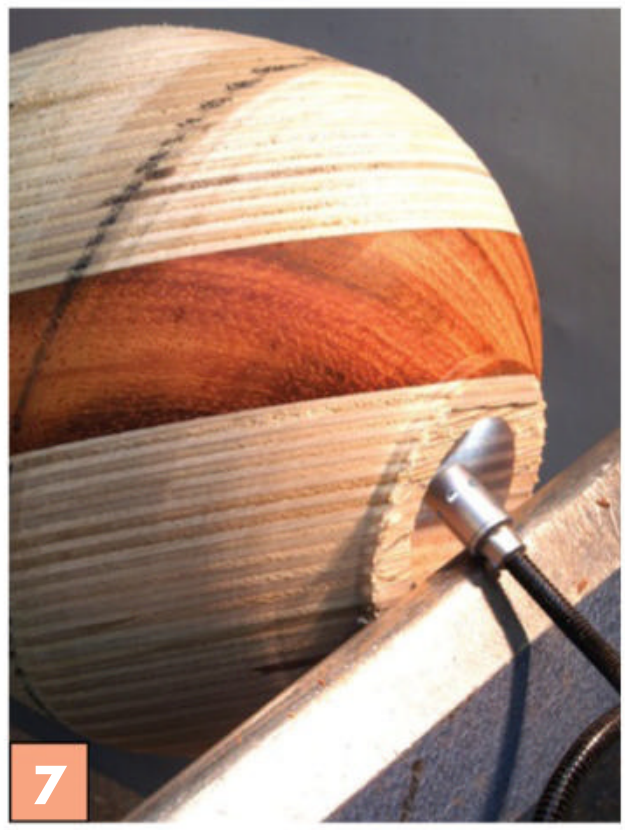
7 A flexible LED lamp will help you see inside the hollow form, and between what you feel through the tool and what you can see inside, you'll develop a 'feel' for what is happening.

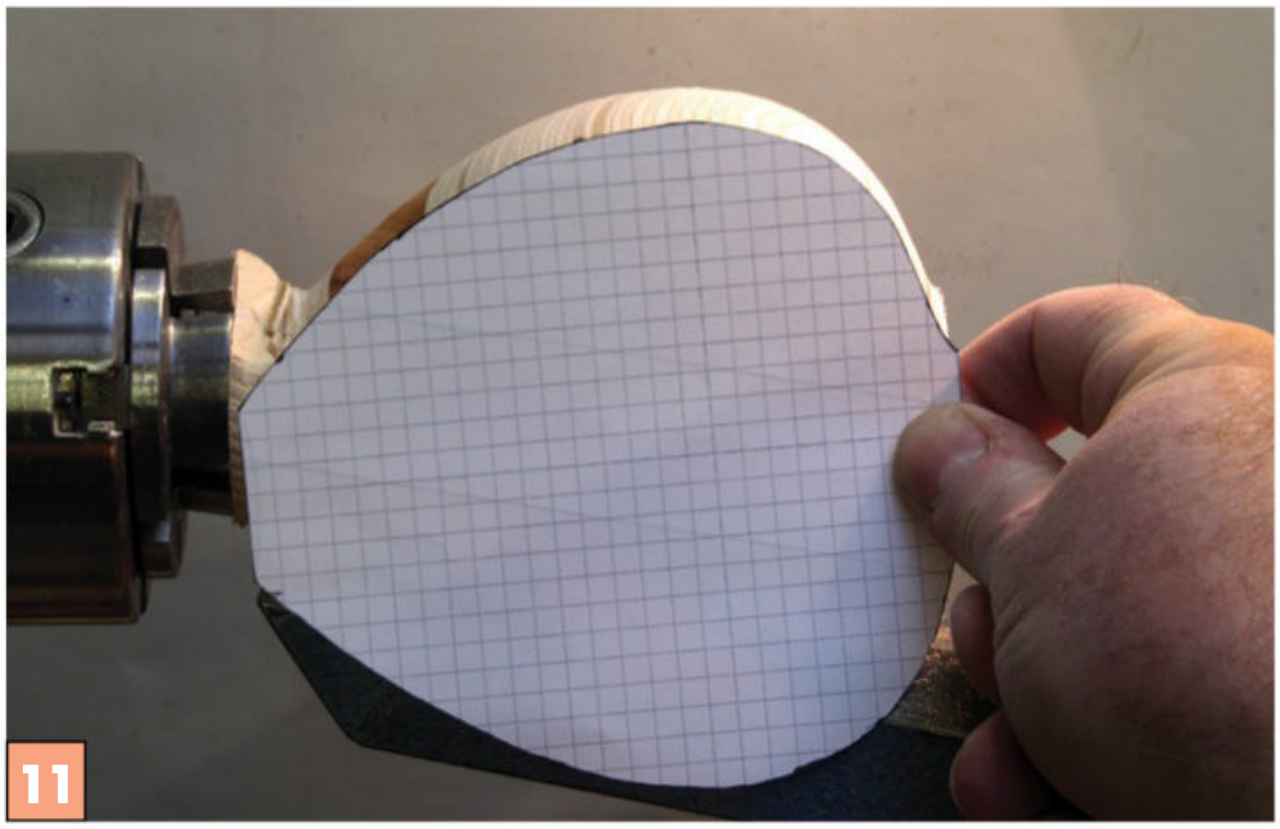

7

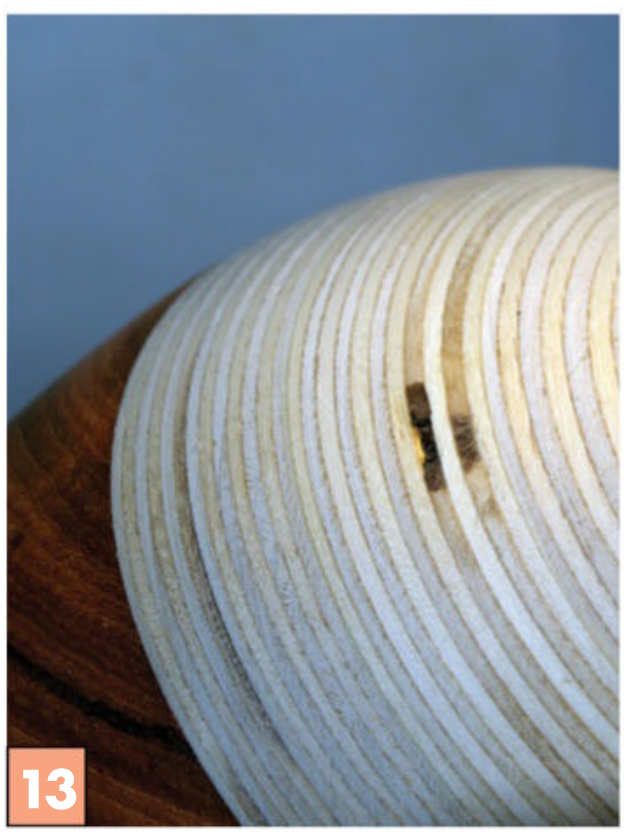
8 I find a blast of compressed air is the best way to remove dust and shavings from inside the hollow form. Alternatively, try using a bent spoon to scoop out the debris or try blowing through a straw. Because the gouge is scraping on its lower wing, and also because the glue in plywood blunts tools very quickly, you may soon tire of hollowing in this way and wish for a more specialised hollowing tool.


8

9 I now use the Rolly Munro mini hollowing tool almost exclusively and find it very controllable in use. Its articulated head is excellent for reaching under the shoulder or to the bottom of a hollow form, depending on how it is arranged. The circular cutter can be rotated to a fresh edge when it dulls, and is easy to resharpen. However, there are alternatives and instead of using a shielded cutting tool like the one I use, there are multi-tip angled, swan-neck and articulated multi-tip hollowing tools aplenty. It doesn't matter what you use as long as it removes the wood cleanly, safely and it is something you feel comfortable using. Take steady cuts, starting under the shoulder and gradually working down the side of the form towards the bottom. Stop frequently to remove shavings and to measure the wall thickness with callipers. Note that I've rotated the headstock a little so that I don't have to lean over the lathe bed to get into the hollow form.


9





Refining the external shape

10 With the hollowing down to an acceptable wall thickness, refine the shape of the outside with the bowl gouge.

11 Continue to remove material from the outside until you achieve the desired shape. Referring to the paper template may help achieve this, but keep an eye on wall thickness – you don't want any accidents at this stage.

12 Next, use a small 10mm bowl gouge to refine the shape of the opening before power sanding the whole of the outside, from 180 grit down to 400 grit.

13 Plywood often has flaws and gaps in the ply layers and it is essential to examine the whole surface to see if you have exposed any. If so, carefully fill with a matching filler and re-sand the surface. Fortunately, the appearance of plywood is such that repairs almost always blend in and become unnoticeable.

HANDY HINTS

1. When working with laminated pieces take precautions against glue failure. Full face protection is recommended. This is especially true when working with plywood, which is well-known to contain voids, and where the quality of the manufacturer's glue is unknown.

2. When working with a combination of pale and highly coloured woods, test if your sanding sealer will dissolve colour.

3. After sanding I now use a quick blast of compressed air to blow any highly coloured dust out of the grain of an adjacent pale timber. This is not generally recommended because it makes more dust airborne and hence more likely to be inhaled. Use with care and wear a good quality dust mask.

Shocking!

14 At this point I applied a generous coat of cellulose sanding sealer and, to my horror, found that the cellulose dissolved the red colour from the padauk and stained all of the plywood a rather delicate shade of pink. With no other remedy available, I bit the bullet and re-sanded the whole thing again and then sealed it much more carefully, taking care not to transfer colour from the padauk to the plywood.

The bottom

15 Using a 3mm parting tool, part off the hollow form from the waste in the chuck. Work carefully as you approach the centre and stop before parting all the way through. Make sure the bottom of the form is slightly concave so that it will sit on the outer edge without rocking. Stop the lathe and cut through the small stub with a hacksaw blade to complete the parting off. Remove the stub and sand the bottom on a 50mm power sanding disc held in the chuck. Hold the workpiece at an angle to the disc so you can sand all the way into the centre while retaining a crisp outer edge on the foot.

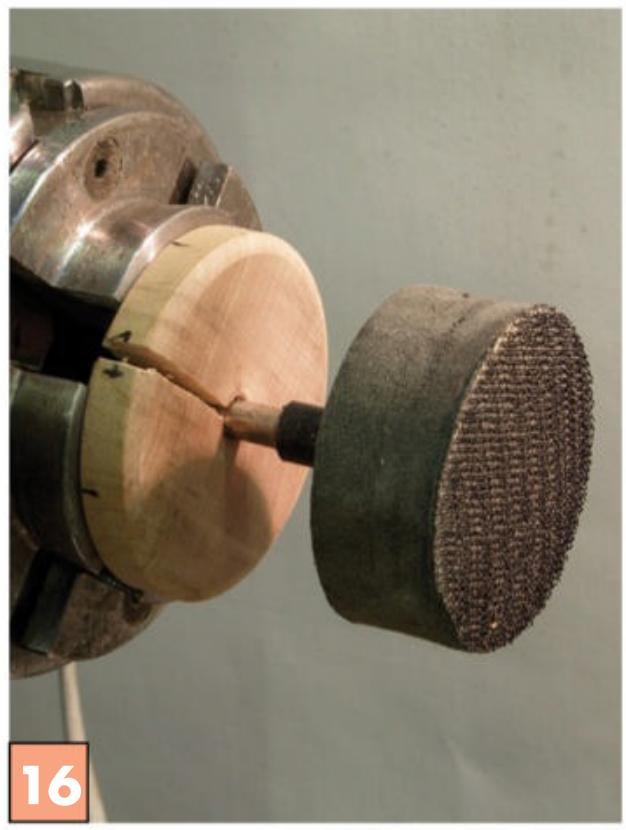
16 The chuck jaws do not close enough to grip the sanding disc so hold it in the chuck in a small disc of scrap wood. Drill a 6mm hole and make a saw cut into it. This allows the wood to flex slightly and grip the spindle when the chuck jaws are tightened.

17 Finish with a final polish using a buffing system to give it a good shine.

18 I used the same technique to make two smaller versions with dimensions two thirds and one third of the original. The sashes are made from roupala (Roupala brasiliensis) and ebony (Diospyros spp.) respectively. The contrast between the close-grained blonde birch plywood and the solid wood sash came out better than expected. All three are now in a private collection. W


14


15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17


18

Using Kumiko in Furniture

Kumiko is a delicate and sophisticated technique of assembling wooden pieces without the use of nails to make decorative panels. Thinly slit wooden pieces are grooved, punched and mortised, and then fitted individually using a plane, saw, chisel and other tools to make fine adjustments.

Most of the kumiko I make is intended to be hung on the wall as decorative art, but I do sometimes incorporate it into the boxes and furniture I make. When I first began to do this, I would make the box, for example, then make and fit the kumiko to it. But that's the wrong way to do it, because often you are left planing the kumiko frame down to fit the opening you have. That's undesirable for a few reasons. First, it weakens the frame. Second, you end up with the outer frame pieces thinner than the interior ones and the infill pieces. The panel begins to look unbalanced. Finally, it's just plain tedious and difficult to plane the outer frame parts of a kumiko panel. So, I now make the panel first, then build the box around it. This isn't as difficult as it sounds.

MARK, DON'T MEASURE

I actually learned this from making frames for decorative panels, but I should have known it from years of making furniture. Measuring introduces far more errors than marking does. So, when I am making a box or piece of furniture with kumiko in it, I make the kumiko panel, cut off the horns, then use the panel itself to determine the length of things like box sides, door rails, etc.

Exactly how you do this depends on the joinery involved. For example, to use kumiko in the lid of a mitred box, I mitre one end of the side, lay the kumiko down, align it with the top of the mitre, then mark the other end.

To determine the length of a door rail, I'd cut a tenon at one end, align the kumiko with the tenon's shoulder then mark the opposite end. Hmm…I think I see a pattern here. Cut the joint at one end, mark the other.

BUILD AROUND THE PANEL

This follows from marking rather than measuring. The best example of this from my own work is box 51 of the 52 boxes I made during the course of 52 weeks. There is kumiko in the plinth of the tea cabinet.

The first time I made box 51, I made the plinth first then made the kumiko to fit. That was frustrating and difficult. Every time I've made box 51 since, I've made the kumiko first then the plinth. Now it goes together without a hitch.

You can do the same for doors by sizing the rail length directly from the kumiko panel, then using the panel to help locate mortises for the rail tenons. Or, just use stub tenons on the lower rail and simply slide it up to the bottom of the panel.

▲ In this tea box, a kumiko panel lightens the appearance of the plinth.

MAKE THE OUTER FRAME THICKER

For large pieces of furniture with large panels, it's a good idea to make the four outer frame pieces thicker than the rest of the pieces in the panel. This makes the panel stronger, but also provides some visual weight, so that you don't jump from the wide parts of a door frame to the thin parts of the kumiko.

Think of the outer frame as a transition, in other words. An alternative is to make the frame pieces all the same thickness, but surround the kumiko frame with an intermediary and thicker "frame" to make the transition.

DON'T GO BIG

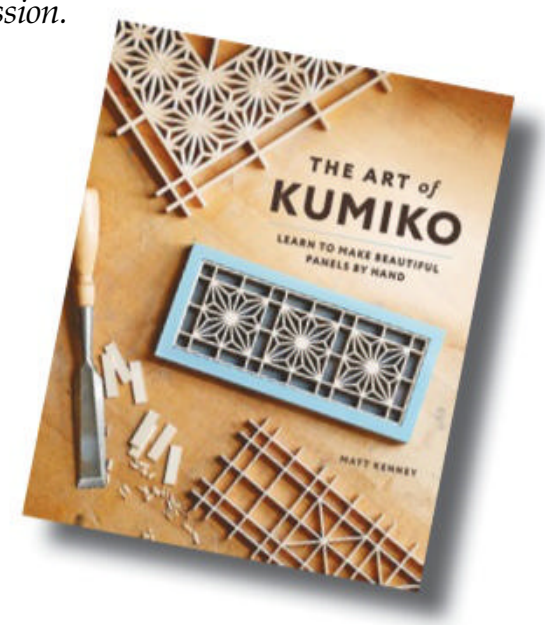
Here's a bit of advice that might be more personal preference than solid design principle. I think that as the size of the furniture grows, the size of the kumiko should not. Certainly, you can make larger panels, but keep the size of the infill patterns relatively small. A bunch of small hemp leaf patterns repeated in a large panel looks better than a large panel with just a few patterns, at least to my eye.

Also, don't go too thick with the parts. Even in full-size furniture, kumiko that is 3mm thick will look great. If you do go thicker, don't take it beyond 6mm. Personally, I'd keep it at 5mm thick at the most. Still, I'm sure that someone out there will make a stunning piece with really thick kumiko and really big patterns. W

Matt Kenney documented his year-long journey building boxes in his fabulous 52 Boxes in 52 Weeks (reviewed in Issue 146). This article is adapted from his latest book, The Art of Kumiko (Blue Hills Press). Used by permission.

▲ A kumiko door panel creates a focal point for a wall cabinet that has both a door and drawers.

▲ Backing a kumiko panel with paper highlights the graphic elements of the panel.



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For more information go to our review in Boys' Toys on page 12.

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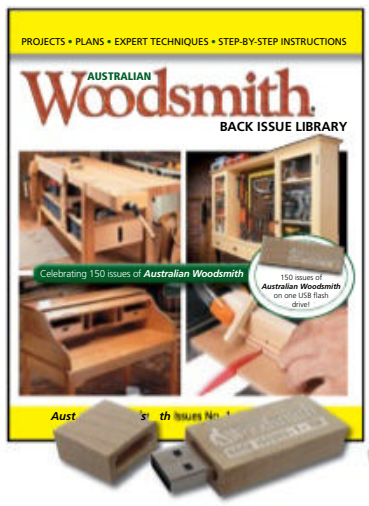

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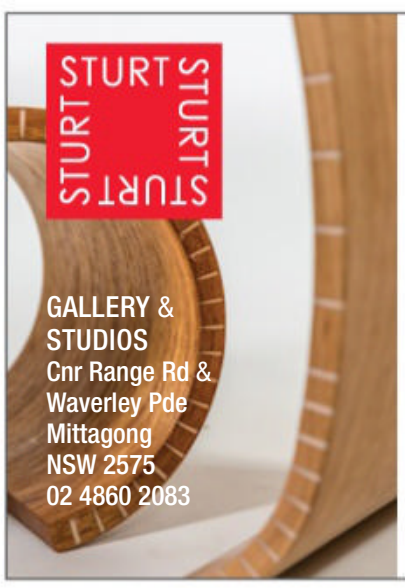

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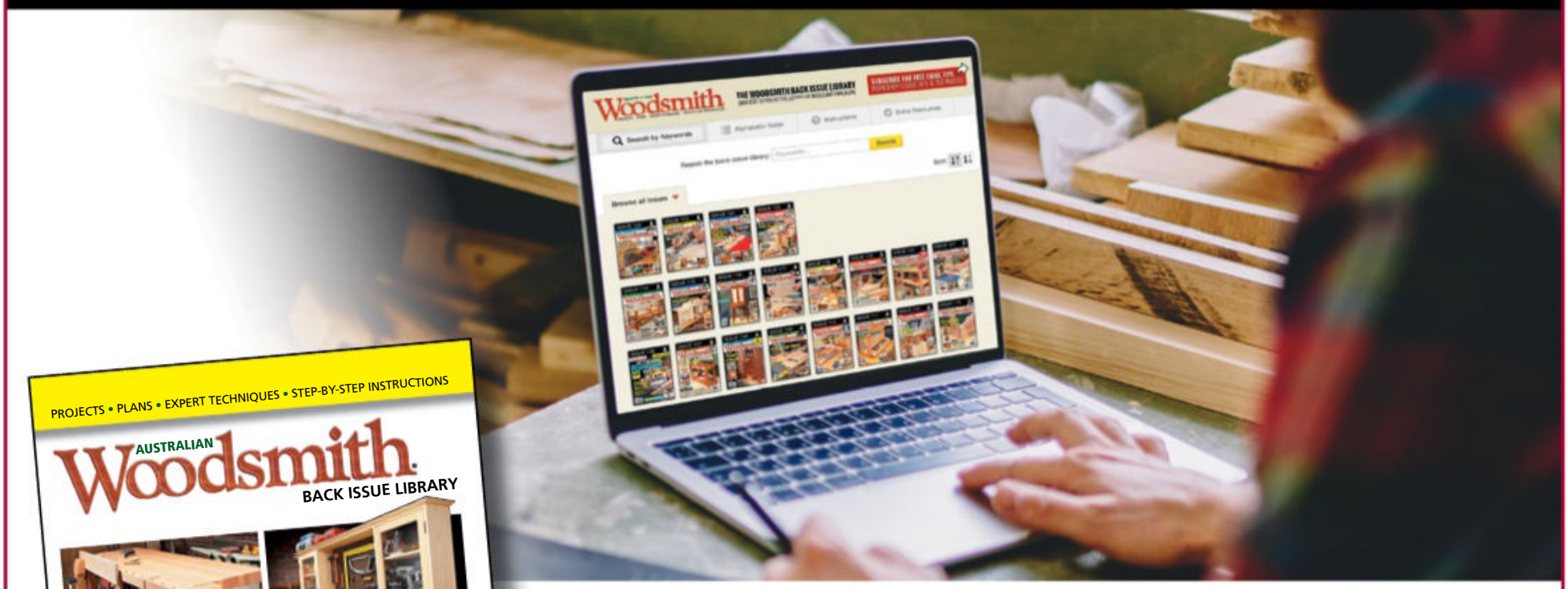

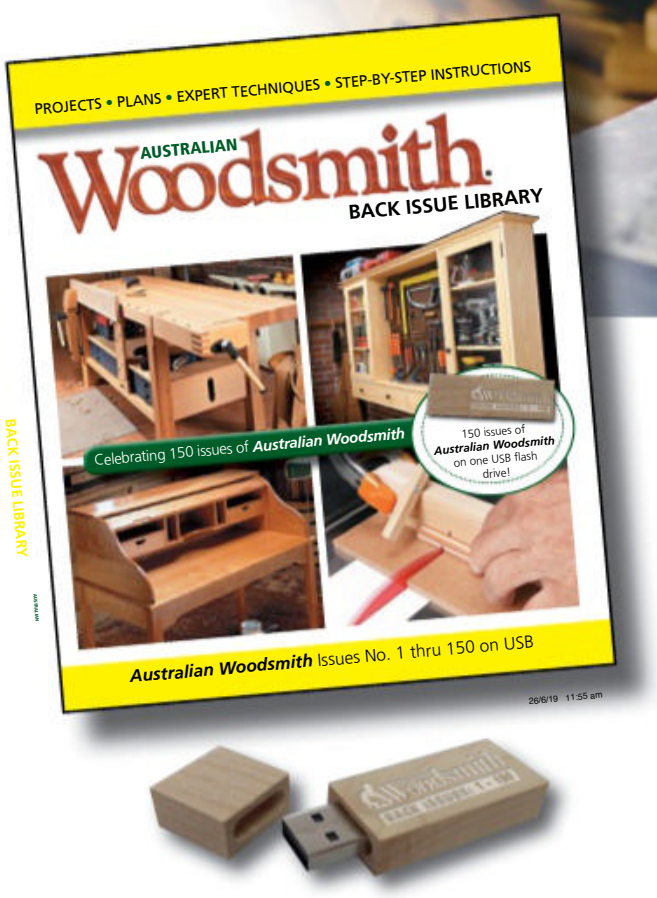

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Hegner Upgrade

Solid carbide CNC end mill bits can add new life to this old workhorse.

In Issue 92 we profiled the Hegner Finger Joint machine you see to the right. Sadly this excellent machine is no longer being manufactured by Hegner.

Lots of schools in New South Wales and Queensland bought the machine (from Wood Works Books & Tool Co Sydney) and have been incorporating it into their woodworking programs ever since.

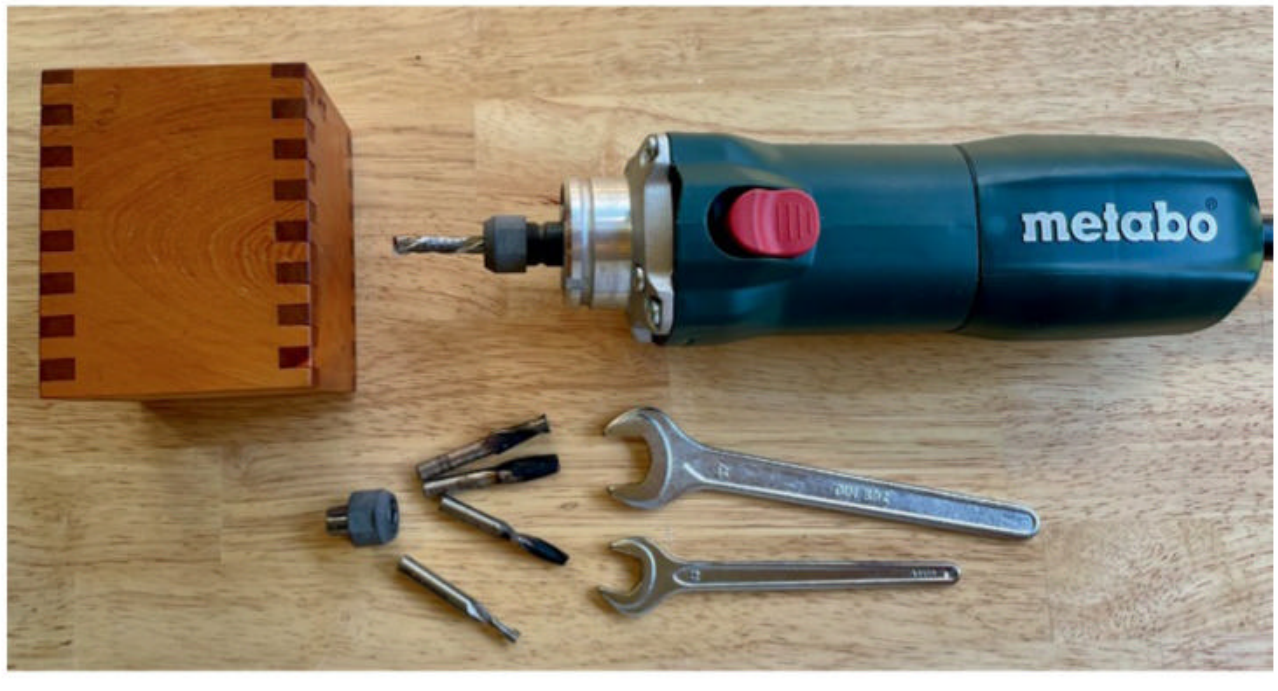
The machine quickly and accurately cuts finger joints in stock up to 16mm thick. The clever design keeps little fingers away from the cutters, making it a safe machine to use with students.

Not only is the machine no longer being made, the Kress motor that powers it is also no longer in production. Fortunately Metabo makes a die grinder that shares the same 43mm-dia collar as the Kress.

As you can see, the Metabo GE 710 Compact die grinder fits seamlessly into the Hegner body and accommodates the ¼"-dia shanks of the original high speed steel cutters.

The downside of the original design was that the supplied cutters soon grew dull if you machined anything that was harder than radiata pine.

CNC End Mill Bits. Computer Numerically Controlled (CNC) router bits are hard and sharp. They keep their edge for years!



The Metabo die grinder comes with two collets. The 6mm collet allows you to mount solid carbide CNC bits and machine hardwoods with ease.

CNC END MILL BITS

The upside of the CNC router table revolution is that solid carbide end mill bits are cheaper than ever ($29 for the 6mm bit above). These bits make fast work of the hardest Australian timbers.

The Metabo die grinder comes with two collets, a ¼" and a 6mm. The standard shank size for CNC mill bits is 6mm. This means that you can upgrade your Hegner by inserting a 6mm collet and then switching across to CNC end mill bits.

Sharp eyes will notice that I have done away with the flimsy clamps that came in the original box and mounted the jig on a board. I also knurled a larger diameter locking nut so that adjustment is easier.

For more information about solid carbide CNC end mill bits turn to page 73.

HARDWARE & SUPPLIES SOURCES

SURCARE

Surcare has a list of Q&As on their website that is sure to answer any question you have about their excellent sanders. Surcare recommends that hook and loop abrasive discs without holes should be used on the clover platten. If you use the more common discs with holes, the hooks on the platten will wear out. The Sandpaper Man is the place to go to get any and every abrasive product you may need. At a pinch you can cut down 178mm-dia flexO-vit sanding discs from Bunnings. They come in packs of 5.

STANLEY 10½

Carbatec now stocks a neat hand tool maintenance kit that includes three grades of Klingspor Schleiffix flexible rubber abrasive blocks (60-, 120- and 240-grit) and a bottle of camellia oil. Schleiffix blocks are the perfect abrasive medium for renovating old tools and removing rust from your table saw. The silicon carbide abrasive that allows these blocks to work so well is embedded all the way through the block.

MOISTURE METERS

The Dr Meter can be purchased online, while the Crommelin pin moisture meter is available from Bunnings. The more professional pinless Orion range of moisture meters is available from Kevmor Trade Supplies.

KNIFE MAKING

Everything you need to start your journey as a knife maker can be found on the Nordic Edge website. You can start by simply buying some cutler's rivets and replacing the handles on an old kitchen knife. Then you could buy a kit. The final step will be to do a course and forge your own knife!

AVOIDING KICKBACK

The T-track and hold-down clamps featured in the sled on page 31 are available from Carbatec.

WINE RACK

Bunnings used to stock Z-clips; however, the product is now cheaper online from Amazon Australia.

ARTS & CRAFTS DOOR

This door features three panels of insulated glass. Insulated glass not only keeps heat and cold at bay, it also insulates against traffic noise. Some panes are made to size (a cheaper option) however an online search will help you locate a glazier who can make your panes to size.

ENGLISH WORKBENCH

The Lake Erie Toolworks rock maple wood vice kit costs around US$330 (plus postage) and is available online. The 2½" thread on this vice is cut with a German-made wooden thread cutting tool available online from Dieter Schmid Fine Tools. The thread cutter costs a staggering €1180.90! Timbecon stocks most fastcap products, however the 75mm Powerhead screws needed for this bench are only available on eBay.

The bench will work just fine with a more economical cast iron vice from Carbatec or Timbecon.

SOURCES CONTACT DETAILS

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Jim Black,
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▲ *Keepsake Box* Issue 91
Don Paviour-Smith, Davistown NSW

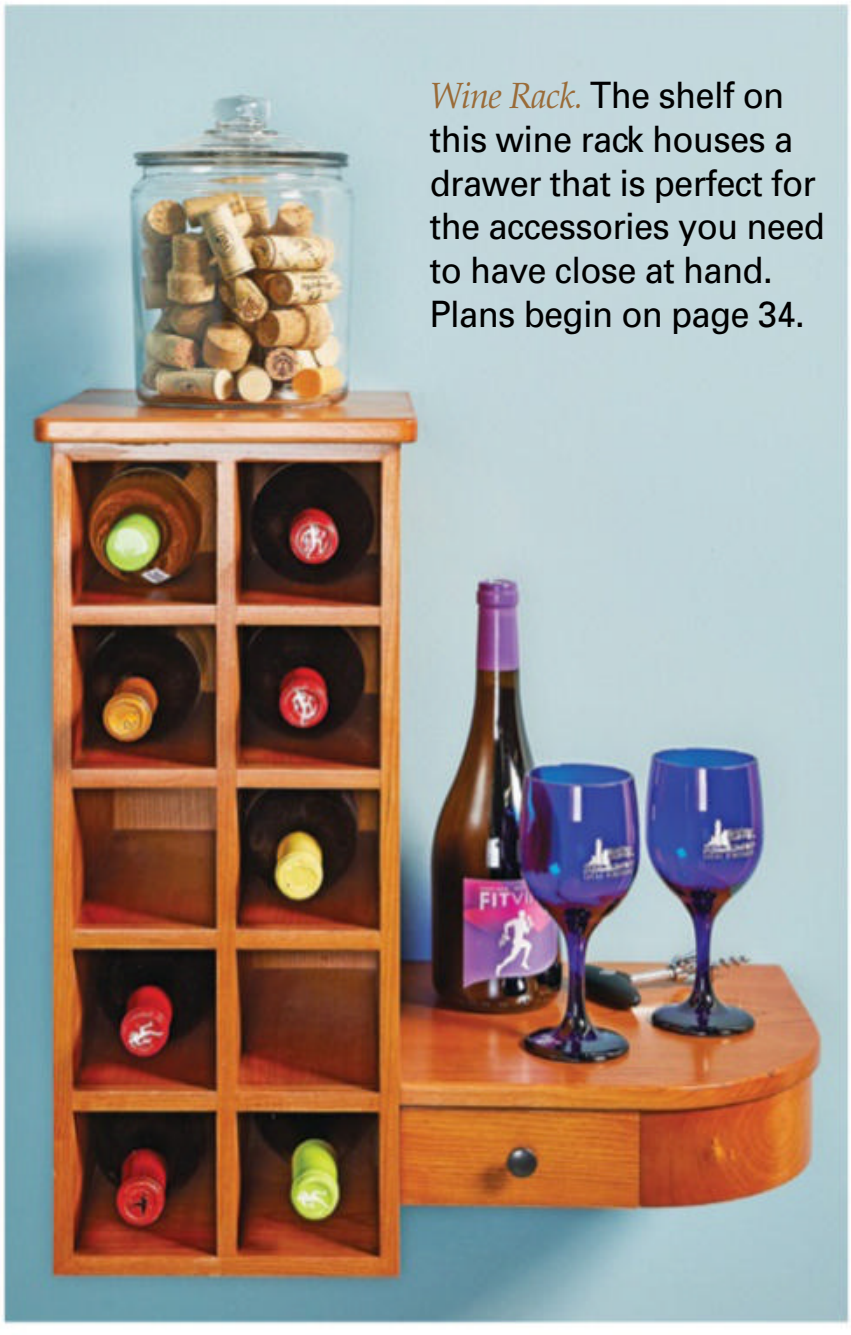
▲ *Barn Door Cabinet* Issue 154 Marty Koopmans, Indented Head VIC

If you have made an *Australian Woodsmith* project, we'd like to see it. Email a quality image to us at julie@australianwoodsmith.com.au
Make sure the photo's resolution is high, the light is good and the project is free of clutter. Also, tell us what timber you use.

◀ *Arts & Crafts Entry Door.* Create a welcoming entrance to your home with this attractive door. Solid-wood construction and strong mortise and tenon joinery mean it will last for years. Turn to page 40 to learn more about it.

▲ *Birch.* Bob Chapman turns hollow forms in birch ply. Step-by-step instructions start on page 60.

Final details



Wine Rack. The shelf on this wine rack houses a drawer that is perfect for the accessories you need to have close at hand. Plans begin on page 34.

▲ *English Workbench.* This modest-sized bench has thick top planks and massive aprons, making it a solid, sturdy bench. To get started turn to page 50.

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TiGer 2500 Wetstone Grinder

- German design & technology
- 250mm stone & 200mm hone wheel
- 90rpm grinding stone speed
- Powerful 200W, 240V motor
- Includes straight edge jig, setting gauge & honing paste

PACKAGE DEALS ALSO AVAILABLE

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Order Code: W868

$319 | 2 YEAR WARRANTY

X8 Industrial Bench Grinder

- Ø200mm wheels
- Fine/coarse grit
- 1hp, 240V motor

EXTRA MACHINERY

Order Code: G159

$236.50

T-13S Bench Mount Thicknesser

- 330 x 152mm capacity
- Helical cutter head with HSS inserts
- Smooth & quieter cutting
- 2.4hp, 240V motor

ANTI-KICK BACK FINGERS

Order Code: W815

$880 | 2 YEAR WARRANTY

bts 900x - Belt & Disc Linisher Sander

- 100 x 915mm belt
- Ø150mm disc
- Tilting table & mitre guide
- 370W 240V motor

scheppach

Order Code: L105

$275 | 2 YEAR WARRANTY

OS-58 - Vertical Oscillating Bench Bobbin Sander

- 1/2", 3/4", 1", 1-1/2", 2" & 3"
- 370 x 290mm cast iron table
- Rotating & oscillating
- 450W / 240V motor

scheppach

Order Code: W843

$319 | 2 YEAR WARRANTY

DS300 Bench Disc Sander

- 305mm sanding disc
- 435 x 225mm table size
- 0.75kW / 1hp 240V motor
- Includes: mitre guide & brake

WOODFAST

Order Code: L1335

$352 | 2 YEAR WARRANTY

Deco XL Variable Speed Scroll Saw

- 406mm throat capacity
- Tilting table 0-45°
- V125W / 240V motor
- Includes LED light, air blower, flexidrive shaft with chuck & 64 piece sanding kit

VARIABLE BLADE SPEEDS

scheppach

Order Code: W350

$297 | 2 YEAR WARRANTY

LT-227 Hydraulic Lifter Trolley

- 227kg load capacity
- 708 x 450mm table
- 225-710mm table height
- 2 fixed & 2 swivel wheels with brakes
- Includes table rubber mat

Order Code: J049

$352

WL-20 Swivel Head Wood Lathe

- Ø370 x 1100mm turning capacity
- Swivelling headstock
- Variable speed 500-2000rpm
- 0.75kW/1hp, 240V motor
- Includes bowl turning attachment faceplate, drive & live centres toolrest & stand

Order Code: W384

$792

HS120 - Table Saw

- Ø315mm TCT blade
- 550 x 800mm work table
- Tilt arbor 45°
- 3hp, 240V motor

SLIDING TABLE WITH MITRE GUIDE

scheppach

Order Code: W443

$572 | 2 YEAR WARRANTY

CALL INTO OUR SHOWROOM FOR PROFESSIONAL ADVICE ON HAFCO TOOLS & EQUIPMENT

STEVE
Staff Member

BD-325 Bench Drill

- 16mm drill capacity
- 2MT spindle
- 12 spindle speeds
- Swivel & tilt table
- 1hp, 240V motor

TABLE TILTS LEFT & RIGHT TO 45° & ROTATES 360°

Order Code: D590

$385

PD-325 Pedestal Drill

- 16mm drill capacity
- 2MT spindle
- 12 spindle speeds
- Swivel & tilt table
- 1hp, 240V motor

TABLE TILTS LEFT & RIGHT TO 45° & ROTATES 360°

Order Code: D592

$462

PP-10HD Workshop Hydraulic Bench Type Press

- 10 Tonne
- Bench mount
- 180mm ram stroke
- Adjust. ram position

METALMASTER

Order Code: P141

$429

WBS-3D Steel Work Bench

- 2000 x 640 x 870mm
- 500kg load capacity
- Bearing slide drawers
- 3 x lockable drawers

OTHER TYPES AVAILABLE

Order Code: A380

$495

UNIQUE PROMO CODE

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Specifications & Prices are subject to change without notification. All prices include GST and valid until 05-08-21

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