

WOODWORKING CRAFTS

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Routing tips **Animal jigsaw puzzles** Rustic table **Home improvements**



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WOODWORKING CRAFTS

Issue 73



Well readers, spring is upon us, and it is my favourite time of year. We emerge from the brown and sticky winter months into the wonderful and colourful season where everything starts to flourish and grow. By brown and sticky, I mean the trees that are devoid of leaves and blossom and are just sticks that make the winter so dull and depressing, but also give us the contrast so we can enjoy watching everything spring into life again. It is also the season when it is probably warm enough for us hobby woodworkers to venture back out into our sheds again after they have thawed out from their winter frosts. Hopefully you did remember to 'winterise' your equipment and tools so the ravages of condensation and resulting rust and corrosion will not have damaged them. It would also have been a good idea to have a frost protection heater in action to take the edge off the cold.

Now you are out in your warmed-up workshop it is the time to gather some ideas of what to make. This is where we come in and help to inspire you with our articles for projects, techniques and shop tips. This issue is no exception, and we have a raft of information for you so you can start making just as soon as you have read this magazine.

For inside the home we have a great article on an upcycled woven chair that will show you how to revive an old piece of furniture, and then on to a bunch of making projects that will look great in any home. The MDF bookcase will look good in a modern or traditional house as will the veneered octagonal clock and the dovetailed writing desk,

which has a place for everything. For more traditional homes you will want to make the rustic oak table and the Tudor-style bench, you will also want to break out your carving tools to make the Celtic cross. For more practical ideas you may be interested in our pizza peel that can be used for other things apart from making pizzas; rout some lettering in it to make a sign, for example. The kids in your house will want you to make them some animal puzzles, which will keep them amused and quiet for a while. Projects for outside the home include how to make posts and spindles to refurbish a porch or even make a new one; this will give your house a whole new look which will be the envy of your neighbours. If you want to further decorate outside, our article on routed lettering will help you make an attractive house sign, and your postman and visitors will also thank you for having one.

For the workshop we show you how to do a quick plane tune-up and how to recycle a bench. We also have an article on how to create mouldings for use in the home to give it a stylish edge or on furniture, and our table routing article will show you how to expand the use of your hand-held router. When you have made something the last thing to do is to give it a finish that will complement all the hard work you have put in to create it, so read how to use water-based finishes to do just that.

Happy 'blooming' woodworking! Alan Goodsell

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Woodworking is an inherently dangerous pursuit. Readers should not attempt the procedures described herein without seeking training and information on the safe use of tools and machines, and all readers should observe current safety legislation.



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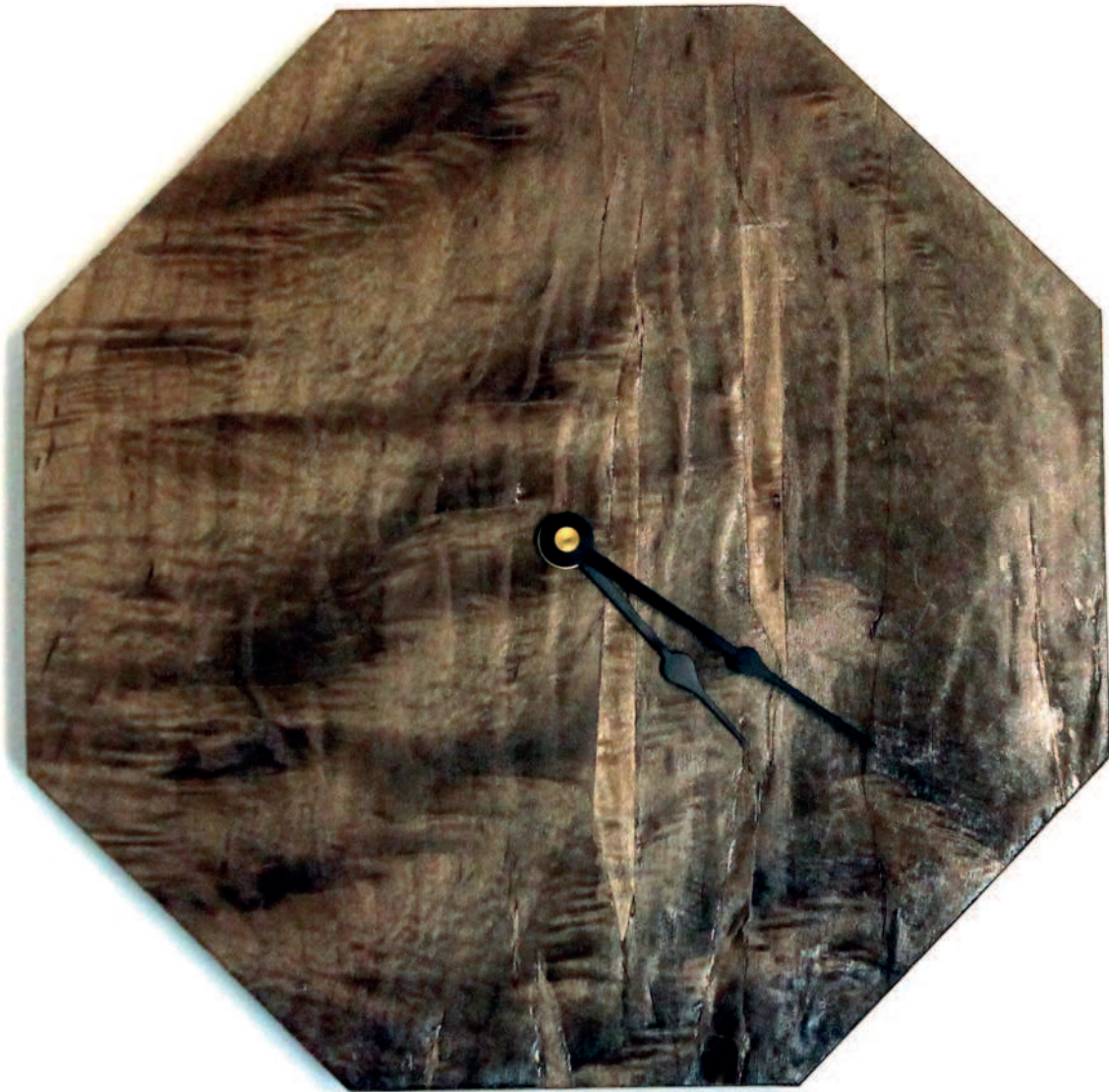


WOODWORKING CRAFTS

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VENEERED OCTAGONAL CLOCK

Charles Mak demonstrates easy techniques for cutting octagons and applying veneer

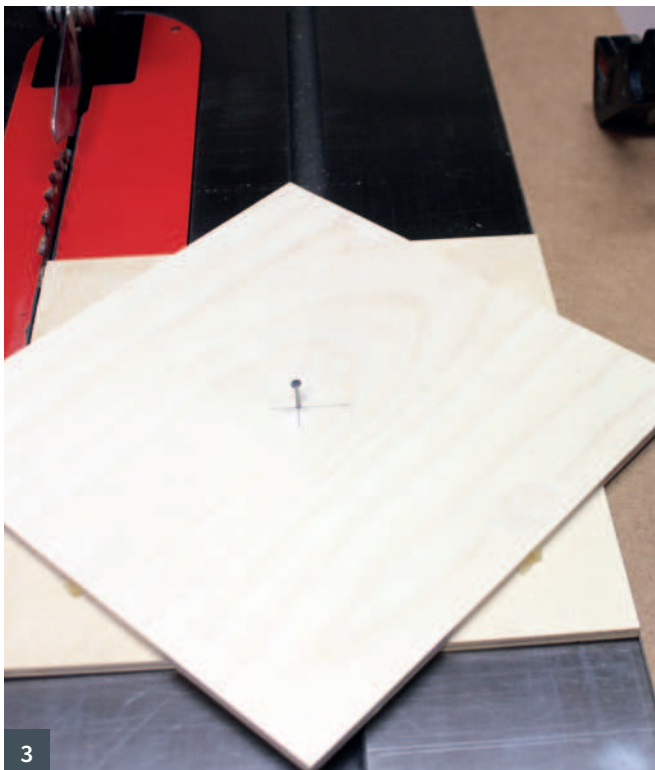


Veneering is the technique of applying a thin veneer – raw or engineered – to a substrate, such as plywood, MDF, poplar or pine. The common adhesives for bonding include hide glue, contact cement and PVA glue. It may sound complicated to those who have never done it before, but as I will show here, you can do veneering with or without any special equipment. I will make an octagonal wall clock to illustrate the basic veneering techniques, employing two different application methods: a vacuum press, and a simple, clamp-free method.

The wall-mounted clock

The clock consists of three main components: the octagonal body, side strips and clock movement. We'll start with the octagon.

Octagons can be cut out in many ways, using a saw such as a table or mitre saw. I will cover two simple tablesaw methods.

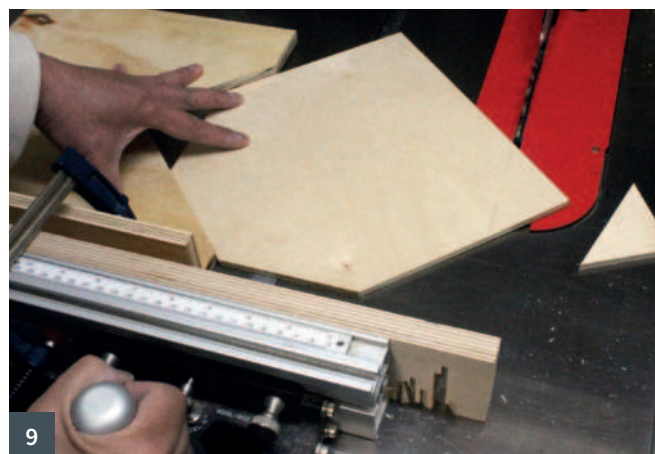
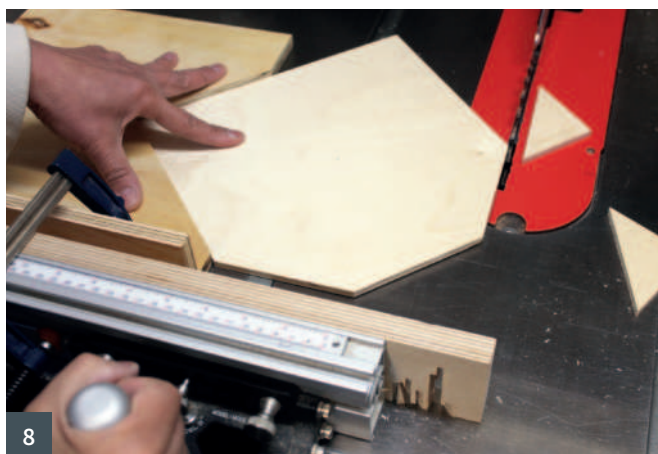
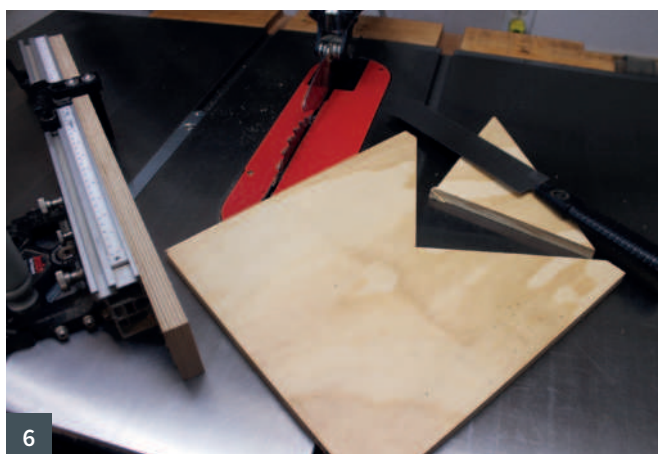
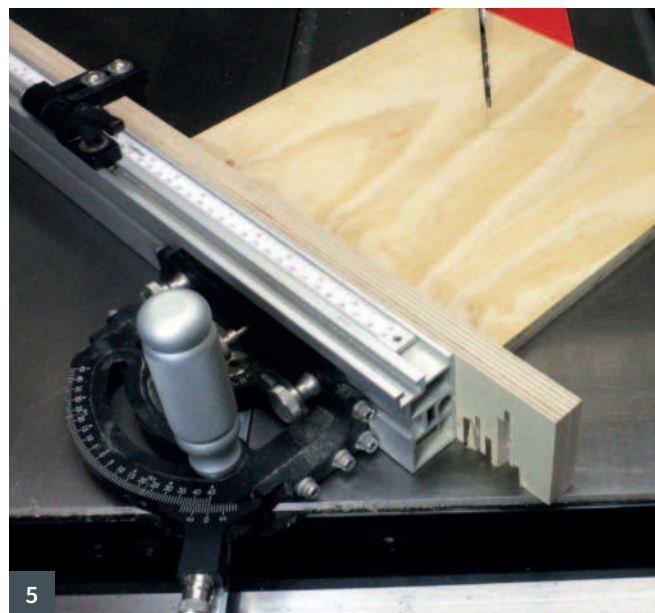
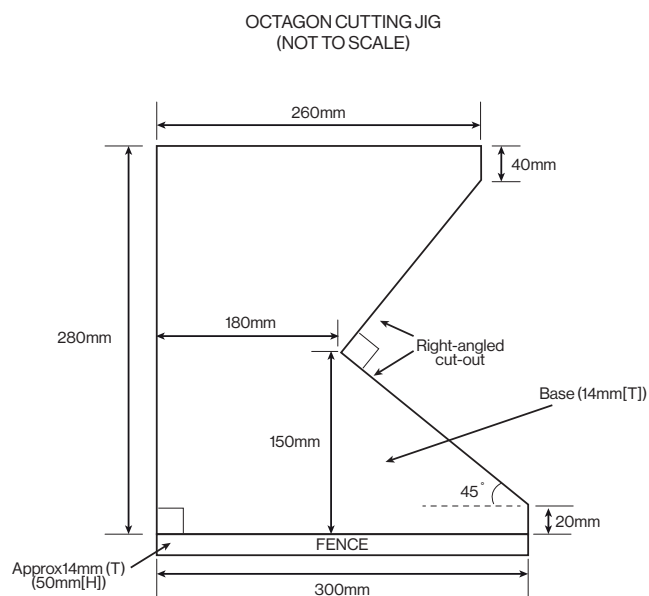


Cutting method 1: using two square blanks

- 1 To cut the body of the clock in an octagonal shape, my first method requires two identical square blanks, a finishing nail and a glue gun. First, find the centre of one of the square blanks.
- 2 Hold the two blanks as a stack, flush on all sides. Put a nail in the centre through the top blank partially into the bottom blank. Set the top piece at 45° to the bottom piece with the help of a combo square,

and hot glue the blanks in place, as shown here.

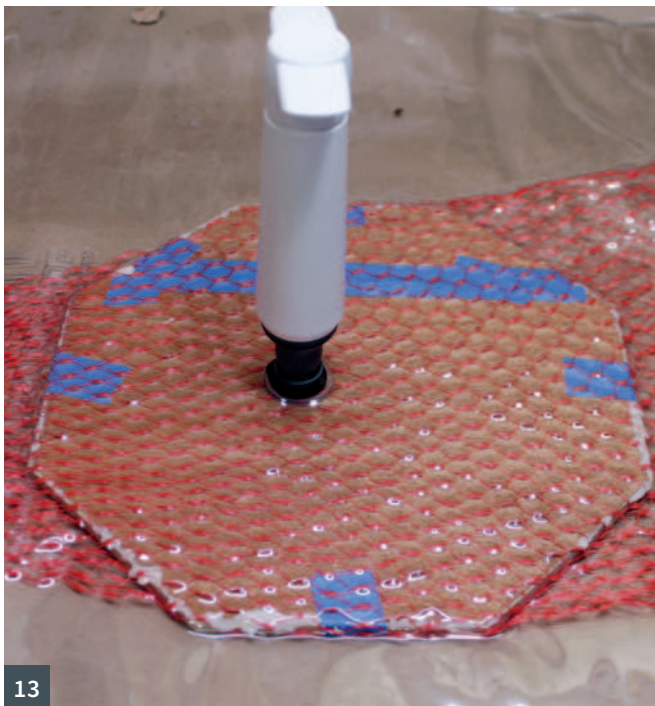
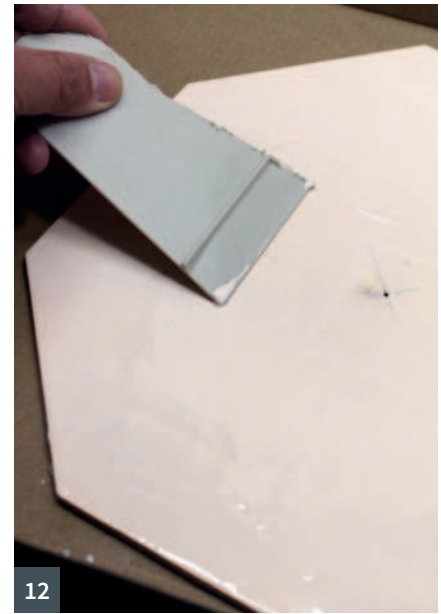
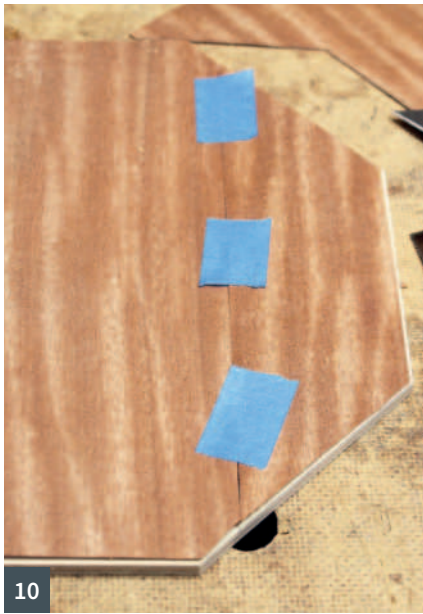
- 3 Secure a thin, wide strip against the saw fence as an auxiliary fence, and after setting the auxiliary fence in position, trim off the first corner.
- 4 Rotate the stack and cut off the second corner. Repeat this step to cut off the last two corners to complete an octagon.



Cutting method 2: using an octagon jig

- 5 For the second method, I built a simple jig that can hold a square blank at 45° to the saw blade (see **diagram above**). To make the jig, cut a 90° V-notch on a square or rectangular plywood base...
- 6 ...as shown here. Note: the safety guard here and in the following photos has been removed for clarity.

- 7 Glue and nail a strip of wood to the base to act as a fence. To use the jig, position it at the desired distance from the saw blade and clamp it to the mitre gauge. Then follow the next steps to cut an octagon.
- 8 Place the square blank in the V-notch, and trim the first corner.
- 9 Rotate the blank to cut the second corner. Repeat this step two more times to form an octagon.



Adding veneer on both sides of the work

To avoid warping due to wood movement, it is necessary to apply the veneer to both sides of a large surface. The technique is demonstrated here. The veneer will be applied in this order: first to the bottom of the body, then the sides, and lastly the top.

Clamps and cauls are a common way of holding a veneer to a surface until the glue is dried. For this project, I will illustrate two other gluing methods, starting with a vacuum press.

Apply veneer to the bottom of the body using a vacuum press

10 Prepare the veneer slightly smaller than the octagon, so it does not overhang any of the edges during pressing.

11 When scoring the veneer with a saw or knife, start with a light stroke to avoid following any grain, followed by a medium and a final heavy cut.

12 Spread PVA glue onto the bottom side of the body (but no glue on the veneer).

13 Apply the veneer to the substrate in position. Sheathe the glue-up with the breather netting, and place the stack inside the vacuum bag. Close the open end of the bag with the sealing tape, and pump the air from the bag. Let the stack remain under pressure in the bag for 10 hours or so before removing the stack from the bag.

Cut and glue the side strips

14 The side strips conceal the clock unit when hung on the wall. Prepare six strips of wood, ends cut at 22.5°, and glue them to the veneered bottom.



Apply veneer to the side strips

- 15** Cut eight veneer strips to the same length as the side strips.
To glue them to the sides, we need to use a different method from the vacuum press, as described below.

Using an iron-on method

- 16** Apply PVA glue to both the veneer strips and the side strips.
Wet the back side of the veneer strips to prevent curling.
Let the glue dry for an hour or so.
- 17** Set the cloth iron to a medium heat setting (polyester/wool, or about 150°C), and position the veneer strip on the side strip.
Press the iron on the veneer to activate the glue. Repeat steps 16 and 17 until all the veneer strips are glued in place.
- 18** Then trim all the veneer strips flush.

Apply veneer to the top

- 19** Cut the top veneer to size, and use the iron-on method again to glue the veneer to the top of the body.
- 20** After the bonding is completed, trim everything flush, and drill a centre hole for the clock's shaft.

Apply a finish and install the clock movement

Ease all the sharp edges and spray a few coats of shellac or any clear finish of your choice to bring out the character of the veneer. I chose to leave the face plain without numerals, and installed the clock unit, just in time for setting the clock for the end to daylight time.

With the success of this project aimed at developing your basic veneering skill, and building your confidence, you are now equipped to attempt more challenging veneer pieces!

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PIZZA PEEL

In the pursuit of perfect homecooked pizza, Kevin Alviti makes a handy wooden utensil



Food is more than a passion in this house – it's an obsession. My wife and I seem to be blessed with three children that will eat anything and everything, as well as loving being involved with making the food.

When I suggested we build an earth pizza oven together last summer they jumped at the chance. We managed to get it ready for our middle child, Melissa's, birthday party where she had asked for a few friends round for games and homecooked pizza. A big risk using it for the first time with guests, especially as some eight-year-olds aren't very forgiving when it comes to burnt crusts. And the first few certainly had more than a smidge of charcoal flavour to them...

One thing became quickly apparent when we were trying to keep the pizzas coming for hungry mouths, that having the children make them then transferring them into the oven was hard work, the dough would stick and the pizzas would look ruined before I had a chance to burn them.

We have since come to realise that we need a few tools to do this job effectively, besides the mud oven we lovingly created. One is a metal pizza peel for adjusting and moving the pizzas once they're in the oven; this slips under them easily and is just the perfect tool to keep them turning when a pizza cooks in under two minutes.

The other was to have a number of wooden peels (like breadboards with handles) to spread the dough out and assemble the pizzas on,

this way more children could be building pizzas at the same time, rather than trying to transfer (badly) a pizza from baking parchment to a board to the oven. A pizza made on a wooden peel, with coarse semolina flour under it, will then slip easily from the board onto the brick floor of the oven to cook.

I decided that as we have three children it was easiest to make three peels and, although I was tempted to personalise them with their names, I decided to go with the word 'PIZZA' carved on the handles instead. It will save arguments in the future if they don't always have to have 'their one' (a lesson hard-learned from a decade of parenting).

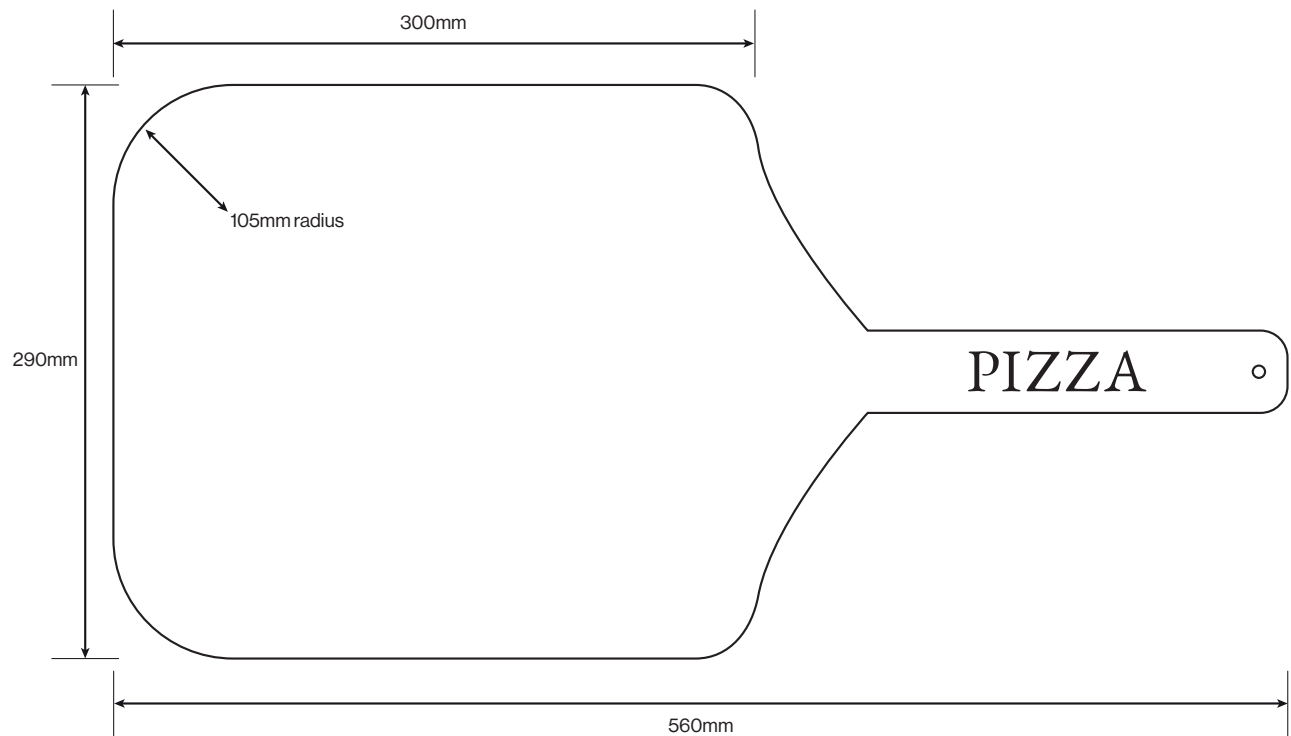
I chose to make the peels from some sweet chestnut. The wood is generally fairly stable and tends to stay flat when dry (hopefully), although slightly softer than something like oak, but we won't use the peels to cut the pizzas on. This timber is also coppiced locally so is a sustainable source of timber and I would like to use more of it. It certainly could be argued that some narrower jointed boards might be more stable and less likely to move, but I have used one breadboard of a similar size and shape for 10 years now and it hasn't moved at all.

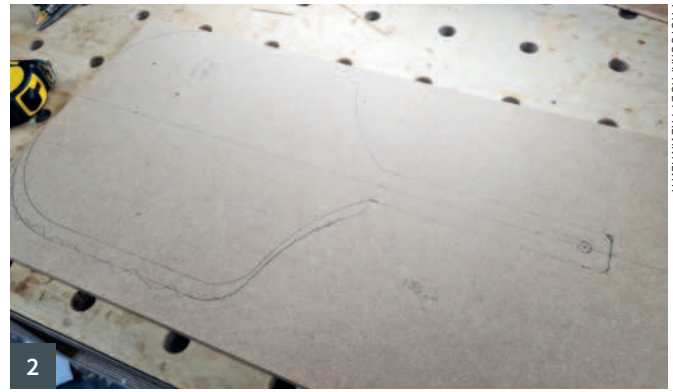
When I came to set the template out on the timber slab I had bought for this project I discovered I could make five peels if I was clever with the layout. As I make my living from making big bits of wood smaller, I decided to make five which would leave two peels to sell at a later date.

YOU WILL NEED

TOOLS:

- Thicknesser planer (optional)
- Tablesaw (optional)
- Sander (optional)
- Bandsaw (optional)
- Jigsaw
- Router (roundover bit and bearing-guided copy bit)
- Drill
- Hand planes
- 12mm Forstner bit
- Carving tools
- Carving mallet
- Straight double bevel chisel, 13mm
- Straight double bevel chisel, 6mm
- No.6 gouge, 7mm
- No.3 gouge, 5mm
- No.3 fishtail gouge, 6mm





Making the template

- 1 As this pizza peel was going to be made to fit our oven, I thought it was fairly important to make sure it would fit and have the correct dimensions, especially the length of the handle to make sure the pizzas could be thrown in there quite easily. Around 560mm seemed the right length and keeping the width to 300mm gives the right size for a good pizza.
- 2 As I wanted to make a set of these, spending some time on the template was really important. I had some offcuts of 9mm MDF, which shapes easily for this type of thing. Ply would work equally as well. If you do use MDF, make sure you use good extraction and PPE as the dust is horrible from it.
- 3 Measure and mark up the template accurately, making sure it's as symmetrical as possible. I used a tablesaw to rip it to a parallel width and then a bandsaw to cut the curves. A coping saw or a jigsaw could also be used instead.
- 4 Sand all the edges to make sure all they all flow from one to another. As this template will be exactly how the other pizza peels will turn

out, it is worth spending time on this step to save work later down the road.

Making the blanks

- 5 Select your wood for the project. I used some locally grown and processed sweet chestnut. I was lucky and found a board that was relatively thin but wide. I managed to use the template to nest the five peels I wanted out of the one board. If this board had been narrow enough to run through my planer first I would have been tempted to do that to more clearly see the grain I was working with when planning where to cut, but it would have resulted in more waste.
- 6 I then roughed out each peel using the jigsaw. I try to keep about 3–5mm away from the line, which will make it easier when routing it out later. The tighter curves sometimes need to be approached with relief cuts. Of course, if you were only making one peel without using a template then it would be fine to cut right up to the line now.



- 7** I then ran each blank through my thicknesser a few times to smooth both sides. This also had the advantage that I could plane one thinner where the slab dipped due to milling, and not have to have them all that thickness. Be careful if your planer suffers from snipe, it could be worth cutting them longer if this is the case. This could also be a great exercise with using a hand plane. As this peel is just for making the pizzas and putting them in the oven having them flat is fine; if it was for manoeuvring the pizzas in the oven then the whole thing would be better off wedge-shaped. I find a metal peel works better for this operation though.
- 8** Fix the template to one of the peel blanks. A good tip here is to use a screw where the hole will be drilled for hanging it. This provides one really good fixing point.
- 9** I also use a few clamps to hold the peel in place while the piece is routed, getting halfway before moving the clamps again. My MFT-style workbench works well here as the holes provide easy clamping options, but it's also simple to do with the edge of a workbench. You could also use a hot melt glue gun to join

the two pieces together, but I find this a bit slow.

- 10** My copying router bit has the bearing at the bottom (bought for a job extending a fireplace surround years ago) so the template goes on the underside. There are also bits that have the bearing at the top. Make sure the template lines up with the bearing whichever style you have, it's a shame to put effort into making a good template then wrecking it with a slip in setting up.
- 11** Even with extraction, this can produce a lot of shavings. Go at it slowly and make sure you approach the workpiece in the right rotation so the bit doesn't snatch the workpiece, in this case, left to right. This could also be performed well on a router table, taking care to feed it the right way and keep hands well away from the cutting edges.

Shaping

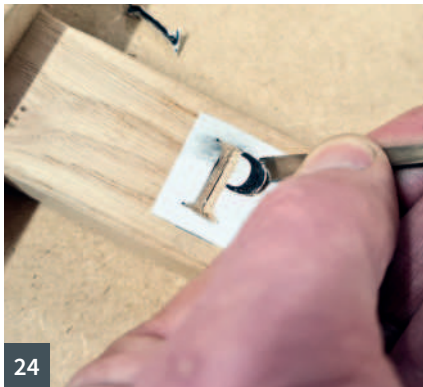
- 12** With the peels all routed to size it's time to work on the last bit of shaping. Mark a line on both sides of the bottom edge, about 18mm in. This will be to chamfer the edge to make it easier to slip the pizzas in the oven.



- 13** Plane up to this line. A sharp plane shouldn't struggle across the grain like this; take care not to tear out at the end of the stroke, the curve should prevent this. Then plane the corners, easing the chamfer to nothing as it goes back up the board, blending it all together. Repeat for the underside as well.
- 14** Using a 6mm roundover bit in a router, set it so it only ever so slightly softens the edge and do this for all the other edges on the pizza peel. You can of course soften it more, potentially making it nicer to hold, but aesthetically it's not so pleasing if it's softened more – style over function if you will.
- 15** Bore a 12mm hole in one end. This is to hang it with or to add a cord to hang it. I used a Forstner bit in my pillar drill; the hole made with the screw when fixing the template earlier makes a starting point. Make sure you have a scrap piece tight against the back of the workpiece to prevent tear-out.
- 16** Sand the workpiece. Depending on how smooth it is, work up through the grits to get to around 220, which is more than enough for a board like this.

Letter carving

- 17** Work out the size of the lettering for the handle. I settled on Bold Times New Roman at 75pt. If picking your own font try to go for one with a serif, it seems like they were designed with carving in mind. If you're new to letter carving, practise on an offcut first.
- 18** Take time to position the letters correctly. I put witness marks to line up the paper when the glue is applied that I'll sand off later. Use a spray-mount adhesive to fix it to the wood. This is the part of the project where I often think the last 10% of effort makes it look 50% better, letter carving is surprisingly easy so don't be put off.
- 19** The only part of the carving you'll need a light mallet for is to split the thicker parts of the letters. A soft tap is all that is required, use the 13mm double bevelled straight chisel. This sets the depth of the writing so don't go too deep. Do this for all the letters in turn.
- 20** Now work from each side of the letter towards the centre. Hand pressure only is needed for this, holding the chisel in both hands, almost like they're in tension between each other, this gives good control. Push towards the centre cut from both sides, removing the chip that results.



- 21** Now, with the same straight chisel, use slicing cuts on the finer parts of the lettering, making sure you don't leave the lines.
- 22** Use the No.3 fishtail gouge, 6mm to cut the curves on the serifs. These should link up with the other cuts and the waste should come free.
- 23** The real advantage of a word like PIZZA is there is only one curve on the whole word, on the top of the letter P. Use a No.6 gouge, 7mm to strike the middle of the curve, as you did for the fatter parts of the other letters.
- 24** Use a shallow No.3 gouge, 5mm to make the curved slicing cuts up to the line, use the chisel the other way up to do the inside of the letter.
- 25** Make sure the letter carving is tidy and clean with no wispy bits. Then remove the paper, and if a spray mount has been used then a wipe of white spirits will remove it easily.

Finishing

- 26** Apply your finish of choice. I went for a wax oil that is completely food safe, a mix of coconut oil and carnauba wax (called Uulki Wax).

This is simply wiped on, with the excess wiped off straight away afterwards. Once it's dry, build up multiple layers for more protection.

- 27** To get the wax into the writing it is good to use a soft brush, an old toothbrush works well.

As these are best used to slip the pizza into the oven, I'd recommend not using them to cut the pizzas on; use a dedicated board for this instead.



LAMINATED ROUBO BENCH

Splash out on materials for new projects or replace a faithful, but tired, old bench?

With a bit of nifty recycling, Matt Morse finds a clever way of doing both

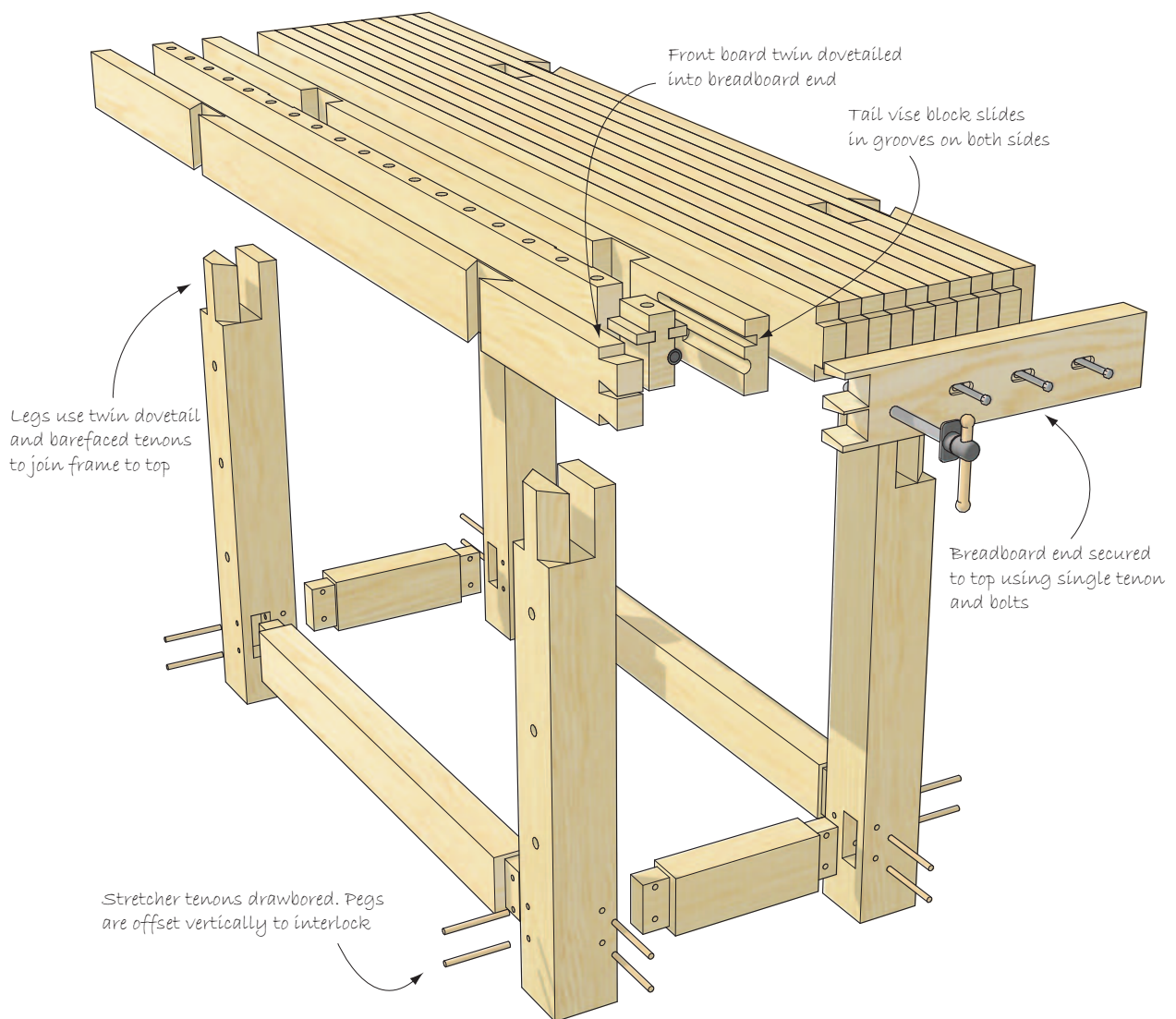
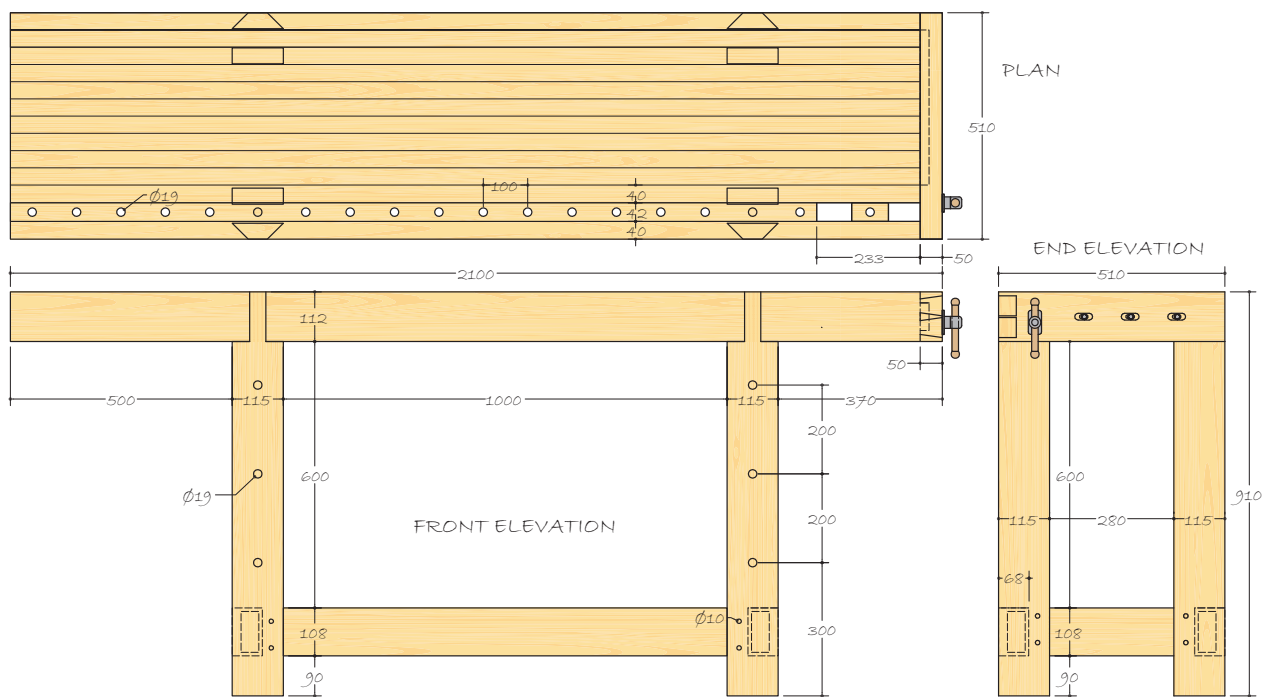
Over the years my off-the-shelf bench gradually had more and more bits screwed and bolted to it to try to make it stiffer and less prone to racking. In the end it also had boxes of tools and nails on the undershelf to weight it down but I still ended up dragging it back to the start line after any hard planing. The cost of a replacement was the issue – not the cost in itself but more that I'd rather spend the money on materials for future projects than on a bench. The solution came in the form of a skip full of joists after part of my house was demolished. They were brought into the workshop and stored for three months to dry out a bit and acclimatise.

A slab-top laminated Roubo was the only choice to build since I'd seen it in Chris Schwarz's *Workbench Design Book*. I could have created the frame to top joints by leaving the through mortises in the

lamination but somewhere in the back of my mind I had the idea that this was a trial run for a really nice bench that I could make later in hardwood with a proper slab top.

The best sides of the boards were easy to find: these were the ones without thousands of nail holes. I thought about patching the other defects, but then realised I'd rather be making furniture than patching knots on a bench. I did take the time, though, to align the board grain direction from right to left in the final benchtop for flattening in the future.

I used Dominoes to keep the boards aligned and glued up three or four at a time. I laminated the slab up to the width of my planer thicknesser – 410mm – and was able to get this flat and of even thickness with one pass over the machinery.





1 Laminating the main slab for the bench top **2** Keeping the slab under 410mm wide allowed rapid planing of the top **3** Wagon vice moving block **4** Cross drilling the salvaged vice nut **5** Marking the dovetails for the end cap **6** Trimming the slab to length **7** Shoulder cut with the track saw

Creating the dog strip

The next stage was to create the dog strip and, in a gung-ho moment, I went straight to the drill press and put a line of 20mm holes 75mm on centre for the whole length of the bench. Then I realised the legs would have blind dog holes in them – I'm sure there's an expensive solution for that somewhere.

I had a spare vice screw from the old bench and wanted to use it for a wagon vice on the new bench. I took the threaded nut and cross drilled and threaded it so I could attach it to a vice block. I then machined grooves in the front strip and the strip between the dog strip and the main slab to take the block. Shellac and wax on all the moving part surfaces before gluing stopped any squeeze-out being a problem when gluing up to the main slab.

The wagon vice needed an end cap that would allow the main slab to expand and contract and also resist the movement of the vice. The end cap was dovetailed to the front strip and a large groove was cut to make the rest of the end cap into a giant breadboard end for the slab. The rest of the end cap was secured to

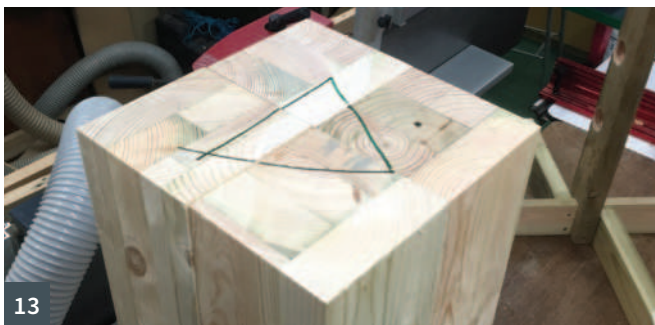
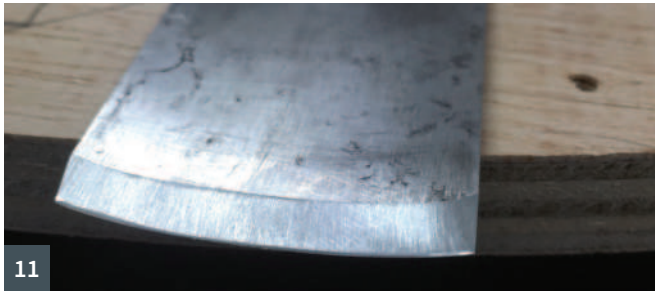
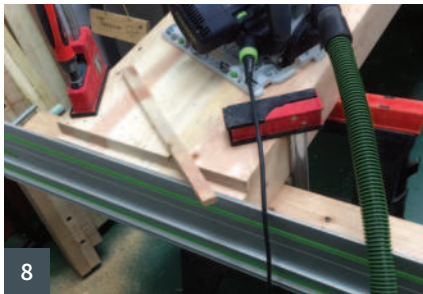
the slab with 100mm long, 10mm coach screws through slotted holes.

The wagon vice sub-assembly was glued up with the dovetail first and then the dog strip and backer strip. The vice traveller block had to go into the assembly at this point. Unlike some wagon vices this isn't bolted in from underneath.

The main slab was cross cut at one end to give a neat end for a tenon cut with a track saw. The track saw was then used guided across the end and the side to create the tenon. After fine tuning, the slab and L-shaped vice assembly of three strips was glued and the end cap screwed to the main slab. The end cap joint was left dry to allow expansion and contraction.

On the level

After the end cap and wagon vice assembly was fitted it had to be brought down to the same level as the rest of the top and given an initial flattening before the leg joinery. I used a Sergeant No.3 set up as a scrub plane to waste most of this away followed by a jack and jointer planes. With an 8in radius on the scrub plane it was very quick.



8 Cheek cut with the track saw **9** Fettle the fit of the breadboard endcap and tongue **10** Laminating the final section to the main slab top **11** The 8in radius curve ground on blade for No.3 **12** Short and light No.3 as a scrub **13** All four legs together marked with the marriage mark **14** Legs after cutting the joints on the bandsaw

Legs and stretchers

The old joists from the skip had provided the material for the slab top but I was still short of four legs and stretchers. Searching the skip came up with a lot of 2 x 6 and 2 x 8 offcuts and these were laminated into 5 x 5 legs and 5 x 3 stretchers. I made sure to cut these well oversize and made the depth of the shoulder between the two tenons dictate the height of the top. I wanted a tight joint and enough excess to be able to bear the joint apart from the topside without damage to the top.

The Roubo bench has a fairly steep angle on the sliding dovetails at the top of the legs. I was going to use the bandsaw to cut these and to accommodate the tilting table I made these 45°. I could then cut from either face of the leg and be sure to get a consistent result. It also meant the marking out was simpler as the same gauge setting could be used from each face. With the cheeks cut I cut the dovetail shoulders with a hand saw and the waste between the dovetail and tenon with a chisel, undercutting a little in the centre.

With the slab upside down on sawhorses the line of the legs was established with a knife line and square from the front edge. The legs were spaced to put a dog hole squarely in the middle of each. With the weight of the legs they didn't need to be held in place to trace a knife line around each. The bevel of the knife was held against the leg to give a very shallow line. The legs were then removed and the lines used to set gauges. The gauges were then used to deepen the lines and transfer

the lines to the other side of the slab. Squares were used to transfer the sides of the leg and the sliding dovetail. After the layout was complete I chamfered the tops of all the tenons and sliding dovetails to prevent blowing out the top on dry assembly.

With the slab on edge the sides of the sliding dovetail were established with a saw. The knife line was deepened to a bit of a 'knife wall' popularised by Paul Sellers. One too-deep knife wall made the saw cutoff line as the 45° cut meant the deeper the knife wall, the further from the line it's possible for the saw to be.

Once the sides of the sliding dovetail were established it was easy to whack out the waste between as the strength of the material was gone with the saw cuts, creeping back to the line to keep it neat and using the gauge line for the final paring cut. Cutting into laminated material means that normal wood behaviour of a split running back, possibly past the gauge line, doesn't necessarily apply.

The through mortises were tried first with a Forstner bit in a cordless drill. This worked fine but there was a lot of subsequent chisel work. For the last three mortises I used a Festool Domino with a 14mm bit. With a little marking out on centre lines this gave a mortise within a hair of the gauge line and hardly any paring of the sides of the mortise. The scale of the joints between the legs and top mean that sometimes unusual tools can be used. To clean up the corners of all the mortises I used a small Japanese saw with a front raker tooth. This efficiently got all the fuzz out of the corners.



15 Laying out and marking the leg mortises on the top **16** Trimming the bench's other end before installing the legs **17** First cut for the sliding dovetail **18** Breaking out the waste from the sliding dovetail socket with a chisel **19** Roughing out the through mortise with a Festool Domino **20** Test fitting the first leg **21** Marking the stretcher shoulders direct from the legs

Dry fit

The dry fit required the use of as big a hammer as I could find. The 2.5lb dead blow hammer was very useful here. For reversing the dry fit I found the deadblow from below onto the oversized tenon got the joint open enough to get in a crowbar. The crowbar gave a lot more control to the movement than just whaling away with a huge hammer – fun though that was.

With all four legs dry fitted and in place, I cut two 2 x 4 battens to help in marking the stretchers. The battens were clamped to the legs and the stretchers were clamped on top of the battens. The shoulder lines were then marked out directly. Any small error in the leg position is allowed for by cutting to fit in this way. Legs were then removed from the top – easier to say than to do – and mortised.

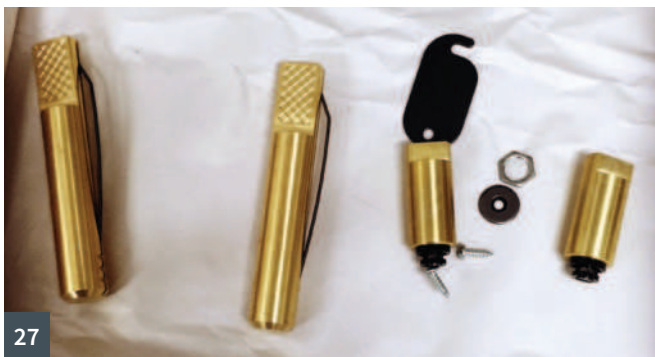
I used a 40mm Forstner bit in the drill press with a fence to ensure all the mortises were identical. The corners were then chiselled square.

The stretchers were cut to length and shown to the mortises. The tenon size was marked directly from each mortise and the marks transferred around to the shoulders. The cheeks and shoulders were then cut out by hand and tuned with a router plane to an easy sliding fit. The legs were drilled for two drawbore pegs each taking care to

avoid hitting the peg from the adjacent mortise. The joints were then reassembled and the drill bit used to mark the centre of the holes on the tenon. The joint was disassembled and the mark transferred slightly closer to the tenon shoulder. How far the mark is transferred can vary and I make a test joint for any new size/timber combination and see what works. A full ¼in offset was too much but just under worked fine.

I then made up 20 or so 10mm drawbore pegs from straight grained ash. Several spares are needed as not all will make it and sometimes enthusiasm will break some. Making pegs with a dowel plate means an even bigger hammer. This time a 4lb lump hammer was the best tool for the job.

A larger hammer allows the same impact force to be applied with more control in the same way a sharper tool allows more control as there is less effort applied. The ends of the pegs were tapered on the disc sander and the holes in the tenons were chamfered slightly with a countersink. These all help the peg find its way through the tenon and out the other side. Drawbore pins can be used to test the fit and ease the path for the peg but I don't have any and have never found them necessary. The benefit of the drawbore technique, apart from its huge strength, is that it allows joint to be a little loose and a frame such as this to move a little to allow the top to go on. With all the joints and the



22 Drilling the waste with a 40mm Forstner bit **23** Failed trial drawbore joint with too much offset **24** Successful trial drawbore joint with curve to 1/2in ash peg **25** All joints glued and all pegs hammered home **26** Fitting the face vice **27** Solid brass dogs – on left – and prairie dogs – on right **28** Cutting a chamfer on the front of the legs and stretchers with chisel, spokeshave and block plane

sliding dovetail/mortise and tenon for the leg/top joint glued up with fairly slow setting glue I put the top onto the frame. The best hammer for getting the top onto the joint is the top itself. Picking up each end and dropping it on the floor very quickly and effectively drives the top onto the legs. There are videos on YouTube of this process and although fun it shouldn't be done in sandals. A light application of alcohol to the respective parts helps the process.

Once the top is on and the clock is still ticking on the glue, the drawbore pegs go in. The pegs are glued and then driven into the holes. The peg starts going straight in, then dives in towards the stretcher, then back the other way. It's important to keep hitting squarely and not snap the peg at this point. The best tool I found for this was the 4lb lump hammer with a good swing. Looking at people who swing hammers for a living – blacksmiths, those men with the huge mallets that install council paving slabs – they seem to have a technique of using the weight of the hammer to do the work with a swing that comes from the shoulder or elbow rather than just the wrist. When the drawbore pegs came through the other side the glue was left to set and then they were trimmed flush. The front face of the frame was then planed flush and a fairly heavy chamfer cut with a chisel, spokeshave

and block plane on all the front arrises. This was to stop the sharp edges attacking me or my work in the future.

The finished bench

The face vice for the bench is my old Record 53, which I bought many years ago and is probably far older than me. I cut the majority of the mortise for the rear jaw with the domino and finished up with an auger bit and chisel for the final depth. An old bit of teak made a nice chop for the vice and also hid the saw marks in the front jaw. Lined with leather for grip and finished with a thumbnail ovolo on each end and an 1/2in bead top and bottom. I bought four new dogs for the new bench from Veritas. The prairie dogs make use of the blind holes over the legs. The solid brass dogs I've put in the wagon vice and the dog strip. To aid pushing these up I've put a heavy chamfer on the underside of the holes to make it easier to get a finger in. I saw this on the Instagram site of Ed Sutton and thought it was a really good idea.

With the bench all done I filled the worst of the defects on the top and gave the whole thing a quick coat of shellac to seal it without making it too slippery. First impressions are that it is rock solid and should last for years; at least until the perfect bench top slab finds me.

ROUTED LETTERING

Anthony Bailey shares his method
for sign-writing with the router

Our house needed a new name sign so I thought I would try making my own using the router. To my mind the router is still the most versatile power tool there is. Along with a vast range of cutters, jigs and gadgets – many of which you can also make for yourself – it can help produce high-quality woodwork.





The jig

- 1 On your computer, choose a simple font shape, blow it up and print, if necessary, across two sheets of A4 paper. I chose an outline setting which uses less ink and makes it easier when marking out the guidebush allowance. Spray mount it to 6mm MDF.
- 2 Mark down the centre of each letter form and then mark outwards each side half the guidebush diameter, in this case 8mm, as it was a 16mm guidebush. Most lines can be ruled but curved shapes require a bit of careful hand finesse in drawing them out.
- 3 Fit a straight cutter that matches the guidebush – fortunately, a 16mm cutter will exactly match the size. In 6mm stock you will need two passes to break through into a sacrificial board placed underneath. Start with the trickiest curved shapes, so if it goes wrong you haven't wasted lots of effort making the whole template.

Proceed with care, following the pencil lines and avoid moving from side to side as it will widen the guidebush slots.

- 4 The vertical legs of each letter are done using a router T-square clamped on the board. Note how the slots are not only wider than the original letter profiles but also overrun to meet the top and bottom guidebush pencil lines.
- 5 The lengthwise slots are made using a batten as a fence. Short straight sections of letters are also done at the same time, linking up with the previous freehand curves. You will probably notice that some letters such as O and A may be taller than other squarer letters – this is because it is intended to look more visually pleasing.
- 6 Use a sharp chisel to help lift the paper off and clean away any sticky residue with white spirit. Check the shapes are smooth and use a half round file to correct any obvious defects in the shaping.



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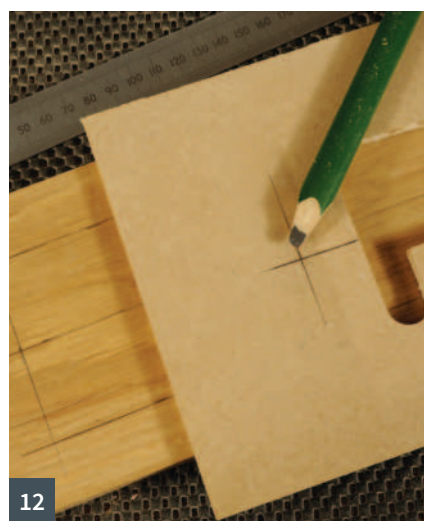
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- 7** The house name template ready for use. It is only going to be used once but as you proceed in setting out and machining it, the process gets easier. The tricky shapes are, of course, any curves as they will be formed freehand. Once made and the shapes cleaned up, the actual name sign isn't difficult to make.

The cutters

- 8** Here are the cutters you will need. Top row: 16mm straight cutter to match guidebush size; 45° V-point used with the 16mm guidebush; combined drill/countersink for the nameplate fixing holes; and a bearing-guided 45° bevel cutter used to chamfer the edges of the board. Bottom row – alternative cutters: tiny Mitelec V-point; larger 45° V-point; Trend CraftPro 60° two and three blade V-point; and a Wealden three blade V-point. These latter ones give a cleaner cut and the 60° angle cut often looks better.

Making the lettering

- 9** The first thing is to make a test piece and then machine all of it out. This takes only five minutes or so and reveals any problems before you commit to decent timber. I used a piece of birch ply because, as the layers are revealed, any errors in the shaping of the template are shown up. Fit the correct guidebush and a V-point cutter of the most suitable diameter. The cuts are done in one plunge and

unplunged immediately each cut is done, to avoid creating burning and divots. If you look carefully the R, O, S in particular have problems, looking distinctly uneven.

- 10** More filing of the template was required so the curves are smoother still. If the guidebush becomes stuck anywhere, relieve those slots a fraction so the router can move easily.

- 11** As a result of the trial cut, I determined that the S needed the guidebush pushed against the outside of the template shape and down halfway from the top and halfway from the bottom to meet in the middle, so there was less strain on the thin peninsula sections in the middle. The E's vertical leg needed the cut to be on the outside so it didn't wander where the crosspieces are. The N needed a clean slotting motion in two halves, again from the top and the bottom, so it would avoid the damage that occurred on the test piece. The felt-tip marking is a reminder for when I was machining.

- 12** The template needs to be pinned carefully on to a pre-sized timber blank. Mark the limits of the lettering height and length accurately on the blank and the position of the intended wall screw fixing holes. Now, sit the template over the blank, siting the pencil lines previously drawn, and then pin through the template where the screw holes will be. Thus the template is correctly centred and once the machining is done, the pin holes will be drilled through anyway, so no unsightly filler is needed.



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- 13** When freehand shaping the template, a base grip gives better control, but once the template is fitted on the timber blank, you can revert to the more usual knob grip. Plunge to depth and machine in one smooth action and avoid stopping, as this will result in burns. Follow your own advice arrows so you end up with the neatest possible result. Each time you lift the router off, tip the chippings out of the template so the guidebush can move right to the end of each shape.
- 14** The whole name board machined. There were several places where the guidebush hadn't quite reached properly – a couple of careful passes ensured the letter shapes were complete.
- 15** The nearly finished result, just a little tidying required with a sharp chisel to smooth the transition between slots where they meet.

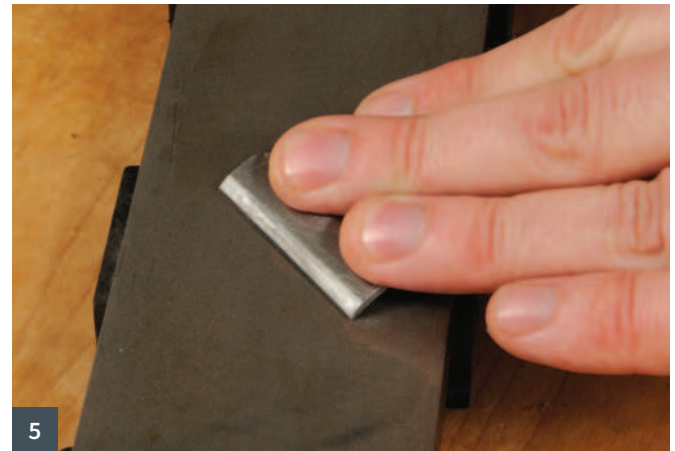
- 16** A combined drill and countersink designed for routing makes fast work of the screw fixing holes. The original template pin holes have vanished in the process.
- 17** The nameboard needs a bevelled edge to look more finished and to help water run off. Do this on the router table using a 45° bevel cutter and a through-fence, so you can easily and safely bevel the ends of the board before doing the lengthwise bevels to help prevent breakout.
- 18** To emphasise the letters and hide any burn marks, you can always infill them with paint, either by brush or my lazy method – laying the template on top as a crude mask and spraying them black. Once the paint is dry, the top is sanded smooth, removing all overspray or surplus brush paint completely before applying an all-weather varnish finish. The sign is now ready to hang.



QUICK PLANE TUNE-UP

Matt Long shares his guide to
quick and easy plane sharpening

We all know the feeling: you pick up your plane, which you need to give you a lovely finish, and all it does is remove scrappy shavings ... it's time for a quick tune-up. There are a lot of complicated ideas out there for the perfect method of sharpening. Here's my simple method, and it produces good results, even on bog standard planes.



Quick fix sharpening

- 1 The first most obvious job is to take out the plane blade by removing the cap iron and unscrewing the chip breaker.
- 2 If the bottom of your plane sole is looking a bit lacklustre, then get some emery paper, fix it to a very flat surface and give the sole a good rubbing down. This will smooth it out, making planing that bit easier, and also flatten the bottom of your plane, making it more accurate.
- 3 Next, regrind the main bevel of your blade – you can do it freehand on a standard grinding wheel with practice. However, to get your 25° angle exact – the best for general-purpose use – then consider a jig or a grinding systems, such as the Sorby Pro Edge. Don't overheat the blade – you can tell this if you start to see bluing on the edge.
- 4 After grinding comes honing. I find I can do this perfectly well freehand. I use a 1,000-grit diamond bench stone.

Remember you want the minimum of strokes to produce your edge. I like to use diamond stone lapping fluid for this job.

- 5 Flat off the back of the blade with a few strokes across the back of the blade.
- 6 I like to finish off the honing with 1,200-grit emery paper. Either use the sheet fixed to the glass used earlier for the sole, or a trick I like is to use half a sheet over your diamond stone, with a little lapping fluid on the stone and the paper. The fluid keeps the paper in place for the few strokes you need, and lubricates the emery. Flat off the back on the emery as well – this gives a nice polish to the blade back, too.
- 7 Then just clean off any wire edge on your plane, a leather strop will do. Reassemble your plane, set the plane blade perfectly and, as with this quite standard Stanley smoothing plane, you'll find you can produce lovely, fine, full-width shavings.

CARVED CELTIC CROSS

Steve Bisco carves and fumes
this traditional Celtic design



The Celtic cross is an evocative symbol of Great Britain's past, conjuring up images of mist-shrouded churchyards sitting on rocky headlands where saintly missionaries from Rome converted the ancient Celts and Saxons from their pagan ways.

The conversions were not completely successful because Celtic crosses were richly decorated with spiritual symbols from the old Celtic religion, which they simply 'recycled' into their new one. The missionary bishops of the Dark Ages were fairly pragmatic about these things, so I have allowed more than a touch of 'sorcery' to creep into this design.

You can carve this cross in a weekend from a piece of green oak. However, it comes with an optional extra. If you want to give it a real feel of the Dark Ages you can blacken the oak by the process

of 'fuming', which will give the effect of ageing it by many centuries overnight. The choice is yours – light oak or dark. Carve it first, and then decide – perhaps the Celtic spirits will guide you!

Carving with green oak

Green oak is much easier to carve than fully dried oak. Its only drawback is its tendency to warp as it continues to dry out, so avoid pieces with knots or a contorted grain pattern. You may not find green oak on sale at a timber merchant, so check online suppliers and at your nearest sawmill.

Just one word of warning – sapwood (the softer new growth on the outer edge of the tree) does not respond to fuming and will stay pale, so only use the heartwood if you choose to fume your cross.



PHOTOGRAPH BY STEVE BISCO, UNLESS OTHERWISE STATED

Check at your local sawmill for supplies of green oak



PHOTOGRAPH BY JOHN BULLAR

Sapwood in green oak does not respond to fuming but the heartwood will work well

YOU WILL NEED

MATERIALS:

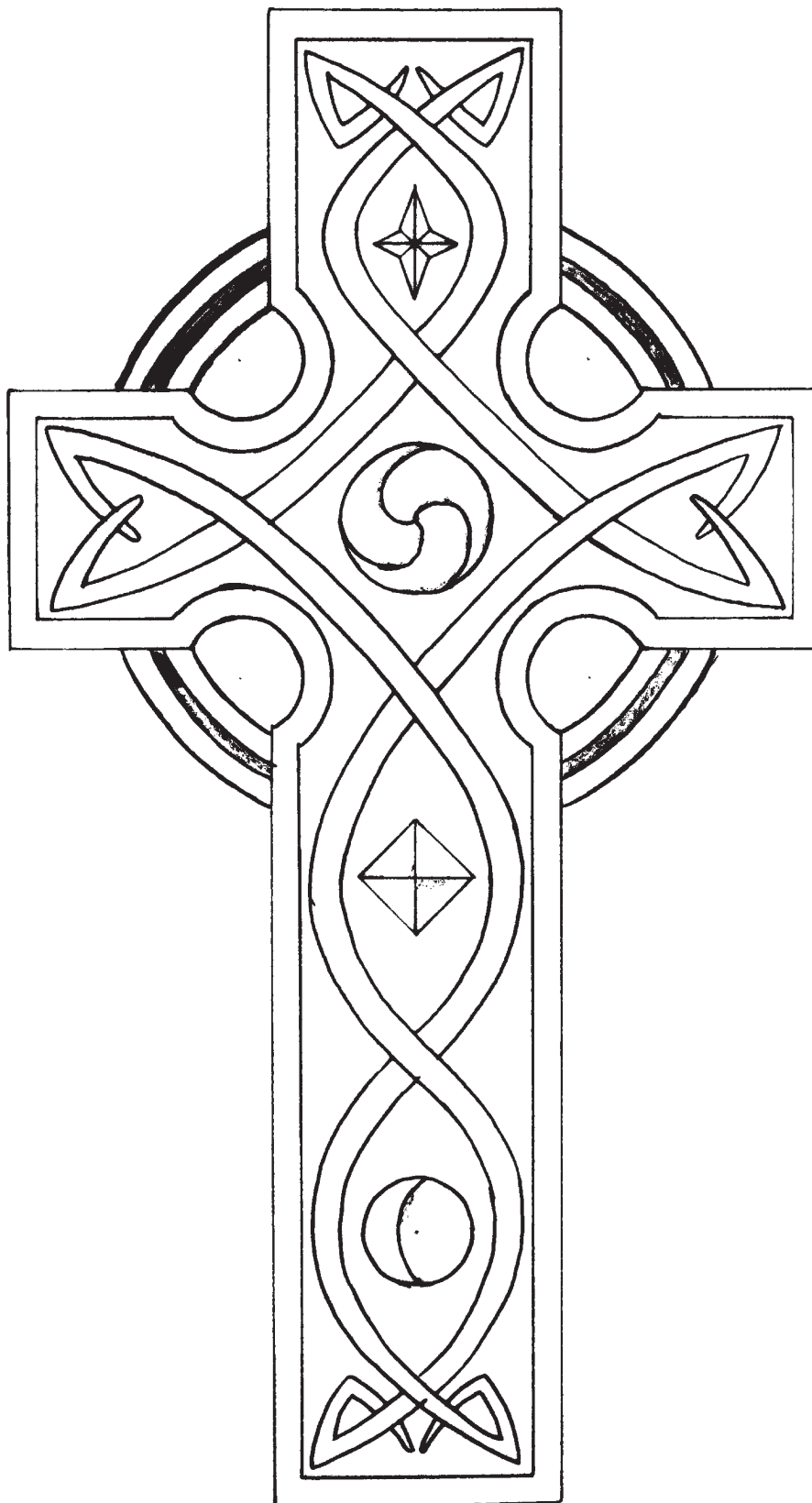
- Oak: 330 x 178 x 18mm

TOOLS:

- 20mm flat chisel
- 6.5mm fine-ground flat chisel
- 2mm and 3.5mm chisels
- V-tool
- 5mm bent chisel
- No.3 gouge, 10mm
- No.5 gouge, 6.5mm
- No.9 gouge, 4mm

FINISHES:

- Household ammonia (for fuming)
- Antiquax furniture polish



Working safely with ammonia

Fuming with ammonia is the traditional way of darkening oak. It looks more natural than stains because it causes the same chemical changes in the wood's natural tannins as ageing does.

Fuming effectively compresses the chemical changes of centuries into just a few hours, so if you want to go for that 'real' Dark Ages look without waiting a thousand years, get out the ammonia.

The easiest way to buy liquid ammonia is as the 'household ammonia' sold by ironmongers and hardware stores. If used undiluted, this is strong enough for fuming oak, even though you may have to leave it in the fumes a bit longer depending on the strength. It is rather pungent, but safe enough to use if you follow the manufacturer's safety instructions. Wear eye protection and gloves when handling, and use it in a well-ventilated place.

Enlarge drawing to required size



Shaping the cross

- 1 Make a full-size copy of the drawing and trace it onto a piece of green oak 330 x 178 x 18mm using carbon paper. If you intend to fume it later, make sure your oak is all heartwood and doesn't have any sapwood in it as it will not darken when fumed.
- 2 Cut round the outside of the pattern with a bandsaw or jigsaw, and trim up the edges to a smooth finish with a spokeshave and a flat chisel.
- 3 Use a jigsaw, coping saw, scrollsaw or fretsaw to cut out the sections inside the ring. Keep the work moving along as the heat will scorch the sides of the cut. Use a half-round file or abrasives to remove any scorch marks.
- 4 Fix the cross to a backing board by screwing from the back with two short screws, and clamp the board to the bench. Cut the surface of the 'ring of eternity' down to 6mm below the surface of the cross with a flat chisel.
- 5 Draw two lines 5mm in from the inner and outer edges of the ring, leaving a 5mm strip in the middle. Cut a U-shaped cove along this strip with a 4mm No.9 gouge, taking care to keep the cutting edge on the 'downstream' side of the grain in each direction. Care must be taken to be as neat as you can as the ring is a prominent feature of this cross.





Grounding out the pattern

- 6** Grounding out – cutting away the background to leave the pattern standing out – is the most time-consuming and least exciting part of a bas-relief carving, but it needs to be done carefully to get a good result. Start by using a V-tool to cut around the pattern lines to define the edges. Don't be tempted to bost down vertically just yet as the pressure may break out parts of the pattern. Be aware that the thin cross-grain sections of the pattern are particularly vulnerable to breakout.
- 7** With the V-cuts relieving the pressure, you can now make the edges vertical with paring and bosting cuts using fine chisels. Take particular care with the outer border. You can clamp a steel rule along the straight edges to give you a clean straight cut. Cut away the background areas to about 5mm below the top surface, taking care not to lever up parts of the pattern in the smaller gaps. There are some very narrow gaps between the knotwork and the sides, so you will need chisels as small as 2mm in width.

Carving knotwork and symbols

- 8** Mark the overlaps on the knotwork, then work them down so the 'ribbons' appear to flow smoothly over and under one another without disappearing into the background.
- 9** Use a No.5 gouge to carve the central 'trinity' knot so the three rounded strands seem to wrap into one-another like an endless cord. The star is carved by creating angular faces with a flat chisel. Try to get good sharp edges as the shadows will define the shape.
- 10** To carve the crescent moon, scoop out a hollow on the right-hand side with a No.5 gouge to leave a crescent on the left side. Give the inside of the crescent a sharp edge to create a strong shadow, and round over the outward side. The four-sided symbol representing earth, air, fire and water, is carved using a flat chisel, cutting from the centre down towards each of the four edges.



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Finishing the carving

11 You can finish the cross in its natural light oak colour by rubbing it hard and vigorously with a dry cloth to bring up a natural sheen. This is better than using abrasives, which tend to leave a dull finish and 'soft' edges. If you don't intend to fume it, you can give it a coat of wax polish to bring up the colour. However, if you have decided to go the 'full Celtic', don't put anything on the surface just yet.

Fuming

12 Fuming is easy – you just need some sort of container that you can make airtight with the wood inside it, such as this plastic tub. I am using polythene sheet to cover the top, sealed round the edges with double-sided tape. Pour four or five tablespoons of household ammonia into the bottom of the container. Place the cross clear of the bottom on

a couple of wooden supports, allowing the fumes to flow freely around the wood. Cover and seal the tub.

13 The time taken for fuming depends on a number of variables – strength and volume of ammonia, temperature and the darkness you want to achieve – so it is more of an art than a science. With household ammonia it should take 12 to 24 hours to go from pale and interesting to dark and mysterious. If it is too slow to darken, add more ammonia and leave it a few hours more. As we are going back to the Dark Ages, there is no danger of leaving it in too long. When the cross is fumed, it will have aged centuries in a day and will look like a relic from the ancient past. This process is such a simple yet effective one.

14 Give the raised pattern a rub over with a good wax furniture polish like Antiquax, leaving the background unpolished for contrast. Now hang it on the wall, and admire your weekend's handiwork.

A collection of various woodworking tools is scattered across a rustic wooden surface. In the top left, there's a wooden handle and a red-handled tool. To the right, a red square is visible. Below it, a black and red tool lies horizontally. In the bottom left, a hammer with a wooden handle and a black head is positioned. On the right side, a large circular saw blade is partially visible, along with a long metal rod. The background is a rich, textured wood grain.

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**LOOK OUT FOR THE
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UPCYCLED WOVEN CHAIR

Amber Bailey restores a
discarded oak chair using
her Danish weaving skills



I found the sorry looking remains of this broken chair chucked onto a bonfire ready to be turned into firewood. I couldn't resist rescuing it and bringing it back to my workshop for a little TLC.

As well as repairing the frame, I decided to add a new woven seat using the Danish weaving technique. If upholstery isn't for you, then Danish weaving is a great alternative. If you decide to try this for yourself, there are a few things to consider:

- ♦ Danish weaving is hard work and can leave your muscles aching and your hands red raw.
- ♦ Weaving a seat requires a lot of cord and will vary depending on the frame size. As a general rule, always have 200 metres to be on the safe side. This is 100 for each direction, although my project took approximately 80 metres.
- ♦ Always keep the cord pulled taut when weaving, otherwise the seat will sag. Gradually over time the weaving will naturally loosen through use, so it needs to be as tight as possible to begin with.
- ♦ Cord usually comes on large reels, which may not fit through the back of the chair. Rather than taking all of it off the reel and getting it all knotted up, cut at 20-metre lengths so the size is manageable. Re-attach pieces with a tight knot facing into the seat, so that it is hidden. The cord is likely to fray if it isn't sealed; avoid this by dabbing on a spot of glue or clear nail varnish, or burn the ends.



Assessment

- 1 The chair components were in a very poor state when I recovered them.
- 2 This was the only sign of a maker's mark that I could find, giving minimal clues to the chair's history.

Consolidation

- 3 Before the dismantling stage during conservation and restoration, it is important to mark everything, from all the large furniture components, down to the screws and hardware. For authenticity everything will go back in exactly the same place that it originally belonged. Before even travelling home with the chair, I identified where each section belonged and labelled them for later reference. With the

front legs and rail labelled up, I did not worry about the tape damaging the finish, as it needed to be stripped down anyway.

- 4 Although the majority of the chair was in pieces, the remaining joints were in a bad state and needed to be opened and cleaned to provide a tighter fit. Like most traditional furniture the components had been adhered with protein glue and could be easily rehydrated by pumping water back into the joints.
- 5 The same method can be used for removing damaged dowels; however, this means a constant switch between drilling and rehydrating.
- 6 Unfortunately, none of the remaining dowels were suitable to reuse, so modern dowels replaced them, secured in place with Colle de Poisson – otherwise known as fish glue – as were all of the joints.



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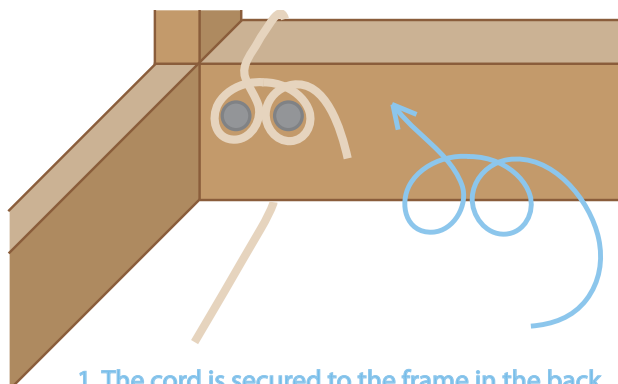
- 7 When it came to rebuilding the chair it became apparent that the quality of the chair was never particularly great and to make it sit straight required a little bit of jiggling about and brute force.
- 8 Fitting one side of the front rail threw the other side completely off as the back ends were angled wrong. The rail had to be hit down with a mallet before clamping.
- 9 The chair was clamped up to dry. Colle de Poisson needs to be left for at least 24 hours to cure.

Clean up

- 10 The original surface was a flaking varnish or lacquer, which could be removed using paint stripper, but this is a messy and long process. It is ideal, however, if the finish is being stubborn – in this case scraping the remnants was nice and quick.
- 11 The actual oak is much lighter in colouring than the dark varnish suggested.
- 12 The chair stripped back to its bare wood.



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1. The cord is secured to the frame in the back left-hand corner, looped around two tacks then carrying on over the back rail and underneath the seat frame.



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Surface treatment

- 13** Unlike the original finish, or the practice I usually use on chairs, I decided not to add a stain to darken or warm the wood. Keeping the colour muted felt like a reminder of its bonfire history, a rich finish instead of a faded appearance felt insincere. Transparent polish is the clearest shellac available, choosing shellac all depends on the desired appearance of the wood.
- 14** The chair was French polished with a cotton rubber and a mop for detailed sections, using transparent shellac and isopropyl alcohol to prevent any yellowing from occurring. A sealant layer was applied at a 50:50 ratio, then thickened to layers of 75:25 ratio until I was happy with the overall look. Finally, the chair was polished over with Microcrystalline wax leaving it until it had hardened, before buffing off. The chair was now ready to weave.

Weaving the seat

- 15** This process shows the basic process for Danish weaving.
- 16** Traditionally, Danish weaving involves natural cord in a single neutral colour, but various cords are now available for a number of different purposes, many of which come in vibrant colours. Polyester cord is incredibly cheap, which is great when it is required in such large quantities and is fairly soft to the touch. This is useful when it needs to be pulled tightly.
- 17** Starting with the vertical weaving, the cord needs to be tacked into place in the back corner of the seat, looping around then following over the back rail and under, pulled towards the front.



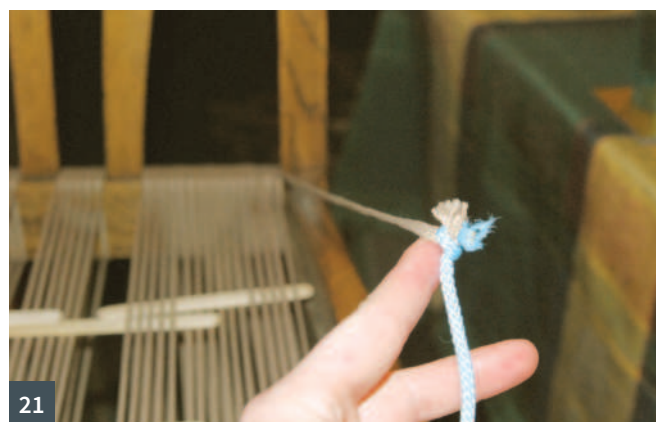
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- 18** When at the front, loop the cord over the front rail twice and on the second loop, pull the cord to the back again, going under and over the rail twice. On the second loop, you need to pull towards the front. Repeat the step along the entire length of the chair.
- 19** The pattern should be continual vertical strips, with a gap between each strip where the cord is wrapped around the rails. Keep the cord wrapped tightly, constantly rearranging along the rails.
- 20** Where my chair has back splats I had to make allowances, wrapping the front rail with cord to fit the length of a splat before carrying on with the pattern. Gaps left because of the back splats won't be anywhere near as noticeable when the horizontal weave is put on. The very end of the vertical weaving should finish with a strip towards the front rail that goes underneath and across to the other side of the chair leg and up over the side rail.
- 21** This is the point to decide between using one continuous colour or – as

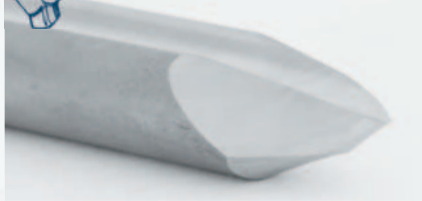
I chose to do – two colours. If you're using two, then before the cord comes up the side rail, cut off and tie a new colour on.

- 22** To decide where the horizontal weave should intertwine, count and evenly divide up the vertical weave. Wooden sticks work well as markers. Following the grouped-up divides in the vertical weave, thread the cord in and out alternating across the seat before pulling the cord down and repeating the exact same pattern underneath before pulling back up the side rail.
- 23** This needs to be repeated a set number of times. For me this was in groups of eight horizontal lengths, before alternating the 'in-and-out' action. Repeat again until the horizontal weave is built up in blocks that switch between whether they start by going in or out of the vertical cord. Finish by cutting off any waste – leaving 50mm – and sealing before pushing the remaining cord neatly into a gap at the back on the top of the weave. Once finished, the chair is ready for use.

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MDF BOOKCASE

Alan Holtham demonstrates the advantages of moisture-resistant MDF when he builds a bookcase with drawers



MDF often receives a bad press, but it is a superb product for painted projects like this one, being flat, stable, easy to machine and relatively cheap.

However, there are a few factors to be aware of when using it. For a start it generates huge clouds of fine dust whenever you machine it, so always take suitable precautions by wearing a dust mask, or preferably an air-fed helmet.

Secondly, although the flat surfaces will finish easily, any machined areas, particularly decorative detail, usually rough up as soon as you apply any form of paint.

Finally, standard MDF is very susceptible to changes in humidity and even storing it in a slightly damp atmosphere will cause the sheets to swell; any edges in contact with a damp floor can be as much as 1 or 2mm thicker than the rest of the sheet. Although not a visible defect this can cause difficulties

when you're trying to produce accurately sized components or fitting them in grooves.

Many of these problems can be overcome by using the moisture-resistant form of MDF, which is always pale green. The moisture-resistant quality is achieved by using a different combination of resins during the manufacturing process, and although the resulting material is slightly more expensive it does have significant advantages.

It rarely swells and any machined edges are much smoother and paint to a better finish without roughing up. The material feels slightly waxy and cuts more cleanly, although it does appear to be slightly more susceptible to scorching with saw or router.

Water-resistant MDF is available in a variety of different thicknesses, but it is slightly more difficult to get hold of through the usual channels, so I tend to keep a stock of the full range of sizes, buying several sheets at a time to minimise the inevitable delivery charge.

YOU WILL NEED

- Circular saw
- Vice
- Plane
- Square
- Sliding head
- Mitre saw
- Biscuit joiner
- Router
- Steel rule
- Soft-faced mallet
- Sash clamps
- Chisel
- Bearers
- No.20 biscuits
- Straight, cove & 1/8in router bits
- Wood glue
- Weights
- Glue roller
- Wood primer
- Eggshell paint
- Panel pins

CUTTING LIST

From 15mm MDF:

- Sides, 2 off – 733 x 300mm
- Top, 1 off – 936 x 338mm
- Top, 1 off – 906 x 323mm
- Shelves, 3 off – 830 x 294mm
- Skirting, 1 off – 890 x 85mm
- Skirting, 2 off – 315 x 85mm
- Divider, 1 off – 25 x 294mm
- Drawer fronts, 2 off – 406 x 125mm

From 10mm MDF:

- Drawer boxes, 4 off – 406 x 125mm
- Drawer boxes, 2 off – 280 x 125mm

From 6mm MDF:

- Back, 1 off – 740 x 844mm

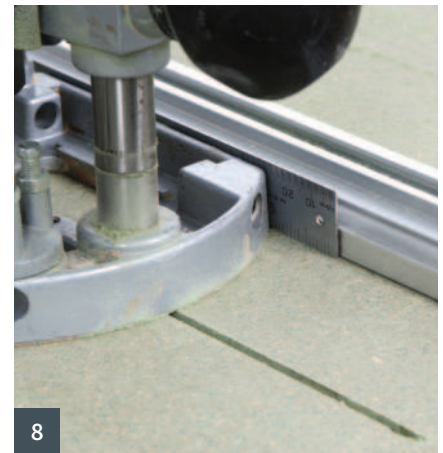
From 4mm melamine-faced hardboard:

- Drawer bottom, 1 off – 396 x 270mm



Component preparation

- 1 Full-sized sheets are awkward to handle, so for the initial breakdown lay them flat on the floor on some bearers and cut out all the components slightly oversize with a portable circular saw.
- 2 Clamp corresponding components together in the vice and plane them to finished size to ensure they all end up exactly the same. The central shelves are narrower in width by the thickness of the back; this will be rebated into the uprights later.
- 3 With the edges straight and square, crosscut all the pieces to exact length, preferably using a sliding head mitre saw.



Making joints

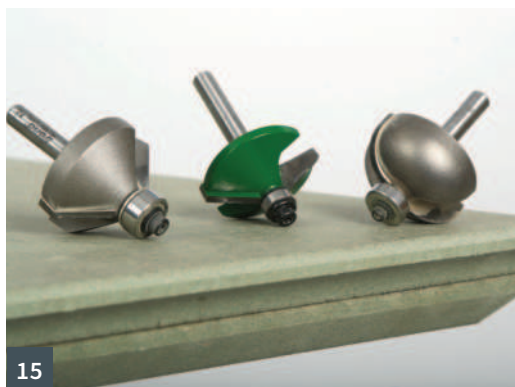
- 4 For this type of work I cut a slot right across the end of the board rather than cutting individual pockets for each biscuit. As well as being quicker, it also gives you a bit more leeway when it comes to lining up for assembly. Cut these slots across the ends of the three horizontal shelves.
- 5 Now mark out the position of the shelves on the two upright sides, scribing the centre line clearly.
- 6 The matching slot in the uprights needs to be cut with a straight router bit, so clamp two uprights together and rout right the way across the two to make sure the slots line up perfectly.
- 7 Once you've cut the first slot, put a biscuit across the join to keep the two components in line while cutting the remaining slots. Stop the slots clear of the two front edges on the uprights so

that they don't show in the finished project.

- 8 My router bit was a fraction too narrow for the width of the biscuits, but a really good tip here is to stick a temporary shim onto the side of the router base using double-sided tape and then make a second cut, rather than trying to adjust the position of the straightedge. A thin steel rule is ideal for just this purpose!

Back and shelves

- 9 Cut a rebate down the back inside edge of the sides to take the back, remembering that by now the sides are handed.
- 10 Temporarily fit the bottom two horizontal shelves in place and measure the width for the upright divider, then cut this divider to exact size and machine biscuit slots in either side of it along with matching slots in the horizontal shelves.



Trial assembly

- 11** Make a trial assembly to ensure everything lines up; the biscuits should be tight enough to hold it all together temporarily.

Slots and glue

- 12** Cut matching slots in the top of the two uprights and on the underside of the top piece. As the finished top is made up from two separate pieces stuck on top of each other, it is better to machine the required profile on this lower piece of the top first.
- 13** Start by gluing the middle upright divider in place, using a soft-faced mallet to tap the biscuits well in. On MDF it is quite safe to wipe off any excess glue with a damp cloth, unlike solid hardwood where this procedure can cause staining problems later.

Shelf assembly

- 14** Assemble the bottom two shelves first and clamp these in place, making sure the front edges line up perfectly. You should now be able to 'spring' the top shelf in place with the clamps still on the lower

shelves. Check for square again; any small discrepancies will make for difficult drawer fitting.

Top work

- 15** While the main carcass is set aside to dry, machine up the second piece for the top, making it slightly bigger to take the required profile. For this I actually used three cutters, machining a cove to line up with the underneath 45° chamfer and then a very slight 30° chamfer on the top.
- 16** Rout the rebate for the underneath piece of the top and square out the corners with a chisel.
- 17** The first layer is glued and then clamped in place using a couple of very heavy weights, but make sure it is standing on a level surface if you use this method. Alternatively, use a couple of sash clamps at either end. When dry roll glue to the surface of this first layer, paying particular attention to getting glue right up to the edges.
- 18** The top layer can then be clamped in place using a mixture of clamps and weights to make sure the glue line is minimised.



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The back

19 Cut out a piece of 6mm material for the back and machine on the V-grooves to look like tongued and grooved boards.

20 Trim to be a neat fit into the rebate in the back of the unit.

The skirting

21 The skirting is just a strip of the same 15mm MDF with a 30° chamfer machined on one edge. Cut the mitres first, making several cuts if necessary to get them spot on, and then mark off the required length.

22 Glue and clamp the two side skirtings in place first, then repeat the procedure with the front skirting, using plenty of clamps to get the mitre nice and tight.

Drawers

23 The drawer boxes are made up from 10mm MDF, the corner joint

being a simple rebate which is easily cut on the mitre saw, providing it has a trenching stop.

24 Use a 1/8in router bit to cut a slot in all the drawer box components to take the bottom, in this case a piece of melamine-faced hardboard.

25 Make sure when you glue up the drawer box that the clamps do not push it out of square.

26 The 15mm MDF drawer fronts have a 30° chamfer machined all round, and are planted on separately.

Finishing

27 The bookcase now just requires some light sanding on any machined edges to make it ready for painting.

28 I like to finish MDF with a coat of slightly thinned down wood primer followed by a couple of coats of standard eggshell paint. When dry, glue in the back and fix with small panel pins.





BARN CONVERSIONS

Kate Jensen of RAW Restorations tells us how she and her dad upcycle old timber into unique, heirloom furniture and artworks

When an old barn has served its purpose and is due for demolition, its timber can still have a new lease of life thanks to Kate Jensen and her father Kelley. The father and daughter team run RAW Restorations, which specialises in tearing down old barns and upcycling the wood and metal components to make furniture and artworks. These unique pieces preserve the history of the timber and the historic way of life it represents, giving RAW's clients beautiful vintage-look pieces for their homes. Much of the work is inspired by nature, including the mountains and lakes of the company's Utah location.

Here, Kate tells us about the difficult but satisfying process of taking down an old barn and giving its wood a new purpose.

Could you tell us a bit about your background?

My background in full-time woodworking only goes back about seven years; before that I was doing residential mortgages in Newport Beach, California. I've always loved decorating and, while living in California for 10 years, I had to make small spaces into my own, so my dad and I would design specific pieces of furniture or shelving, etc., for my houses.



How were you first inspired to turn old barn wood into furniture, art and other objects?

My love for old, rusty, second-hand treasures probably originated with my grandpa, he rarely bought anything new and always made do with what he had on hand. Everything was sturdy but pieced together, so



I think I just thought that's how everything was! It reminds me of where I came from and who I am.

Do you have any formal training in woodwork and furniture making?

I don't have any formal training, I've learned everything I know from my dad, who I own the business with. He was in construction his whole career as a brick mason and built our home, so he's knows all there is to know about building. He has been and continues to be very patient with teaching me daily!

Could you tell us a bit about the process of turning timber and metal from an old barn into different objects – how do you go about assessing and selecting suitable wood?

Tearing down a barn is hard work! When we are looking at one to possibly tear down, we make sure there is wood that is structurally sound enough to build with before we decide if we want to take the time to do it. Some old barns are too weathered for it to make sense to try to preserve. We've torn some down where the roof is almost see-through and the wood is basically falling apart – those aren't worth the time and are unfortunately too far gone.

Tearing down a barn is a laborious process: some barns, even though they are leaning to one side, still don't want to come down! They don't

make them like they used to! We try to take the wood off board by board to preserve everything possible, and then collapse it and salvage what we can after it's down. Once it's down, you have to take out all of the nails and determine what is usable for furniture and what we will saw into slats for art pieces. All of that is done BEFORE you even start the project you're working on!

Does the wood need to be stored or treated in any way before it can be reused?

We don't live in an area where there are termites or anything, so we



PHOTOGRAPHS COURTESY OF KATE JENSEN/RAW RESTORATIONS



store the majority of the wood on large steel racks behind our shop and have stacks against the walls inside as well. We bring it inside and dry it with heaters, and clean it, etc., before using it on a project.

What kind of tools do you use?

Before I started working with my dad I didn't know how to use many tools, but now I can use most everything in the shop! I use my tablesaw, mitre saw, scroll saw and sanders the most every day though.

What types of furniture do you make?

We make dining tables more than any other kind of furniture, but also do a lot of side tables, consoles and benches.

What are your favourite projects to work on?

My favourite thing to make is sliding barn doors. I've done some really fun ones with designs on both sides. It's rewarding to see something big like these come together in a home or business.

I love the colour palette you work with; is it inspired by the timber itself?

Yes, I do a lot of mountain and nature pieces, so I try to use the natural colours that are in the wood, but I do paint some for sunsets and different coloured skies. I also do some design pieces where I throw some colour in with the neutrals.

Could you tell us about the inspirations behind the Wave, Mountain and Pattern collections?

The Pattern collections come from my love of decorating and design.



I love clean lines and do some pieces that are more modern than rustic, depending on the style of the client. I also get some inspiration for southwestern-style pieces from spending time in Mexico and their culture/style there.

The Mountain and Wave collections come from my deep love of nature. I am happiest and feel an undeniable connection to God and the earth when I'm outdoors. I hope my love for it is portrayed in my art.

Do you feel that your work is helping to preserve something of the history and traditions of the homesteading way of life?

I absolutely feel like people are longing to get back to a more simple way of life in some aspects, and using reclaimed wood gives an element of that inside our homes. It's almost a reminder of where we came from in a way. It gives us an opportunity to preserve history and give old barns a second chance at life!

How does it feel to see your work in use in your customers' homes?

It is an honour and privilege to have our work in people's homes all around the world! I still get shocked every time I get a photo from a client or walk into a building with our work in it. Just knowing clients have an art piece I made on a mantle or a set of sliding barn doors as a centrepiece in the home that they look at daily is humbling. I'm so grateful I get to do what I do!

www.rawrestorations.com

Instagram: rawrestorations



BEAVERCRAFT

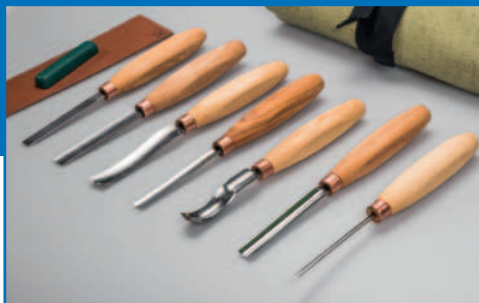
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ANIMAL PUZZLES

Fred and Julie Byrne use their scrollsaw to make a set of freestanding puzzles



We're not promising to keep the kids amused for hours, but these puzzles will keep them happy long after they've been made! We have used 27mm beech, but any chunky hardwood would do. To a large degree the pattern size can be governed by the size of wood you have – just be aware that if you go smaller some of the pieces may be too small. The puzzles should not be given to very young children because they could be a choking hazard. Finishes can either be a child-friendly varnish or food-safe oil.



YOU WILL NEED

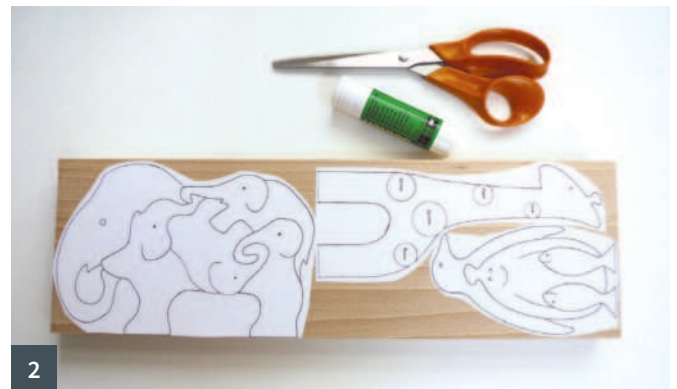
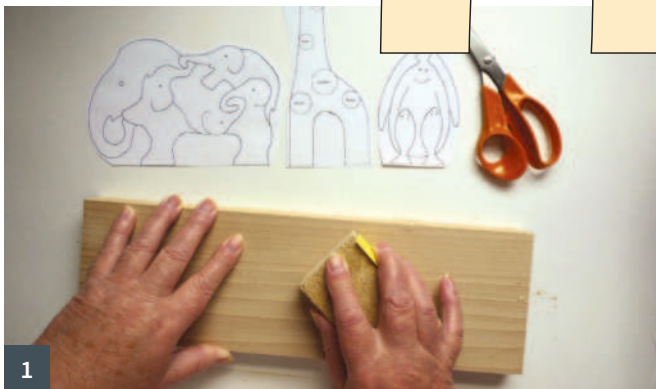
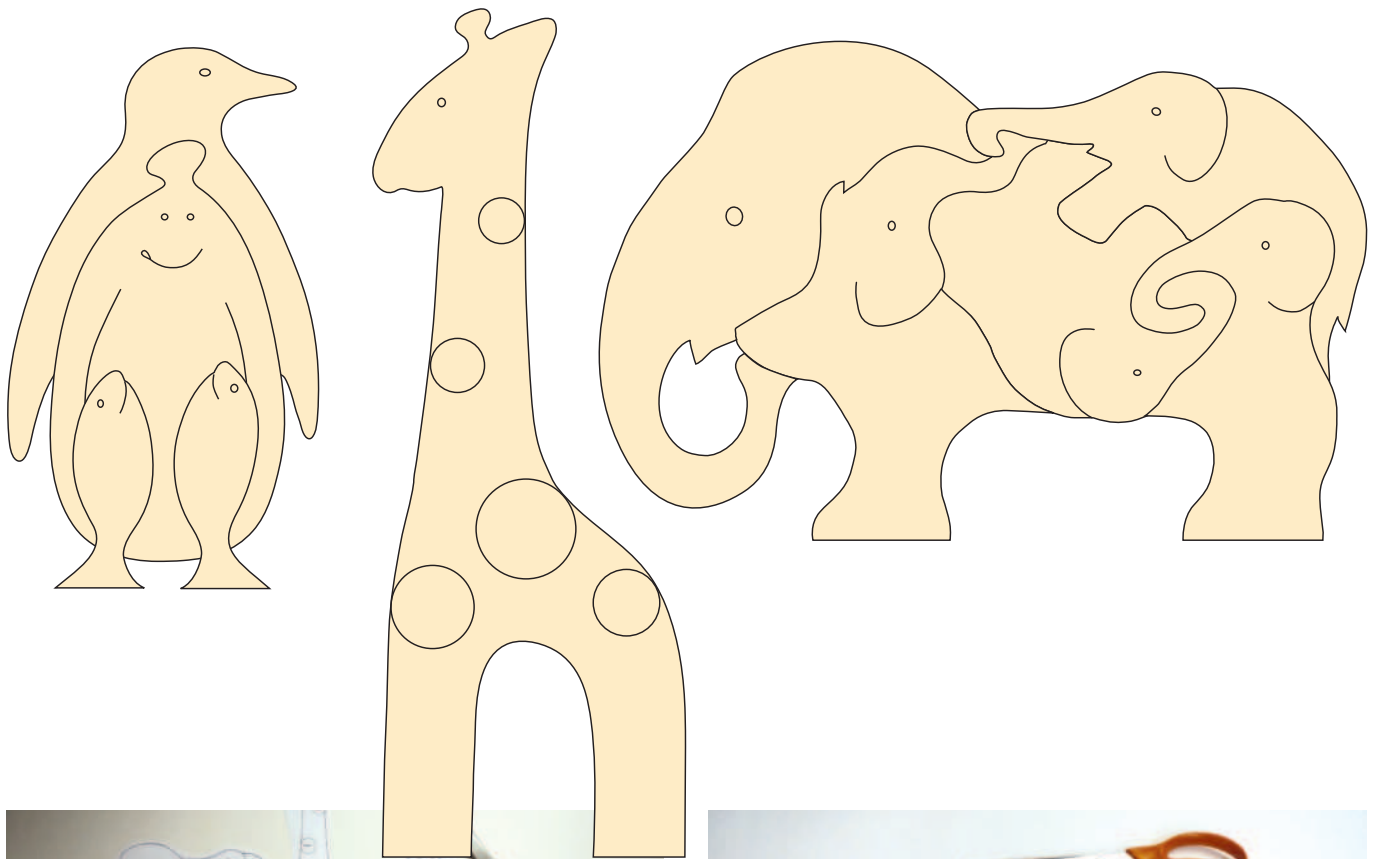
TOOLS:

- Scrollsaw
- No.7 reverse tooth blade
- Pillar drill
- 4mm, 3mm, 2mm drill bits
- Pattern
- Scissors
- Glue stick/spray adhesive

- Sandpaper: 180, 240, 320 grit
- Sanding block
- Finish of choice

MATERIALS:

- Beech: 400 x 125 x 27mm, or hardwood of choice



PHOTOGRAPHS BY FRED & JULIE BRINE

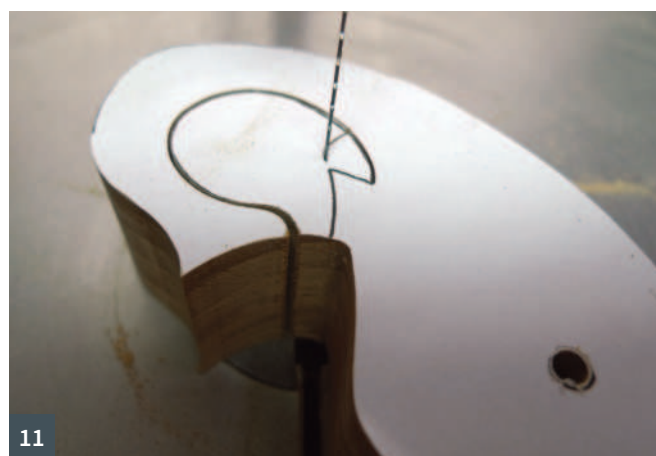
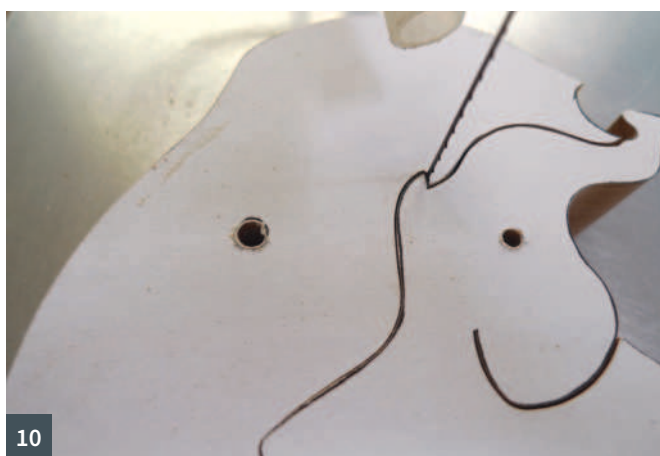
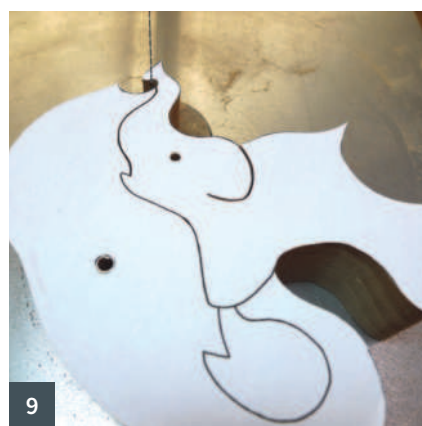
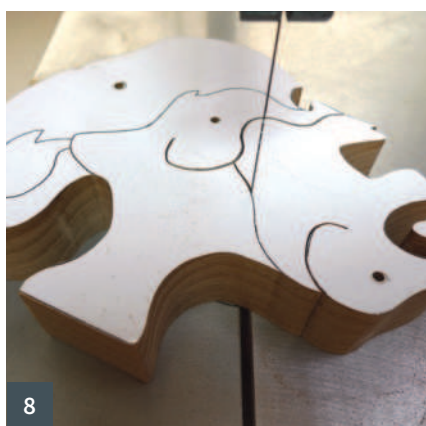
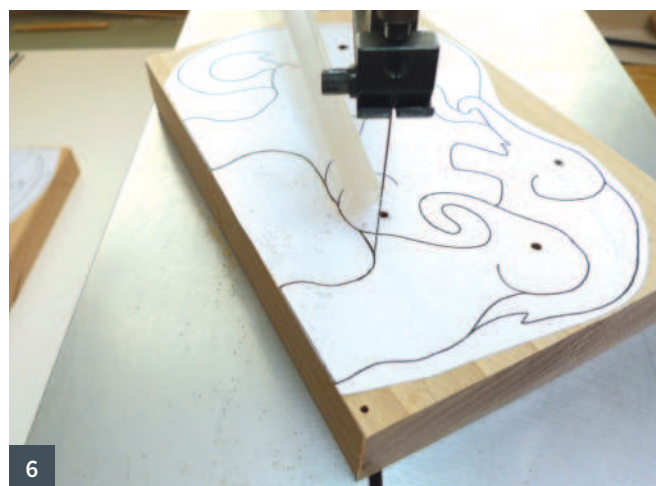
Getting started

1 First, prepare the wood by making sure both sides are completely flat and then sand all surfaces smooth, going through the grades of sandpaper from 180 to 240 grit. Utilise the surface of the prepared wood by placing the pattern of the elephant horizontally across the grain, with the feet aligned with the edge of the wood.

2 The giraffe and penguin can then be placed vertically with the grain.

3 Next, use the 4mm drill bit to drill out the eye of the main elephant and penguin.

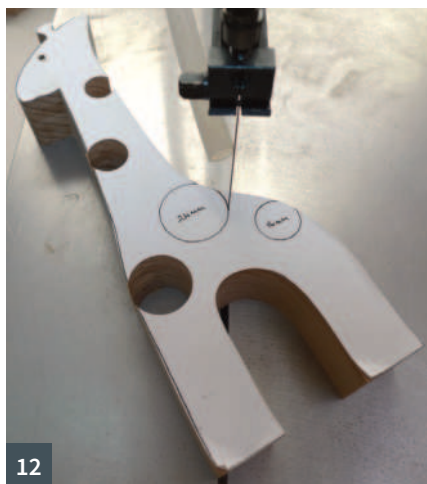
4 Change to the 3mm bit to drill the remaining smaller eyes, leaving the 2mm bit to make the blade entry hole for cutting the smiley monster's mouth within the penguin.



Cutting out

- 5** Fit the scrollsaw with a No.7 reverse tooth blade – this will keep the underside burr to a minimum. Check that the blade is square at 90° to the scrollsaw table, and then begin by cutting the wood block in half to make it a more manageable size.
- 6** Begin by cutting around the outer edge of the elephant, starting with the piece between the feet. Continue to cut around the back of the elephant in one continuous cut, returning to remove the waste from the tail.
- 7** Once the main elephant is cut out, continue to cut out the smaller individual puzzle pieces. Cut into the lines of the smaller elephants to define the ears.

- 8** Sometimes it's easier to follow the cut line of the smaller elephant all the way to the end of the ear, and then back the blade out to continue along the cut line to separate the piece.
- 9** The same can be said of the last small elephant to be separated. Make the first cut in toward the mouth, back the blade all the way out, then continue the cut from the other side ...
- 10** ... stopping when you reach the mouth to let the blade catch up with you, before making the sharp turn to meet up with your first cut.
- 11** Cut the waste from the area inside the trunk on the main elephant. The best way is to follow the cutting line towards the mouth, then back the blade out just enough to be able to continue along the cutting line, then return to make the last cut into the mouth for a lovely sharp corner.



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12 Continue to cut out the giraffe ...

13 ... and the penguin in the same way as with the elephant.

14 When cutting the smiley monster's mouth within the penguin, thread the blade through the pre-drilled hole ...

15 ... then cut along the low edge of the mouth line.

16 Next, back the blade up to the pre-drilled hole and then follow the short upper cut line.

Finishing

17 Remove the paper pattern from all the pieces.

18 Round over the edges and remove the burr from the underside with a fine 280- or 320-grit sandpaper to give a better appearance.

19 Apply paint in the colour of your choice to the puzzle circles within the giraffe, and allow to dry before applying a suitable child-safe finish.

PORCH POSTS AND SPINDLES

Richard Findley turns some replacement posts for a decaying porch



Usually jobs like this come from a joiner or builder, but unusually I was approached directly by the customer on this occasion. My customer's father was a retired cabinetmaker and had advised her that she needed the services of a woodturner to repair the decaying porch at the front of her house.

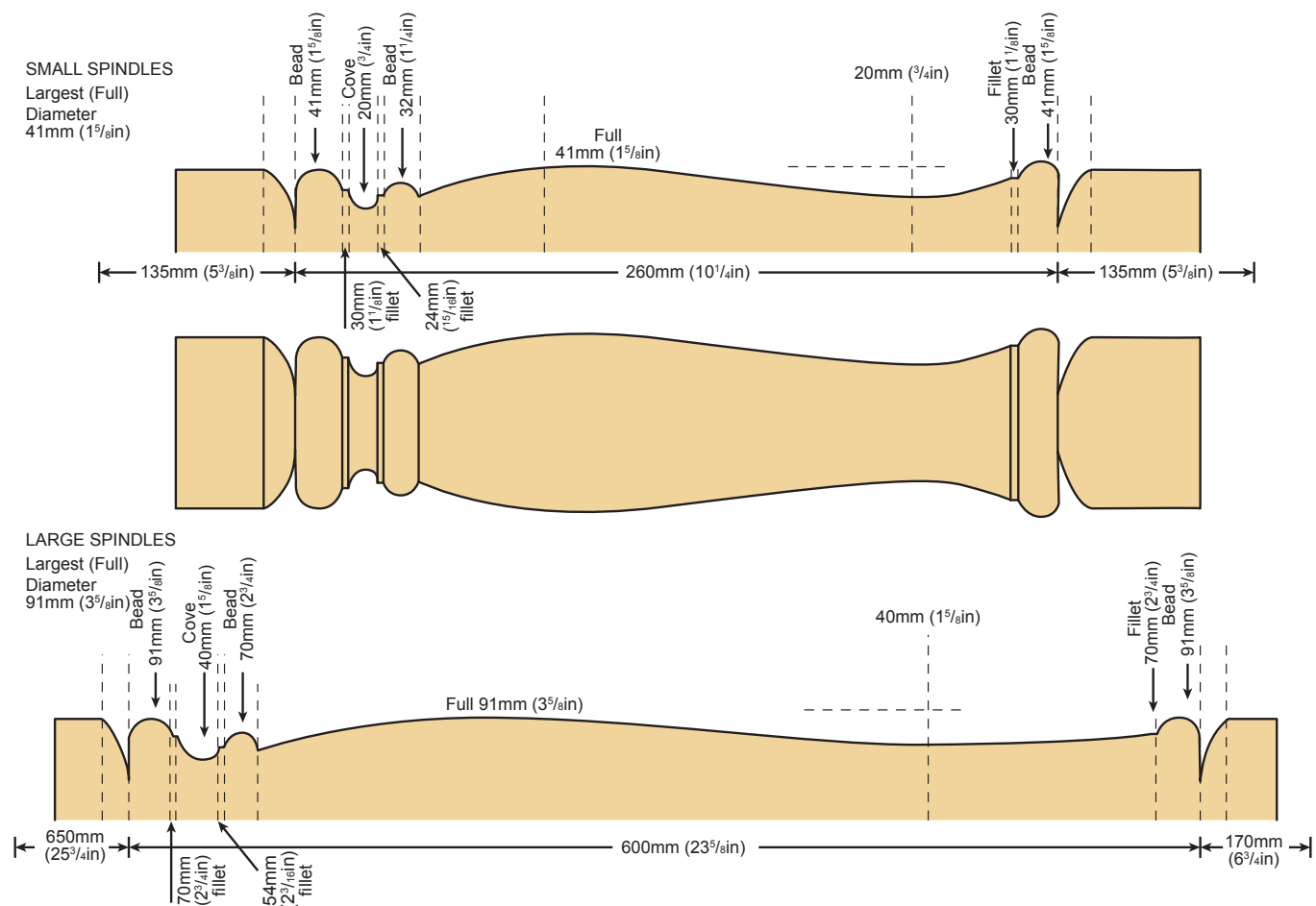
The porch had been built along with the house around 12 years ago but had been made from very standard mass-produced turned components, designed for internal use, which had led to the timber rotting. The customer wanted a similar design but something that made her house unique.

The turning work was no problem but she needed it fitting and some other cosmetic work doing on the porch to bring it up to standard; having trained as a joiner, I knew the sort of work

that would be required to do this job, I also knew that I didn't have the experience to do it justice, but a friend of mine named Steve, did. Having seen his work and his portfolio of previous jobs, I knew he was the man to do this. Steve has a workshop specifically set up to manufacture all types of joinery, and most importantly, porches!

Joinery design

The way the spindle section of the porch had been put together was not correct and almost entirely to blame for the speed at which it had deteriorated. The correct way to do this is to make a baseplate with an angled surface; this allows the water to run away and gives it nowhere to collect and cause damage.



YOU WILL NEED

TOOLS:

- 25mm spindle roughing gouge
- 32mm spindle roughing gouge
- 10mm spindle gouge
- 12mm spindle gouge
- 10mm beading & parting tool
- Vernier callipers
- Spring callipers
- 180-grit abrasive

- PPE: facemask, respirator/dust mask and extraction

MATERIALS:

The customer wanted a deep red/brown finish so I used sapele for this job. It is readily available in the large sizes required and is rated as 'moderately

durable' by my suppliers which means that, untreated it should last for 15 years in a position such as this. Looked after properly it will last for many more.

- Small spindle: 41 x 41 square x 530mm long
- Large spindle: 91 x 91 square x 1,420mm long



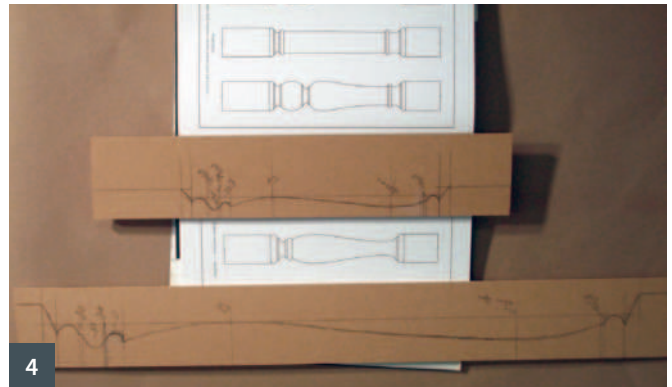
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Assessing the problems

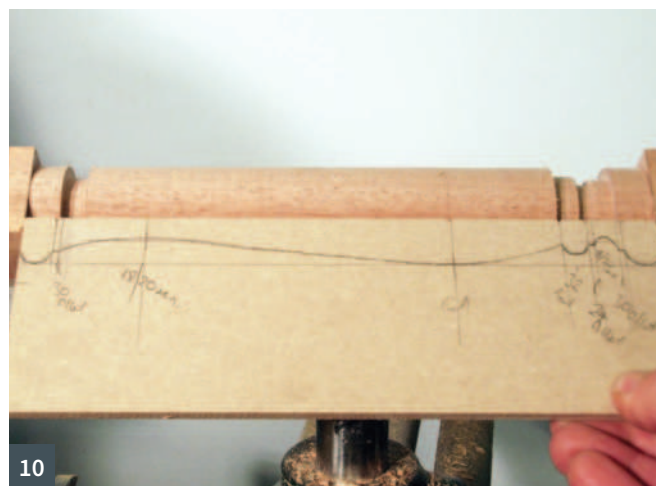
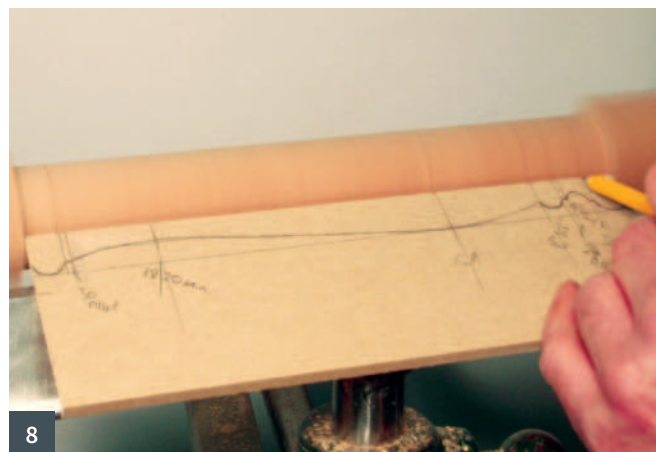
- 1 The porch timber was rotting and in need of urgent replacement.
- 2 You can see from this image how badly the timber was rotted. This was mostly because the spindles were seated, as you might on an internal staircase, in a groove cut into a base rail. Here, rainwater can gather and over time, cause the rot.

Design

- 3 My first task was to design the spindles and make up copy templates for them. The copy templates have half of the spindle drawn out with the positions of all the details marked along with the diameters and any other useful information that might be useful during turning.
- 4 The design was chosen from *Classic Forms* by Stuart Dyas. I simply had to proportion the original drawing to the two very differently sized spindles.

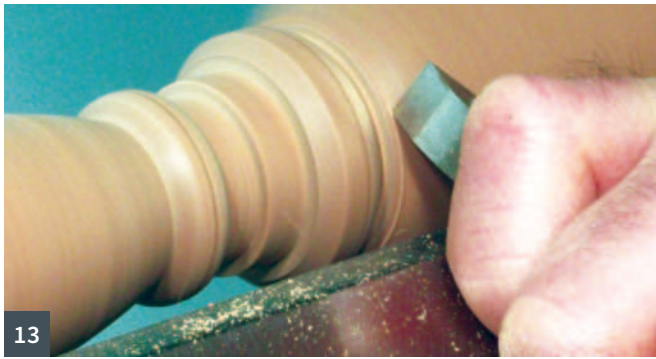
Turning the spindles

- 5 With the timber cut and planed to size I marked the positions of the pommels – the square section at each end of the spindle – while they were all on the bench. I find this is much quicker than doing each one individually on the lathe.
- 6 It didn't really matter whether I made the large or small spindles first, but I decided to start with the smaller of the two as this allowed me to have plenty of practice at the cuts and making the shapes before working on the large spindles. If I messed up a smaller one there would be much less waste than if I messed up one of the big ones! I made the first cut with the tip of my beading and parting tool – which I use as a skew chisel – cutting a square pommel and separating the section I wanted to keep square from the turned area. Although the pommels have a curve down to the first detail, I initially cut them square. I have found that, if I cut the curve too early in the turning process, the next detail can be prone to wander down the spindle a little. By starting with a square edge, I find it easier to ensure all details are cut where they should be, which is the key to good copy turning.



- 7** With the pommels cut, I then used my 25mm spindle roughing gouge to remove the waste. I designed the spindle so that once it is turned completely round, it would be the correct diameter which saves time measuring. Once the spindle is round it is the right size.
- 8** Using the copy template, I marked the positions of the main parts of the design. Notice the template is cut to fit between the pommels of the spinning wood. If you don't feel comfortable with this, stop the lathe to mark it out.
- 9** Using my beading and parting tool and Vernier callipers, I made sizing cuts at various points along the spindle which shows me where each detail sits and where I am cutting to. I call this 'blocking out'.

- 10** The spindle was now 'blocked out', so it was now just a case of 'joining the dots' and turning all of the details in the places they should be.
- 11** Sticking with the same tool, my first cut was to shape the lower curve of the long central section. This gives me space to shape the next detail.
- 12** Using the tip of the tool, I rolled the first bead. When rolling beads with any type of chisel you must use the very tip of the tool, this gives complete control throughout the cut, it is only when the cut comes away from the tip and on to the edge that the tool wants to catch. When turning beads, a pencil line in the centre can be helpful. It is easy to end up with a bead that leans to one side but a pencil line helps to balance the shape and keep it looking right.



13 With the first bead cut, I could roll the right-hand side of the bottom bead and then cut and shape the pommel. Notice I hadn't yet cut the left side of the bead as there isn't space to easily use the tool to make the cut.

14 I repeated the above steps to shape the top bead and pommel, then switched back to my spindle roughing gouge to add some shape to the long elegant curve of the spindle.

15 I cut the cove last with my 10mm spindle gouge. When shaping the long curve I noticed some vibration on the spindle so by leaving the cove until last – which is the thinnest part of the spindle – it minimises the vibration and lessens potential chatter marks.

16 I then sanded with 180-grit abrasive, flexing it in to all of the details and opening it out to sand the long curve. These spindles are for outdoor use and being combined with joinery so sanding beyond 180 grit was pointless. Done properly, finishing to 180 grit is ideal in this situation. As you can see, the toolrest was still in place for this sanding

operation. By leaving the toolrest in place throughout a production job like this you can save a considerable amount of time. However, notice the technique that I use which makes this an entirely safe procedure: one hand is below the toolrest and all of the sanding is at the rear of the work. If you do not feel comfortable doing this then please do remove the toolrest when sanding.

17 With the small spindles complete it was time to move on to the large set. Much of the work was the same, just scaled up, so I won't detail every step as it would be repetitive; I will simply point out the main differences in the work. The first difference was my choice of drive centre. For the smaller spindles I used the ring centre because this allowed me to finish one spindle and then carefully swap it for the next blank with the lathe running. For the larger spindles I preferred a four-prong centre as this gives a more positive drive. I wouldn't consider swapping the blanks with the lathe running on such large sections of timber as this would be unsafe.



18 The next and most obvious difference is that I used my larger tools for the work, so my 32mm spindle roughing gouge rather than my 25mm and my 12mm spindle gouge rather than my 10mm. The beading and parting tool remained the same.

19 When the timber is below around 65mm in diameter, I prefer to use Vernier callipers for sizing but above this they are not accurate because of the length of the measuring legs. For larger sizes such as these, I use my spring callipers.

20 The steps were repeated as for the small spindles and with the first of the large spindles turned, I stood it up and compared it with the smaller set. I decided it needed a little more from the narrowest part of the long curve, towards the top, and was able to remount it and reshape it before finally sanding it.

21 The full set of porch posts and spindles were now complete and ready for installation.

RUSTIC OAK TABLE

Peter Brett builds a stylish occasional table



Like many woodworkers, I started making furniture because I thought I could design and make better pieces more cheaply than I could buy them. The original design of this table was determined by the wood I bought – for the princely sum of £5 – then as now, times were hard, and a bargain is not to be passed up.

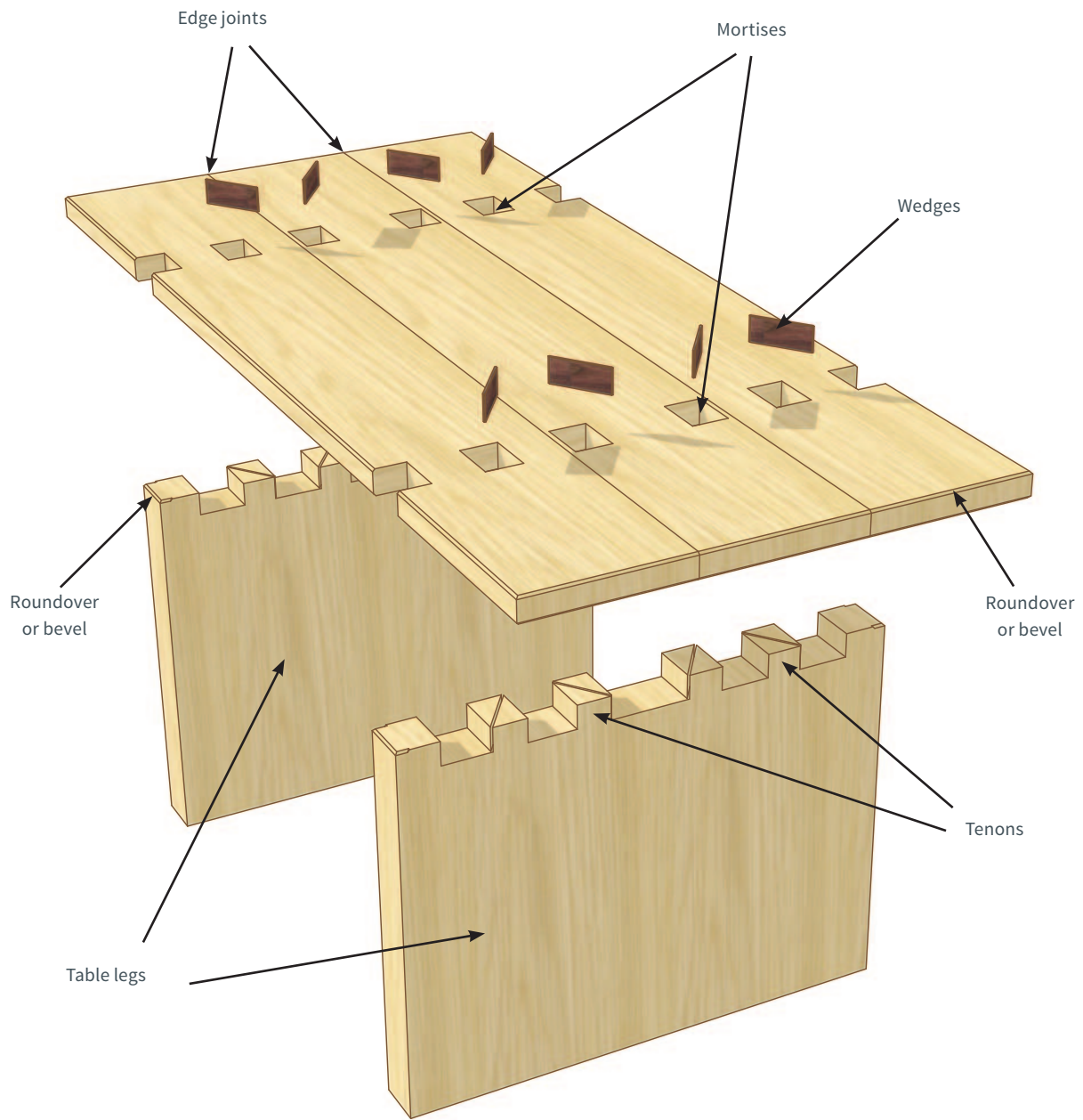
Over the years I have been commissioned to make at least five more versions of this table in different sizes with slightly different proportions. It seems that what attracts the punters is the simplicity and strength of the design, and the decorative possibilities of the wedged through-tenons.

In many ways it is an ideal design for DIY woodworkers because it provides the opportunity for some accurate handwork, as well as a chance to use a router and a simple jig, to achieve a reasonably impressive and usable result.

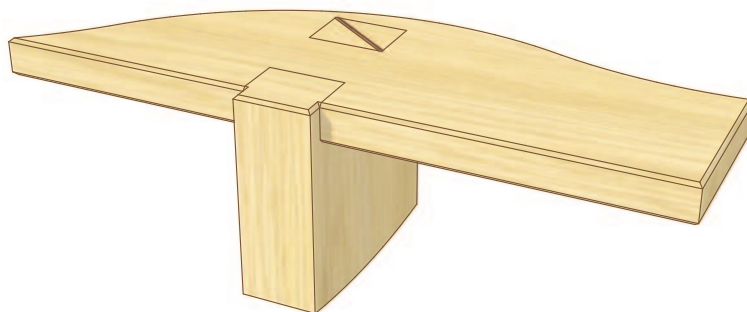
The timber

My client for this table wanted oak, not that much different from the original, which was made in ash. I live near a large national timber supplier that sells reasonably sized offcuts at a reduced price, and I usually start there before trying other timberyards. The advantage is that the pieces are often machined to standard sizes with square edges, therefore making joining easier and saving hours of preparation.

The dimensions of the table are: height 350mm, length 950mm, width 440mm – very similar to the original. I think it is important to retain the proportions of the table. Other clients have wanted slightly different arrangements, but some of them appeared clumsy and unbalanced. It sometimes helps just to have a good ‘eye’ – when it looks right, it probably is, so experiment with the roughed-out pieces to find the proportions that suit.



Leg joint detail





Joining the top

- 1 I had to thickness up some of the planks for the top to about 22mm. The table does not look good if the top is much thinner than that. I shot the edges square with a No.7 try plane. There is no shortcut here, as the edges have to fit square and close. Good technique helps, so keep the sole of the plane flat on the surface, with pressure on the front of the plane as you start and on the back as you finish. The edges have to be kept square as well, so check it with a small try square as you go. I usually use a biscuit joiner to make a solid edge joint. This helps to locate the edges and strengthens the joint.

Making the legs

- 2 The legs are in effect, two slabs of oak about 45mm thick, 450mm wide and 350mm tall. I glued my legs up from 45mm-thick offcuts until I had the required width.
- 3 Then, using a circular saw and straightedge, I cut a square reference side from which I could mark off the dimensions I wanted. It really helps if the saw blade is sharp so that you end up with a smooth, almost planed finish.

Squaring off – other ways of doing it

- 4 A square-edge jig can be made from a piece of MDF, a straight 25 x 50mm softwood batten and another softwood batten screwed at

right angles to them. This works in a similar way as a proprietary square edge, and if made large enough, will serve another turn or two in other jobs, particularly cutting up large sheet material. With two squared-off leg sections ready, it is now time to turn to the next jig for making the holes or mortises in the table top.

The mortise jig

- 5 A piece of 6mm-thick MDF is useful for jig-making as it is stiff enough and strong enough to bear the weight of a router, as well as being easy to cut and shape. Cut the MDF exactly the width of the table top, allowing a reasonable length for clamping to the top when routing the mortises. This allows clamps to be placed where they won't interfere with the passage of the router.
- 6 Start by marking a pair of lines the same width apart as the thickness of the legs (in this case 45mm) the distance from the end of the table that you want the mortises cut. The lines need to be exactly parallel. I usually make a middle mark and then space the mortises fairly evenly – the middle mark is also useful when lining up the legs to the top later. If the mortises are too small, they won't work well, so I suggest a minimum of 50mm long. I also allowed the legs to be wider than the top, allowing a half mortise slot to be made that makes the edge leg joints a feature.



- 7** Once satisfied with the spacing of the mortises – use a card pattern to test spacings – the offset for the router guidebush needs to be marked off on the width and length of the marked mortises.
- 8** I cut the jig holes with a jigsaw and metal cutting blade. The fine-toothed blade creates less splch and is easier to control. Cut just inside the lines and finish up to the lines with a fine file.
- 9** After all the marking, cutting the mortises is easy. Clamp the finished jig in place on one end and the 'upper' side of the top. At least two strong clamps are needed. With a guidebush and long straight cutter in your router (6 or 10mm dia max), plunge to about 6mm deep into the first mortise slot. Never take too much waste out in one go, as you will strain the cutter and burn the workpiece. Work carefully and plunge deeper each time, until the cutter projects through the mortise. It should be possible to avoid a split-out by plunging through in one place and then guiding the cutter round the edge.

10 Cut each mortise on the jig and clamp the jig to the other end of the table top.

11 Repeat the process and you have your mortises cut in your table top. The corners will need squaring up with a chisel, or you can leave the mortises with round edges and shave off the tenon corners.

Cutting the tenons

12 Using the cut mortises from the top as your guide, mark their positions onto the legs with a knife or sharp pencil. Use a try square to mark the cutting lines at right angles. Then with a marking gauge, mark the depth of cut from the thickness of the table top. Make it a fraction over to allow for the tenon joint to slightly protrude when fitted, so it can be planed and sanded flush. The first cuts are easy – straight down with the grain with a jigsaw or tenon saw. You could then use a coping saw to cut out the waste.



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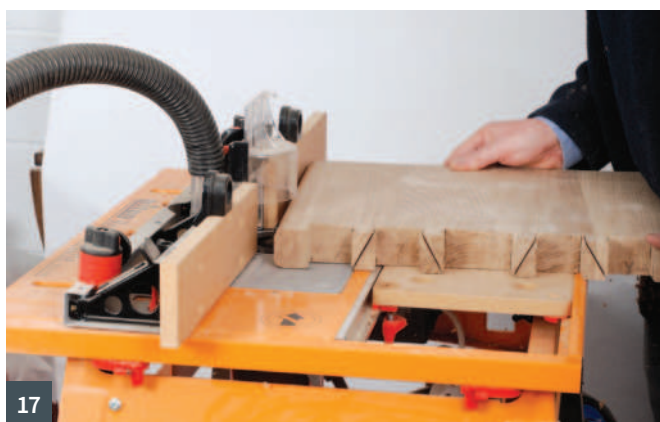
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13 I use a pro-spec jigsaw to cut the tenon shoulders, but you need to ensure that the blade does not wander and that it stays at 90° to the timber surface. Most small DIY jigsaws won't do this, so give yourself the best chance by using a pro-spec jigsaw. Failing that, use a brand new blade on the coping saw and allow some space against the line for hand finishing with a sharp chisel.

14 When chiselling, work from the marked outside line to the middle of the workpiece in small steps – do not cut large chunks as they may split out. Once you have cut to the line on one side, turn the leg around in the vice and do the same from the other marked line to the centre again. This will avoid splitting out and small inaccuracies are hidden once the leg is joined to the top. Once all the tenons are cut, it's time to fit them. This may take some time and careful work with a sharp chisel, but proceed carefully so that material from the tenons is not removed by mistake. It's a good idea to mark each leg to a set of mortises. I also mark inside and

outside, and right and left orientations so that each will be fitted only in its correct position. Despite best efforts, there may be small variations in marking joints, and this helps to avoid mistakes and gappy joints.

15 I also rounded the corners of the tenons with a fine wood file to fit the rounded corners of the mortises left by the router cutter – I think it looks better and it is easier than trying to square the corners of the mortises with a chisel.

16 Once cut, try out a rough fit of the mortises and tenons.

17 When all the joints were cut, I used a rounding over cutter on the router table to round the sides of the table legs. You may prefer a bevel or leaving them square – these details add to the overall effect of the table and are important, so choose carefully.

18 I also used the router with a bevel cutter to rout a bevel on the bottom of the legs, so that they will not split out when the finished table is pulled along the floor, for example.



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The leg joints

Once all the tenons have been fitted, consider the orientation of the wedges. I chose to do the wedges in an alternating herringbone pattern – the advantage being that it expands the tenon joints in two directions, helping to close any small gaps, and it makes for a more interesting wedge pattern. You should avoid wedges that are orientated along the long grain of the table top as it will split easily if the wedges are driven in too hard.

Another pattern to consider would be two small wedges per joint, but they will need to be carefully measured and cut to ensure maximum visual appeal. Random wedged joints just look horrible.

19 Mark the wedge positions with a pencil ...

20 ... then cut the tenons to the marked depth with a tenon saw. Accurate cutting will ensure a good visual effect from the wedges once they are knocked home.

The top

21 I always prefer to relieve the edge of a table top with a bevel or slight rounding. Before joining the legs to the top, I routed a bevel on the underside of the top. This means that the bevel is not interrupted where it meets the legs. I did not bevel the

mortise openings, but this may be an attractive option with bigger mortises.

The wedges

22 I used dark iroko to make a contrasting colour wedge to fit through the top tenons to lock them into place. They are cut on a bandsaw and carefully made all the same size by gingerly using an upended belt sander. I rounded the ends of the wedges to fit the rounded corners of the mortises. As mentioned above, I fitted the wedges diagonally across the tenons for visual effect. Remember to mirror the pattern of the wedges on the other leg.

23 When fitting the wedges, a small smear of glue will ensure they stay permanently in place. The wedges are fitted into the tops of all of one leg's tenons (support the other end of the top with the loosely fitted other leg) and gently tapped to hold them in place. Then using a mallet, in a series – one at a time – they are tapped further into place. Tap the wedges down so that they are all of an even depth. As soon as you can feel the wedges becoming too tight to hit further, stop. Any further and you might split the top or break the wedges. Repeat the process on the other leg.

24 Using a small pull saw, cut the wedges off nearly flush with the table top.



25 The tenons and wedges can be planed level with the table top using a sharp, finely set block plane.

26 The last job before finishing is to use the router with a bevel cutter and run a bevel all round the top, including the leg edges where they stand away from the top.

27 Here you can see the table bevel and wedges.

Finishing and polishing

28 Because it is made of large, flat surfaces, this table is easy to sand with a random orbital machine. I used a belt sander on the top and

legs before assembly to make sanding a bit easier. Go through the grades of paper from 80 to 240 grit and that should be enough.

29 I used Danish oil to finish, applying three coats with a cloth and sanding with 320 grit between each coat. The coats need at least five hours to dry. Overnight drying is sometimes needed, especially if the weather is cold or humid. After gently sanding the last dry oil coat, apply good quality furniture wax sparingly and then gently buff it with a soft cloth.

30 You should get a soft, subtle sheen that is very easy to look after, as well as being fairly durable.

Product news

Find out about the latest kit and tools for your workshop

New cordless finishing sanders from Makita

Makita UK has introduced two new cordless finishing sanders to its range of cordless tools. The 18V DBO381 and DBO380 Brushless Finishing Sanders are designed to deliver increased efficiency and mobility to woodworkers.

Featuring three speed settings (4,000, 8,000 and 12,000 OPM) to match the speed to the application, both models provide up to 50 minutes of run time on a single 6.0Ah battery. The 18V sanders have been engineered for efficient sanding with a 2mm orbit that removes material quickly for a swirl free, flawless finish.

For improved efficiency and user mobility, the DBO381ZU features Makita's Auto-start Wireless System (AWS) so that the sander can

be paired with a compatible vacuum for on-demand dust extraction. Utilising Bluetooth technology, AWS wirelessly powers the extraction unit on and off using the tool trigger. Furthermore, a dust box is provided with the tool as standard, and the extraction port allows for connection to any dust extraction system.

For corner sanding, the front grip is detachable and the tool-less paper clamp fastening system allows for quick paper changes and secure fastening. Constant speed control maintains the operating speed under load, optimising operation and providing the user with an even finish.

www.makitauk.com



Clarke CCO14D Abrasive Cut-Off Saw

The Clarke CCO14D is a robust and powerful 355mm high-speed cut-off saw. It is able to slice quickly and cleanly through ferrous metal bar and tube only while also featuring a quick-release vice assembly, adjustable from 0–45° for angled cutting with a carry handle for on-site handling.

This tool is ideal for use for DIY and light usage for a quick, clean and accurate finish. The CCO14D is supplied with a 355mm metal cutting disc (already fitted), reliable safety guards for safe operation, quick clamp for securely holding the material for cutting, spindle lock for easy replacing of disc while also being provided with a one year or 12 months' warranty.

www.machinemart.co.uk



JIGS FOR BOXES – PART 2

Steve Maskery makes two more jigs that will improve your box making



Although grooved joints are valid from an aesthetic point of view and are often used in box construction, they certainly have some major drawbacks: gluing between surfaces composed of 50% end grain is weak, for example. However, there are a couple of ways to make them stronger, the first and simplest of which is to insert a tab that acts as a bridge between the parts. In addition to strengthening the joints, the tab allows the sides of the box to maintain alignment while they are assembled with glue and clamps.

The first jig that I'll make in this article is used to obtain, with the saw bench and the required precision, the groove in which to insert the reinforcement.

The jig for the internal tabs

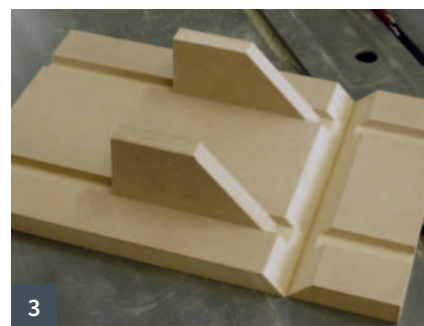
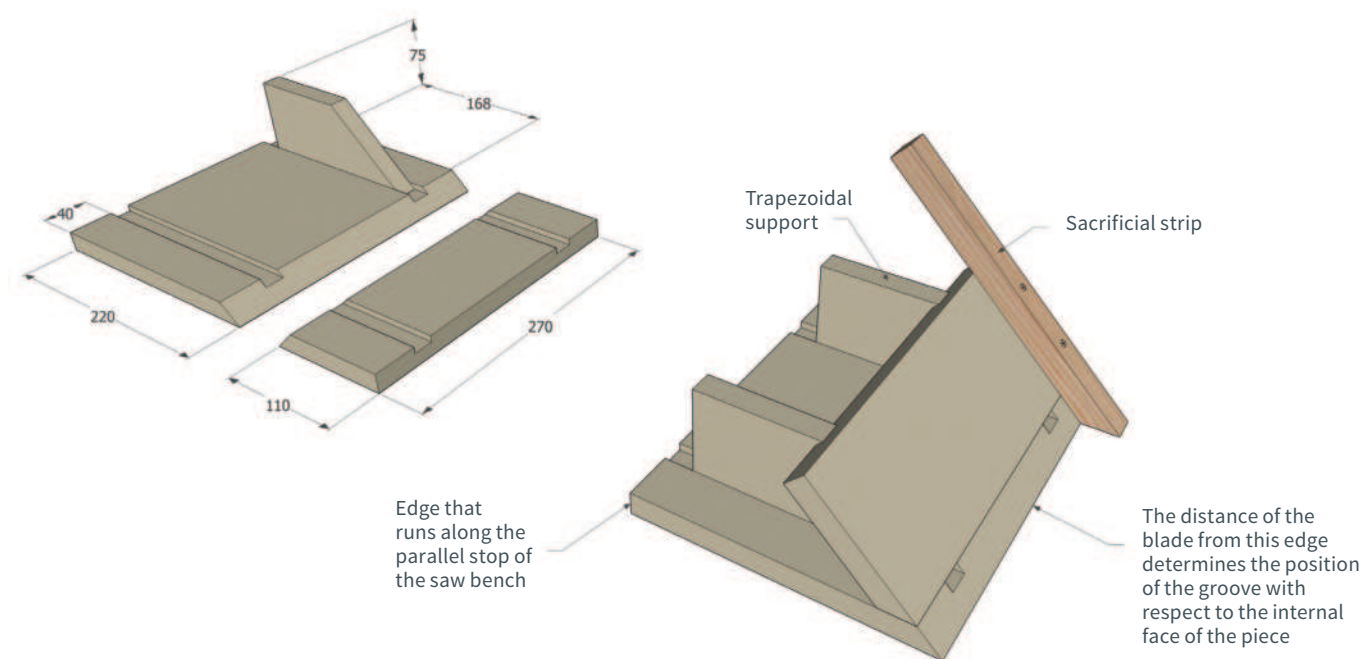
This jig consists of two MDF planes joined together at 45° through

a pair of trapezoidal supports cut at the same angle; corresponding open grooves in the two planes allow these supports to position themselves parallel to each other and align the parts correctly.

To ensure that the grooves coincide perfectly, it's best to cut them first on a whole panel (with the portable saw or router and its parallel fence) at a large enough size, and then divide this with a double cut at 45° to get the two required pieces.

The assembly of non-orthogonal components such as these can provide unpleasant surprises, so it is better to proceed carefully. First, glue the supports in the grooves of the base and then add the inclined piece only once the glue has set.

Complete the jig by screwing the stop strip onto the trailing edge of the inclined plane (not gluing it so it can be replaced when worn) that supports the workpiece.



PHOTOGRAPHS BY STEVE MASKERY/LEGNO

1 The grooves can be made with the tablesaw or with a router **2** The cuts must be made in both sides before dividing the panel with a double cut at 45° to obtain the two pieces for the construction of the jig. This means the grooves will be perfectly aligned between the two pieces **3** In the first assembly phase, only the trapezoidal supports are glued to the base. The inclined plane is added only after the initial glue has set, so that it cannot misaligned by sliding along the angled sides as it is tightened with the clamps **4 & 5** The accessory slides along the parallel fence advancing towards the blade. The piece is leaning against the sacrificial stop and thus locked to the inclined plane **6** The maximum strength of the joint is achieved when the dimensions of the tongue perfectly match those of the groove and its grain is arranged along the short side

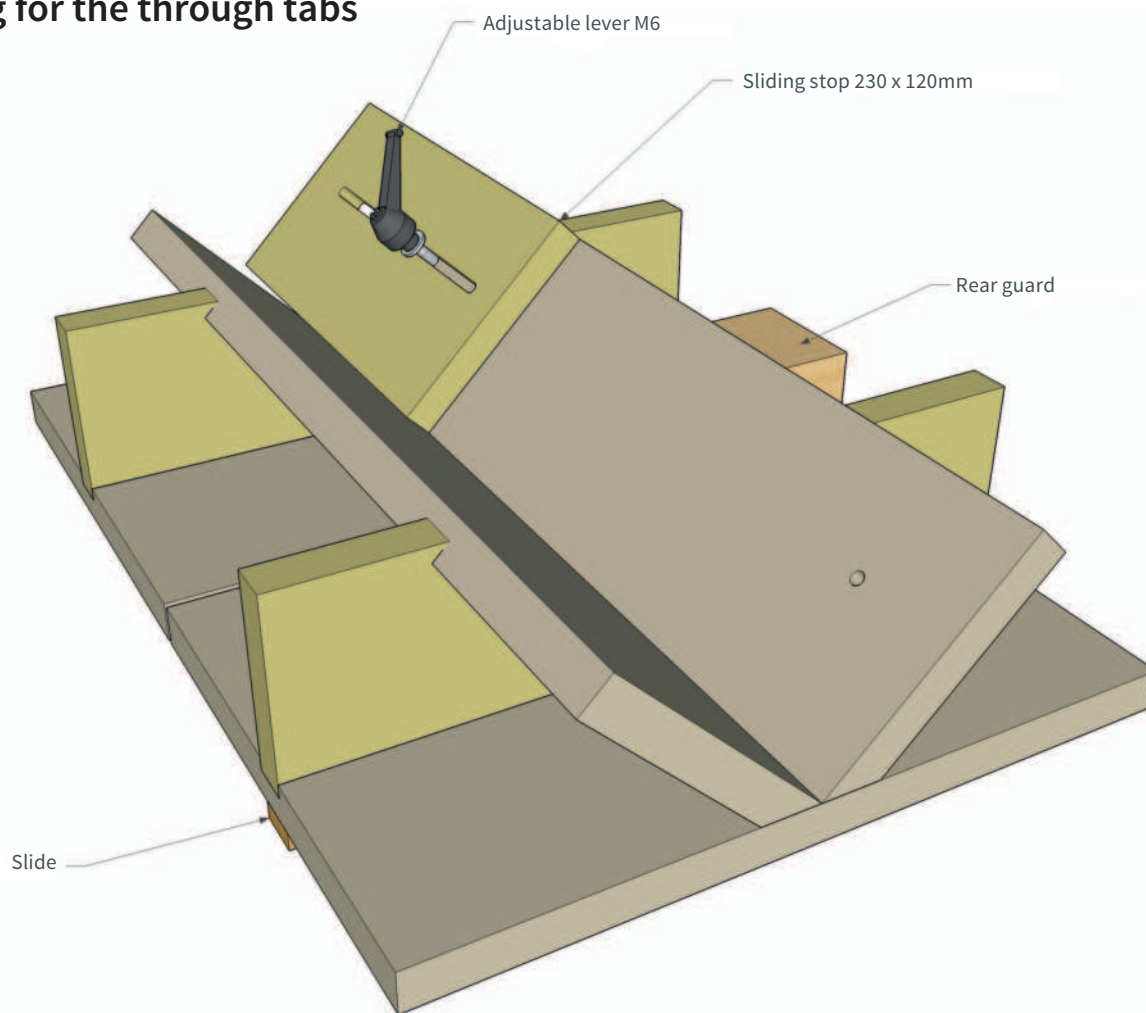
Using the jig

In use, the jig slides against the parallel guide. The offset between the 45° edge and the blade determines the distance of the groove for the reinforcement to the inside edge of the piece; for small boxes of 3 or 4mm, this should be fine but of course you must consider the height of the blade. Generally, I measure it to have a similar dimension margin with respect to the external face.

When preparing the tabs, it pays to be meticulous, not only with regards to the thickness but also the width: if they are even a hair wider than the grooves they will not close completely, and if they are narrower the gap will be obvious when the lid of the box is opened.

To obtain maximum strength, prepare the tabs with the grain arranged crosswise, i.e. along the short side of the tab.

The jig for the through tabs



The previous jig system allows you to make discrete joints, however we do not always want our joints to remain hidden. Sometimes for aesthetic reasons we want to put the construction details on display. This is the case with through tabs, arranged in the direction of the fibre, which is the system I prefer to strengthen the grooved joints and make the aesthetics of my boxes more appealing. I usually choose a contrasting coloured wood to make them but you can of course use the same one as you use for the box. For the maple and cherry box that you see in the photos here, I inserted darker tabs in bog oak.

Unlike the first jig, which involves making the housings for the tabs on the individual walls, this is used afterwards, after gluing the four sides of the box together.

This jig consists of a sort of V-shaped cradle mounted on a base. The jig slides on the table saw bench using a slide on the jig that locates in the table's groove, or runs against the saw's fence. A sliding stop built into the jig allows you to repeat the positioning of the box on the four corners and to set the pitch of the grooves. There is a guard fixed at the back to prevent the operator's pushing hand from coming into contact with the blade in the final stage of the cut.

This jig is not difficult to make even though it is a little more complicated than the other one, the only difficulty concerns the assembly, due to the complications of the angled parts and how they can become misaligned during gluing. The trick to succeeding is to split the assembly and leave time for the glue to cure between one step and the next.

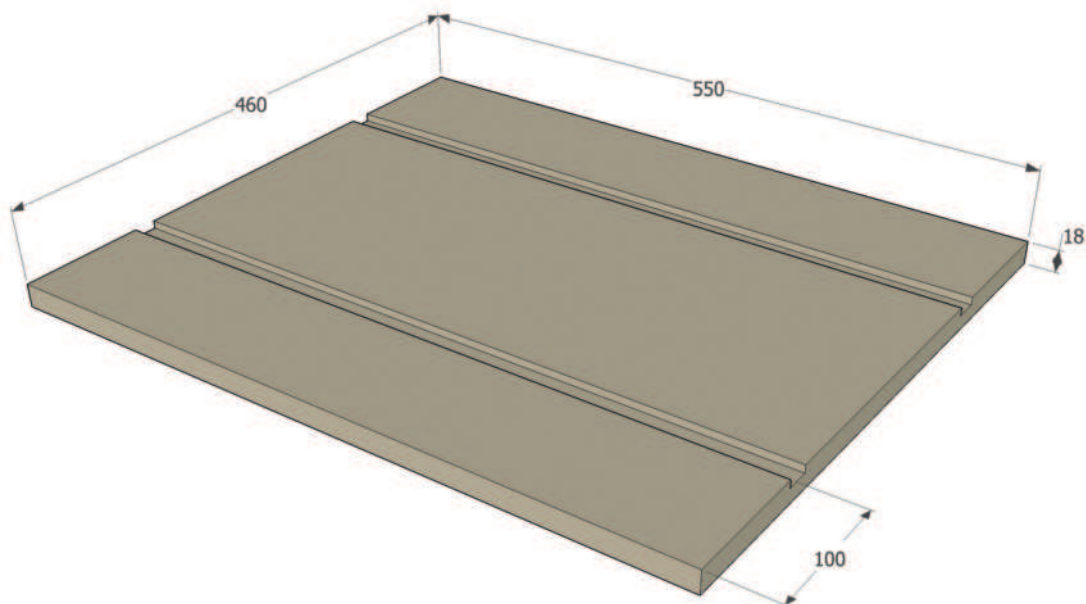
The construction begins with a panel of MDF, big enough to obtain both the base and the inclined sides of the cradle. Before proceeding with the dividing, make the two grooves in which the four supports of the cradle will be inserted.

Divide the panel into the three components, make the angled cut on the two sides of the jig but leave a flat part of 2 or 3mm which will help the alignment of the pieces.

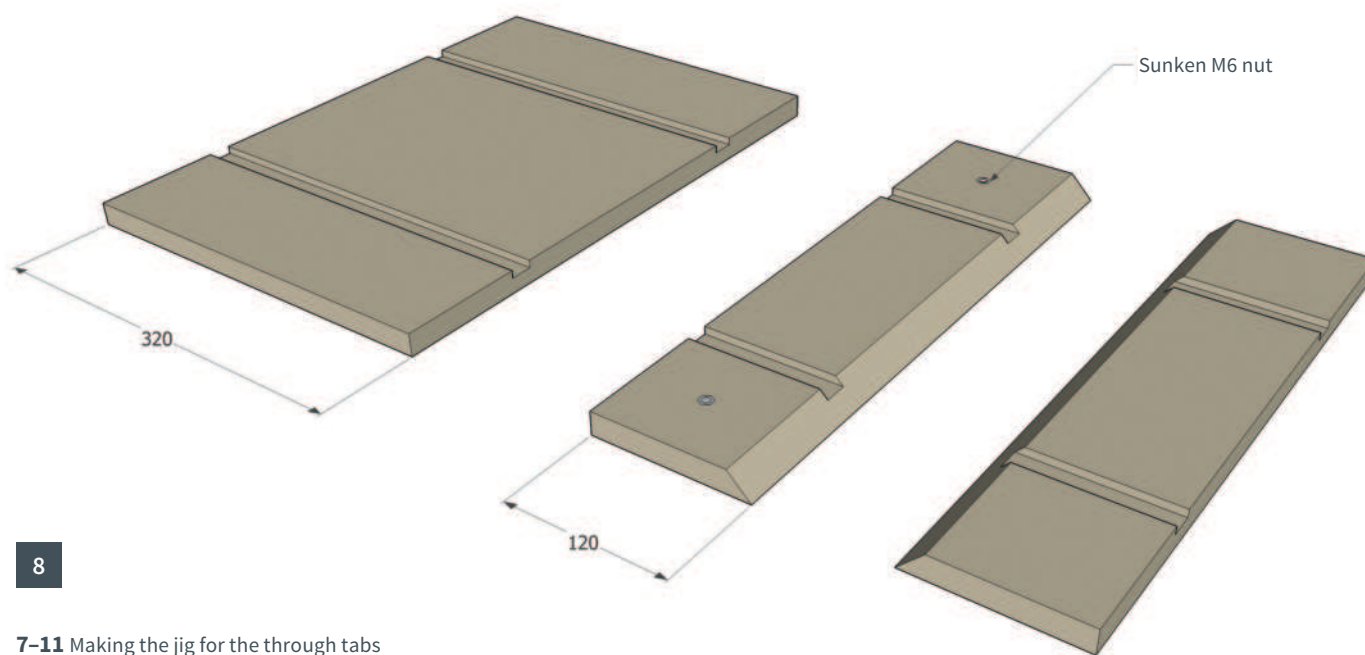
Glue the two trapezoidal supports in the grooves of the base surface, flush with the front edge. Then, on what will be the inclined wall on the operator side, proceed to embed two spider nuts at approximately half height of the piece; these are used to fix the mobile stop which can be mounted on the right or left as needed. Next, glue the front side of the cradle to the already prepared angled pieces.

Prepare a block of wood and chamfer one side at 45°, then complete the assembly by adding the second side of the cradle and gluing the block against it, at the bottom and in the centre. When the jig is used, at the end of the cut, the uncovered portion of the blade will slip into this block without endangering your hands; it is undoubtedly a basic but very effective system.

The mobile stop consists of a simple MDF box on which a slot for the passage of the adjustable lever needs to be cut; the slot will have to be at the same height as the previously recessed nuts. Finally, complete the construction by screwing the slide under the base, so that the blade crosses the base of the accessory centrally.



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7-11 Making the jig for the through tabs

Using the jig

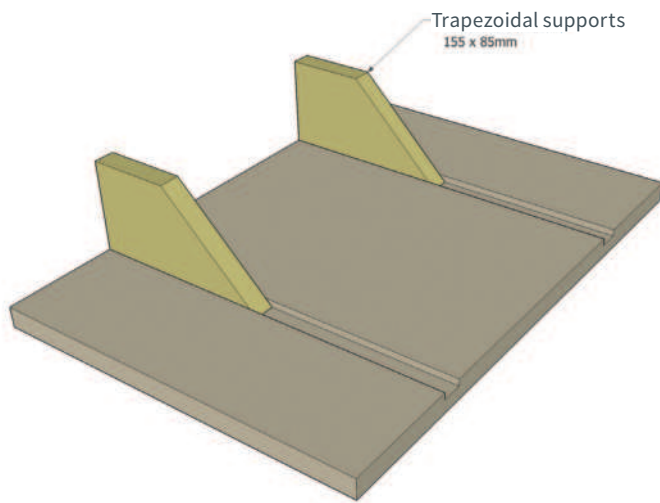
There are two things to keep in mind when setting the cuts: the spacing of the tabs – which can be set through the movable stop – and their length (in the portion visible from the outside on the sides of the box), which is established by the blade height. The maximum height to which the saw can cut depends on the thickness of the walls of the box.

Generally, the best result is obtained when the two measurements match, or when the length is equal to the thickness, which is achieved with a cut that stops halfway between the external and internal edge. To accurately calibrate the height of the blade, you can use a piece of scrap wood, marking the thickness of the walls

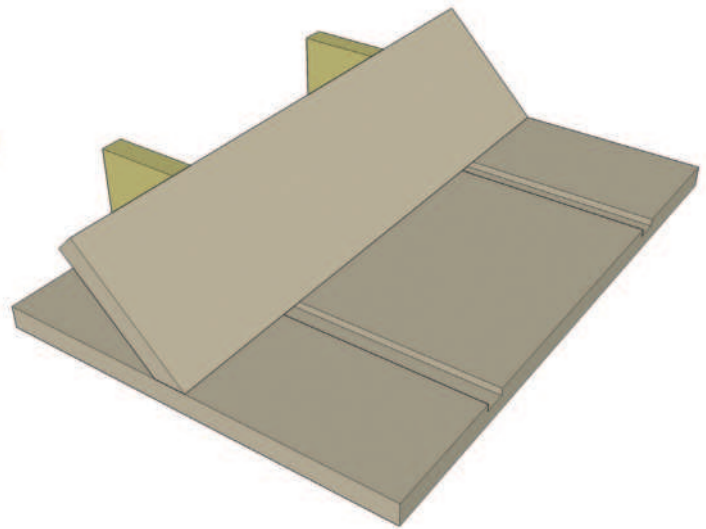
on it, which will also prevent the blade from splintering the sides.

When setting up the blade in this way, remember to leave the board in place, otherwise the cut will be deeper than desired; don't ask me how I found out ... Instead, a ruler can be used to adjust the movable stop. The spacing can be as desired but generally it is better if the spaces are even. If the lid is cut from the height of the box, it is important to consider the thickness of the cut when calculating the spacing.

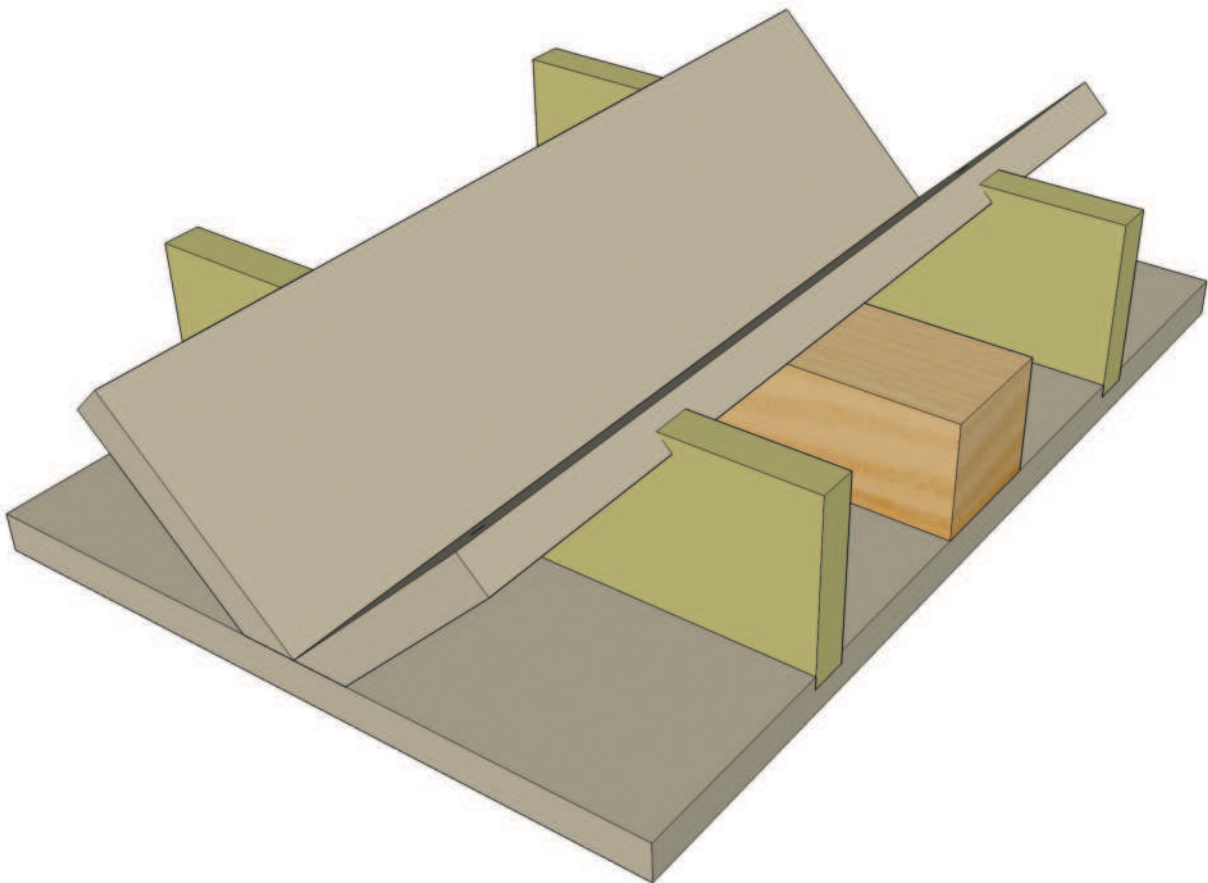
When you're creating the different grooves, the box must be handled with care, due to the inherent weakness of its joints; in this case, gluing the tabs is done long grain on long grain and will make them strong.



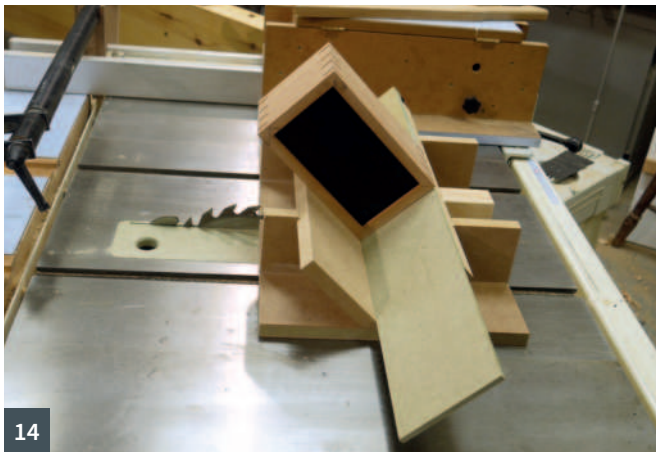
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10



11



12 The correct height of the blade can be set with a test piece on which, starting from the lower edge, the length is marked for the exposed portion of the tongue. Set a lower height than the estimated one and gradually raise the blade until the groove it leaves touches the mark **13** For setting the sliding stop, which establishes the distance from the edges and the separation between the grooves, the groove left by the blade is taken as a reference **14 & 15** The box should be placed against the board with which the height of the cut was recorded and then placed against the sliding stop. Then the jig is advanced towards the blade until the blade does not touch the rear guard. The saw is turned off, the jig moved back and the box turned to cut the next groove **16** If the lid is made by cutting the box, the spacing of the grooves must take this into account. On this box the distance between the edges and the inserts is constant, except between the first and second tabs, where it increases by 4mm to allow for the thickness of the cut



TREES OF LIFE

Lauren Jarvis discovers why
old-growth forests are essential
for protecting the planet's
biodiversity and fighting
climate change



PHOTOGRAPHS BY SHUTTERSTOCK

Forests cover 31% of Earth's land area, which is 4.06 billion hectares or 10 billion acres. Of this, 36% is primary forest, also known as virgin, primeval or old-growth forest. According to the International Union for the Conservation of Nature, a primary forest is a 'naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed'.

Some of the most critically important habitats on Earth, these old-growth forests are home to myriad animals and plants, as well as being essential carbon sinks, absorbing enormous amounts of CO₂ from the atmosphere and playing a crucial role in the fight against climate change. Here, we take a roam around some of these most precious areas and explore if there's a way to manage their resources more sustainably.

Carpathian Mountains, Romania

Forming an arc across central and eastern Europe, this magnificent mountain range hosts the continent's largest area of virgin forest, including some 500-year-old trees. The incredible region is home to the largest remaining European populations of large carnivores, including bears, lynx and wolves, and many other species, such as capercaillies, owls and woodpeckers.

Sadly, these precious forests are under threat from commercial and illegal logging practices, poaching and hunting. Conservationists, scientists and the Foundation Conservation Carpathia are working to protect a vast area of the Carpathian forests, restoring the ecosystem and creating a national park, which they hope will become the 'European Yellowstone'.

Foundation Conservation Carpathia acquires and protects forests and grasslands for the benefit of biodiversity and local communities. See carpathia.org

Amazon, South America

The world's largest tropical rainforest – this symbol of epic wilderness and adventure, and the famous 'lungs of the planet' – is in peril. The Amazon covers 2.6 million square miles of South America – mainly in Brazil, but also Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname and Venezuela. It makes up almost a third of all tropical rainforest left on Earth, but it is being dangerously plundered

and deforested at an incredible rate: according to WWF, an area the size of a football pitch is destroyed every 12 seconds.

Covering 1% of the planet's surface, the Amazon is home to an astonishing 10% of all known species, so its value is immense. Research by WWF shows that a new species is discovered every three days here, joining the rainbow of life we already know and love, including pink river dolphins, hyacinth macaws, emerald tree boas and golden jaguars.

Indigenous people have long used the forest for food, shelter and medicine, but for many years, logging companies have driven their way deeper into their lands, cutting away primary forest for timber, urban development, mining and cattle farming: 17% of the forest has been destroyed, and indigenous people have been displaced and even killed. Across the Amazon, fires are also lit to clear land, with the deforested regions becoming more susceptible to devastating wildfires and releasing huge amounts of CO₂ instead of absorbing it, which is fuelling climate change. The time to fight for the Amazon is now.

WWF is campaigning to save the Amazon rainforest and has lots of ways for people to help. See wwf.org.uk





Daintree Rainforest, Australia

A Unesco World Heritage Site, the Daintree is the largest continuous stretch of tropical rainforest in Australia and holds the prestigious title of the world's oldest rainforest, at 180 million years old. Home to generations of Aboriginal people, the forest was recently returned to its original custodians in a historic deal and will now be managed by the Eastern Kuku Yalanji people, alongside Queensland's state government.

Full of magical creatures, including crocodiles, possums, tree kangaroos and ostrich-like cassowaries, the area holds the best representation of the plants and animals that populated the ancient continent of Gondwanaland. It is also home to 90% of Australia's bat and butterfly species

Covering 463 square miles, Queensland's Daintree National Park encompasses mountains, waterfalls, gorges and rainforest that runs right to the edge of the ocean, meeting another of the country's natural wonders: the Great Barrier Reef.

Although protected, development around the Daintree and the introduction of non-native plants are threats to the forest's unique biodiversity, so Rainforest Trust Australia is working to expand the park's borders with a 70-acre buffer zone that will help to protect this critical habitat.

Rainforest Trust Australia is dedicated to the protection, extension and recovery of Australia's natural landscapes. [See rainforesttrust.org](http://rainforesttrust.org)

Congo Rainforest, Central Africa

The Congo Basin contains 1.2 million square miles of primary forest, which spans six countries in central Africa: the Democratic Republic of Congo, Cameroon, the Central African Republic, the Republic of Congo, Gabon and Equatorial Guinea. This is the world's second-largest tropical forest, and its ancient trees are a vital weapon against climate change, soaking up 1.2 billion tonnes of CO₂ each year.

A biodiversity hotspot, the lush rainforest is home to several unique and endangered species, including lowland and mountain gorillas, forest elephants and okapis, which live alongside indigenous communities. But illegal logging, mining, petroleum exploration and palm-oil plantations have eaten away large areas of forest in the Basin, and in 2019 alone, 590,000 hectares were destroyed. Now there are plans to lift a 20-year ban on new logging permits, which could lead to a climate and biodiversity catastrophe, with an area of forest the size of Britain – including carbon-sequestering peat swamps – at risk of being lost. With conflict and poaching also taking their toll on the region's people and wildlife, protecting the indigenous population's rights and land is vital and urgent.

Rainforest Foundation UK advocates for indigenous rights and rainforest protection. [See rainforestfoundationuk.org](http://rainforestfoundationuk.org)



Tongass National Forest, US

Tongass is the world's largest and oldest coastal temperate rainforest, and the largest national forest in the US. Stretching across 17 million acres of south-east Alaska, this spectacular realm is a nature-lover's paradise and home to grizzly bears, wolves, moose, humpback whales, orcas and all five species of Pacific salmon. Coastal temperate forests are found in wet, cool climates where marine air and mountains combine to create heavy rainfall.

Old-growth forest of hemlock, spruce and cedar rises above land sculpted by ancient glaciers, remnants of the last ice age. The forest, which includes 800-year-old trees, is the traditional homeland of the Tlingit, Haida and Tsimshian people. It is also one of the world's most effective carbon storehouses, holding more than 1.5 billion metric tonnes of CO₂ and sequestering an additional 10 million metric tonnes each year.

In 2001, the Roadless Area Conservation Rule was introduced in the US to protect national forests, including Tongass, from industrial clear-cut logging, but the forest has remained under threat from attempts by various administrations to harvest the region's rare and valuable old-growth trees.

The Natural Resources Defense Council protects wildlife and wilderness from the threats of industrial development. [See nrdc.org](https://www.nrdc.org)

Sustainable forestry: healthy forests, healthy planet

Sustainable forestry ensures the long-term health of forests while providing social, economic and environmental benefits from harvesting. Sustainable forest management decisions and activities are based on scientific research, rigorous planning, certification standards and meaningful public consultation.

Sustainable management also supports ecosystem services, such as water purification and carbon storage, while preserving the health and diversity of forests. Replanting after harvesting aids the regeneration of forests and the habitats they contain. This is a core principle of sustainable forest management.

Forests, when sustainably managed, are one of our most important natural resources. They are the ultimate renewable, and one of our greatest tools in fighting climate change. They clean the air we breathe, filter the water we drink and provide opportunities for a diversity of communities.

Certification standards, such as the international Forest Stewardship Council and North America's Sustainable Forestry Initiative, help to ensure that forests are managed sustainably and that forest products come from well-managed forests, too.

Protecting the world's forests is one of the most cost-effective forms of climate action: forests act as carbon sinks, absorbing roughly two billion tonnes of carbon dioxide each year. They are also increasingly managed for resilience in the face of climate change's effects. Practising climate-smart forestry focuses on actions like increasing the diversity of tree species to make forests more resilient to wildfires and pests. According to the US Forest Service, 100 trees remove 53 tons of carbon dioxide and 430 pounds of other air pollutants every year.

Sustainable forestry is focused on nurturing a positive relationship between people who live near forests and work in them, and the goals of a sustainable marketplace and healthy forests. Sourcing products from a sustainably managed and certified forest helps to conserve our planet's precious wildlife and natural resources. As consumers, we should be checking that wood or paper products are FSC certified, or that any palm oil in the products we buy is RSPO certified. Communities rely on forests for jobs and economic development, sustainable products, recreation and health. These links between people and forests have always been important, but are even more relevant in an increasingly connected and changing world.

Logging companies need to ensure they are implementing sustainable forestry practices that protect the environment every day. Sustainable management enhances water quality, protects wildlife habitat, accounts for wildfire risk, counters invasive species and recognises indigenous rights. Trees should be harvested according to forest-management plans that are based on science, regulations and certification standards. The Sustainable Forestry Initiative trains thousands of loggers in each year. When they are aware of the importance of their role and responsibilities, they're better equipped to protect the environment. Loggers are key players in helping to solve some of today's biggest sustainability challenges.

With thanks to the Sustainable Forestry Initiative. [See forests.org](https://www.forests.org)

TUDOR-STYLE BENCH

Vic Tesolin makes a simple bench with rock-solid interlocking joinery



PHOTOGRAPH BY VICTESOLIN, UNLESS OTHERWISE STATED

As you look at furniture throughout the ages, you start to realise that the joinery and overall construction remains the same. What does change over the years, however, is the styling and aesthetics. This Tudor-inspired bench is a fine example. This piece uses some simple, rock-solid joinery that you would expect to find on a bench of this type but what sets it apart is the styling. Don't be afraid to experiment with the shapes and curves – it's not like you have to worry about losing your head over it.

I chose to use tulipwood for this build because my plan is to finish the bench with paint. The original would likely have been done in oak but I have exercised my poetic licence and opted for a different look. That's one of the best things about being a woodworker, you can make things how you want them.

TIMBER CUT LIST

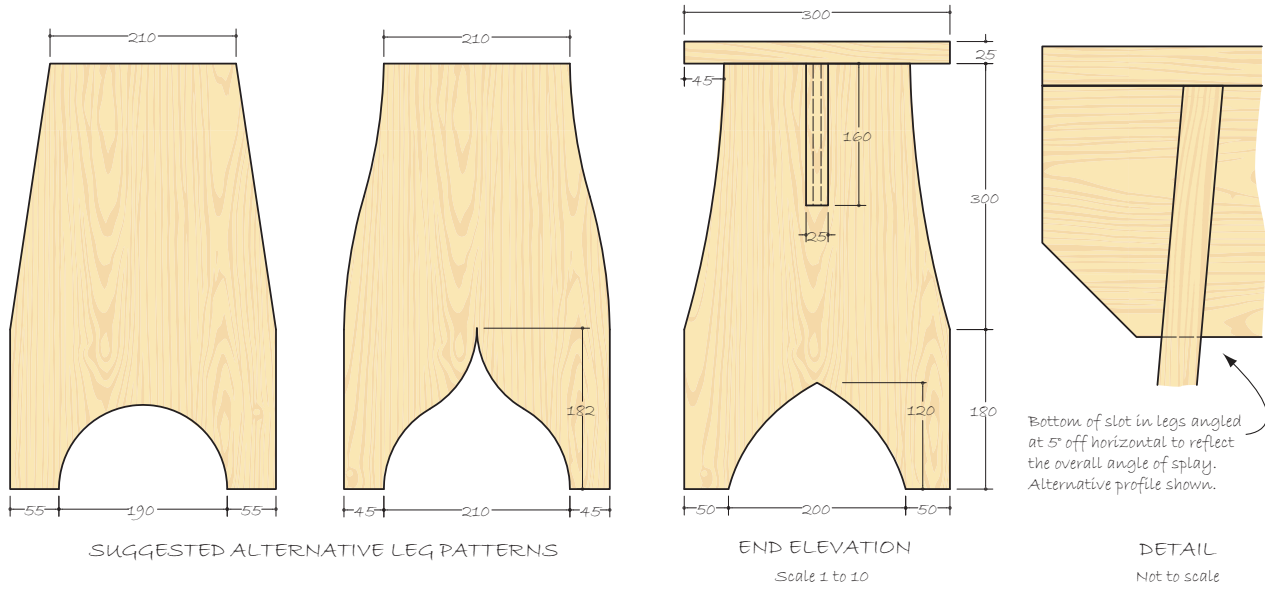
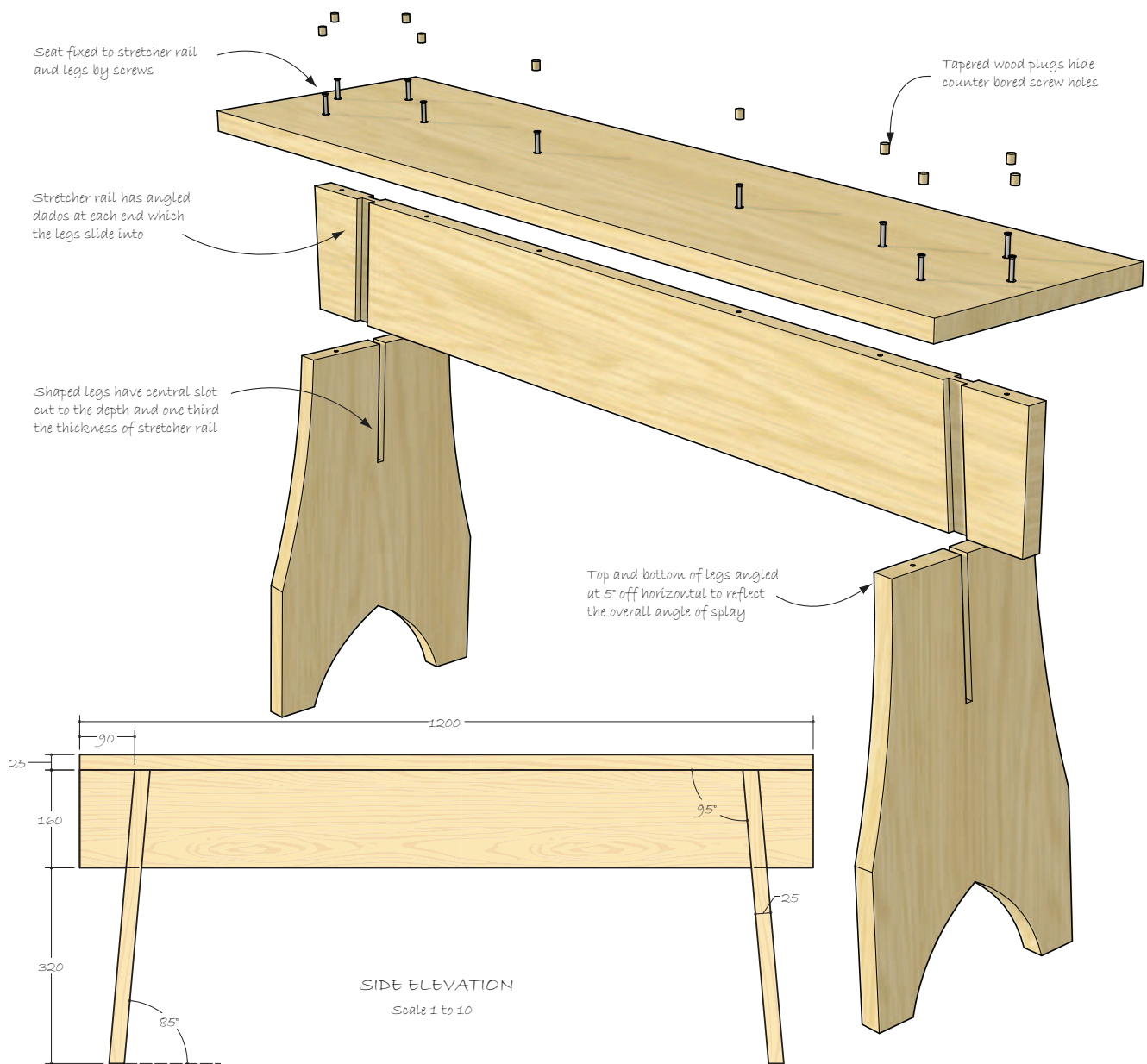
(Length x width x thickness)

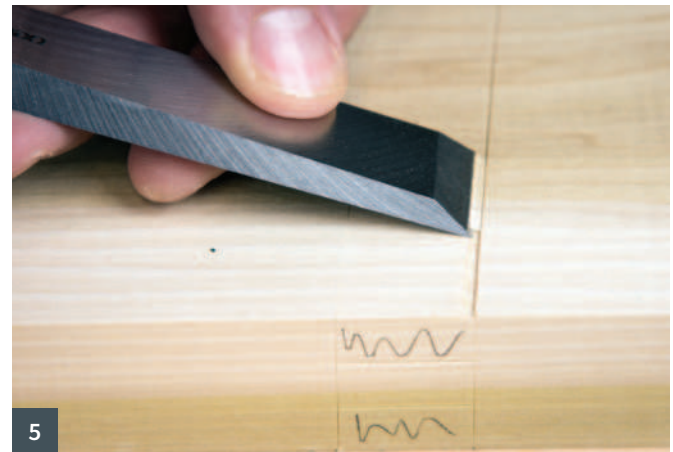
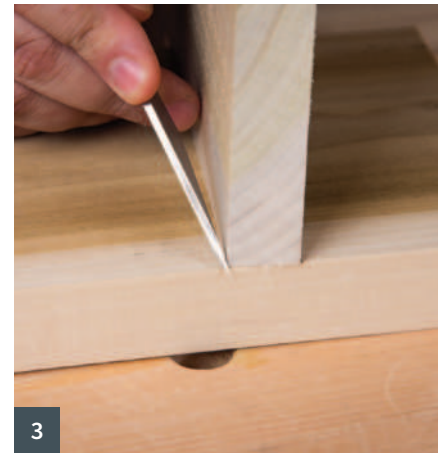
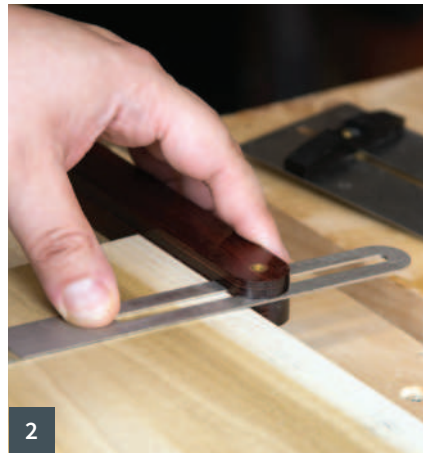
- **Legs:** 480 x 300 x 25mm
- **Seat:** 1,200 x 300 x 25mm
- **Stretcher:** 1,200 x 160 x 25mm



PHOTOGRAPH BY SHUTTERSTOCK/KEVINVICTOR

Tudor furniture in the kitchen at Hampton Court Palace





1 Keep the parts straight with the cabinetmaker's triangle **2** Make light strokes with the knife for accurate lines **3** There's no need to measure: use the actual parts to ensure accuracy **4** Set your marking gauge once you divide the thickness into thirds **5** The knife wall will help guide your backsaw

Break out

Start with breaking out your lumber according to the cut list provided. One of the nice things about this build is that you can dimension all of the components ahead of time and then cut the joinery. Be patient and wait to cut all the curves after you have cut the joinery because the parts will be easier to hold on to if you leave them square. Mark all of your components with a cabinetmaker's triangle so you can keep track of them. You really can't go wrong using this method to mark your work because your pieces will always be in the right orientation as long as they form the triangle. This will be important for later steps because each joint will be cut and fit individually. Putting the left leg into the right leg's position may not work, so take the time to mark your components.

The bench gets its strength from the dados the legs will slide into. The legs will sit at a slight angle, in this case 5° of outward splay. Start with laying out the angled dado on the stretcher. Locate the two inside shoulders of the dados according to the drawings. Set your bevel gauge to 95° and place it on these marks and strike a knife line.

Place your leg parts up against the knife line you struck and make another mark denoting the thickness of the leg. Some people would measure and transfer this mark but this technique will fail if your leg dimensions are off by even a small amount. It is safer to use referential methods for this step – in fact, I use referential techniques as often as I can in woodworking. Place your knife into this mark, bring your bevel gauge to the knife and strike a knife line parallel to the first. Carry these lines onto the other side of the stretcher and the edges to

complete the angle layouts. Leave the bevel gauge set to 95°, you will need this setting again in a later step.

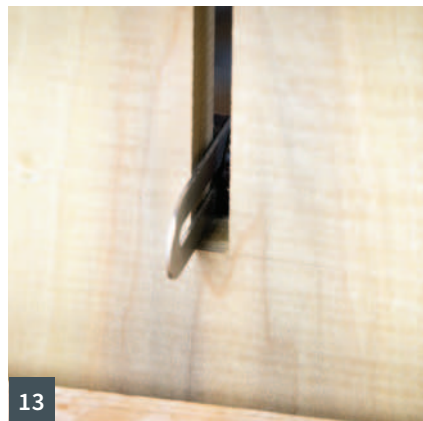
The dados

The dados are going to be $\frac{1}{3}$ of the thickness of the stretcher. Again, don't worry about the maths here, simply use a small divider to step off the thirds then set a marking gauge to the mark and you're ready to go. Mark your depths and then mark your waste with a pencil so that there is no confusion about what material needs to come away.

To cut the dado, start by creating a knife wall with the lines that you struck. Now place your backsaw into the groove you created and saw to depth. If you are worried about sawing straight, there is no shame in using a jig to ensure that your cuts are perpendicular to the surface. Keep an eye on those depth lines so that you don't cut past them and weaken the joint.

Pick a bench chisel that is slightly narrower than your dado and start removing the bulk of the waste. The goal is to leave about 1mm of waste to remove with a router plane so don't get too carried away. Be sure to not simply drive the chisel out the back end of the dado. Doing this will lead to splashing on the other side making a mess of the joint. Always work inwards from both sides to avoid the dreaded splch.

With the bulk of the waste removed, set up a router plane to the final depth of your dados and set a stop if your router is equipped with one. Bring the router blade up to where you left off with the chisel and begin nibbling away the remainder of the waste.



6 A jig can help you learn how to saw straight **7** Be sure to keep both hands behind the chisel edge – safety first **8** Router planes are perfectly suited for making a clean, flat surface **9** Transfer the thickness carefully with a marking knife **10** Mark the waste and make sure you don't saw on the wrong side of the line **11** A panel saw is the best choice for deep cuts **12** Come in from both sides with a chisel to remove the waste **13** Use the sliding bevel to check the bottom of the slot **14** Use a plane to bring the top of the leg flush with the stretcher

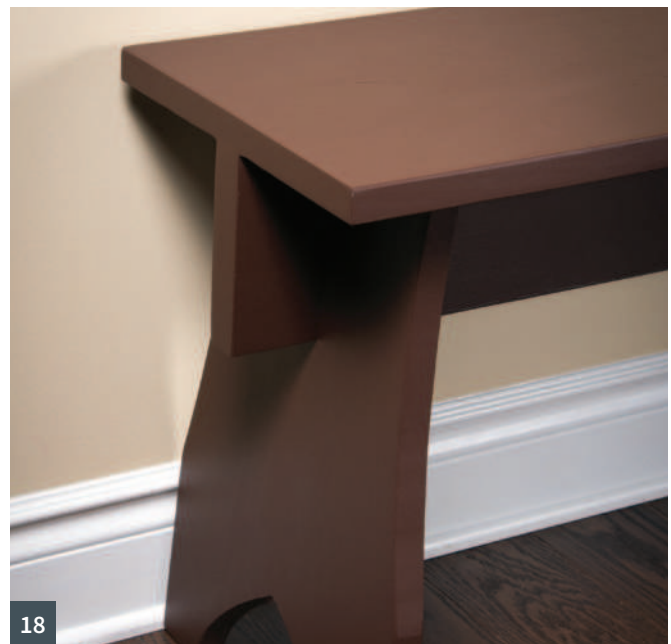
The legs

Lightly mark a centre line with pencil on the top of the leg parts. Centre the leg on the stretcher and mark the web of material onto the leg. These marks will be the amount of material you need to remove in order to slide the legs into the stretcher. Use the stretcher's width to set the depth of cut you will make into the leg with the saw and use a square and knife to carry the lines down to this depth. Feel free to darken the knife lines with some pencil graphite to make them easier to see.

Use a panel saw to saw out the waste being mindful of your layout lines. Remove the fillet of waste by chiselling down from both sides of the leg until it comes free. In order to get the leg to sit properly,

you have to make the bottom of this groove 95° to match the angle of the dado. The bottom of the groove needs to be angled downwards going from the inside to the outside of the leg. Start to angle the bottom and use the still set bevel gauge to monitor your progress.

Dry fit the legs to the stretcher to make sure everything is fitting. The legs should slide in with moderate hand pressure. If there are any tight spots, remove a bit of material from the sides of the groove, not the dados on the stretcher. Another potential hang-up can be the thickness of the leg not fitting into the dado. In this case, simply hand plane a small amount of material adjacent to the groove to thin it down slightly. You will also have to plane a 5° bevel on the top of the legs to bring them coplanar to the stretcher.



15 Make a half-pattern to help keep the form symmetrical **16** Always drill pilot holes for your screws to prevent cracking **17 & 18** A coat of paint will give this classic design a more modern look

Shaping and assembling

Now for the fun part: the shaping of the legs and stretcher. You can use the provided drawings or you can come up with your own shapes that you find pleasing. I find making a half template makes it easy to ensure that your parts are symmetrical. Make your marks and saw them out with a bow or coping saw then refine the cuts using rasps/files and spokeshaves.

Assemble the legs to the stretcher using glue, remembering that glue is not a lubricant so the joint may need a bit more pressure to come together. Put glue on all the surfaces of the dado to help lock things up. While the glue dries, prepare the seat by carefully marking out the centre line and the leg locations on the top. These lines will guide your fastener locations. Traditionally this bench seat would have been attached with nails or wooden pegs. I have chosen a more modern approach to counterbore holes to receive screws and then finished off with tapered plugs to hide the fasteners. There is no need to use glue when attaching the seat, the screws on their own will be just fine. As for spacing, don't drive any screws closer than 50mm from the edges to

prevent cracking. You can also use a divider to mark off the locations of the screws along the length. Doing this will give you a nicely spaced set of plugs and it's just good practice.

Finishing

Once the bench is assembled, go around it with a small plane and remove any sharp arrises and round-over the top of the seat so it is comfortable. A simple oil finish would work well for this project if you want to see the wood. In my case, I decided to go with a dark brown paint that I think will age well with the piece. Don't get too hung up on the type of paint to use. In this case I went with a high-quality, matte-finish, interior house paint. This particular brand has primers in the paint so two coats were all I needed.

There are many lessons we can learn from studying furniture of the past but don't feel that you have to mimic the aesthetics. For me, the learning came from the joint construction but I wanted a more modern look. Don't be afraid to flex your design muscle in the workshop, you'll be pleasantly surprised when you do.

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is more

TABLE ROUTING

Stuart Lawson explains the advantages of table routing and makes a large and small table

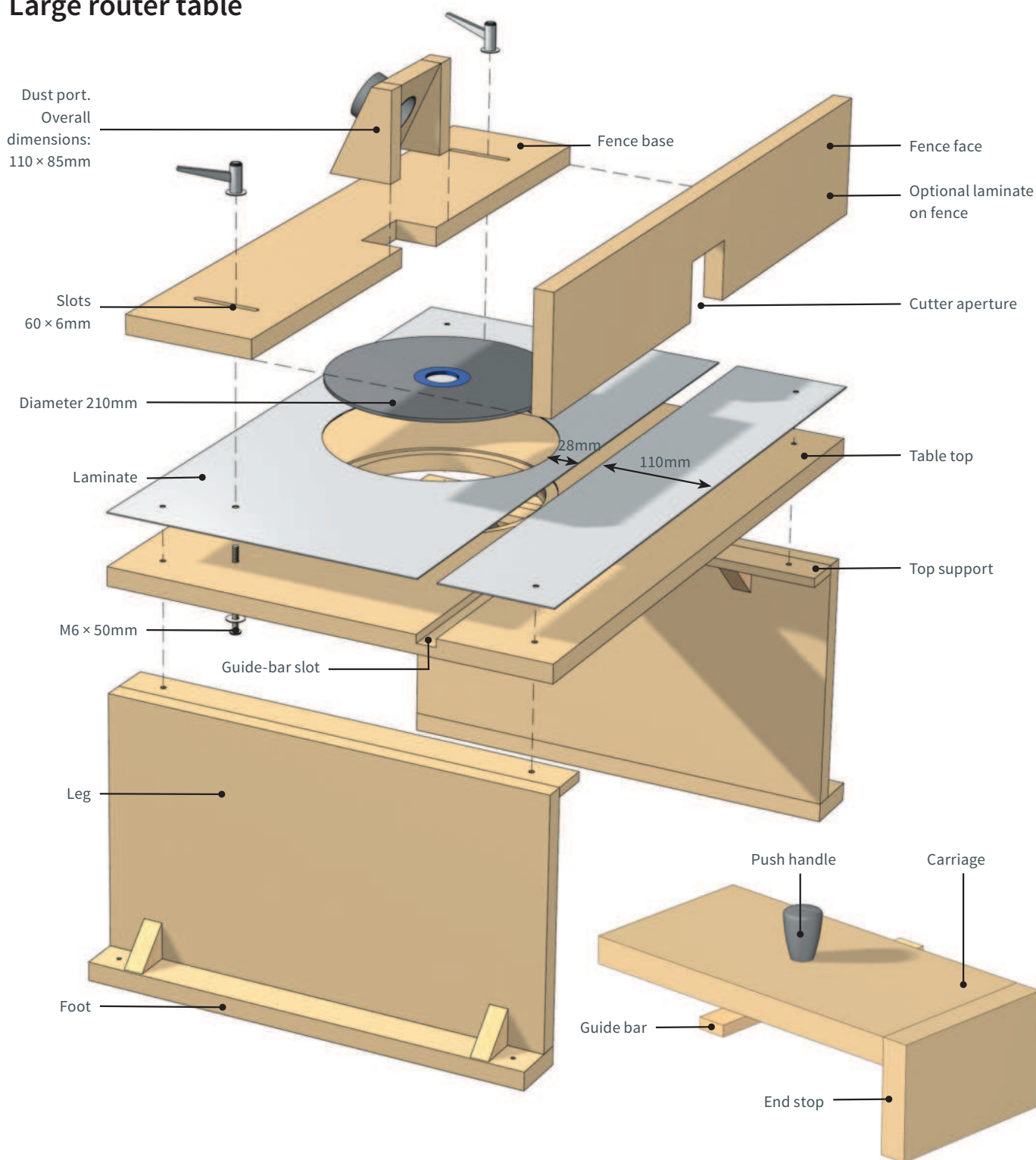


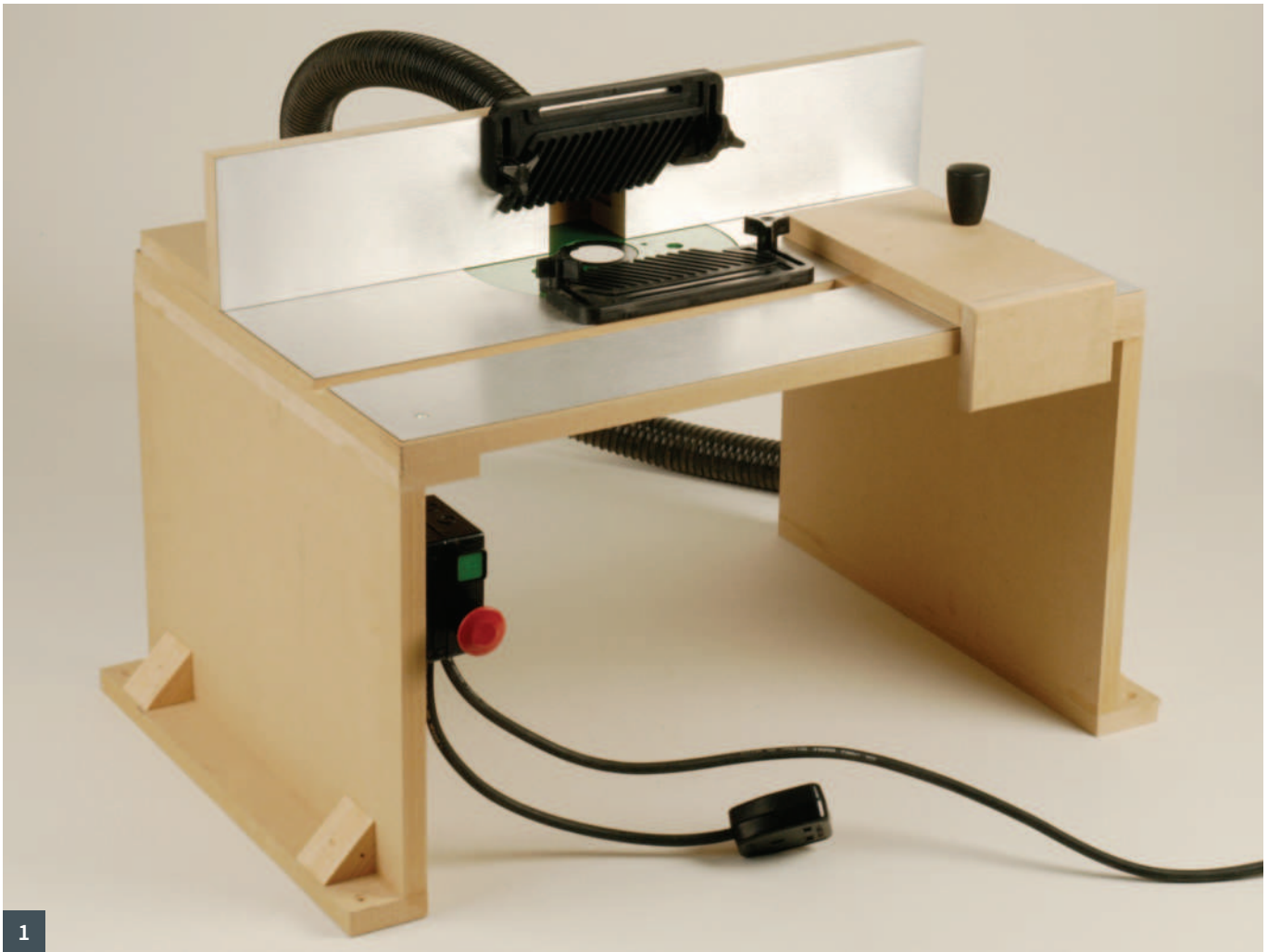
Routing: A Woodworker's Guide by Stuart Lawson, GMC Publications, RRP £16.99, available online and from all good bookshops.

Routers are generally thought of as hand-held tools, but that isn't the only option. Not that table routing is massively different – the router is simply inverted and mounted under a stationary surface. The main upshot of this is that the workpiece is brought to the cutter, rather than the other way round.

Table routing solves many of the problems presented by routing freehand, simply because it becomes easier to control the workpiece. Edge moulding, template following, joint cutting and many other applications are well suited to the table. If you have purchased a router and become enthused by its possibilities, table routing is the way forward.

Large router table





1

1 The large router table is simple to build and makes a good proprietary set-up

Despite costing very little to make, this large router table will work as well as a proprietary set-up – providing you spend the time getting every detail right. In my experience, it will take the average beginner up to four days to make this project. The small circle jig (see page 90) is needed during the construction process.

CUTTING LIST: LARGE ROUTER TABLE

TABLE:

- Top: 600 x 430 x 18mm
- Top supports (2): 430 x 40 x 18mm
- Legs (2): 430 x 324 x 18mm
- Feet (2): 430 x 60 x 18mm

FENCE:

- Face: 600 x 110 x 18mm
- Base: 600 x 140 x 18mm

SLIDING CARRIAGE:

- Carriage: 230 x 120 x 18mm
- End stop: 120 x 75 x 18mm
- Guide bar (hardwood): 150 x 20 x 8mm

Constructing the large table

COMPONENTS

Cut the component parts slightly oversized and then true the edges with a hand plane. Make sure that they are square and square-edged.

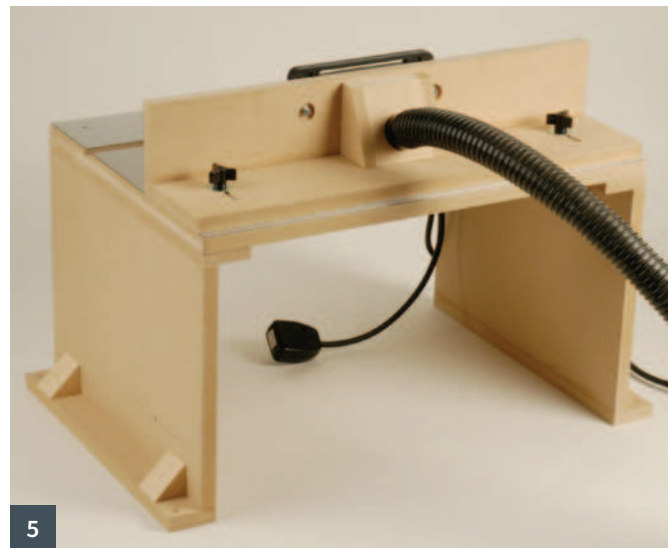
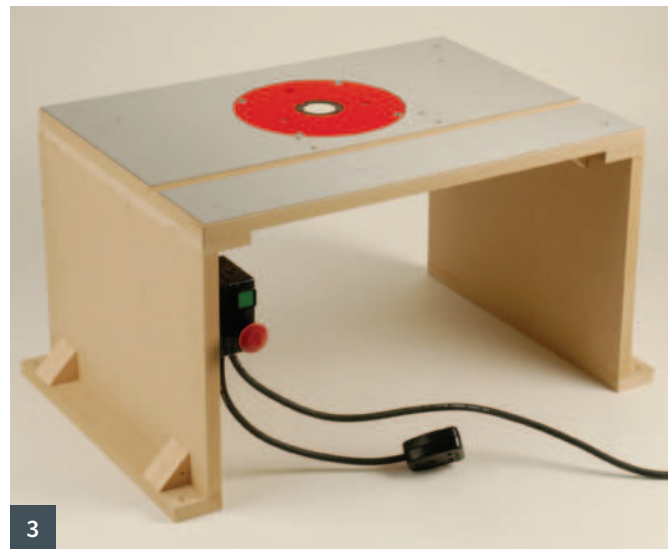
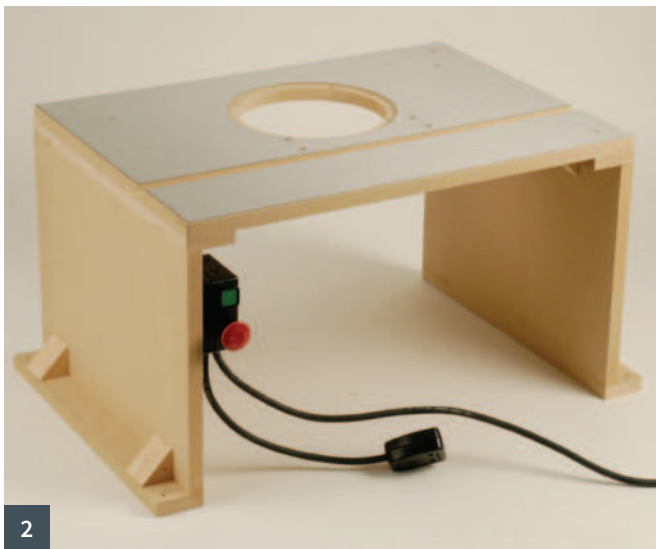
PRE-LAMINATION

Fix the two parts of the fence together, making sure that they are straight and that they rise at exactly 90° from the table. Use contact adhesive to stick the laminate to the fence and the table top, being careful to not use too much glue. When properly stuck, use a bearing-guided trimmer to clean up the edges and then add a chamfer to the table top's laminate edges.

INSERT PLATE

The advantage of using a thin metal insert plate is that it maximises the potential height of the cutter. Secure the table top to a sacrificial board, making sure that the centre of the circular cut-out is stuck with double-sided tape.

Using your small circle jig and a 12mm diameter cutter, rout a recess as deep as the insert plate is thick (+0.5mm). The diameter of this circle should be 1–2mm greater than that of the insert plate. Re-set the small



2 The basic carcass of the large table **3** The carcass with the insert plate added **4** The main fence added **5** A rear view showing the dust port and the fence adjustment

circle jig to cut a diameter of 20mm less than that of the insert plate and fit a 6mm diameter cutter.

Plunge cut through the table top in stages of anything up to 6mm. Once finished, remove the cut-out and fix the insert plate into its recess.

SLIDING FENCE GROOVE

Rout the groove for a cross-cut carriage using a parallel fence and a cutter of a suitable diameter so that it can be routed in one depth pass. If you do make a mistake, you can always widen the groove in another pass and adjust the dimensions of the inserting rail to suit.

FENCE

First, you'll need to rout out the cutter aperture using a template and a guidebush. Once you've routed one face, carefully align the template on the other face and make a repeat cut.

Next, rout the slots for the fence fixing and adjustment bolts. A 6mm diameter cutter will provide a perfect loose fit for an M6 thread.

The extraction-port construction can simply be butt-jointed with a little glue, but before you start you'll need to cut the hose aperture in an

oversize workpiece using the small circle jig. Once you have achieved a good fit, trim this workpiece down to size. Then attach the side panels and cut to shape. Once dry, the extraction port assembly can be butt-jointed and glued into position.

LEGS

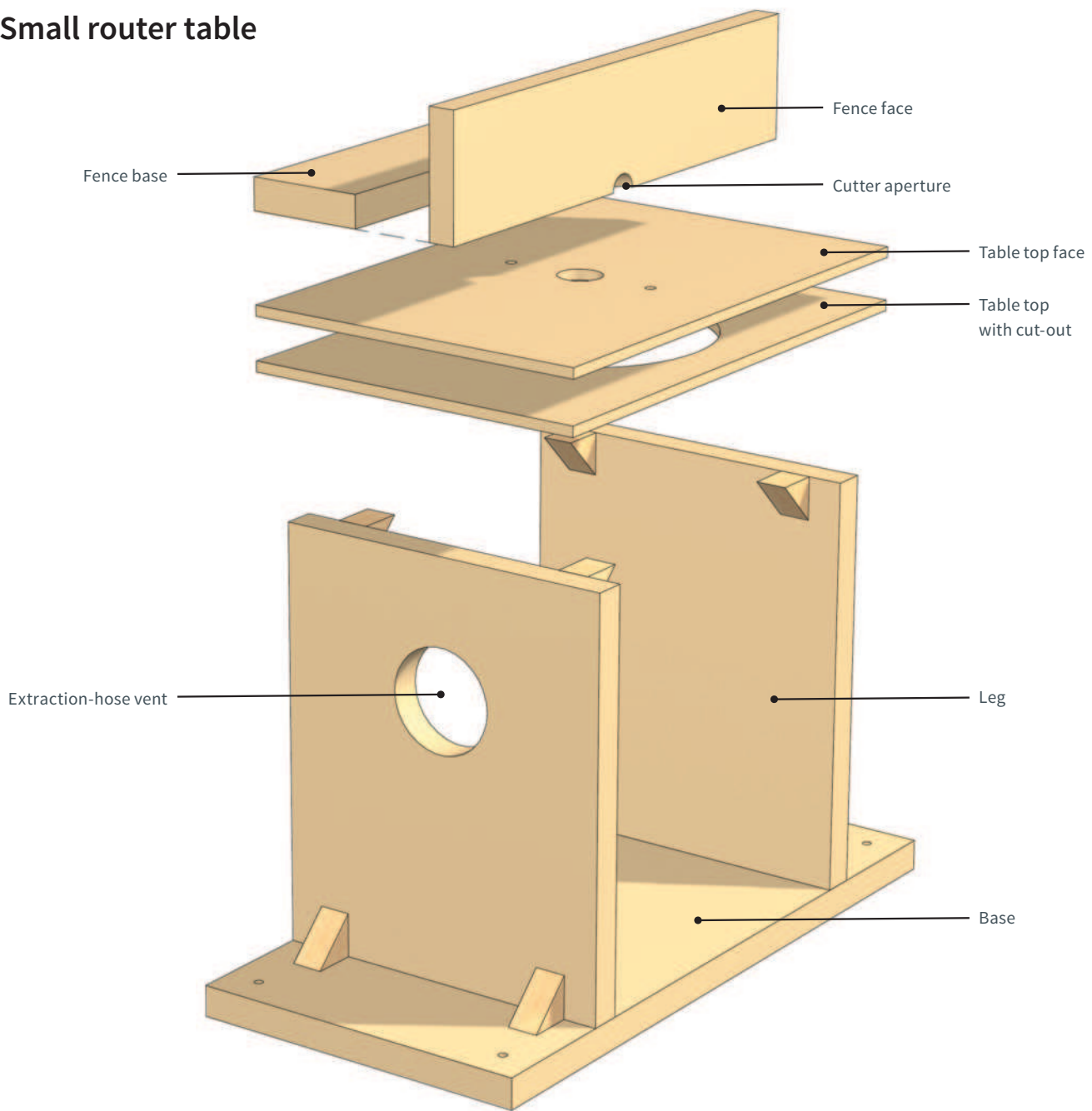
The leg frames can be assembled separately and then attached by screwing through the table top. Some 45° angle fillet blocks must be added in order for the table to cope with the stresses of machining. These can also be rub-jointed with glue.

The whole construction is too high for use on a standard workbench, so you will need to find a suitable sturdy support table as a temporary or permanent home.

SLIDING CARRIAGE

Rather than make a multi-angle parallel fence, I thought it more useful to make a rock-solid 90° fence that could be used to cut the likes of halving joints. Often, however, a simple support board run against the fence will be the best solution.

Small router table



This project should demonstrate just how simple a router table can be to make, and although this bench-top version is only really suitable for small dimension timber, the same design could be scaled up to the same dimensions as the large table. As previously, the small circle jig is needed during the construction process.

CUTTING LIST: SMALL ROUTER TABLE

TABLE:

- Top (2): 300 x 200 x 6mm
- Legs (2): 250 x 200 x 18mm
- Base: 400 x 200 x 18mm

FENCE:

- Face: 300 x 70 x 18mm
- Base: 300 x 80 x 18mm

Constructing the small table

COMPONENTS

Cut the component parts slightly oversized and then true the edges with a hand plane. Make sure that they are square and square-edged.

TABLE TOP

The table top is constructed of two pieces of 6mm MDF that are glued together after a circular cut-out is machined from the lower piece.

Using the small circle jig, rout a piercing circular cut through a workpiece that is stuck to a cutting table with double-sided tape. The diameter of this circle should be around 5mm greater than the dimension of your router's base.

Glue the two parts together and, after it has dried, stick the router centrally inside the recess using double-sided tape. Using a straight cutter, plunge a hole through the table top then remove the router.

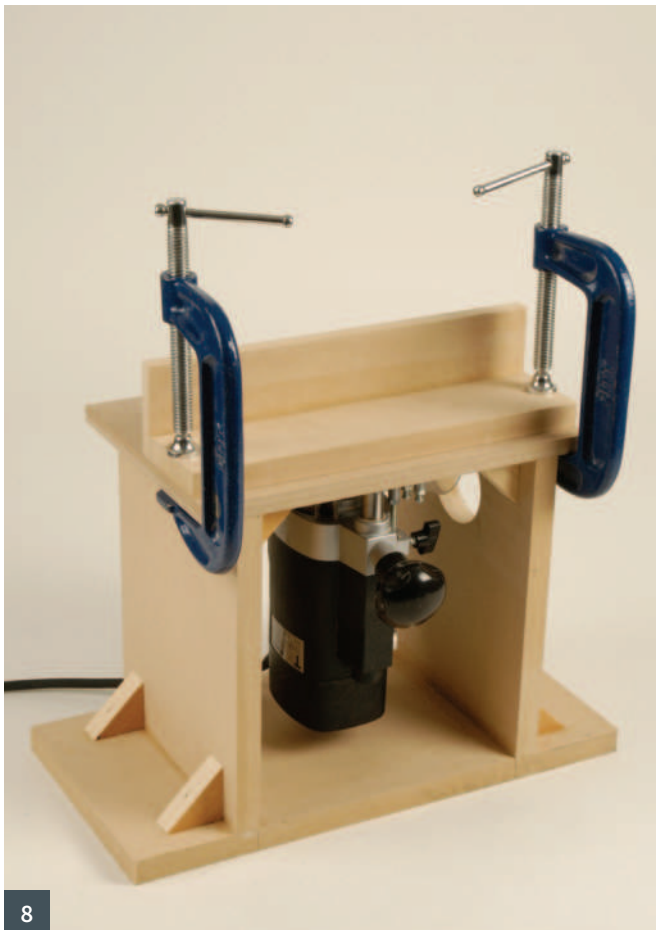


6



7

6 This bench-top router table can be used with small dimension timber
7 The basic carcass of the small table **8** A rear view of the small table



8

With the cutter protruding slightly through the base, locate the cutter in the hole, but this time on the top of the table. Square the router to the side of the MDF and draw around its base. Transfer the position of the base-fixing screws onto the table top before drilling and countersinking.

LEGS

Using the small circle template, cut out an oversized hole in the appropriate leg for a dust extraction hose.

Assemble the frame and construct the fence, making sure it is absolutely square. Once the glue is dry, clamp the fence to the table top with its face directly over the centre line of the cutter, before plunging the previously used straight cutter up into the fence.

Whatever diameter cutter is used in future, the hole in the fence and through the table top will need to be approximately 25% bigger or more in order to aid extraction. Without being present in the fence, this will need all the help it can get to extract through the dust spout.

Small circle jig

This wonderfully simple jig can cut perfect circles down to about 30mm diameter. The results are easy to control, and the set-up takes only a few seconds. I can guarantee that if you don't make this jig right away, you'll be kicking yourself later.

CUTTING LIST FOR SMALL CIRCLE JIG

• 255 x 167 x 6mm

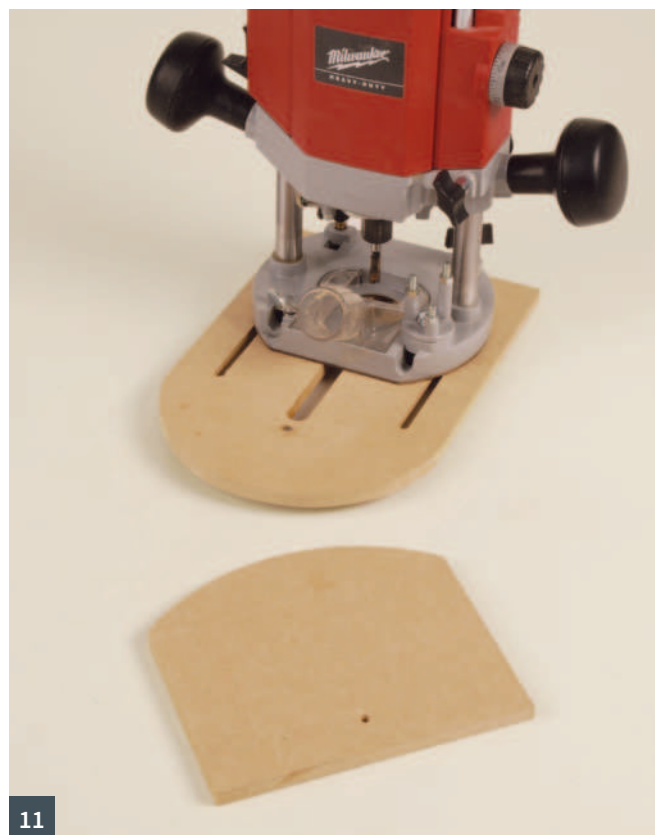
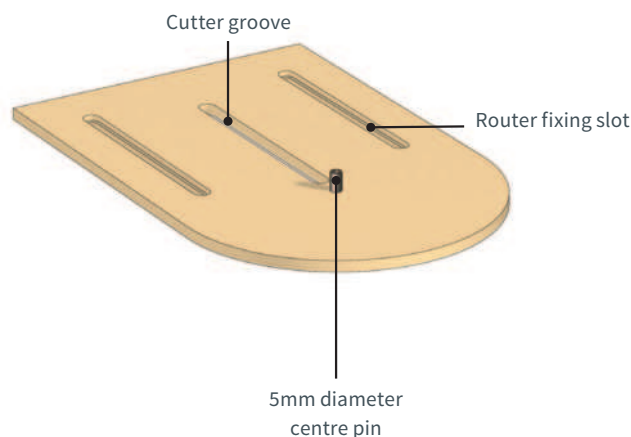


Constructing the small circle jig

Cut out a piece of 9mm MDF to whatever length you require (and slightly wider than the widest part of your router's base).

Mark a centre line down the length of the jig and position the router so that its spindle is exactly centred on this line. Mark the position of your router's base-fixing screws and then extend these points as parallel lines to the other end of the jig.

Attach a parallel fence to your router and fit a 6mm cutter. Rout a piercing slot centred on the closest fixing-screw lines to within about 30mm from the far end. Without adjusting the fence, fit a 12mm



9 This jig can help you to cut perfect circles **10** Attached to the router **11** For routing arcs and full circles

cutter and rout the same centre line to a depth of 5mm, then extend the length of cut by a further 3mm at each end. Repeat the process for the opposite side.

With the 12mm cutter still fitted, rout a piercing slot down the jig's centre to 30mm from the spindle centre point. Cut a short length of steel or aluminium and place it in a pre-drilled hole about 20mm from the end of the central slot. Glue it in place so that 5mm stands proud of the jig's underside.

The jig can now be attached to your router using pan-headed screws whose heads recess into the external slots.

I find that by using a pair of Vernier callipers to set the distance, the results are normally perfect first time.



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Flexcut



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Robert Forby

MORA

A man in a light blue shirt and jeans stands in the middle of a massive, dense pile of driftwood. He is holding a dark hat over his head with both hands. The driftwood consists of numerous pieces of weathered, bleached wood in various shapes and sizes, creating a complex, textured background. The lighting is natural, highlighting the textures of the wood and the man's clothing.

TRANSFORMING INTO STUNNING

James with his pile of driftwood

Reckless



IG DRIFTWOOD G SCULPTURES

**Artist James Doran Webb
tells us about his life and career**

James Doran Webb gives new life to dead driftwood by transforming it into stunning sculptures of animals and mythical creatures. Born in Devon, he now lives in the Philippines where he finds daily inspiration from the local crafts and landscape. Here, he tells us about his background in the antiques trade, his nomadic childhood, his working process and his ambition to plant 80,000 trees.



Lunch

How did you first get into woodworking?

My parents were antique dealers, and my first memories of woodworking were running in and out of my father's workshops as his carpenters patiently fielded my questions and allowed me to try out ideas that would germinate during the night and bubble to the surface with excitement as I awaited their arrival. Of course, the results never really matched the vision but that did not stop me dreaming!

Throughout my pre-teens I would often assist my parents as we renovated the pieces that they bought; stripping a cherry farmtable or French provincial chair down to its respective components and building them afresh.

As a teenage student, my parents sent me to a London school of accelerated learning or 'crammer' to take my A-levels. My stepfather paid the school fees by sending me antiques which I would sell along the King's Road and at a Saturday stand I ran at Portobello market. Quite quickly I started to buy and repair my own antiques in my lock-up in Hounslow.

How have your travels influenced your work?

I doubt whether I would be making today were it not for my extensive travels. My parents were modern-day nomads, exploring the world in search of art and antiques. It was a glorious childhood made all the more interesting from the lack of formal education. My stepfather thought that immersion in a foreign culture and its history was education enough. Most importantly, he would offer a detailed provenance of whatever artwork he was purchasing at the time, making pieces from generations gone come alive again. We spent a year on the Adriatic coast of Italy investigating the treasures of a 12th-century exiled English knight. Then Pennsylvania renovating one of the oldest houses in a small town called Milford. Yet another year was spent in Hotel Bristol opposite the Bahnhof in Basel, Switzerland, while my stepfather negotiated to buy the only existing copy of the Bureau de Roi of Louis XV. A big chunk of my early teens was spent in provincial France when my parents were buying hundreds of antique French provincial rush-seated chairs. Perhaps more important than the travels themselves were the exposure to craftsmen of years gone by and their own regional influences.

What first took you to the Philippines and what appeals to you about the country?

I first visited the Philippines in my late teens to help a friend who had

a costume jewellery workshop. I was immediately bowled over with the wealth of natural materials that can be found everywhere in this tropical paradise! Craftsmanship is evident on every street corner from the ramshackle roadside hut where a tyre slicer transforms old tyres into rooster coops, to the ladies decorticating palm fibres to weave into bamboo-handled broomsticks. From the back-street shop that bends and welds steel plate by hand to make the local motorcycle side cars to the craftsman hand sawing letters outside the local cemetery to adorn the marble headstones, I love the Filipino's optimism when tackling a project that tests the limits of one's experience.

When you did you start working with driftwood?

I started to collect long dead wood upon arrival in the Philippines some 32 years ago. Aside from making the odd piece of fine furniture, I also made home accessories such as book ends and lamp bases from the more interesting shapes of wood. I made my first horse sculpture from driftwood 20 years ago. I was so happy with the results that I placed the piece on my bedside table so that it was the first thing I saw when I woke up! I ended up giving it to my mother and have spent the last 19 years trying, unsuccessfully, to sneak it out of her house without her noticing to burn it!

What are the qualities of driftwood (aesthetic and practical) that appeal to you?

I am very selective about the species of long dead wood I use. Most of the wood one collects from the beach will succumb to dry rot quite fast. Experience teaches you which type of wood will stand the test of time. The three or four species of long dead wood that I use are rich with tanins. The wood has been dead for at least 50 years before I get my hands on it and is wonderfully grooved and pitted with intense character. It is not quite dense enough to sink in water. The wood has a tight grain and is exceptionally oily. The wood fares just as well in the cold climes as it does in very dry and hot environments. I have sculptures on the foothills of the Swiss Alps, in the dry heat of Dubai and the unforgiving conditions of northern China and in all cases my sculptures stand the test of time.

How do you source driftwood for your work?

Sourcing long dead wood, whether from the coastline or from inland, is a painstaking process. I only buy my wood from four trusted suppliers who I pay handsomely for the material. I make sure that the payment



PHOTOGRAPHS COURTESY OF JAMES DORAN WEBB

Old Lonesome



Lady Sanctuary

filters down from the suppliers through their collectors and ultimately to the landowners. I try to encourage the landowner to allow me to replant on the same land in pursuit of my 80,000 trees goal. The certification process is rigorous and demanding – every piece of long dead wood is inspected by the local Department of Environment and Natural Resources who issue a Permit to Transport the material after full compliance with the lengthy procedure.

Tell us about your workshop. What kind of tools do you use?

My workshop is a curious mix of traditional hand-held tools and modern electronic tools; basic tools that I have fabricated myself and expensive tools bought for a specific purpose. I have a 9m-high gantry frame that I made myself capable of lifting 3 tons of sculpture and moving it over a 40 square metre area.

When I start to work, I have an inverter arc welder with stainless steel welding rods beside me, an axe, an angle grinder with sanding and metal cutting discs and a Stihl with 10in bar on hand. I use an impact driver and drill driver set-up with countersink drills ready to screw in coarse stainless-steel screws to secure the wood. I have 3/8in stainless steel threads with corresponding nuts and washers on the table ready to weld onto the armature to secure the larger slabs of wood. I have welded up a custom-made work bench with vice and holding mechanisms to keep most of the tools organised within easy reach. At the end of the workshop, I have a tig welder and plasma cutter. I also have a couple of bandsaws, one narrow blade small bandsaw and a monster for larger slabs. Outside on the wood pile I keep a couple of larger Stihls, one 20in and one 30in for cutting the larger pieces of wood.

What kind of finishes are suitable for driftwood, and what maintenance products do you use?

My driftwood is so oily that regular maintenance is not vital. A lot depends on the aesthetics. If the sculpture is positioned near trees, moss or lichen might start to grow. If the piece is in the sun, the sculpture will weather white over the course of time. There are different maintenance approaches depending on what 'look' the client requires. If the client would like the sculpture to revert to how the piece looked upon leaving my workshop, I will wait for a sunny day then apply regular moss killer that you might use to remove algae from your patio. I leave the solution to burn the moss for a couple of hours then pressure wash the sculpture under a high pressure setting to remove the white fuzziness caused by weathering. I then apply a specially formulated coating that is mixed from wood preservative such as solignum or cuprinol and a couple of other hardwood finishes. It is a bit like a vinaigrette and needs to be constantly shaken during the application process. The coating takes a couple of days to dry and the sculpture is good for at least a year!

What inspires your work?

I draw inspiration from all over. It could be an animal in a David Attenborough documentary or a cloud formation that suddenly comes alive! It can be the way my daughter's dog looks askance at me or a proud rooster standing astride his suspended bicycle tyre. I love the challenge of making something new and really enjoy mixing artistry with hardcore engineering challenges.



James working on Wyvern in the Baobabs

What has been your most ambitious project so far?

The most ambitious project has to be my 11m-high Family of Giraffes, which includes a bull giraffe reaching 9m high and a cow giraffe with neck bent around to nuzzle her foal. The giraffes are protected by a 11m high tree that acts as a lightning conductor. The installation is attached to a 25m-high roof deck at the foot of the Great Wall of China, around two hours north of Beijing, and exposed to extreme climactic conditions throughout the year.

Was your work affected by the Covid pandemic and lockdowns?

Covid has really affected my work. Like all the artists I know, I live to make and need to sell what I have made to finance my next work. I went two-and-a-half years without a serious exhibition and living in the Philippines I did not have the benefit of a government safety net to reduce the intense financial stress. Nonetheless Covid has provided some positives. The two months of lockdown were some of the most joyous moments of my life –spending lots of time with my nine-year-old daughter and working alone in my workshop without assistants and distractions to take me away from my project. During that first lockdown I made a Phoenix that I donated to a wonderful charity that finances education for girls from challenged backgrounds. The piece ended up selling for \$15,000.00!



Grizzly

It's been four years of tough knocks starting with my younger brother dying in slow motion of glioblastoma, running straight into the pandemic and most recently ending in a 240km typhoon that ripped the roof off my workshop! Each set-back makes one a little stronger and there is no doubt that I am incredibly lucky that my work and my family allow me to ride through the debris that each calamity leaves behind relatively unscathed!

Could you tell us about your tree planting project?

Ten years ago I got into an early morning discussion with the regional chief of the Department of the Environment and Natural Resources about how I wanted to do something meaningful to give a little back as a token of gratitude for the wonderful long dead wood that I am privileged to use. Within half an hour we had come up with the concept of 80,000 trees, which was meant to be a 10-year project. I set out to plant a mix of predominantly native trees, 30% fruit bearing to provide a little income to the stakeholder after four to eight years, 30% timber to harvest after 10 to 20 years and 40% heritage trees to repopulate the hills with indigenous hardwoods that would be protected for future generations. The goal was to plant sufficient seedlings to make up 80,000 trees. Considering the high mortality rate, this will almost certainly require that I plant almost double the amount of seedlings. I work very closely with the people living on the land (this is 'timberland' owned by the government). I pay a monthly stipend based on the



The Wyvern dragon

success of the seedlings under their care. So far, I have planted some 23,000 seedlings of which 18,000 are thriving. We have had setbacks. About nine years ago Typhoon Haiyan ripped through the central Philippines killing some 6,000 people. I suspended tree planting for the following two years diverting all resources to community and livelihood work to assist the typhoon victims. Very little new planting has taken place over the last four years with my brother's illness and the pandemic, however in 2022 my small, dedicated tree planting team and I are ready to take up the baton and continue to plant! First, we have to take stock of our existing trees following our most recent typhoon and then prepare 10,000 seedlings for planting in August at the start of the rainy season. It is an incredibly exciting and fulfilling project!

Tell us about the community projects you are involved with, such as Bantayan Crafts.

In the aftermath of Typhoon Haiyan, my brother and I started off a project called Bangka Relief which assisted small fishermen by setting up four boat repair stations across Bantayan island with our carpenters providing technical assistance and materials to repair their typhoon-damaged fishing boats. In return we enrolled the fishermen in their own fishing co-op and had them repay a small part of the costs of the repairs into the co-op providing them and their families medical insurance and other government benefits. In Tacloban, where the small boats had been 100% wrecked in the storm surge, I made up a boat kit from sustainable

parts and a jig system that allowed the fishermen in Tacloban to assemble their own fishing boats from the parts shipped to Tacloban from Cebu. Some 500 boats were made or repaired through Bangka Relief.

The wives of the fisherfolk had a particularly hard lot and I came up with Bantayan Crafts to assist them. I then worked with several other designers to come up with a range of tourist gift items from typhoon remnants. Picture frames from old boat keels, bags from disused jeans, jewellery from beach remnants. We trained up a group of 30 women from Bantayan to make the pieces and I provided point of sale displays made in my workshop to present the range in some 15 outlets dotted around Cebu. It was a wonderful project loved by all involved. The ladies from Bantayan earned a living wage for making the product, then received the profit once their product sold. Unfortunately, the pandemic closed this enterprise, and we are awaiting a reopening which will allow us to jump straight back in and rejuvenate the line and start again!

What do you like to do outside of work?

I enjoy mountain biking, messing around with my daughter, travelling with my family when time permits (which is not often!) and enjoying a glass of wine with my wife at the end of a hard day at the workshop while observing the ridiculous antics of my daughter's three toy poodles at play!

jamesdoranwebb.com Instagram: [@jamesdoranwebb](https://www.instagram.com/jamesdoranwebb)



WATER-BASED FINISHES

Derek Jones investigates whether the new generation of water-based lacquers are a match for old-school finishes

If you think the list of accessible finishing products is a long one then just maybe consider the number of possible outcomes there are when you mix and match the techniques for applying them. My youngest daughter's maths homework this week was on the subject of probabilities. She's learned that the chances of getting a Royal Flush in poker are about 2.5 million to 1. Fortunately the chances of achieving a perfect finish are more in your favour and it's with this in mind that I've decided to shorten the odds even more by looking at water-based finishes and whether there is a place in the shop cabinet for a small selection of reliable alternatives to solvent-based products.

First observations

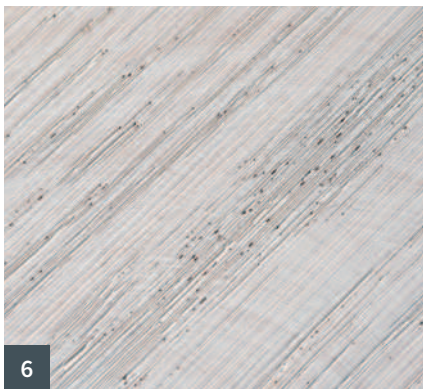
In the run-up to preparing this article, almost everyone I spoke to about water-based finishes has had a bad experience using them or were either just irrationally averse to trying them, period. Old habits die hard and as I've had a foot in both camps in the past, I can identify with that. I also know that all it takes is one positive experience for you to adjust your thinking. The most common argument against them was that they don't go on the same way as oils. That's true. The second was that they aren't as hard wearing as oils or lacquers. That's not true, so before we go any further let's start by scotching a few rumours about water-based finishes.

Why use water-based anyway?

For a start they are better for us and those around us, which should be a good enough reason to try them out. In many cases the compounds used in their manufacture are the same as those used in solvent-based finishes so it's the solvent that has been replaced and not always the important stuff. Solvents have a great effect on the way finishing products behave in the tin, while being applied, while they are drying and in some cases long after they have cured. Some oils, alcohol and spirit derived solvents are toxic, unpleasant to use and also require specific arrangements to dispose of excess, so it makes sense to limit our exposure to them. The trouble is we've got used to having them around.

Application

It's a fact that water-based finishes raise the grain more than oil-based ones. Dampening the surface with a mist of water or a damp cloth, allowing it to dry and re-sanding will generally overcome this. If a thin top coat is your desired outcome, water or oil for that matter, do this at least twice in your surface prep before sanding with a 180g abrasive and then again with 240g. If you're intending to build a thick layer there's hardly any point in going finer until you have built up a good layer of product. There will always be exceptions to the rule and I know a lot



1 General Finishes' Whitewash and Top Coat **2** A heavy-duty wire brush will remove all the dust and pith from the grain **3** Vacuum all the loose particles from the surface **4** If a wire brush is too aggressive try preparing the surface just with hand tools **5** The Whitewash has a high solids content so needs a good stir before use **6** Pay attention to air bubbles and loose dust in the open grain of the wood **7** Wipe away the excess before the paint has a chance to dry

of finishers that prefer to dive in straightaway with product onto bare wood without going through this procedure, but none of them use water-based finishes.

The first thing you notice when changing over to a water-based product is that it doesn't lie as flat as oil straight off the brush. Faced with this the temptation is to re-work the product to improve things but because water-based products gel much quicker than oils you end up pulling at the surface while it's still tacky and making things worse.

The second most obvious difference and the one that catches most folk out is that in warm conditions water-based products do the opposite to what oils do. They tack up even quicker and when it's cool or humid they slow down, or worse, stop drying altogether. So if you can get your head around that switch they really do behave in much the same way as oils, just at opposite ends of the warm/cool, dry/humid spectrum.

Water-based effects

The process of liming is effectively the same as grain filling and typically uses a filler that contrasts with the colour of the substrate. For the best effect, timbers with an open grain structure such as oak, ash or elm respond better to the technique than those with a fine grain.

Traditionally the effect was the result of applying a lime paste mixture to hardwood surfaces to ward off attacks from bugs and beetles. The caustic nature of lime means this method is no longer practised. However, the appearance of lime has been a popular decorative style falling in and out of fashion for the last couple of centuries. First of all if you want to achieve that look nowadays, it's not difficult and won't strip the skin off your hands either. The simplest option is to source a proprietary liming paste. These are generally wax-based pastes that are applied to the surface and require little or no further treatment. They also offer little or no protection from the rigours of daily life.



8



9



10



11



12

8 Enduro-Var 9 Hard wax oil 10 Quick dry varnish 11 Ronseal's Quick Drying Woodstain is a finish and stain in a single application 12 After a winter out in the open the Woodstain retains its colour and still repels water

Step things up a notch and you can seal over the filler with a protective coating of your choice for a more durable surface. I don't want to cover every possible permutation in this article, you wouldn't thank me for it, so instead I'm going to focus on an effect that mimics that of liming with acrylic milk paints. I've chosen those made by General Finishes. Just so we're clear, this is not liming but a technique that mimics the effect of liming.

Preparation

Preparation, as they say, is everything and for a limed appearance that means scrubbing the surface with a coarse brush, preferably a wire one to remove all the pith and dust from the grain of the wood. Sanding might have been a good idea up until now but once you have brushed the surface don't touch it again with any abrasive. Instead, reach for the vacuum and remove all the loose particles from the surface. If you like the idea of surface preparation without the use of abrasives then now's a good time to try it out. A finely set smoothing plane or card scraper will serve you well.

Laying down colour

Strictly speaking paint isn't the best medium for liming. It can dry

before you have had time to force the solids into the grain and wiping the excess off has to be done quickly. And given that the colour in paint is partly due to the use of dyes and not pigments, staining the surface is a real possibility. It would be wrong to suggest that some colours work better than others as colour is subjective in terms of quality. It's not even fair to assume that better quality solids or pigments or a higher density of them will result in a better paint for liming. To get the paint into the open grain, work the brush or pad across as well as along the grain. Air gaps and dust in the grain will cause bubbles to appear so you'll need to be vigilant to achieve an even look. Before the paint dries take a clean cloth and wipe away the excess. Dampen the cloth with water if the paint begins to dry. Although this won't offer a great deal of protection to the surface of the wood, it may be the finish you want. For something a little more robust re-coat with something like a General Finishes clear Top Coat.

Water-based finishes in general

Water-based finishes take longer to dry than you think. If it says dry in 30 minutes that's really all it means. Dry is not the same as cured and this can take up to a week in low temperatures and four days under normal conditions for some products although it probably won't say

that on the tin. During that time, however, the products are typically safe to handle and it's really only excess moisture that you will have to avoid. Try to resist the temptation to apply wax until the product has cured. It will only slow things down. Be equally cautious about burnishing or rubbing out too soon after application.

There were a couple of products that really stood out for me while compiling this article: General Finishes Enduro-Var and Liberon's Water based Hardwax Oil.

Enduro-Var

This urethane varnish is quick to build and is remarkably self-levelling. A foam applicator is the best method for applying by hand but a brush works just as well. It tacks up quite quickly so you need to work fast on large areas if you are applying by hand. It sprays straight from the tin so there's no need to thin. In fact doing so could affect its performance. The product is translucent and slightly pink in colour but this is not transferred to the timber. On pale timbers you may initially experience some slight warming of the general tone but this fades as the product dries. Sanding between coats is recommended and a pre-sealer is not required. It offers a good level of protection for interior use although not in very wet areas and resists scratches.

Hard wax oil (HWO)

You wouldn't usually expect to find the words water, oil and wax in the same sentence let alone in the same tin but that's what Liberon have done and it works a treat. Unlike solvent-based HWO this isn't a saturation product meaning it doesn't crosslink with the wood. Instead it becomes a membrane-like layer like a traditional varnish or lacquer. It goes on with a brush and skins over quickly just like shellac so try to avoid overlapping brush strokes. It has a milky white appearance on application but soon clears and when it does, unlike oil-based HWOs, it won't cast a yellow hue. Sanding between coats is recommended but not nearly as important as wetting and sanding before applying the first coat. For a quick drying general-purpose finish on interior work it'll give oil-based HWO a run for its money.

Quick dry varnish

By fine finishing standards this is crude but effective. It builds to a very thick coat easily, is less susceptible to runs on vertical faces than the other water-based finishes I tried and more so than oil varnishes. I applied this with a cloth French polish style on a new handrail where the window of opportunity for finishing was limited. Even though it says 'quick dry' on the tin you do need to wait a couple of hours before re-coating. Despite this the job was completed in a day with a minimum of disruption to other trades. To slow the drying time down and to help with work in higher temperatures the instructions suggest thinning with water by 10%. That's good to know but perhaps best left for horizontal surfaces only. Like all the other water-based finishes it's virtually odourless and brushes or rollers can be cleaned with water.



13

13 On everyday pieces it's hard not to like a water-based finish

Water-based for outside use

Exterior work is perhaps where you have to be a little more cautious about where and when to apply. Your working conditions are likely to be more extreme and avoid the end of the day if you suspect a dewy evening or rain. My experience with exterior water-based products is limited to garden furniture. It's the one and only time I've used a varnish/stain combination. By my reckoning they seem to be aimed at the DIY/amateur market as an easy fix for tired old timber. Over-coating is a real problem if you want to avoid patchy areas that obliterate the character of the wood. For extra protection consider applying a clear top coat to build up layers.

Conclusion

If you were to base your choice of finish purely on ease of use then water-based products should win hands down every time, although they're a long way from replacing oil and solvent-based ones for the majority of new interior fixtures and fittings. For post-installation flooring products however, the split is around 50/50. Water-based finishes result in a surface film being applied much like a traditional varnish or lacquer so good surface preparation to ensure reliable initial adhesion is important. They can appear at first to be rather cold on virgin timber but this is often short lived as the wood changes colour on exposure to UV light anyway. The only difference being that the change you see is in the colour of the wood and not the finish.

A PLACE FOR EVERYTHING

Anne Briggs Bohnett constructs a dovetailed oak writing desk with room to store a few of life's essentials, like hand tools

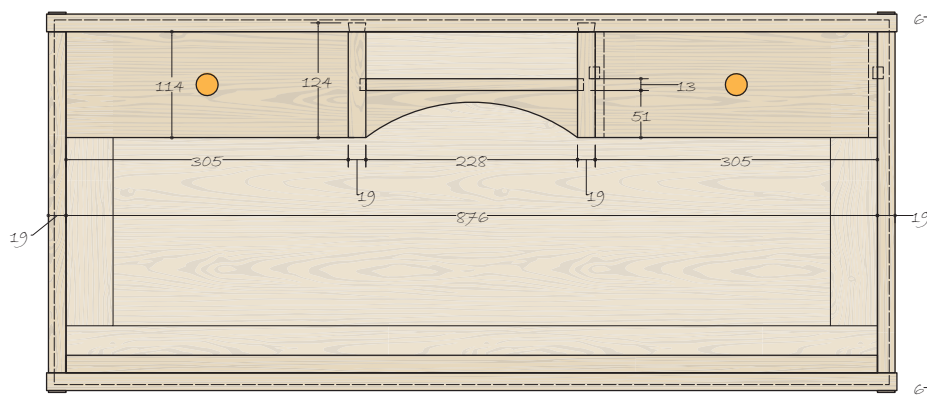


When I visited the Homestead Heritage Traditional Crafts Village in Texas I had the opportunity to collaborate with traditional craftsmen Jonathan Schwennesen and Caleb Nolen on an exciting project – a dovetailed writing desk with proud joinery, blacksmith made hardware and space for woodworking tools. Because, who doesn't need space in their writing desk for a few tools?

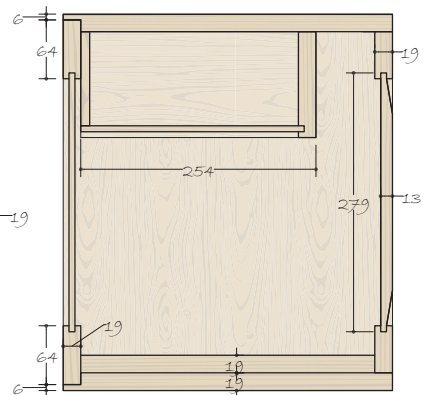
Proud joinery

In my limited building experience, I've been fairly tied to the (few) tried

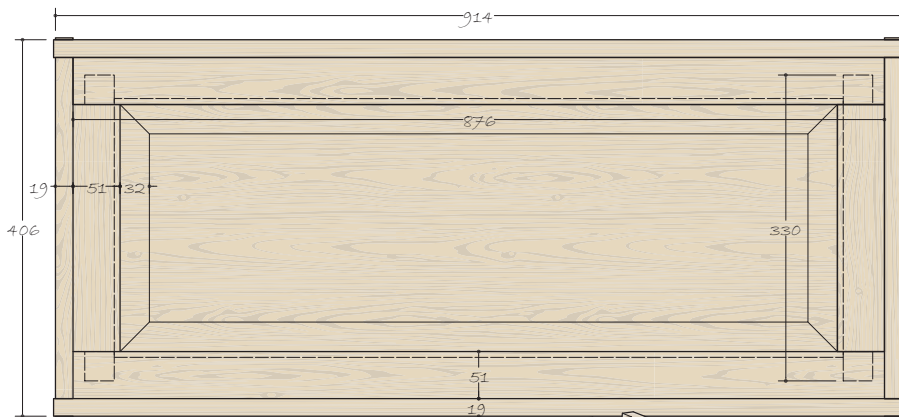
and true methods of joinery and aesthetics characteristic of the way I was taught to build. Having been very inspired by the work of Mike Pekovich of Pekovich Woodworks, I decided to incorporate a 'new' design feature into the building of the chest – proud joinery. Little did I know that that simple 'design feature' would end up totally altering the original design of the chest. The proud joinery made the whole project intensely more difficult, but also gave the three of us plenty of challenges and head scratchers, which also made the project way more fun to tackle together.



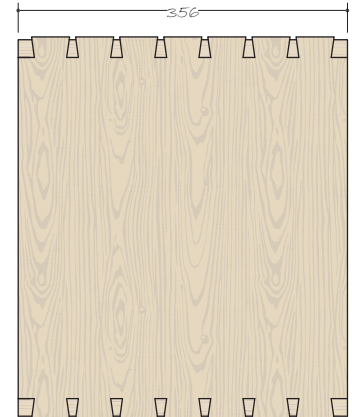
FRONT ELEVATION (without inset door)



SECTION



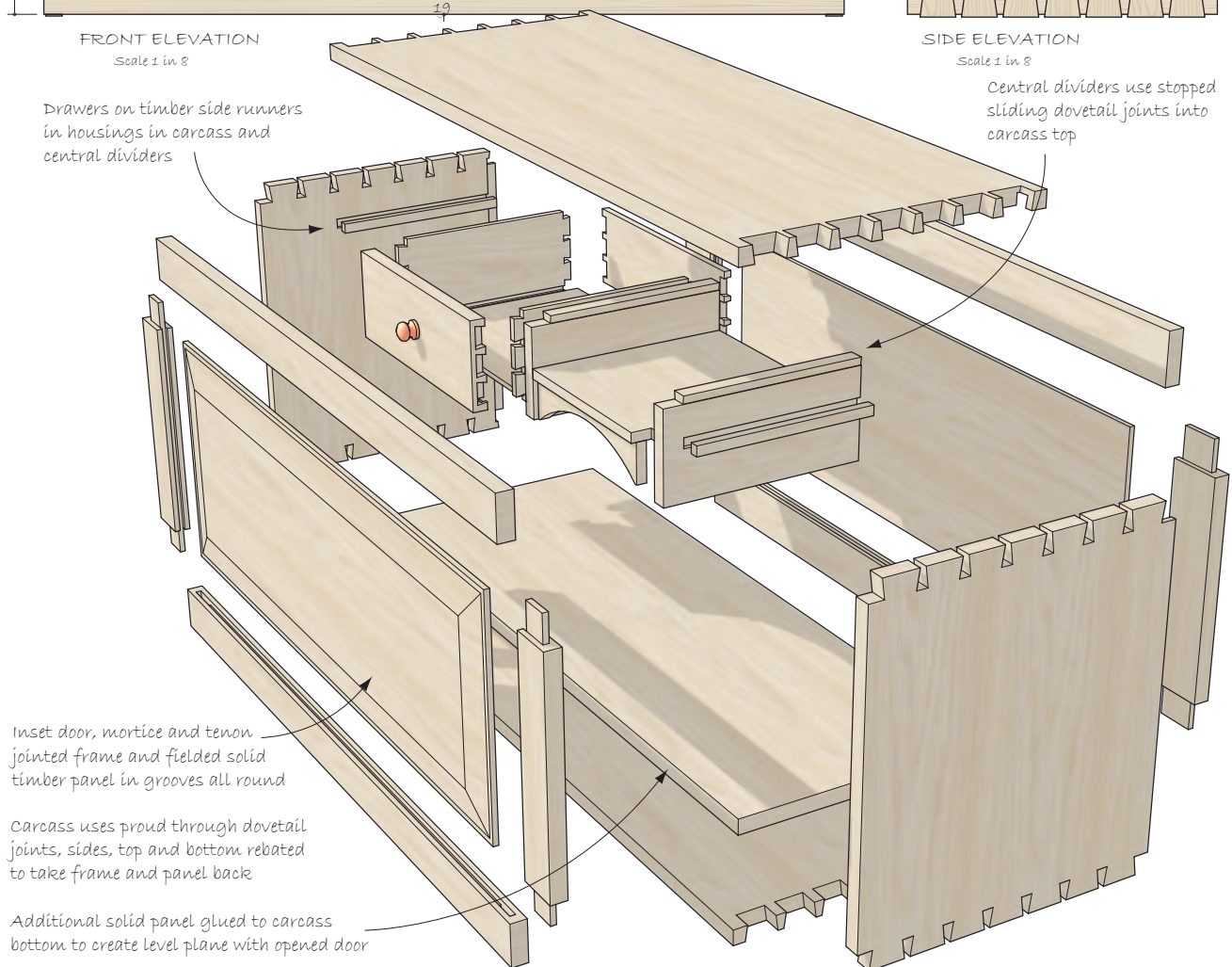
FRONT ELEVATION
Scale 1 in 8



SIDE ELEVATION
Scale 1 in 8

Drawers on timber side runners
in housings in carcass and
central dividers

Central dividers use stopped
sliding dovetail joints into
carcass top



Inset door, mortice and tenon
jointed frame and fielded solid
timber panel in grooves all round

Carcass uses proud through dovetail
joints, sides, top and bottom rebated
to take frame and panel back

Additional solid panel glued to carcass
bottom to create level plane with opened door



PHOTOGRAPHS BY ANNE BRIGGS BOHNETT, BEN OWEN AND JONATHAN SCHWENKESSEN

1 The wood was laid out in different orientations to find the best way to put it together **2** The measured drawing **3** Cutting the dovetails **4** Caleb's hand-smithed hardware

Orienting the material

We began the project by laying out the wood in every possible orientation to select the most attractive way to put it all together. Trying to maximise the width of each panel according to the boards we had available, we had our boards edge jointed, glued and in clamps by lunchtime the first day. I spent that afternoon learning how to make measured drawings, something I had previously never done (as a young woodworker, there are lots of steps in every new project that I'm trying for the first time). Jonathan stressed to me the importance of making a measured drawing so we could see, in true proportion, how everything would look on the completed chest as we came up with the design. It would also make building a second chest much easier, should I ever decide to do so. As it turned out, having that measured drawing came in extremely useful because we ended up having to tweak the design several times due to unforeseen problems caused by the proud joinery which arose throughout the project; more on that later. I used a scale ruler to draw a 1/3 scale drawing of the chest.

After finalising the measured drawing, it was on to preparing the stock for joinery. Because we were using hand tools to cut the joinery, the stock only had to be 'roughly' square and true, rather than squared to machinist tolerances. And that was another thing I took away from my time building with Jonathan: so many woodworkers care way too

much about how square and true their lumber is. Hand tool joinery allows for much greater tolerances than machines do.

At the Heritage School of Woodworking the No.80 cabinet scraper is an oft used tool. Though I have one in my collection at home, I'd never actually used one until Jonathan and his crew showed me how versatile it really is. Jonathan showed me how to remove the glue from the panel, smooth it up and call it 'good enough' to move onto the dovetails, all with the cabinet scraper. One thing that really impressed me in the school's woodshop was the bare bones, 'no-nonsense' toolkits in each of the benches. Just a few well-tuned antique hand planes, a marking knife, a handmade dovetail template and marking gauge, a Starrett combination square, two sizes of Marples chisels and a couple of well-used joinery saws were all that were in my bench drawer, and it turned out that that was plenty. Aside from a few speciality tools for specific joinery tasks, I used those few tools almost exclusively on the chest build.

Making the dovetails

I marked my dovetails with a pencil – my baselines were set at 3mm longer than the thickness of my material, which would create proud pins and tails upon assembly – and started cutting.

My usual method of leaving a hair of material on the waste side of



5 Forming the leaf 6 Forming the hinge 7 Cleaning the cut 8 Fitting the hinge

the line and hoping the wood fibres compress upon assembly to make a nice, tight joint was not effective at all with this iron-hard oak. I could have spent a lot less time fussing over the fit of the dovetails had I just trusted myself more and cut straight to my line every time. And, less fussing always means a cleaner, tighter joint. The more you fuss, the more opportunity you have to introduce more errors.

Another lesson within that lesson was that cutting 'perfect' dovetails isn't, or shouldn't be, the point of a project. Though I myself am also guilty of caring too much, I often encourage other woodworkers who have a tendency to fuss too much to examine the dovetails in 200-year-old furniture. I think most woodworkers today should be encouraged to care a little less about cutting 'perfect' dovetails. When you step back and look at a piece, you see the whole piece, not that tiny gap in one of your tails. It's hard to think that way when fitting a joint, because you are looking at those gaps up close, but when the piece is together, those gaps will be insignificant and invisible to nearly everyone who will ever examine the finished piece.

Making the hardware

Once the dovetails were cut, I headed over to the Heritage Forge to design the hardware with Caleb Nolen, Homestead Heritage's resident blacksmith. We decided upon simple strap hinges with a leaf design

for the door, and replicated some really great handles I'd seen on an antique chest a few months prior to the build. My favourite thing about those antique handles was the simple stop created by a 90° bend in the handles where they meet the chest, which kept the handle from pinching fingers when the chest was lifted, and the way the handles were fastened to the interior of the chest by two metal straps that penetrated the interior of the chest and bent over, acting like nails. Caleb did an incredible job on the hardware, and it was even cooler to be able to watch him make it before my very eyes.

The interior joinery

With hardware in hand, we returned to the wood shop to tackle the interior joinery of the chest prior to the dovetail glue-up. Our design included two drawers, a paper tray and a door that would sit flush with the interior of the chest when opened to make a near-seamless writing surface. And here is where the proud joinery really started to mess with things: we realised that our original door design – one that simply attached to the front of the box and sat flush with the case – would look ridiculous next to the proud dovetails.

We decided instead to inset the door into the case, which then gave us quite a puzzle. To make an inset door that would sit flush when opened would require some pretty fancy hinges; hinges that Caleb



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9 The false floor solves problems **10** Refining the sliding dovetail **11** The interior joinery **12** Clamps and cauls in all the right places **13** Gang marking saves time and increases accuracy

unfortunately didn't have time to make for this project. After a lot of head scratching, we finally came to the realisation that the best solution would be to glue an interior panel, a 'false floor' into the bottom of the chest. This would solve the door and the hinge problem all at once, so we did just that.

One very cool moment for me occurred when we were cutting the stopped tapered sliding dovetails that would hold the interior drawer sides and the paper shelf. I had actually first learned to cut that joint via the Ploughshare Institute, Homestead Heritage's online school, long before I ever imagined I'd one day be standing at the very bench from which the video was filmed. I realised then just how fast my woodworking hobby had overtaken my life and turned into my career, one for which I'm incredibly grateful.

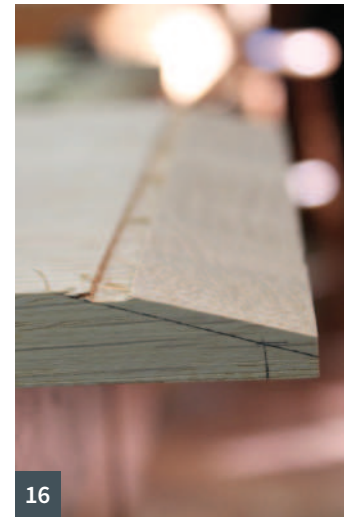
While cutting the joint, Jonathan showed me a new method for removing the waste from the sides of the dovetail on the shelf; I used to use a saw to remove it, but not only was that very difficult and cumbersome, he also mentioned that that method wouldn't work on a joint longer than your longest saw, so he preferred to use a sharp chisel and a knife wall to remove the waste instead. He also used a knife wall and a sharp chisel to remove a majority of the waste inside the mortise

as well. Followed up with a router plane, there was a nice, clean mortise for the shelf pieces to slide into. When the mortises for the sliding dovetails and the dado for the paper shelf were cut, it was time for glue.

Our design had a flat frame and panel glued into a rabbet at the back of the chest, and a raised panel on the door. Jonathan showed me how to gang mark the mortises and tenons to ensure that the rails were the exact same length and the mortises were in the exact same places on the opposing corners. The paper shelf and the mortises for the drawer slides were all simple stopped dados, made with a knife wall, a chisel and a router plane.

Then came the frame and panels for the front and back of the chest. First, we scored the sides of the groove with a deep marking gauge line to create a clean path for the blade. Then, starting at the end of the board, we took a few short passes and increased the length of each pass until the plane was cutting along the entire length of the board. With the depth stop set, it stopped the plane from cutting once the desired depth was reached along the entire board.

The tenons for the frame were the same width as the groove, to simplify the mortise cutting – the sides of the groove were the outside walls of the mortise as well. The back panel being flat, we only needed



14 Jonathan critiquing my sawing technique **15** Ploughing the grooves **16** The plough plane defines the straight edge **17** The sacrificial board protects the edge **18** This chest is the result of a wonderful collaboration between woodworkers

to create an even rabbet around the entire panel on either side to fit inside the grooves in the frame and allow for seasonal wood movement. A rabbet plane with a sharp nicker made quick work of that. The front panel, however, provided me another opportunity to learn, as it was my first time making a raised panel. Jonathan showed me how to use a marking gauge to define the edge and to sever the fibres to make way for the plough plane.

We ploughed to the final depth of the square edge, then used a smoothing plane and block plane to remove the bulk of the waste, which was marked with a pencil line on the side of the board.

A board, clamped to the straight edge protected the fibres there from being accidentally nicked by the block and smoothing planes. When enough material was removed from all four sides to allow for panel movement within the grooves in the frame, the chest was ready for assembly and hardware installation.

Finishing

After the case was finish planed on both the interior and the exterior then glued up (finish planing had to be done prior to glue-up due to the proud joinery), we attached the straight frame and panel by gluing

it into the rabbet at the back of the chest. We chamfered the edges of the proud dovetails with a very sharp block plane with a tight mouth and a feather light cut.

At this point, my time in Texas had sadly come to an end, so hardware installation, building the drawers and adding finish would have to be put off until after I'd returned home. Despite some unfortunate damage to the chest in the shipping process, the chest turned out even better than I could have hoped, and is now sitting on my bench awaiting drawers and finish.

The chest will be a lifelong reminder of some helpful woodworking lessons, but far more importantly, of the great friendships that were formed during my time spent building it in Texas. Woodwork has, for so long, been a solitary pursuit, and while there is certainly merit in time spent practising alone, building skill and confidence, there is a rich and vibrant community to be found and shared with others who love thin, wispy shavings as much as you do, and I encourage you to go out and find it!

For more information about the Homestead Heritage Traditional Crafts Village, visit: www.homesteadheritage.com

TRADITIONAL MOULDINGS

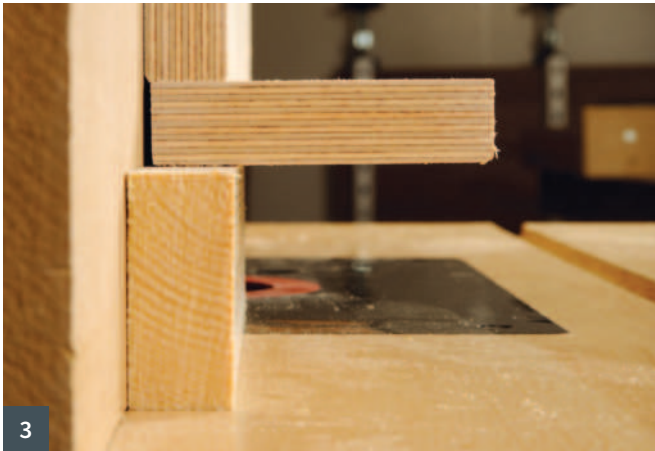
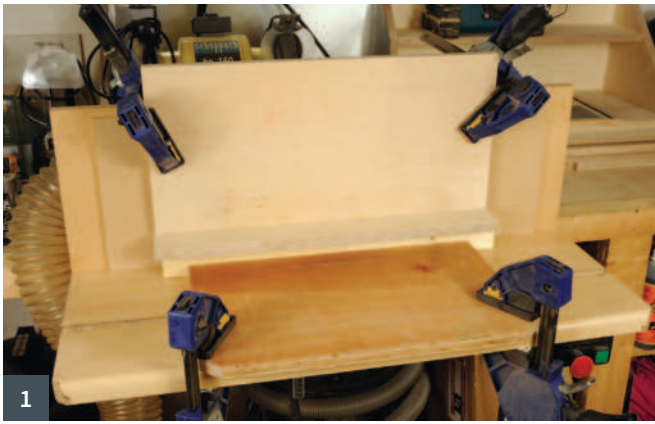
Anthony Bailey uses his router to create second fix joinery from scratch



In this article I'm going to focus on the typical mouldings that make a room feel complete. We are talking here about skirting, architrave, dado (mid-height mouldings) and picture rails – these are not so common these days in modern buildings, but they can help create a more traditional style of room. However, as the same mouldings, or ones like them, can be used when making other pieces, I have included examples anyway – a trick for making a plain panel door look more impressive is to fit a bolection moulding that sits around the frame edge, for example. So, there are various ways you can improve and enhance the look of a room and major fittings within it with mouldings.

Ancient influences

The traditional mouldings we commonly use today are derived from various influences from the past. They have appeared, not just on furniture, but also in architecture and interiors. Influences from diverse periods such as the Egyptian, Greek, Roman and Medieval epochs, can be seen in many places. I find it fascinating to study the mouldings and detail in historic buildings, and even modern ones, that seek to copy those earlier architectural cues. In particular, Andrea Palladio was a Renaissance writer and architect whose carefully observed reinvention of classical Greek and Roman architecture has been a major influence, which can still be seen in many stately homes and major public buildings. Many of the moulding profiles we use today, such as the Grecian ogee, have their origins between 550–400BC, more than 2,000 years ago!



The jig

- 1 The key to moulding successfully is control of the workpiece, so that vibration is eliminated. This prevents chatter, jumping and breakage. The only practical way to achieve this, unless you are machining the edge of a wide board, is to use a tunnel. This is exactly what it says – an enclosing space that matches the stock dimensions, thus preventing any movement except in the direction the workpiece is pushed through onto the cutter. It is very safe for the operator as well.
- 2 Prepared timber sizes are likely to be around the 50 x 25mm size – even for skirting, as the top moulded section is added afterwards to the separate plain bottom section. You need a decent size fence to work off, so make a backboard for your fence that can be moved up and down to suit the height of the workpiece – offcuts of which are shown sitting underneath.
- 3 The batten or strip of ply fixed to the fence must press down evenly on square-edged stock. Make it wide enough to suit the likely workpiece dimensions, plus the thickness of the side support which we need to make next – with a little spare as well.
- 4 The board that lies on the table and which the side support is fixed to will almost certainly project forward from the router table, so nip the front corners off for operator comfort.
- 5 Mark and screw the side support in place on this board. Both the top and side support must be square to the workpiece.
- 6 Now, both the fence and table supports must be clamped tightly against the workpiece. Check this with offcuts at both infeed and outfeed sides.



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The cutters

7 There are as many cutters as there are styles of moulding, so how do you choose? Cost – set against likely usage – is something to consider as they can be quite expensive. You can buy ready-moulded softwood sections, so your choice of cutters might be to create profiles you cannot buy off the shelf, or for moulding hardwoods if you want plain wood rather than painted mouldings. Victorian torus or, my favourite, Grecian ogee, are ideal for skirtings, with a smaller version for matching architraves. Dado mouldings come in various different styles but are effectively like a large edge moulding, usually with a large central bead. A picture rail isn't necessary these days, but can be added to give an authentic period look that can be used with paint and wallpaper to give a visual break high up the wall. Likewise, you can create wall frames to create a panel effect. It isn't usual to make wooden cornice except in very large undertakings for bigger period properties. Shown here, from left to right: biscuit slotter for two-part skirting, small Grecian ogee, large Grecian ogee, modern torus, multi-profile, multi-mould, decorative bead, linenfold and classical cornice cutters.

Making the moulding

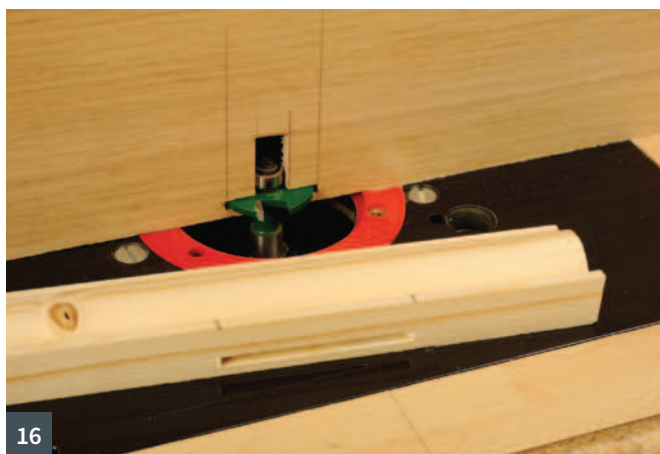
- 8 Skirtings can be almost any height, but in modern rooms are anything up to 200mm. And, without exception, the lower portion is a flat board, so we can make that separately with solid timber or MDF – which can be painted or veneered, the latter for a hardwood timber finish to your room fixtures.
- 9 Fit the desired cutter and a breakthrough subfence – if necessary, making a slot to accommodate a bearing, if fitted. With the subfence



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forward of the cutter, switch on and push the fence backwards and machine through until the correct amount of cutter projects for the first pass. Switch off and tighten the fence knobs.

- 10 Fit the tunnel correctly so it clamps the workpiece tightly. Do a test piece that is long enough to go right through the tunnel, as you will need to pull it from the outfeed end. Some effort is required, but the tunnel plus the subfence will have prevented chatter and tearing. You still need extraction behind the fence or the chippings will not clear. Repeat the cut on all required stock.
- 11 Move the fence back for the second and hopefully final pass. Do a test cut without the tunnel in place, just for the first 50mm or so, and check the result. If the cut depth is correct, refit the tunnel.



- 12** Now machine again at this setting and you should get smooth, well-formed mouldings without machining defects.
- 13** However, it can happen that workpieces want to twist where part of the face has been machined away. The way to counteract this is to use a very small support strip, which you can fix to the subfence and table with double-sided tape.
- 14** A dado moulding has two corners missing, so it will want to turn over even more. This time, two support strips do the trick.
- 15** This cornice mould has a limited amount of surface depth missing after moulding. In this case, two strips of veneer are taped together to give anti-chatter support.
- 16** To fit a skirting mould to the flat section, you can cut the sections

to length, and then mark and cut the biscuit slots on the router table. A breakthrough fence with lines showing the extent of the slot, plus two marks for each slot 65mm apart on the moulding are needed. Swing the workpiece onto the cutter so the first fence and workpiece marks align, push along to the second set of marks, and swing the workpiece away. It is a very quick, easy operation but ensure the slots don't cut right through the moulding profile.

- 17** I usually cut the lower section length with a square joint on internal corners and mitres on external corners, and then make the biscuit slots. The upper moulded section has both internal and external mitres, of course.

SLIDING DOVETAILS

Liam Thomas discovers a new technique for cutting sliding dovetails



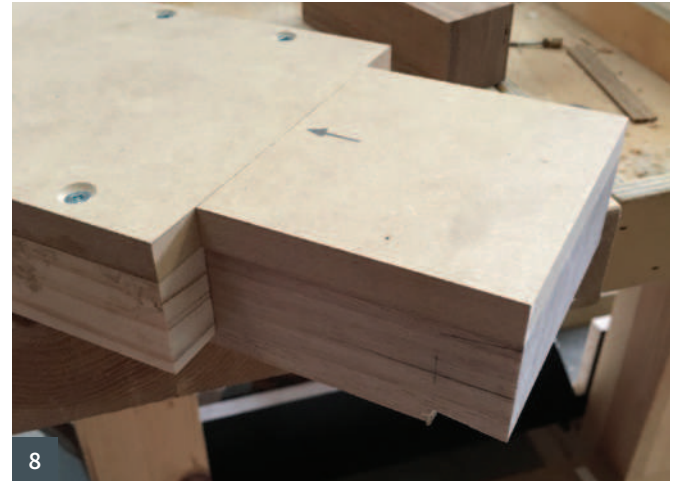
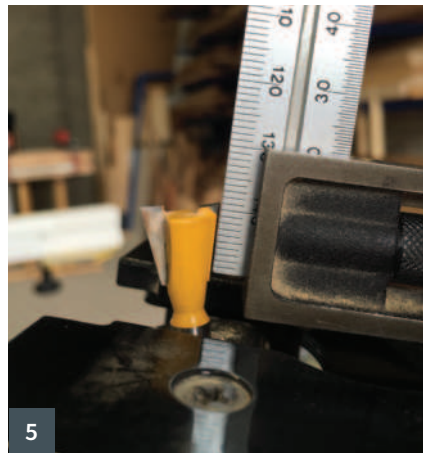
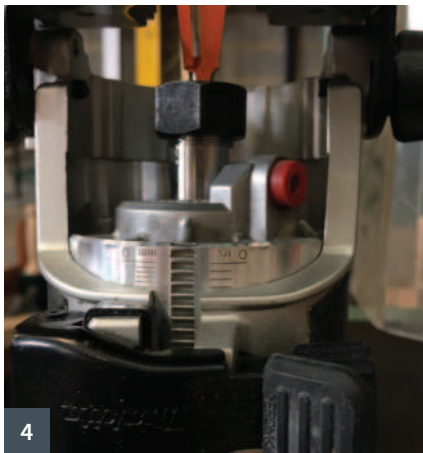
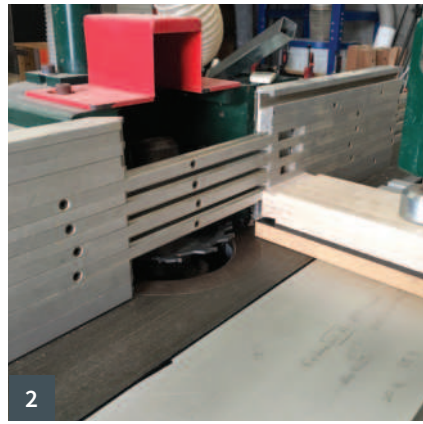
A dining table commission came into my workshop that required an oak base capable of holding a 100kg concrete top. The weight of the top coupled with the client's design meant some sturdy joinery was required for the legs and rails. I decided the best solution was to opt for a sliding dovetail joint. With this in mind I set about trying to find an easier way to cut this somewhat complex joint on the ends of long table components.

Process of elimination

A solution was needed to enable the quick and accurate production

of the sliding dovetail joinery. To add further complexity to the task, the rails requiring sliding dovetails would be angled by 2° to match an inside tapered leg profile.

I evaluated several options, including using the more conventional method of a dovetail cutter in a router, hand-held and running against a guide along the end of the rail. I also considered using the same cutter but mounted in a router table with an angled jig to hold the long rail upright at 2° . Finally, I considered using my combination saw and spindle moulder with sliding table. This option would allow the rail to sit flat on the sliding table, then using a 4mm grooving cutter in the



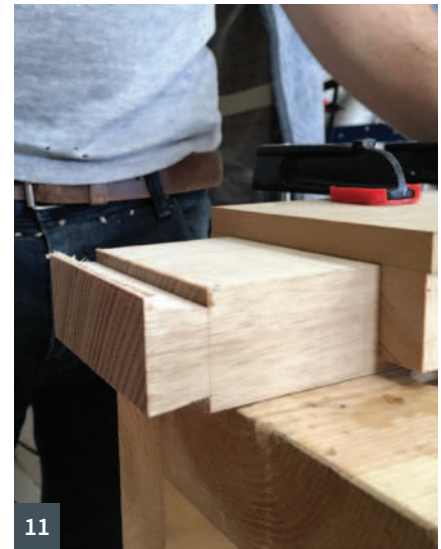
1 One option was to cut the sliding dovetail vertically on the router table. Note: safety guard removed for photo clarity only **2** Another was to cut the dovetail using the sliding table spindle moulder. Note: safety guard removed for photo clarity only **3** Makita trim router with tilting base accessory **4** Depth adjustment on the router is simple with some patience **5** The quick and easy way to set up the tilting base angle is to use a square **6** Successful test of the new method **7** New angled fence jig for the router to run against **8** MDF spacer, with 2° angled sides ...

spindle moulder tilted to 7° and the fence angled at 2°, the dovetail would be cut in two passes, being flipped over between each pass and the angle of the fence changed.

Each traditional method of cutting this joint had its merits but each one was also a compromise of sorts. With the rails being so long I felt that the two router options were unsuitable as the workpiece could not be handled or worked on in a way that was safe and accurate requiring either extensive work holding

jigs to balance either the router or workpiece.

Similarly the spindle moulder option would require a number of cutting operations per dovetail as well as additional set-up time, with adjustment of the fence angle as well as further hand tool fettling to fit the final joint, cleaning up the intersection of the dovetail and shoulder, which would be left square by the cutter. After each method was dismissed I kept coming back to the dovetail router bit itself – maybe I was looking at it all wrong.



9 ... used to set the fence spacing on the workpiece **10** Marking out the joint can help with depth and fence alignment **11** Dovetail cut in one pass leaving a small ridge on the end ... **12** ... which was easily cleaned up with a block plane **13** End result, clean sliding dovetails **14** The fence is flipped over and spacer used to align the second cut

Testing the tilt

A couple of years ago I purchased a Makita CT0700CX2 trim router that came with a number of additional accessories including a plunge router base as well as tilt base. With my long workpiece flat on the bench and the router upright I wondered if the tilting base accessory could be used in conjunction with a standard dovetail router bit to cut the sliding dovetail. Time to test my idea.

A simple guide was made out of MDF and clamped to a test piece for the tilt base of the trim router to run against. Like fitting a tenon to a mortise, the pin part of the sliding dovetail was machined first as often it can be easier fitting the tail part to pin. This does mean some careful adjustment of the depth of cut is needed, something which can be done with a little trial and error with this router.

A quick test was in order. Knowing that the shoulder of my dovetail needed to be 90°, with the router base tilted over and the dovetail bit in the collet, a square was sat firmly on the base up against the edge of the cutter. When the blade of the square sat flush against the cutter edge I tightened up the thumbscrews that lock off the tilting base.

With the tilt base angle set closely to that of the dovetail bit and

a simple guide fence clamped in place a test joint was produced, the resulting sliding dovetail was more than acceptable for a first try. The joint was a good fit and the actual cutting time was comparatively quick. With the right jig and set-up procedures it looked like this method would be good enough to use for the dining table commission.

Time for the real thing

Although the test run was a success, further refinement was needed to ensure consistency and accuracy. One area needing improvement was the fence. Rather than clamping one shoulder to the edge of the workpiece and then the whole assembly clamped to the bench, a new jig was made that was an exact fit of the width of the rail now only requiring a couple of clamps to hold in position.

The distance of the angled guide fence from the end of the workpiece needed to produce the correct dovetail length was determined once the pin parts of the joint were cut and some further test pieces completed. From here an MDF spacer was prepared that could be used to accurately align the fence to both faces of the workpiece.

A marking knife was used to mark the shoulders of the joint to help



15 Rail fitted to table leg **16** Tilting base angled to that over the dovetail cutter **17** Routing the sliding dovetail **18** Clinometer app showing the router tilt base angle **19** Using layers of masking tape can help with fine adjustment of cutter depth

avoid any damage to the fibres caused by the router at the end of the pass. This is also a useful guide to check that the angle and depth of cut are correct before any cutting begins.

The dovetail was cut in one pass. With not a great amount of material being removed, a sharp cutter and steady feed rate, the Makita trim router performed without fault.

The diameter of dovetail bit was slightly less than the required length of the dovetail. This was of little concern, however, as the leftover material at the edge of the dovetail was easily planed flush with a block plane.

The assembly of the finished dovetailed rail required just the right amount of pressure to bring the joint together, one of those small pleasures for woodworkers worldwide.

The final result was a nice clean sliding dovetail, produced easily and quickly on a long table rail component. Success!

Digital angles – the future is here

When it came to doing the final set-up for the sliding dovetail I double-checked the angle of the tilting base using my smartphone. The internal

inclinometer in the iPhone is surprisingly accurate and can measure angles on two different planes. The app I used is called Clinometer and can be found in the App Store. Not only was it useful for double-checking the angle of the tilt router base but I have also used the same app to check compound angles on drill press jigs with great results.

One tip for use on larger angled surfaces, especially for users of the iPhone, is the camera lens protrudes 1mm from the back of the phone so a 3mm MDF spacer below the lens will ensure the inclinometer gives an accurate reading.

Quick fix for a loose dovetail

A loose-fitting dovetail in the testing stage can be remedied by using a little bit of masking tape. Apply a layer of tape to the angled face of the sliding dovetail, reduce the cutting depth by sitting the cutter on top of the masking tape. Using more layers of masking tape will move the cutter up further, increasing the width of the sliding dovetail tail for a tighter fit.

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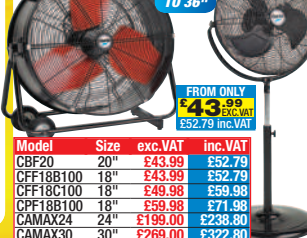


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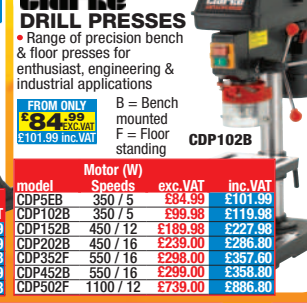


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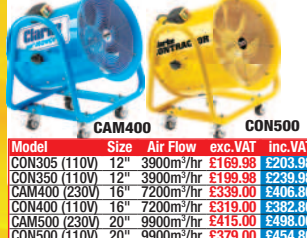
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CAM400	230V 16"	7200m ³ /hr	£339.00	£406.80
CON400	110V 16"	7200m ³ /hr	£319.00	£382.80
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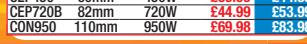
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Model	Width of Cut	Motor	exc.VAT	inc.VAT
CEP450	60mm	450W	£36.99	£44.39
CEP720B	82mm	720W	£44.99	£53.99
CON950	110mm	950W	£69.98	£83.98

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CP1000	10" (254mm)	120mm	£379.00	£454.80

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Model	Motor	CFM	Tank	exc.VAT	inc.VAT
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Tiger 11/550	2.5HP	9.3	50ltr	£189.98	£227.98
Tiger 16/550	3HP	14.5	50ltr	£249.00	£298.80
Tiger 16/1050	3HP	14.5	100ltr	£319.00	£382.80



Model	Mounting	Jaw (Width/Opening Depth) mm	exc. VAT	inc. VAT
Clarke CHT152	Bolted	150/152/61	£14.99	£14.99
Record TV75B	Clamped	75/50/32	£24.99	£24.99
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Model	Motor	CFM	Tank	exc.VAT	inc.VAT
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Tiger 11/550	2.5HP	9.3	50ltr	£189.98	£227.98
Tiger 16/550	3HP	14.5	50ltr	£249.00	£298.80
Tiger 16/1050	3HP	14.5	100ltr	£319.00	£382.80



Model	Power	Depth of Cut (Wood/Steel)	exc. VAT	inc. VAT
CJ3400	400W	55/-mm	£15.99	£19.19
CON750	750W	80/10mm	£29.98	£35.98
Bosch PST1700E	500W	70/4mm	£48.99	£58.79



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- Cuts in all types of woods

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Model	Motor HP	Fuse	exc.VAT	inc.VAT
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PC40	3.5HP	20Amps	£329.00	£329.00
PC60	5.5HP	32Amps	£389.00	£389.00



Model	Motor	Speed RPM	exc.VAT	inc.VAT
CSS400D	120W	400-1600	£99.98	£119.98
CSS16VB	90W	550-1600	£114.99	£137.99
CSS400C	90W	550-1600	£144.99	£173.99



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CR4	2000	0-66	£99.98	£119.98



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- Includes 3 wood & 3 metal blades



Model	Motor	exc.VAT	inc.VAT
QAST10V	710W	£37.99	£45.59
CON850B	850W	£49.98	£59.98

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- Induction motors

Model	Throat Depth	Max Cut 90°	Max Cut 45°	exc.VAT	inc.VAT
CBS250C	245mm/10"	115mm	65mm	£229.00	£274.80
CBS300	305mm/12"	165mm	115mm	£249.00	£297.80
CBS350	340mm/14"	225mm	160mm	£269.00	£326.80

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Model	Duty	Wheel Dia.	exc.VAT	inc.VAT
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CBG6RZ	PRO	150mm	£59.98	£71.98
CBG6250LW	HD	150mm	£59.98	£71.98
CBG6250L	HD	150mm	£68.99	£82.79
CBG6S	PRO	150mm	£74.99	£89.99
CBG6370LW	HD	200mm	£94.99	£113.99

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Model	Blade Dia/Bore (mm)	Max Cut Depth/Cross	exc.VAT	inc.VAT
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A matter of taste

Alan Goodsell takes a workshop break and ponders the subject of 'taste' in design

What do you consider to be good taste in design? Many years ago, when I started making furniture, I thought my taste in furniture design was the best, and my passion was traditional English oak pieces, so I made everything I could in that style. This is something I got known for and my customers came to me from far afield for my skills at making this style of furniture. Once I had built up relationships with my patrons, they would recommend me to their friends as they liked not just my furniture but also my work ethic and wanted others to get the same level of service. However, their friends didn't always want my English oak and would ask me to make things that did not conform to my taste. As I was running a business, I would politely go along to design meetings expecting to be horribly disappointed with what I was going to be asked to make. In fact, I found that exactly the opposite turned out to be true: going to these meetings and listening to my new customers talking with passion about what they wanted enlightened me and opened my eyes to a world of different designs and styles. I was well and truly educated out of my rigid sense of



PHOTOGRAPH BY SHUTTERSTOCK

taste and learned a valuable lesson. You may have what you think is the best in taste but there is always another opinion that is just as valid as yours. This thought process can be applied to many other topics, and it pays to listen and learn rather than be stubborn and isolated, in doing so, you will find that life is a much more interesting and varied place.

WORDSEARCH

Bandsaw	Knife	Scraper
Bradawl	Lathe	Scrollsaw
Carpenter	Mallet	Sharpening
Dowel	MDF	Varnish
Gouge	Mouldings	Workbench

L	R	E	T	N	E	P	R	A	C	O	W	R	R
M	O	M	W	N	W	A	S	D	N	A	B	W	G
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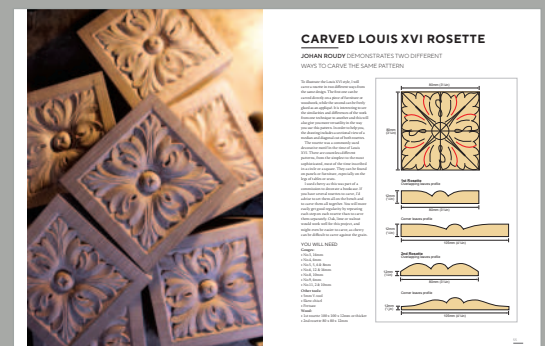
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8		9	4		7			
	7				3		9	
		3		1				
2	3			7	8	4		
		8	2		4	6		
		4	3	9			2	8
				4		3		
	6		7				4	
			6		5	7		1

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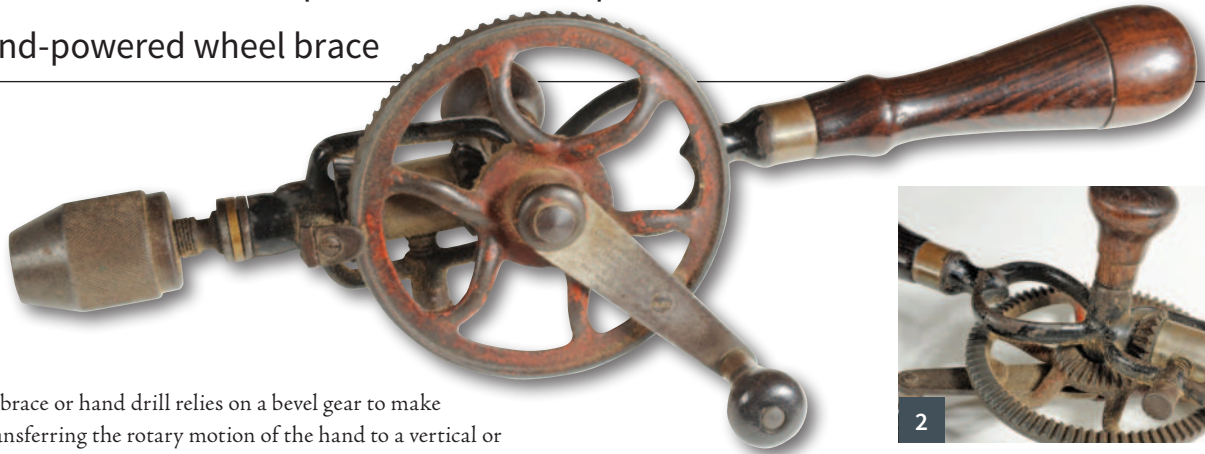
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The vintage toolbox

Colin Sullivan looks at the predecessor of the power drill:
the hand-powered wheel brace



PHOTOGRAPHS BY ANTHONY BAILEY/GMC PUBLICATIONS

The wheel brace or hand drill relies on a bevel gear to make it work, transferring the rotary motion of the hand to a vertical or horizontal rotary motion of the chuck. By the 1850s bevel gears could be machine made accurately and were soon used on drills to improve their performance over the age-old brace and bit. The Americans in particular saw the advantages they gave and went into large scale production; the Millers Falls catalogue of 1887 features a full range of drills that were to set the pattern for the next 100 years. Close copies of these drills were later made in England but in my opinion few could claim to be as good and ingenious as the American imports.

At the beginning of the 20th century hand drills were offered in all shapes and sizes from 8in to 18in long, some with two-gear ratios and with improved three-jaw chucks. They were given a variety of different names by tradesmen: egg beater drill, angle drill, gearing brace, corner brace and my favourite, the twirly.

There were simple hand drills made in either France or Germany with a forged iron frame and two gear wheels of the same size giving a one-to-one gearing. The bit holder was similar to the normal brace, using square tapered tangs.

Millers Falls was not the only company to make great hand drills; Goodell-Pratt and the famous Yankee company also made various ingenious designs. Record tools also offered a range of drills in England.

The three-jaw chuck we use today was developed by Millers Falls – as far as I can find out – from a simple two-jaw chuck around the early 1900s, making it possible to hold drills up to ½in securely, easy to open and close with a twist. Another nice detail was to have the handles hollow with screw tops to contain a set of drills, some had removable handles for the same purpose. Only the best materials were used on these drills up to about 1940, cocobolo handles with nickel-plated brass ferrules; attractive, functional designs that still work today just as they did originally. In fact, restoration of these old drills is usually no more than a case of removing the rust, repainting the metal parts and maybe taking up some of the wear by filing various parts.

I think these drills certainly deserve a place in any workshop alongside the power and cordless drills, holding a countersink bit or a regularly used pilot or clearance drill – remember, they even work when the mains power is cut off!

Drilling dead upright holes is not easy by hand with any sort of drill, unless you can see both ways at once and still turn the handle, and so I hit upon the idea of sinking a round spirit level into the top of the handle. The result is great, upright holes every time, how simple.



1 & 2 This Millers Falls drill, made around 1920, has two gears, an improved chuck with a thrust race, and drill storage in the handle **3** 8in Goodell-Pratt **4** 10in Goodell-Pratt **5** 13in Millers Falls **6** 16in Yankee with several speeds and ratchet system for use in restricted places **7** An early iron wheel brace

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