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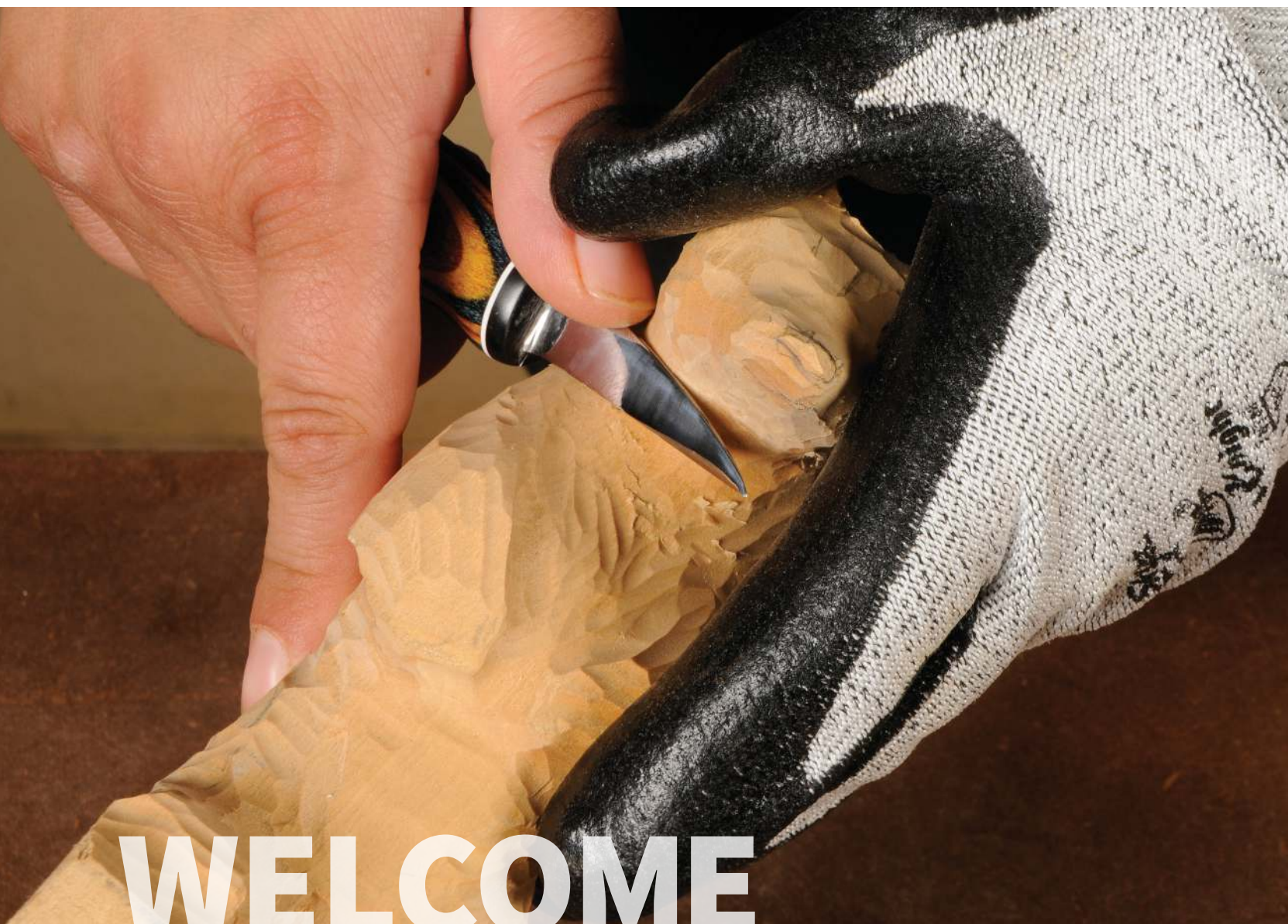
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is more

WOODWORKING CRAFTS

Issue 59



Wood-based crafts come in an infinite variety, from the simplicity of knife carving right up to large pieces of cabinet furniture. That is the wonderful thing: there are no boundaries, nothing to hold us back, only the limitations of the mind which we impose upon ourselves.

The new-look *Woodworking Crafts* has given us much more space to explore all the different areas we are interested in, and it's had a great reception from you, the readers. Some have even described it as a book, as there's so much in it. With the extra pages on offer we've been able to put together much more variety of content, so it really is a special experience to read.

Which projects will you choose from this issue? Or will our features inspire you to design something completely unique yourself? If you're new to woodworking, do what every aspiring 'woodie' does: start small, then get bigger. Don't run before you can walk – it doesn't work. In this age where technical training in any sphere is sadly lacking, we need the chance to start at the bottom and learn patiently step by step until we become more proficient at whatever we want to do. And when you're starting out, remember to play it safe and don't take risks.

So, don't stress if things don't go right, keep trying until your projects bear fruit – and simply enjoy your time working with wood.

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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

If you would like to be featured in *Woodworking Crafts* please email wwceditorial@thegmcgroup.com



Contemporary walnut dining table

Fine dining requires a fine dining table, which is exactly what Brendan Devitt-Spooner set out to make...

Designing an item of furniture as an exhibition piece affords the opportunity for one to consider different shapes, alternative methods of joining and, possibly more importantly, using timbers that might not be so common. This dining table came about as I had previously made a similar one in acacia and ilex oak, which sold at an exhibition on its first showing. Having had many positive comments on the design and shape I decided to replicate it but with different timbers, partly because I did not have enough acacia left to make another top. The timbers used for this table, although not uncommon, were chosen because of their provenance.

A lucky find

A few years ago I was taking part in a contemporary craft show at Stanmer Park on the outskirts of Brighton. Next to the car park I noticed a fallen tree. Wandering over, it turned out to be a walnut with a trunk approximately 4m long with a diameter of 600mm. It transpired that it had succumbed to strong winds the previous winter and had not been dealt with. After phoning the parks department, they responded by saying I could have it as long as I did not cause too much damage to the park land, as well as making a donation to allow for a new sapling to be planted. The following week I, my son Ross who is a tree surgeon and John Plater, a well-respected woodturner, removed the tree. After separating the trunk from the rootball and the crown branches we winched it onto the trailer and transported it my local sawmill for conversion. John took the rootball, which was eventually turned into a metre-tall hollow vessel. The sycamore for the underframe came from a tree in a garden in Hassocks.

Timber with character

A few years elapsed before this table was made

by which time the timbers had been air dried. The boards were then stacked into the kiln for a week to reduce the moisture content to about 10%. Both trees had been sawn into 54mm planks. Walnut can be a risky timber to invest in; some trees have little dark heartwood and some can be riddled with shakes. This tree only had about 50mm of grey sapwood, the rest being a deep chocolate brown but it did have a number of shakes and knots. On the positive side, this gives the timber a lot of character, which I find clients generally like. The sycamore, which had initially been end racked to prevent sticker marking, turned out to be a lovely white colour.

Book-matched boards

With no particular dimensions to adhere to, I selected two of the walnut boards which



Beauty found in knots and wavy grain

PHOTOGRAPHS BY BRENDAN DEVITT-SPOONER





were consecutive so I could book-match them. Avoiding the larger shakes and more unsightly knots, I managed to end up with a top length of 2,200mm by 995mm in width. This was made up from two large book-matched pieces and two smaller ones. The four pieces were initially surfaced and thickened and left oversize and left for a couple of weeks in the workshop to acclimatise to the ambient temperature. I also cut up all the pieces of sycamore oversize and roughly machined them and again left them to settle.

Joining the top

I concentrated first on the top as this could be part finished and then left to settle before being finished. The four pieces for the top were then re-machined and glued together. I used 6mm birch plywood in stopped grooves for joining. As with most operations, the choice of machines and/or tools would influence the preferred method. I used a spindle moulder with a $\frac{1}{4}$ in grooving cutter to form the twin grooves. As the design was to have concave ends, it was a good idea to mark where the curve would be to ensure that the grooves weren't exposed inadvertently when cutting out the curve. Gluing up was straightforward given that a dry run ensured that all the joints were closed up and all the sash clamps ready along with scrap pieces of wood to protect the edges. When glued I set aside the top in its clamps for at least 24 hours.

The underframe

MAKING THE LEGS

Attention could now be focused on the frame. Although I had the sycamore sawn into 54mm-thick boards, I wanted the legs to be 60mm thick. Machining some of the pieces down to 34mm, I face joined eight pieces to form the four legs. After they had set they were machined to 61mm thick and dimensioned to 750 x 150mm before final sizing later. The upper H-frame pieces that comprise the two cross rails and the longitudinal beam were machined. The long beam was joined to the cross rails by twin through-tenons and wedged. I like to use this joint as it shows the eventual owner the method by which the pieces are joined. Having said that I did not use them to join the cross rail to the leg as I felt it would detract from the circular joint lower on the leg. The joint between the cross rail and the upper leg would be a simple haunched mortise and tenon. The central crossbar employs a simple cross-halving to join the two components. Before the H-frame was glued I thickness sanded the pieces and then formed a 12mm cove on each lower edge. After finishing the surfaces with a sanding sealer and then a polish, the frame was glued together, making sure that the walnut wedges were driven in cleanly into kerfs sawn in the through tenons.

MORTISING AND DRILLING

While the frame was drying, I dimensioned the legs to their finished sizes and then marked out the mortises and the holes. The mortises were cut using a chisel mortiser. There are three different holes to drill. I began by drilling a 40mm diameter hole 10mm deep on the outside of the legs. With the small indent left by the pip of the cutter, I drilled a 3mm hole all the way through. Turning the leg over, a 25mm hole was drilled to a depth of 30mm. The 3mm hole was then enlarged to 5mm to accommodate the screw which would secure the turned bar to the leg. With the joints complete the leg was then tapered, the resulting flat surface planed and sanded. The edges were then all rounded over with a 12mm cove cutter in a router. Sanding the rounded edges was accomplished by very carefully holding them over the top surface of an industrial pad sander and lightly sanding them, making sure that the leg was constantly rotated to avoid any flat spots.

CYLINDRICAL BARS

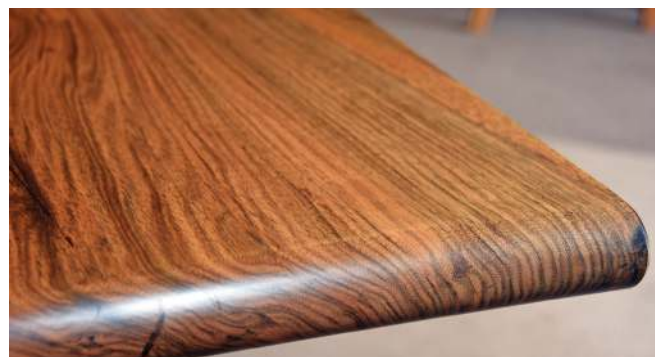
The cylindrical bars, which are in walnut, were turned with a 25mm spigot at each end. As can be appreciated, the distance between the spigots must be identical to the distance between the tenons on the cross rails. A discrepancy here would result in a trapezoidal frame, which is not what is desired! With the two bars sanded and finished on the lathe the whole frame could now be assembled. Turning my attention back to the upper frame, the protruding tenons were trimmed, the surfaces sanded and then finished again with sanding sealer followed by polish. As with any assembly a dry run should always be done as a matter of course; the whole could now be glued and cramped.

Shaping the top

Firstly, using a scraper plane I cleaned off the beads of squeezed-out glue. This was followed by squaring off the ends on a dimension saw. The top is heavy so an assistant is useful but it is surprising what one can achieve without help. With the luxury of an 1,100mm-wide belt cabinet sander the top was thickness sanded down to 38mm. The concave curves were marked out using a pre-made 10mm MDF template, rough sawn with a jigsaw and then accurately trimmed using a 50mm bearing-guided cutter against the template. The bull nose was



The wedged round tenon detail



A very smooth roundover edge



Extra support for the table top

formed using a $\frac{3}{4}$ in bearing-guided roundover cutter from both sides. There followed a period of hand sanding to achieve a constant curve. The long sides were hand planed and then a 4 x 4mm chamfer was formed using a router with a bearing-guided chamfer cutter which were then hand sanded.

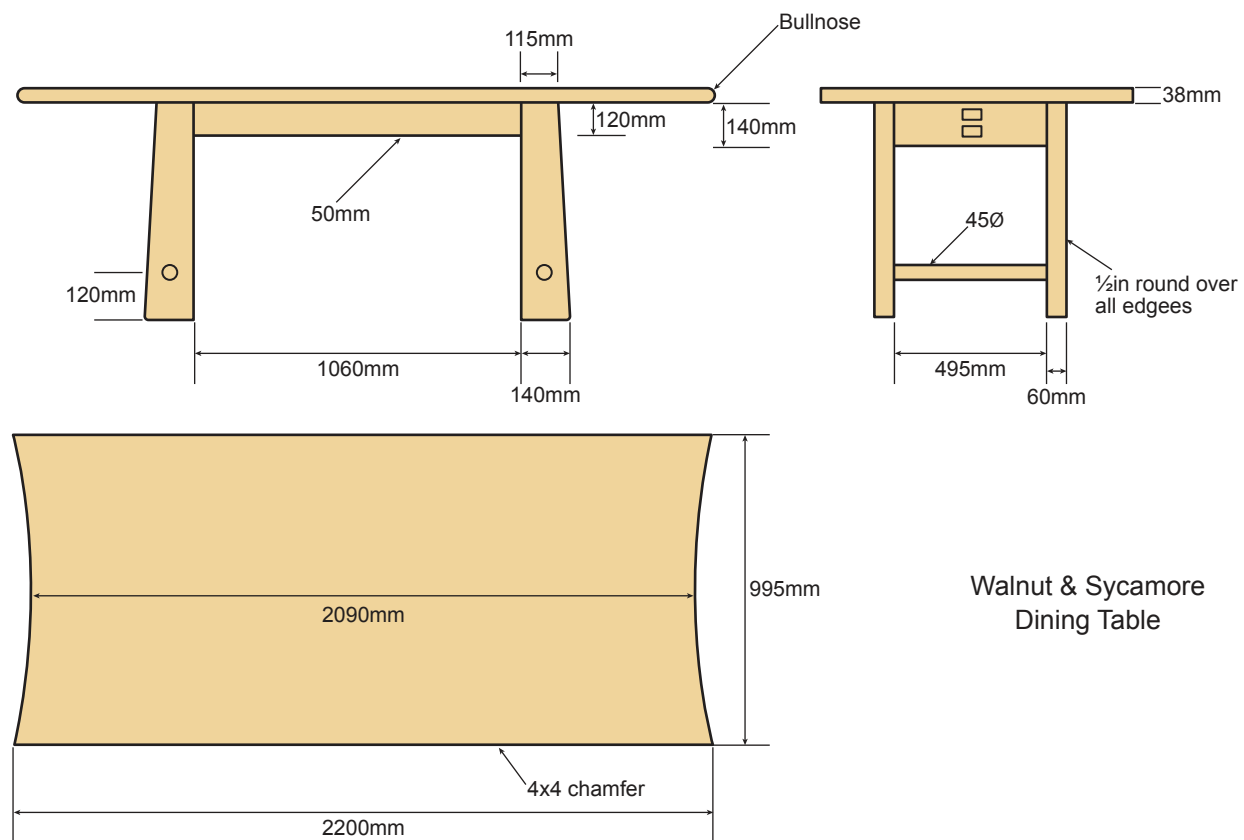
Finishing the frame

Before the top could be married up with the frame, the frame had to be finished. This involved inverting the frame and forming 4 x 4mm chamfers around the leg bottoms. Turning it the right way up, the top edges could be 'tweaked' with a hand plane to ensure a flat surface for the top to sit on. With some foam blocks sitting on the frame, the top was placed on the frame upside down so that the underside of the top could have a finish applied. As it would not be subjected to any wear, I chose to apply two coats of Danish oil with a brush over two days, wiping the excess off with a dry cloth. Once the top was back up the right way, I applied a coat of Osmo oil using a rag, wiping it sparingly over the surface, ends and edges. This was left to dry for 24 hours and then repeated four times over four days with a little gentle denibbing with 240 grit paper between each application.

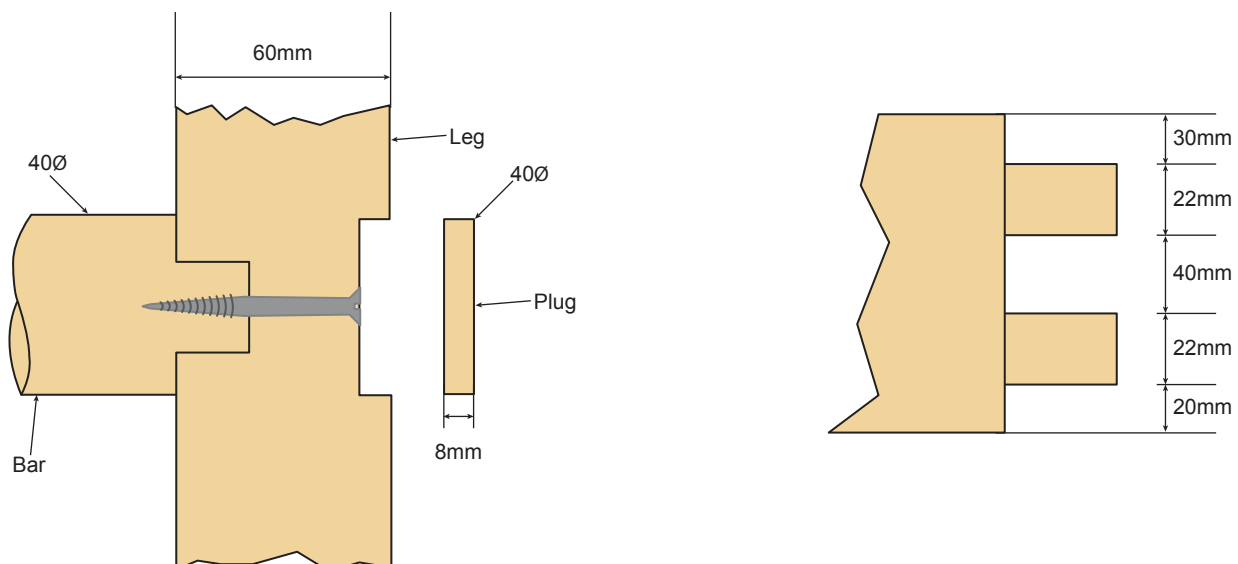
Securing the top

The top was secured to the frame by wooden buttons at each end and by screws through the crosspiece. The final components were the four end caps that would hide the bar securing screws. With a slight taper and a chamfer on the edge they were gently tapped home with a

little glue. Getting the grain direction the same on each really helps. I finished the top off with two coats of Danish oil followed by a light application of Vaseline applied with 0000 wire wool to give the top a slight sheen. This very desirable dining table just needs a new owner!



Walnut & Sycamore
Dining Table



Wood Awards winners

We celebrate the winning projects from the 2019 awards

Each year the Wood Awards honour outstanding design and craftsmanship in product design, architecture and interiors. The 2019 ceremony took place on 19 November at Carpenters' Hall in London hosted by Priya Khanchandani, editor of *Icon* magazine. The Gold Award, presented to the 'winner of winners', was awarded to Cork House. Judge Ruth Slavid commented, 'This is a really exciting project. Not just a house, it is also a piece of research.' Here, we take a closer look at Cork House, as well as the winning projects in the other categories.

For more information about the Wood Awards, visit: woodawards.com

CORK HOUSE: GOLD AWARD AND PRIVATE BUILDING WINNER

Cork House is built almost entirely from cork and timber. Monolithic walls and corbelled roof pyramids are built with loadbearing expanded cork made from the bark of the cork oak tree, a byproduct from wine stoppers. The house is a prefabricated kit of parts: blocks of expanded cork were CNC-machined off-site and then assembled on-site by hand without mortar or glue. A CLT floor platform, finished with oak floorboards, rests on Accoya beams supported on steel screw piles. Accoya is also used for the bespoke doors, windows and external steps. Western red cedar weatherboarding is used on the roof and rear façade. All internal built-in joinery and loose furniture is made from spruce.





Location: Eton

Architect: Matthew Barnett Howland
with Dido Milne and Oliver Wilton

Client: Matthew Barnett Howland
and Dido Milne

Structural engineer: Arup

Main contractor: Matthew Barnett Howland
with M&P London Contractors Ltd

Joinery: Whyte & Wood

CNC machining of cork blocks: Wup Doodle

Internal joinery: Nic Rhode Furniture

Furniture: Tom Graham Workshop

Wood supplier: NFP Europe Ltd

Wood species: Portuguese cork oak,
New Zealand pine, Estonian spruce,
American/Canadian western red cedar,
Austrian spruce and American white oak



ROYAL OPERA HOUSE 'OPEN UP': COMMERCIAL & LEISURE BUILDING WINNER

This transformation of the Royal Opera House provides improved access and transparency, a completely new Linbury Theatre and new foyers, terraces, cafés, bars, restaurant and retail facilities. At entrance level, subtle timber elements inlaid in the stone floor offer a warm welcome. Descending into the double-height Linbury Theatre foyer, the atmosphere becomes more intimate and theatrical as book-matched veneer surfaces are complemented by elegant linear grids of timber batons and solid wood parquet. The Linbury Theatre is entirely clad in black walnut, inspired by the rich cherry cladding in the main 1858 Opera House auditorium. Lights, acoustic insulation and sound equipment are integrated within the timber.

Location: London

Architect: Stanton Williams

Client: Royal Opera House

Structural engineers: Arup, Robert Bird Group

Main contractor: Swift Crafted Ltd

Joinery: Birmingham Veneers Ltd, T T Gillard, Thornell Veneers Ltd

Construction manager: Rise

Wood supplier: Missouri Walnut LLC

Veneer supplier: Reliance Veneer Co Ltd

Wood species: American black walnut

CAMBRIDGE CENTRAL MOSQUE: EDUCATION & PUBLIC SECTOR BUILDING WINNER

The Cambridge Central Mosque is a calm oasis of contemplation within a grove of trees, inspired by an image of the garden of paradise – with its water fountain symbolising the source of all life. Timber was chosen for its natural, warm and calming qualities. The expressed vaulted structure is glulam, while the surrounding wall and roof structure is CLT. The guiding geometry of the building is The Breath of the Compassionate, a historic Islamic pattern which evokes breathing in and out. Repeating star octagons are converted into a continuous structural pattern and projected onto the three-dimensional fan vaulting form. Alternate octagons are converted to the



structural columns or 'trunks'. The 30 trees create an overall impression of stillness, quiet and focus. Wherever possible metal connectors have been replaced with half lap joints for continuity of timber grain.

Location: Cambridge

Architect: Marks Barfield Architects

Client: Cambridge Mosque Trust

Structural engineer: Price & Myers

Main contractor: Gilbert Ash

Joinery: The Deluxe Group

Wood supplier: Mayr-Melnhof Holz Reuthe GmbH

Timber frame engineer & installer: Blumer Lehmann

Project manager: Bidwells

Building services & sustainability consultant: Skelly & Couch

Wood species: European spruce, oak and mahogany

BATTERSEA ARTS CENTRE: INTERIORS WINNER

In March 2015, a fire broke out in the northern half of the 1890s grade II listed Battersea Arts Centre, destroying the roof of the largest performance space. The original decorative plaster barrel vaulted ceiling was completely lost. Rather than replicating the lost ceiling, a contemporary plywood lattice ceiling was conceived. The new ceiling



belies the engineering challenges created by the thinness of panels, significant cantilevers and the complexity of designing a structure that can be reduced to a set of parts. Like a piece of flat-packed furniture, MultiPly arrives as a kit of parts and can be assembled in under a week.

Architect: Waugh Thistleton Architects

Client: American Hardwood Export Council

Structural engineer: Arup

Main contractor: Stage One

CLT panel manufacturer: Construction Scotland Innovation Centre (CSIC)

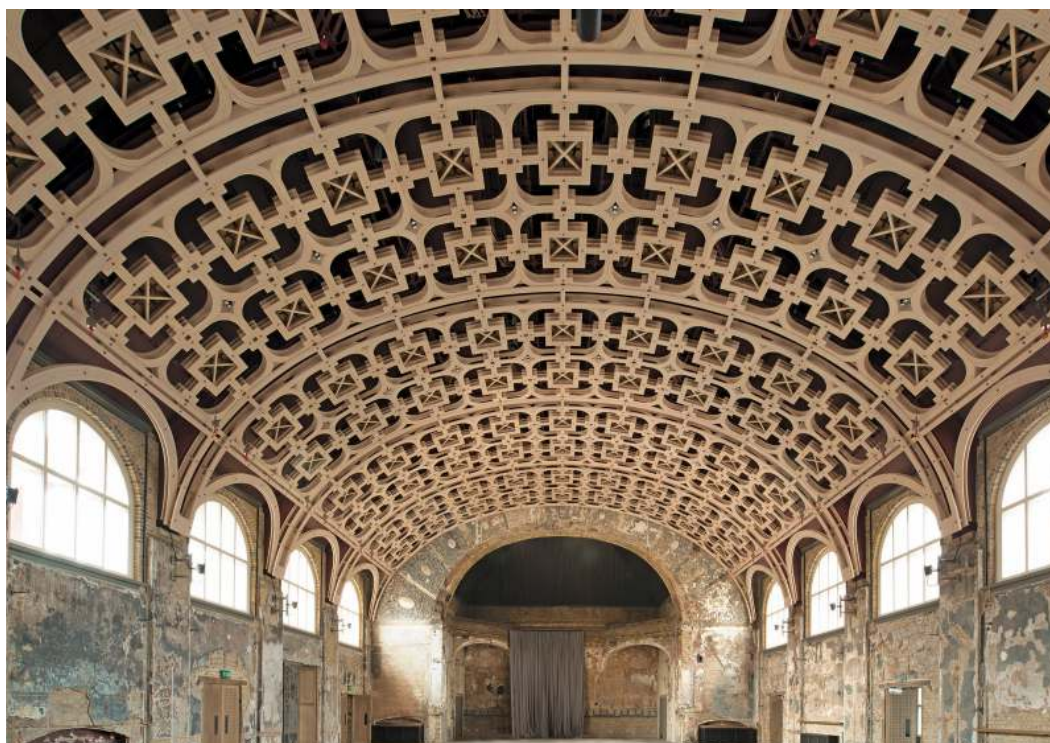
Lighting design: SEAM

Wood supplier: Glenalmond Timber Company

Wood species: American tulipwood



follows the curvature of the original and echoes the motifs in the plasterwork. The new ceiling is constructed of three layers of 18mm-thick birch-faced plywood. Many apertures provide multiple rigging and lighting positions from the technical walkway built into the roof space above.



Location: London

Architect: Haworth Tompkins

Structural engineer: Heyne Tillett Steel

Main contractor: 8build

Lattice ceiling joinery: Joinery Fixing and Finishing Ltd

Wood supplier: IBL

Wood species: European poplar plywood with birch faces

MULTIPLY: SMALL PROJECT WINNER

MultiPly is a carbon neutral engineered timber pavilion, made from hardwood CLT. The vertical maze of stacked modules and staircases creates labyrinthine spaces which intertwine, inviting people to explore the use of wood in architecture and reflect on how we build our homes and cities. The pavilion has been shown in three locations, each iteration taking a different form. The unassuming assembly of modules





HOUSE IN A GARDEN: STRUCTURAL WINNER

Replacing a dilapidated 1960s bungalow built in the garden of an 1840s villa, the house is on the ground and two basement floors surrounded by gardens, light wells and skylights. The ground-floor, pavilion-like structure floats, creating distant views through gaps in the city skyline. Wood is used throughout the project: structurally for the roof; as wall, floor and ceiling linings; and for the floating staircase. The glulam structure is unique in terms of the double curvature and the slender section sizes. The roof curves into an oculus. Shaped and informed by light and shadow, the roof's tent-like form creates a new place for life to occur. 'Internal' wood-lined living rooms and bedrooms are juxtaposed with marble-lined 'external' spaces (wet areas, pools and courtyards).

Location: London

Architect: Gianni Botsford Architects

Structural engineer: Built Engineers

Main contractor: New Wave

Roof Structure: ZÜBLIN Timber GmbH

Joinery: New Wave

Stair manufacturer: SteelOne srl

Wood supplier: Roof ZÜBLIN Timber GmbH, floors, walls, ceilings, stairs Dinesen

Landscape architect: Todd Longstaffe-Gowan

Wood species: European spruce, birch and Douglas fir



THE KISSING BENCHES: BESPOKE FURNITURE & PRODUCT JOINT WINNER

The Kissing Benches were made for the Figaro Garden at Glyndebourne. The client required something that would complement and not draw attention away from the Henry Moore sculpture on display in the garden. These benches are a contemporary take on an old style of outdoor seating, designed to enable people to engage in conversation, embrace or kiss. Gigantic beam sections of green English oak have been hand-carved using traditional gouges and mallets to create an ergonomic and attractive seat surface.

Designer/maker: Alison Crowther

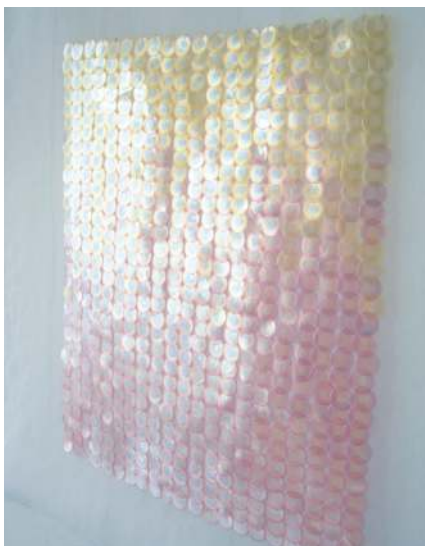
Client/owner: Glyndebourne

Wood supplier: Neil Humphries

Timber conversion: Vastern Timber

Photography: Jacqui Hurst

Wood species: English oak



BIO IRIDESCENT SEQUIN: STUDENT DESIGNER WINNER

Bio Iridescent Sequin is a response to the unsustainable beads and sequins currently used in fashion and textiles. Elissa Brunato's sequin uses bio-technologies to create colourful shimmering sequins from naturally abundant wood. Through extracting the crystalline form of cellulose, the wood imitates the visual aesthetics of shiny plastic while remaining lightweight, strong and compostable. Brunato is working alongside material scientists Hjalmar Granberg and Tiffany Abitbol from RISE Research Institutes in Sweden. She was awarded a £1,000 cash prize as winner of this category.

Designer/maker: Elissa Brunato

University/college: Central Saint Martins, Material Futures

Bio-engineering wood/cellulose: Research Institutes

of Sweden (RISE), Hjalmar Granberg and Tiffany Abitbol

Wood species: Canadian softwood Kraft pulp

LITTORAL CHANCES 1&2: BESPOKE FURNITURE & PRODUCT JOINT WINNER

This unmatched pair of collecting cabinets is based on the beauty of chance composition. David Gates is drawn to industrial and agricultural architecture, including jetties and pylons, and the paraphernalia that populates these sites, such as containers and crates. Gates is often struck by the balance and beauty of chance compositions; how stacked and piled objects present themselves sculpturally. The timber has been sawn, scraped, planed and cleft to emphasise the woods' varying surfaces. The cabinets appear chaotic and improvised but are carefully made using adaptations of traditional construction techniques.

Designer/maker: David Gates

Vitreous enamel on steel panels: Helen Carnac

Wood supplier: Adamson & Low, English Woodland Timber and Timberline

Wood species: European oak, bog oak, ripple sycamore, Cedar of Lebanon and Douglas fir, American bird's eye maple



UDON STOOL: STUDENT DESIGNER PEOPLE'S CHOICE AWARD WINNER

As a young boy, Anton Mikkonen was fascinated by woodgrain and knots. He would look for knots near each other and create faces and other shapes. With the Udon Stool, Mikkonen has matched the uniqueness of woodgrain with a very unique aesthetic. The stool consists of five parts, all CNC routed with a 2D CNC machine. The holes for the legs were also cut out with the CNC router and the legs were then added by hand. This award was voted for by visitors to the 100% Design show in London. Anton received £500 for winning this category.

Designer: Anton Mikkonen

University/college: The Sir John Cass School of Art

Wood species: Ash

IAN McCHESNEY BENCH: PRODUCTION FURNITURE & PRODUCT WINNER

These highly crafted benches are made in two sizes. The gallery bench is designed to sit in the middle of a room and is 900mm deep to allow for sitting on both sides. The foyer bench is designed to sit at the edge of the room and is 600mm deep to allow for sitting on one side only. The gently pillowed top and bottom give the benches a very natural feel. They are carved initially on a 5 axis CNC machine and then assembled and finished by hand to create the elegant edge profile. They are finished with hand-applied natural hard wax oils to keep the timber looking and feeling as natural as possible.

Designer: Ian McChesney

Manufacturer: Benchmark

Wood supplier: PB Hardwoods and English Woodlands Timber

Wood species: European oak or American black walnut



Restoring an antique chest of drawers

Kevin Jan Bonner restores a damaged piece back to its former glory



This classical-style chest of drawers is well made and constructed from good quality, richly coloured mahogany. However, it was in dire need of restoration when it was donated to me. I want to return it to its original condition using traditional finishing methods. In this case there is no need to gild the lily – just allow its full natural beauty to shine through.

This is a complex piece of furniture, and the more complex the project the more essential the action plan becomes. As always with furniture restoration, the first stage is to investigate the piece fully, then compose your action plan carefully.

Investigating the chest of drawers

THE DRAWERS

First I removed all of the drawers to examine them. The bottom drawer is destined for intensive care – it just fell to pieces as I removed it from the carcass. All of the joints had become unstuck and the drawer front had two nasty splits in it. The right-hand side of the drawer was in three pieces. The drawer slip had broken away and someone had tried to nail it back into place with a 50mm nail!

Although this sort of bodging is a common sight in old furniture, and should be frowned upon, the fact that this piece of wood has been nailed into place and not lost or discarded is extremely good luck. If that single, innocuous, nondescript scrap of wood was missing, I would probably have decided not to bother restoring this piece of furniture.

Consider the work involved. The whole side of the drawer would have had to be re-made. I would have had to buy a suitable piece of wood, plane it to the correct thickness and cut it to size. This sized piece would then have needed a groove routed in the side in order to accept the base of the drawer. Then, most difficult of all, I would have had to copy exactly, each of the dovetail joints, done by hand.

In short, to re-make this seemingly inconsequential scrap of wood would have doubled the amount and difficulty of work involved in the restoration of this chest.

The second drawer from the bottom was not so bad. The only real problem was that the glue had failed, making the drawer joints loose. To fix this, the drawer needed knocking apart so that the joints could be scraped clean of old glue, and the drawer reassembled with fresh glue.

The smaller top drawers were solid but needed cleaning inside. A previous owner had spilt something sticky inside one drawer and all the fluff and drawer debris had stuck to this over the years.

THE RUNNERS

With the drawers out, I could check the condition of the runners. The runner mechanism is composed of two parts: the runner itself and the bottom of the drawer side, which bears on the runner. Because of the friction between these two parts, the wood often wears away here, causing a groove in the runner and the drawer side.

This is a very common fault in old chests. If it is badly worn, the runner mechanism will need replacing. This is work for a well-equipped and experienced cabinetmaker as it involves cutting out sections of the drawer side and replacing them with new wood. If the runner mechanism does need replacing and you are not a cabinetmaker, don't bother restoring the chest; find another one to restore. The drawer runners in this chest of drawers, although not perfect, were acceptable, so no work was needed.

THE CARCASS

Often it is only the drawers that are stopping a carcass from falling apart. With the drawers removed, give the carcass a push at a top corner to see if it has any loose joints. If it is wobbly, you will have to dismantle the carcass, clean all the old glue from the joints and reassemble after applying fresh glue. This process can be complicated and time-consuming. Luckily, in this case, the carcass was in very good condition.

While you are examining the carcass, look out for any woodworm or obvious amateur repairs. These are often hidden inside the cabinet where the inexperienced buyer/restorer fears to tread.



The poor condition of the chest of drawers before restoration



The two big splits in the drawer front



The sticky stain and debris inside one of the top drawers

THE DRAWER PULLS

Often only one drawer pull will be missing or broken, as was the case here. This may seem like a small problem, but if you can't find a matching replacement, then you will have to replace the full set. Brass pulls can be very expensive, so for large cabinets, which can need up to 10 pulls, replacing them all can be a costly business.

THE TOP

The top was split in two places, one section had warped and lifted, and there were some deep gouges and scuff marks. Not to worry, I enjoy fixing this type of problem.

The restoration

REPLACING THE DRAWER PULLS

After a fruitless search through my collection of furniture hardware catalogues, I removed one of the drawer pulls and took it to a London supplier of furniture hardware with a comprehensive stock of old cabinetware.

Unfortunately, they only had a smaller version of the original design. I could have replaced the brass knobs with wooden ones, but this would most certainly look 'wrong'. So I decided to replace the knobs with the smaller brass pulls. This is not perfect but it is a pretty neat compromise in the circumstances.

REPAIRING THE BOTTOM DRAWERS

My next job was to fix the two nasty splits in the bottom drawer front. Unfortunately, at some time in the past, a misguided amateur had tried to fix the splits by squirting some glue into the cracks and hoping that would do the job. (This is a common bodge.)

Unless the split is now completely cleaned of all wax, dust and any other detritus, the glue will fail. This left me with the impossible task of cleaning out all of the naturally occurring dirt, and all the old glue that was located deep in the splits.

After much thought I composed myself, gritted my teeth and pulled tentatively and firmly at each split to break the bottom of the drawer front off completely.

Now that I had access to the faces of the split, I picked off the bodger's glue with the corner of a 1/4in chisel. I then soaked the unclean areas in white spirit and scrubbed them with a wire brush.

Once the white spirit had dried, I glued the bottom of the drawer front back on with PVA glue, securing it with five F clamps to hold it tightly in place while it dried overnight. I used masking tape to keep it from sliding about while I tightened the clamps.

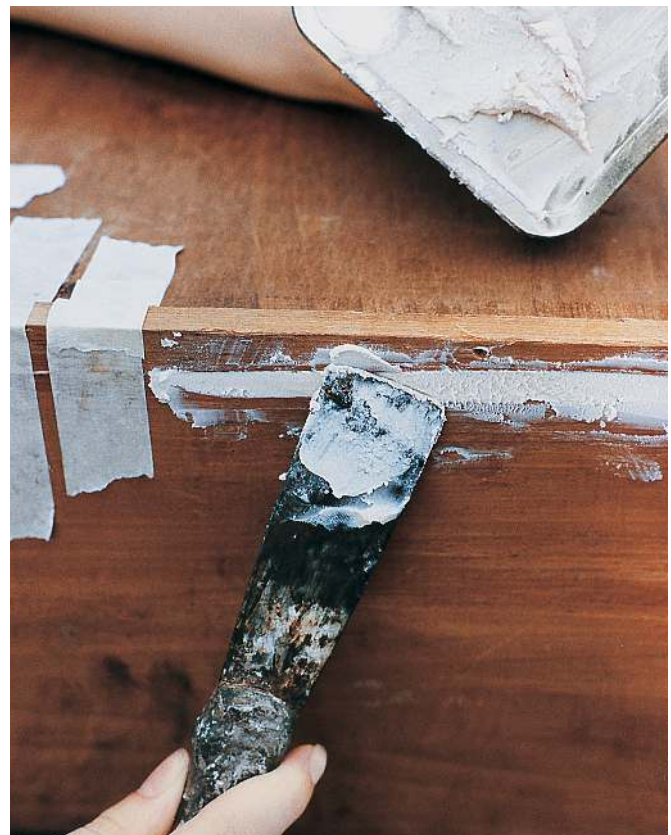
I then started work on the split side panel of the drawer. I removed the nail and glued the piece of wood back into place, securing it with masking tape while it dried.



The best match for the drawer pulls: a smaller version of the same design



Clamping the drawer front in position while the glue dries



Replacing the missing wood with car body filler



Scraping all the old glue from the joints



The countersunk screw holes and gap between two of the wood pieces are filled with car body filler



The surface of the wood after stripping

There was still a large section of the drawer side missing. Luckily, this was just a plain piece of wood and could be replaced with car body filler, which is an exceptionally good wood filler. You can purchase a small tin of it from any car accessory shop, then just follow the instructions on the can. The soft filler is made rock hard within minutes by adding a small quantity of the hardening paste which comes with the filler. Use it quickly before it goes too hard. You can build up very large sections of missing wood with this stuff, once you are experienced in its use. The car body filler will be coloured with an appropriate spirit stain later in the restoration process.

The next day I scraped the old glue from the dovetail joints (this took approximately 20 minutes) and then reassembled the drawer. There was no need for clamps in this instance as the joints were tight.

When I had finished, I slid the drawer carefully into the carcass; it worked just like new. If the assembly of the drawer had been slightly wonky, if glue had been spilt on it, if the wood had swollen slightly, it may not have slid in so smoothly. In such a case, the drawer runners would have to be sanded or planed a little at a time to remove the offending parts.

I repeated the process on the second from bottom drawer. Again, this drawer did not need clamps.

REPAIRING THE SPLITS IN THE TOP

The solid wood top is made up from three pieces of wood glued together. One of these sections had started to warp, causing it to break away from its glue on the top of the carcass and split away from the rest of the top.

After some investigation and a number of experiments, which involved trying to glue the top from underneath with new glue blocks, I decided that the most secure way of fixing this would be to clamp, glue and then screw the top down.

Glue blocks are small, square sections of wood, typically 50 x 13 x 13mm. They are glued along the intersection of two pieces of adjoining wood in order to join them together. They are commonly used on the interior, unseen portions of cabinets and often come unglued, thus weakening the structure. They can be replaced and would have pulled the top into place here, but I rejected this solution because in this instance they would not have been strong enough.

I drilled the screw holes so that the heads of the screws would be sunk below the surface of the wood, and then used car body filler to fill these countersunk holes. At the same time, I filled the thin gap that remained where the warped section of wood did not join exactly. I sanded down the areas of filler with wet and dry paper (600 grit), and shall stain the filler to match the surrounding timber after the cabinet has been stripped.

STRIPPING

Wherever there are structural jobs to be done on the furniture, it is best to leave any stripping until these have been successfully completed. There is an outside chance that the structural repairs will not be successful and you may decide not to continue with the restoration, in which case you will have avoided wasting time stripping the furniture. More importantly, structural repairs usually involve clamping and gluing, and glue will inevitably drip and splash. The old finish will protect the wood from contamination by the glue and will also help protect it against inadvertent knocks and marks caused by the clamps and other tools. Stripping the finish before gluing is a bit like laying a carpet before painting the ceiling.

I used a chemical stripper on the chest of drawers. Even though the work was mainly on flat surfaces, it took me a whole day to strip the chest. However, I didn't rush the job – it was quite a leisurely and pleasant experience.

I started with the top, then moved onto the two sides before stripping the carcass front and the drawer fronts.

CLEANING THE INSIDES OF THE DRAWERS

After stripping each of the drawer fronts, I cleaned inside each drawer by rubbing over with wire wool dipped in white spirit. Although they looked a lot better for this treatment, they will all benefit from lining paper and a spray of perfume.

REPAIRING THE DENTS AND GOUGES

Dents and gouges are common problems and are easily removed. The repair relies on the principle that if water is applied to wood it causes the fibres to swell up or 'inflate'. When wood is knocked, the fibres of the wood are squashed or deflated; these can be re-inflated by the judicious application of water. This process is often referred to as 'raising the grain'.

For the minor dents, I simply painted on water with an artist's brush. As they dried, I applied more water, keeping the dents soaked all day long. By the end of the day most of the minor damage had disappeared.

I covered the more severe dents with wet tissue paper formed into snake shapes to follow the line of the dents. In this way the dents can be kept wet for days on end if required. I left the snakes on overnight. By the morning the fibres had been re-inflated and the dents had disappeared.

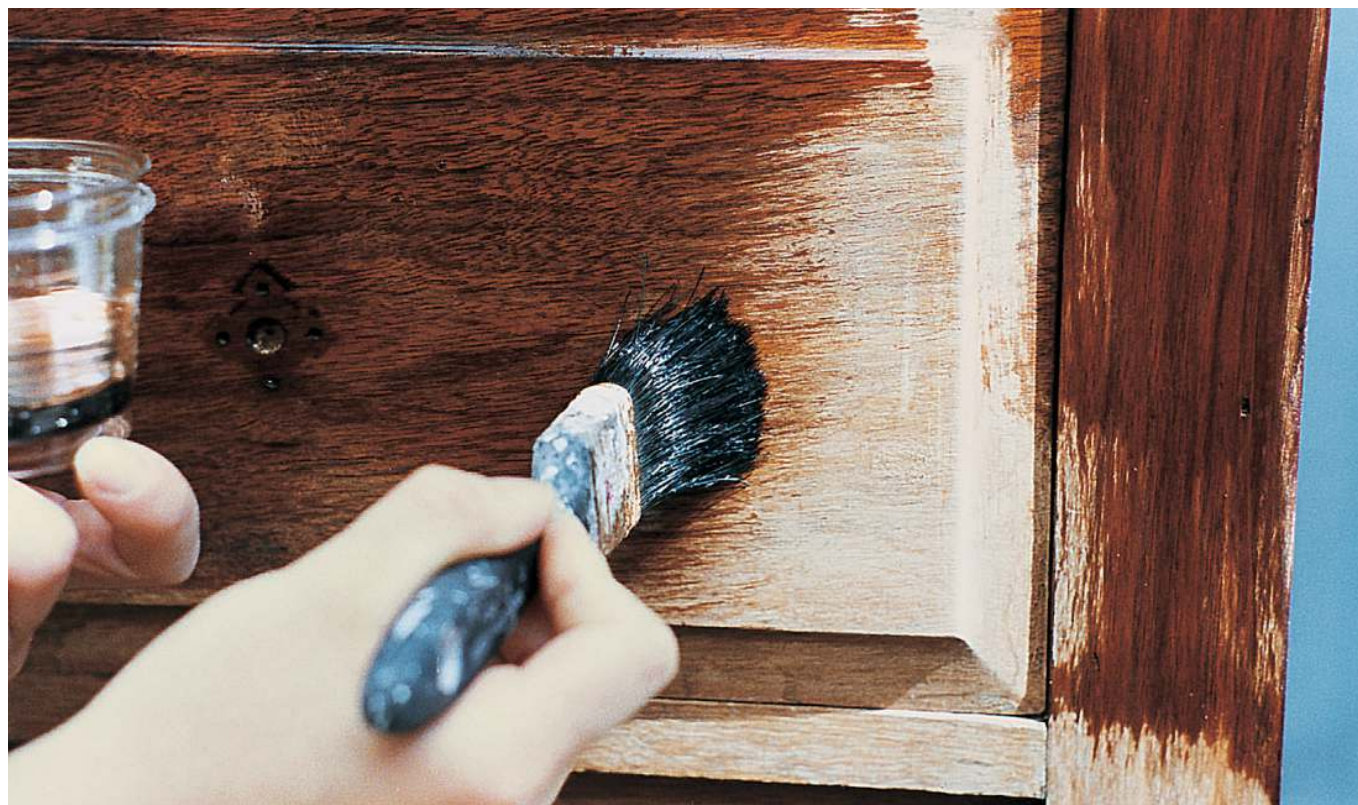
In really severe cases, or if you are in a rush, you can apply the tip of a hot iron to the tissue, thereby forcing the moisture into the fibres of the wood.



Applying water to the minor dents to 're-inflate' the wood fibres



'Snakes' of wet tissue are placed on the major dents and left overnight



Applying the coloured oil stain

APPLYING AN OIL STAIN

I decided to use a mixture of boiled linseed oil thinned with a little white spirit. I added just a splash of brown oil stain to give it a little colour.

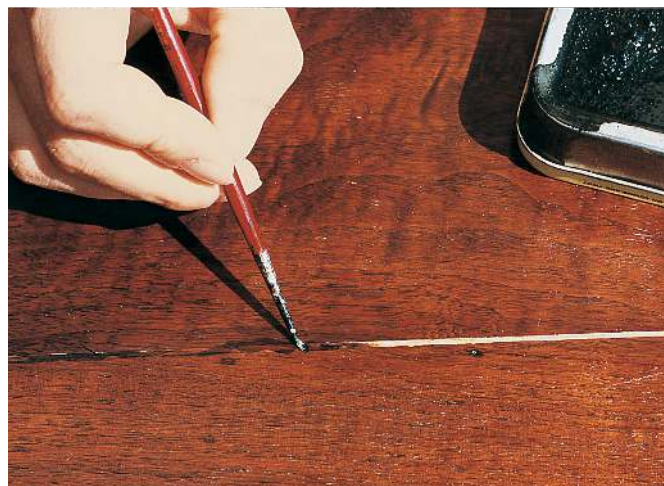
I brushed this mixture liberally onto the wood. In most areas the oil makes the plaster invisible immediately, but in a few stubborn areas, I needed to rub the oil into the plaster-filled grain with wire wool to get it to penetrate. Applying the stain took about 15 minutes. I left this for 10 minutes before applying a second coat to the absorbent areas, and finished by wiping off any excess with a cotton cloth.

APPLYING THE FRENCH POLISH

For this project, I used button polish (a particular type of French polish) for the following reasons:

- It was the original finish of the cabinet
- It will impart a warm colour to the mahogany
- I intend to colour the various patches of filler with spirit stain.

There is a very important relationship between spirit stain and French polish. The solvent for French polish and spirit stain is the same (methylated spirit): therefore, spirit stains can be used to tint and stain French polishes. More importantly, the stain can be painted onto the top of the French polish and it will adhere to the finish. It can then have further layers of French polish applied over the top, so



Painting on the coloured stain to conceal the car body filler



Mixing an oil stain and wax to create a coloured, 'antique' wax

capturing the colour between layers of finish. This method has been used by craftspeople to stunning effect in creating finishes, notably, to simulate different woods when 'matching and patching' furniture.

Having left the oil to dry overnight, I mixed equal quantities of methylated spirit and button polish, and brushed this mixture onto the wood. I systematically coated the chest one section at a time. The important thing to remember about French polish is that because it dries very quickly you have to apply it very quickly. Don't overload the brush; dip just the tip into the mixture and smooth it out before applying more polish.

I applied only one coat of this thinned button polish before preparing the stain to fill the coloured areas.

COLOURING THE FILLED AREAS

To colour the filled areas, I mixed some brown spirit stain powder with meths and added a splash of button polish. Using an artist's brush, I painted this stain over the car body filler in the drawer front, over the recessed screws and filling the split in the top.

If you have ever used watercolours, the process with spirit stain is very similar; you build up dark colours by applying many thin coats. This approach will give you close control over the process. If you do overdo it, the colour can be removed by rubbing with a very fine grade wire wool.

This is a time-proven system. The French polish sealer allows me to make mistakes. If I were to work directly onto the surface of the wood, the stain would soak directly into the fibres and be next to impossible to remove if I were to make a mistake. With a coat of the sealer applied to protect the wood, I can play around with colours and brush strokes for as long as I like. Indeed, in this case I removed my handiwork twice because I was not satisfied with the look. (It usually takes a few attempts before you get the hang of it.)

Once I had achieved a reasonable effect, I gave the stained areas a coat of the thinned button polish to seal the spirit stain. To finish, I then gave the whole cabinet another coat of button polish.

Within the two sealing coats of thin button polish we have entombed the colouring stain that obscures the filler. This will protect all of my painstaking artistry from future wear and tear, and from the wax polishing finish that is to follow.

APPLYING COLOURED WAX

I wanted to apply a dark wax to darken the tone of the cabinet and to create a slightly older, more antique look by simulating a patina. This is a common subterfuge in antique circles.

On the DIY store's wax finish shelf you will find, along with natural, uncoloured wax, an array of coloured waxes. Don't bother purchasing these; make your own. To do this, scoop the required amount of natural wax into a screw-top jar, add a few drops of oil stain to taste and stir until well mixed. In this way you can create your own coloured or 'antique waxes' to suit your own needs.

Please note that you cannot mix spirit stain and wax; only oil stains and wax share the same solvent and therefore only oil stains and wax can be mixed.

I made some dark brown wax in this way and applied two coats. I rubbed the wax into the wood with cotton cloths, allowed the solvent to dry, and then polished the wax with a second, clean cotton cloth. The dark wax builds up in the crevices and mouldings of the furniture and artificially replaces some of the patina that was lost in the stripping process.

WOODS FOR STICKMAKING

Andrew Jones and Clive George
advise on the best materials to use



What type of wood makes a good stick? It is true that you can make a perfectly acceptable stick from the wood of most trees: indeed, I have a Victorian stick manufacturer's catalogue which lists the availability of dozens of different sticks made from woods as exotic as ebony, aucuba, orange and olive. While the choice of woods available in most countries today is more limited, it still offers an interesting range with which to work. Those that follow are generally available and I have used all of them at one time or another.



Pages from a Victorian stick manufacturer's catalogue

BIRCH

(*Betula pendula*)

Most people are familiar with the white bark of the silver birch, but young trees are deceptively brown. The wood itself is pale brown and even-grained, producing light yet strong sticks. With the bark left on, or peeled and stained, such sticks are very attractive.



SYCAMORE

(*Acer pseudoplatanus*)

This is so common now it has almost become a 'weed tree', and I am constantly removing seedlings which have taken root in our flower borders. While younger trees produce branches that are straight and of sufficient length, the taper over such a length is very often excessive. This is a good wood to practise on, but not to spend too much time perfecting. There are better woods around. It does, however, produce good wood from older trees for stick handles.



CHESTNUT

(*Castanea sativa*)

The wood of the sweet chestnut provides those easily recognisable walking sticks that are available in outdoor pursuits shops and in hospital outpatient departments. It is also used to fashion what is sold as a rather cumbersome 'shepherd's crook', although I can't imagine many shepherds actually using one of these products!

Nonetheless, chestnut is used to make large numbers of sticks which are cheap and functional. The bark is usually peeled and the wood coloured by staining, fuming or scorching.



HAZEL

(*Corylus avellana*)

This is a beautiful wood to work with and my favourite. The tree, easily recognised by its catkins in the spring and its nuts in the autumn, throws up numerous shoots from its base, many of which are straight for the greater part of their length. This considerably reduces the amount of work required later to straighten the stick.

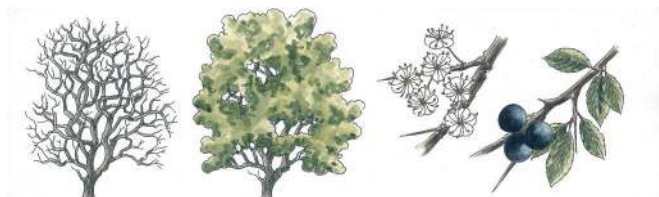
The range of colours and effects in the bark are many and varied – from a very dark brown to almost silver; from something like snakeskin to a lovely bird's-eye mottling. The wood seasons well, producing a strong stick, and it is easily obtainable.



BLACKTHORN

(*Prunus spinosa*)

Felt by some to be the ultimate wood from which to produce sticks, there is no doubt that the best examples are very beautiful. However, such examples are difficult to find and the wood is dense, which makes the stick heavy. The bush itself is thorny, difficult and sometimes dangerous to cut. Branches, suckers or saplings of appropriate length and diameter are hard to come by and the degree of taper in a stick may be excessive. If you find a good one, then rejoice. With its thorns trimmed back a little and its rich bark varnished to a deep red hue, it will look magnificent.



ASH

(*Fraxinus excelsior*)

A strong wood, resistant to splitting, the bark of which is a rather uninteresting grey. With care the outer bark can be buffed down to reveal a more colourful underbark. The tree is very common, particularly in limestone areas, and can grow to up to 40m high. It can be recognised by its paired leaves and winged fruit. Look out for the black buds in winter.



HOLLY

(*Ilex aquifolium*)

The most instantly recognisable tree in this list, holly is better associated with Christmas decorations than with producing walking sticks. It is particularly difficult to season with the bark left on, as it inevitably wrinkles, and the effect is unacceptable. The wood itself is usually like ivory and, when the bark is stripped, can be left in its natural state or coloured.



HONEYSUCKLE

(*Lonicera spp*)

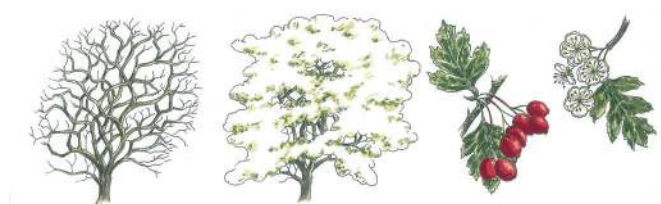
I mention this plant not because it offers suitable wood itself, but because its climbing habit, and the effect this has on other trees, occasionally provides interesting material for the stickmaker. It has a tendency to twine itself around young saplings and, as they grow, the constricting effect of the honeysuckle produces a spiral which, in appearance, is not dissimilar to that of a corkscrew. Such shanks, which are known as 'twisties', are highly prized by stickmakers.



HAWTHORN

(*Crataegus monogyna*)

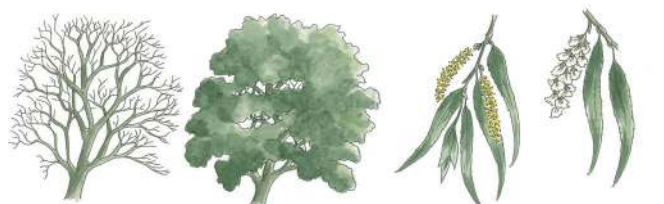
Commonly found as a small hedgerow tree, and still planted to make stockproof hedges, hawthorn does not have the same character as blackthorn. Nevertheless, it can make good sticks, although they are on the heavy side. The bark is drab, like chestnut, so it is usually peeled and the wood stained or fumed – although, with care, the underbark may be retained to provide a pleasing contrasting effect.



WILLOW

(*Salix viminalis*)

This wood is generally in plentiful supply, especially in wet ground. It produces straight shafts of good length, but the bark and the wood are characterless and cut sticks are 'whippy'. In a world that contains an increasing number of disposable items, willow is the equivalent where sticks are concerned.



ROWAN

(*Mountain ash*)
(*Sorbus aucuparia*)

The red berries of the rowan tree distinguish it and help to identify saplings that might be good prospects from a distance! A tough, springy wood and on the heavy side, it produces durable sticks of usable shapes and sizes.



Stickmaking by Andrew Jones and Clive George, published by GMC publications. RRP £16.95

STICK MAKING BASICS



Dave Wilkins introduces all the techniques you'll need to make your own walking stick

The majority of homemade sticks comprise a handle and a shaft, which is also called a shank. The shaft, and the handle if made of wood, will need to be seasoned. The rule of thumb for drying wood is one year for every 25mm of thickness. The woods traditionally used for the shaft are shown in photo 1; they are (from left to right): ash, blackthorn, hazel, holly, sweet chestnut.

CUTTING SHAFTS

Shafts of all these woods, if grown in a coppice, will have a tendency to be reasonably straight, which will reduce the need for straightening at a later stage. From a conservation viewpoint, try not to cut proposed stick shafts that you later have to discard as unsuitable.

The ideal time for cutting shafts is when the wood sap is down, i.e. when the tree is hibernating for winter – this is generally indicated by the leaves having fallen from the branches, and is usually between November and February of each year. Holly, an evergreen tree, does not shed its leaves but can also be cut at this time of year. Look for shafts that are about 1.5m in length, and about 25-30mm at the thick end, tapering to about 15mm at the thin end. After cutting, store them in a cool, dry, airy place for 12 months to season.

1



PHOTOGRAPHS BY DAVE WILKINS

STRAIGHTENING AFTER SEASONING

After seasoning your shaft, inspect the shaft for any sections that require straightening. To straighten, start at the fat end and working your way down in stages, apply heat using a hot air gun to any sections that require straightening. Fan the heat over a 150mm length all around the circumference of the shaft at the point that needs to be straightened. Apply only sufficient heat so that the shaft is just too hot to hold at the heated area with an ungloved hand, then straighten and allow to cool before straightening the next 150mm length. Straighten across your knee or the corner of a bench, see photo 2.

TYPE OF JOINT

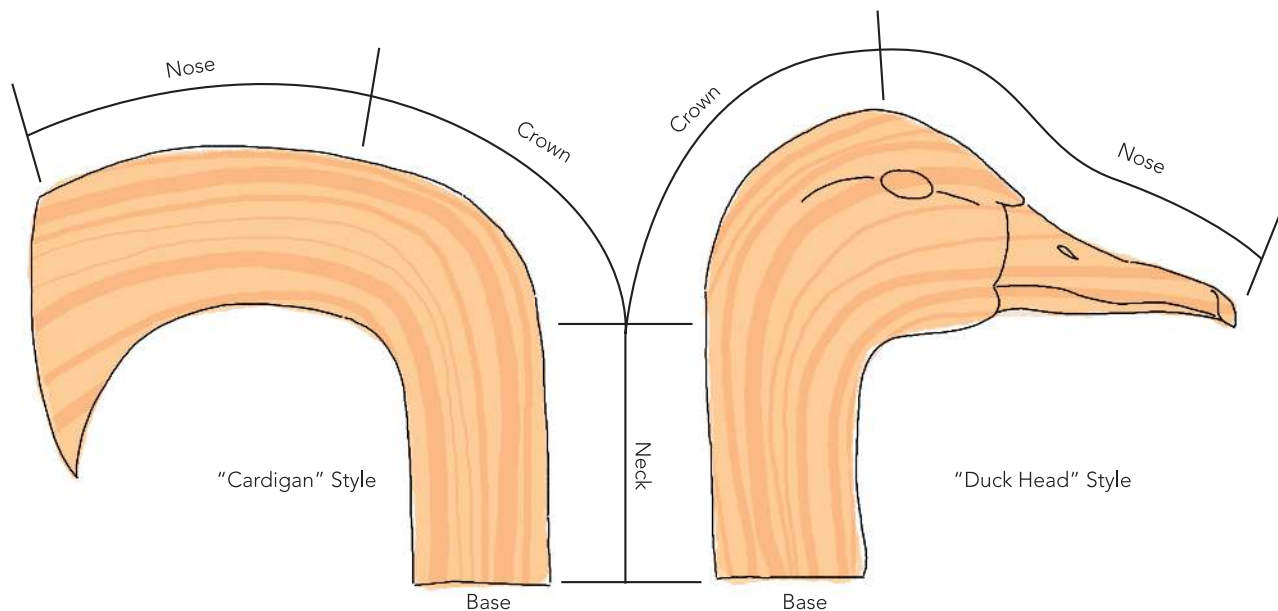
There are two types of joints used for joining the handle to the shaft:

- Dowel joint – where the end of the shaft is made into a dowel, and the handle is drilled to accept the dowel.
- Studding joint – where a single threaded metal rod is glued into both the handle and the shaft.

We'll look at the studding joint first since this is easier, and an almost perfect joint can be made every time.



A dowel joint, once made, cannot be adjusted to be made perfect. Only experienced stickmakers can successfully make perfect dowel joints.



THE HANDLE

Regardless of whether the handle is carved or plain, the process for a studding joint is the same. Here I am using what is known as a 'cardigan' style handle, the shape being very similar to that of a carved handle.

Square the base of the neck (photo 3). Mark the centreline on all sides of the handle blank, then a centreline in each half of the handle – this will help with the shaping up later (photo 4).

Mark the centre of the base of the handle. Put the handle in a vice upside down with the neck vertical – check and confirm using a spirit level. (see photo 5).



THE THREADED ROD

At the central point of the base, drill a vertical hole using an 8mm drill bit (photo 6) to the depth of 60mm, or 55mm (if you intend using a spacer with the threaded rod – the threaded rod is 125mm long).

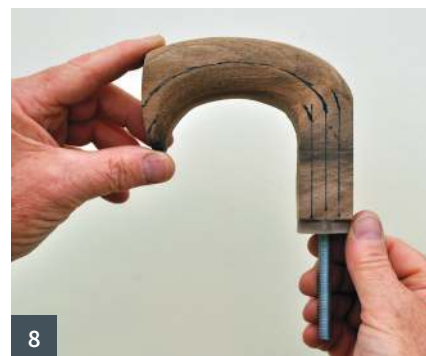
The threaded rod can be glued in place either now or later in the making process, depending on your preference. When gluing the rod in the hole, it must be held by pressure while the glue dries.

A pocket of air can sometimes get trapped at the bottom of the hole and if pressure is not applied, the air that is compressed in the hole will cause the rod to come out slightly. Remove any excess glue before it dries.

If you are fitting a spacer, drill the centre with an 8mm drill bit and glue it to the handle when the glue holding the threaded rod has dried. Remove any excess glue before

it dries. You can apply pressure by using a large washer and a wing nut screwed down on the threaded rod.

When the glue has dried, remove any excess spacer material back to the original size of the handle neck (photo 7). Now you can carve/shape the handle. You must leave the neck squared, so do not reduce the neck part at this stage (photo 8).



DRILLING THE HOLE

Ensure that the thicker end of the shaft is flat and at 90° to the shaft. Ensure that the shaft is vertical in the vice using a spirit level (photo 9).

Find and mark the centre of the thick end of the shaft using a metal washer of smaller diameter than the shaft, since it is round and has a central hole – the smaller the hole space the easier it is to find the centre (photo 10).

Drill a hole using the 8mm drill bit to a depth of 60mm. Drill a small way and then move 90° round the shaft to the side and drill another small way, then move back 90°. Continue drilling, moving 90° back and forth until the hole has been drilled. The reason for moving 90° is to ensure that the hole is as upright as possible from both the front and the side (photo 11).

Now is the time to glue the threaded rod into the handle if you have not previously done so, and the spacer if one is being used. Check that the hole is deep enough for the threaded rod protruding from the bottom of the handle. About 25mm from the top of the shaft, put a strip of masking tape completely around the circumference of the shaft.



HANDLE ALIGNMENT

Viewing from the back, insert the handle into the shaft. Looking down the full length of the shaft from the thin end, slowly rotate the shaft while keeping the handle still. Keep the back of the handle uppermost on the end of the shaft while rotating the shaft. When the shaft and the handle are in a straight line, draw a vertical pencil line on the masking tape that follows down from the centreline on the back of the handle (photo 12).

If you cannot get the handle and shaft

in a straight line, then place the neck of the handle in a vice and using a hammer, tap the threaded rod to adjust its position, and then try again to get the handle and shaft in a straight line. Always ensure that the direction you are tapping the threaded rod is against the jaws of the vice.

With the view from the back in line, and the pencil lines lined up, view from the side (photo 13). If the handle is leaning forwards or backwards, repeat the process of tapping

the threaded rod in the vice so that from the side, the handle is vertical (see photo 14).

When you have completed the view from the back and the side, hold the handle in its lined-up position on the shaft – there may be a small gap between the handle and shaft surfaces. Where this occurs, remove any wood from the top of the shaft that is preventing a complete touching surface from being achieved. When you have a complete touching surface, the handle will need to be glued to the shaft.



Choosing materials

Try to select a handle and shaft – and a spacer if one is used – that complement each other, and as a finished item will be pleasing to look at. Consider the colour and grain of the handle wood; the colour of the bark on the shaft; the thickness of the shaft and its relationship to the thickness to the neck of the handle (the neck of the handle must not be smaller in diameter than the thickness of the shaft); the size of the finished handle, particularly if it is carved; the material being used as a spacer – either wood or horn – and its colour.

GLUING THE HANDLE AND SHAFT

At the very top of the shaft, put a strip of masking tape completely around the circumference, but do not cover up the 'jointing line' pencil mark – if you do, re-mark the line down the shaft. The masking tape is to prevent the glue from damaging the bark.

Using a sharp knife, slightly dish the top of the shaft around the hole drilled for the threaded rod. It is important not to cut the dish out from the whole so that it reaches the bark (photo 15).

Remove the wood between the outside lines, thereby changing

the four sides of the neck into eight sides (photo 16).

Using the two-part epoxy, mix enough glue to cover the threaded rod, and insert the handle into the top of the shaft. Line up the jointing marks on the handle and shaft, and apply pressure to the joint until the glue is set.

Note: It is possible to get a small pocket of air trapped in the joint which if pressure is not applied, will push the joint apart.



REDUCING THE HANDLE TO SHAFT

Using a 'bastard cut' file, smooth down the corners of the neck of the handle so that the neck becomes round in circumference.

There are rules that need to be applied when looking at the appearance of the handle and shaft:

- ♦ The inside line of the handle needs to be a straight continuous line up from the shaft, which must not fall forwards or backwards.
- ♦ The back line can be either straight or slightly backwards, but must not fall forwards.
- ♦ The two sides can be straight or slightly flared out from the joint but must not fatten.

Use the bastard file to reduce the sides of the handle to get to this stage. Remember to cut with the grain or across, but never against it.

Now use cloth-backed abrasive from 125 grit in stages down to 400 grit to sand the neck down to the shaft circumference. Sand the handle until the masking tape at the top of the shaft starts to rough up. This is a signal to be careful since you are now only a paper thickness away from the bark. Continue carefully using the fine grit abrasive until all the masking paper has been removed, then gently rub the joint with 000 grade wire wool to remove any trace of the masking tape.



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Use the wire wool down the whole length of the shaft to ensure that it is smooth. Now cut the shaft to the length required, remembering the old saying 'measure twice, cut once'. If you are fitting a metal ferrule, make sure that it is the correct size, not bigger or smaller in circumference than the shaft.

THE DOWEL JOINT

We'll now look at making the dowel joint. In order to ensure this joint fits together properly, the initial preparation of both the handle and the shaft is imperative. This is because, once constructed, it is near impossible to make adjustments to this type of joint later on.

First, select a handle and shaft that complement each other. For continuity purposes I will use a 'cardigan' style handle again. At this stage a selection of flat wood drill bits between 13mm and 16mm are necessary to drill the correct size hole into the handle base (photo 18). It is fundamental

that the chosen drill bit leaves sufficient wood around the hole to support the joint and allows for the removal of wood at the end of the shaft to support the dowel. In general terms, the dowel needs to be about half the diameter of the shank (photo 19).



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DRILLING THE HANDLE

Select a suitable sized drill bit (photo 20), then put the handle upside-down in the vice with the neck vertical. Check and confirm using a spirit level (photo 21). At the central point of the base,

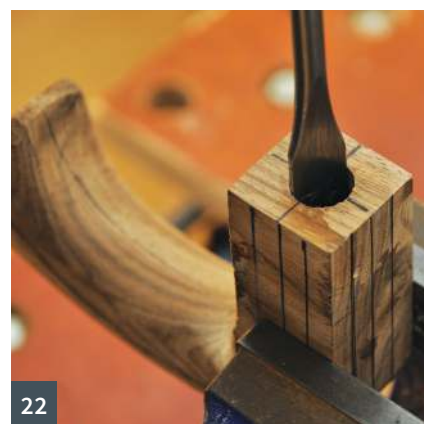
drill a hole using the flat wood drill bit to the depth of the shoulders of the drill bit (photo 22). Use a pencil to mark the depth of the hole on the drill bit.



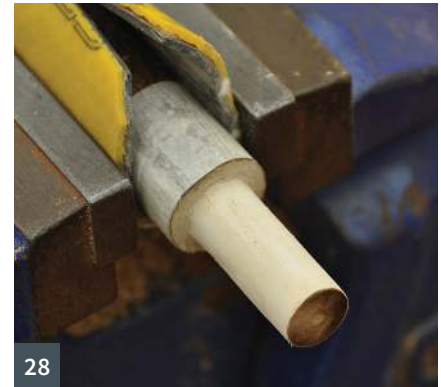
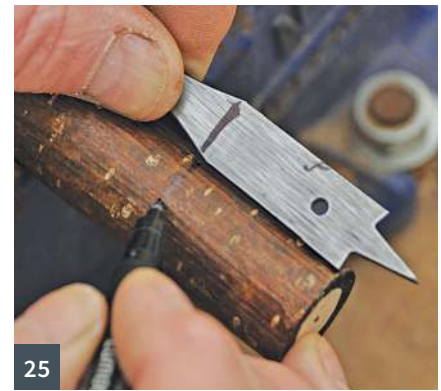
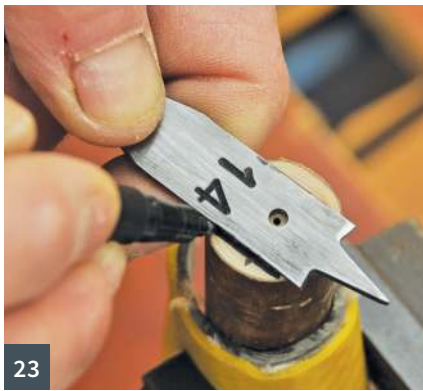
20



21



22



MAKING THE DOWEL

Place the shaft in the vice (remember to protect the bark) and with the same flat wood drill bit, put the hole in the drill bit directly over the centre mark on the thick end of the shaft (photo 23). Then draw a pencil line each side of the drill bit on the top of the shaft, move the drill bit round on the centre mark and redraw the lines again. Repeat this until you have a series of pencil lines that indicate the width of the dowel to be cut, and the centre mark is in the middle of an area that is unmarked (photo 24).

Using the pencil mark on the drill bit that indicated the depth of the hole in the handle, mark that distance down the shaft from the thick end, and using a pencil, draw a line around the shaft circumference at that point (photo 25). Do not include the point of the drill bit in marking this distance, only the flat section.

Using a coping saw (or hacksaw) cut into the shaft to the depth of

the pencil mark on the thick-end for the full circumference of the shaft (photo 26). Then put a strip of masking tape around the circumference immediately below the cut, and using a sharp knife remove chips of wood from above the cut (photo 27).

This will make it easier to get a clean joint-edge without damaging the bark. Place the shaft in the vice, and using a rasp/file, remove wood to leave a dowel (photo 28). Ensure that the sides of the dowel are parallel. The handle should now fit onto the dowel. Do not force the fit or you will split the handle (photo 28).

If the dowel is too big, use a file and/or sandpaper to reduce the sides until it fits. You must remove wood from the whole of the dowel's circumference to ensure that it is round. If there is a small gap between the handle and shaft once they have been fitted together, lightly file off the inside edge of the hole in the handle, taking care not to sand off too much wood (photos 29 and 30).



HANDLE ALIGNMENT

Now align the handle so that its centre line and the shaft are straight. Then draw a vertical line onto the masking tape on the shaft, ensuring it is in line with the centre line on the handle (photo 31).

If the handle doesn't sit tightly on the shaft, you simply need to drill a slightly deeper hole in the handle, or fractionally shorten the dowel. Ensure that the handle sits on the shoulders of the dowel; only remove wood from the base of the handle that prevents a complete touching

surface being achieved. When you have a complete touching surface, the handle is ready to be glued to the shaft. Remove the wood between the outside lines of the handle, changing four sides into eight (see photo 32).

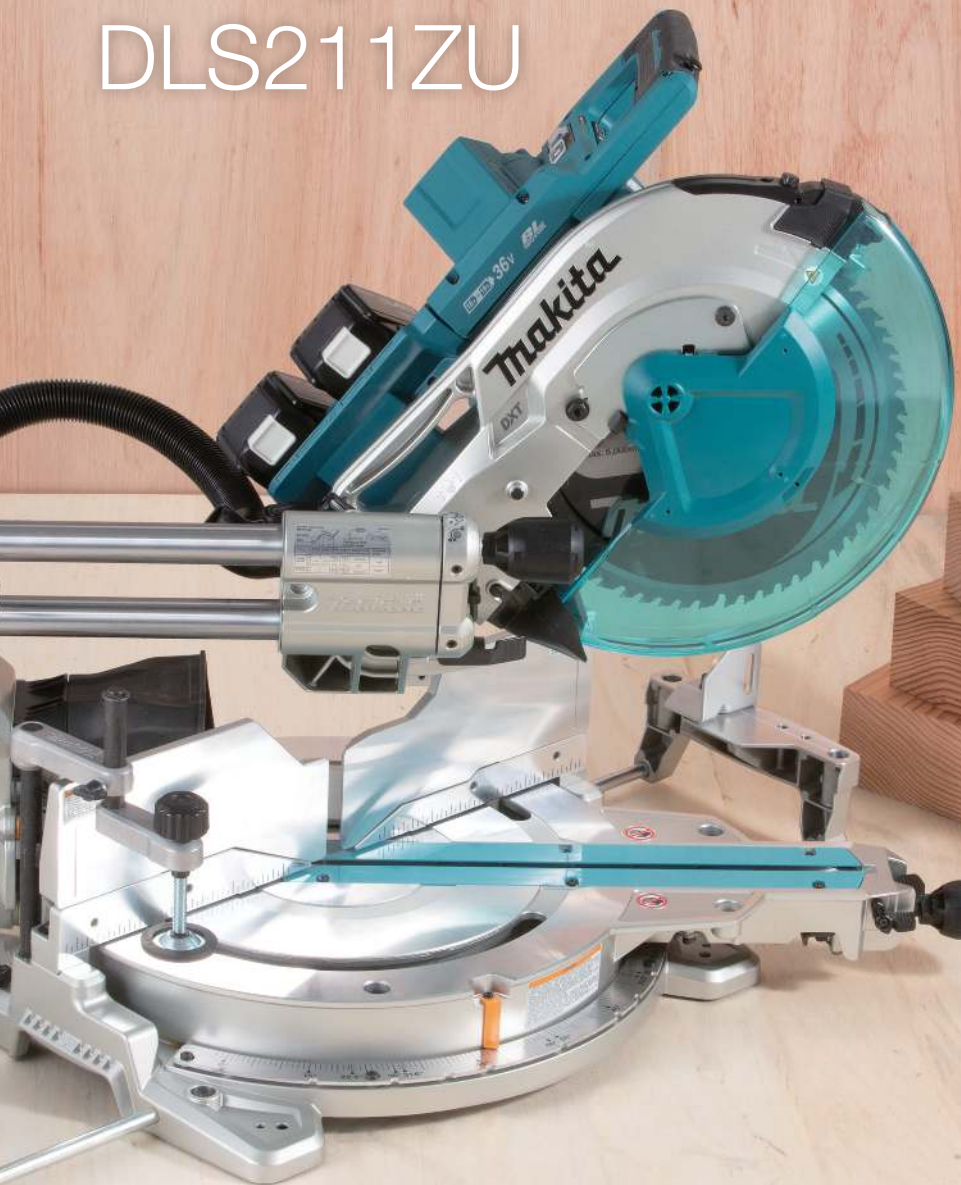
Glue up the joint. Remember to line up the jointing pencil lines, and apply pressure to the joint until the glue is set. Reduce the handle to the shaft size as demonstrated in the above (see photo 33).

Aligning the shaft and handle

If you are unable to get good alignment between the shaft and the handle you may be better off reverting to a studding joint. This is done by sawing off the dowel with a very small piece of shaft and gluing it into the handle. Then using the procedure shown on page 25, revert to a studding joint by squaring off the base of the handle, and the top of the shaft. Then make a joint with a 8mm piece of studding.

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Boxing clever

Mattia Migliorati uses stitching to make unique round wooden boxes



The origin of the box dates to ancient times, when containers were hollowed from wood with rudimentary tools, created by the need to keep and hold objects. Is it still possible to create an original box with a good design and interesting shape? Leaving aside the classic square shape and adopting a circular one requires wood bending. The sides of these boxes will be made by bending a wooden strip around a circular shape and overlaying the ends on each other. To give a touch of originality, the ends are sewn together where the sections overlay and possibly using a lace to match instead of a knob.

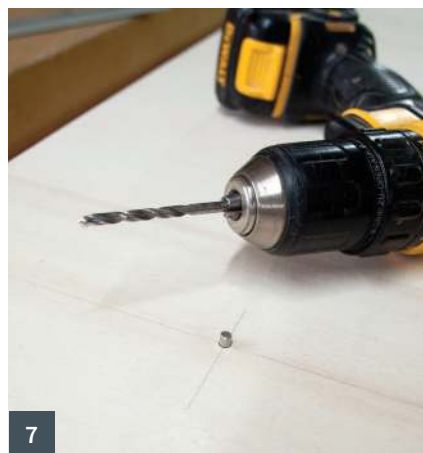
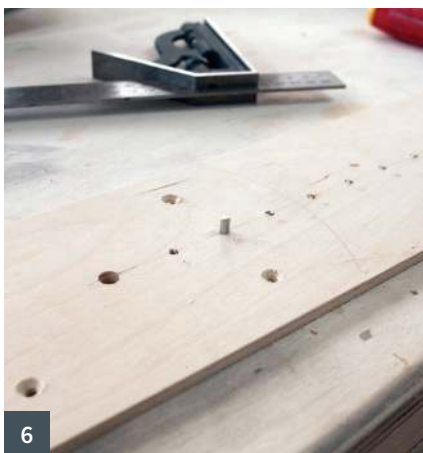
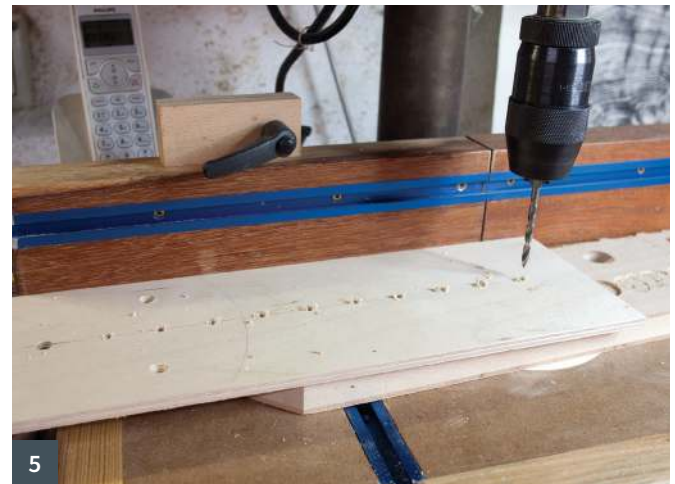
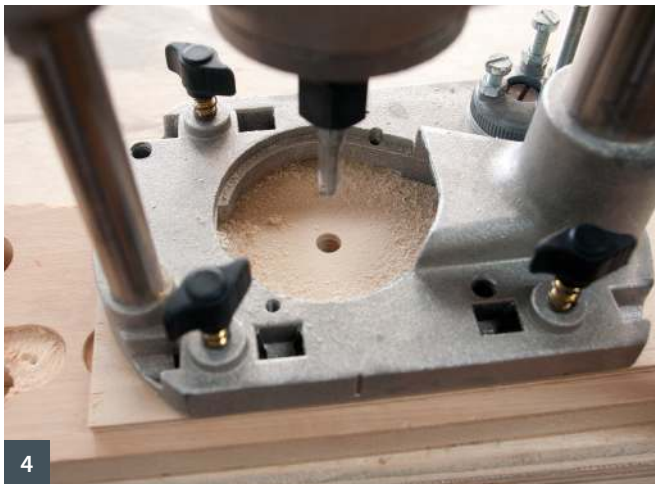
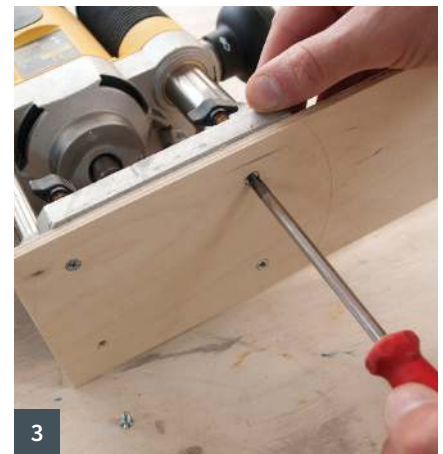
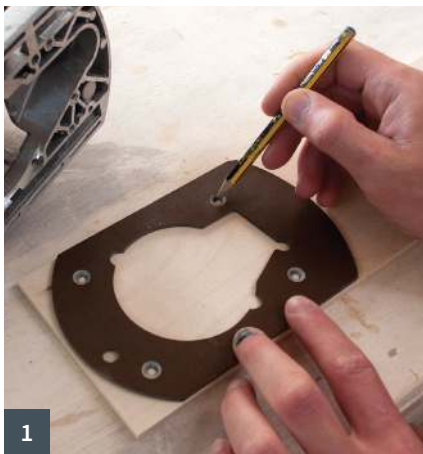
MAKING FORMERS

To bend the wooden strip and make the side of the boxes you need to make some purpose-built formers, otherwise it would be very difficult to shape a circle freehand and reproduce it exactly every time. The former guides the bending into a pre-defined shape and gives good

support to the wooden strip under tension. The diameter of the formers is chosen based on the overall dimension of the box; the height has to be able to support the width of the wooden strip to be bent. Suitable sizes are 150, 200 and 250mm diameters, with variable height from a minimum of 50mm to a maximum of 100mm. A feature of the formers is they can be used repeatedly. Plywood or MDF are best as they won't deform due to humidity caused by the steam.

YOU WILL NEED

- 4 and 10mm thick solid ash
- Chopsaw
- Bandsaw
- Pillar drill
- Steam box
- Hand tools

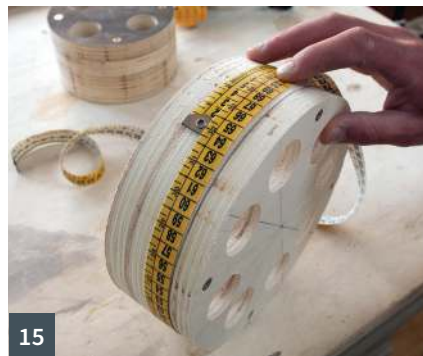


PHOTOGRAPHS BY MATTIA MIGLIORATI

NO-FRILLS ROUTER TRAMMEL

- 1 A basic trammel allows circle cutting with set radii but doesn't allow for infinite adjustment. To start, a piece of 6mm-thick plywood is cut to the same width as the router base. Unscrew the plastic soleplate from the base, the screws will be used to fit the trammel on.
- 2 Mark the position of the screws on the plywood.
- 3 Make the holes for the screws and fix the plywood to the router base after fitting the cutter that will cut the discs.
- 4 Switch on the router and machine a hole through the plywood base.

- 5 Starting from this hole, mark a series of points for the various radii. The trammel is marked every 25mm, which gives diameters in multiples of 50mm.
- 6 Drill the marked points to take a metal pin.
- 7 To use the trammel, drill a hole of the same diameter (in this case 6mm) on the piece you will be working on, so the metal pin allows rotation at the required distance.
- 8 Switch on and plunge the router to cut the material with a straight cutter pushing down for a few millimetres for one rotation, then repeat until reaching full depth.



CREATING A STACK

- 9** Having made one disc you can now make more so they combine together. Bandsaw out the shape close to the pencil trammel line. Then glue and clamp one or more discs to the next so the profile cutter will follow the first shape.
- 10** Repeat until the height of the stack is right for the intended height of the box.
- 11** A number of large holes then need to be drilled using a Forstner bit, so clamps can be inserted for holding the bent strips of wood in place.

MAKING THIN STRIPS

- 12** The bandsaw, correctly set up with a good blade, can make clean straight cuts. Every time you make a sawn veneer cut, you must then plane the surface of the remaining stock to obtain a flat surface that can run against the fence and make box finishing easier as well.

A good thickness is roughly 4mm, the base and the lid of the boxes are 10mm-thick solid wood.

TOPS AND BOTTOMS

- 13** The boards are planed ready for gluing together to create the tops and bottoms of the boxes.
- 14** The edges need to be straight and square for a neat joint.

MEASURING

- 15** To measure the circumference of the former use a tape measure. You need to add about 100mm extra to facilitate the bending process.
- 16** Before bending prepare the boards. First of all refine the surface to remove marks left by the bandsaw. Then cut one end and taper it for the length of the intended overlap using a block plane, so the inside of the box will be smooth and level.

Box Material

Not every kind of wood is suitable for bending, some types are not flexible enough and have a tendency to split if they are bent tightly. Suitable timbers include ash, oak, birch and beech. Pick the best boards that have regular grain and dense fibres. Irregular knots and grain will compromise flexibility and can deform or crack.



BENDING THE BOARDS

- 17** Bending the boards that will be the sides of the boxes is done with a steam box. Heating the wood at high temperature increases its flexibility, then when it cools the wood becomes rigid again and stays more or less in its bent shape. The steam box can be a simple wooden box with a lid or a large diameter PVC pipe or any other material that is not easily deformable by the heat. It has to be easy to open and have holes to connect a steam boiler and to discharge the condensation. Once cut the boards are tied together and immersed in water for 8–10 hours before being put in the steam box. The water and the steam work together to heat the wood right through, thicker wood will take longer to become pliable. The 4mm-thick strips will need to stay in the preheated steam box for approximately 20 minutes.
- 18** After this time, the first strip is taken out from the steam box and fixed with a clamp to the round shape...

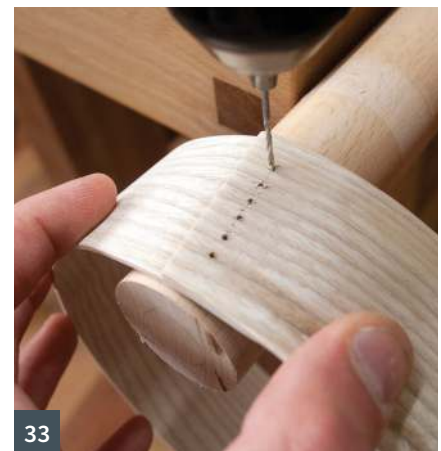
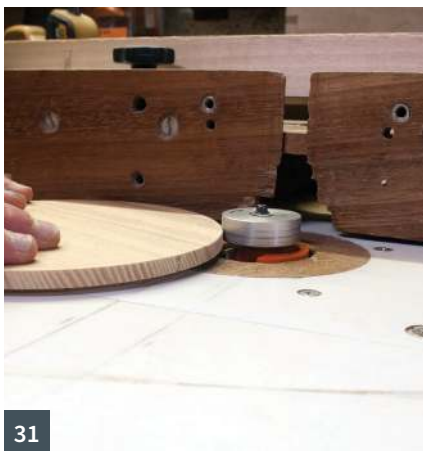
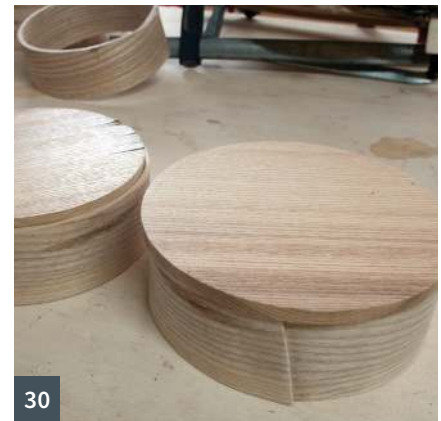
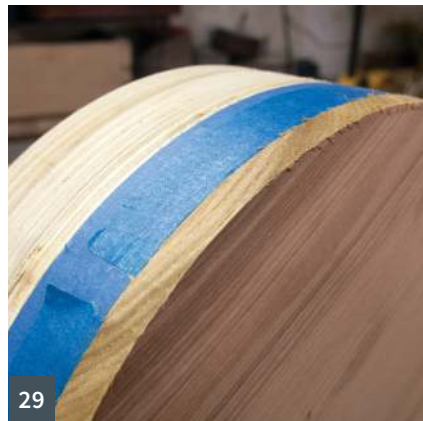
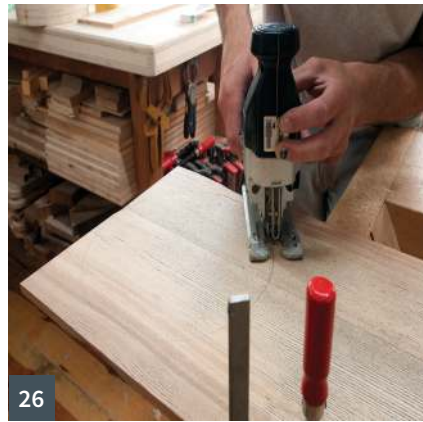
- 19** ... with the tapered end facing outwards then gradually fixing with more clamps...
- 20** ... until the two ends overlap. This operation must be done quickly before the wood cools down losing elasticity, if this happens put the strip back into the steam box for a few minutes before starting again. Keep the clamped strips in position until completely dry ready for gluing the joints.

OUTSIDE FINISH

- 21** Once the glue has dried, the ring is ready to be refined.
- 22** To eliminate the excess at the joint, cut it away diagonally at roughly 75° to give a pleasing appearance to the side of the box.
- 23** The ring can then be levelled on a sanding board, belt or disc sander.
- 24** The external and internal surfaces are then smoothed with a cabinet scraper. A sanding board will make the box edges perfectly flat.

Speed and Safety

Wear thick safety gloves when taking the strip out of the steam box and quickly wrap it around the former. Having help is invaluable when clamping.



THE BASE

- 25** Make the bottom of the box by fitting the wooden discs inside the ring and fixing them to it by dowels inserted from the outside. To make the disc, the shape used for bending the strips is the reference diameter. Mark the shape ...
- 26** ... and then cut it out with a jigsaw.
- 27** Attach the base to the former using double-sided tape...
- 28** ... then use the bearing-guided profile cutter to obtain a perfectly matching disc to fit.
- 29** The shape of the ring can become deformed during the drying phase, so it is better to have excess material in case the base doesn't fit, rather than having gaps.

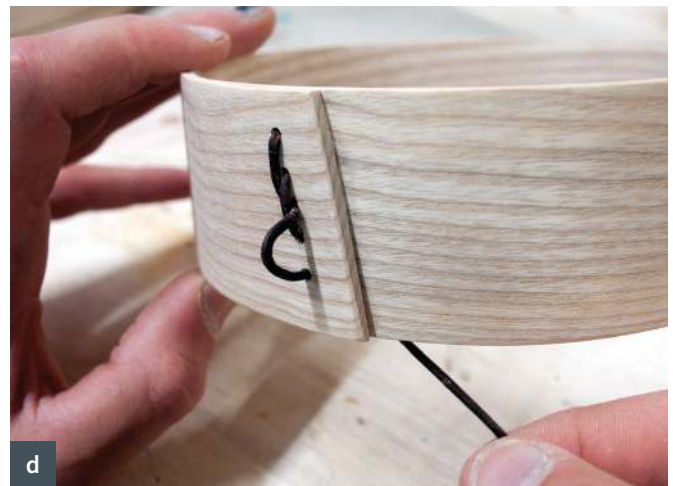
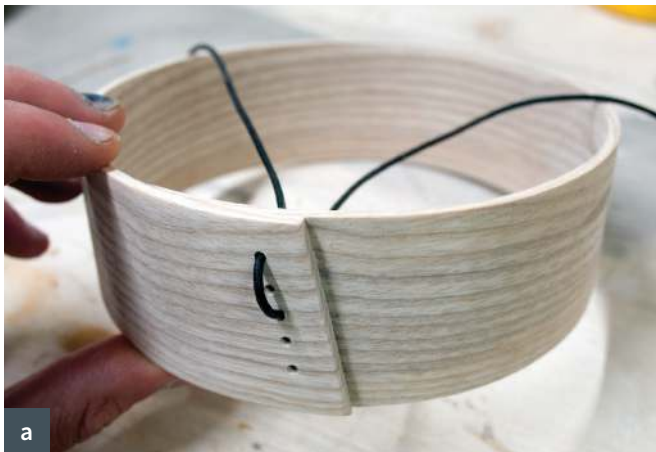
THE LID

- 30** The lid overlaps with a diameter bigger than the external circumference of the box.
- 31** Make it by machining with the router trammel and then use a bearing-guided rebate cutter to create the lip.

BINDING THE JOINT

- 32** The aim here is to give the impression that the box is kept together by the binding. The reality is the glue keeps everything together so the binding is just a decorative feature. You need to drill a series of holes through which you can pass the cord. Practise on an offcut to determine the spacing and number of holes and the cord diameter.
- 33** Mark the hole positions with a pencil and use a centre punch to guide the drill bit. Put the ring over a cylindrical support while drilling.

Let's Get Sewing



- a) The end of the string is inserted in the first hole at the top, going from the inside to the outside of the box, we jump the second hole and insert the string into the third (the middle one) going inside the box.
- b) The end goes upwards and is inserted in the empty second hole, then outside and in again through the fourth hole.
- c) It goes up one hole, doubling the existing threading and down again...

- d) ... to be inserted into the fifth hole.
- e) The stopper knot is made inside the box, it is a common reef knot.
- f) Five holes give three full wrappings of the string, with a design similar to a plait. The same method can be applied to a longer line of holes, increasing or decreasing the distance between the holes.



34



35



36



37



37a

PRIMITIVE THREAD

34 Any thread can be used for this type of binding: cotton, wool, nylon or some other synthetic fibres or leather, even metal or vegetable fibres. Birch roots were used here, they were picked, cleaned and left to dry. This natural fibre is very flexible and strong and comes in considerable lengths. The fibre needs to be immersed in water for a few hours to create the necessary elasticity for binding.

FIXING THE BASE

35 The best method of fixing the base is to drill the perimeter with the pillar drill with the base inserted. Once completed, the dowels can be inserted with a drop of glue. For small boxes, of 150mm

diameter, four dowels equidistant are enough; bigger boxes of 200–250mm diameter will need six dowels.

FINISHING DETAILS

36 The surfaces of the base and the lid are refined separately, using gradually increasingly finer abrasives up to 320 grit. Apply a light oil finish with cloth or brush and wipe off the excess after about 20 minutes and a second coat applied after 24 hours.

37 After finishing, the last thing is to fit either a stylised knob or a simple lace using the thread material.

Making Dowels

You can make 4mm diameter dowels by cutting square section lath and rounding the edges with a block plane. A more commercial solution is bamboo sticks, which are slightly thinner, or you can buy 4mm beech dowels from a modelling shop. Once the glue is dry, the excess section of each dowel is cut off with a fine handsaw, then trimmed flush with a chisel.

A collection of various woodworking tools is scattered across a rustic, dark-stained wooden surface. In the top left, there's a wooden handle and a red-handled tool. To the right, a red and black level is visible. Below the level, a circular saw blade with a black handle is partially shown. In the bottom left, a black hammer with a wooden handle lies diagonally. At the very bottom, a black power tool, possibly a sander or planer, is partially visible. The background wood grain is prominent and adds a textured, natural feel to the advertisement.

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Unfinished but not unworthy

Incomplete projects are usually viewed in a negative light, but there's much that can be learned from the work you choose to abandon

When Spanish architect Antoni Gaudí was killed by a tram in 1926 it was a real blow for the city of Barcelona. He had spent more than 40 years working on the Sagrada Família, a Roman Catholic church inspired by Gothic and Byzantine designs. After his death some of the architects and craftsmen Gaudí worked with used his plans and models to continue the construction, but more than 90 years later the building remains unfinished. (It is hoped that the building will be complete in time for the centennial of Gaudí's death in 2026.) Yet the basilica receives more than three million visitors each year, making it Barcelona's most popular tourist attraction – proof, if any were needed, that unfinished does not equate to unworthy or unpopular.

Gaudí's church is one of the world's most famous unfinished projects, but there are many other examples of buildings, paintings, books, sculptures, films and musical scores that are celebrated for their greatness despite being incomplete. Leonardo da Vinci, for example, left many of his projects unfinished including his painting *Adoration of the Magi* (commissioned by Augustinian monks at San Donato a Scopeto in Florence in 1481 but abandoned the following year when da Vinci moved to Milan). Likewise, composer Franz Schubert began work on Symphony No 8 in B minor in 1822, but failed to complete the piece, earning it the title *Unfinished Symphony*. (Nobody knows quite why Schubert abandoned the work, but theories range from ill health – he had syphilis – to a desire to tackle new projects.) Poet Geoffrey Chaucer, on the other hand, was still working on *The Canterbury Tales* when he died in 1400 (some 15 years after beginning the first story).

There are many reasons why a project is abandoned, including the death of a key person. To give another example, in 1945 Elizabeth Shoumatoff was forced to abandon her painting of US President Franklin D Roosevelt after he collapsed during the sitting, dying several hours later. The incomplete work now hangs in the Little White House, Roosevelt's retreat in Warm Springs, Georgia, and has come to represent his final days in office.



The Sagrada Família is still unfinished, more than 90 years after construction began

PHOTOGRAPH BY ANTHONY BAILEY

PHOTOGRAPH BY SHUTTERSTOCK.COM

Some projects falter because of artistic differences or unrealistic plans. In 2004, for example, the Shimizu Corporation proposed a Mega-City Pyramid, a structure that would reach more than a mile high over Tokyo Bay, making it the largest man-made construction on Earth. But its success depended on the availability of super-strong lightweight materials that currently don't exist. And then, of course, there's the problem of perfectionism. Some projects fail to reach completion because the artist reworks a piece over and over, hoping to achieve a flawless result. Edgar Degas, for example, rarely considered his paintings as finished and was famous for continually reworking his canvases, even after they had been sold.

Now, a century after Degas' death, Western culture places great emphasis on completing projects. Business coaches, teachers and bosses rate success by how many courses and exams you pass, and any hint of underperformance is considered a deficiency that must be dealt with as soon as possible. As a result, abandoning a project can lead to feelings of guilt, failure and inadequacy. To make things worse, these feelings can carry over into your private life.

You might start a turning project full of enthusiasm, for example, but weeks later a pile of timber stands in the corner waiting for your attention. At this point you can choose whether to feel weighed down by the presence of this unfinished project or to take a moment and consider what it can teach you. Did you start the work only to find that you lacked a particular skill, for example? If so, perhaps you could use this brief hiatus as an opportunity to learn something new. Did you discover you didn't have the right materials? This could be your chance to make contacts by joining a turning group and swapping tools, skills or sources of inspiration.

Of course, it might be that you have lost interest in the project – this is natural. The human brain gets a kick out of novelty, and the chemicals it releases when you tackle a new project or learn a skill have been proven to increase motivation. Once you get stuck in, however, this chemical disappears and that's when you have to decide whether you are going to knuckle down and do the work, or call it quits and move on. At this point it can help to think about why you started the project in the first place – revisiting these feelings can often reignite your enthusiasm. It's easy to become addicted to the high you feel when you start something new, but the hit you get when you complete a task or project is equally hard to resist. In truth, the reward will be far greater if you approach a project mindfully and enjoy the process, disregarding the end result.

Abandoning a project does not need to be a negative act. In fact, there are many positives to be gained from laying down your tools (whatever they may be) and assessing where you are right now. If you're ready to move on it might suggest that your interests have changed, and recognising this shift can be a good thing. Let go of any feelings of guilt or failure you may experience and try to view an incomplete project as an opportunity for learning or self-development. Knowing when, and what, to quit is a sign of strength, not of weakness. If you do decide to continue working on your project, slow down and enjoy the process. Life is a project of sorts, and you can be sure that most people are in no rush to get to the end.

Words: **Tracy Calder**

HOW TO DEAL WITH AN UNFINISHED PROJECT

- Learn from it. Spend time working out why you abandoned the project. If you were too ambitious, next time consider breaking down a project into smaller stages and try to complete one stage per day.
- Let go of perfection. You might think you have a mountain left to climb, but your desire for perfection could be clouding your judgment. Edgar Degas has been described as 'a tinkerer' as he never seemed to know when a piece of work was finished. Step back and consider if your 'incomplete' project is perfect just as it is.
- Look at other incomplete works. Study a painting, sculpture, building or piece of music that is considered incomplete. Does the work have more or less of an impact because of its unfinished state? Create your own ending or piece of work based around this unfinished piece.
- Seek a second opinion. Stephen King threw out the first few pages of what would later become *Carrie*, convinced that he couldn't write from a woman's perspective. His wife, Tabby, found the crumpled sheets in the bin and persuaded him otherwise. Before you let go of your project, ask someone else if they can see any value in it – you might be surprised what a fresh pair of eyes can glean.
- Remember the brain loves novelty. The brain gets a buzz out of learning something new, but it's what you do after this feeling has subsided that determines whether or not you will finish a project. Sometimes it's a good idea to push on through and see what happens.
- Come back to it. It might seem like a project has no value, but revisiting it weeks, months or even years later can lead to fresh insight.
- Give it to someone else. If you have no desire to finish your project, consider passing it on to someone else. Before you do, though, make sure that they really want to complete it – it's not fair to pass your workload on to someone else simply to lessen your burden.



As much use as a chocolate biscuit...

It's time to step away from
the workbench and take that
all-important tea-break

You may be familiar with the term 'as much use as a chocolate teapot' but how about a Lamello biscuit that you certainly can't join wood with? It's a bit of fun alright, but maybe stick to beech biscuits and keep the chocolate for your tea break instead. What's your tea time favourite? Biscuit sales in the UK were just over £2.6 billion in 2018, indeed there are now so many types of biscuit, not just sweet treats but savoury, 'healthy' options, breakfast biscuits – you name it, there is something for every occasion. It seems we are a nation of biscuit lovers and where better to savour them than in the workshop when the kettle goes on?



PHOTOGRAPH BY ANTHONY BAILEY

WORDSEARCH

ADHESIVE	GOUGE	LACQUER
CLAMP	HANDSAW	MORTISE
DIMENSION	INTARSIA	NOTCH
ESCUTCHEON	JOINERY	OUTFEED
FIGURE	KICKBACK	PANEL

E G Y D D H B A W D J O G X Q
N S F P C U D B A I I Y L V J
C Q C T M H T G S M O B E D T
E Z O U E A H R D E R U G I F
L N E S T X L O N N U J E M P
F R I S Y C X C A S Z Y Y O X
H V K G C Q H O H I P R D R H
E T M C Y S U E K O E B R T H
A I S R A T N I O N O B N I O
M F L S F B N D I N D V B S B
P A N E L E K O L A C Q U E R
Z P E X F G J C S C R F U V T
S D N B Z U L B I L H K T U Z
G Y H M A O U O P K E I N M Q
X Z I K Z G Z C E T V N H K W

SUDOKU

Sudoku is a great activity to sharpen the mind. The object of Sudoku is to fill in the empty spaces of a 9x9 grid with numbers 1-9 in such a manner that every row, every column and every 3x3 box contains all numbers 1 through 9.

		2	8	7			5	
8		9	2			4	3	
7	6		3			2	8	
					1		4	8
		1				3		
4	9		7					
	1	6			3		7	4
	8	3			7	9		2
	4			6	2	8		

Pole lathe leg turning

Danny Harling shows us how to turn a baluster-style chair leg



We first met green woodworker Danny Harling in WWC 57 when we learned about his forestry business and the chair-making workshops held at his own woodland in East Sussex. Here, Danny shows us how to turn a traditional baluster chair leg on a pole lathe.

POLE LATHE TOOLS

These are the lathe tools I use. The roughing gouge is in fact a large carving gouge. The skew is an old $\frac{3}{4}$ in mortise chisel ground at an angle. The spindle is a small 10mm turning tool and the planing chisel (not in the picture) is a 2in ordinary carpentry chisel. For power woodturning, only tools intended for such work can be used safely. Pole lathe turning is much, much slower and therefore safer.





ROUGHING OUT

- 1 Split a straight grained piece of green ash into a roughly 50mm square section using a heavy hide mallet and an axe without a sharp edge – what I call a splitting axe.
- 2 Use a nice, sharp carving axe to cut the corners off and start to make the piece straight and round. I work at a chopping block, which ideally needs to be about waist height.
- 3 With the wood clamped firmly in the shave horse, use a drawknife to cut the corners off more accurately, making sure to keep the piece as straight as possible. The shave horse is a simple clamp which you sit on and use your feet to tighten the clamping action. The drawknife is used with both hands, hence the necessity to have a foot-operated clamping system.

- 4 Mount the billet in the lathe, making sure the string is wrapped around it twice and the wood is nicely centred.
- 5 When it is running well, use the roughing gouge to turn all the facets off and create a round piece.
- 6 I've turned it 'end for end' and am now roughing out the other side, where the string was running before.
- 7 Once the roughing is done, use a planing chisel to create a really fine finish.
- 8 Here, I'm sharpening the skew chisel, which is the tool used for the decorative shapes. Pole lathe tools need to be kept very sharp in order to get a good clean finish as the structure of green wood is more open and a sharp edge is needed to slice through, rather than tear the fibres.



TURNING THE BALUSTER PATTERN CHAIR LEG

- 9** The design has a ball about a third of the way down the leg.
Start by making two V grooves about 32mm apart.
- 10** Use the skew to round the part between the two grooves into a ball.
- 11** Now use the roughing gouge to reduce the wood below the ball.
- 12** Turn two more V grooves below the ball, about 5mm apart from each other and then rounded to make a bead.
- 13** Using the planing chisel, smooth back into the base of the bead.
- 14** Use a small spindle gouge to hollow out the space between the ball and the bead.
- 15** On the other end of the leg form another bead about 100mm up from the end, this is the foot bead. Some 'meat' is taken away and then smoothed up, so the bead is proud of the leg.
- 16** Smoothing the foot profile.
- 17** Use a handful of clean shavings and some pedal power to burnish the surface of the leg. This polishes the wood fibres a little; there is no abrasive involved.
- 18** The finished leg! If I'm making chairs, I will make a decent bundle



of legs and then match them together in groups of four. There is no need to obsess about each one being identical. If you make enough legs, they will all turn out almost the same. The bodgers of old would apparently make over 200 legs in a day. They probably didn't give them a second glance as soon as they stopped pedalling.

Chopping and stacking firewood

Follow Anthony Bailey's guide to get the most from your woodburning stove



PHOTOGRAPH BY SHUTTERSTOCK

Most people love an open, crackling log fire. It looks beautiful burning in the hearth and its flickering flames echo ancient times. In practice, however, an open fire is slow and inefficient, and its heat output can be disappointing. This is where that relatively modern contrivance, the woodburner, comes into its own. An efficient source of heat that comes to life quickly and can be contained without risk, it is a far cry from our ancient ancestors rubbing sticks to make a tiny spark from friction. This is 'the modern way of the flame'.

It makes sense, then, that increasing numbers of people are opting for the independence and pleasure that ownership of a woodburning stove brings. The woodburner not only looks inviting, and provides a comforting heart and soul to the home, but its heat output can also be fiercely impressive. Anyone with the right sort of property and location can install one and enjoy both the practical benefits and the satisfaction that owning one brings.



PHOTOGRAPH BY PHOTOCASE

Some woodburning stoves incorporate a built-in oven. Even without this feature you can use the top of the stove for cooking



PHOTOGRAPH BY THINKSTOCK

Chopping wood for your woodburner is healthy, satisfying outdoors work and provides a good antidote to all the time we spend indoors sitting down

The benefits of a woodburner

The heart of a woodburner's appeal is that it fulfils a basic need within us for a heat source that we can entirely control, instead of being subject to the whims of energy companies or a loss of supply due to bad weather. But there are also plenty of other benefits that make investing in one worthwhile.

LOWER ENERGY BILLS

Running costs for central heating are high, especially in the winter months. With a woodburner you can save a considerable amount by foraging for wood, and by cutting and storing your own timber from all kinds of sources.

VERSATILITY

A woodburner isn't just good for heating. Many a stove can be found with a kettle steaming away on top. And cooking on a woodburner is perfectly feasible. Even a small one has room for a couple of saucepans on top, and when it is running on a medium heat it is perfect for slow cooking a casserole. If you choose a stove with a rear flue exit, then the whole of the top is available for cooking. An alternative option is to buy a woodburner with an integrated oven.

A slightly less decorous facility of a woodburner is its ability to dry laundry. The heat is terrifically effective at driving moisture from fabric, especially if the items being dried are up near the ceiling where the heat

risks and circulates – a 'kitchen maid' clothes dryer suspended from the ceiling is ideal for this. The safety proviso is that nothing should be near enough to the stove to present a fire risk, particularly if it consists of man-made fibres or a lightweight fabric, which are more vulnerable to heat.

A 'GREENER' LIFESTYLE

Any process of very rapid oxidation – or burning, as it is otherwise known – results in the release of carbon dioxide into the atmosphere. It is the build-up of this and other greenhouse gases that is responsible for climate change. So, is a woodburner really a more eco-friendly way to heat our homes? Most green campaigners believe that the release of 'ancient carbon' – such as coal, oil or gas derived from underground sources laid down as forests millions of years ago – is bad for the environment, and that this matter should be left buried underground. However, 'new carbon' – that is, growing woodland and forests – should be managed and cropped sensibly and sensitively, and the felled timber processed and used in the most efficient manner. This is because nature left unchecked runs rampant. Trees, bushes and undergrowth become an unruly mess that chokes itself. Burning wood as fuel therefore forms part of a natural cycle: it makes good use of felled or fallen trees, and makes space for new trees to be planted. Unlike fossil fuels or minerals, this supply of fuel is inexhaustible, so long as we look after our trees.

A SENSE OF SATISFACTION

When our woodburner is running I regularly go to the nearest log store, outside our back door, bring in a new sack of wood and empty it into the log basket. Then I go and get a bag of kindling and some newspapers. This all happens every day and sometimes more than once in an evening, depending on how inclement the weather outside happens to be.

Every week, that log store is refilled by wheelbarrow from one of the other stores at the bottom of our very long garden. This could all be seen as tedious. However, it's not such a chore if you think about the benefit you are getting from it. Energy is not being supplied from hundreds or thousands of miles away, it is being created with your own bare hands. For me, and for many others, this provides a profound sense of satisfaction that makes it well worth all the physical labour expended.

A PRACTICAL SOLUTION

I get to visit many woodwork shops and most, if not quite all, have either a woodburner or a heating system that uses wood-waste pellets or simply waste wood. It would be strange indeed if they didn't make use of their redundant wood material in this way.

Generally, for small workshops I recommend enclosed heating systems because there is no danger of dust igniting. Not everyone realises that any dust, however inert, under certain conditions can be persuaded to explode – and this naturally includes flammable wood

dust. However, it is important to make a distinction between 'lying dust' and 'flying dust'. A limited amount of dust and shavings lying around on the floor does not present a hazard, so a stove is suitable for this situation; just make sure flammable materials such as timber, varnishes, polishes and rags are kept well away from it.

Canal boats, caravans and camper vans need heat for comfort and cooking, and a woodburner is often the only practical solution. There are, in fact, smaller stoves designed with narrowboats in mind. Essential safety measures include a sealed flue; a hardstanding for the stove, such as a concrete slab; and a carbon monoxide alarm.

TIME SPENT OUTDOORS

The woodburner appeals to our desire for a simpler, more down-to-earth lifestyle. It brings a natural element into even the busiest of working lives – something that commonplace 'flick-of-the-switch' central heating never can. If you enjoy the outdoor life, then it gives you the perfect excuse to forage for kindling. If you can obtain a tree that has been felled and chainsawn into logs, you can learn the best, most efficient way to split the logs then season them outdoors, under cover, ready to be used when they have dried. It is all very satisfying, and the exercise is good for you. Then, after a hard day's work in the open air, splitting and stacking logs, you can look forward to a long, hot soak in the bath, followed by relaxing in front of the very stove that was responsible for all that hard work in the first place!

How to chop wood

This is hard physical work, when done the traditional way with a splitting maul. One side of the maul's head is like a sledgehammer, the other like an axe. It usually has a hook at the back for helping to separate split wood.

You can either strike wood using the axe side, or use the sledgehammer side to drive in a splitting wedge or a 'log grenade'. The latter option is generally used when splitting logs with a large diameter.

You need a large slice of log to use as your 'anvil' on which to place each log you want to split. It must not rock, but sit solidly on the ground. Once the tip of the splitting wedge or log grenade is in the log, the splitting maul can be raised and brought down smartly on the top of it with some force. With practice, you will be able to land a blow without missing almost every time.

Should the log you are trying to split become stuck on the blade, rather than levering it off it is better to lift splitter, log and all, and bring them down hard on your chopping block so the wood is forced to split apart. Never raise them above your head! I find using a rather blunt log grenade gets around this problem because the maul is always free to use – only the grenade gets stuck in the log, and repeated blows will make the log give up and fall apart.

If you use a splitting axe or the splitting edge of a maul, it's worth noting that a sharp edge is not required. This may seem to run counter to the usual idea that a cutting edge should be sharp, but what is required here is blunt force. It works better, and you don't need to worry about laborious sharpening sessions.

There are also manual, electric and petrol (gasoline) log splitters, which make the job safer and easier. Of course, the electric model is no use unless you are near a mains supply, but if you intend to do a lot of log splitting yourself, a petrol model may be a good investment.



PHOTOGRAPH BY ANTHONY BAILEY

Clockwise from top: two splitting wedges, a splitting maul, a 'log grenade' and a sledgehammer



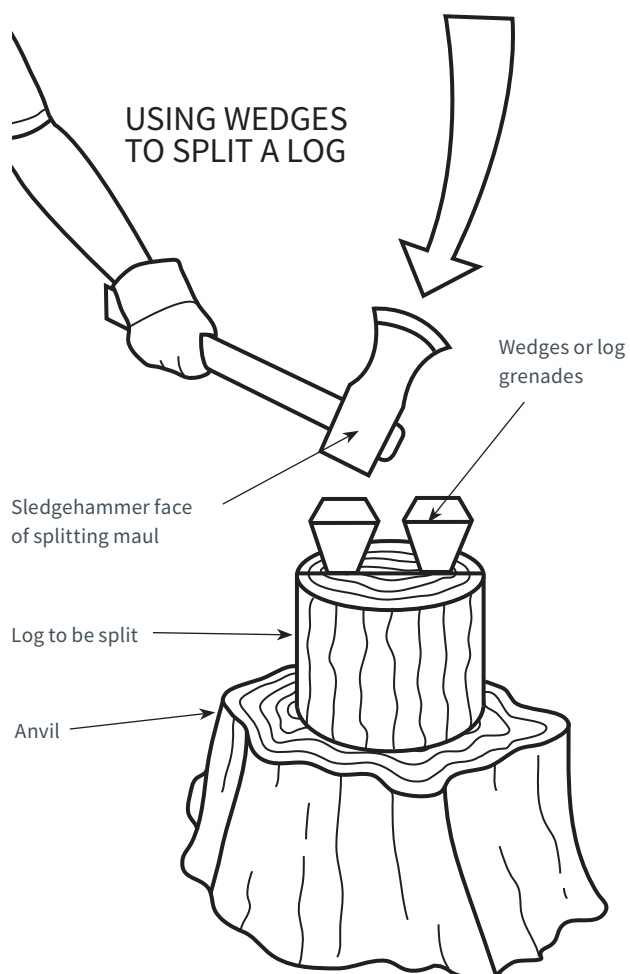
PHOTOGRAPH BY ANTHONY BAILEY

Splitting a log with a sledgehammer and a 'log grenade'. Note the 'anvil' log placed beneath the log being split



PHOTOGRAPH BY SHUTTERSTOCK

A hand axe can be used as an alternative to the maul or sledgehammer and wedge



Log splitting can be a strenuous activity, but it need not be dangerous if sensible precautions are taken:

- Whichever tools you use, you will need the correct clothing and safety footwear. You will need safety goggles, a pair of leather armoured gloves, and safety boots with steel toecaps and sole inserts. When splitting logs you need to prepare properly before starting. Do not start work without the proper safety wear and sensible work clothing.
- Do some warm-up exercises such as touching your toes, running on the spot, etc., to warm and loosen muscles before exerting yourself.
- You will get hot after a while, so keep a bottle of water or soft drink handy to avoid dehydration, and a towel to wipe your brow. I like to wear proper work trousers but just a T-shirt, so I don't get overheated and sweat too much.
- Check that the head of your maul or axe is secure. Modern ones often use a bonded construction which should be very safe.
- Make sure no one else is in your swing line, so they cannot get hit, and that there are no other obstacles.
- Do not bother with half-hearted swings, which can be difficult to control. I make very measured blows standing quite calmly and striking resolutely – don't get angry with the wood!
- Try to avoid striking ahead of the log or behind it. If you stand with the maul head resting comfortably on the log (as shown opposite), that shows the distance from which you should hit the log.
- To avoid back damage, work at improving your aim, so you strike where you intended to rather than bouncing off to one side.

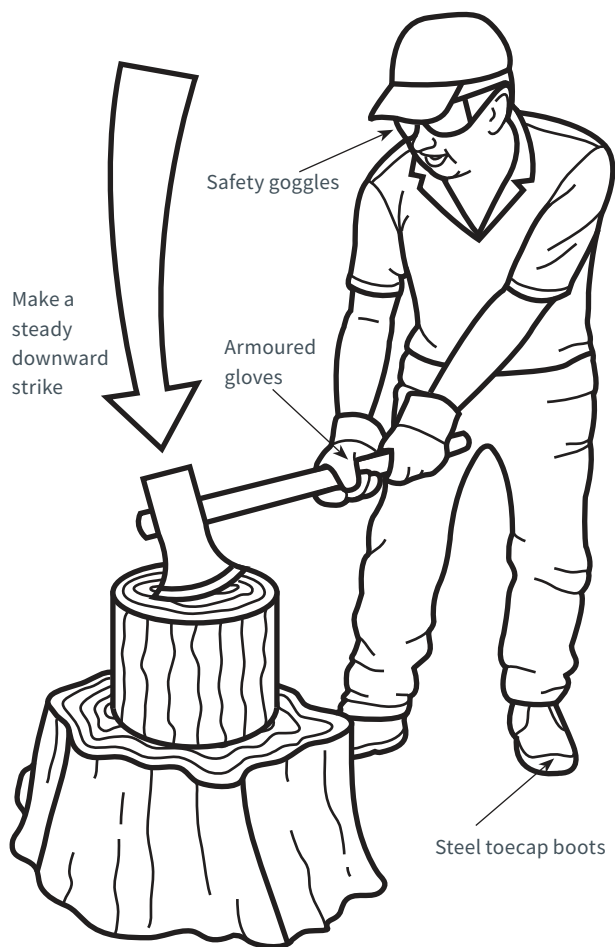
Top tips

- Two splitting wedges are often better than one. Drive each one alternately until the wood gives way. If one wedge gets stuck, the other can be used to retrieve it.
- Pace yourself when log splitting – don't try to rush through a large quantity as you'll likely tire more easily and be susceptible to making errors. Follow the advice given, but also accept that over time you will find a method and choice of equipment that works best for you. To a great extent, the tree or logs will determine how best to work because some will split easily and others will defy you, especially when you

find the maul or splitting axe is buried close to a large, hard knot and cannot be extracted without great expenditure of effort. Try to 'read' each log and find the straightest path through without knots or branches before taking aim.

- The smart thing is to build or adapt every practical space you can outdoors to take log storage. Start buying or collecting wood at least a year before you need it. If you are new to wood burning, use wood waste and eco-logs for now but build up a long-term store of split logs that can do their final drying ready for the next burning season.

CORRECT STANCE FOR SPLITTING WOOD



Stacking and storing logs

First, and most importantly, you will need dry, ventilated storage. Anything less than that and your efforts will be wasted. Timber that stays damp or gets damp is harder to burn. It becomes covered in fungus and woodlice, and may even harbour voracious woodborers such as the woodboring weevil.

You might think that fully enclosed storage would be best, but in fact the ideal is a top cover to keep off the worst of the weather, leaving the front of the stack open to the elements so the air can get through and carry off moisture as the wood dries. Logs should be kept off the ground so they stay dry and don't start to rot, and the stack needs to be neat and stable with a uniform airflow throughout. For wet weather, a drop-down tarpaulin can be used to shield the wood and carry off the rainwater; but hitch it up neatly out of the way in better weather so moisture cannot get trapped under cover.

There are different designs of storage and you will need to decide what is practical in your own situation. The best kind, though, is a stack placed away from any walls so the air can get around it easily. This type of stacking can be done in rows or aisles if you have the room, so you can move between rows to stack or remove logs. The more usual arrangement, however, is a lean-to store against a wall, with a slanting roof to let rainwater run off. This doesn't give the same level of ventilation but is perfectly adequate.

The real problem with log storage is not having nearly enough of it. Anything you can do to increase the space will help, as you can then buy wood when it is readily available and possibly cheaper, and ensure that it is dry and ready to burn when you need it. It's also a good idea to have a small stack of logs indoors so that the ones you are about to burn have a chance to dry out a little more before you use them.



ABOVE: LEFT: Logs drying under cover. This log pile boasts the luxury of a permanent roof MIDDLE: A less permanent but equally effective arrangement; note how the logs are raised off the ground to protect them from moisture rising from below RIGHT: A lean-to store with a wooden roof helps to keep logs dry

Oak fire surround

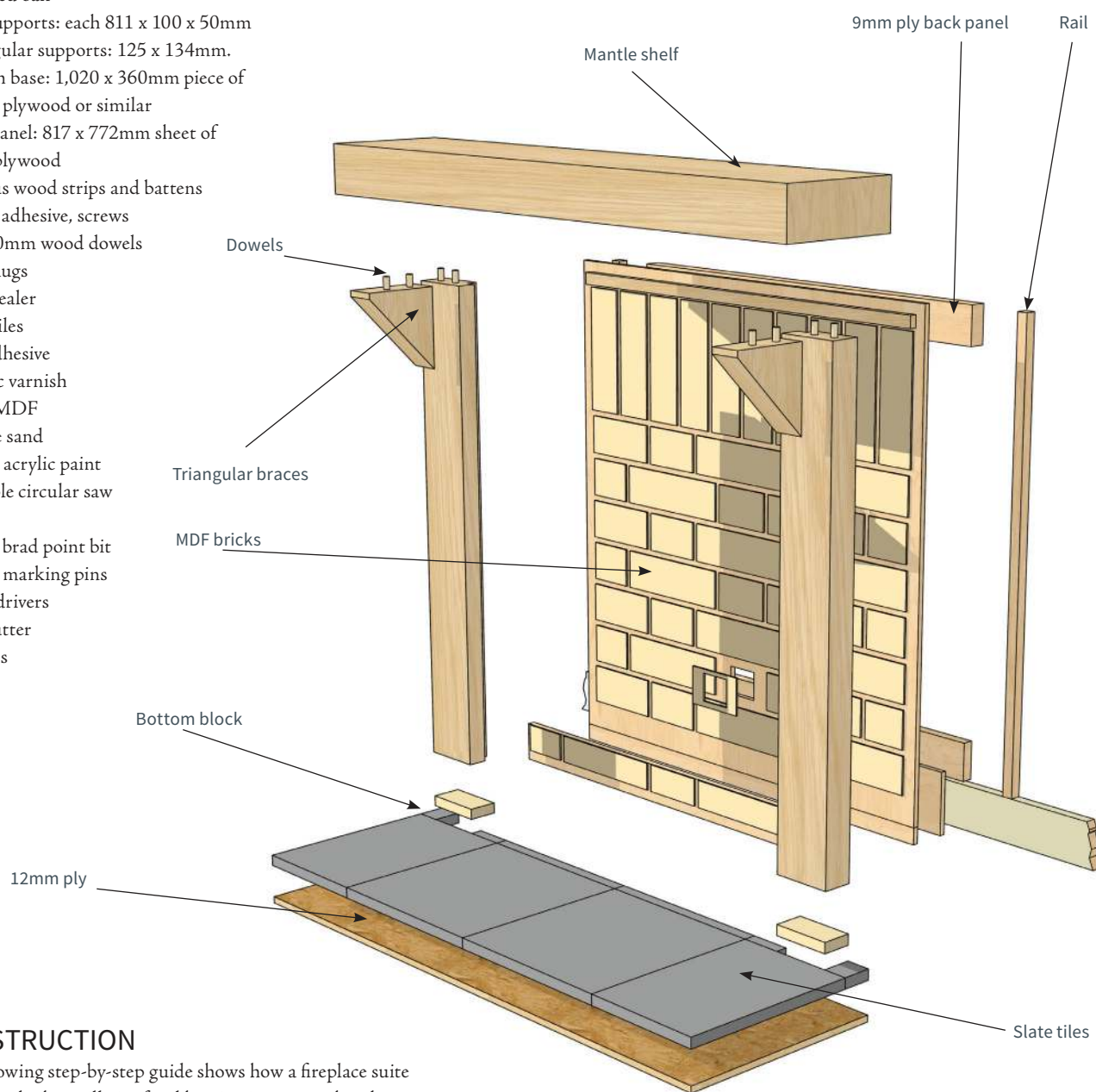
Add finesse to any stove with James Hatter's stylish fire surround

Fireplace suites have been around in one form or another for some time, and can add the right degree of character to a room that lacks a built-in fireplace. The most convenient type of suite consists of an electric heater source and a decorative surround, although other heat sources are available but these usually require a flue outlet to be taken into consideration.



YOU WILL NEED

- Mantle: 1,020 x 200 x 80mm length of prepared oak
- Side supports: each 811 x 100 x 50mm
- Triangular supports: 125 x 134mm.
- Hearth base: 1,020 x 360mm piece of 12mm plywood or similar
- Back panel: 817 x 772mm sheet of 9mm plywood
- Various wood strips and battens
- Wood adhesive, screws
- 10 x 40mm wood dowels
- Wallplugs
- PVA sealer
- Slate tiles
- Tile adhesive
- Acrylic varnish
- 3mm MDF
- Coarse sand
- White acrylic paint
- Portable circular saw
- Drill
- 10mm brad point bit
- Dowel marking pins
- Screwdrivers
- Tile cutter
- Clamps



CONSTRUCTION

The following step-by-step guide shows how a fireplace suite can be made that will give focal heating in a room that does not possess a built-in chimney. An electric stove heater is used, and the example shown uses chunky English oak for the mantelpiece and side supports. This is a little rustic in look but a more contemporary version could use a finer finish, or softwood painted to match its location could be used, with use made of a contemporary style electric heater. A back panel has a simulated whitewashed brick effect and the hearth uses natural slate tiles.

DETAILS

The fireplace consists of a mantelpiece that rests onto two side supports; each side support has an added triangular-shaped piece at the top for added support of the mantle and for decoration.

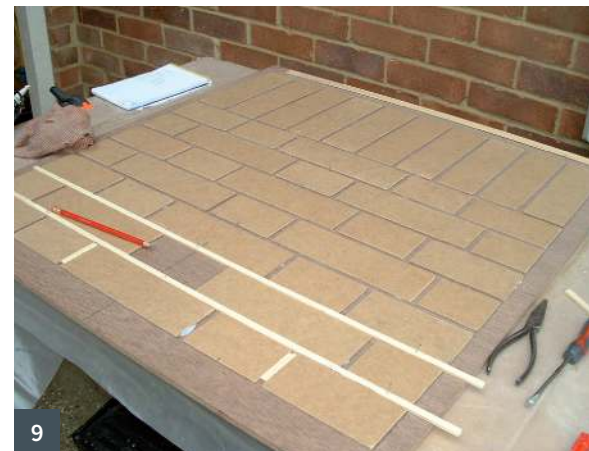
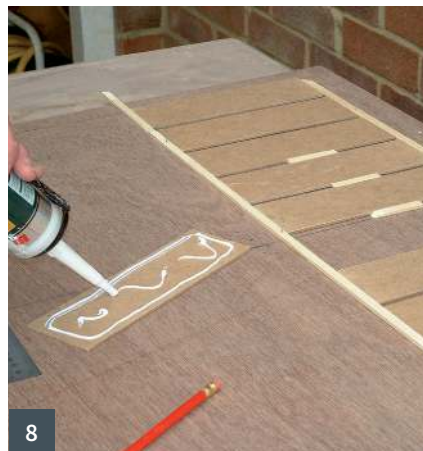
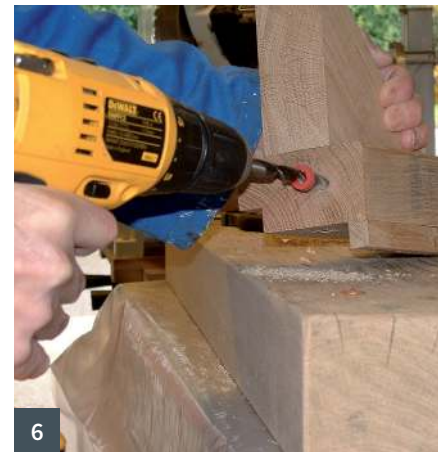
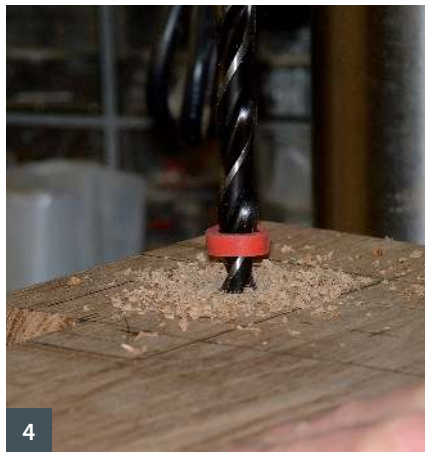
A back panel is screwed into rebates cut in the mantle and side supports, and the whole assembly is slotted into the back of a hearth. The construction is fairly simple with wood dowels being used to

attach the mantelpiece to each side member. Other components are joined to each other using screws and adhesive.

The back panel is made from 9mm plywood with 3mm-thick MDF brick profile shapes attached and treated to give a simulated whitewashed brickwork effect. For a more contemporary feel, consider attaching marble, granite or limestone tiles to the back panel instead.

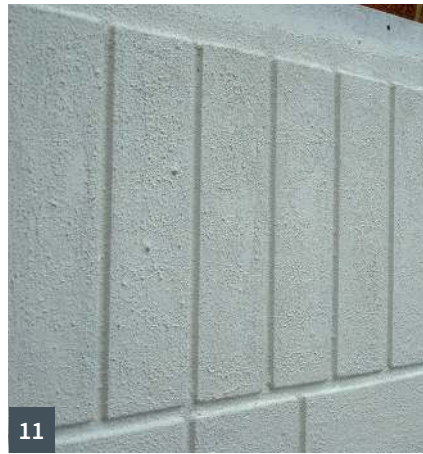
The hearth uses a base of 12mm board. Fixed onto the base are natural slate tiles. The edges of the base are painted in a slate colour to blend with the real slate tiles above.

The top of the fireplace is attached to the wall by screws through the top of the back piece and into a batten attached to the wall. An oak strip then covers the screwheads.



- 1** The oak used was sourced from a local timber yard. It was rough sawn so a sanding was applied to give a smooth but slightly rustic finish.
- 2** Cut the side supports to length, and cut a rebate to take the back panel. Attach an oak spacer batten to give added depth to allow for any skirting.
- 3** Cut the mantelpiece to size, and cut a stopped rebate to take the back panel.
- 4** Cut two triangular mantle supports, and attach one to the top of each side support, using adhesive and screws through the rear. Mark the position on the underside of the mantelpiece where the side supports will be attached, and drill 10mm holes for dowels.

- 5** Insert dowel marking pins into the drilled holes and align into position the top of the side support with attached mantle support. Press down to mark the matching dowel positions.
- 6** Drill the matching dowel holes.
- 7** The side support ready for assembly later.
- 8** Cut the back panel to size; next cut the brick-sized shapes using 3mm MDF. Attach the shapes to the back panel using adhesive.
- 9** Continue attaching the shapes, making use of temporary spacers. Cut out a hole to allow the electrical cable to be fed through later.



- 10** To get a realistic brick effect, spread a coat of PVA adhesive over the brick shapes, and then sprinkle sand over the adhesive. Dab the sand into the adhesive using a brush.
- 11** When dry, remove any loose sand then paint with a quick drying white primer/undercoat. Follow this with a white satin topcoat.
- 12** Start assembly by attaching the side supports to the mantelpiece using dowels and adhesive.
- 13** Apply cramps, and then attach the back piece within the rebates.
- 14** Assemble the back panel location arrangement. Attach the brick shapes and apply sand as described for the back panel. Cut the hearth panel to size, and then attach the back panel location arrangement, cut tiles to size, then spread tile adhesive over the hearth panel.

- 15** Bed the tiles onto the adhesive. Use the adhesive to grout the tile spaces. To fit the surround in position, first attach the hearth assembly to the wall, using screws through the back panel location arrangement into the wall. Attach a batten to the wall, positioned just below the underside of the mantelpiece level.
- 16** Feed the mains cable through if using an electric fire, and then lift the main assembly and slot it in the back panel location arrangement.
- 17** Use screws to attach the main assembly to the wall attached batten. Cover the screws with an oak strip. The fire surround is now in position.

Scrollsaw construction: tool caddy

Carry your tools in style with John Everett's caddy design



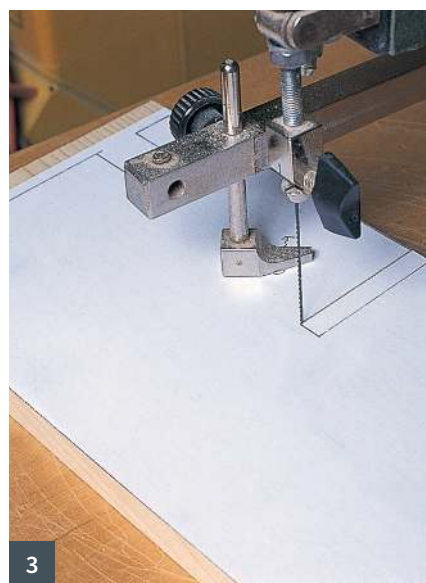
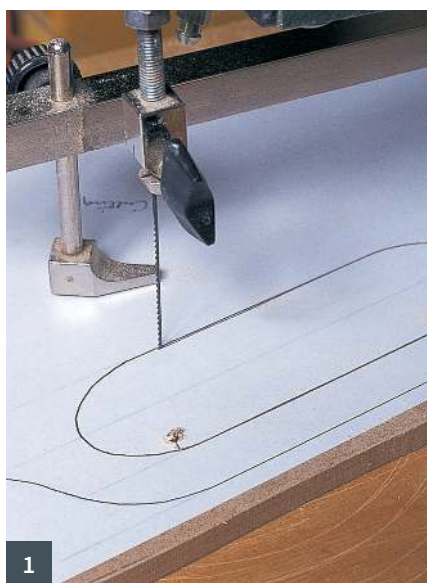
HEADER PHOTOGRAPH BY GUY/CANTHONY BAILEY

This sturdy tool caddy has one or two refinements that make it ideally suited to construction with the scrollsaw. The basic box section has a central dividing panel, which also acts as a handle, locked in place with a scroll-cut projection at each end. This makes the caddy much stronger. The lower portion of the slot of the carrying handle is reproduced on each of the side panels. This helps to avoid scraped knuckles when you pick it up.

An optional feature of this caddy is the title, which is scroll cut into one or both of the side panels. This could be personalised with the owner's name.

YOU WILL NEED

- 9mm MDF:
- 1 piece 350 x 180mm, for the centre panel
- 1 piece 340 x 275mm, for the bottom panel
- 18mm pine board:
- 2 pieces 350 x 145mm, for the side panels
- 2 pieces 275 x 145mm, for the end panels
- 8 mirror screws No. 8, 32mm
- 16 woodscrews No. 8, 32mm
- 2 woodscrews No. 6, 24mm
- Drill bits, to drill pilot and clearance holes for woodscrews
- Wood glue and two-part epoxy resin
- Paint, for decoration



PHOTOGRAPHS BY JOHN EVERETT

- 1 Make up a set of cutting patterns. You will need two copies each of the end panel and side panel patterns. Either follow the measurements given here, or adapt the dimensions to your own requirements. Make up blanks for all pieces.
- 2 Stick the centre panel cutting pattern on the appropriate MDF blank. When cutting out the blank, take advantage of any pre-cut straight edges. Drill a starter hole for the carrying handle cutout. Make the cutout with the skip-tooth blade, then make the external cut. Clean up the piece with sandpaper, especially inside the handle, and apply a coat of primer, followed by a couple of coats in the colour of your choice. Put the panel aside until the paint dries.
- 3 Fit a general-purpose blade to the scrollsaw and cut out the two end panels from pine board. Pay particular attention to the recess in the

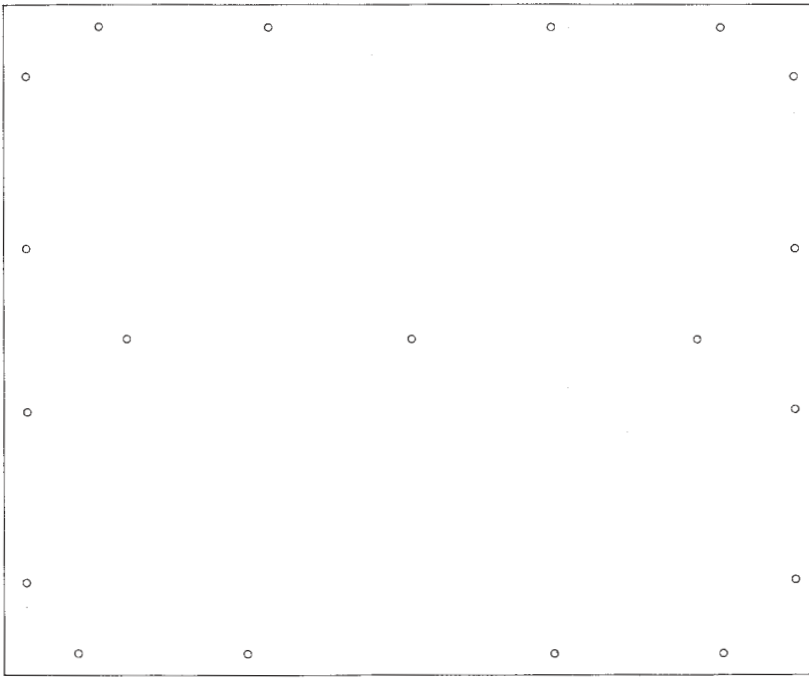
centre of the panel which needs to fit closely with the projection of the centre panel. This part will carry most of the weight of the full caddy when it is being carried around.

- 4 The side panels are similar to the end panels with one or two additional features. If you wish to incorporate the tool caddy lettering (or any other customising feature), make the relevant starter holes in the design. The scroll-cut tenon joints on the side panels fix into the end panels, so that they project a little. This is purely for decorative effect, cut them flush if you prefer. Make the external cut to both side panels.
- 5 If you intend to add lettering and your scrollsaw has a limited throat capacity, fit a spiral blade and make the appropriate cutouts. Smooth off the lettering using a round file.

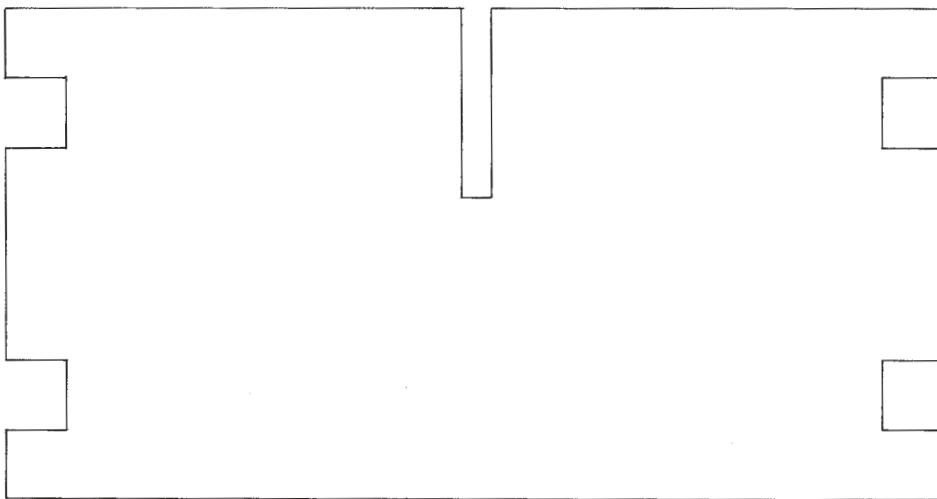


- 6 Try putting together all of the panels you have made so far and check that they fit together easily. If the fit is too tight, the tenons can be filed or gently pared with a wood chisel.
- 7 When you are happy with the fit of the panels, check the dimensions of the cutting pattern of the bottom panel by laying the side, end and centre panels fitted together, in place over the cutting pattern. Draw a pencil line down each side of the centre panel onto the cutting pattern. This will help you to mark the exact positions of the clearance holes in the bottom piece. Cut out the bottom panel from MDF, again making use of any pre-cut straight edges.
- 8 Drill clearance holes, as marked, in the side and bottom panels. Check that all the pieces fit together properly. Begin assembly by slotting the two end panels in place over the projections at each end of the centre

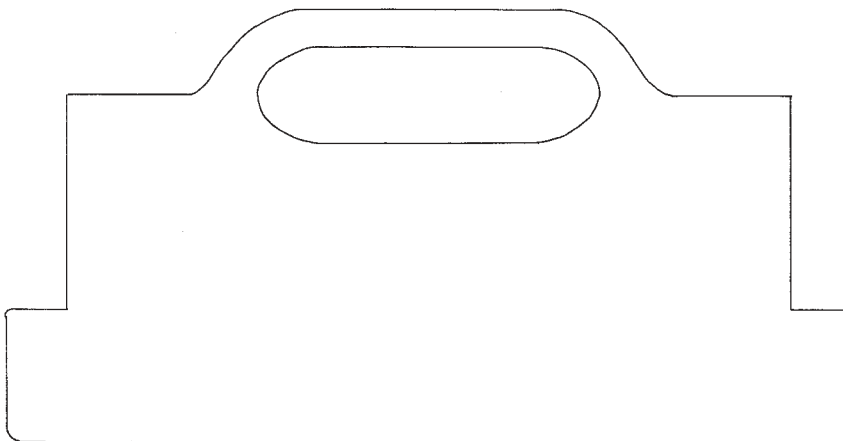
- panel. Add wood glue to the joints where the wood surfaces meet.
- 9 Fit the side panels to the end panels, again adding wood glue where the side and end pieces meet. Do up the mirror screws, but leave the cover caps until later. Turn the fitted pieces upside down and support them on two lengths of 50mm square timber, allowing the carrying handle to clear the bench. Smear wood glue around the underside of all the panels. Screw the bottom panel onto the side and end panels. Use a small drill bit to make pilot holes in the bottom of the centre panel so that the screws do not split the MDF. Fit the remaining screws. Mix up some two-part epoxy glue to fit the mirror screw caps. Smear some over each of the mirror cover caps and attach them over the screws in the side panels. When the glue has completely dried, varnish or stain the completed caddy to your own preferences.



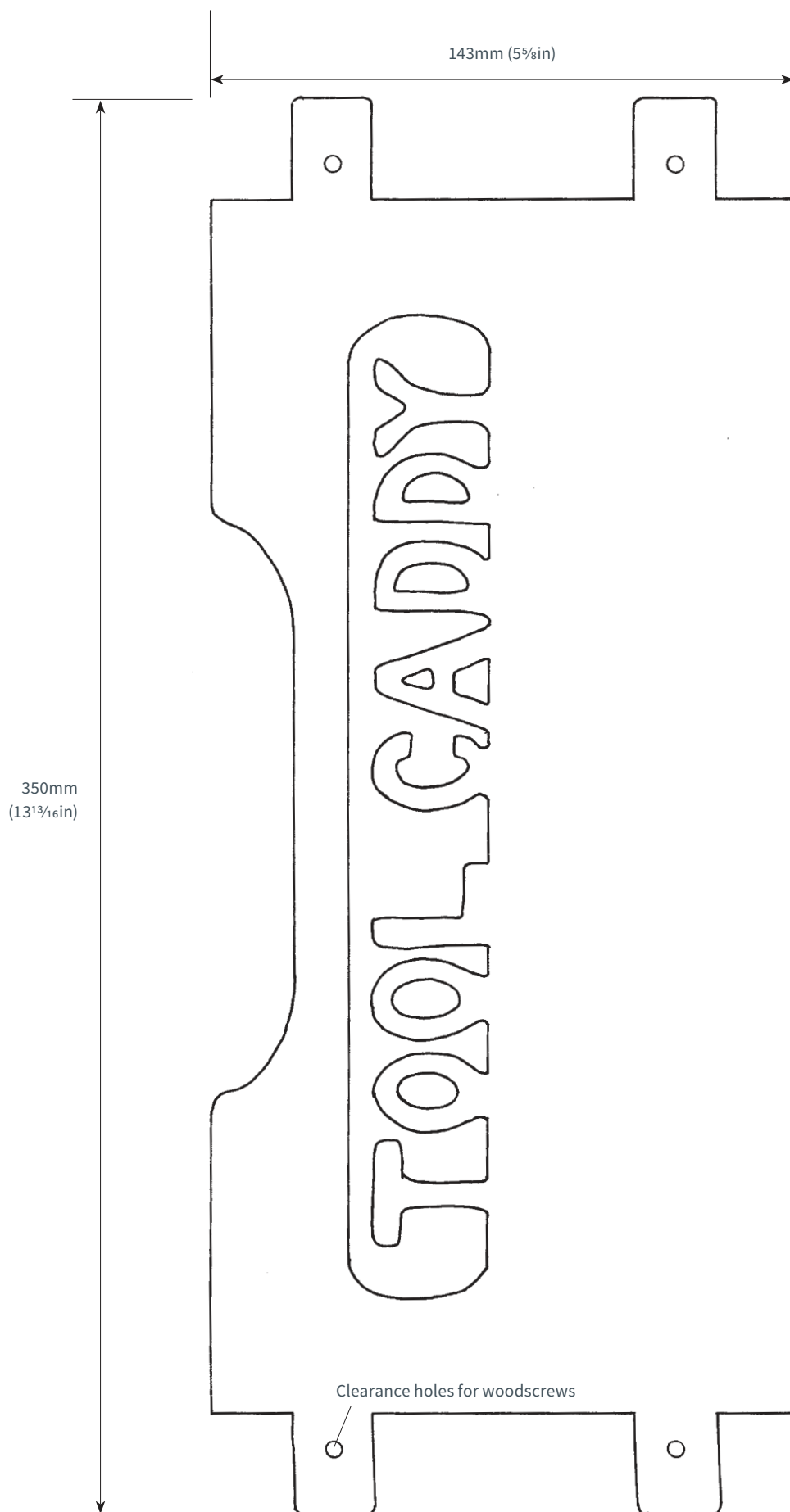
Caddy bottom



Caddy ends



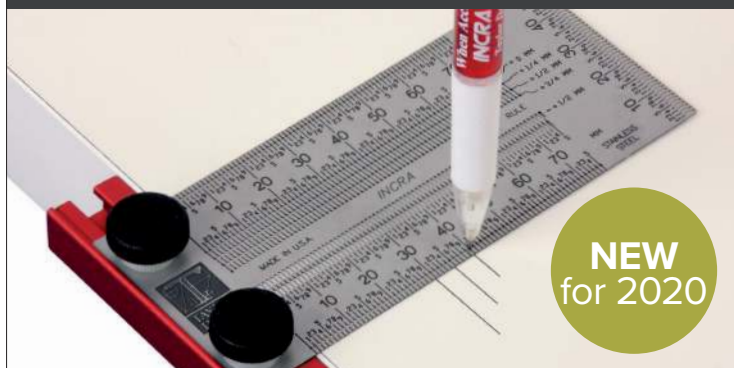
Caddy centre grip



Side panels
(cut two)



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Creature comforters

How sculpting bespoke animal designs out of willow has turned a young widow's life around

Natalie McLay has an incredible bond with her daughter, understandable given that she has practically brought the youngster up alone after being widowed at the age of 37. Eleven-year-old Imogen also adores her mum, but can occasionally morph into a wannabe teenager over her choice of occupation. 'All my friends have mums with normal jobs – you sit on the kitchen floor playing with sticks,' she exclaims in mock exasperation.

In just two years, though, Natalie has turned 'playing with sticks' into a thriving business called Trottiscliffe Willow, with customers

including the Royal Horticultural Society. For what she actually does at her home near Sevenoaks in Kent is create bespoke animal sculptures out of willow, which is grown on the Somerset Levels.

None of this seemed possible in 2009 when she tragically lost her husband in a motorcycle accident. It left her wondering how she would juggle caring for her number one priority, the then 21-month-old Imogen, and her job as a dedicated London paramedic.

Discovering by chance that she had a flair for willow sculpture was literally life changing. It meant Natalie could give up working for the

NHS and the shift work it entailed, and concentrate on both her child and making a go of her new venture.

'It was really when I met my partner, Rob Slee, that everything changed,' explains Natalie. 'He didn't know what to buy me for my birthday one year and his mum lives in Somerset, where I get the willow from. He saw they were running a workshop to make a sculpture, like a small bird, so paid for me to go. I haven't got an art background but I made a peacock and it actually looked like a peacock, so I decided to buy some willow and practise with it until I mastered how to make various animals.'

'Family and friends asked me to make things for them and kept saying I ought to do it as a business. Rob's always been a bit crazy and adventurous, and he encouraged me. Without his intervention I still would have been a paramedic, undoubtedly so. I took a sabbatical from the NHS to test the water by exhibiting at some garden shows to see if there was any interest, and people bought a few things. I ended up quitting my job and set up as a one-woman band in January 2017 and haven't looked back.'

'Working from home and not having to do shifts is part of the appeal of the business as it gives me the flexibility to be with Imogen all the time. That's obviously really important. After everything that happened, I have the view that you only live once and you shouldn't let opportunities pass you by.'



PHOTOGRAPHS PROPERTY OF TROTTSCLIFFE WILLOW



A THRIVING BUSINESS

A friend helped Natalie design a website and word-of-mouth also played a huge part in marketing her meticulously crafted creations. 'In my first year, I got my biggest commission to date and it remains my favourite job,' she says. 'I was asked to make two enormous turkeys, both 4ft tall, for a farm in Tenterden, Kent. They've been on display above a hedge at the farm for the last two Christmases and, hopefully, they'll be there again this year. I had to take quite a trip to see them the first year and I must confess I did it again last year to see if they were back up. It's thrilling to drive past and think, "I did those!"'

A couple of well-known people and a big media company have since commissioned Natalie, but contractual obligations mean she cannot reveal their identities. 'What I can mention, though, is that the Royal Horticultural Society asked me to supply 50 animals, from foxes to boxing hares, to decorate their displays at the prestigious Chatsworth Flower Show and Hampton Court Garden Festival. That was absolutely amazing.

'At Chatsworth, they were used in the Power of Trees display and at Hampton Court they were spread out all over the showground in clusters, popping up in the flowers. The animals remained my property as the RHS just paid a hire fee, but they put my details on plaques and

people ordered them direct, so I pretty much sold out by the end of both shows.'

Natalie's creatures are mostly life-size and can take anything from a week to a month to make. However, before she can get down to the nitty-gritty of designing them, she has to soak the willow for up to a week to make it pliable, then it has to be rested for a couple of days. 'If I tried to weave it dry, it would snap,' she explains. 'I use two large cattle troughs in my back garden and you have to be exacting about the amount of time the willow is soaked because if you do it for too long, the bark peels off. It's quite a fine line to tread.

'There's no steel or wire framework in my animals, but some do require metal rods in their legs to enable them to stand. Once completed, each piece is coated with a high-quality UV sunlight barrier to help protect them against the elements.'

Although Natalie works alone, she says she could not manage without Rob handling the logistics. 'He lifts and shifts the materials and finished products, plus tows an old horse trailer that we bought to transport everything to the shows,' she says. 'He's built bunk beds, a kitchen and installed a wood-burning stove on it so that we have somewhere to live while we're exhibiting. I couldn't do it without his





support, nor without Imogen either. Despite what she says about me playing with sticks, she gets quite upset when some of the animals are sold. She'd like to keep everything!

When it comes to the loaded subject of Brexit, that holds no fears as Natalie sources all her materials from the UK and, so far, has only had domestic customers. 'There is cheaper willow I could order from Europe but, in my opinion, British is best. I feel quite strongly about buying British.'

Natalie's inspiration for making her business grow and flourish comes purely from the enjoyment it gives her. 'I love it when people get pleasure from my animals, even if they don't buy them. When I'm on a stand at a show, it's wonderful to see families smiling as they approach them. Children stroke them as if they're real and pretend to feed the ponies. And if I could charge a pound for every photograph they take, I'd be a very rich woman.'

'It's obviously even better if people decide to buy the animals as I put so much of myself in them that it feels very personal. Afterwards my customers often send me messages telling me they've given them names and send pictures of them in their gardens. I think it's wonderful.'

She has recently set up a sideline in running sculpture workshops both here and in France and would like to develop that. Haver Castle, the stunning childhood home of Anne Boleyn in Edenbridge, Kent, is one of her venues.

So where does Natalie see herself in 10 years? 'I hope I'll still be sitting on the floor playing with sticks. Or maybe I'll be at the kitchen table by then as it'll be easier on my joints!'

www.trottiscliffewillow.co.uk

Words: **Kim Smith**





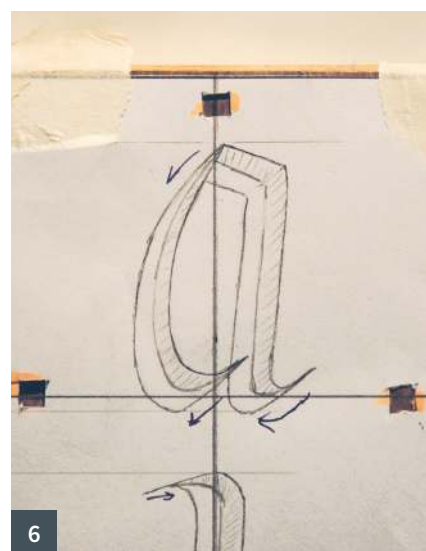
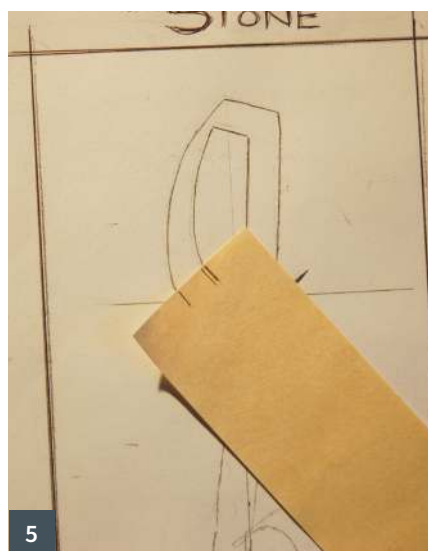
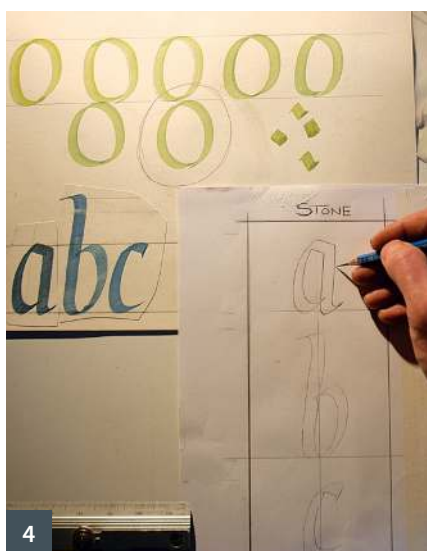
LETTER CARVING

Andy Hibberd shares his techniques for letter carving on both wood and stone

I hope that this article will awaken an interest in the beautiful structure and form of brush lettering, leading to well understood and carefully constructed letter carving through looking at, understanding and admiring letterforms. Once you start looking, you can find inspiring examples of lettering all around you. First I'll show you how to form the brush letters using paint, and then how to carve them into wood and stone. We'll carve the word 'stone' into a piece of wood and the word 'wood' into a piece of stone.

YOU WILL NEED

- Chisel-ended 12mm-wide paintbrush
- Watercolour paints and paper
- HB and 4H pencil
- Lining or tracing paper
- Carbon or preferably lining paper
- Masking tape
- Drawing board
- Staedtler Mars lumograph pencils: 6H for stone and HB for wood
- Mallet/stonecarver's dummy
- An adapted marking gauge to set out the lines on the wood/stone
- Woodcarving chisels:
- 8mm skew
- No. 5 gauge 8mm
- V-tool 2mm
- No.1 (just off the flat) 4mm
- Al-Orr tungsten carbide 7mm



PHOTOGRAPHS BY ANDY HIBBERD

Forming the letters

BRUSH STROKES

- 1 Mix up the paint to a creamy consistency, load up the brush and dab it onto the paper – this will achieve a sharp edge on the brush. Hold the brush upright between the thumb and fingers, just above the metal ferrule, with the outside edge of the hand resting on the paper. Don't grip too tightly. Try to feel the weight of the brush and then practise stroke making.
- 2 Once you are happy with your method, paint your letters and fix these brushed letters to your drawing board with masking tape. Next, underline them and make sure they are squared up on the paper.

TRANSFERRING LETTERS TO PAPER

- 3 Place lining or tracing paper over the painted brush letters and draw around the outline of the letter using a sharp HB pencil. Fix the lining paper over the top and carefully draw round these letters. It is vital to remember that at all stages of line drawing, the current one must improve upon the previous, and of course it is easier and less costly to make the decisions at this stage rather than later.

- 4 Next, using carbon paper, trace the letters onto a clean sheet of paper and redraw carefully. I have drawn two columns on my sheet of paper to represent the wood and stone blocks.
- 5 Using a strip of paper, mark the stroke widths of the letters, the widest point and the upward stroke. Check all the letters and adjust them to these marks.

MARKING ONTO WOOD AND STONE BLOCKS

- 6 Using a marking gauge with a pencil attachment, mark the horizontal and vertical centrelines onto your wood or stone block – these are independent of the line drawing. Cut out sections of the centrelines on the drawing and then place the drawing onto the wood or stone in such a position as to line up with the centrelines showing through. Now trace the letters onto the wood or stone. Carefully redraw the letters again, always looking at the original brushed letters so as not to miss any nuances or detail. At this stage I would draw in the centreline of the letter – this is a very important line and should always be in the middle at all points of the letter.

Note: a V-cut letter is constructed by changes of plane and only seen by the shadows formed when light hits it. It is different to a line drawing, which is an interpretation of this.



Carving in wood and stone

PREPARATION AND WORK HOLDING

7 I would suggest that, instead of clamping the piece of wood or stone directly onto your workbench, make a jig whereby the work can be positioned in an upright stance. This will enable you to view it in the correct orientation at all times. Carefully trace the letters onto the wood or stone. Draw over these letters again; not to tidy up the tracing but to gain a better understanding of the letterforms.

CARVING THE 'S'

8 Using the V-tool, start to remove wood along the centreline of the letter. Don't be tempted to cut into the serifs at either end of the 'S' and don't worry about trying to remove as much wood as possible at this stage – all we are really trying to do is ease ourselves into the carving of this difficult letter.

9 The next tool, the skew chisel, is used for about 90% of the work over the whole carving. Most of the time I use a paring action by hand and a mallet when required. The accuracy of the drawn lines now comes into play – they will be one of the two boundaries of

the 'V' cut. Try only to remove half of that line, it may only be a millimetre thick, less in places, but it is a good discipline to get into the habit of applying. The second boundary of course, is the bottom of the 'V' cut, the depth of which will be determined by the angle of the 'V'. An angle of about 60° is a good starting point, but experiment on a piece of scrap wood to find the angle of cut that suits you.

10 After the 'V' cut, start cutting the serif at the bottom of the 'S'. This is a very delicate job for the skew chisel – on small letters I would even consider using a scalpel. As a general rule it is better to cut from a thin stroke leading to a thick stroke, as on this letter 'T', so make sure you have sharp tools to prevent problems with the grain.

Note the arrow showing the 'counter' shape in photo 10. It is very important to be aware of these negative spaces, both at the top and bottom of the 'S'. Care should be taken when cutting these curves; keep referring back to your drawings. For part of the curves on the 'S' I used the other chisels. Take extra care when doing this to stop them from dictating the letter shape, or leaving unwanted stab marks on either side of the 'V' cut.



CARVING THE 'T'

- 11** Start cutting the cross stroke of the "T" using the V-tool first. This is only about wood removal and getting started, so keep well away from the serif-ends of the "T". This will also alleviate the need for a stop cut.
- 12** Cut both end serifs and work your way to the middle of the cross stroke to meet up. Then, starting at the base of the down stroke of the "T" – at the very end of each serif – start cutting towards the middle of the down stroke. Be very careful you don't cut into any pencil lines. This is done using the bottom edge of the skew chisel. Finish off this chip cut by running the edge of the skew chisel along the base of the letter.
- 13** Starting at the serif ends, run the "V" cut into the down stroke and continue upwards until you reach the crosspiece. You need to finish off the letter with the type of junction shown in photo 13. Remember not to cut into the crosspiece above the centreline.

CARVING THE 'O'

- 14** Carving the letter 'O' throws up all kinds of problems so it's worth spending some time practising this. Start by looking at the centre or the 'counter' of the 'O'. Notice how the axis runs through at an angle. The outside, slightly flattened circle has a more upright axis running through it. This balances the letter and gives it a feeling of tension. Run the V-tool around the centre of the 'O', making sure that this is done carefully and accurately.
- 15** Using the skew chisel, shape the counters of both 'O's as close to the bottom of the 'V' cut as you feel confident to go.
- 16** Keep checking the negative spaces of the two counters to make sure that they are similar.
- 17** When you are happy with the carving of the two counters, again using the skew and any other chisel you feel will help, start carving the other side of the 'V' cut. Whatever you do, don't cut into the work you have just painstakingly done. This is where the accuracy of the bottom of the 'V' cut's centreline will be tested.



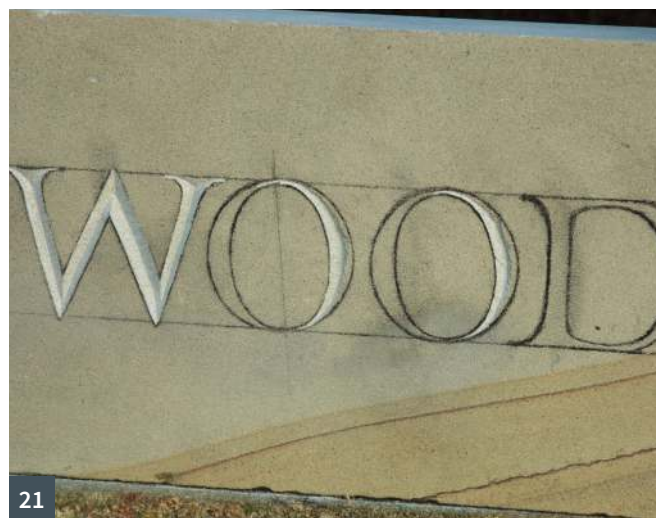
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21

CARVING THE 'N' AND 'E'

- 18** The 'N' and 'E' are cut using only the skew chisel, with a stab-cut centreline used as a guide.
- 19** Note the linking of the two serifs on the 'N' and the 'E'.
- 20** I will now focus on the real danger area when carving in wood or stone: the junctions on the letter 'N'. They are extremely vulnerable and if not cut with care are liable to break off, so practise this cut until you're confident. Don't focus on this problem to the exclusion of all else, however, the important part is the overall structure of the letter.

CARVING THE 'W'

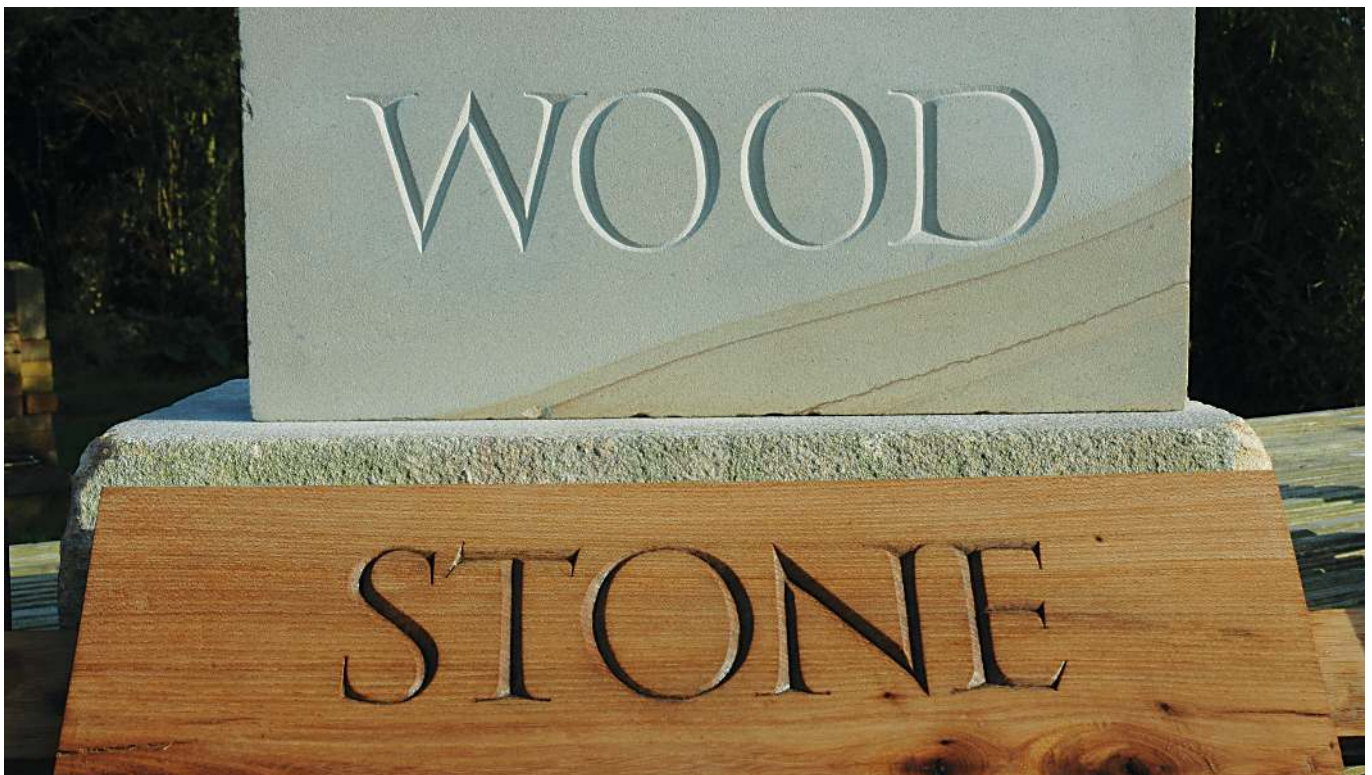
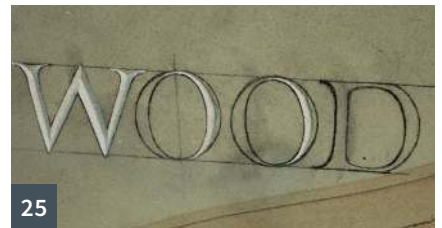
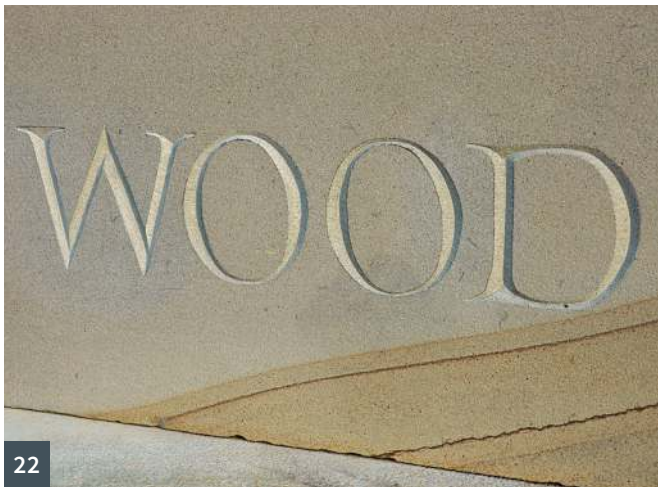
- 21** Unlike the letter 'N' which has two vulnerable junctions, the 'W' has three to contend with. To make life a bit easier, approach this letter in three sections. It has a centre section similar to an 'A' with two letter 'V's standing side-by-side. Start by carving the thin strokes first, taking care not to try to finish them before starting the thick strokes. It is very important to always have the bottom of the 'V' cut – the centreline – in mind and make sure not to change the angle of the cut at the vulnerable junctions. As with all the letters, the 'V' cut should run continuously around the letter. Using the analogy of the two 'V's, the inside cut of each should be visually at the same level, even though the junctions are formed by different sized stroke widths.

CARVING THE 'D'

- 22** As with the letter 'O', concentrate on fixing the shape of the counter before moving on to the rest of the letter carving. A similar brush stroke is used to form the curves on the letter 'O' and the letter 'D', so treat them in a similar manner.

FINISHING TOUCHES

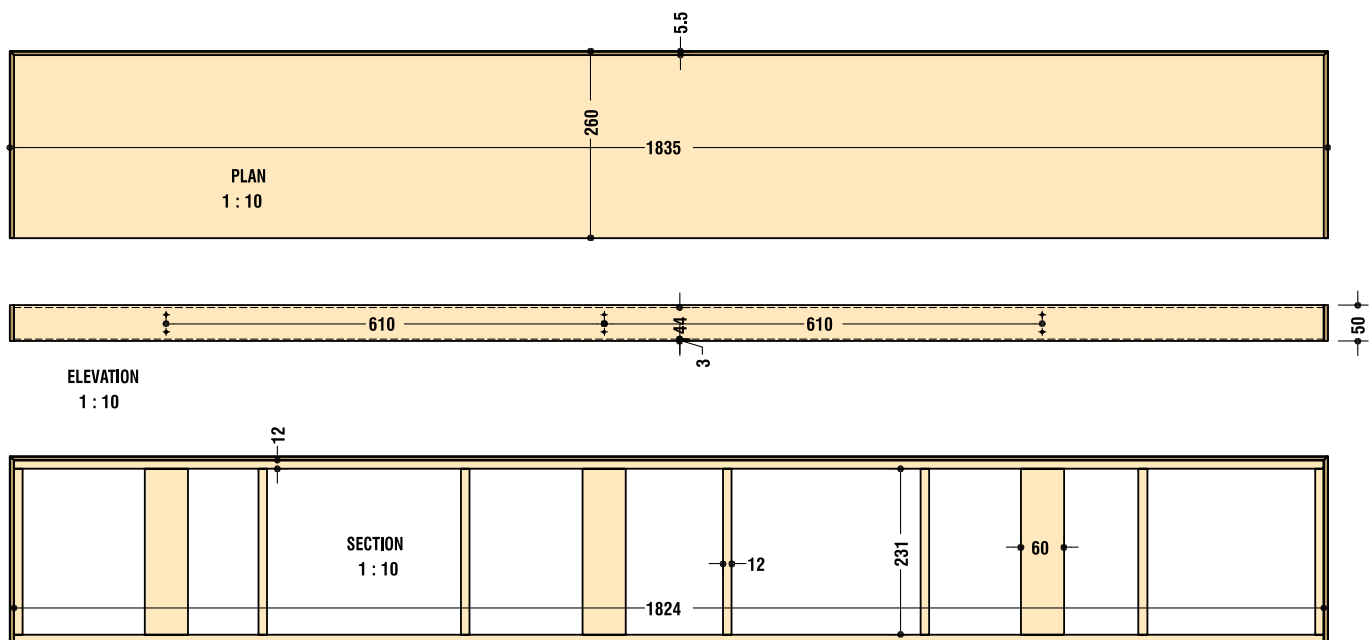
- 23** When you are satisfied with your letter carving it is time to remove all traces of pencil. A light sanding with fine paper is usually enough.
- 24** View the carving under different light intensities to see how it stands up. What you will inevitably find is that certain letters look strong and others look weak. You will probably also find that some of the lines are not straight. If the work is small enough, turn it upside down; this will highlight any problems with tricky letters like 'O' and 'W'.
- 25** When you have decided which the strongest letter is, mark the stroke widths on a piece of paper and carefully adjust the remaining letters to conform to these marks. Then re-carve all of the letters to the same weight. A try square is a useful device enabling you to see whether the letter is leaning or not, but don't be tempted to use it to draw a straight line. Keep referring back to the drawings of the letter forms throughout.



Floating shelf

Anthony Bailey shares the secret of the hollow box section technique to make a shelf with no visible means of support

Some modern furniture can look a little improbable, such as the shelf project shown here. It looks very clean lined but how does it hang in there? This design is intended for mounting on the sort of stud interior found in most modern homes, as it takes advantage of the studwork for the invisible fixing. It should not be overloaded by lots of books however!





MAKING A HOLLOW BOX

- 1** The hollow box section technique uses two pieces of a very light coloured 3mm ply found in any DIY superstore. The box framework is created using whatever hardwood happens to be found around the workshop. Take a standard 2m x 600mm 3mm ply board and cut two identical pieces to the size on the drawing. You could always make it smaller if you wished.
- 2** Use the tablesaw to cut the pieces for the framework. These will be 44 x 12mm in section and you need plenty to make up the box

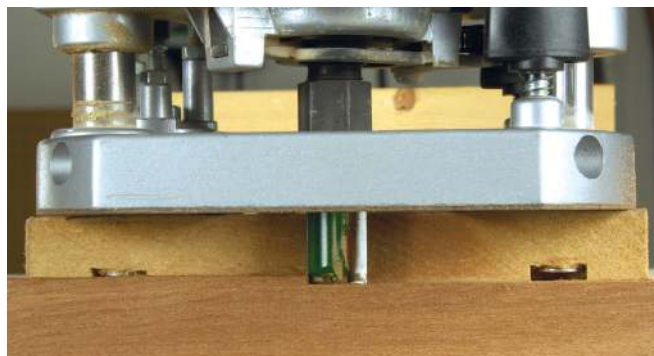
pattern, but short offcuts will do for the cross pieces and the fixing blocks.

- 3** You need to know where the shelf will actually be fixed so that you can find the stud centres and position the fixing blocks accordingly inside the shelf. In the drawn example the shelf position didn't match the studs and thus the internal framework is asymmetrical to suit the situation. Make sure you mark where the blocks are as once the shelf is glued up you won't be able to locate them again!

FLUSH SURFACE TRIMMING



Make up an MDF sub-base for the router that can slide across the shelf surface while keeping the router base off the work. By carefully depth setting a straight cutter, you can then machine off the



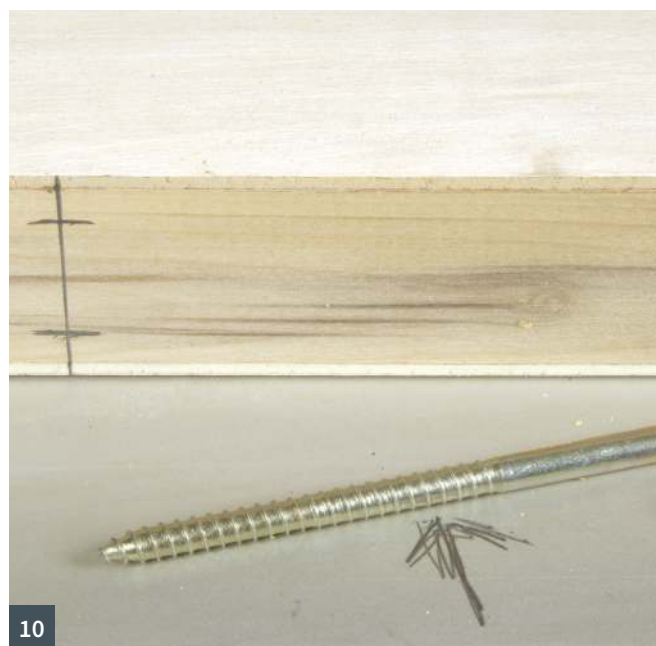
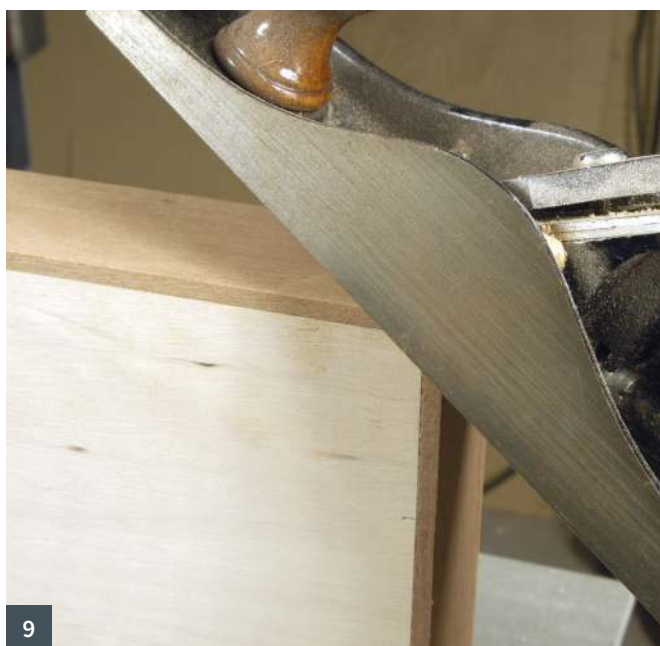
projecting sawn lippings flush with the shelf surface. Take care to avoid 'dig-in' and make several passes to approach the corners as the meeting edges can foul the sub-base.



4 Find a good flat assembly surface and place all the parts in their relevant positions. Now apply the glue, reposition everything and place the top layer of ply. Ensure all the outer solid pieces are correctly aligned and the two layers of ply likewise. Now place weights carefully on the whole 'sandwich' and leave to set.

5 Both long edges need to be flush and smooth so a couple of passes on the planer table will sort that out.

6 The ends also need to be smooth; this is best done on the crosscut saw using a board underneath to prevent breakout, or alternatively use a big router with a long straight cutter and a T-square.



CONTRAST EDGING

Now you need to prepare the contrast edging from a dark mahogany-type wood, which will probably only be slightly wider than the shelf thickness it will be applied to. Therefore thickness the lippings down to about 5–5.5mm but leave the sawn edges.

- 7** Mitre the ends of the front piece accurately to fit, then cut and mitre the end lippings. Add the glue in a wide zigzag pattern...
- 8** ... and tape the lippings in place using plenty of masking tape.
- 9** Any minor gapping between the lippings can be carefully filled ready for sanding. Use an orbital or random orbital to sand all surfaces and take the sharpness off all edges with a piece of abrasive. The mitred lipping joints are lightly planed on the bevel to make them safer and to correct any inaccuracy in the mitring.

WALL FIXINGS

On the rear of the shelf mark the centres for the wall fixings. There are two reasonably low-tech ways of doing this.

- 10** The one adopted here uses long frame-fixing screws which are sometimes referred to as Fischer fixings; most of the threaded portion is wound into pre-drilled holes in the studding before the heads are ground or hacksawn off. The shanks are run into holes in the shelf rear using a generous amount of epoxy resin to provide adequate glue strength. Insert two bolts per stud, one above the other. The alternative is to use threaded rod that can be screwed into the studs by winding in with mole grips after first grinding a point on each piece. The rod is then epoxy glued into the holes in the shelf. Your friends will gaze in awe and wonder at an apparently flying shelf!

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CDP202B	450 / 16	£189.00	£226.80
CDP10B	370 / 12	£199.98	£239.98
CDP452B	550 / 16	£239.00	£286.80
CDP352F	550 / 16	£229.00	£274.80
CDP502F	1100 / 12	£549.00	£658.80

• Includes bench dogs and guide holes for
variable work positioning • 2 Heavy Duty Vices
• Large storage drawer • Sunkin tool trough
• LxWxH 1520x620x855mm

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Clarke 4" BELT/ 8" DISC SANDER

• Includes two
tables • 550W
230V motor

CS4-8

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• Powerful, bench
mounted • 900W

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Clarke DUST EXTRACTOR/ CHIP COLLECTORS

CDE7B

CWVE1

FROM ONLY
£109.98
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INC.VAT

• Powerful 1100W
motor • 50 litre bag capacity
• Flow rate of 850M³/h

MODEL	MOTOR	FLOW RATE	BAG CAP.	EXC.VAT	INC.VAT
CWVE1	1100W	183 M ³ /h	50Ltrs	£109.98	£131.98
CDE35B	750W	450 M ³ /h	56Ltrs	£144.99	£173.99
CDE7B	750W	850 M ³ /h	114Ltrs	£159.98	£191.98

Clarke RANDOM ORBITAL SANDER

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• All models include nail/staple
pack and tough moulded
case • 18V 2Ah Li-Ion
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Staple/Nail Gauge

Clarke POWER PLANERS

NEW RANGE
CEP450

MODEL	WIDTH OF CUT (mm)	EXC.VAT	INC.VAT
CEP450	60mm	£34.99	£41.99
CEP720	82mm	£44.99	£53.99
CON950	110mm	£67.99	£81.99

Clarke ELECTRIC POWER FILE

CPF13

• Variable belt speed
rattling head
• Black & Decker

MODEL	MOTOR	BELT SIZE (mm)	EXC.VAT	INC.VAT
CPF13	400W/230V	13x45	£49.98	£59.98
KA900E	350W/230V	13x45	£59.98	£71.98

Clarke 18V BRUSHLESS COMBI DRILLS

• 2 forward and
reverse gears

CON180LI

MODEL	VOLTS	BATTS	EXC.VAT	INC.VAT
CON180LI	18V	2x 2.0Ah Li-Ion	£109.98	£131.98
CON180LI	18V	2x 4.0Ah Li-Ion	£159.98	£191.98

• Simple fast assembly in
minutes using only a hammer

Clarke DETAIL SANDERS

• Perfect for smooth
and fine
finishing along
with hard to
reach areas or
curved
surfaces

MODEL	WATTS	EXC.VAT	INC.VAT
PS105	105W	£19.98	£23.98
GDS-IV	280W	£29.99	£32.99

Clarke BELT SANDERS

• Ideal for surface removal,
sanding and finishing

MODEL	MOTOR	M/MIN	EXC.VAT	INC.VAT
Clarke BS1	900W	380	£37.99	£45.99
Clarke CBS2	1200W	480	£79.98	£95.98
Makita 9911	650W	75-270	£99.98	£119.98

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• Great range of DIY and professional
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MODEL	MOTOR	MAX CUT 90/45 (mm)	EXC.VAT	INC.VAT
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*Includes
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& support
frame,
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& water trough

CWS200B

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MODEL	MAX OUTPUT KW	EXC. VAT	INC. VAT
Little Devil II	10.3	£79.98	£95.98
Devil 700	15	£99.98	£119.98
Devil 900	24.9	£139.98	£167.98
Devil 1600	36.6	£169.98	£203.98
Devil 2100	49.8	£259.98	£310.80
Devil 4000	131	£429.00	£514.80

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BEST SELLER

DEVIL 7003
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MODEL	VOLTAGE	HEAT OUTPUT KW	EXC. VAT	INC. VAT
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DEVIL 7003	230V	3	£59.98	£71.98
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DEVIL 7005	400V	5	£84.99	£101.99
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MODEL	BLADE MAX CUT DIA/BORE DEPTH (mm)	CROSS EXC.VAT	INC.VAT
CMS210S	210/30	£60.120	£74.99
CMS210MP	216/30	£65/305	£139.98
CMS10S2	254/30	£78/340	£139.98
CMS250S	250/30	£85/250	£109.98
CMS250MP	255/30	£90/305	£189.00

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FROM ONLY **£79.98** EXC.VAT
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MODEL	MOTOR	SPEED RPM	EXC. VAT	INC. VAT
CSS400D	120W	400-1600	£79.98	£95.98
CSS16VB	90W	550-1600	£94.99	£113.99
CSS400C	90W	550-1600	£119.98	£143.98

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* "V" Twin Pump

MODEL	MOTOR	CFM	TANK	EXC.VAT	INC.VAT
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7/250	2HP	7	24ltr	£94.99	£113.99
11/260	2.5HP	9.5	24ltr	£109.98	£131.98
8/550	2HP	7.5	50ltr	£119.98	£143.98
11/550	2.5HP	9.5	50ltr	£139.98	£167.98
16/1010	3HP	14.5	100ltr	£259.98	£311.98

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NEW RANGE

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FROM ONLY **£69.98** EXC.VAT
£83.98 INC.VAT

MODEL	MOTOR	EXC. VAT	INC. VAT
CPS85	550W	£69.98	£83.98
CPS160	1200W	£139.00	£166.80

Clarke MULTI FUNCTION TOOL WITH ACCESSORY KIT

• Great for sawing, cutting, sanding, polishing, chiselling & much more • 250W motor
• Variable speed

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Clarke JIGSAWS
CON750
FROM ONLY **£15.99** EXC.VAT
£19.99 INC.VAT

* DIY #Professional

MODEL	POWER (W)	DEPTH OF CUT (WOOD/STEEL)	EXC. VAT	INC. VAT
CJS380*	420W	55/6mm	£15.99	£19.19
CON750*	750W	80/10mm	£27.99	£33.58
Bosch PST700E*	500W	70/4mm	£44.99	£53.99

Clarke BENCH BANDSAWS

• Produces fast, precise mitre & longitudinal cuts
• 350W motor
• 7.5" throat size
• Cuts in all types of wood

CBS190B
FROM ONLY **£129.98** EXC.VAT
£155.98 INC.VAT

CBS225
FROM ONLY **£189.98** EXC.VAT
£227.98 INC.VAT

• Great for both home & professional use
• Induction 300W motor
• Table tilts up to 45°
• 9" throat size

Clarke MAGNIFIED MITRE GUIDE

CBS300
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• QUICK RELEASE FENCE
• DRIVE-BELT TENSIONING
• SOLID GROUND CAST IRON TABLE

Clarke PROFESSIONAL BANDSAWS

Top Quality Bandsaws - ideal for professional workshop use. Strong steel body with solid cast iron table

- Table tilts 45°
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- Supplied with stand, 4TPI wood cutting blade, rip fence, mitre guide, mitre gauge and push stick
- Induction motors
- Includes stand

MODELS ALSO FEATURE:

- MULTI-STEP DUST EXTRACTION OUTLET
- FLEXIBLE LED WORKLIGHT
- REMOVABLE DUST TRAY
- BLADE TENSIONING CONTROL

MODEL	THROAT DEPTH	MAX CUT 90°	MAX CUT 45°	EXC. VAT	INC. VAT
CBS250	250mm/10"	100mm	75mm	£219.98	£263.98
CBS300	305mm/12"	165mm	115mm	£398.00	£477.60
CBS350	340mm/14"	225mm	160mm	£498.00	£597.60

Clarke ROUTERS
BOSCH **NEW**

• Powerful heavy duty machines ideal for trade and DIY use

CR4
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• Stands come complete with bolt mountings and feet anchor holes

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STANDS FROM ONLY **£47.98** INC.VAT

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MODEL	DUTY	WHEEL DIA.	EXC.VAT	INC.VAT
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CBG6RSC	HD	150mm	£54.99	£66.99
CBG6SB*	PRO	150mm	£56.99	£68.39
CBG6RWC	HD	150mm	£59.98	£71.98
CBG6W*	wet	HD 150/200mm	£58.99	£70.79

Clarke STATIC PHASE CONVERTERS

• Run big 3 phase woodworking machines from 1 phase supply
• Variable output power to match HP of motor to be run

PC60
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CONVERT 230V 1PH TO 400V 3PH

MODEL	MAX. MOTOR HP	FUSE	EXC.VAT	INC.VAT
PC20	2HP	10Amps	£229.00	£274.00
PC40	3.5HP	20Amps	£269.00	£322.80
PC60	5.5HP	32Amps	£319.00	£382.80

Clarke 12" DOVETAIL JIG

• Simple, easy to set up & use for producing a variety of joints • Cuts work pieces with a thickness of 8-32mm • Includes a 1/2" comb template guide & holes for bench mounting

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Clarke ROUTER TABLE
CRT-1

Router not included

CR4
FROM ONLY **£69.98** EXC.VAT
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• Converts your router into a stationary router table • Suitable for most routers (up to 155mm dia. Base plate)

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Making a king size bed

Morgan Peyrot uses solid construction techniques and Japanese detailing to make a bed fit for a king



Made of solid oak and ash, this king size bed measures 1,800 x 2,000mm. The entire structure was designed with mortise and tenon joints without any metal fastenings. For a special decorative effect, the headboard and footboard panels were covered with semi-transparent Japanese Shoji paper. The lines are simple and clean and in order to give the structure a less squared and more undulating appearance, the upper crosspieces of the headboard and footboard have been shaped to create a slight curvature. In order to avoid noxious fumes (important as this will, of course, be slept on), only two coats of oil were used after the wood was sanded.

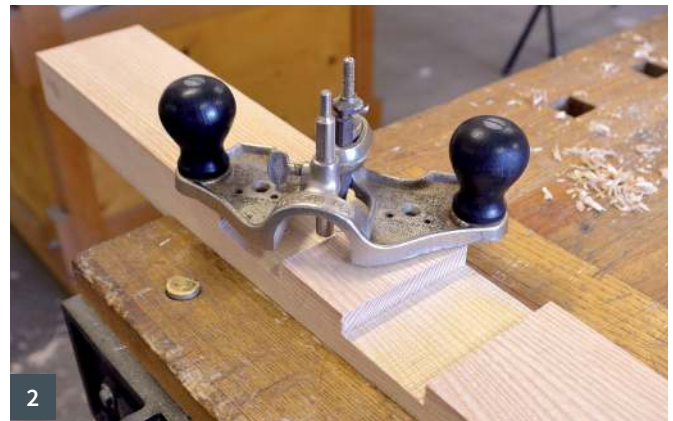
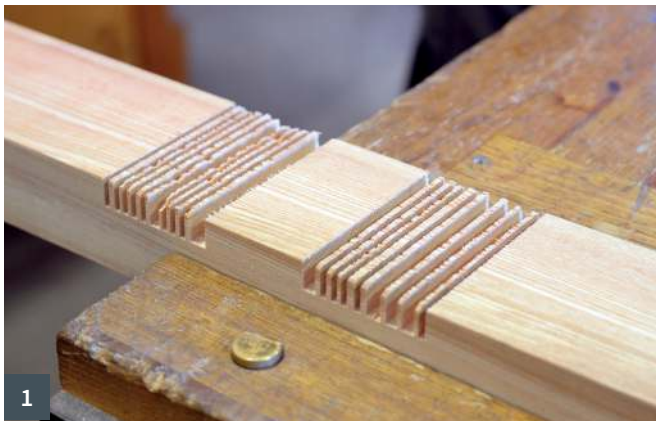
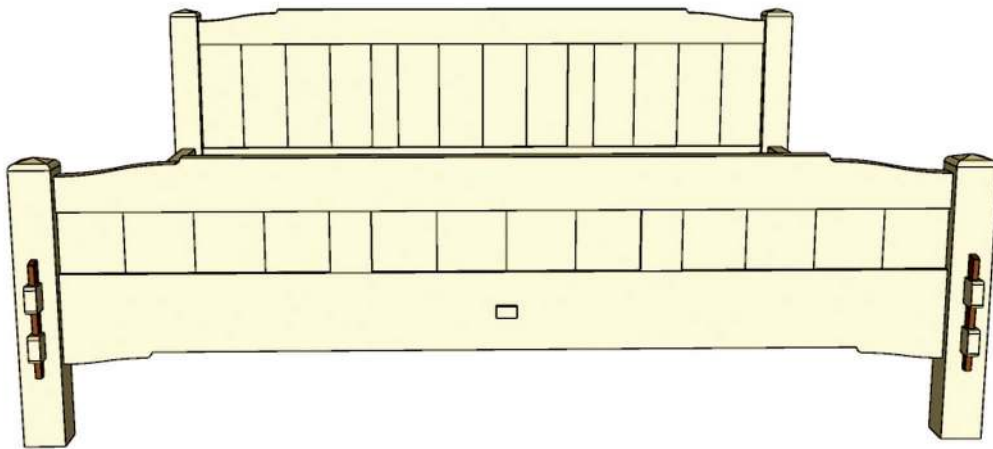
THE STARTING POINT

Making a piece of furniture for yourself is always an opportunity to experiment, sometimes with unexpected results. I always end up changing some elements as I work – often the finished item is very different from the original

idea. But the beauty is just this, not being bound by the needs of the customer and being able to let your imagination wander. In this case, my initial idea was to make a headboard and footboard out of wooden boards, but I later decided to have a single panel in birch plywood covered with shoji paper to reveal the delicate veining below. You may notice other differences between the design and the finished product.

CONSTRUCTION METHOD

The overall design of this bed is rather simple, so I want to focus on some aspects of the joints, the strategies to reduce working time and the techniques adopted. These are the result of using both manual and power tools. This allows you to have the best of both ways of working – the speed of execution with machinery and customisation to add that extra touch, the signature of the craftsman, that you can only get with traditional tools.



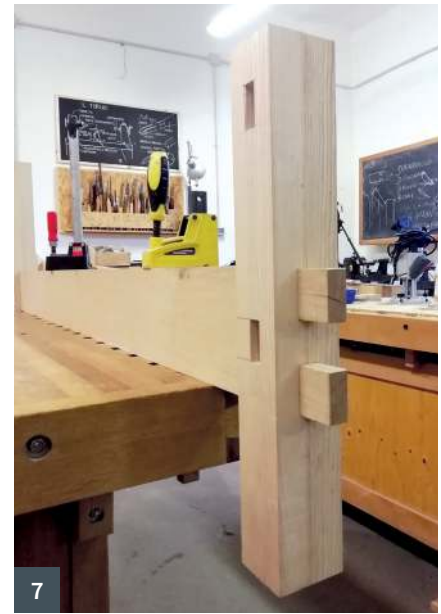
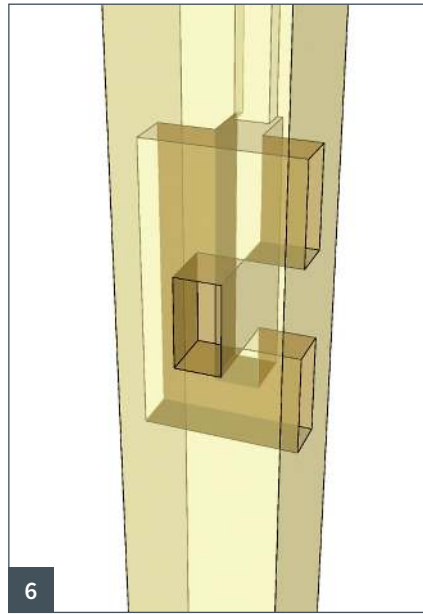
PHOTOGRAPHS BY MORGAN PERROT

1 Given the considerable size of the legs, it was much easier to make the joints while they were still in two halves and then reassembling **2** In this way it was possible to make half mortises by roughing with the circular saw and then finishing with a chisel and router plane **3** The heads of the uprights are machined as a four-way bevelled shape. It is important to get the leg lengths to match in pairs, by using an end stop on the saw table **4** When the legs are glued together inevitably the mortises won't quite line up so a small amount of paring with a chisel will probably be needed. After assembly it is necessary to remove a part of the bridge that remains between the two mortises for a depth not less than 20mm. This will then create a continuous recess, which will accept a twin tenon

LEG MORTISE JOINTS

Let's start with the four legs. The joints are designed so the ends of the tenons project. This is a strategy that breaks up the impressive volume of the uprights without weakening them excessively. The legs are 90 x 90mm square sections in ash, each made from two pieces of 45 x 90mm glued together. Before assembling each leg from these paired

components, the joints were made on each half leg, first using a mitre saw in trenching mode and then using a router plane to clean up the half-mortises, which are designed to accommodate the double tenons of the two long bed side beams. Once each leg was glued back together, the mitre saw was used to bevel the leg tops.



5 It's best to use a Forstner drill bit and a pillar drill with a chisel and mallet to finish the joint **6** If it is true that the idea and the aesthetic content can be worked out with the initial design... **7** ... it is equally true that a careful design of the joints is rarely obvious in the completed project. In a complex project like this, having a precise design is very helpful **8** Hand trimming was limited to the joint corners wherever the two machine cuts did not meet perfectly **9** Note the tenon shoulder covers any defects on the exposed face of the mortise

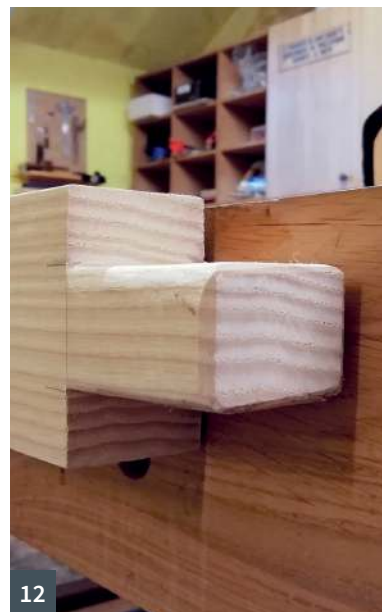
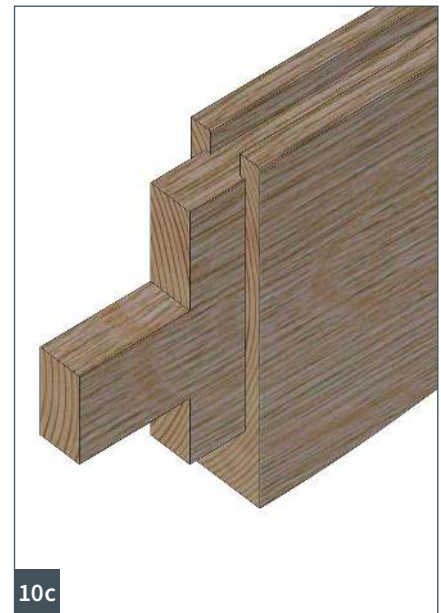
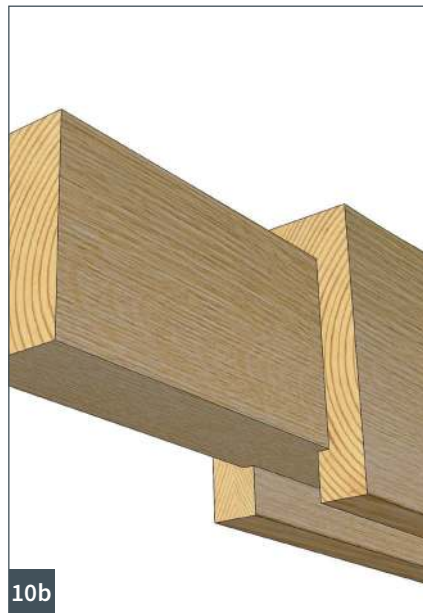
CROSS RAIL JOINTS

The mortises for the lower tenons in the short cross rails obviously need to fit in between the twin tenons of the side rails. This explains the need for a double tenon, which, like a fork, houses the single tenon in between. The choice of the double tenon for the side transoms is deliberate because they undergo the greatest stresses due to the levering effect caused by the greater component length. The single mortises have been made in the already assembled legs, using a pillar drill and Forstner bit and squared out using a chisel and mallet. The marking out is done from one leg to the other using an accurate square and a mortise gauge. The same methods are used for both the head and footboard mortises.

MAKING THE TENONS

Cutting out the tenons (four doubles and four singles) was much faster as this could be done entirely by machine. The long cuts were made on the bandsaw and a router table and the tenoning cutter was used to machine the shoulders. A chisel was used to clean up the shoulder line by hand.

To reinforce the joint strength with the leg, the double tenon is continuous between the tenons, a tongue that prevents any torsion movements.



10 Inside the head and footboard, there are recesses that house the closing panels. They run in the centre of the pieces but, as these are different widths, whatever tool is used must be calibrated in the passage from uprights to crossbars **11** The internal crossbars were fitted using mortise and tenons. A template was used to create the mortises in the long sides **12** The tenons are rounded on the edges with a chisel, to match the shape of the mortises created by the cutter **13** The dry pre-assembly. Note the three supporting crosspieces for a lightweight frame with close divisions that will take the actual mattress, the grooves that houses the head and footboard panels, which is a substantial variation from the initial design

THE HEADBOARD AND FOOTBOARD PANELLING

In the original design, the head and footboards were going to be made in solid wood, however, after a first trial assembly I realised this would be too heavy. Instead of the thick wooden panels I used the existing slot for the insertion of 10mm birch plywood panels covered in Japanese paper. The slots had been machined using a router table with a straight cutter fitted in the router. Stopped slots had also been made in the legs so the plywood had to be sized to fit into slots all round. The fence setting was adjusted to ensure the slots were on the centreline of the legs and a 'drop on-lift off' machining technique used.

INTERNAL CROSSBARS

The last pieces to be made were the support crossbars for the slatted frame. They are lower than the height of the bed side rails so that the mattress, once inserted, is sitting on a slatted frame 30–50mm thick, there should be a recess of several centimetres depth to hold the mattress in position. The crossbars are fitted by using tenons passing through the bed side rails. In addition to making a stable assembly, this creates a visual pattern that reflects the head design of the leg tenons. To make the mortises, a router template was used to work with an electric router and guide bush.



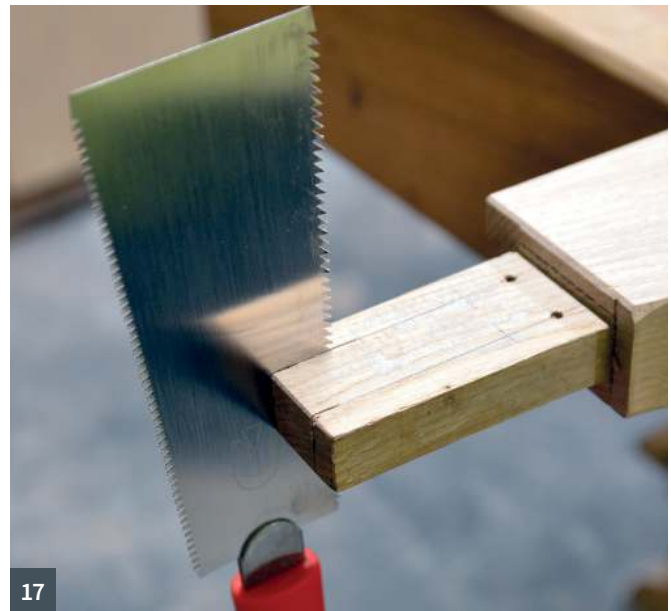
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14 These two products are a winning combination for every full-bodied but satin finish. The abrasive creates a uniform surface eliminating flaws while the oil warms the wood and highlights the texture **15** The tenons, which cannot be glued, are forced into their seat by the insertion of wedges **16** The wedges need to be the same size and shape before fitting and trimming off **17** The kerfs for the wedges could cause the outer sections of a tenon to break off. Avoid this by drilling holes at the inner end of each kerf which will stop any splits 'running'

SANDING AND OIL FINISHING

Before final assembly every single component was scraped and then sanded to a fine finish. Small 45° bevels were made with a hand plane, so all the components will feel comfortable once the bed is assembled. For the finishing, organic boiled linseed oil was thinned slightly with turps substitute to help it penetrate the grain. The oil was applied with a medium-grain Scotch-Brite sponge to equalise the overall finish. The result is a perfectly satin surface, thanks also to the fine sanding dust that partially closes the pores and is fixed in place by the oil.

WEDGED ASSEMBLY

As mentioned at the start of this article, the only key requirement for

this work was the absence of any metal parts. So, in order to be able to transport it disassembled from the laboratory and be able to assemble it in its final destination, I chose a traditional joint fixing system. Each tenon has a pair of kerfs or cuts for the insertion of wedges to spread the tenons. Once the bed was assembled, the wedges were tapped into place until perfectly tight joints were obtained. Potentially, even with some difficulty, it should be possible to dismantle the bed by easing or drilling out the wedges, in case of moving house.

The finished bed is very impressive indeed! Please note this design can be altered to suit smaller standard UK bed sizes visit:

www.bedfed.org.uk/consumers/bed-hub/bed-sizes-uk-bed-and-mattress-size-guide/ for overall mattress size information.

Making Shoji Panels

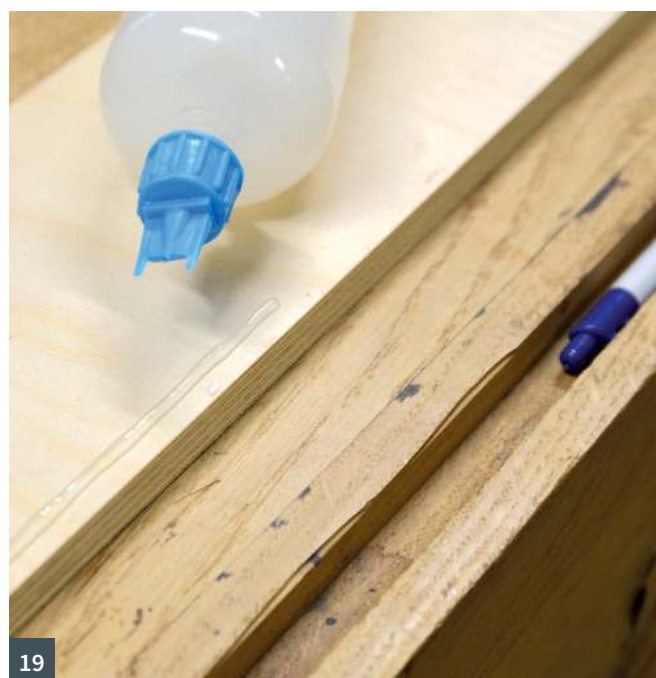


18 Precision is needed when working with Shoji paper

The use of the Shoji paper cover for the headboard and footboard panels required precision and a good dose of delicacy, because being milky white it is easily subject to marking and stains. Shoji paper is a resistant and translucent product made of wood fibres. The type used in this work is available both in A4 sample sheets and 7.2 metres long and 940mm in height.

The application is not particularly difficult but requires some precautions. The surface of the wood must be dry and clean, free of paint or dust. The glue to be used is solvent-free and transparent. It is purchased together with the paper and comes in a bottle with a special dispenser, which allows precise application in the right quantity. Once the perimeter of the panel is dabbed with glue, proceed with the laying of the covering. The paper must be unrolled and pressed down with the palm of the hand (make sure your hand is perfectly clean and dry), starting from the centre until it is all perfectly flat. When the glue is dry, preferably after leaving overnight, the paper should be moistened with water using a spray dispenser. In this way it will dry flat and the gluing lines will be invisible.

For those wishing to use this material on an oil-finished piece of furniture, as in this case, I advise you to let the finishing product dry perfectly first. Otherwise the card may absorb it slowly and show the problem even several days after the final assembly.

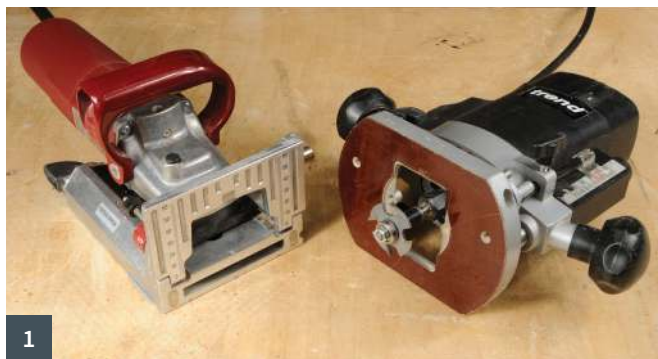


19 The glue used must be solvent-free and transparent

BISCUIT JOINTING WITH THE ROUTER

Anthony Bailey explains how to make biscuit joints without a specialist jointer

Many woodworkers now use biscuit jointers, however, if you want to minimise your outlay and already own a router, or need to form biscuit joints in awkward locations, why not try using a biscuit jointing cutter set fitted to your router?



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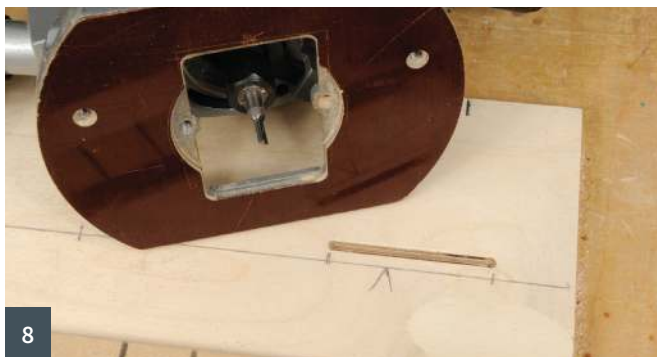
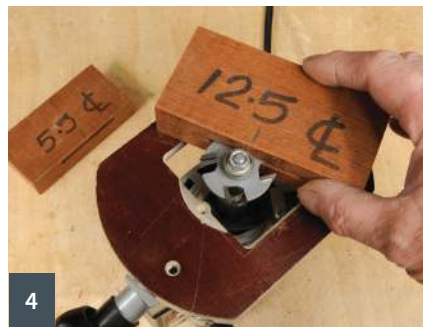
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1 The biscuit jointer versus the router... a more even contest than you might imagine **2** Only a router biscuit cutter will do for biscuits in tight corners

1 For anyone not familiar with biscuit jointing, it is normally done with a dedicated biscuit jointing machine. This creates a 4mm slot of a depth that can be easily changed to suit one of three standard sizes of 0, 10 and 20 biscuits. The speed and ease of jointing has to be seen to be believed – it also allows a degree of sideways adjustment, which is useful. The biscuits are formed from compressed beechwood cut at an angle for maximum joint strength, and with a hatched grip pattern that holds the joint tight as the glue in the joint swells the biscuits. The biscuit jointer, with its flat front face and fence, works well in most circumstances but if you already own a router then you can

simply buy a biscuit jointer cutter set at a fairly low price.

2 There are other reasons to do biscuit jointing using the router. Since a standard jointer can only work on flat surfaces, any attempt to do the same thing on a shaped edge will fail as the blade may not even touch the surface, let alone make a slot. A typical example would be a postform kitchen worktop joint, held together by special worktop bolts fitted into routed recesses underneath. Biscuits are the perfect way to keep the two surfaces flush but the dogleg shape of the joint created will prevent a jointer from doing the frontmost slot. Using a router and biscuit jointing cutter overcomes this problem.



PHOTOGRAPHS BY GMC/ANTHONY BAILEY

3 The cutter set with the different biscuit sizes and their respective bearings **4** A set of templates to give the correct cutter plunge depth **5** Using a registration stick to mark out the length of the biscuit cut **6** The cutter slides in sideways and you move the router along the correct width **7** A dry fit will check for flush faces and that the joint will close properly **8** To form T-joints, you will need to use a straight cutter with light cutting passes **9** Here's a section through the different biscuit joints. The jointer (left) produces the best result, followed by the cutter set, and then the straight cutter (right)

- 3** The typical cutter set can be on any standard shank size but a 1/4in fitting is probably best, as you can use a small lightweight router. The cutter is either fixed or removable – in the latter type you must ensure the cutter is fitted the right way round for the motor rotation. There will be three bearings: the largest being for size '0', the next one for '10' and the smallest for '20' biscuits. An Allen screw and washer or nut are used to keep the bearing and cutter in place.
- 4** To set up your cutter, choose and fit the appropriate bearing and check the cutter can plunge through the machine base. Plunge to the correct depth with power off, which should normally be to half the thickness of the board to be jointed. You can verify this by doing a test cut.
- 5** Normally with a biscuit jointer, you would just place a strike mark across both boards to be joined and this would be the centre mark for the slot. However, this time, you need two outside marks where the slot should start and stop. You need to experiment to get a slot deep and wide enough – this will vary according to what biscuit size you are using. The best solution is to make a registration stick to suit each biscuit size and use it to mark out each biscuit position.
- 6** Make sure the depth rod is locked tight and the router plunged and

also locked tight. Plug in and sit the router base on the workpiece just enough to support, but so the cutter cannot contact it. Switch on and slide the router into the job sideways and start to cut from the first mark, and stop at the second. Pull the router out sideways. **DO NOT UNPLUNGE!**

- 7** Machine the other half and do a dry fit with a biscuit to check for fit. Repeat for your other joints.
- 8** Such a cutter set is fine for edge-to-edge joints, but cannot do T-joints such as shelves in a carcass where the cutter needs to be well away from the edge of the workpiece. In this case, you can use a 4mm straight cutter to make the slots using a guide rail, or T-square to guide the router. There is more strain on the cutter so do it in a couple of passes.
- 9** This cut through shows how a biscuit fits in each type of slot. From left to right: biscuit jointer, router biscuit cutter and 4mm straight cutter. The last two leave bigger glue pockets and the last doesn't give a lot of strength, so ensure the glue has plenty of time to dry. Polyurethane (PU) glue has the advantage of gap filling but good clamping is required.

Oriental nightstand

Mitch Peacock creates a bedside table in an East Asian style

After repeatedly pushing the TV remote off the far side of the bedside table it was time to revisit the design of these useful pieces of furniture. The upturned edges of Oriental temple roofs have always fascinated me, as has the simple open framework and fretwork used as decoration, and here was a chance to combine these to make a better nightstand. My design solves the TV remote problem by incorporating upturned edges to the table top. For visual interest, the legs are curve tapered, and the main aprons are pierced.

TIMBER SELECTION

I knew that I wanted to stain the nightstand quite significantly, so in terms of timber I was looking for ease of working, availability and cost, rather than natural colour and figure. Some experiments with colouring both dark and light red meranti confirmed that this would be suitable. The curve tapered legs, the front ones of which have a top bead or astragal, are more easily shaped in the light red meranti, whereas the the aprons' crisp piercings and joinery will be better using the

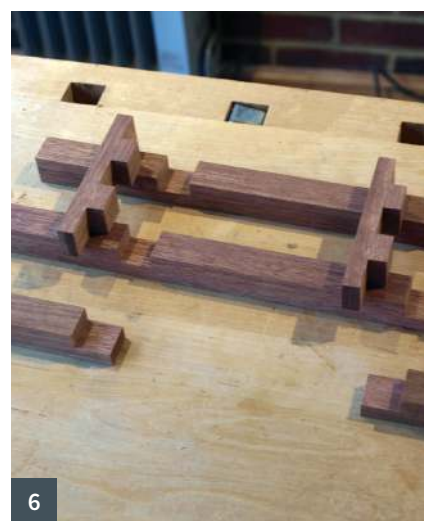
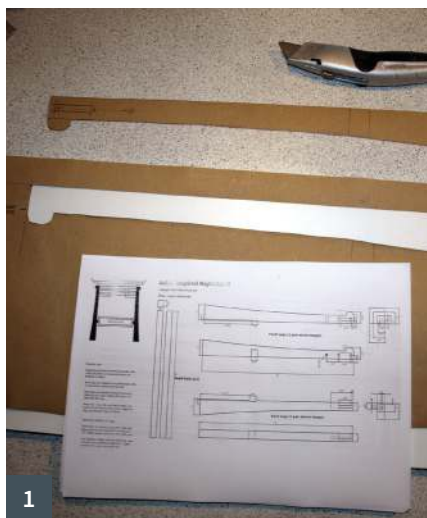
dark red. The table top could easily be made from either, but using the light red will keep the weight down. Because the light red meranti is quite open grained, the finishing will benefit from grain filling.

The drawer was made from dark red meranti with a plywood bottom, and its box, which also serves as a shelf, was made from veneered chipboard with solid nosing.

INITIAL PREPARATION

All the component parts were rough cut slightly oversized, and left to acclimate indoors for about a month. Mostly they didn't move significantly, although two of the aprons bowed so much that I had to stray a little from the planed profiles – always check that variations from a plan won't adversely affect the build later on!





PHOTOGRAPHS BY MITCH PEACOCK

LEGS

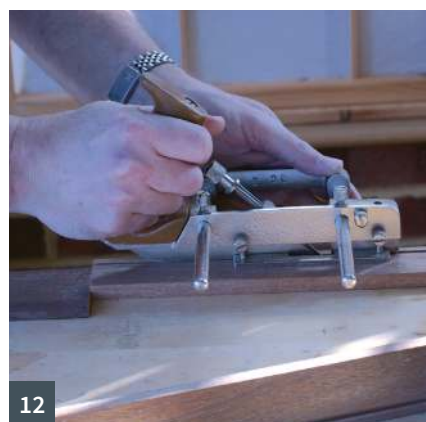
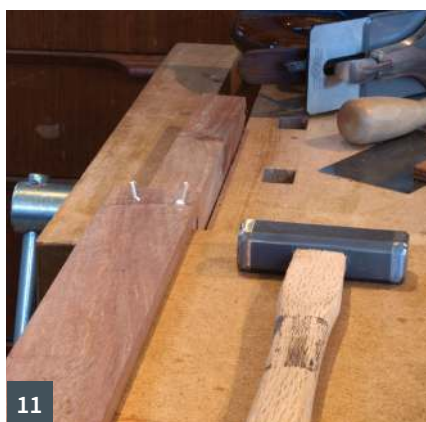
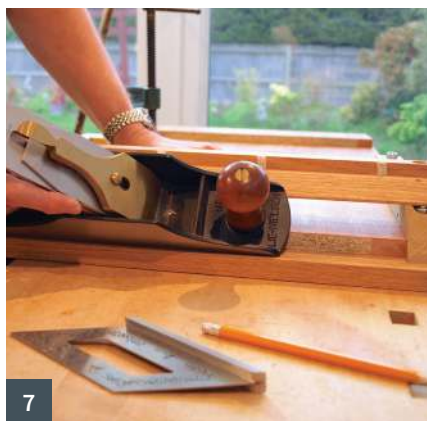
- 1 I made a template for the curved taper legs, including details of all the joinery too. This made tracing out the shape easy and accurate to repeat over all four legs. The rear legs only received the taper in their width, and although my plan omitted the top bead I included it at this stage – it would be a simple job to remove it later if desired. The roughed leg blanks were squared up at the bench with a No.5 bench plane, which I find much easier on the ears than a powered jointer, before tracing on the outlines using the template. The joint details were transferred and marked in with knife and mortise gauge, ready to prepare. Cutting the joinery on the squared leg blanks is easier to do after the legs are shaped; something I learnt the hard way when starting out in woodworking.
- 2 I chopped the mortises for the side and back aprons, and bored dowel holes for the front apron. Dowelled joints need care as holes bored off plumb will likely make them impossible to close up tight and square. To that end I used a drill press here, but could have used a dowelling jig, plunge router or improvised guide.
- 3 The legs also received dados for the drawer box rails; these were sawn and pared, then finished to consistent depth with a router plane. With the joinery complete, I took the blanks to the bandsaw. The back legs were easy to cut, with the shaping only in the one plane, but the front legs required cutting in two passes, re-attaching

the waste that was initially cut off to provide a good base contact against the saw table.

- 4 Final shaping of the curved tapers and beads was done with a spokeshave, rasp, file and card scraper, with the need for minimal sanding to achieve a flowing, smooth finish.

APRONS

- 5 The rear apron was simplicity itself, with two stub tenons sawn and fitted to their respective mortises. The side rails were first shaped by clamping together, top to top, and boring the semi-circular cutouts with a large Forstner bit at the drill press. The rectangular cutouts were jig sawn after boring access holes, and then pared to the layout lines left by the mortise gauge. Stub tenons were sawn and fitted to the leg mortises, and the rear apron tenons recessed to allow them to pass each other.
- 6 The front apron was built up from six pieces, using half-lap joints. These were all prepared by hand, and the assembly glued together before boring for dowels in the two ends. In this instance I used a shop-made dowelling guide to ensure plumb holes, after marking for them with dowel pops – although the centres are marked on the plans, any slight discrepancies in boring the holes in the legs or assembling the front apron could throw these locations out, resulting in a joint that doesn't want to go together easily.



DRAWER BOX

- 7** The drawer box sides were all sawn to size before the corner mitres were prepared. Most of the waste was sawn away, and a mitre shooting board used to perfect the joining edges.
- 8** Biscuits were chosen to join the corners, and a simple jig was assembled to make the cutting of the slots safer and more accurate than free-handing the biscuit jointer with its small fence at 45°.
- 9** After the box was glued up, dados for the drawer box rails were sawn and then cleaned to depth and width, using the router and side rebate planes. The rails themselves are simple squared batons, prepared with the hand plane for an accurate fit to the dados.

DRAWER

- 10** Half-blind dovetails connect the sides to the drawer front, and these were prepared by hand. There are a lot of dovetail jigs on the market

that make this sort of joint a breeze, but they also have limitations on the pin widths. To mark these hand-cut joints out from the machine-cut ones, I designed the layout to have a 'skinny' pin on centre.

- 11** The drawer back is set into dados in the sides, and held in place by 'dovetailed' wooden pins. I love the simplicity of this joint, which can be prepared very quickly with minimal tools.
- 12** The base slots into grooves ploughed into the drawer front and sides, and is secured by a screw, through a slotted hole, up into the drawer back. The drawer front and sides were all prepared to a snug fit in the drawer box before the joints were cut.
- 13** The resulting drawer is virtually impossible to insert, but after some clean-up shavings are taken it begins to go, and careful planing can then achieve a perfect fit.
- 14** A simple drawer pull was sawn and planed to shape from holly, and attached from inside with two round head brass screws.



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TABLE TOP

- 15** After flattening and jointing the boards for the table top, they were glued up into a panel, taking care to keep it as flat as possible. Once dried, any out-of-flat was easily planed away. The 'wings' on each side are essentially breadboard ends. Their profile makes attachment a little more tricky, since deep mortises would burst out through the edges, and so stubby tenons fit into shallow mortises. To allow for seasonal movement, only the front tenon was glued, with the remainder being pinned in position. In standard breadboard ends, draw-boring is often used, but here the height of the tenons means that there isn't sufficient strength present to attempt that. Instead, the joint was prepared so that it pulled up nice and tight, and straight holes were bored for the hardwood pins. The holes in the tenons were elongated across the grain, sufficient to allow for any expected movement (2mm each side of centre). For a cleaner table top, these pins were held just short of piercing through the wings.
- 16** Shaping of the wings was done in two stages. Before attaching to the main top, the internal profile was prepared. A series of steps, matching the profile, were run with a rebate plane, and then smoothed out with a round plane and shaped card scraper, leaving the transition to the main top slightly high.
- 17** Then after the wings were attached to the top, the outside profile

was shaped with a jack plane and smoothed with a card scraper, and the internal transition flushed to the main top.

COLOURING AND PRE-FINISHING

- 18** With the contrasting colours I wanted to use, it was essential to complete this prior to assembly, to prevent the colours bleeding into each other. I also appreciate the simplicity of applying the finish prior to assembly: improved access for finish, and easier removal of glue squeeze-out. The dark colour was achieved in three phases, each one simple and each one adding a little to the colour depth. Firstly the parts were fumed with ammonia, using zip-lock bags to contain the fumes, which are unpleasant to inhale. Next, a shop-prepared stain, made by dissolving a ball of 0000 steel wool in white vinegar, is wiped over and allowed to dry. Finally, a commercial ebony stain is applied. The red colour was built up from the natural red in the meranti. First a grain filler was mixed with a Peruvian mahogany stain, and then applied to the porous light red meranti. Excess was removed with a rough cloth before it set completely (inevitably some excess was left, and this was scraped off before continuing). Finally, two coats of the same stain were applied. All the parts received a light sanding before and during the build-up of the lacquer finish.



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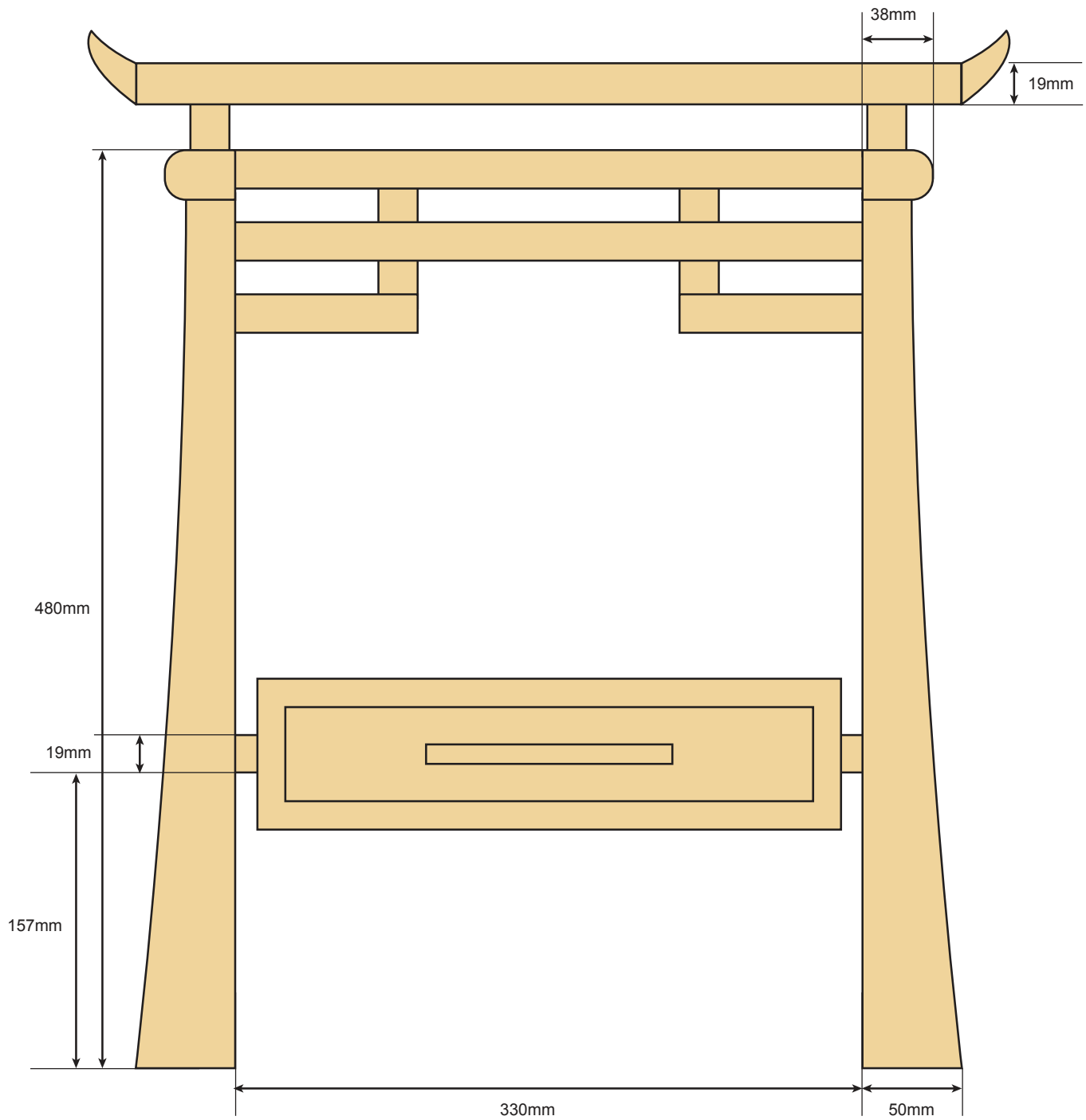
ASSEMBLY

- 19** Dry assembly of the two side frames allowed a re-bore of the dowel holes that intersect the side rail tenons. Holes for screw reinforcement of the shelf box, through shelf rails, to the leg dados were then bored. Through holes in the shelf box and shelf rails, and pilot holes in the legs were also bored. The holes on the inside of the shelfbox were also countersunk, so that the screws lay just below the surface. The side frames were then glued and clamped, checking for square, and allowed to cure. The whole frame assembly was then glued up, and the reinforcing screws installed from inside the shelf box.
- 20** A single pair of clamps across the top of the legs at the front and back were all that was required while the glue cured.
- 21** There are a few options for attaching a table top, and I decided

to use buttons. These were simply sawn and bored from prepared stock, and installed, with the top upside down, and the base inverted and centred on top. With everything assembled, the drawer was inserted to the desired closed position, in this case flush, and two drawer stops glued behind the rear of the drawer sides, in the back of the drawer box. It's unlikely that the drawer will ever move so much as to require the stops to be moved, but fashions do change, so I included some adjustment within these stops, allowing the drawer to be stopped anywhere from a little proud to a little recessed within the box.

IN CONCLUSION

Success – the TV remote has yet to spill over the edge. Problem is, I now need to make one for my wife's side of the bed!



If you would like to make this project for yourself you will need the full set of drawings.
Just email us and we will send you PDFs of Mitch Peacock's drawings: wwceditorial@thegmcgroup.com



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Turned pestle and mortar

Perfect for the budding cookery connoisseur, Steven Russell turns this matching pestle and mortar from two types of olivewood



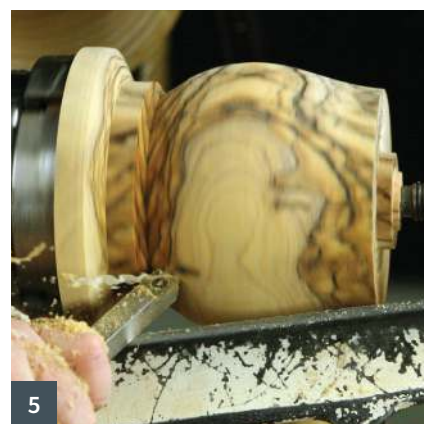
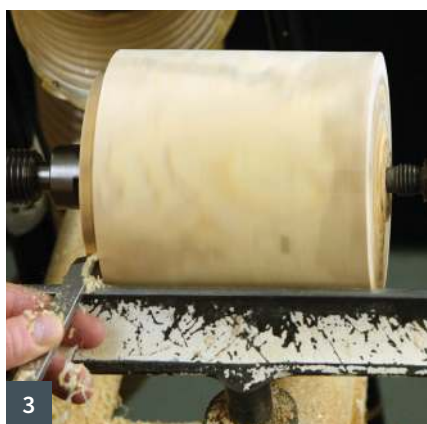
Wooden mortar and pestle grinders are used for grinding and blending dry materials like spices, sea salts, etc. The best hardwood timbers to use are those with very dense and tight grain like olivewood, hard maple and similar timbers. Avoid any timbers in the rosewood family, or other timbers that have extractives that might alter the flavour of the spices when crushed. The wood used for mortar and pestle grinders should be well seasoned. Do not use green wood as checking may develop as the wood continues to dry. Cracks in the bowl will allow spices to accumulate in the cracks and will make cleaning much more difficult.

Exposure to elements like light, oxygen and moisture can rapidly cause ground spices to lose their robust flavour. So, if you want the best flavour from your spices, you need to freshly grind them as needed. Mortar and pestle grinders are also great for mixing custom sea salt blends, preparing infused breadcrumbs and many other uses around the kitchen.

For this project, I used the Ci1 Easy Rougher and the Ci0 Easy Finisher carbide-tipped woodturning tools from Easy Wood Tools (www.easywoodtools.com). Fine bead details were added using the Ci2 Mini Easy Rougher. If you do not have these tools, you can use a round-nosed scraper or a French-curve scraper.

YOU WILL NEED

- 60 x 180mm Bethlehem olivewood blank
- 75 x 75 x 305mm Sicilian olivewood blank
- 12mm skew chisel
- 5mm micro spindle gouge
- Ci0 Easy Finisher
- Ci0 Easy Rougher
- Ci2 Easy Rougher
- Ci3 Easy Finisher
- Thin parting tool
- 10mm spindle gouge



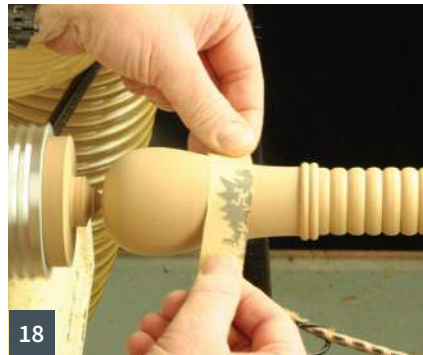
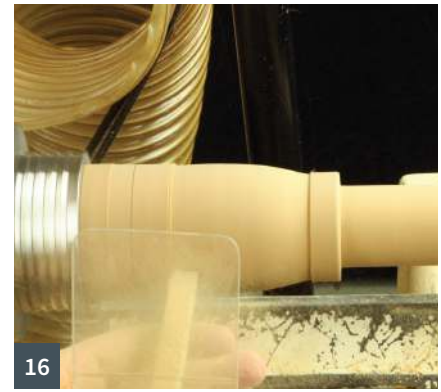
- 1 The Bethlehem olivewood mortar blank needs to measure 160mm in diameter and 180mm tall. The Sicilian olivewood pestle blank should measure 75 x 75 x 305mm.
- 2 To round over the blank, mount between centres using a four-prong drive spur in the headstock. Lathe revs should be set to 500rpm. Set the Ci1 Easy Rougher's (or spindle roughing gouge) square shank flat on the toolrest, with the crowned cutter head directly on centre line. This tool will make short work of rounding over, leaving a very smooth surface as well.
- 3 Once the blank is rounded over, turn a dovetail on the bottom of the blank to fit your scroll chuck using a 12mm skew chisel.
- 4 Using the Ci1 Rougher, or spindle roughing gouge, you can easily and quickly rough to shape the gross exterior profile, with lathe revs set to 750rpm.
- 5 Add an elegant flowing curve using the Ci1 Rougher or spindle gouge. Block the foot and primary bead in as well at this time.
- 6 Continue the primary rounding over of the bead with the Ci1 Rougher, or equivalent tool. To complete the gullet and transitional areas around the primary bead, use a 12mm skew chisel ground with a classic Raffan radius edge.
- 7 The outer profile is now complete and ready for interior hollowing. The ultra smooth surface you have created means that little sanding is necessary to prepare the exterior for finishing.



- 8** Do the initial hollowing of the interior crushing bowl with the Ci1 Rougher, or equivalent, with lathe speeds at 750rpm. The slight angle on the crowned cutter head presents the corner edge of the tool to the wood and greatly reduces the possibility of chattering. Continue removing the bulk of the interior end-grain. To smooth and shape the interior sidewalls, use the left-side cutter face and sweep the tool back towards the rim.
- 9** When making a mortar and pestle, you need to ensure that the interior curve of the mortar matches the pestle's outside curve for efficient crushing of your spices. To guarantee complementary curves, use a pre-drawn paper template to measure the bowl depth and the overall shape of the initial curve. Final turning of the interior curve will be completed after sanding the exterior.
- 10** Since this is intended to be a functional project, you only need to

lightly sand this project with 240, 320 and 400 grit abrasive papers. Once the exterior has been sanded, complete the bottom of the interior curve using the Ci0 Easy Finisher, or equivalent tool.

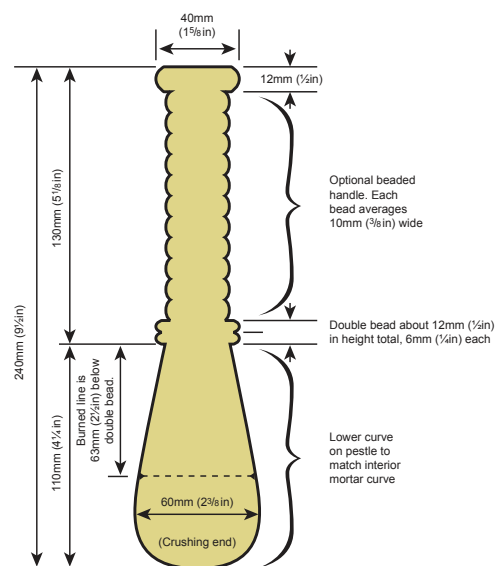
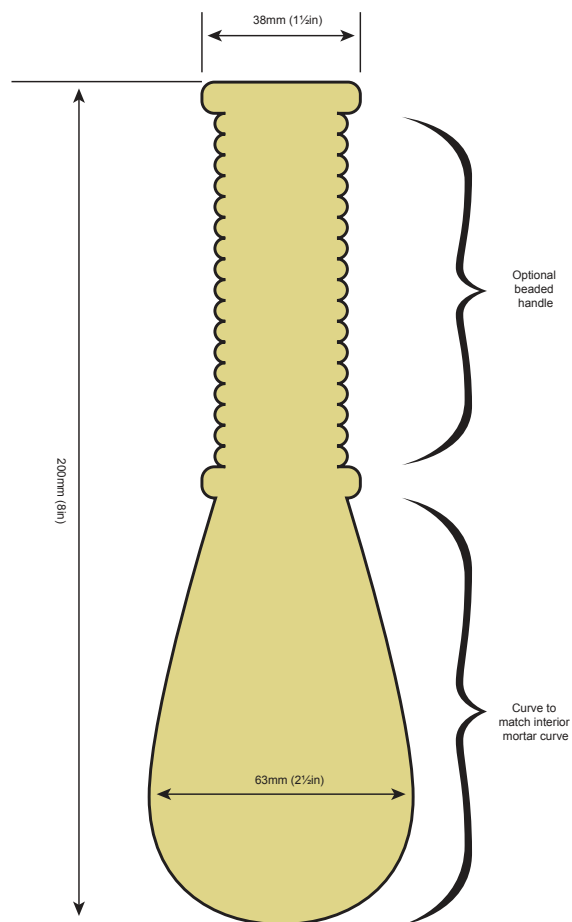
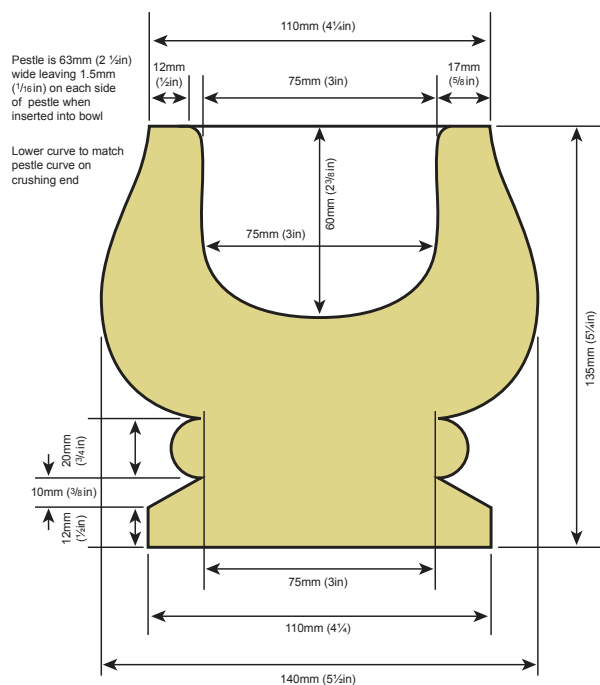
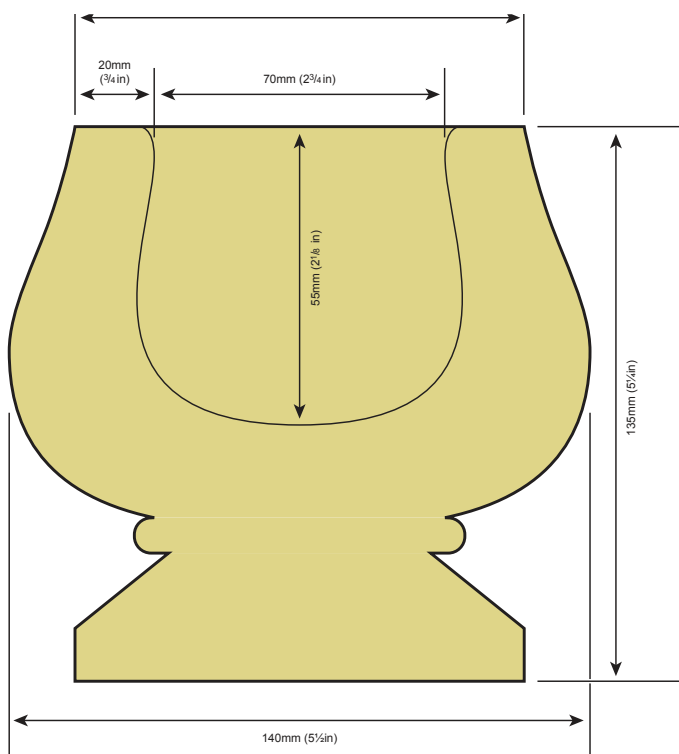
- 11** To add a bit of protection to the exterior, apply a cellulose sanding sealer to the exterior of the mortar only and friction dry it on the lathe with kitchen paper. I prefer to leave the interior of the bowl unfinished. After the cellulose sealer has been friction dried, add a top coat of Renaissance wax for extra protection.
- 12** To part the project off the fixing for reverse turning the foot, use a thin parting tool.
- 13** To complete the foot, turn a simple jam chuck from scrap wood with a boss turned to fit the inside of the mortar bowl. The mortar is then reverse mounted against the jam chuck boss, using the tailstock ram.



- 14** Final turning of the foot is performed using the Ci1 Rougher, or equivalent, and a 10mm spindle gouge ground with an Irish swept-back grind. The small nub left by the tailstock is removed with a carving gouge and then sanded with a 25mm hook-and-loop faced sanding mandrel to 400 grit. To round over the pestle blank, simply mount it into your scroll chuck using your chuck jaws. Turn a tenon on one end and the blank is then reverse mounted into the chuck for turning.
- 15** Ensure the hand grip on your pestle is properly sized for your hand. If the handle is too small, you will have a difficult time crushing harder spices. Rough turn the area with the Ci1 Rougher tool and make any necessary adjustments to the diameter before turning the rest of the pestle profile.
- 16** Complete the exterior roughing using the Ci1 Rougher, or spindle roughing gouge. To refine the pestle curve, switch to the smaller Ci2 Mini Rougher, or smaller scraper.
- 17** To mark out the beads on your grip, simply turn the Mini Rougher with the square cutter head at 45°. This presents a sharp pointed end to the wood, which easily marks the gullet transitions between each

bead. To finish the bead details, use a 5mm micro spindle gouge and a 12mm skew chisel (to turn the bottom 'V' of the bead gullets).

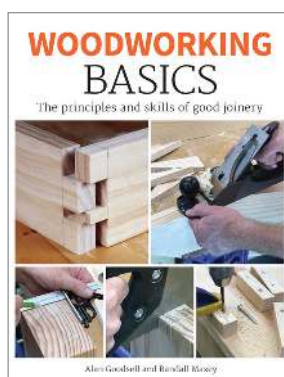
- 18** Once the pestle turning is complete, sand the exterior using 240, 320 and 400 grit abrasives.
- 19** Apply cellulose sanding sealer to the grip area directly above the crushing end of the pestle. The end of the pestle is left unfinished to match the interior of the mortar bowl. After looking at the finished pestle, I changed my mind and decided to add a burned line element near the bottom. This line will add more visual interest to the crushing end of the pestle and will allow you to extend the cellulose sealer below the beaded area on the grip, enhancing the beauty of the olivewood.
- 20** Here is the completed Sicilian olivewood pestle with beaded grip. The only thing left to do is part it off and finish sand the ends.
- 21** To prevent the possibility of any grain tear-out, I opted to use a Japanese pull saw to cut through the tiny nubs on each end of the pestle. Once the pestle is free of the fixing, sand the areas and blend the surfaces using a 25mm hook-and-loop faced sanding mandrel with 240, 320 and 400 grit abrasives



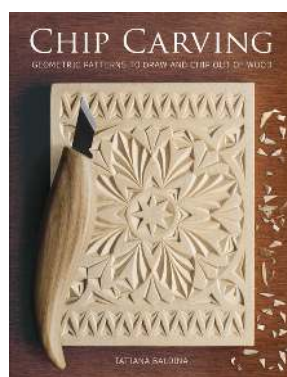
AFTER CARE

To clean the inside bowl of your mortar simply wipe it out with a dry piece of kitchen paper, or a small soft brush. If necessary, you can crush a small amount of sea salt, or dry rice to clean the bottom of the mortar bowl. If the bottom of the mortar bowl or pestle face becomes excessively scarred after years of use, it can be easily sanded back to a smooth and flowing shape with a hook-and-loop faced sanding mandrel and abrasives.

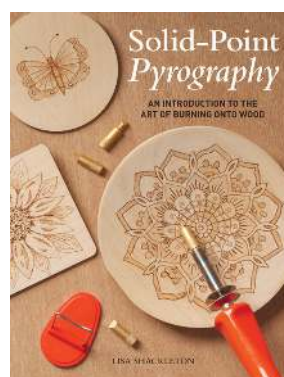
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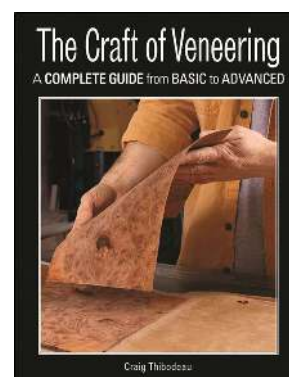
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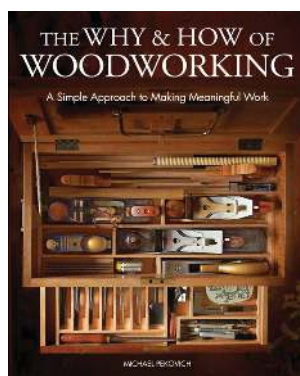
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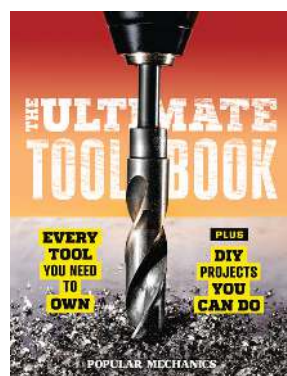
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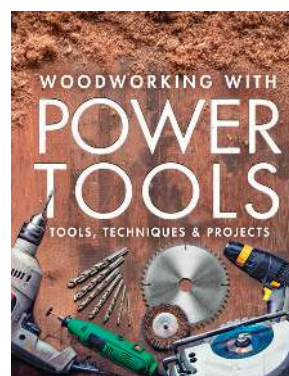
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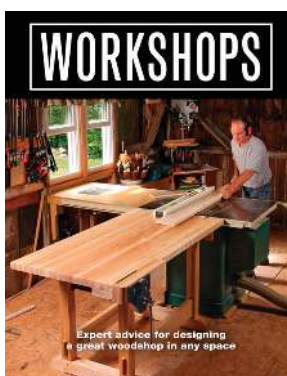
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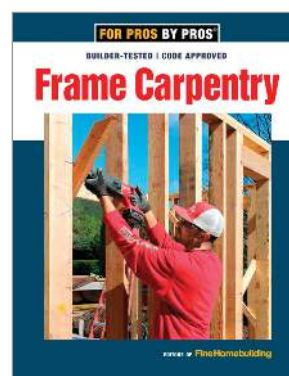
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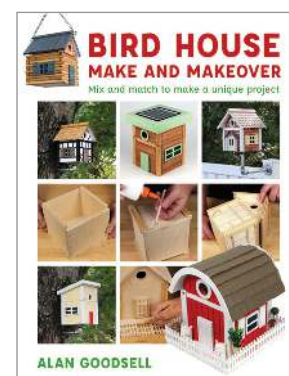
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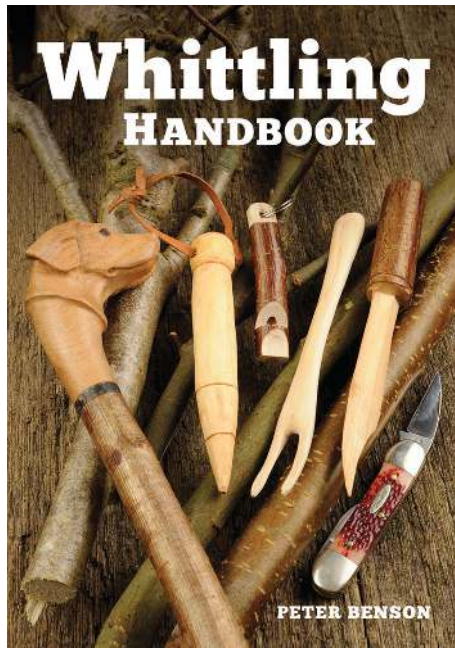


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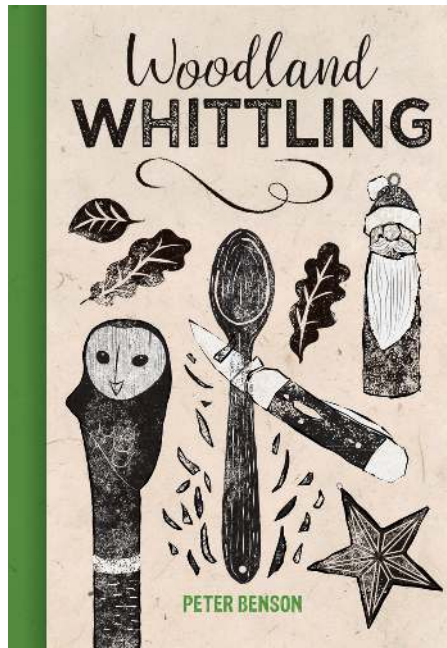


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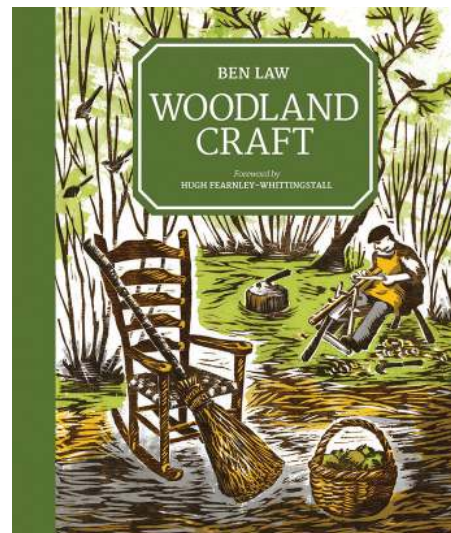
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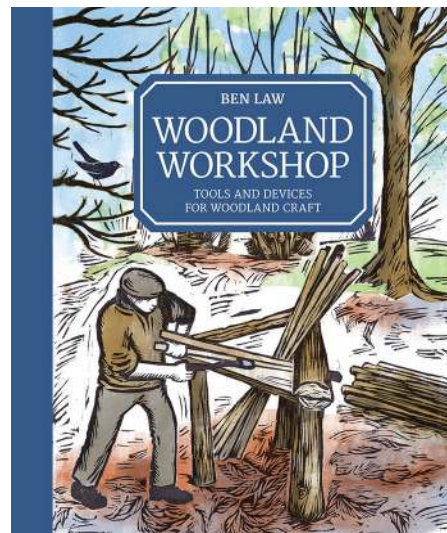
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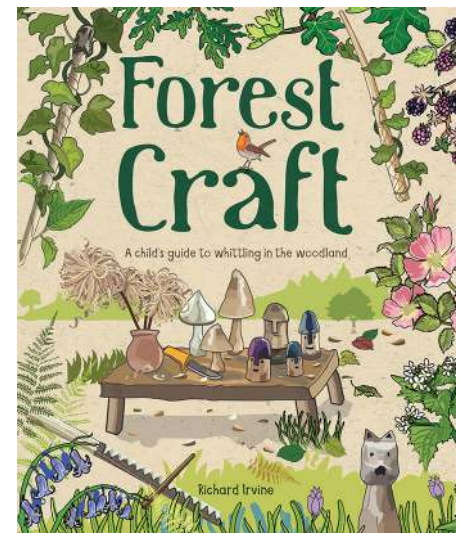
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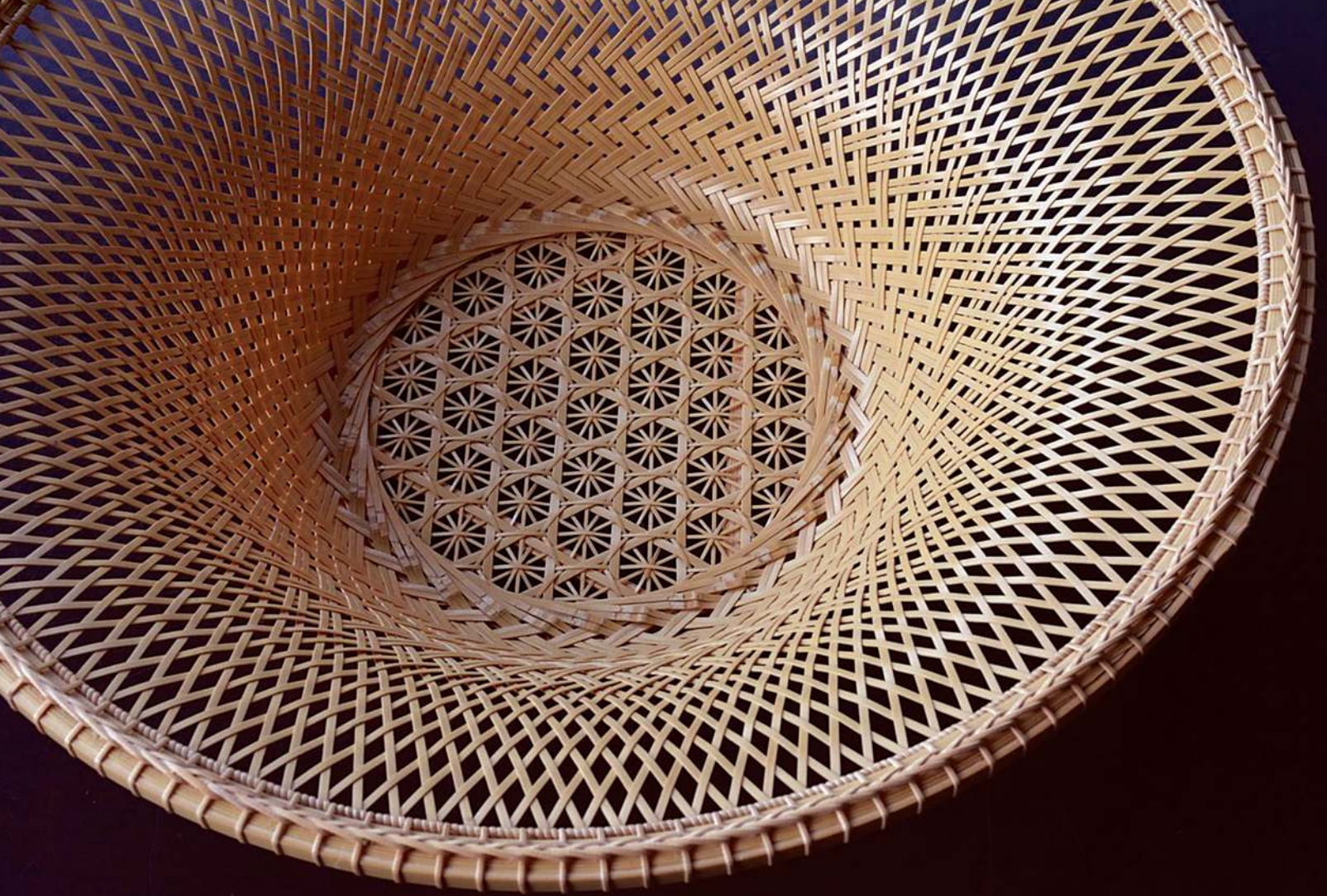
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KYOTO BAMBOO BASKETRY

Chiemi Ogura introduces us to the traditional Japanese craft of bamboo basketry

Chiemi Ogura was born in Kanegawa Prefecture, near Tokyo. At high school, she became interested in ecology and eco-friendly materials like bamboo. She also admired the refined traditional culture of Kyoto, such as the tea ceremony and its elaborate utensils. In 2002 she entered the Traditional Arts School of Kyoto where she learned bamboo craft, mainly bamboo basketry. After graduating from the college, she started

a workshop with six schoolmates. In 2011 she became independent and has since been working from a studio/living space based in a traditional townhouse in Kyoto. She makes accessories including baskets, cuffs, bangles, rings and pendants. She incorporates traditional patterns, many of which are inspired by nature, into these modern pieces – a perfect combination of heritage and function.



BAMBOO BASKETRY STEP-BY-STEP



1



2a



2b



3a



3b



4



5

1 Cut the bamboo to the required length. Split the bamboo in half, then in half again. Repeat until you are left with thin strips. If you are going to colour the bamboo, shave the surface of all the strips.

2 Run the strips through a pair of knives to make them all the same width, then slide the strips along a pair of knives to shave their edges a little.

3 Run the strips between another knife and a metal stick to make them all the same thickness.

4 Weave the strips in a traditional pattern and form the shape of the product.

5 Put the frames and other parts on the piece and wire them temporarily in place, then fix all the parts using rattan strips.

6 To add colour, boil the bamboo in water with eco-friendly dyestuffs. Finally, coat the finished piece with Urushi lacquer or urethane.



Building a child's bench

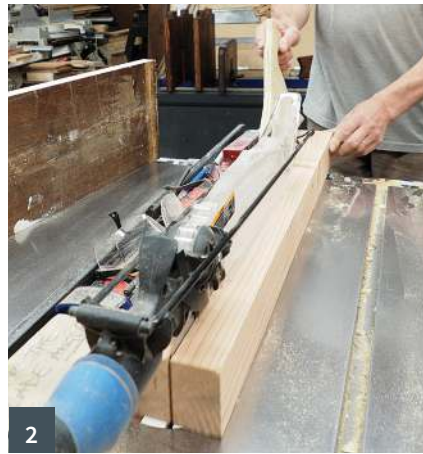
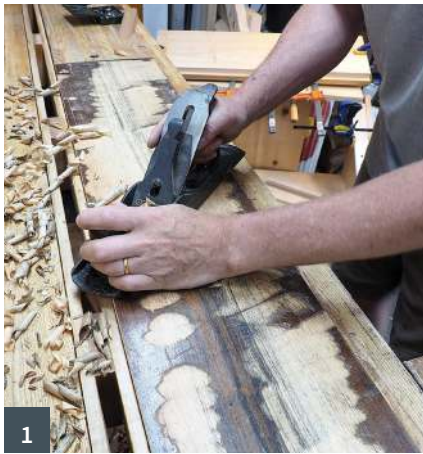
Michael T Collins has played with tools since he was a child. Here he builds a bench for the next generation of woodworkers

I remember my first tool kit – a beautifully made finger-jointed case that contained a basic joiner's tool kit. Saw, mallet, chisel, screwdriver, square, measure, pair of pliers, clamp (which I still regularly use to this day) a claw hammer, plane, awl and sanding block. I recall being most disappointed and frustrated that the chisel and plane were not very sharp and remember my father sharpening them for me and then being given my first lesson in the use of real tools. Needless to say, I have travelled a long way from those first beginnings, with many years of experiential learning (and have the scars to attest to the journey!).

In this article I will show you how to make a French 'Roubo-esque' bench from pieces of wood you probably already have lying around. Mine is made from pine, oak, maple and some fir – the size is completely up to you. I have designed this to allow the average five to seven year old to comfortably stand at the bench – it is approximately 700mm high x 800mm long x 280mm deep.



ABOVE LEFT: The first thing that I helped make was a bench – after all, almost all books on woodworking start with making a bench. Here's me at five years old – I think the bowler hat needs to make a comeback RIGHT: On a recent visit to Lewes in East Sussex I came across an early French child's bench – quite rudimentary but charming – it was simply nailed together and very rickety



PHOTOGRAPHS BY MICHAEL T. COLLINS

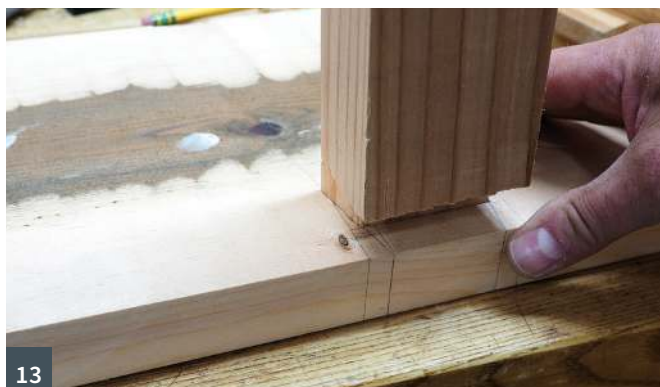
PREPARATION

The pine that I chose had a thick layer of varnish on and it is for jobs like this that I keep a jack plane with a 250mm camber, this allows me to remove a lot of wood in a short time. The scallops that this plane produces can be removed with a jointer plane. Once the plane is producing continuous shavings, you are done.

THE LEGS

It's all about proportion – this bench needed to look right and I wanted the legs to have a solid feel to them but not look too chunky and out of place.

1 The first step was to prepare the top **2** Rip the legs to size **3** Set a marking gauge to the thickness of the top, plus 1mm **4** Scribe this onto the tops of the legs **5** Using a bevel gauge set to 1:6, draw a dovetail on the upper end of the legs **6** Carry the lines down to the shoulder **7** The triangular wedge can then be sawn off **8** The shoulder can now be removed **9** Lastly, divide the dovetail in half and remove the widest section. When seated in its mortise this configuration will give the table top a firm shoulder to rest on and give the look of an authentic French bench, it will also test your joinery skills



CHOPPING OUT THE MORTISES

When making mortise and tenon joints, I generally chop the mortises first – it's easier to make a tenon fit a mortise than vice versa. But in this instance, I felt it would be easier to make the tenon (basically a single dovetail) and then use that to create the mortise, in much the same way that I make dovetail joints – rails first.

THE LOWER RAIL MORTISE AND TENONS

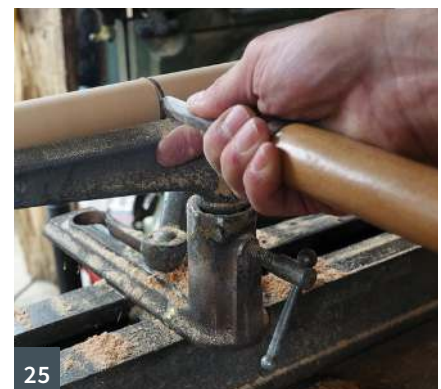
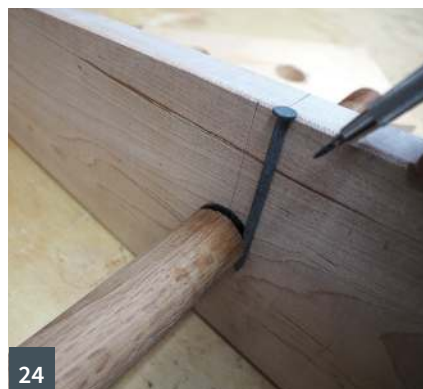
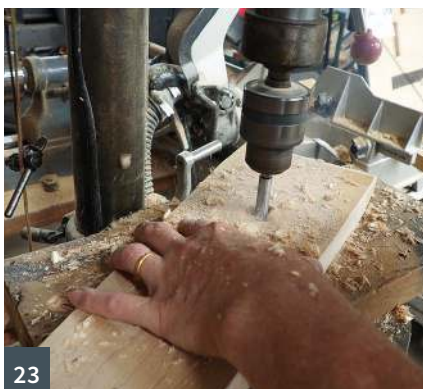
The lower rails are going to have a traditional mortise and tenon joint.

THE RAILS

The rails are all milled to final dimension. The length is 50mm longer than needed, which allows for the 25mm tenon at each end.

The depth of the mortises is a little over 25mm – knife the shoulder on all four sides of each rail.

10 Mark the location of the legs on the table **11** Then, with the legs in the correct orientation, use the same bevel gauge setting used for the dovetail and draw the dovetail on the table top. Knife in the edges of the dovetail. With a pencil, carry the layout lines around the edges and draw the same layout on the other side of the top. It never pays to try and chop out a through mortise from one side; it's better to approach from both sides and have crisp edges **12** Chop out the mortise just like any other mortise – start from about 2mm from one end and chop perpendicular to the grain – march to the other end and then about turn and repeat. Once you are about halfway through, turn the top over and repeat the process from the other side **13** Clean up the mortise by paring the sides and test fit the tenons **14** Because the dovetail mortises are each custom fit, it is important to fit all the legs into their respective mortises and label them. Then, mark the location of the leg mortises on the sides of the legs **15** Set the mortise gauge to the width of your chisel and then adjust the fence so that the gauge marks are centred on the rail ends **16** You can now use the gauge to scribe the tenons on the ends of the rails – remember to always do this from the face side. Once the tenons are marked, set the rails aside



MAKING THE LEG VICE

The vice face or 'chop' has to be thick and strong to be able to apply enough pressure. Choose a good straight grained piece of hardwood. Although maple was used for this project a good reliable timber such as ash or beech will do just as well.

THE VICE MECHANISM

For the leg vice to work it needs to be pulled into the leg as the screw is tightened. This can be achieved with having a very loose vice that simply moves back and forth on the threads, but that is far from ideal.

17 Gang the legs together and using a rail position it on the legs and mark the width on the legs **18** Without changing the mortise gauge setting, define each mortise location on the legs. If you want to create a reveal, simply move the mortise gauge's fence further away from the spur closest to the fence **19** You are now ready to chop out the leg mortises – I use a piece of masking tape to mark the depth at which to stop **20** Use

your preferred method to cut the tenon **21** Finally, cut the tenon's length to fit the mortise – at this stage clean up the shoulders if needed. Glue the bench together starting with the rails and legs and then glue the top to the legs remembering to mate the correct dovetails and mortises **22** The first step in making the leg vice is to decide on the shape – I went with a very traditional tapered form – the top of the leg vice (the chop) should be at least as deep as the bench top is thick. Here I am using a scrap of maple that I have sized to be about 10mm shorter than the height of the bench. Start the taper just below where the bottom of the top meets the chop. Once the taper is cut, clean up all the edges with a plane **23** Find the location for the threaded dowel and drill a 30mm hole through the leg vice. Position the leg vice in its final position on the bench and clamp in place. Now, use the hole you just drilled at the pilot hole to drill through the leg, place a scrap piece of wood behind so there is no tear-out **24** A better solution is to fix the leg vice to the threaded rod by way of a pin that is pushed through the edge of the vice and allow the pin to run in a non-threaded groove **25** Turn the groove on the dowel at the approximate location where enough dowel would protrude out the front to attach a handle. Then, drill a hole from the side that intersects with this groove. Once done, the dowel should be able to turn freely



MAKING THE THREADED DOWEL

To make threaded dowel you would normally need a very expensive matched tap and die set for wood. So ask around among any fellow woodworkers to see if they happen to have a box cutter threading set or alternatively you could buy a steel threaded vice set and make up the wooden jaws to accommodate steel instead of wood. Steel rods are narrower diameter but have plenty of strength. You only need one threaded steel rod and associated parts as it is a traditional leg vice. The steel needs to be fixed securely into the wooden boss with a steel rod right through.

26 My thread cutter is designed for a 30mm dowel. After many years of cutting thread, I have found that the first step in the process is to soak the oak dowel in mineral oil for a couple of days – this allows the cutter to slide freely and slice the wood with ease. Using this method I get very little tear-out **27** The next step is to cut the internal thread in the leg with the appropriate sized tap 28mm. This process should be done slowly, working the cutter back and forth, and allowing the chips to come out **28** The handle 'hub' was turned on the lathe – here I am using the bottom end of an old leg. Once turned, I cut it to length, chucked it back into the lathe and added some fancy end treatment **29** Drill a hole into the end of the hub and tap a thread into the hole, tightening it so that when the dowel is placed into the hole in the leg vice the pin hole is lined up with the groove in the rod **30** Drill a hole through the hub and the rod and insert a handle through the hub, then secure a couple of wooden balls to the end. To secure the bottom of the vice, drill a hole through the vice and a slightly larger hole through the leg – this is simply to keep the vice aligned, whereas in a full size bench it would be there to keep the vice parallel



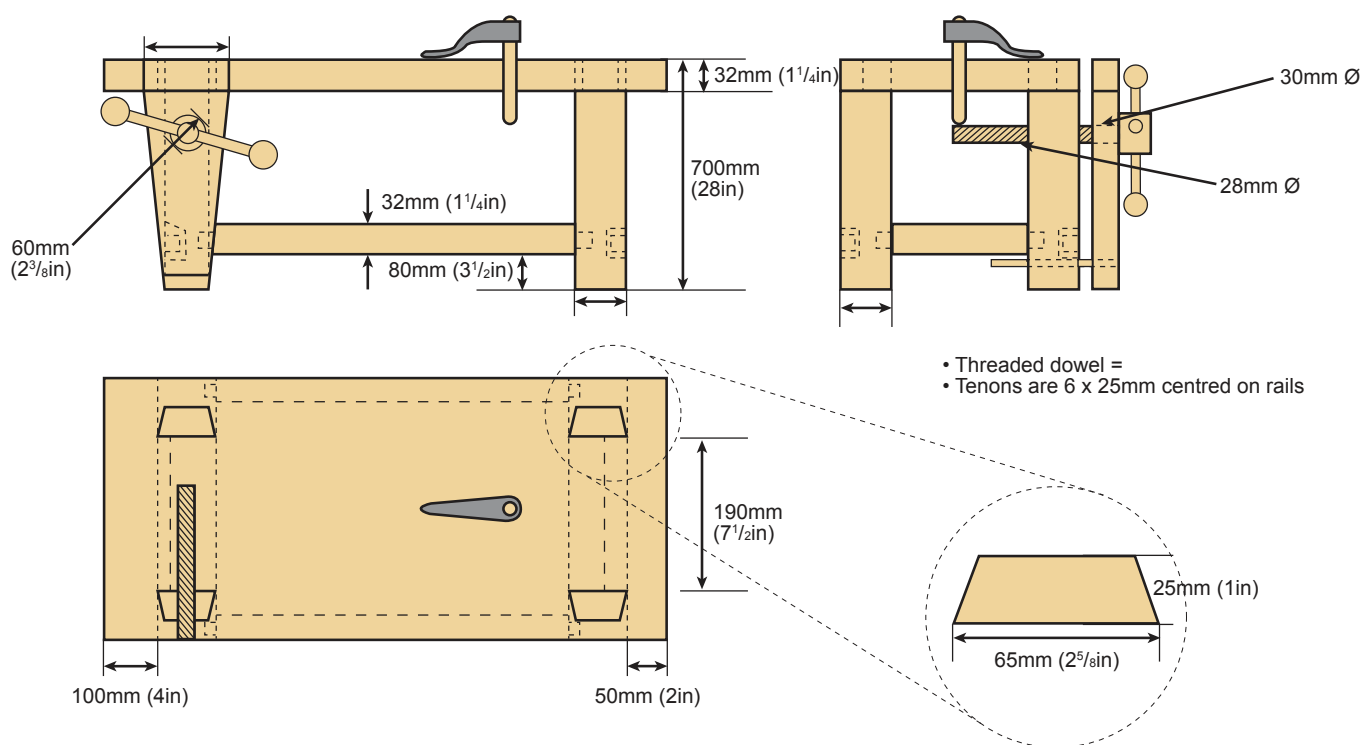
31



32

31 Next, it's just a matter of putting the parts together – and rounding over the front of the vice **32** Chamfer all the hard edges; a good tip for end grain is to dab some alcohol on the grain before planing. And finally, give the whole bench a coat of boiled linseed, turps and beeswax

NOT TO SCALE



All dimensions can be customised to suit the child's needs

CHILDREN AND TOOLS – SAFETY NOTE

Encouraging children to use handtools is a good idea as learnt hand skills are very useful in later life.

However, they should only use tools under proper adult supervision explaining the safest way to carry out any operation.



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ONE BIG DOVETAIL



John Bullar makes a supersized dovetail joint

Dovetails don't have to be fiddly little things – a large single dovetail for example, could join the corner of the robust frame around a workbench where the stress would break a lesser joint.

Think of the dovetail as a tenon with sloping sides. The tail is wide at the end, narrowing towards the shoulder line. It fits sideways into a socket sawn in the end of a second piece of timber held at right angles, and each side of this socket are the pins.



TOOLS FOR DOVETAILS

- 1 You will need either a dovetail saw or a tenon saw for shaping the sides, and a coping saw for removing a chunk of waste to make a socket. Alternatively, with care, you could use a fretsaw or a scrollsaw. A decent chisel saves a lot of hassle in dovetail work – it needs to be one with bevelled sides and, most importantly, it must be very sharp. You need a fine pencil and a thin craft knife with a pointed blade for getting into tight corners. A try-square and a steel rule complete the kit for dovetailing.
- 2 The dovetail is a right-angled joint, so before making it you must ensure the sides, faces and ends are precisely right angled. This means spending some time working with a sharp, carefully adjusted plane and a square.

MARKING THE SHOULDERS

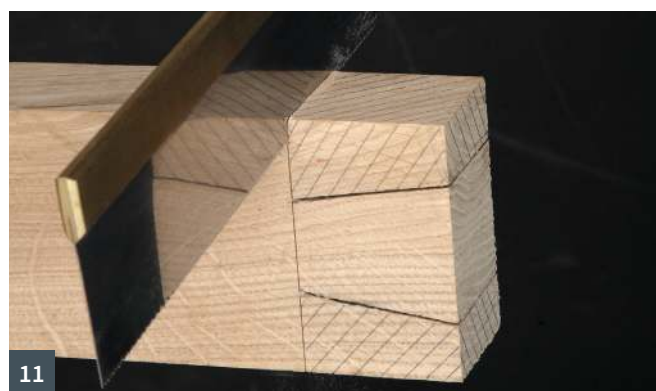
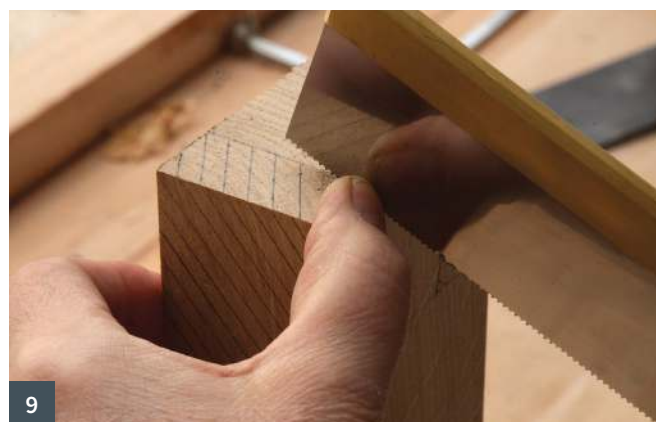
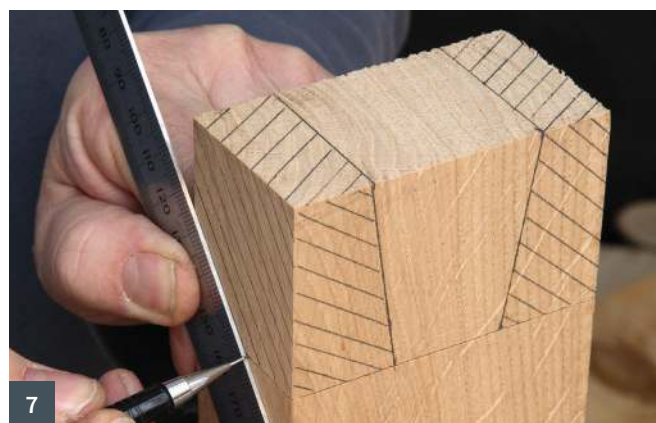
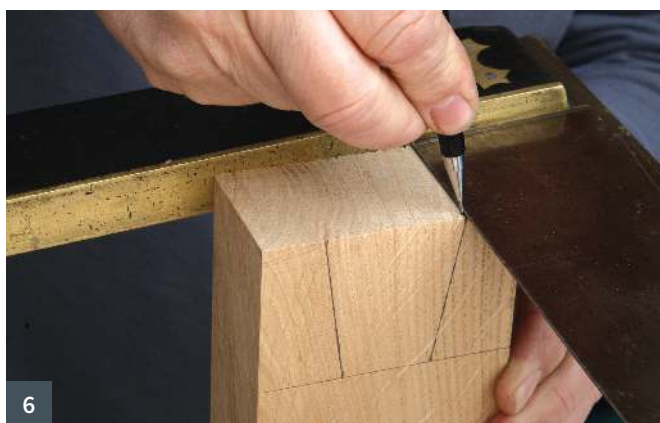
- 3 Use the square to mark a shoulder line with the knife. Position the square for the tail shoulder line by sliding it up against the socket

wood, held endways to act as a gauge. Run the knife tip down the edge of the square.

- 4 For the other three shoulder lines, position the square by placing the knife tip in the edge of the previous line. Slide the square up against the knife before running the knife across the wood.

TAIL ANGLES

- 5 Woodworkers often say the angles for dovetail sides should be about 1:5 for softwood, or 1:8 for hardwoods – actually dovetails are immensely strong and so long as they look alright, the precise angle doesn't matter. You can use a special dovetail gauge to set the angles for the sides of the tails, or just a pencil and ruler. I marked the tail width 50mm wide at the end and 36mm wide on the shoulder. My shoulder line was 50mm from the end, so this made the angle of each side about 1:7 ($50 \div 7$ is just over 7, so knock 7mm off each side to leave 36).



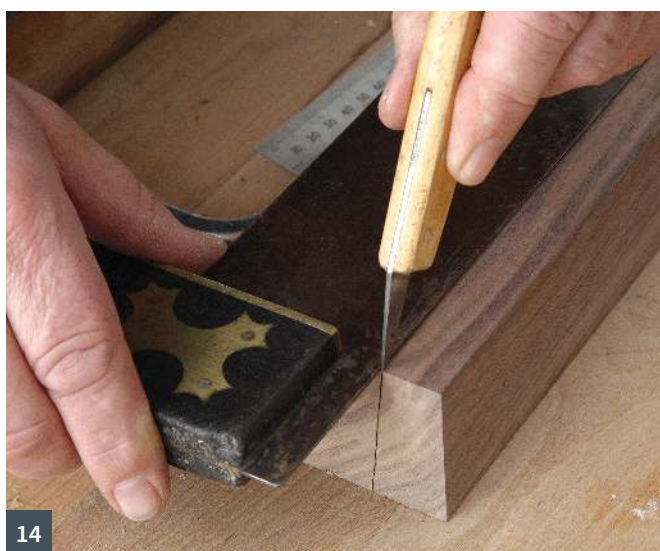
- 6** You need to extend the marking lines for the sides of the tail across the end grain. It is important these are precisely at right angles to make the joint a good fit.
- 7** I shaded the pieces of waste to be removed. I normally do this as a teaching aid and it is not essential, but I suggest scribbling a cross on the waste areas as a good habit – it avoids the risk of removing the wrong piece, especially when you move on to more complicated joints and want to work quickly.

CUTTING THE TAIL SIDES

- 8** Clamp the timber as low as you can in a vice so it does not vibrate. For the tail sides, the saw is held at an angle to the timber face, so you can watch the saw-teeth run down the outside of two knife marks at once.
- 9** Start the cut with the tip of your saw, holding most of the weight off the teeth so it does not jump. Use your thumb as a guide

against the side of the saw to keep it aligned with the pencil mark.

- 10** When the saw cut (or kerf) is well established, the saw can be levelled so the teeth run horizontally, allowing you to cut level down to the shoulder line. Throughout these cuts, the sawblade stays tilted to follow the angle on each side of the tail.
- 11** Accurately cut shoulders are one of the trickiest aspects of producing tidy dovetails. Clamp the timber edgewise in the vice to remove the wedges of waste from each side of the tail. Saw against the shoulder line, just inside the waste.



MARKING THE SOCKET

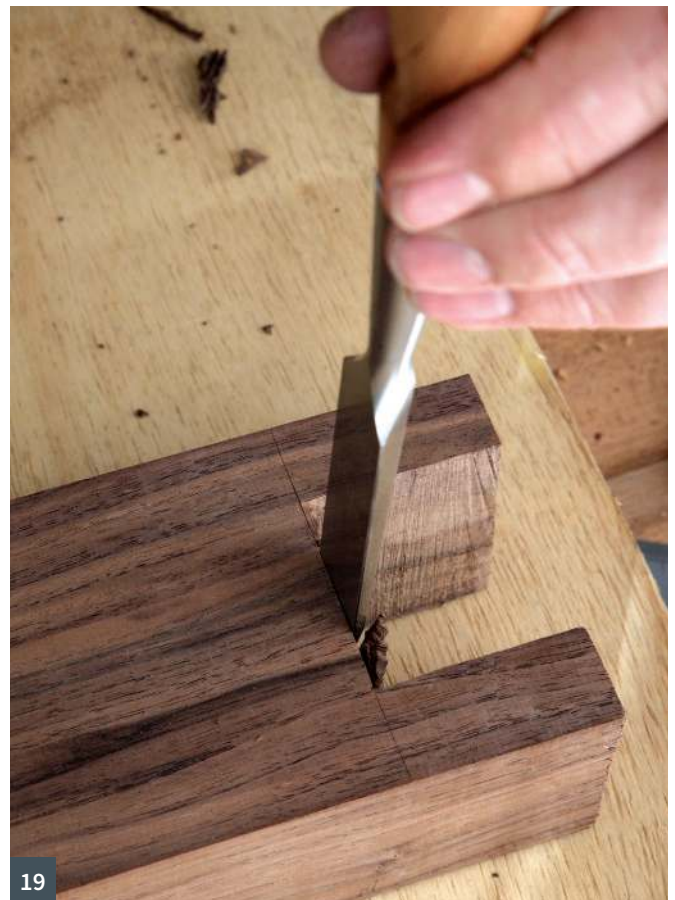
- 12** Although the exact angle and position of the tail sides are not important, these details are critical when it comes to transferring them on to the end of the second piece of timber, ready to cut a matching socket. Large pieces like this are best laid flat on the bench and pressed firmly together, while you use the tail as a template to mark around its matching socket.
- 13** Use the square to mark a socket shoulder line with the knife. Position the square for the shoulder line by sliding it up against the tail held endways to act as a gauge. Run the knife tip down the edge of the square.
- 14** You need to extend the marking lines for the sides of the tail down the long grain as far as the shoulder line. It is important these are precisely at right angles to make the joint a good fit.
- 15** I shaded the socket waste to be removed with a pencil. Again, not essential, but it's a good idea to mark this with a large cross.

CUTTING THE SOCKET

- 16** With the timber clamped low and vertical in the vice, saw down inside the knife-lines to make the sides of the socket. This time the saw is running at a slight slant to the faces of the timber,

so extra care is needed to start the rip cut on course.

- 17** Remove the large wedge from the socket with a coping saw, cutting some distance above the knife line. Cutting with a fine blade is bound to make the kerf a bit wiggly, so give yourself a margin inside the line.
- 18** Remove the timber from the vice and lay it flat on a piece of scrap board so you can chop down against it with a chisel to flatten the socket base. Stand edge-on to the chisel so you can ensure its underside is truly vertical. Firstly, chop to within a millimetre of the shoulder line...
- 19** ... finally, chop down the last millimetre against the shoulder line. Check the base of the socket with the square – it should be completely flat, or if anything, slightly undercut. Any protrusions in it would prevent the tail fitting. The tail should slide into the socket with firm pressure and lock itself there securely – but don't force it. If the socket is too narrow for the tail, it may be necessary to pare down the sides with a chisel. There is very little difference between a joint so tight it splits the socket, and a sloppy one that doesn't stay together. Smack in the middle of that small difference is the magical thing – the well-fitted dovetail.



Freestanding bathroom rack

Alan Holtham makes a storage unit from veneered boards

I made this storage rack as part of a suite of furniture for a bathroom, however it could be used equally well as a hallway unit or a display cabinet in the living room.

The rack is made from oak, but I am always wary of using large pieces of solid material in an environment like a bathroom, where it is going to be subjected to such extremes of humidity. It is asking too much to expect wide panels to stay flat under such conditions, so where possible I use veneered board and lip the edges with solid material, though for the smaller-section material it is quite acceptable to use solid timber. To my mind veneered blockboard is better than veneered MDF, as although dearer, it is stronger and much lighter in weight, as well as being totally stable and more pleasant to work with. The downside of all these advantages is that all exposed edges need to be lipped, and you have to work it carefully to avoid chipping the very thin veneer.

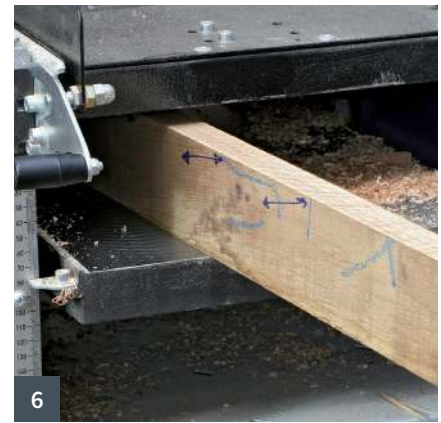
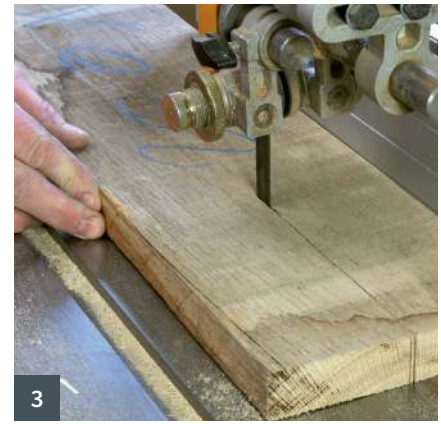
HORIZONTAL ROUTING TABLE



Grooving and jointing work calls for a horizontal routing table

There is a lot of grooving and jointing work involved in this project and for this I prefer to use a homemade horizontal routing table. I have always found this to be much easier and more accurate to use than a vertical table, though of course they both have definite uses. For grooving you cannot beat the accessibility and visibility of cutting the material with it flat on the table, and if you think ahead a bit and cut all the grooves that have to match up before you change any settings, then it will all line up effortlessly at the final assembly stage. Such a table is dead easy to make and over the years will more than repay the time involved in its construction.





PHOTOGRAPHS BY ALAN HOLTHAM

LONG UPRIGHTS

- 1** The first stage in this project is to prepare the four long uprights. For speed and convenience I used solid European oak. The material is supplied as square-edged boards approximately 150mm wide, ideal for splitting down the middle to provide two uprights from each board.
- 2** Trim up one end, to remove any end checks or splits and also any embedded grit which can damage the planer knives later. With one sound end, cut the board to length but leave an allowance for final sizing.
- 3** Although it would be easier to plane and thickness the board as one piece, it is actually better to split it into the two components first as this releases any drying stresses and the resulting warping or twisting can be machined out in the next stages.
- 4** First plane one face of each upright, taking care to orientate it correctly on the planer to minimise tearing the grain. To have the best chance of straightening the length, work with the concave edge face down on the planer tables.
- 5** Use this flat face as a reference against the planer fence to machine a square edge, once again keeping pressure on the outfeed table to ensure everything is straight.
- 6** Run the pieces through the thicknesser on edge while they still have maximum thickness, but only feed them one at a time as they will not all necessarily be the same width and any small ones might not be gripped properly by the feed rollers or anti-kickback fingers.
- 7** Only once they are all down to the same size can you thickness several pieces together quite safely. I also take a light pass on the previously planed edge as well, as thicknessing always seems to leave a much better finish.
- 8** With both of the edges finished you can now thickness the faces, taking several light passes from either face to reduce it down to the required thickness.



MORE MACHINING

- 9** A project like this, with lots of small pieces, allows you to use up those 'useful' offcuts that have been lying around in the workshop for ages, but do machine up the pieces at the same time to ensure that all the dimensions are the same.

MARK UP FOR SHELVES

- 10** Lay out the four uprights on the bench and carefully mark the position of the shelves, scribing across all of them at once for maximum accuracy.

CROSSRAILS & SLOTS

- 11** Cut the cross rails to length, ideally on something like a mitre saw where you can set up a repeat stop, so that they are all guaranteed to be spot-on for length.
- 12** Start by machining a biscuit slot in the end of each of the cross rails, feeding the timber onto a 4mm straight bit in the router and providing support with the mitre guide in the table slot.
- 13** If you make reference marks on the router table fence to indicate where the cut should stop and start, it is very quick and easy to

machine all the required slots without worrying about breaking out onto the edges.

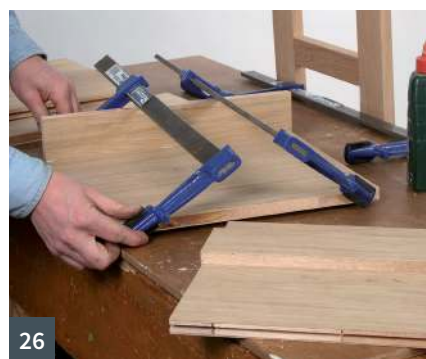
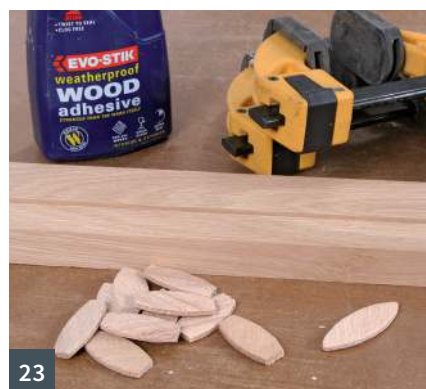
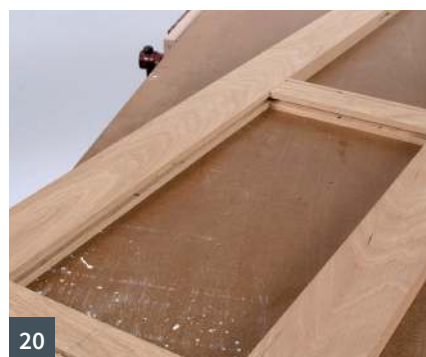
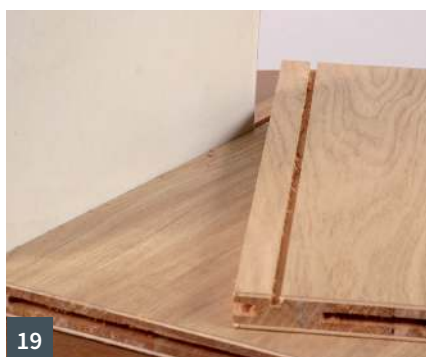
- 14** Leaving the router on the same setting, machine corresponding slots in the uprights, once again using the same reference marks to control the length of cut and match it to the rails.

END FRAMES

- 15** The end frames quickly take shape and if you have worked from the face side on all the pieces they will line up perfectly, even if the groove is not exactly central.
- 16** Next, machine a groove along the length of each cross rail to take the biscuits to support each shelf.

SHELVING

- 17** Cut the shelves from veneered blockboard and machine matching grooves in either end of each one. Provided you have not altered the setting on the router this will line up perfectly with the cross rails, so that the bottom of the rail and the bottom of the shelf finish up perfectly flush.



- 18** Also machine a groove in the back of the shelves that are going to have an upstand on the back, as this will be biscuit jointed in place in the same way.
- 19** Use the horizontal router table again to put in a groove in the bottom two shelves to take the 4mm white-faced MDF that forms the back of the cupboard.

CUPBOARD

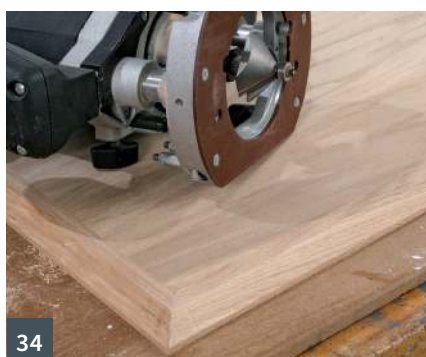
- 20** Fit a 6mm cutter in the router and machine another groove in the uprights and cross rails to take the oak-faced ply sides of the cupboard section.
- 21** Cut the ply panel to size and do a trial assembly to make sure everything still fits together, as any oversize discrepancies in the panel will stop the joint pulling up tight.
- 22** Run another groove down the back of the uprights to take the back. I had to use the router and guide fence as I could not reach in far enough using my horizontal table.

FRAME WORK

- 23** The 50mm cross rails are just slightly too narrow to use standard number 10 biscuits so cut the ends off them to fit the slot dimensions and at the same time provide maximum support.
- 24** Now you can assemble the end frames using the shortened biscuits and inserting the ply side panels, constantly checking for squareness as you apply the clamps.
- 25** Once the frames are dry, clean them up using a random orbit sander with a fine-abrasive pad, taking care not to rub over the sharp edges.

UPSTAND ASSEMBLY

- 26** The upstands are glued and biscuit jointed to the back of the shelves in exactly the same way, but once again be careful how you apply the clamps to make sure it stays square.



NOW FOR THE DOOR

- 27** Use up more offcuts to prepare the material for the door, in this case rails and stiles of solid timber and an oak-faced ply panel.
- 28** The inside front faces of the door frame have a stop-chamfer applied, which is cut using a 45° chamfer bit in the router before the frame is assembled.
- 29** The panel grooves are again machined on the router table, remembering not to cut them right through the ends of the stiles.
- 30** Reinforce the corner joint of the door with a biscuit and then glue and clamp the whole assembly. If the panel had been solid it would be better to leave it loose in the frame to allow for any movement, but with these ply panels you can apply glue round the edge to further increase the strength of the door.

LIPPING THE TOP

- 31** The top of the unit is prepared by edging it with a wide lipping of solid material to allow the decorative underside chamfer to be machined on later.

GETTING IT TOGETHER

- 32** Assembling a project like this can be a bit of a nightmare, particularly

if you work on your own, but prepare everything thoroughly before you start applying glue and then take your time – the glue doesn't go off that quickly. I found it easier to work with the unit laid horizontally on the bench, applying a couple of clamps at either end just to hold it together.

- 33** Then you can stand it upright on a flat floor to apply the rest of the clamps, making frequent checks for squareness and ensuring the shelves with their upstands line up perfectly with the back of the unit.
- 34** While this is all drying, machine the chamfer around the underside of the top shelf using a bearing-guided 45° cutter...
- 35** ... then this top shelf can be biscuit jointed in position and the front and rear pelmets glued and clamped in place.
- 36** The exposed edges of the remaining shelves can be lipped with a thin strip of solid material; I use 5mm-thick strips as this is as thin as my thicknesser will go!

FIXTURES & FINISH

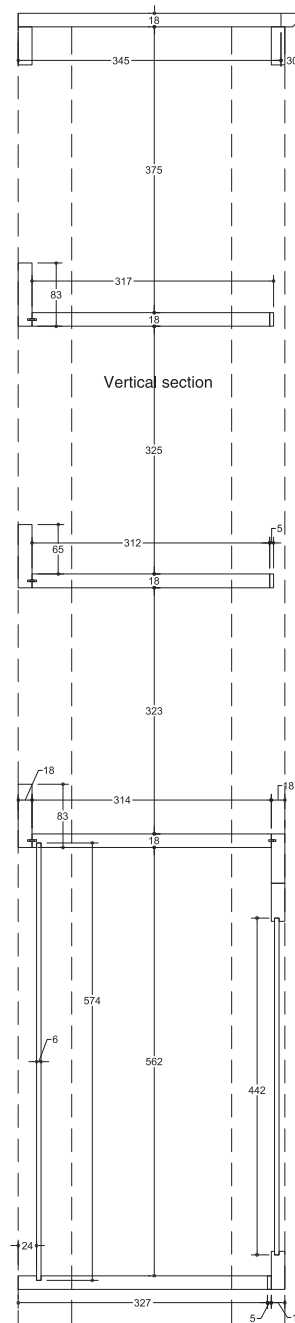
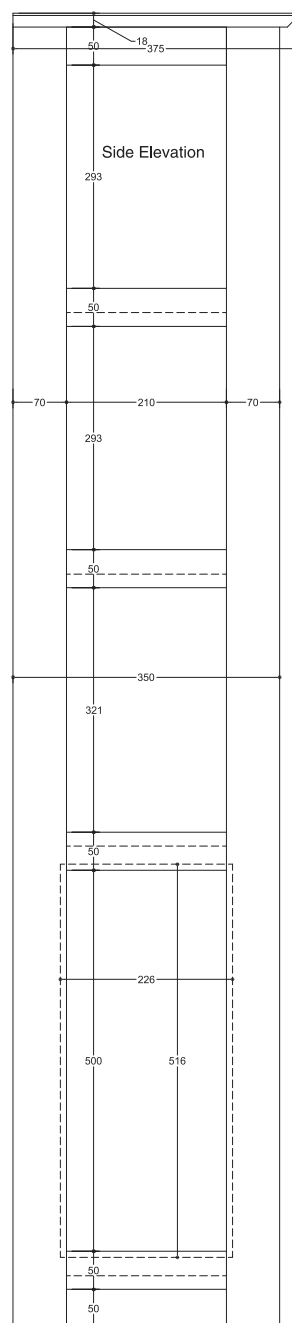
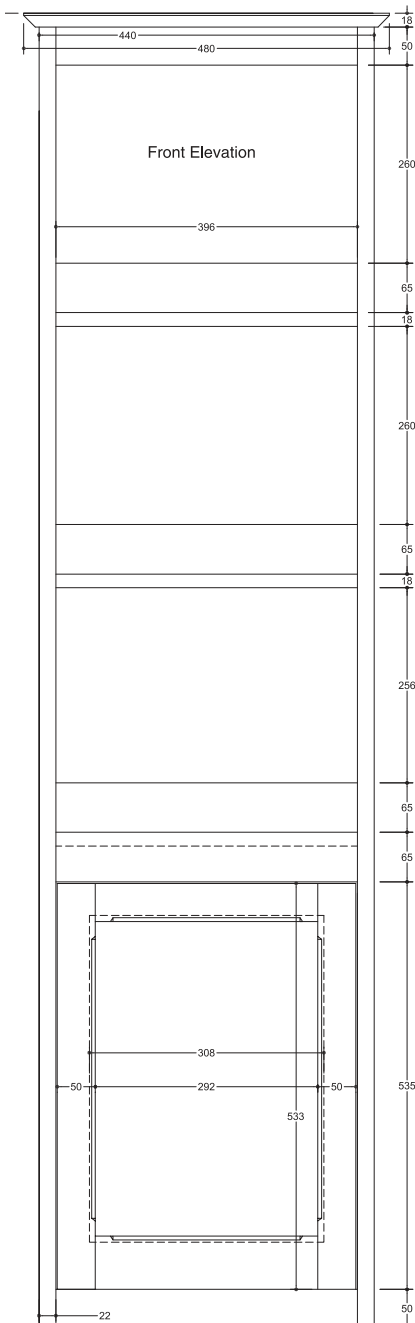
- 37** Finally fit the door, catch and knob and the job is complete. My preference for finish is a coat of clear finishing oil as this is easily rejuvenated if and when it becomes tired looking in the steamy environment.



36

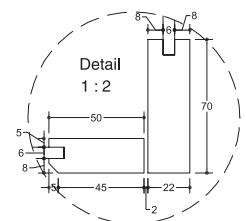
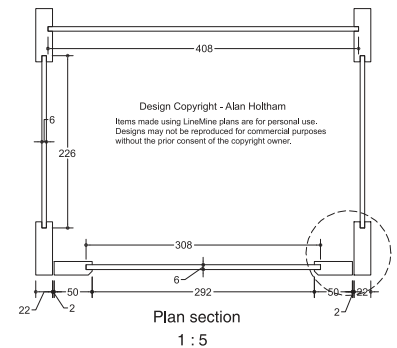


37



Cutting List

TOP	1 @ 420 x 345 x 18
TOP LIPPING	1 @ 480 x 30 x 18
TOP LIPPING	2 @ 375 x 30 x 18
SIDE UPRIGHTS	4 @ 1707 x 70 x 22
TOP RAILS	2 @ 396 x 50 x 18
SIDE RAILS	10 @ 210 x 50 x 18
SHELF UPSTANDS	3 @ 396 x 83 x 18
SHELVES	2 @ 396 x 312 x 18
SHELF	1 @ 396 x 314 x 18
SHELF	2 @ 396 x 332 x 18
SHELF LIPPING	3 @ 396 x 5 x 18
CURBOARD RAIL	1 @ 396 x 65 x 18
SIDE PANELS	2 @ 516 x 228 x 6
BACK	1 @ 574 x 408 x 4
DOOR STILES	2 @ 533 x 50 x 18
DOOR RAILS	2 @ 292 x 50 x 18
DOOR PANEL	1 @ 429 x 308 x 6





At the cutting edge: SAW

From the most surprising royal gift and one of the strangest musical instruments, to a gigantic piece of art, there's more to the (not-so-primitive) saw after all

1 Made in Sheffield

If its design remained rather basic for several millennia, by the 18th century the hand saw had evolved to become the most technically complex of all tools to manufacture. Sheffield was then the centre of the saw industry; home to 80% of the nation's sawmakers, the city's products were recognised for their quality and excellence world-wide throughout the 19th century and until its industrial decline late in the 20th century.

2 The 'Princess Victoria Saw'

When Princess Victoria, Queen Victoria and Prince Albert's oldest daughter, married the Crown Prince of Prussia in 1858, the newlyweds received, among other magnificent gifts... a saw. But this was not just any saw: with its outstanding design and execution, and elaborately carved ivory handle, it surpassed anything that had ever been made before. In fact, nothing like it would ever be as beautifully made again...

3 The singing saw

Not only exquisite in looks, a hand saw can also be harmonious when used as a musical instrument. One of the best-known sawist was German actress and singer Marlene Dietrich, who would notably play it as she entertained the US troops on the front lines during WWII. Although it may not be as popular today, performers and aficionados still gather every year at the International Musical Saw Festival in California.

4 Inspired by the spinning wheel

Although British sailmaker Samuel Miller patented the circular saw in 1777, legend has it that the first circular saw used in a saw mill was actually invented by American Tabitha Babbitt in 1813. When she saw two men sawing timber with a pitsaw and noticed its inefficiency of only cutting one way, she used her knowledge of weaving by, as simple as it sounds, creating a circular saw blade that she mounted on a spinning axle. And voilà!

5 The world's biggest saw

Much more complex is the 'bucket wheel excavator', the world's biggest saw, at 12 metres high and weighing an incredible 45,000 tons. It is not only a monster machine in size but also in power; it is used to destroy coal mountains at the world's biggest coal excavation site in Kazakhstan, and is reported to mine a staggering 4,500 tons of coal per hour.

6 Large-scale art

Another 'unequalled' saw is over 15 metres tall and can be seen cutting through the earth in Japan. Installed at the Tokyo International Exhibition Center in 1996, 'Saw, Sawing' is a giant sculpture of a Western-style hand saw. It was designed by artists Claes Oldenburg and Coosje van Bruggen, and is entirely made of steel and resin. The presentation model of the sculpture sold in 2009 for the grand sum of US\$62,500 – just under £50,000!

7 Death by sawing

Believe it or not, this cruel method of execution was used all over the world across the centuries. One man in particular, infamous for his madness and perversity, enjoyed murdering his enemies in this most gruesome of ways: Roman Emperor Caligula would watch executions by saw while he ate, stating that witnessing the suffering acted as an appetiser!

8 Behind the magic trick (spoiler alert!)

Thankfully, sawing someone in half nowadays is just a classic illusion. Still wondering how the magician's assistant lying in a box keeps smiling while being sawn in two and gets away without a scratch? The whole secret lies in the box: it is compartmentalised so the assistant either stays at one end while fake legs stick out at the other end, or there is another assistant hidden in the other part of the box.

9 The nib debate

Another mystery is the purpose of a saw nib on the end of fine hand saws. Some say it is purely decorative, others an indicator of quality, or to attach a blade guard, etc. There have been many more theories, yet nobody knows for sure. The enigmatic nib has sparked lots of curiosity and it is still the source of heated argument among antique-tool collectors.

10 A multifunctional hunting tool

Sawfish, one of the largest fish in the world, are also known as carpenter sharks thanks to their distinctive saw-looking head extension, called the rostrum. But what do sawfish do with it? The rostrum contains sensory organs that can detect the smallest electrical signals produced by potential prey even in murky waters, so once they find a target, they use their 'saw' to dig, slash, impale, or knock and pin their prey. A pretty handy tool all around!

PHOTOGRAPH BY SHUTTERSTOCK

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