

From Wreck to 'Right On' – Upcycled Windsor Chair

WOODWORKING Plans & Projects



The UK's essential workshop project & technical manual

Issue 99 October 2014

Rebates

Simple steps to
create perfect
joints

TECHNIQUES

Using a scraper
Fitting a vintage vice
Veneering with hide glue

ON TEST

Makita thicknesser
Warco bench mortiser

PROJECTS

A3 Project – TV Stand
Downdraught Table
Turned Jardinière
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New versus old

Hello everyone and welcome to the October issue of *Woodworking Plans & Projects*.

We have the usual selection of projects, majoring this time on furniture and storage. However, it did strike me while looking at what we have been plotting for this issue, that we have two radically different approaches to the subject of chairs. Our feature is about Joe Thomas, whose own hall table 'statement piece' was a project in issue 86. This time we look at his final year piece, having now graduated from Bucks New University. It is a 3D printed chair or more precisely, the joints are 3D printed in a plastic compound. In the news some time ago, it was reported that the Ministry of Defence are hoping to be able to do 3D printing of metal components for our RAF strike aircraft 'in the field', making some battle repairs almost immediate. Although there also have been some rather amusing horror stories of 3D printers spewing uncontrollable plastic 'spaghetti', this technology is definitely here to stay and may well change the face of manufacturing, potentially with many craftspeople in the future manufacturing high quality, computer generated products in the comfort of their own garages or back garden sheds!

On the other hand, there is me, mister old technology himself, rescuing a wreck of an old Windsor chair and giving it a second life as a recycled, up-styled 'sit-able' chair, which is also a statement piece when put in the right setting and perfect for anyone wanting a more modern interpretation of traditional furniture.

A question of balance

It seems to me there will be a tussle between old and new. There always was in the past, and technological and cultural change has been a feature of human existence right from the beginning, and it is going to continue. The best thing about it is surely, that we can choose in many cases what we want from each thing. We all have different tastes, needs, budgets and concerns. Is a 3D product less or more damaging to the environment? Did it involve far less transportation? Is it only used to make what is actually needed, rather than drastic factory-based over-production? Does it let us use materials in new and more imaginative ways?



PHOTOGRAPH BY JOE THOMAS

PHOTOGRAPH BY GMC/ANTHONY BAILEY

Joe Thomas' 3D chair

The Editor's upcycled Windsor chair

Is an old chair better burnt for fuel along with other timber – 'new carbon' – sourced above ground, rather than 'old carbon' fuels – from below ground, which are guilty of adding to global CO₂ levels? Or does recycling create extra problems? For instance, the modern glues and paints used to rescue my old Windsor chair – are they creating hazards in both production and disposal of waste? In this modern age there are many perplexing and not easily answered questions about how we live our lives. Life is no longer a matter of 'black and white' – definitely many shades of grey instead. At least timber, sensibly grown and harvested, can be used for benefit without harming the planet – it's all very much a matter of balance...



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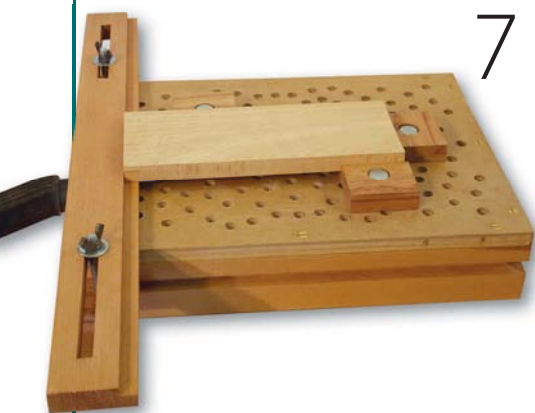
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Woodwork on the web

To find more great projects, tests and techniques like these, visit our fantastic website at: www.woodworkersinstitute.com



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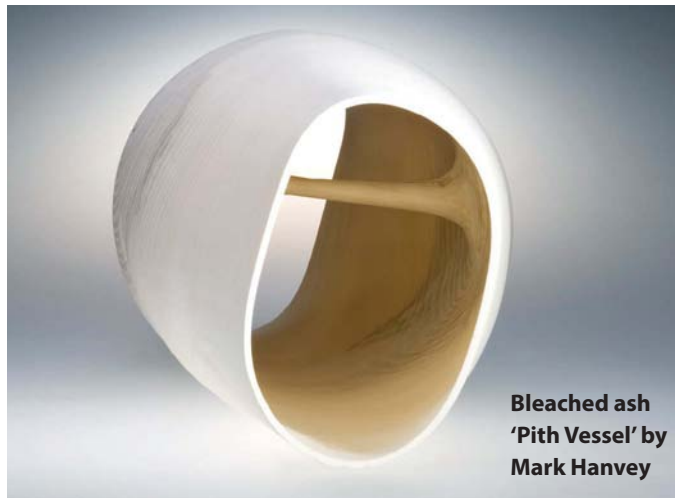
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Noticeboard

All the latest events and news from the world of woodworking...



Bleached ash
'Pith Vessel' by
Mark Hanvey

PHOTOGRAPHS COURTESY OF HANDMADE IN BRITAIN

Handmade in Britain 14 The Contemporary Crafts & Design Fair

This November, over 100 UK-based designer-makers will showcase the best of contemporary fine crafts in all disciplines across interiors and fashion over three days at Chelsea Old Town Hall.

The show is an inspiring alternative to the high street and a unique opportunity to browse exceptional crafts, buy unique and handmade gifts or commission a bespoke piece of work. This is a luxury shopping experience with added value, a very special chance to buy directly from the makers and discover the inspirations and processes behind the work of Britain's most skilled craftspeople.

This event offers a unique opportunity to explore British contemporary crafts in a showcase of innovative design alongside exceptional craftsmanship presenting a rich variety of form, function and style.

DETAILS:

When: 14–16 November, 2014

Where: Chelsea Old Town Hall, King's Road, London SW3 5EE

Contact: Handmade in Britain

Tel: 0207 2865 110

Web: www.handmadeinbritain.co.uk

Triton open day at Yandles

Yandles will be holding a special Triton Day on Saturday 18 October to celebrate the opening of their new Triton Academy and Showroom display.

The day starts at 10am, with demonstrations on the full range of Triton power tools and machinery and there will be seating available for this part of the day. There will also be an opportunity for visitors to try out the products for themselves.

In the afternoon, customers will be able to get specific advice on Triton products and there will be a trip around the sawmill with a general talk about timber. The sawmill talk has limited places and those wishing to attend should book through the office.

During the day, there will be special offers available on all Triton products and discounts on timber. There is a café on site, a hobbies store, gallery and plenty of free parking. See details below.

DETAILS:

When: 18 October, 2014

Where: Yandle & Sons Ltd, Hurst Works, Martock TA12 6JU

Contact: Yandle & Sons Ltd

Tel: 01935 822 207

Email: jane@yandles.co.uk

Web: www.yandles.co.uk

CAD for woodworkers course

Have you ever wished you could draw dimensioned plans, quickly and accurately? Have you ever needed to send drawings by email and then realised it meant scanning lots of bits of paper? Have you ever had to redraw something, either starting again from scratch or trying to draw over what you've done already? CAD drawings are 100% accurate, easy to dimension and easy to edit, often in seconds. They can be printed or saved as PDF files and attached easily to emails.

The online course, CAD for Woodworkers, shows you how to draw your own fully dimensioned woodworking plans, using the FREE CAD program, DraftSight. Using the coupon code CAD4WW MAG1, you can join the course for only \$29 – roughly £17.50 – a 70% saving. Just go to www.udemy.com/cad-for-woodworkers and click

'Redeem a Coupon', then enter the code as directed. The coupon expires on 1 November, 2014.

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Men in Sheds – Milton Keynes

Trend is supporting the Men in Sheds activity group in Milton Keynes with equipment and product demonstrations. Men in Sheds aims to provide a place where men from all walks of life can get together to share their experiences and skills on a variety of projects. The Men in Sheds Milton Keynes project was launched through a press announcement by a member of the public, and actively supported by Age UK Milton Keynes. With 80 or so men expressing an interest, there was a lot of enthusiasm but the limited accommodation and opening hours meant things developed slowly. Until, luckily, an adjacent warehouse rented by Age UK became available and they generously let Men in Sheds have it rent-free for the first year. The shed in Milton Keynes measures over 4,000sq.ft. but this now brings its own problems: £8,000 a year rental costs. There is also a modest metal-working area, with two benches, welding, turning and milling. Then there is the model-making area as well as a kitchen and lounge/office area. The Trend product demonstrations showed the members routing techniques and various members had the opportunity to try some techniques for themselves. See details opposite to find out more.



PHOTOGRAPH COURTESY OF TREND

Members of the Men in Sheds activity group in Milton Keynes

DETAILS:

Contact: Men in Sheds Milton Keynes

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Email: info@meninshedsmk.org.uk

Web: www.meninshedsmk.org.uk

READER EMAILS

Hello,

I have a 1930s lime waxed chest of drawers, probably from Heals originally. The lime wax is faded and I want to re-wax it. I've got Liberon liming wax and finishing oil plus steel wool and cloths. To prepare the surface, should I just lightly sand it or does it need more than that?

Thanks,

Susannah

Dear Susannah,

It is impossible to say without examining the surface of the furniture what additional steps you may need to take. However, oak (*Quercus robur*) is the usual choice for liming because of its very open pore structure, which the liming paste fills perfectly. Oak is one of the few timbers that can be waxed or oiled without further underlying treatment, so hopefully your piece may not have a lot more on it than just wax but, and it's a big but, it may have had a spray nitrocellulose coating before it was waxed. What you need to do before liming is to dewax the surface with a dewaxing solution, Liberon make such a product. This will remove the old

wax back to bare wood, but if it remains shiny after that, then it has had a coating on first. This is not necessarily a problem but in order for liming to work, you do need to open up the grain of the oak using a wire brush. I would suggest using one with brass bristles rather than steel, as it will cause less damage to the wood but still clean the pores. Do this 'with the grain'. Inspect the surface and hopefully you will see the pores in the wood grain are open enough to accept the liming paste. I would avoid sanding the surfaces if possible as it will attack any finish or the wood itself and remove or reduce the patina that has developed over the last 80 or so years.

Regards,

Anthony Bailey

Dear Anthony,

Thank you very much for your reply; it's really helpful. I have one more question: the wood is quartersawn, so the grain is different and it's not so obvious which way it goes. Does what you say about how to clean the pores, if necessary, remain the same in this case? It's great to have your advice; it's a beautiful old piece of furniture and I just want to make it more as it would've been when it

was first made.

Thank you again,

Susannah

Dear Susannah,

Most oak is 'through and through' sawn, which is quicker and more economical to do, whereas quartersawn requires sawing into the middle of a log from all quarters, a bit like creating parallel cake slices. It is wasteful, but shows off the ray figuring which looks silvery and tends to sweep in broken curves. I think you still need to use a brass wire brush but try to follow the sweep of the grain because the pores need to be unclogged ready to accept the liming paste. I hope that helps.

Regards,

Anthony Bailey



PHOTOGRAPH BY GMC/ANTHONY BAILEY

Liming paste wiped and buffed on unsealed oak leaving a milky sheen

Wood news:

The Forest Man

One man, since 1979, has been on a mission. Jadav Payeng, also known as The Green Warrior, has planted a forest larger than New York's Central Park, one tree at a time. His hard work has now accumulated to become the 1,360-acre Molai Forest in Assam, India. Jadav planted the forest on the barren wasteland of a sandbar, Majuli, which is on the largest river on Earth. The sandbar is home to 150,000 people, nestled in Northeast India, next to the Brahmaputra River. Due to corrosion over the past 100 years the landmass has been reduced by a half, causing Jadav to act on the situation.

For the past 35 years Jadav has planted and tended to the trees, creating a forest of 1,000 species, including 300 hectares of bamboo. Not only has Jadav created a new landscape, he is also providing a habitat for several endangered animals, who have returned to the area. These animals include a herd of nearly 100 elephants that visits the forest regularly every year and stays for about six months – who in turn have given birth to an additional 10 elephants. There are also Bengal tigers, Indian rhinoceros, deer, rabbits and a species of vulture that hasn't been seen in the area for nearly 40 years!

In 2008 the local authorities became aware of the forest when department officials went in search of a herd of 115 elephants that had retreated into the forest. The officials now regularly visit the area. Jadav now hopes to spread his forest to another sandbar, inside of Brahmaputra.

To learn more about Jadav's amazing story visit:

www.jadavpayeng.org



PHOTOGRAPHS BY WILLIAM DOUGLAS MCMASTER

Jadav Payeng – The Forest Man



Payeng planting in his forest

Ash dieback a threat to Kent and Sussex

Ash dieback is a serious disease, caused by a fungus called *Chalara fraxinea*, and is thought to be a significant threat to the ash (*Fraxinus excelsior*) trees in the south and east of England, particularly Kent and Sussex. It is predicted that 75% of ash trees in Kent and Sussex will be infected with ash dieback, according to government scientists, by 2018.

The deadly fungus was originally found in England in 2012, having blown over the English channel or been imported via nurseries. It causes the crown of the tree to blacken and wither, even killing the younger ash trees. It is also thought that other counties such as Essex, Norfolk and Suffolk will be hit, with around 50% of their trees expected to be affected by 2018.

Although the spread cannot be stopped, Ministers have admitted

it has been tested against 17 chemical treatments and proved highly sensitive to four.

Ash dieback isn't only a threat to ash trees, but conservationists worry that a rapid spread would be 'devastating' to landscapes and have a 'very real economic cost' too. To find out more about ash dieback, visit: www.forestry.gov.uk/chalara



Further symptoms of ash dieback



Symptoms of ash dieback

Downdraught table

Neil Lawton makes a downdraught table, a valuable addition to any workshop



In the fight against airborne dust, a downdraught table is a valuable addition to any workshop. Small rotary tools and even hand sanding can cause a large amount of dust that is not immediately evident. It is only on the rare occasion when a stream of sunlight hits the workshop window it becomes apparent that you are working in the wood dust equivalent of a 'snow globe'. This project was conceived to help address the problem, but should be seen as an addition and not as a replacement for conventional dust control measures.

The unit is designed to be used with any modern fine filter vacuum cleaner and allows the clamping of workpieces, while carrying out sanding, routing or shaping operations. The dimensions here were entirely dictated by the use of reclaimed timber and offcuts throughout. The reclaimed beech (*Fagus sylvatica*) table legs provided the ideal tight grained timber required,



PHOTOGRAPHS BY NEIL LAWTON

but other materials such as plywood can be used. The dimensions could also be tailored to any given need.

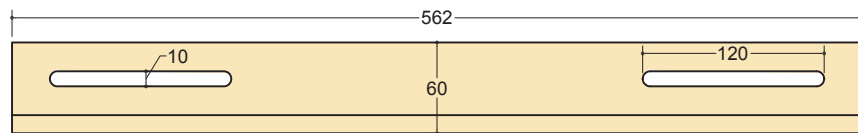
1 When working with reclaimed wood, a metal detector is a good investment. In some cases, you would never know that a joint has been repaired or reinforced with screws or nails at some point in the past. I know from experience that what looks like an innocent dowel joint can be a screw and plug in disguise. It only becomes obvious when it's too late and the damage is already done to your blades or knives.

2 Start by rough cutting the legs into lengths 21mm thick, with a view to obtaining a finished thickness of 18mm. A thick walled



carcass is essential for this project, as will become apparent later.

3 Plane down six lengths of beech to the same dimensions on the thicknesser. These will become the four box sides, fence and clamping dogs. Vary the infeed position with each pass; this will prevent uneven wear on the knives.



Fence Plan

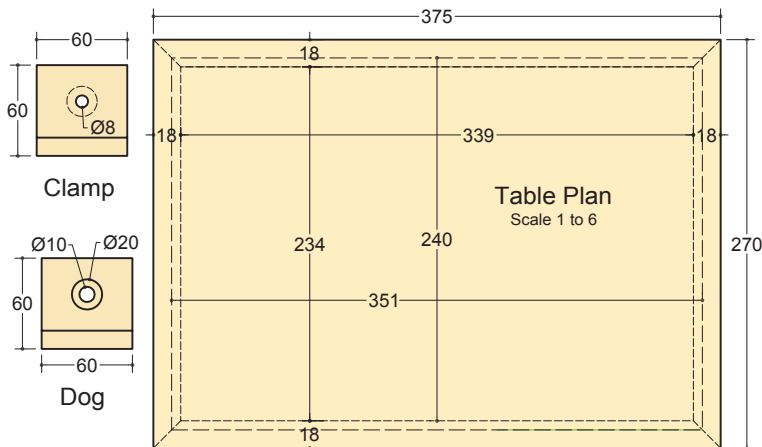
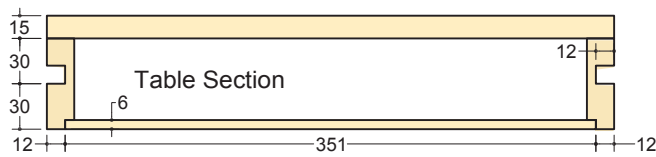
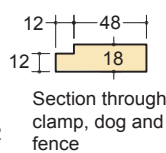


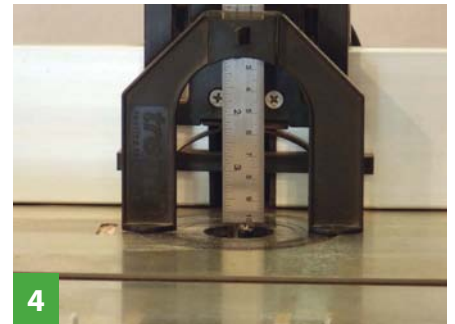
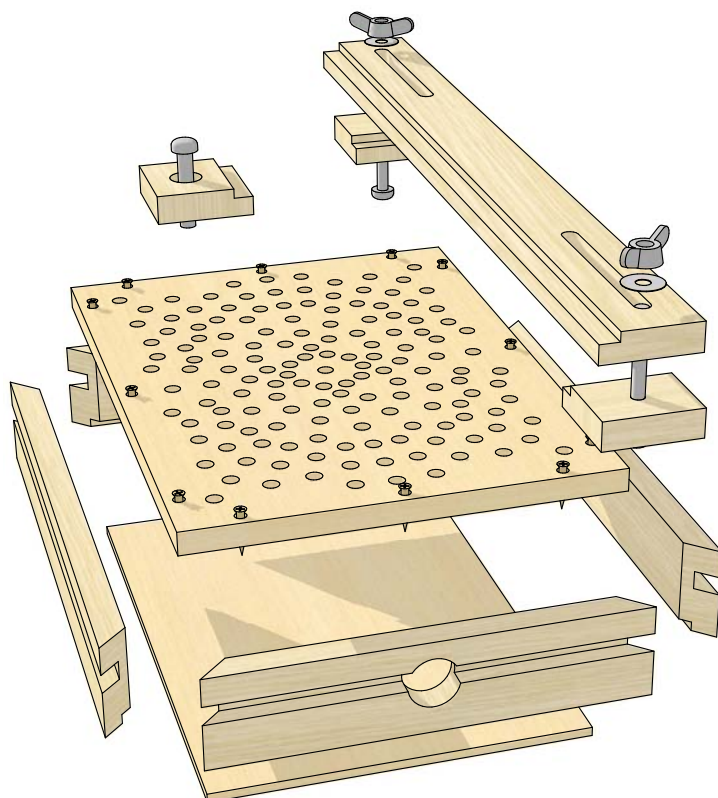
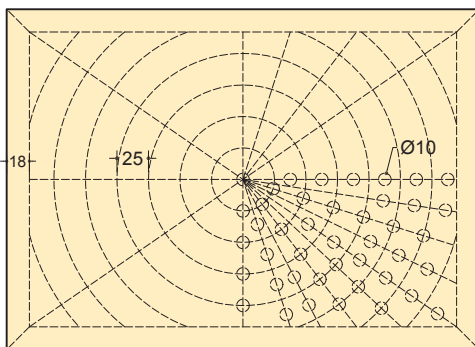
Table Plan
Scale 1 to 6



Vent hole layout



Section through
clamp, dog and
fence



4 With a 12mm straight cutter fitted in the table, set the fence to just under the maximum width of cut. Set the cutter low for ease of cut.

5 Rebate the two pieces for the fence and clamping dogs, taking shallow cuts and multiple passes until you reach the required depth.

6 The rebate should be routed until the remaining timber forms a square, on both the fence and clamping block pieces.

7 Reset the fence to the thickness of the board being used for the bottom. The bottom needs to sit flush with the box sides.

8 Again taking shallow cuts, run the four side pieces through to form the bottom rebate. The six pieces should now look something like this.

9 The final router table operation is to cut the clamping rebate. Set the fence 30mm from the top of the sides to the edge of the cutter. Taking note of the orientation of the bottom rebate, pass the sides through. It becomes plain now why a reasonable thickness of timber is required, as the rebate must be deep enough to seat the clamping piece, while maintaining enough timber for structural strength.

10 Next, mitre the side pieces to length. This can be done by hand or powered mitre saws, or as here, with the tablesaw.

11 Dry clamp the sides and square up. Measure the rebate and cut the bottom board to suit.

12 The size restriction imposed by using the reclaimed timber means the extraction hole has to be drilled through part of the clamping rebate. A piece of scrap cut as a tight fit will prevent any breakout while drilling. A good friction fit is required to stop the hose working free during use. On measuring, I discovered that the hose was not entirely round, so I selected a slightly undersized bit.

13 Using a bobbin sander, enlarge the hole, but a rotary tool sander, or a sanding stick could also be used. Repeatedly check the hose for fit until you reach the desired size.

14 With the sides and bottom glued and clamped, run a small bead of glue around the edge and then lightly sand in. The bottom needs to be well sealed, but it doesn't have to be pretty.

15 The top could very easily be made with one thick board, but in my case, the use of offcuts made laminating my only option. For this method, glue two pieces of 6mm ply and a piece of 3mm MDF by combing the glue onto the boards, which can then be twisted into position to ensure an even distribution of adhesive. The boards can then be tightly clamped flat and left overnight to dry.



16 Due to the splintery nature of the offcut ply, I cut the top slightly oversize. It was then clamped to the box and routed to fit with a flush trimming bit in the router.

17 Mark the grid out on the underside of the top, allowing for the thickness of the box sides. Mark the centre and corner to corner lines first, followed by circles at 25mm spacing. Draw extra lines to the centre until the centre circle has roughly equal segments.

18 Mark the drilling points out, on and between the circles alternately. Mark extra drilling points wherever large enough gaps occur. These slightly more random points may be useful when clamping workpieces. After drilling a 2.5mm pilot hole through each point, drill the top from both sides with a 10mm Forstner bit, to achieve clean holes.

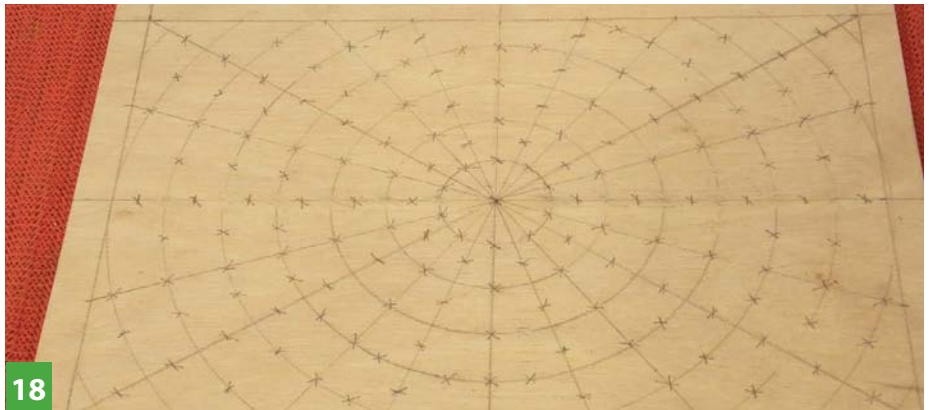
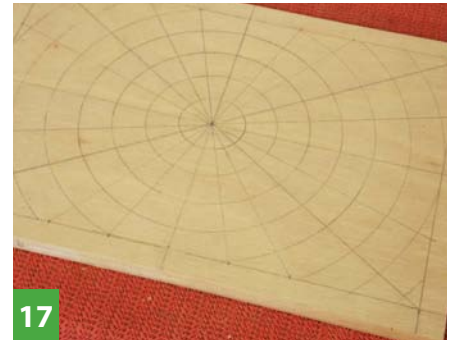
19 Any rough spots inside the enclosure will trap dust, so seal the inside and wax before you fit the top.

20 The top is fitted using screws; this will give easy access to clear any blockage, or if something is accidentally dropped through the holes. The countersinks are deep enough for the screw head to sit just below the surface, so as not to interfere with any clamping process.

21 Seal the sides and top with sanding sealer. Use a stippling technique on the top; this will prevent excess sealer clogging the holes. Wax and buff the top and sides, taking care to ensure no wax enters the clamping rebate, or gathers in the holes.

22 Use a proprietary fabric glue to adhere a piece of non-slip matting to the bottom; this can be trimmed to size once dry. Using reclaimed materials does have its advantages, as the glue and matting are the only materials that have to be purchased specifically for this project.

23 Next, cut one of the clamping pieces to a suitable length, which will be used as the fence. You can then mark out the slots, which will enable the fence to fit across the table at any angle.



24 The waste can be removed in several different ways, either by drilling or routing. In my case, the mortiser was the easiest option.

25 You can then cut six squares from the remaining clamping piece. Two of the blocks are centre marked with the rebate facing down; these will become the clamping blocks for the main fence. Mark the remaining four with the rebate facing up; these will become the auxiliary clamps or 'dogs'.

26 Select a Forstner bit that will match the size of the bolt heads and drill to an appropriate depth to countersink them in. Drill the blocks through with drills that match the thread diameter. Fit the dogs with M10 × 50 bolts and the clamping blocks with M8 × 75.

27 Fit the clamps to the fence and tighten them up into the rebate. If there is too much play, the clamps can be packed by adding extra material. Here I have added some cloth abrasive; which helps to provide extra grip. Wear should not really be a problem, as the blocks are placed into the rebate before tightening up and are not run along it.

"The combination of the fence and dogs allows a wide variety of shapes to be held securely"

28 The combination of the fence and dogs allows a wide variety of shapes to be held securely.

29 The rebates on the clamping pieces hold the work above the table, allowing the extraction holes to do their work more efficiently.

30 This project can easily be tailored to your own needs. The table on the left was made to accept a rotary tool set as either a router or a sander. As a belt and braces approach, the rebate was reinforced with mild steel, though this has since proved to be unnecessary. In continued use there is little evidence of wear on either the clamping blocks or the rebate. ■



24



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Old Windsor chair

This time **the Editor** has decided to rescue a weather-beaten old pile and give his 'country seat' a complete makeover – at least we know he's not just sitting around all day...



This poor old Windsor chair had been left out in the elements and reached the point when it was definitely bonfire time. Or was it? It had plenty of problems, but thanks to the resilience of the woods used in its construction – especially the elm (*Ulmus procera*) seat – with its ability to 'wriggle' out of shape but stay together

in one piece, there was a glimmering of hope that this 'old soldier' could be rescued, even now.

Assessing the problem

1 Elm is remarkably tough and will stay intact even as a wide seat, although it tends to misbehave shape-wise as this one has. There were some nasty cracks around where the back components fitted into it. However, they didn't threaten the integrity of the seat itself as they were only short cracks.

2 There were several lengthwise splits in the legs, but again, not actually serious structural defects. They looked worse than they really were. Judicious use of glue and filler should tidy them up.

3 A close examination revealed lots of short, very porous cracks in the legs, not serious but rather ugly and evidence of a lot of weathering. A fine filler would sort this out satisfactorily.



1



2



3

PHOTOGRAPHS BY GIMC/ANTHONY BAILEY

Chair disassembly

4 Fortunately, all the glue joints in this chair had failed, so it was just a case of thumping apart those ones that needed a bit of gentle persuasion. I was pleased to discover that the wood was quite tough, so a few discreet mallet blows wasn't about to harm the chair.

5 A key element of restoration and conservation technique that I have borrowed for this project is the labelling of all the parts, so it is obvious what goes where at reassembly. This ensures that, once reassembled, if you've labelled everything correctly, they should go together correctly and without difficulty. Some rails needed twisting to separate them.

6 The back spindles were labelled so there would be no mixup when they got fitted together again. After each stage of work the labels needed to be reattached.

Carrying out repairs

7 The first task was to dribble aliphatic resin glue into all the major cracks to help give some integrity back to each component. Glue was rubbed into minor cracks with a fingertip as well.

8 A steel card scraper with a formed burr on the edge, as shown in the scraper article on page 25 of this issue, was used to repeatedly scrape off the old varnish finish and glue.

9 Even the sharp back edge of a chisel came in handy, taking the finish back to bare wood. The beads are harder to scrape, but can easily be sanded instead.

10 The back rail was scraped clean in the same manner. With a burr formed on all four long edges – two per edge in other words – I could change around for new burr as the old one wore down.

11 The seat was more easily done with a sander and an 80 grit abrasive disc. Afterwards the grain needed wire-brushing to clear it of loose dust.



12 I hadn't seen one of these in a long while – a wriggle nail used during a previous repair; they are actually very neat and effective.

Filling the cracks

13 I decided the answer to filling was two-part filler for anything major and a very fine filler for all the cracks and gaps. I bought a new filler knife and, as usual, I stoned the edge a bit as I don't like the blunt edge on a new filler knife. Eventually, it will get thinner, more flexible and more knife-like – just the way I prefer it.

14 I decided that I would do all the filling while the chair components were apart. It was easier to do and easier to sand or level the fillings. The bigger two-part filler repairs came first. I tried to mix up only what I could do in a short space of time as it can be very wasteful if the unused filler hardens off too quickly.

15 As soon as the two-part filler was hard and sanded off flush, I applied the fine filler. I chose One Strike filler – it is very soft and almost mousse-like. It is easy to apply, rubbing it into fine cracks and equally easy to wipe off again with minimal sanding required after it has set.

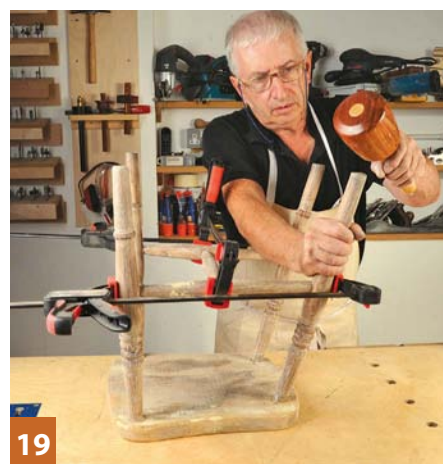
16 To sand the filler off I used my favourite MDF 'bats'. I have these in several different sizes with hook-and-loop fastening, to which I attached coarse 80 grit Abranet abrasive; this is non-clogging and very efficient.

17 For the spindles and legs I used a narrow 'bat' with Abranet attached. A quick run around all the surfaces got the chair components ready for reassembly.

18 The last surface to fill was the chair seat. I rubbed the filler all over using a household foam scourer and wiped it off again going across the grain to help keep the filler in the wood.

Glue up

19 Because the joints were quite loose I decided to use PU – polyurethane glue. This is an expansion glue, rather like builder's



expansion foam. The joints need to be clamped firmly so the glue could not push them apart. Then, a final tap on each leg to check it was seated fully. The legs were checked to see they were in the correct positions as the back legs angle outwards.

20 Once the glue had been given enough time to set, the hardened foam was cleaned off with a chisel and lightly sanded to remove any remainder. It was easier doing the seat first and leaving the back for the next operation.

21 Now for the back assembly. It was important the spindles stayed in their correct order as the fit could be tighter or looser in the wrong place and there was a 'set' or shape on some of them, which made assembly a little more difficult. Polyurethane glue was applied around the inside rim of each hole so the spindles then pushed the glue further into the holes.

"The elm seat had gone out of shape over time"

22 After a slight fight getting the spindles to go into their respective holes, the back rail went on well. Two squeeze clamps ensured the whole thing went together tightly. A visual inspection was made to check the back rail was level.

23 The elm seat had gone out of shape over time, so the chair rocked. A couple of deft cuts with a Japanese pullsaw levelled the two legs that were 'proud' of the others and the ends rounded slightly with abrasive papering.

24 The completed assembly looks very solid and almost good enough for a natural finish, apart from the filler everywhere. However, I was going for a modern two-tone 'upstyled' paint treatment so it could fit into a variety of settings.

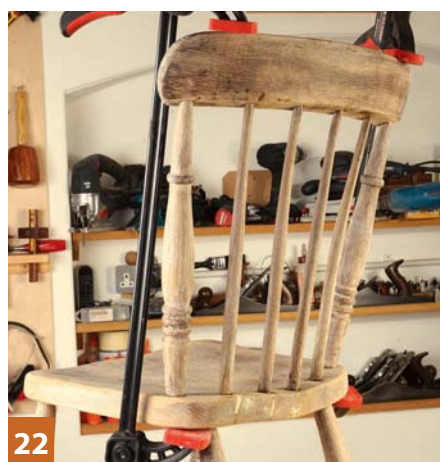
25 I had plenty of Hammerite Direct-To-Metal custom mixed paint, left over from painting my daughter Amber's treadle fretsaw. They don't specify it for wood, but I



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couldn't see a reason why not, apart from needing two coats to level the surface of the wood and to get a good degree of gloss finish.

26 After the first coat the chair needed a little denibbing with finishing paper. After that a second coat was applied. By painting the blue layer over each joint it made it easier to 'cut a line' when painting the pink on to it as it was smooth and no longer porous. Now, the job's finally done! ■



26

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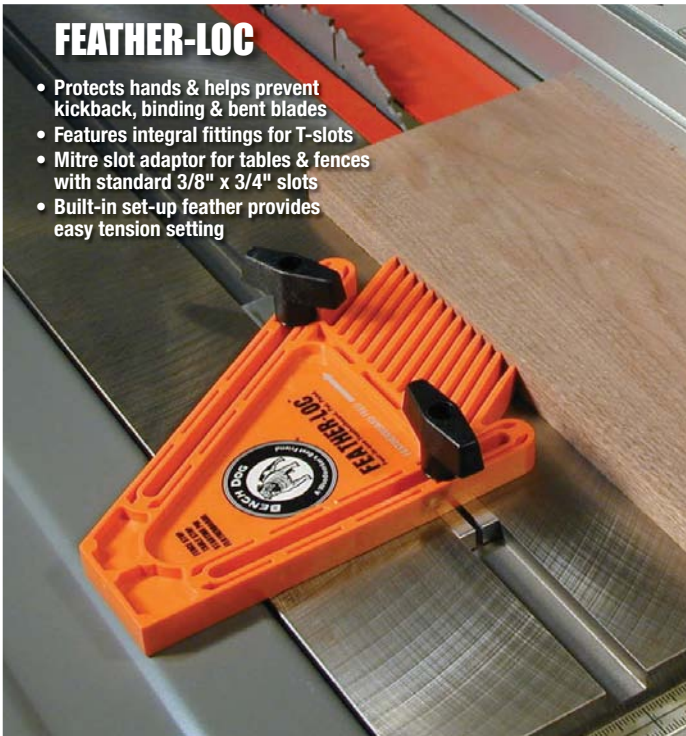


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3D-printed chair

In issue 86 we featured a hallway table made by **Joe Thomas**, then in his second year at Bucks New University. How has he got on since then? We thought we ought to take a look at his most recent creation – a chair with 3D-printed joints...

PHOTOGRAPHS BY JOE THOMAS



Joe Thomas

Joe developed a love of woodworking from an early age, thanks to enthusiastic design and technology education throughout school. This encouraged him to complete a City & Guilds furniture course at Herefordshire College of Technology, which further developed his woodworking skills and built on his interest and enthusiasm for fine craft. After graduating, he earned a degree in Furniture Design & Craft from Buckinghamshire New University. He is now training to become a secondary school Design and Technology teacher at Cardiff Metropolitan University.

Web: www.joemthomas.com



The joints were 3D-printed in blue nylon

3D-printed clip which could clip around a component and stay in place.

I soon realised that the 3D-printed parts weren't just components but were what makes the chair interesting and unique. Most 3D-printed parts are made in white plastic, which can be boring. Shapeways is a 3D-printing company that offers a variety of different materials and colours. I chose royal blue for my pieces as I liked the contrast with the white sycamore (*Acer pseudoplatanus*). Once I was happy with my design, I ordered the 3D-printed parts. Shapeways print and send the parts within three weeks.

The dowels

I ordered 30mm sycamore dowel from G&S Timber as it would save a considerable amount of time trying to turn 5m of dowel from solid pieces. The dowel is also

I made this chair as my major project in my third year at Buckinghamshire New University. I'm very interested in new technologies and how they're impacting industries and society, this was also the subject for my dissertation. I wanted to design something new that hadn't been done before, so I decided to explore the potential of using 3D-printing in furniture. 3D-printed pieces of furniture do exist, but they're wholly 3D-printed and as a result are incredibly expensive. I wanted to see how 3D-printing can be utilised to aid manufacture and combine it with cheaper materials and traditional manufacturing methods to create a piece of furniture.

3D-printing

3D-printing is a technology that enables the physical printing of three-dimensional objects in many different materials, from plastic to gold and even food. 3D-printing is starting to infiltrate many different industries but the furniture industry is still largely unaffected. If you search for 3D-printed furniture you'll find very few results and what you do find is ridiculously expensive as the pieces are wholly made using a 3D-printer, which is still a very expensive method of production. I think that although one day it may be economical to 3D-print whole pieces of furniture, I currently see 3D-printing working in partnership with traditional manufacturing methods and materials.

The key aspect of 3D-printing to consider is that it doesn't differentiate between what is technical and detailed and what is plain and simple. A simple cube takes just as long to print as an incredibly detailed ornate design. This requires a new way of thinking as you no longer need to be constrained by how to join components or how long and difficult a joint intersect would be to construct. I wanted to utilise this potential and exploit its possibilities within furniture.

The chair joints

At first I wasn't sure if 3D-printed joints would be strong enough, but research convinced me that they'd be up to the task. I knew that 3D-printing in nylon, when thin enough, has a certain amount of flex or elasticity in it. This elasticity got me thinking and I came up with the idea of having a



The wooden dowels are made from 30mm sycamore



The backrests were shaped using a template to ensure an identical bend

consistently 30mm along the length, which I'd never be able to achieve turning it all by hand. I cut all the components to the correct length leaving some overlength to allow for clamping on the lathe. I then centre drilled all the dowels on the lathe ready for the threaded metal bar to be inserted.

Assembly

Once the 3D-printed parts arrived I could start assembling the chair. As the 3D-printed parts are the joints connecting the components the assembly of the chair was very quick. My design used threaded metal rods screwed and glued into both the 3D-printed parts and the wooden dowel. Using metal rods increased the strength of the joints considerably and increased the gluing area of the joint too.

The 3D-printed parts needed tapping before the threaded metal rods could be screwed and glued into place. Once all the pieces had been tapped I could then insert the metal rods and glue them in place using epoxy resin. I used epoxy because it forms a bond between plastics, metals and timber without the need to penetrate into the fibres.

I turned the cutouts for the dowels and checked that the clip could snap around the dowel leaving a step-free edge. While the legs and back uprights were on the lathe I also turned them to length and turned a radius on the ends.

"I chose to finish the sycamore using white Osmo oil because I wanted the sycamore to maintain a clean white colour"

Finish

Once all the machining had been done and all the wooden dowels had been sanded to 240 grit, I applied the first coat of finish. I decided to finish the wooden components before assembling the chair because it's easier to finish components when they're still individual pieces as you don't have to worry about getting finish on any other sections of the chair. It also ensured I wouldn't get any finish on the 3D-printed parts. Once the timber has been sealed it means that if there is any bleed out of epoxy resin from the joints I could wipe it off using methylated spirit.

I chose to finish the sycamore using white Osmo oil because I wanted the sycamore to maintain a clean white colour and not turn a horrible yellow, which happens when using many other finishes.

I masked off the joint faces and the cutout where the clips went so the glue would seep into the fibres of the timber and form a stronger bond. I didn't need to finish the seat rails as these would be covered by the seat weave. This meant I could glue up the seat frame while waiting for the first coat of oil to dry.

Before gluing up the seat frame I drilled several small holes into the timber joint face to allow the epoxy resin to seep down the holes and penetrate into the fibres of the timber. One end of each rail could be glued and screwed into place, which made gluing up much easier; the other



The seat was woven from blue polyester cord

end just needed gluing. I then used one band clamp to pull the whole seat frame together while waiting for the glue to dry. Once the first coat of oil had dried I cut the dowel back to 320 grit and applied another coat of oil for a smooth finish.

The under frame

The next stage of construction was the under frame. This process required some thought as all the legs would need to be attached and the under frame glued together within the 30 minutes it takes for the epoxy to set. I decided it would be best to glue and screw the front legs on first before attaching the under frame and then screwing in the back legs. Once the front legs had been attached and the under frame clipped onto the front legs, I then clipped the back clips on above their location with the glue on the timber cutout and screwed the back legs in place and clipped the back clips into place. The location of the legs pushes the under frame together and closes up any gaps without the need for any clamps.

The backrests

The backrests attach to the back uprights with the same design clip as with the under frame. They have a slight bend in them for added comfort. My initial idea was to steam bend them, but this process proved to be surprisingly difficult. Each piece of timber reacts differently and springs back different amounts, so it was very hard to produce three identical pieces, each with the same bend. I eventually decided that it would be easier to cut the backrests out of a solid piece of timber and to shape them round and use a template to ensure they all had the identical bend in them.

Once the pieces had been trimmed to size I could start shaping the components into 19mm curved dowels. To do this I first cut the components into octagonal tubes using a 45° router cutter. This helps in reducing the amount of material I'd have to remove afterwards by hand. I could then shape the octagonal pieces into round components. I used round and flat-bottomed spokeshaves and 80 grit abrasive paper to help remove any of the high spots left around the dowel.

After shaping the backrests, I had to put a slight round shoulder on each end so that they matched the rest of the

"I feel that I have proved that the potential of 3D-printing for furniture making truly does exist"

components. I put a new bed on the router table and used a bearing cutter with only a very small amount of the blade extruding, holding the dowels upright I then very carefully twisted them until the shoulder went all around.

The final stage of the frame assembly was attaching the backrests to the clips, the clips to the back uprights and the back uprights to the frame. To do this I again only needed to use one band clamp to pull the components together and remove any slight gaps.

The seat

The seat was woven using blue polyester cord to match the nylon joints. After several failed attempts I eventually developed the knowledge and skills required for seat weaving and understood the importance of following a strict plan otherwise the weave wouldn't meet correctly in the middle. I chose to do a weave that had the finished appearance of lines coming in from each corner and meeting in the middle. I chose this design as my chair frame isn't square and using this method you could fill in the corners before moving onto the rest of the seat. I think the finished weave looks good and is very firm with minimal sagging even when you're sat on it. I also feel the thin weave adds to the final appearance of the chair as it maintains its sleek, elegant design.

Conclusion

I'm very pleased with the final appearance of the chair, particularly with the colour combination and how well all the aspects of the design have worked. I feel that I have proved that the potential of 3D-printing for furniture making truly does exist and I'm very interested in the future of the industry and what I can do to inspire a new generation of creative thinkers who will hopefully continue to push the boundaries of what is possible. You can view an interactive PDF of the chair design on my website. ■



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Using a scraper

In the previous two issues, **the Editor** showed us how to successfully plane a board to a complete finish, all bar one final process – using a scraper...

Rather like our modern approach to preparing timber, i.e. using a planer/thicknesser, or buying already prepared stock, finishing is generally done by using sanders – either belt, orbital or random orbital – in order to bring the process to an easy conclusion. In days of yore such means didn't exist and other methods were developed to bring a fine finish to a wooden surface. The fairly universal one still espoused by makers of quality furniture today is the humble scraper. Just a flat piece of springy steel can remove all the highs and lows in a surface and deliver a lovely smooth result if done correctly. Let's look at how this can be done.

TYPES OF SCRAPER

Card scraper

The term for a flat rectangle of steel that is prepared so it develops a burr on the edge capable of cleanly cutting the wood with a scraping action. It requires thumb pressure to bow the scraper in use. Card scrapers come in different sizes and thicknesses and experimentation is needed to find the best one that you want to work with. Thin scrapers bow much more easily than the thicker ones, which isn't necessarily good.



A selection of card scrapers



PHOTOGRAPHS BY GMC/ANTHONY BAILEY

Shaped scrapers

The same thing, but delivered in a number of useful shapes for scraping curved profiles effectively. You can create your own shapes as well as buying ready-made ones. Standard shapes are gooseneck, radius or straight with larger radius.



Handled scrapers

These put the blade, which is thicker than the card type, within a handled body; this makes it easier to use and also avoids the thumb pressure and uncomfortable heat build-up associated with the card type.



Scratchstock

The scratchstock, a wooden bodied tool fitted with blades of different shapes, is in fact a scraper, so I have included it here. The action allows the production of grooves for inlaying, stringing and banding or for creating beads and reeds on furniture.



Scraper plane

A scraper plane looks and behaves rather like a conventional plane, except the blade, as with all scrapers, angles forwards and has a burr. The essential bowing of the blade can be adjusted as required.



Glass scraper

Strictly for the specialists, a thickish piece of cleanly cut glass that can be used to scrape difficult timbers that don't behave well when scraped with a metal blade. Safety gloves need to be worn to avoid the possibility of cutting yourself.

PREPARING THE SCRAPER BLADE

There are slightly different methods of creating a working burr on a scraper blade, but the aim is to raise a burred edge or edges that project over the face of the blade, so when it is pushed along the wood at a forward angle, the burr can dig in sufficiently to catch and lift thin curly shavings from the surface. If a burr is tiny, too curled over or worn by use, any shavings may be too few and too fine and dusty rather than the pure shavings you are looking for. There is a trick to doing this, which is learnt from experience, as trying to apply an exact 'burring' regime to it is fairly impossible.



TYPICAL METHOD



1 Place the card scraper face down on a medium sharpening stone with lubricant, then rub it back and forth to remove any burr that may be present. Repeat on the other face.

2 Clamp the blade vertically but low down, in a vice for proper support, and use a medium file to flat the edge. Alternatively, if your sharpening stone is level, then rub it back and forth vertically to do the same thing.

3 Traditionally, a burnisher or 'ticketer' is used to 'spread' the steel to create a burr. This is a two-stage operation.

4 First, lie the scraper flat on the bench so it is slightly overhanging the edge and pressed down by the palm of your hand. Which one will depend on whether you are right- or left-handed.

5 Using the other hand, take the ticketer – no doubt named because

of the clicking noise it creates as it comes on and off the scraper – and rub it firmly along the edge of the top face at a slight angle. This should make the metal spread slightly. You will need to take several strokes to achieve this.

6 Clamp the scraper blade vertically in the vice and run the burnisher along the top edge with it angled down slightly towards you. Repeat back and forth several times; this pushes the slight metal projection from the last step so it curls over creating the burr. At the same time the pressure is squashing the edge so it adds to the projection of the burr.

7 To check if a burr is present, run your fingernail along under the burr. It should feel both present and constant in size all the way along, or you can rub a fingertip gently across the face of the scraper to check for a burr. You can create a burr on both faces while you are at it.



MY FINER SHAVINGS METHOD



1 Very similar, except I use the same large combination diamond plate that I use for sharpening all my edge tools. It stays flat and reliable. It can be used for both scraper face and edge preparation before turning the burr. It is the edge finish from the plate that makes the difference.



2 After that I substitute the ticketer for a screwdriver shaft as these are hard and have a chrome vanadium coating, which makes them ideally tough for forming a burr. A number of passes back and forth are needed for an acceptable burr to develop.



3 The difference between these two methods of creating a burr is quite obvious. On the left, the sharpening stone and file make thicker coarse shavings, while on the right, the diamond plate and screwdriver method creates much finer shavings, which are ideal for using after the other method for a better finish.

USING A SCRAPER



1 Take an already planed, flat piece of board as a test piece and fix it firmly to the bench. Bench dogs are ideal as they don't obstruct the surface of the workpiece.

2 This photo demonstrates holding the card scraper in both hands, using both thumbs to make it bow forward in the middle. The amount of bow can influence how much is taken off.



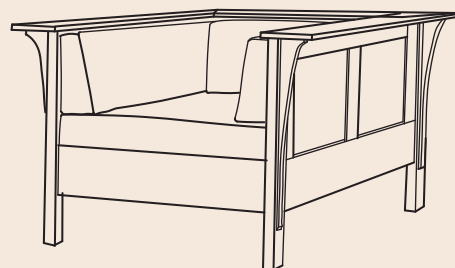
3 Push the scraper forward and, in theory, a shaving should be produced as it cuts the surface without any risk of digging in. Experiment with different amounts of bowing to observe how it changes the cutting action.

4 If you cannot get decent shavings because they are too dusty or tiny, then don't worry, just go through the process of creating a burr all over again. Your thumbs not only get sore scraping after a while, but they will also get hot as the blade metal heats up, hence the use of scraper planes!

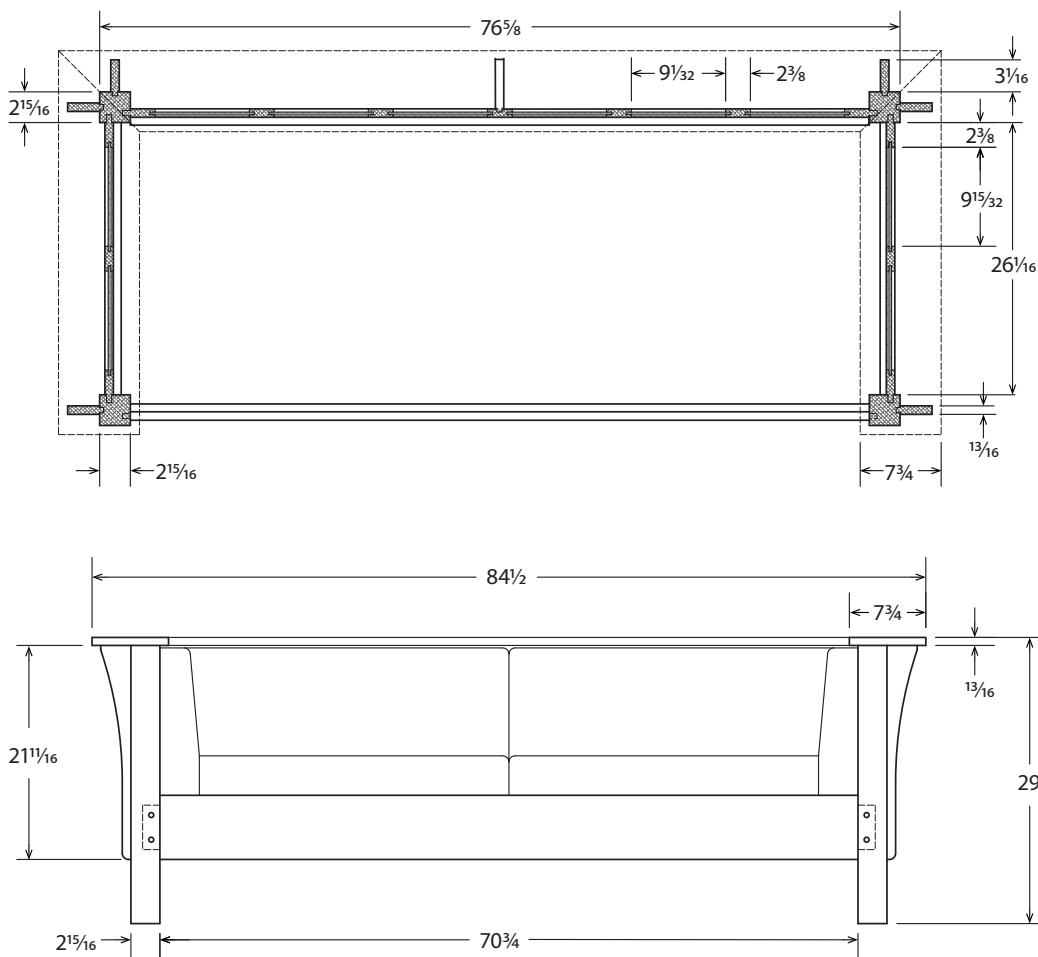
5 Scraping is hard work, but the results can be very satisfying and if done evenly and well, the surface should be ready to apply a suitable finish whether oil, French polish, varnish or lacquer. ■



Taken from the *Great Book of Shop Drawings for Craftsman Furniture*, we look at Gustav Stickley's No.220 Prairie Sofa

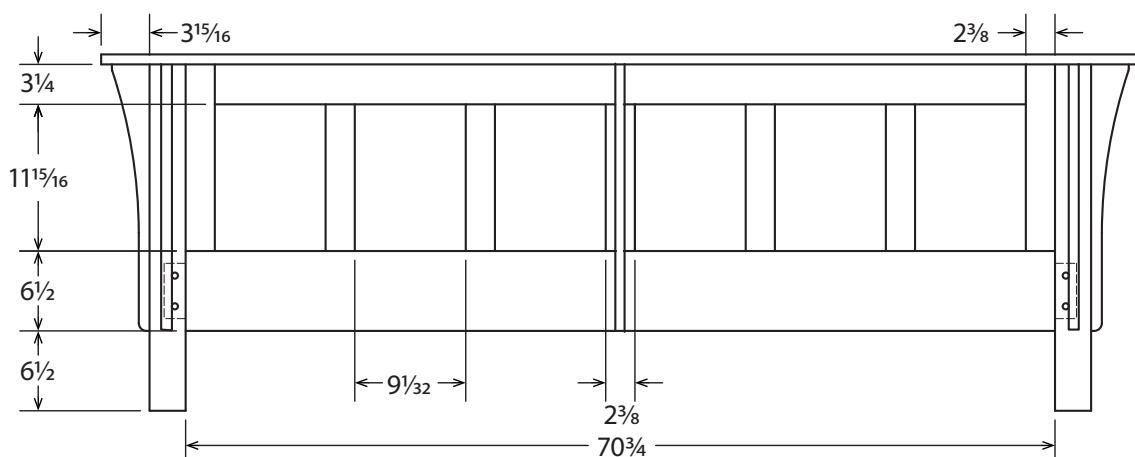
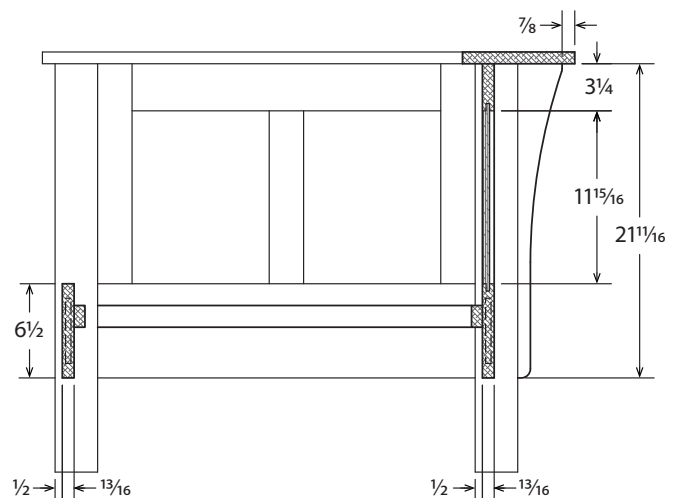
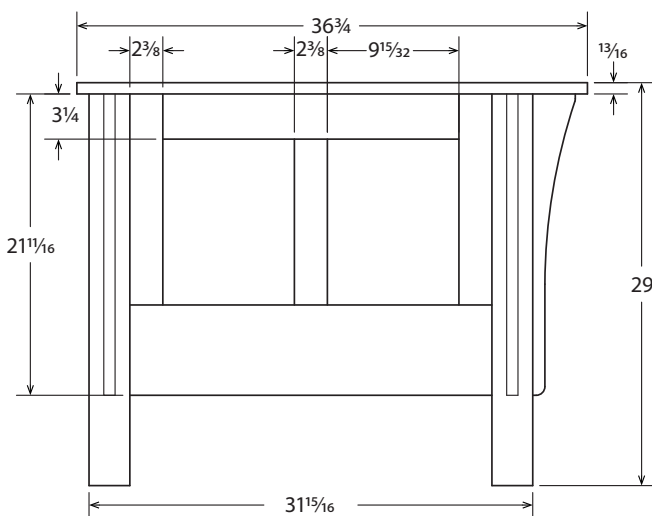


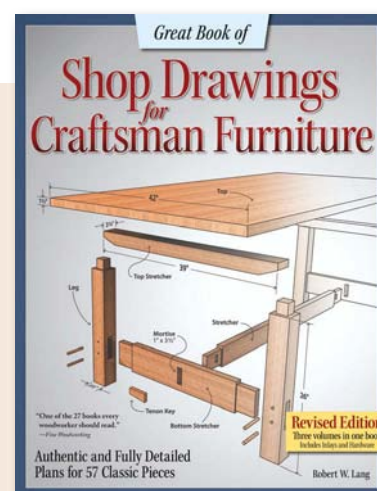
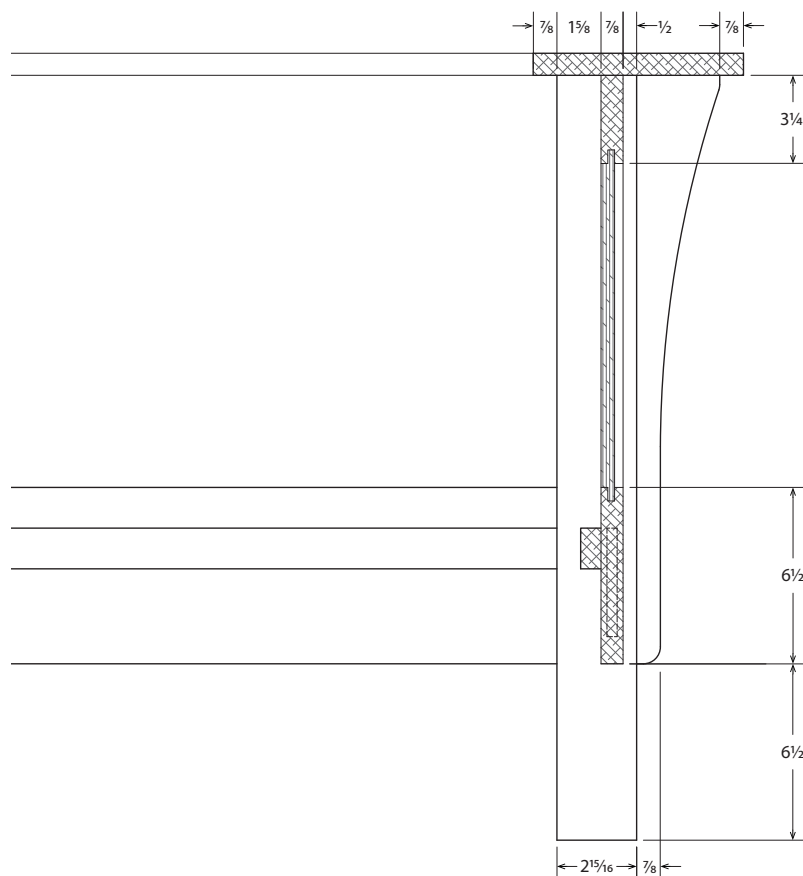
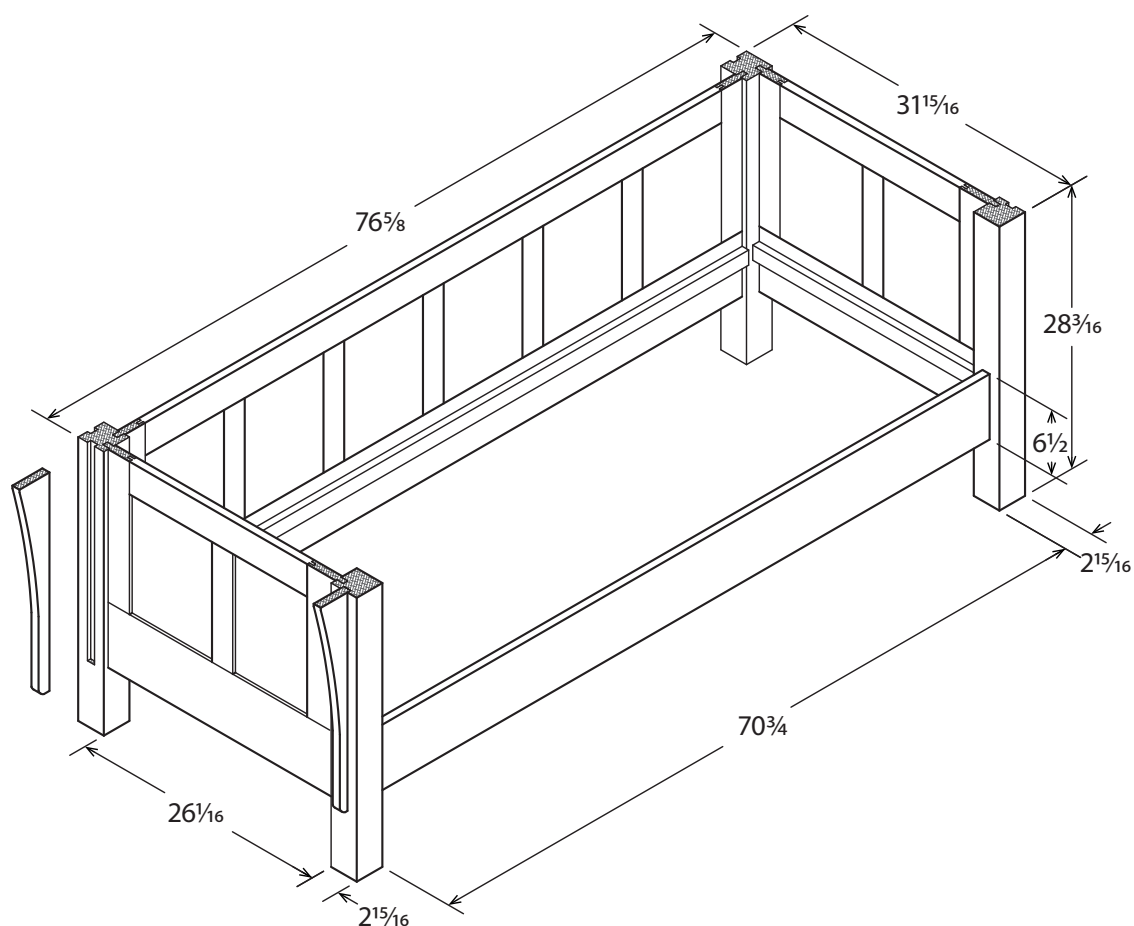
The overall dimensions are 29in high × 84½in wide × 36¾in deep.



Cutting list

Qty	Part	Size	Notes
4	Legs	$2\frac{1}{16} \times 2\frac{1}{16} \times 28\frac{3}{16}$	
2	Side panels	$\frac{1}{16} \times 27\frac{9}{16} \times 21\frac{11}{16}$	$26\frac{1}{16} \times 21\frac{11}{16}$ exposed - parts detailed below
4	Side outer stiles	$\frac{1}{16} \times 3\frac{1}{8} \times 15\frac{1}{16}$	$2\frac{3}{8} \times 15\frac{3}{16}$ exposed
2	Side middle stiles	$\frac{1}{16} \times 2\frac{3}{8} \times 12\frac{1}{16}$	$11\frac{1}{16}$ between tongues
2	Side top rails	$\frac{1}{16} \times 3\frac{1}{4} \times 22\frac{5}{16}$	$21\frac{5}{16}$ between tongues
2	Side bottom rails	$\frac{1}{16} \times 6\frac{1}{2} \times 27\frac{1}{16}$	$26\frac{1}{16}$ between tenon shoulders
4	Side panels	$\frac{1}{2} \times 10\frac{1}{2} \times 12\frac{1}{16}$	$9\frac{1}{2} \times 11\frac{1}{16}$ exposed
1	Back panel	$\frac{1}{16} \times 72\frac{1}{4} \times 21\frac{11}{16}$	$70\frac{3}{4} \times 21\frac{11}{16}$ exposed - parts detailed below
1	Back bottom rail	$\frac{1}{16} \times 6\frac{1}{2} \times 73\frac{3}{4}$	$70\frac{3}{4}$ between tenons
1	Back top rail	$\frac{1}{16} \times 3\frac{1}{4} \times 67$	66 between tenons
2	Back outer stiles	$\frac{1}{16} \times 3\frac{1}{8} \times 15\frac{1}{16}$	$2\frac{3}{8} \times 15\frac{3}{16}$ exposed
5	Back inner stiles	$\frac{1}{16} \times 2\frac{3}{4} \times 12\frac{1}{16}$	$11\frac{1}{16}$ between tongues
6	Back panels	$\frac{1}{2} \times 10 \times 12\frac{1}{16}$	$9 \times 11\frac{1}{16}$ exposed
1	Front rail	$\frac{1}{16} \times 6\frac{1}{2} \times 73\frac{3}{4}$	$70\frac{3}{4}$ between tenon shoulders
2	Arms	$\frac{1}{16} \times 7\frac{3}{4} \times 36\frac{3}{4}$	
1	Top cap @ back	$\frac{1}{16} \times 7\frac{3}{4} \times 84\frac{1}{2}$	
6	Corbels	$\frac{1}{16} \times 3\frac{1}{2} \times 21\frac{11}{16}$	3 exposed
1	Corbel	$\frac{1}{16} \times 5\frac{1}{16} \times 21\frac{11}{16}$	$4\frac{1}{16}$ exposed
2	Seat supports	$\frac{3}{4} \times 1\frac{1}{2} \times 70\frac{3}{4}$	
2	Seat supports	$\frac{3}{4} \times 1\frac{1}{2} \times 26\frac{1}{16}$	





DETAILS:

Great Book of Shop Drawings for Craftsman Furniture, Robert W. Lang, Fox Chapel Publishing

ISBN: 9781565238121

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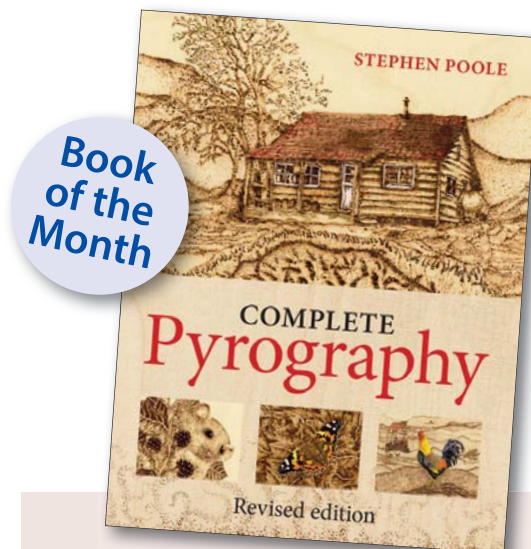
Complete Pyrography

by Stephen Poole

The revised edition of *Complete Pyrography*, by Stephen Poole, is a masterclass in pyrography techniques, covering the history of pyrography right through to teaching you some simple project patterns to sell. Stephen makes sure to start with the basics, for those who are new to pyrography. He looks at materials and types of wood, sources for composition, tools, equipment, starting out and even gives a sampler to try. The guide covers creating nature images, still-life and atmospheric scenes.

Stephen doesn't just stick with beginners, though, as he then moves on to intermediate and advanced pyrography. He looks into how to create life-like textures, furs and shading, and also covers the use of colour in your work, which is not addressed in many pyrography books. Going into more detail in equipment use, the guide has an 'exploration' of hot-wire and solid-point techniques. After the step-by-step projects Stephen provides, he looks at how to protect your finished work and even marketing and selling it.

As a highly respected teacher in the craft, it would be expected that Stephen would cover all possible aspects of pyrography, and that he certainly does.



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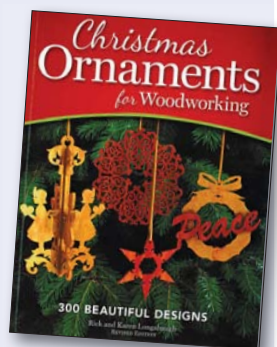
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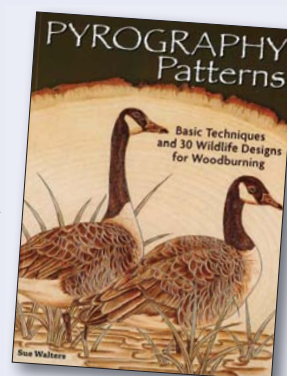
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by Sue Walters

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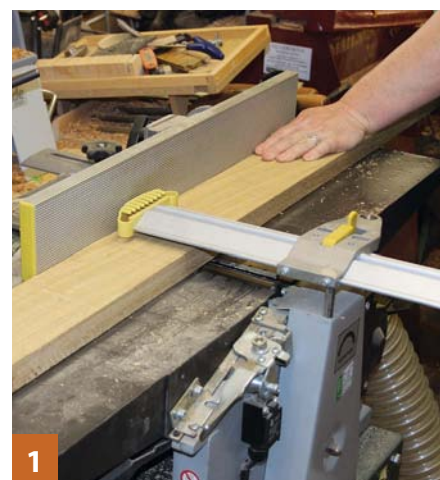


Wendy Greenwood makes an oak TV stand with plenty of storage space

Gone are the days when your TV was a box-shaped object, which at one point came in its own cabinet. Modern TVs have become much slimmer with larger screens. They are usually accompanied by a selection of technical items to record, play, tape and much more. This TV stand was designed to take a reasonable sized TV and also to fit into the space available for it. It has storage cupboards for DVDs and an adjustable shelf for various recorders and players. It is made in oak (*Quercus robur*) to match the coffee table in a previous issue of *WPP*. There is space at either

side of the top shelf to take speakers if required. The width of the inner shelf is 500mm, which will be wide enough to take most technical 'add-ons' that are available.

1 The pieces of timber I used were rough-sawn oak. If using similar, the first task is to put them through the planer to give a flat edge to work from. Pass the pieces of timber over the planer until the surface is flat and free from any saw marks. It is important to keep the fence as near the top of the plank of timber as possible, and also to keep fingers well away from the blade.



Safety note

Apart from edge planing, **ALL** surfacing must be fed **UNDER** the guard not next to it, as advised by the Health and Safety Executive

PHOTOGRAPHS BY WENDY GREENWOOD

2 Once the surface is flat, pass the timber over the planer again; this will give a flat edge that is at right angles to the flat surface. It is easier with a wide piece of timber to keep fingers away from the blade of the planer but if you're planing a narrower piece of timber, then a pushstick can be used.

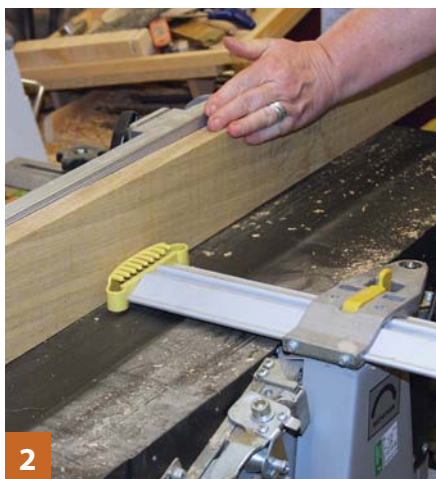
3 Here you can see the timber being put through the thicknesser on its edge to give an even width of board. Pass the timber through on its face; this will ensure that the plank is the same thickness along its length. Once all these processes have been done, the timber is ready to work with.

4 If some ends of the timber are uneven, saw the planks to give a right-angled straight edge, which makes it easier to measure lengths from. Use a sliding crosscut saw to do this task. These pieces can be used for other small jobs.

"Use No.20 biscuits, five in each edge of the base and top and three in the uprights, shelf and the top shelf"

5 The next task is to cut the lengths of timber for the base, top, upright panels, shelf and top shelf. Here you can see the laser being used to make sure that the timber is being cut in the correct place. You can see that two pieces of timber are being cut at once. The two pieces should be clamped together, which will prevent them from moving while being cut.

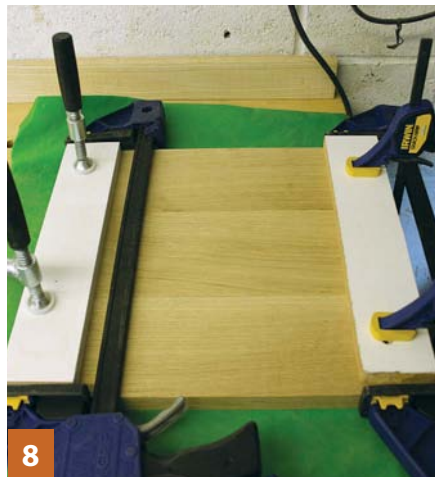
6 The pieces of timber cut for the base, top, uprights, shelf and top shelf need to be joined together. I chose to biscuit mine together as the biscuit joints are easy and quick to do. Using the biscuit joiner, cut slots into the edges of all the boards. Use No.20 biscuits, five in each edge of the base and top and three in the uprights, shelf and the top shelf. The workbench surface can be used as the datum rather than relying on the fence, which can still be used as a 'hold down'.



7 Glue the biscuits in and join the edges together to form a wider board. The photo shows the biscuits in the edge of one of the uprights, and also one board already glued up.



8 Once all the planks are biscuited and glued and joined together, they need to be clamped until the glue has set. Use longer clamps to apply pressure on the edges and other clamps on the pieces of scrap timber to prevent the planks from bowing.



9 Once all the joined planks are dry and set they can be sanded. For any bad machining marks a belt or orbital sander can be used, followed by some hand finishing. To give a good finish always sand in the direction of the grain. Work through the grits from coarse to fine using standard abrasive papers. However, if you get the chance, try some Abranet mesh. It doesn't clog and has a brilliantly efficient cutting action. Note: it is possible to use a belt sander cross-grain, which is excellent for flattening slightly cupped boards, but even with a random orbital sander, it is impossible to remove the cross-grain scratches. However, it can be used for internal surfaces where residual scratch marks are much less visible.



10 The shelf in the middle of the TV stand is going to be adjustable so drill a series of holes in the uprights. Use a cardboard template to make sure that the holes on both sides of the space match and that the shelf will be level. Drill the holes just big enough to take the little shelf supports. An alternative method is to create an MDF jig for use with a router and guidebush combination. Use a 16mm Forstner or router bit to drill the guidebush holes and use a 5mm straight bit in the router to make the support holes.



11 The next task is to make the cupboard doors. The central panel for the doors is made from thin panels of the same timber as used for the rest of the construction. You can do this by cutting a length of timber plank in half and then passing it through the planer/thicknesser. The pieces of half thickness, slightly less after planing, can then be measured to length and cut.



12 Use 25mm thick prepared timber to create the door panel frames. The narrow sections form the stiles – see the pull-out plans on pages 40 and 41 – and the wider sections make up the top and bottom rails. Once cut overwidth they need accurate planing and thicknessing to ensure they go together properly. Cut all sections to length, including the jointing allowance; this means all sections run right through to the door corners. Try and match the grain or figure on the frames and also on the panels. Oak often has some quartersawn ray figure showing, so it helps to position it to look best.



13 The door framework is made using bridle joints, also known as open/slot mortise joints. Cut these joints using a saw, and then clean up with a chisel to make a snug fit. Cut the tenons in the rails and the open mortises in the stiles. (The bridle joint, which Wendy refers to, will be featured in several issues' time in the 'Joint Solutions' series, so watch out for more on this very useful jointing option – Ed.)

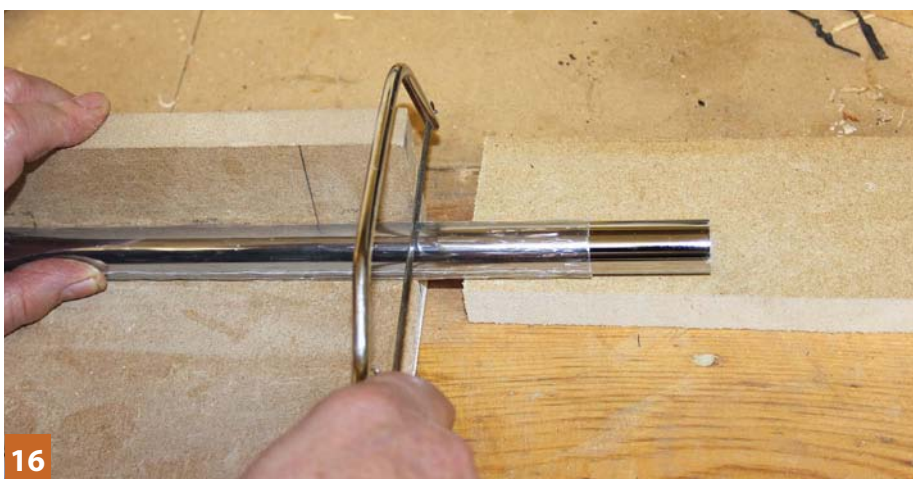


14 The next step, once the joints have been cut, is to rout a groove along the inside edge along the centre of the piece of timber. Stop the grooves in the top and bottom piece of the doorframe before reaching the tenon. Use a featherboard on the router table to prevent kickback. At 6mm wide, this groove is very slightly wider than the panel; this provides space for any slight movement in the timber.



15 To put the doorframe together glue the tenons at the bottom, put one upright in position and then the panel can be slotted into the groove without any glue. Glue the tenons on the top piece, slot the panel into the groove and then finally the upright. Neither the panel nor the groove are glued, only the bridle joints. Next, clamp the doorframe, making sure it is square.

16 While the panels are drying you can cut the chrome tube to length; this will support the top shelf. Cut the tube to a length of 100mm using a small hacksaw; this will allow you to cut through the tube without denting it.



17 It is easier to apply a finish at this stage, before joining the components together. Sand all the components down to remove any scratches. Apply a coat of oil and allow to dry before rubbing down with a fine grit sandpaper. Apply a second coat of oil and leave to dry before final construction.

18 Once the door panels have been sanded and oiled, cut the recesses for the hinges. After deciding what distance from each end of the door the hinges need to be, use a marking knife to lay the hinge on the frame and mark out the area that needs to be removed. Use sharp chisels to first cut the perimeter of the area and then to slowly and carefully remove the timber. Keep checking the depth so that the hinge will sit flush with the edge of the doorframe.

19 Join the base and top panels together using biscuit joints. Cut the biscuits into the top and bottom edges of the uprights – use three No.20s in both edges. Next, glue the carcass, clamp and check the frame to make sure it is square and then leave overnight to dry. Once the frame is dry the doors can then be screwed into place.

20 I chose small oak knobs for the doors. Drill a pilot hole through the door and also into the knob; this will prevent any splitting when the knob is screwed on.

21 Screw a door catch onto the inside of the door; again, drill pilot holes to prevent splitting. The choice of door catch is up to you.

22 The top shelf is supported by chrome tubes, which will sit into cups screwed to the top of the base unit and the underside of the top shelf. I decided to have the top shelf flush with the back of the base unit, and in the middle of the length. Measure this carefully and set 25mm from both edges of the top shelf. You will need round-headed screws to fix the chrome cups in place. To avoid damaging the slots use ordinary twinfast screws to act as pilot screws first, then use the proper chrome ones afterwards. If you want to be a bit 'bling', then gold finished tube and cups could be used instead.





23 Once the cups are screwed to both the base and the top shelf and you've checked that the top shelf sits level, place silicon around the base of the chrome tubes, which will help to stabilise the supports. Do this on the cups on the top shelf first and leave to dry before turning them upright and placing in the cups screwed onto the base unit. It goes without saying that the cup positions must match or the tubes won't all be upright and parallel to each other. You need to make sure that the positions on the top board have been marked across from the carcass; this will ensure they match.



24 Rout the backs of the cupboards to make a rebate to take the 3mm white-faced hardboard. If you want to do things the traditional way, you can square out the rebated corners with a wide sharp chisel following the line of the rebate as you chop them out carefully. It does mean you can fit square back panels without any rounding to put them in. The rebate needs to be wide enough to take the pins. If you use screws, pre-drill so the wood won't split when putting them in.



"The unit is light in colour and fits in with a modern setting and there is plenty of storage and display space..."



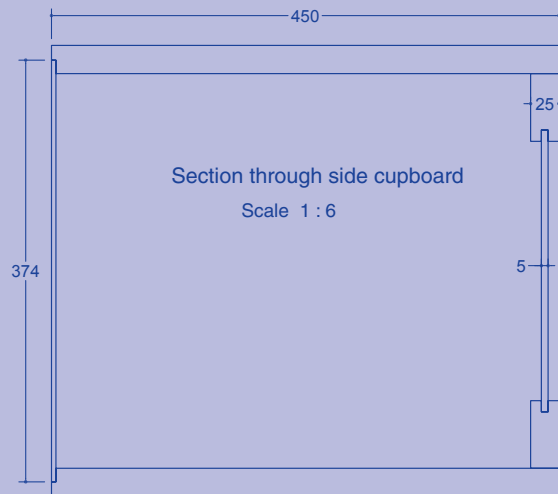
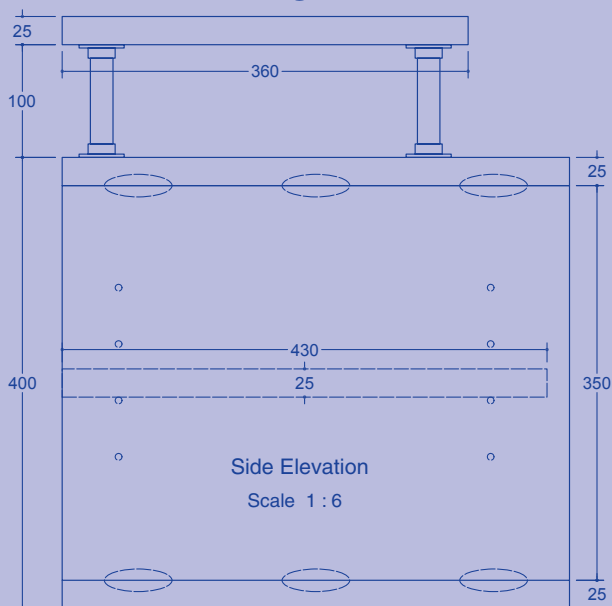
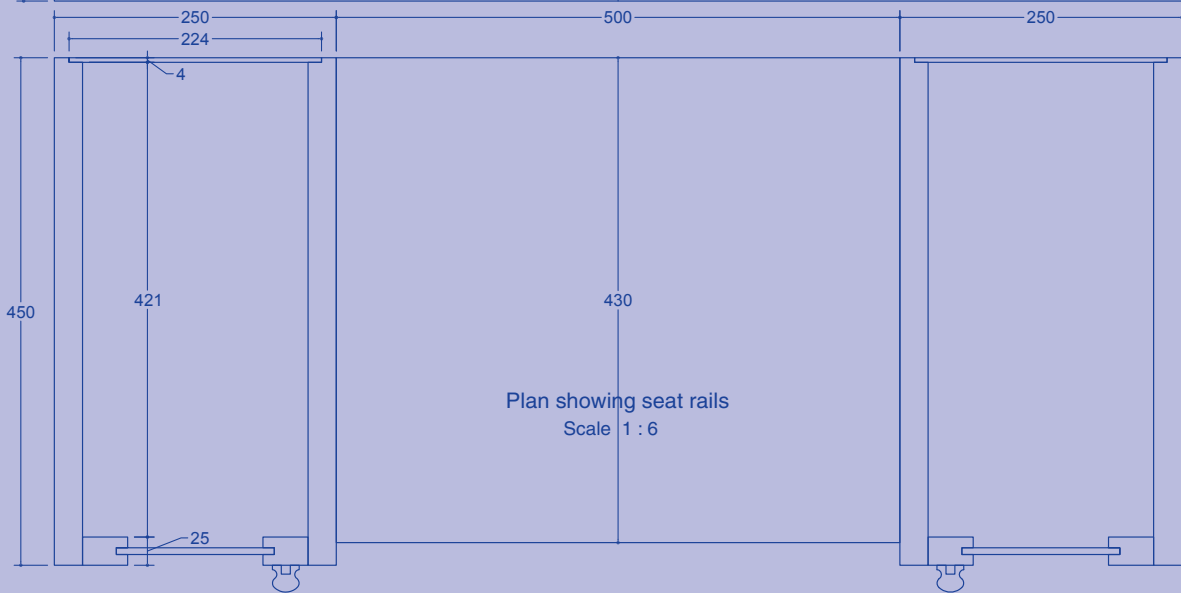
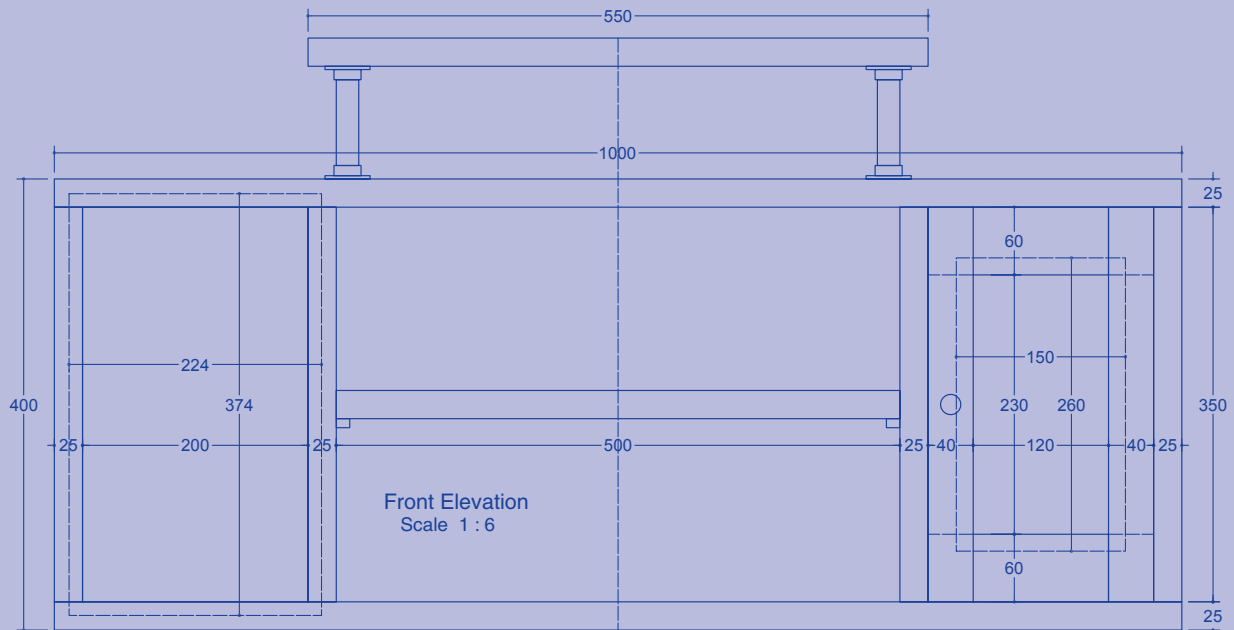
25 Next, glue the hardboard into place and use panel pins as an additional fastener. If you want to have the back panels in keeping with the rest of the unit, then you can use pre-veneered oak face 6mm ply or MDF. Some suppliers can provide part boards for this kind of job.



26 The finished TV stand should look something like this. The unit is light in colour and fits in with a modern setting and there is plenty of storage and display space on top as well as in the cupboards. If you have a special decoder unit and extra cables, then you may need a cutout, which will ensure that you can easily access these items. ■

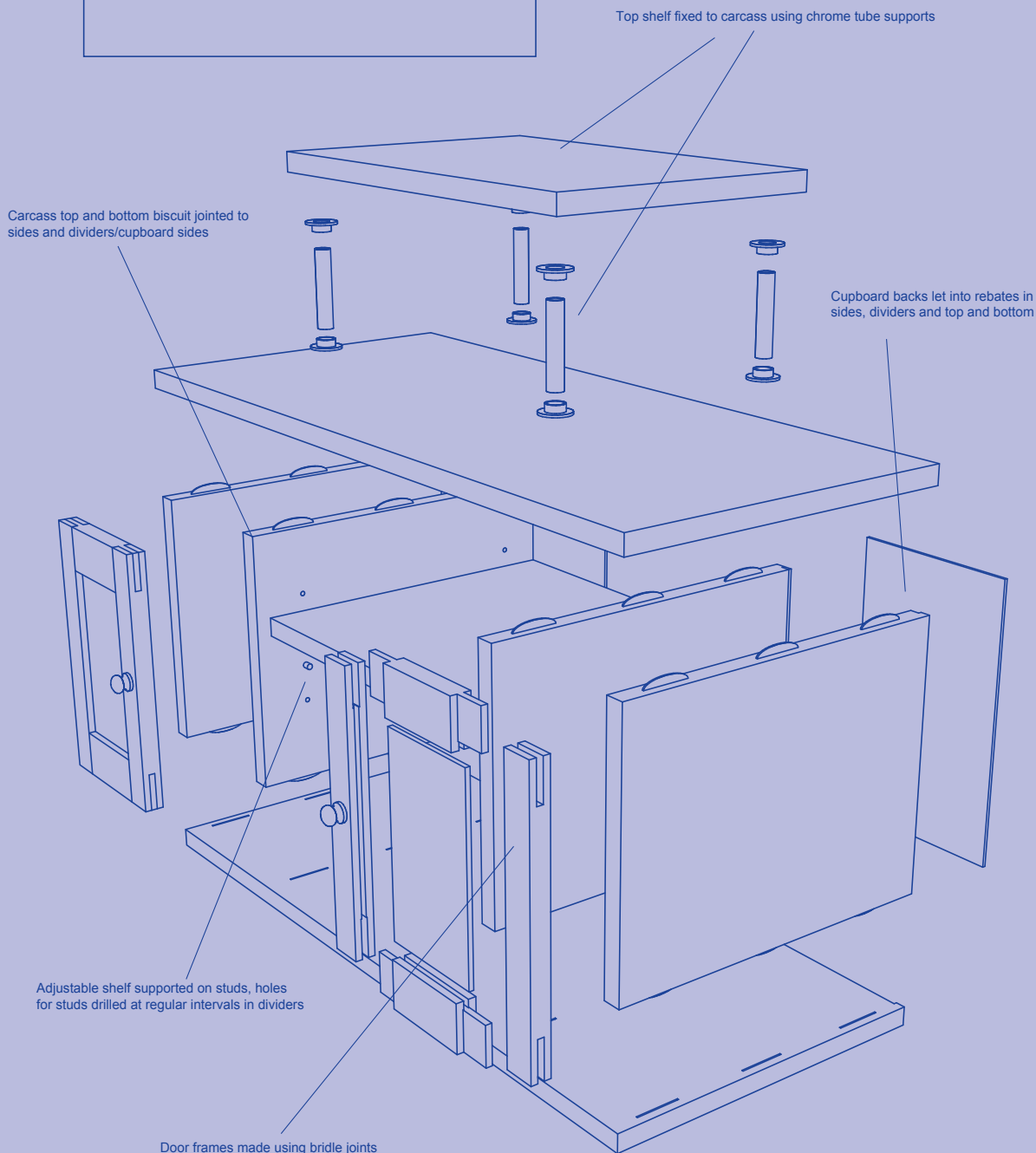


Your free TV stand plans



Cutting List

TOP/BOTTOM	2 @ 1000 x 450 x 25
SIDES/DIVIDERS	4 @ 450 x 350 x 25
BACKS	2 @ 374 x 224 x 4
TOP SHELF	1 @ 550 x 360 x 25
ADJUSTABLE SHELF	1 @ 500 x 430 x 25
DOOR STILES	4 @ 350 x 40 x 25
DOOR RAILS	4 @ 200 x 60 x 25
DOOR PANELS	2 @ 260 x 150 x 6



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Workshop notes:



Fitting a vice

Anthony Bailey talks about fitting a vice

Previously, I have described restoring an old Lervad workbench for my daughter Amber. What it lacked was a small vice, so I went looking for one as I only had a big secondhand Record 53.½ E in stock. Judging by the blue marks underneath the one I found, it was a Record vice before and the bolt spacing meant it had to be a No.50 model. Secondhand vices fetch good money, so I thought I had a bargain on a very vintage quick release version, at £25. I had a gut feeling it might not match because of its age, as it turned out, I was right. The book *Planecraft* by C & J Hampden, then owners of the Record

brand, put the vice's age at pre-1960s, whereas the Lervad was probably a 1970s bench model. Because it was so old, the quick release on the No.52 didn't even have a dust cover at the vice rear, let alone over the buttress thread. A good cleaning and degreasing followed.

The first thing to do was to mark and cut out recesses to take the cast reinforcing ribs behind the rear jaw. I used a pullsaw to work into the tight 'pocket' space where the jaw would sit. This would then allow me to chisel out the waste until the vice bedded into place nicely.

The next stage was getting the bolt

holes to line up, which was not an easy job. Two were more or less in line and the bolts wound in, so the rear vice jaw was pressed forwards against the front inside face of the jaw pocket. Once that was done, I could re-drill the other two holes and wind those bolts in.

The last job, being a bench for marquetry work in the main, Amber decided to paint the vice front in a smooth pink – Direct To Metal Hammerite – at least I persuaded her not to paint the tommy bar, shaft and quick release lever as it would have worn off! Last of all, a careful re-greasing for the vice bars.



1 This older model vice required slots, which help to accommodate the ribbed casting.



2 A Japanese pullsaw was ideal for making restricted stop cuts behind the vice jaw slot.



3 A bit of chiselling was needed until the ribs fitted in properly and vice casting seated flat.



4 Luckily, I discovered that the first two bolt holes were a virtual match for the existing ones, although new holes were needed at the rear.



5 The next step was a check for slight vice 'toe-in', which is essential if the jaws are to grip the work properly.



6 Pink paint – it is my daughter's vice – plus new birch ply jaws with leather facings for delicate workpieces complete the fit. ■

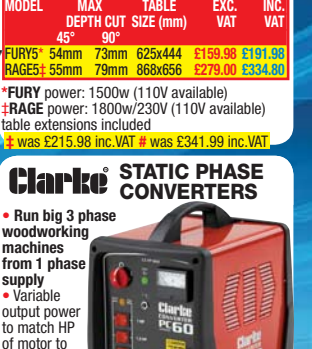
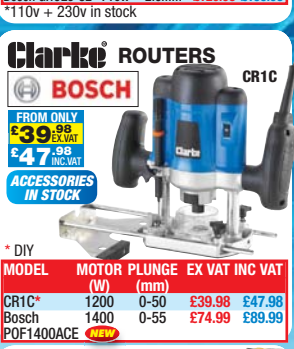
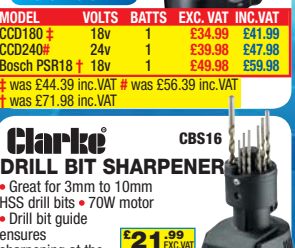
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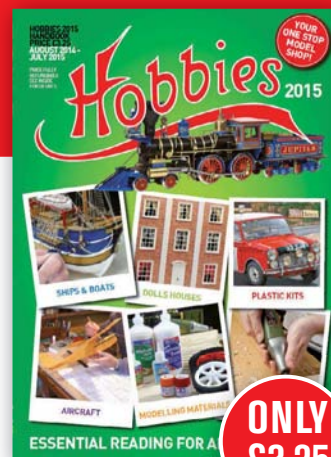
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Warco CM2 chisel mortise machine

The Editor looks at this specially dedicated chisel mortising machine from Warco

There are several ways of machining mortises: router, chain or chisel and each has its merits and demerits. Where you get involved in regular work that needs mortises cut, it deserves a proper solution that delivers a good quality finish without further work needed, such as squaring routed sockets. For a very reasonable cost it's well worth considering the Warco CM2 with its 6-12 x 75mm deep chisel capacity. It takes up limited space and can work over the end of a bench for large components.

What it is

It features a geared column and piston return with vinyl type ridged pull-

down handle. There is a top work clamp to stop components moving and the fence can be removed if needed. Workpieces can be clamped to the back of the fence and there is also a depth stop collar to limit the mortise depth. It is also worth noting that there is the larger, better specified CM3 floorstanding model if you need a more industrial solution.

Verdict

This particular machine is compact but heavily built so it can cope with some serious work and yet not take up a lot of space in the workshop, which is good to know. This is good for the occasional run of work if you don't need a regular mortising facility.



Accessing the CM2's chuck to tighten the drill bit



A downward work clamp holds the workpiece securely



The piston that supports the mortiser head of the machine

THE NUMBERS

Model: CM2 chisel mortise machine
Motor input: 370W/230V
Spindle speed: 1,400rpm
Chisel capacity: 6-12mm
Mortising depth: 75mm
Drill chuck capacity: 1-13mm
Height: 780mm
Table size: 340 x 150mm
Base size: 320 x 200mm
Spindle to fence: 65mm
Chisel to table: 120mm
Headstock rotation: 0-360°
Weight: 31kg
Price: £175 (RRP inc VAT)

WHERE TO BUY

Contact: Warco
Web: www.warco.co.uk

Craftsman's corner



One of the two-bay cart barns, complete with wood store

With a Classic Barn Company frame you not only receive a generous cross section of oak but you also receive a well sized and beautifully designed building boasting many traditional features

The Classic Barn Company

The Classic Barn Company offers a wide range of quality oak-framed barns and garages

This month we look at the Hampshire-based, family run business The Classic Barn Company. As members of The Guild of Master Craftsmen they provide strong, reliable and quality oak (*Quercus robur*) framed barns and garages throughout the UK. The timber, which has been used over hundreds of years for frame building, sits at the centre of the company's work, producing two-bay cart barns, three-bay cart barns, accommodation barns and bespoke frames. With a secondary office in Sussex, the company have a reputation locally for 'being the most generously detailed frames in the marketplace', sourcing the oak for the frames, specifically for their purpose. With offices in Hampshire

and Sussex, they are easily accessible in the surrounding counties. They even sign-off their frames with a signature plaque.

With experienced teams of craftsmen to create and install the frames, The Classic Barn Company know they can maintain the quality of each frame installation, all while delivering the projects to the clients on time. They manage the entire project, from planning through to completion, to create a building that will only be a valued investment towards the enhancement of your property. All frames are carefully designed and crafted in their saw mill and as well as their standard range of oak frames, The Classic Barn Company can offer the unique



Ethos

The Classic Barn Company's ethos is simple: to create a beautiful detailed oak framed barn that reflects genuine quality throughout its design. Support along with a service that is both transparent and efficient ensures each project represents excellent overall value, enabling their clients to pass on a good name

Above: Each garage utilises traditional mortise and tenon joints and hand curved features. Even the roofs remain open-span

Extrawide™ range, which offers exceptional width across each bay.

As The Classic Barn Company say, their service starts in their free brochure, after which – upon choosing a potential design – a friendly chat with a consultant is arranged for a detailed discussion on the project. Following that is a free, no obligation site visit, and once the appropriate frame has been chosen, The Classic Barn Company team will complete the frame foundations to the Building Regulations. The team can be very flexible with what they cut, so do not be afraid to make suggestions and ask for something different. ■



Another example of one of the beautifully made two-bay cart barns

The most important element of each oak-framed garage is the frame



Details

Contact: The Classic Barn Company

Tel: 08448 000 708

Web: www.oakgarages.com

For more information on The Guild of Master Craftsmen, see www.guildmc.com

Hot Stuff

Take a look at the tools, gadgets and gizmos that we think you will enjoy using in your workshop

Prices correct at time of printing and inclusive of 20% VAT. Photographs and information courtesy of the manufacturers

Bosch GAL 1830 W Professional battery charger

Bosch is the world's first supplier to enable the advantages of 'inductive energy transfer' to be used with cordless tools. With the launch of its 'wireless charging system', they are opening up a new dimension in charging technology and providing new ways to make work with cordless tools efficient, cost-saving and time-saving. Bosch kicked off the 'Wireless Charging System' in autumn 2014 by launching the GAL 1830 W Professional battery charger and the GBA 18V 2.0 Ah MW-B Professional 18 volt Bosch will begin the new era with the GAL 1830 W Professional charger and the GBA 18 V 2.0 Ah MW-B Professional CoolPack battery. The GAL 1830 W Professional is exceptionally compact and currently the smallest charger available on the market for 18V lithium-ion batteries.

£109.99



CONTACT: Bosch
TEL: 03447 360 109
WEB: www.bosch-professional.com

Roughneck Logger's Mate

This new product is specifically designed to simplify and enhance safety levels when it comes to cutting logs, branches, timber, fence posts and other similar items with tools such as chainsaws and bow saws.

Constructed from lightweight, ultra-durable superior grade steel as well as supplied 'flat-packed', the new Roughneck Logger's Mate offers maximum portability and ease of storage. Once at the intended site of use, it can be assembled in seconds to provide a full height cutting bench.

The fully adjustable vice-like grip allows you to safely and securely hold logs and other lengths of wood from 50mm to 240mm in diameter, up to four metres long and weighing as much as 150kg. After use, the product can then be disassembled and packed away just as quickly.

CONTACT: Olympia Tools
TEL: 01189 511 942
WEB: www.olympia-tools.co.uk



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£17.88



Irwin's new circular saw blades

This range from Irwin offers a complete assortment of blades suitable for every application and material, all of which are compatible with any machine on the UK market. It includes the launch of two key ranges – Marples Stationary Blades and WeldTec Handheld Blades. The Marples blades for stationary mitre and tablesaws are high quality blades and are specifically engineered for a longer life, flawless finish and ultimate precision. The range comprises 28 products, ranging from a rake angle of -5-15°, either Alternative Top Bevel (ATB) or Triple Chip grind (TCG) toothing, angle of 10-25°, a tooth count of 24-100, diameters of 216-305mm and kerf thicknesses of 2.5-3.2mm.

WeldTec for handheld, corded and cordless are designed with the busy contractor in mind and feature welded carbide teeth, making easy work of foreign objects, such as nails and staples that could otherwise cause the blade to break. The ATB is perfect for crosscutting and ripping in all woods, while heat vents will keep the blade cool.

Last month also saw Irwin officially launch its digital circular saw blade selection guide – a first for the industry.

Available online and on iPhone and Android, the guide will match any machine brand with the required diameter and arbor, leaving users to choose their desired tooth. Users will be able to manually input specifications to bring up relevant blades. The blades are now available in stores nationwide.

CONTACT: Irwin
TEL: 01543 447 001
WEB: www.irwin.co.uk



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PLANS

4 YOU

Step stool

Simon Rodway shows you how to make this multi-purpose step stool based on a Shaker design

Cutting list

Stool sides	2 @ 460 x 354 x 20mm
Top step	1 @ 375 x 188 x 20mm
Bottom step	1 @ 375 x 106 x 20mm
Back brace	1 @ 375 x 75 x 15mm
Seat braces	2 @ 375 x 40 x 12mm

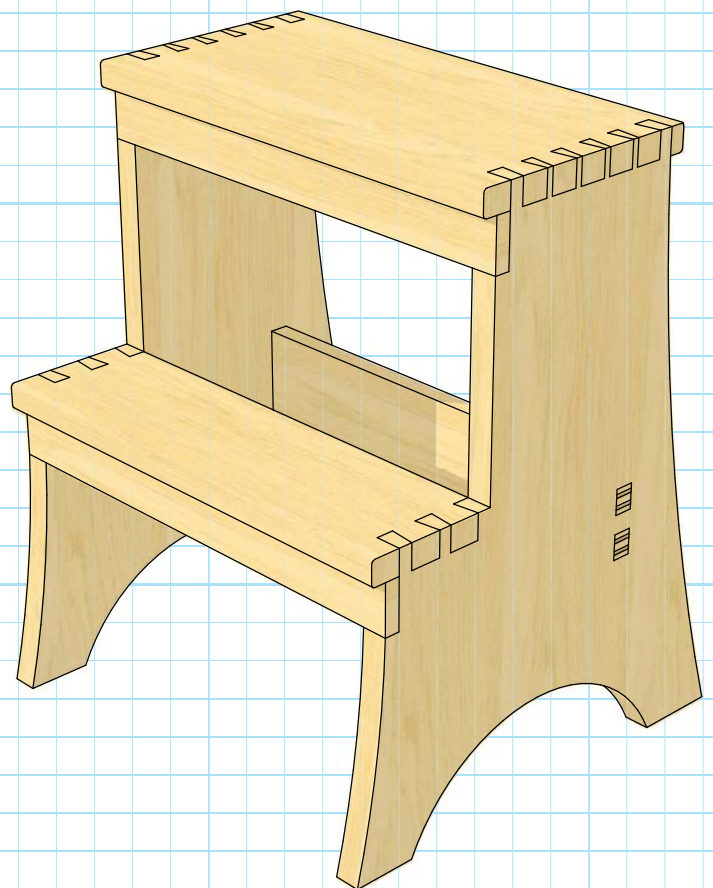
I've always had a real admiration for multi-purpose things: they seem cleverer than ordinary objects; a bit like someone who can multitask with unflappable ease. The step stool has a long tradition, a simpler version of its cousin the library steps, which usually have a folding element, and I particularly like some of the Shaker examples you can find. However, if you really need stability from a piece of furniture, then it's probably a good idea to make the base wider than the top – a principle that is applied to lots of things from step ladders to chairs. With this in mind, I've taken a Shaker idea and added curves, spreading the base of the step stool beyond both steps – or seat if you prefer.

Making the step stool

There isn't a great deal of timber in this, so a nice hardwood is an affordable option. However, you will have to make the sides up from two or three planks glued together and this is where you need to start. A biscuit jointer is a great time saver here, but routed grooves and loose tongues or splines will do the job. Plane the edges square, mark the biscuit positions and cut the slots slightly long so that you can adjust the planks as you are gluing up and cramping. Once set, sand both sides flat with an orbital sander and then use some double-sided tape to fix the two sides together. This will allow you to cut them as a pair without any movement, once you have drawn out and cut the side template. A thin piece of hardboard or MDF/ply will do best for this. Make sure you don't cut the notches for the braces that go under each step too deeply, as the brace will then be set back behind the front edge of the side and spoil the effect. At this stage, also include marking out and cutting the mortises for the twin through tenons on the back brace.

Dovetail jointing

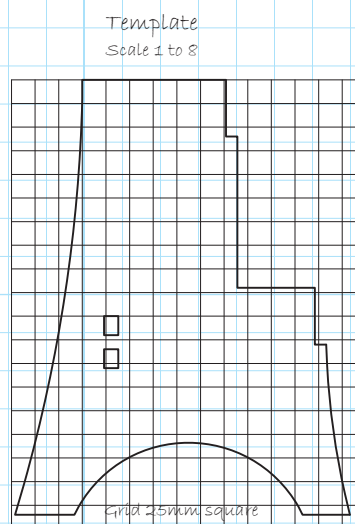
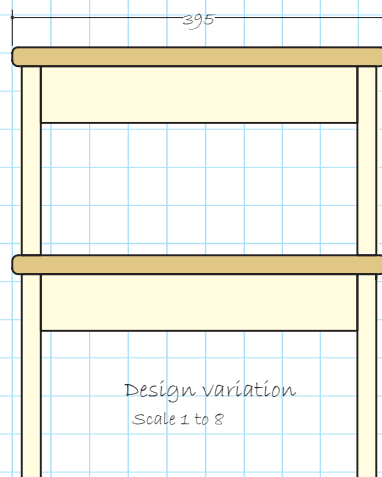
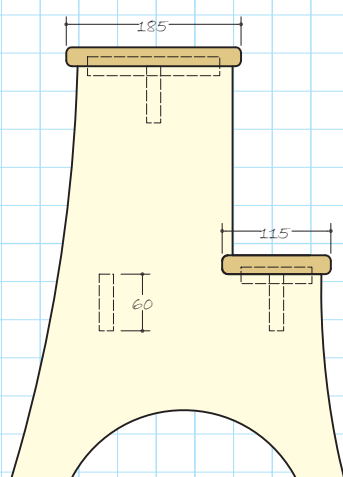
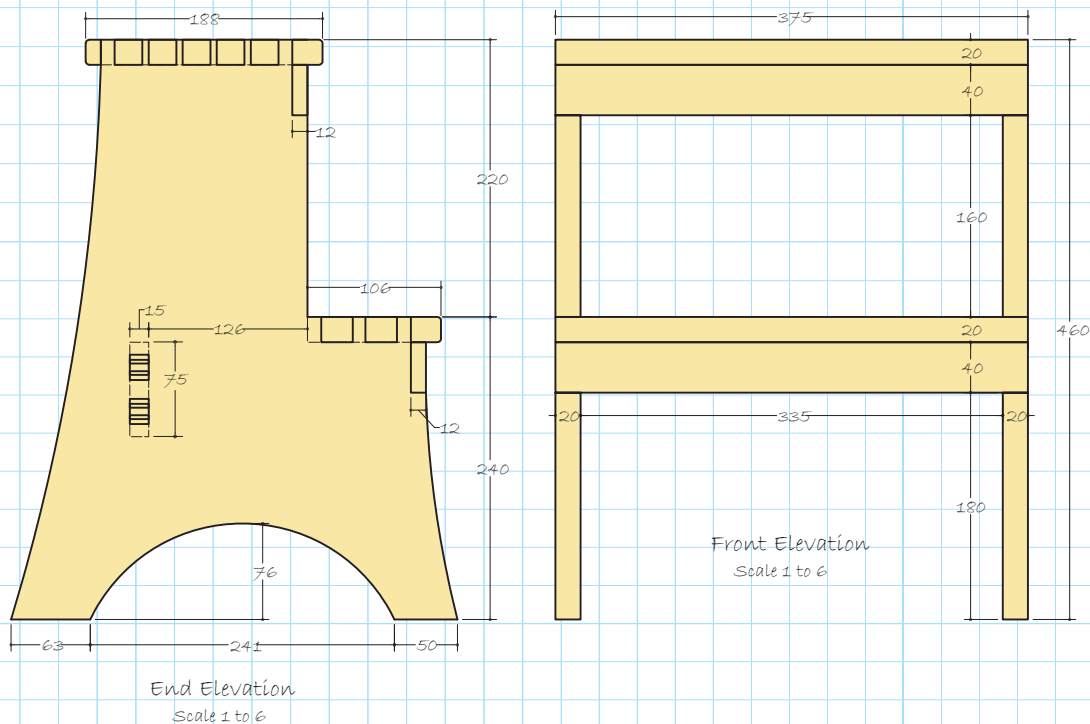
Next, you need to cut the steps and the braces to length and width. Leave the two front braces just slightly wide, so that



you can make sure they finish flush with the underside of each step when you dry assemble. Mark and cut your tails on each end of both steps and use to mark out and cut the sockets on the sides. At this stage, you could round over the front edges of both steps and the back edge of the top. Now you need to cut the twin tenons on the ends of the back brace and then add saw cuts 4mm in from each end of each tenon for the wedges. Cut your wedges at approximately a 4-7° taper and use a contrasting wood if you like, as this can look really effective.

Dry assembly

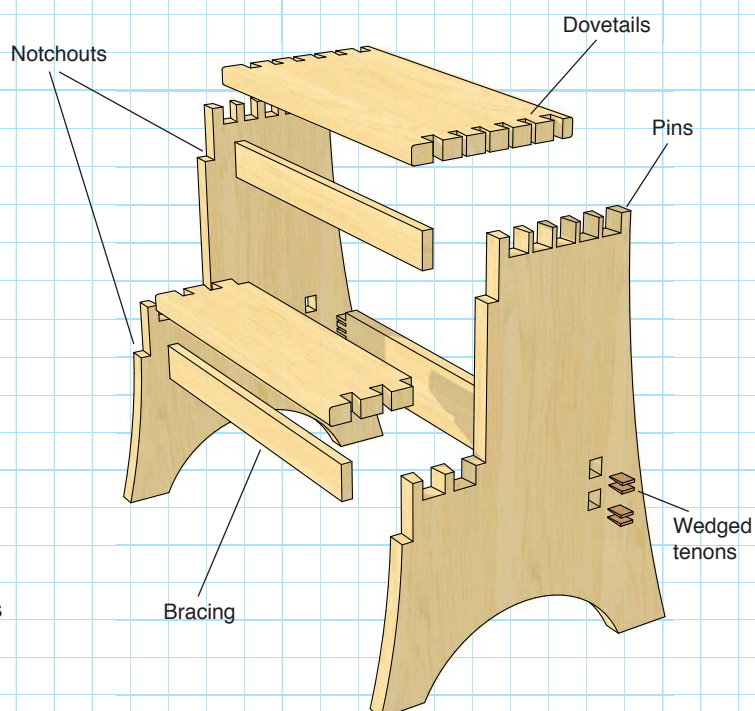
You also need to flare or widen the exit side of the mortises for the twin tenons; this will allow for the spreading action of the tenon when you insert the wedges. The rule of thumb here is to widen the mortise each side by the width of the thick end of the wedge, minus the thickness of the saw kerf. You should now be ready to dry assemble the stool and check for square against the underside of the



steps and sides. Glue up starting with the back brace, as all your other components can be slotted in with the two sides parallel. The two step braces are just glued in place, to the sides, and then along the top edges to the steps above.

Alternative design

I've included an alternative design with this month's project, which doesn't involve lots of accurate jointing. The steps have a small overhang at the sides and are loose tenoned into the sides as opposed to dovetailed. The braces are all dowel jointed into the sides and the two seat braces are located centrally under the steps. Additionally, the bottom step is let into the front edge of the sides. The template would need to be modified to allow for this and you would need to leave out the notches for the seat braces as well as shorten the sides where the steps are located, as they finish underneath the steps, instead of interlocking with dovetail joints. ■



Turned jardinière

Jim Robinson makes a stylish jardinière

This jardinière is turned from European yellow oak (*Quercus robur*), mostly 50mm and 38mm thickness after planing. The centre column is about 75mm diameter, so it has been necessary to join the wood together to make up this thickness. It is possible to buy thicker wood to avoid gluing thinner material together, but it is my experience – particularly in oak – that shakes are likely to occur in this thicker material. It is often a better job to make up the thickness. A 50mm piece is sawn to provide two equal thicknesses to make up the column. My lathe would take the length of the centre column in one piece, but it looks better if it is broken up with the centre decoration or boss, also there is less vibration to worry about when turning shorter pieces.

The centre column

First of all, glue together two thicknesses to make up the blanks needed for each of the two stem parts. The two columns are held in clamps until set, then in a similar manner, make up the size for the centre boss. The centre boss is made in the same way, but it was necessary to glue three pieces together. The column is joined to the centre boss and the top and bottom with a 19mm diameter pin, so it is necessary to cut the blanks for the column long enough to accommodate the length of the pin.

Cutting list

Part	Qty	L	W	T
Stem	1	395	70mm dia.	
Stem	1	405	70mm dia.	
Centre boss	1	145	100mm dia.	
Base feet	4		50 dia.	25mm
Base disc	1		305 dia.	53mm
Base disc 2	1		250 dia.	50mm
Base disc 3	1		172 dia.	50mm
Base disc 4	1		115 dia.	45mm
Top disc 1	1		260 dia.	50mm
Top disc 2	1		210 dia.	47mm
Top disc 3	1		128 dia.	50mm

1 For this project, you need to use wood that is mostly 50mm thick or slightly less.

2 The centre column has to be cut from 50mm thick board and glued together with a 50mm board to make up the required thickness.

3 Saw a 50mm piece to provide two equal thicknesses; these will make up the column.

4 Glue the two pieces together and apply PVA to one face only.

5 Hold the two columns in cramps until set.

6 The centre boss is made in the same way but it is necessary to glue three pieces together.

Turning a column length

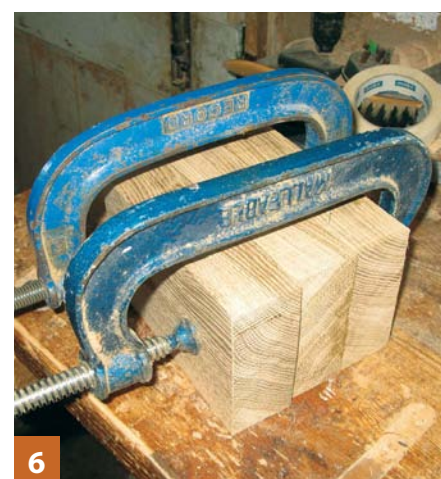
Prepare the column length for turning by cutting the ends square and marking the end centre position by drawing diagonals. To simplify the turning, tilt the bandsaw table to 45° and cut away the corners, being careful not to remove too much.



“Run the lathe at a slow speed if you are drilling hard material”

Mount a drill chuck into the headstock and then hold the blank between a revolving centre and the drill centre. I used a machine sawtooth bit to carry out the drilling. With the lathe running at a slow speed, drill the 19mm diameter hole in one end. Hold the wood stationary with your left hand and slowly advance by turning the headstock wheel with your right hand until you reach a depth of about 25mm. When you are drilling a hard material, it is best to run the lathe at a slow speed.

Replace the drill chuck with a driving centre, then reverse the blank so the drilled hole is located over the tailstock and the other end is centred on a driving centre. Some revolving centres are too small in diameter to use this method, so you may have to turn a plug to fit in the 19mm diameter hole and locate the revolving centre in this plug.





7

Turn the blank into a cylinder using a large gouge held on its side and at a slight angle. Start with the handle held about 90°, then gradually raise it until it starts cutting – this gives a better finish than scraping. Next, smooth the cylinder by planing with a large skew chisel. There is no need to be frightened of the skew chisel; if you take light cuts only, then use the centre third to avoid a dig in. A large skew chisel is a very versatile tool and if you are not experienced with it, it is very worthwhile practising until you are proficient. Plane the cylinder smooth with the middle third to avoid dig in, but I used a different technique to smooth the ends of the cylinder. To avoid a dig in, cut with only the long point of the tool and hold the tool at a slight angle away from the wood so that the point is the only part that makes contact. This is a useful way of smoothing the end after you have used a parting tool or small chisel to reduce the pin to size, checking with Vernier callipers as you proceed.

7 Draw diagonals to locate the centre, then remove the corners with a bandsaw set at a 45° angle; this makes the turning easier.

8 The three blanks to make the centre column are now ready for turning.

9 Joint the parts together with a hole and pin. Make the hole with a sawtooth bit, but held in a chuck mounted in the headstock.

10 Use the lathe to drill the hole with the drill mounted in the headstock and the other end of the blank held against a revolving centre mounted in the tailstock.



8



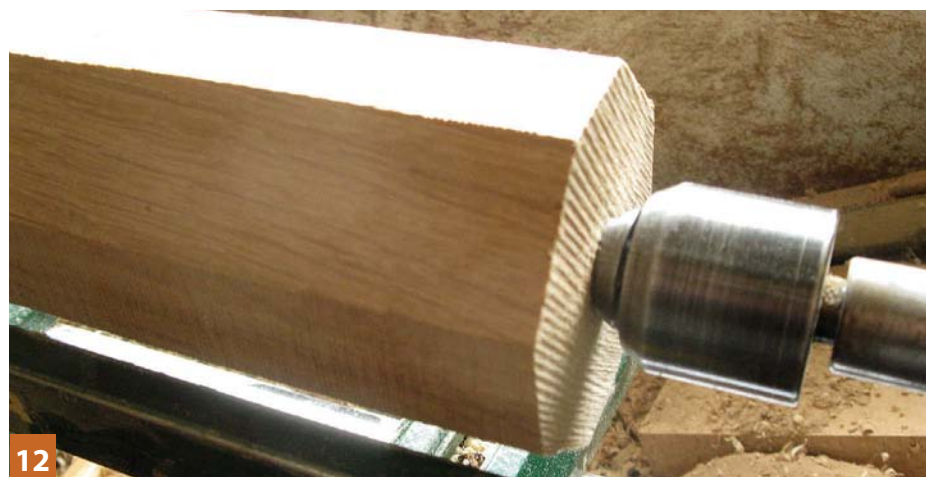
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10



11



12

- 16** Use the long point of a skew to mark the extent of the pin.



17 Complete the shaping of the pin to size with a parting tool or beading tool.

18 Use Vernier callipers to check the size of the pin.

19 Turn the centre bead on the stem boss using a small beading chisel.

20 Turn the concave parts of the boss with a fingernail gouge; keeping the tool well over on its side will allow you to take light cuts and ultimately achieve a good finish.

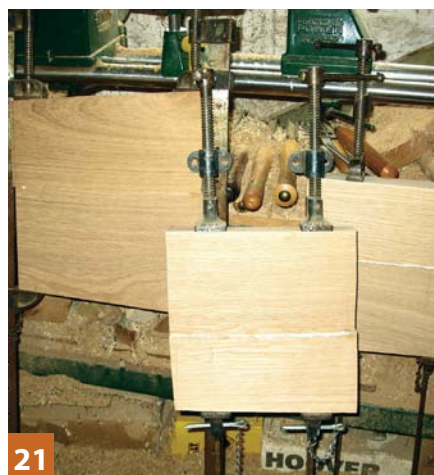
The base and top

The base and top are turned as a series of discs, each one the thickness of the wood available – in my case generally a little under 50mm thick. The base needs to be fairly substantial to keep the whole thing stable. To prepare the wood for turning, glue together the width required, then cut to a circular disc with the bandsaw before screwing to a faceplate. When fixing the plate to the headstock, place an 'O'-ring on the screw thread first; this prevents the faceplate from jamming, which makes it difficult to remove after turning.

"Start by turning the disc to a true circle"

After turning the discs, glue them together. It helps to position them if a central hole is drilled. This also adds strength when a 19mm diameter length is turned to fit the hole. With the faceplate screwed on the headstock a 19mm diameter hole can be drilled with a drill mounted in a chuck fixed to the tailstock. If the tailstock is advanced, slowly the hole is located in the centre of the blank. Do not drill all the way because you might encounter the faceplate; however, the hole can be extended when the disc is removed from the faceplate upon completion of the turning.

When turning wood screwed to the faceplate there are a couple of places when you are turning across the end grain, so care has to be taken. Start by turning the disc to a true circle using a small spindle roughing gouge held on its side. Take light



cuts and sharpen the tool frequently. Incidentally, with the exception of the skew chisel that I hone on a Japanese waterstone, I use all the tools straight from the grind stone.

Turn the concave parts of the disc using a small spindle roughing gouge, starting towards the centre of the disc and taking the cuts in a slightly curving action towards the outer diameter. I do not attempt to use a beading chisel to form any of the beads, but rather take lighter cuts with a small straight scraper again, keep the cutting edge sharp. I think it helps to locate plant pots if a shallow depression is turned on the upper surface of the top.

To complete the turning, make four small feet by turning between centres. After drilling small holes in the underside of the base, form a small pin on the upper side; this will allow you to fix them in position.

21 You can now make up the blanks for the base and glue them together.

22 After drawing the outline with a pair of compasses, use a bandsaw to cut the blank into a circle.

23 Using a small spindle roughing gouge ground straight to shape the lower segment of the base, keep touching the edge up on a grind stone. Take light cuts with the tool on its side, which will allow you to achieve a slicing cut and a good finish.

24 Drill a centre hole, which will help you to locate the position when assembling the base.

25-26 The third segment from the base has a small bead, which is formed with a sharp straight scraper.

27 You can now turn the three lower segments.

28 After a trial fit, place the lower segments in position.

Finishing

After gluing together, give the complete unit a sealing coat of Danish oil, before applying a coat of clear wax with a Scotchbrite pad. After it is dry, polish with a soft cloth and it is then ready to display. ■





Joint solutions

Rebate

The biggest door rebate in the world?
Quite possibly... Underground blast
doors at NORAD (North American
Airspace Defense Command)

We are gradually working our way to more complicated or difficult joints in this series. This time **the Editor** looks at the deceptively simple rebate that is often used, but frequently overlooked

I love taking a sideways look at the mundane and ordinary and putting a new spin on it, so to speak. Nothing typifies this better than the humble rebate. Not of itself particularly impressive or difficult, or even a joint necessarily, but if you look around you, everything from a car door, to a window, to a lid for a tropical fish tank, all these and many more demand a rebate of some sort. So the first observation is that rebate acts as a 'stop' – a means of containment or preventing further movement in a given direction, a blast door for a nuclear bunker couldn't be a more extreme example of that necessity!

A rebate allows a pane of glass to fit into a window frame with a glazing bead added to keep the glass in place. A wooden panel can sit in a rebate, either as a tight fit or a loose one, depending how it is fixed. A rebate can also effectively be half of a lap

joint – these were discussed in depth in issue 97.

I'm known for using the router quite a lot in my woodworking career and still do, even though I tend to make a lot more use of hand tools recently. If I was putting together a first set of cutters for routing, based on my experiences I wouldn't go for a mixture of moulding profiles and a rather redundant dovetail cutter, which is what you normally get in starter sets. Instead, I would choose a series of different diameter straight cutters and a rebate cutter with interchangeable bearings! Why? Because they are needed far more than the occasional ogee or ovolo moulding. You can then create grooves and rebates of all sizes and make joints if you need to; the selection shown here are the ones most suitable for rebating. Those with bearing guidance can work along curved edges.



Here I am fitting a glazing bead into the rebate



A useful set, but why have a dovetail cutter?



I find that I can do a lot more with these cutters

TYPES OF REBATE



Frame rebate

As previously discussed, while this is not strictly a joint, it forms the basis for holding doors, panels, glazing and the like. Usually part of a larger construction that is jointed by a suitable method.



Corner rebate

A rebate at its simplest, it extends the jointing surface for the purpose of fixing with glue and nails or screws. It gives a reasonable amount of strength and location to the joint. The component that runs through to the corner covers the rest of the joint and is therefore normally the 'presentation face' hiding the construction. It can therefore be used for basic drawer boxes.



Lap rebate

The same, but with an additional step in the middle. This can seem a bit unnecessary; however, if you have a relatively easy means of making it, you can try it instead of the basic version, it does add a bit more rigidity.



Mitred rebate

This presents a clean corner and generally looks better in a good piece of work. It does need careful machining to get a good joint using a bevel cutter as well as a rebater.



Rebated tongue and groove

By rebating a component end you can create a tongue of a specific width to match a straight cutter or groover, so it can locate as corner joint. This is handy for drawer box construction with the grooved components at the side and a 'planted on' drawer front to cover up the joints.

MAKING REBATE JOINTS



From top to bottom: cabinetmaker's shoulder rebate, carriage maker's rebate and a small shoulder rebate

Unlike the joints we have looked at in previous issues, the rebate is better done by machine than by hand; however, there are ways for both methods.

Rebate by hand

It is possible to hand saw rebates using a decent backsaw and a

bench hook to hold the workpieces. However, it is hard to do this really well and repeatedly.

Whether you hand saw most of the waste away or not, a proper rebate plane will give better results. A large shoulder rebate plane is expensive, but a smaller version won't break the bank. There are also carriage-maker's



Cleaning up a rebate is quick and easy

rebate planes either vintage or brand new and duplex rebate planes. Personally, I just stick with the small rebate plane for hand work.

Using a sharp, well set rebate plane makes cleaning up or trimming a rebate quick and easy. It can be used in both physical planes, either end grain or across the flat grain.

MACHINED REBATES



There are different ways to machine rebates

MACHINING SOLUTIONS

The choices are: compound mitre saw, hand power planer and fence, bandsaw, freehand router using a T-square fence, router table and fence or bearing-guided rebate cutters for working curves.

ROUTING End grain

End grain joint machining done on the router table only needs a pushblock or a protractor fence with a wooden sub fence for support to contain any tendency to 'breakout'. Take several passes to final width and have a 'through fence' to act as an end stop to control the width of the rebate. Hold-downs in this instance interfere with the progress of the workpiece, downward hand pressure alone should be enough.

Long grain

Wider boards that need a rebate aren't a problem, but the problem with long grain rebating of narrow stock is 'chatter' causing it to jump around and the tendency for it to turn over as it has mostly passed over the cutter when using a static machine, like a router table or spindle moulder. Therefore, we need to devise ways to support the workpiece as well as use hold-downs and at the same time feed it through safely. It isn't as difficult as it may sound. The methods shown here can be replicated on a spindle moulder too.



Use a 'breakthrough' fence and pushblock



Narrow stock needs safe support!

Outfeed support

The key is to machine stock to an exact common dimension. This allows you to do two things: one, fit a support to the outfeed fence that matches the dimensions of the rebate, so the freshly machined workpiece slides over it. Two, make a 'tunnel' or close fitting guards that act like one. The tunnel is the same size as the stock exterior dimension. It holds the workpiece down on the table and gives complete cover guarding. Each workpiece is pushed through by the next one so fingers never get near the cutter.



Wider boards can be easily rebated



First, an outfeed support to fit the rebate



Followed by hold-downs to enclose the workpiece

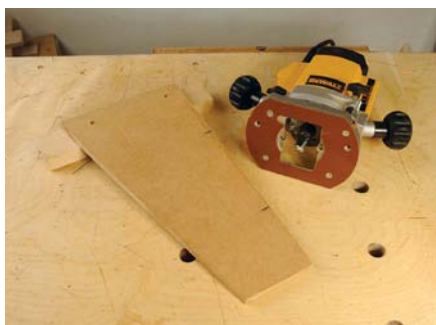
Safety

Rebating is an operation that has often been done in the past under unsafe conditions. Rebating on a saw table is NOT permitted as it requires removal of the crown guard, unless an alternative approved guarding system and safety hold-downs are fitted. A spindle moulder with chip-limiting tooling may be used with hold-downs, or preferably a power feed unit or a sliding and table work clamp for end rebating.

Visit the Health and Safety Executive website and download these documents for further guidance: www.hse.gov.uk/pubns/wis16.pdf
www.hse.gov.uk/pubns/wis18.pdf

Freehand rebates

A router can sit on the workpiece, guided by a T-square, which can be moved after each pass until you reach the final rebate width. You need to make sure the T-square is truly square when you make it. You can sight the correct cutter position rather than measuring the T-square offset distance.



Make up a simple T-square jig



Clamp it in place before making cuts

OTHER MACHINE METHODS

The compound mitre saw can be set to machine rebates by adjusting the trenching stop. The cut surface may not be entirely flat as the saw head will bounce slightly and repeated side-by-side cuts are needed to create the full rebate width.

Power planers are only any good for long grain rebating as they need a long edge to run against.

A bandsaw that is well set up and with a sharp blade can cut neat rebates repeatedly. Shown here are an end stop to limit the length of the rebate and the protractor fence being used to cut the shoulder, thus creating the rebate.

Right: Set the trenching stop before cutting

Below: The result can be uneven



Left: Power planing is a rough and ready method



Here an end stop is in place for the rip cut, shoulder cut taking place



Next time in issue 100 – yes, truly 100! – we will look at the primary woodworking joint of all time, the mortise and tenon. ■



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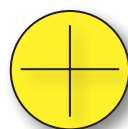
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PHOTOGRAPHS BY PETER BRETT

Makita 2012NB thicknesser



Peter Brett gives us his thoughts on his one-year-old plus Makita 2012NB benchtop thicknesser

For the space required by this type of machine, compared to its usefulness, a benchtop thicknesser is something that keen 'garage' woodworkers should consider in my view. There are many different makes of benchtop thicknessers available, with most major machinery and power tool brands represented, as well as a few 'own-brand' machines, so the more demos at shops and tool shows you can see, the better!

Having tried out an 'own-brand' machine from a reputable supplier, I found that I should have read the specs more closely and also had a demo before purchase. While the machine worked well and was reasonably accurate, it was crudely made and very noisy – and it was

comments from the neighbours that made me decide to change it. Also, small things like glitches in the drive chain were starting to cause concern for the longer life of the machine.

After much Internet research, visits to tool shows and chats with other users, I decided to buy the Makita 2012 NB thicknesser. Prices vary a lot from different suppliers, so remember that Google is your friend! The key spec for me was that this machine is the quietest on the market, at around 85dB and is recommended by many users for giving a smooth, accurate finish to the timber.

Setup

Unpacking and setup are pretty easy – the only things that need attaching

are the cutter guard and the chip extraction hood. This is done via two hand-tightened bolts. Tools are supplied in a plastic box that is kept safely on top of the rear cutter guard. The instruction booklet is clear, reasonably well-written and simply illustrated. Bigger illustrations would help people like me, who don't always have reading glasses handy.

Running any kind of planer or thicknesser without chip collection is a guaranteed mess-maker, so a good vac extractor is an absolute necessity. On the Makita the chip extraction outlet is only 45mm diameter and, because my extractor has a standard 100mm cuff on it, I bought an adaptor that had to be taped to the machine's outlet with gaffer tape.



100mm adaptor cuff allows flexible use



Chippings can sometimes stop cutter head movement so needs vacuuming out



use magnets to set cutters in groove

I couldn't find an adaptor that fitted over the machine's extraction spout despite much research. It is not an ideal solution, but it works OK and saves me time, because some other machines I have use a 100mm diameter outlet and share my chip extractor vacuum. So far I haven't spotted any company that stocks an adaptor that would slide on instead of being taped, so if anyone knows of one, then please get in touch!

It is always well to bear in mind that a bench top thicknesser is just that – it does not have the capacity or power of a small stand-alone thicknessing machine. With care and patience I found that the Makita 2012 would do a lot of preparation tasks quite accurately and would plane right up to its maximum width of 304mm on hardwood, as long as I followed the instructions that full-width planing should have a depth of cut of no more than 1mm.

The depth-adjusting handle is wound clockwise or anti-clockwise to set the depth of cut. This mechanism works smoothly via the threaded columns that are supported on four robust steel columns. The handle is marked on top with indicators to help the user set the depth of cut. One full rotation of the handle will set the blades 2mm up or down. To help set the initial thicknessing position a floating pin on the infeed table contacts the workpiece when the thickness is reached – a simple but effective method that prevents workpieces that are marginally too thick from being forced into the feed rollers, or thinner pieces from being flung out of the machine at high speed.

First use

The first time I used this machine I managed a mirror smooth finish on some rough sawn hard oak (*Quercus robur*) and the thickness was consistent all the way along the plank. This boded well for the future. Noise levels were definitely much more under control and while I know I shouldn't, I sometimes forget my routine ear protection without suffering any ill effects.

Another key aspect of these machines is how quickly the cutters can be changed. With practice, I can now change them in a little over 10 minutes. By using the wrench

and magnetic blade setting guides provided, the guesswork is taken out of it and an accurate result can be achieved every time with the groove in the back of the cutter locating easily when aided by the magnetic guides. The wrench has a small T-handle that prevents over-tightening of the cutter retention bolts on the cutter block.

I have only used the double-sided disposable blades on my machine, but there is an option to use re-sharpenables, that may be more economical. At around £35 a pair, the cutters are not cheap, but they need to be sharp to give a good finish. I don't suppose it is recommended, but it may be possible to touch up used cutters with a fine diamond hone to give a slightly longer life.

I only made the mistake once of running some very silica-pocketed iroko (*Milicia excelsa*) through on a new-ish set of blades, before I became much more careful of cutter life and the timber I use.

And now...

Over a year later, the machine has been used pretty much every working day and is still performing well. Small adjustments have had to be made on the outfeed tables and depth of cut scale, but these are anticipated by the manufacturer and are easily done. Compared to my previous 'own-brand' machine it has been a welcome respite from noise and so-so finished surfaces. It is definitely portable using the two handles on each side of the machine. I often take it outdoors and mount it on a workmate to surface pieces of timber up to 1.8m long. While it is more expensive than many other comparable tools, it seems to be in a class of its own and I would recommend it to others. ■

THE NUMBERS

Makita 2012NB thicknesser

Motor input: 1,650W (240/110V options)

Feed rate: 8.5m/min

Planing width: 304mm

Planing depth: 3mm min-100mm max

No load speed: 8,500rpm

Net weight: 27kg

Typical price: £454 (240V) inc VAT – but shop around!



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Project Deconstruct – *ideas and techniques*

Tools and accessory storage



PHOTOGRAPHS BY JOHN CORFIELD



John Corfield shows us his own solution for storing all those useful bits and bobs that plague the workshop because they are essential, but hard to keep neat and tidy

Over many years I've collected quite a range of drills and associated bits and pieces – about 500 in total! – and thought it high time I sorted them and collected them all into one storage cabinet. This was to be a low cost project with the intention of reusing as much as I could from what I already had. This was after all, to be a strong, functional item and looks were not important. In addition I decided that I would use the simplest construction principles and rely on very accurately cut wood just assembled using glue and screws.

Preparation

I had laboriously laid out all the drill bits, etc. that I wanted to store and calculated that I would need a dozen drawers measuring $340 \times 240 \times 25$ mm. I decided to go ahead and make all the drawers and then build a cabinet around them. I started by cutting all the pieces I'd need to make the 12 drawers and by the time I'd made the third drawer, I was in 'full production' mode.



John's storage problem...



Drawer construction

I made each drawer frame from 20 × 20mm softwood, screwed together at each corner with a single long screw. I then glued and screwed a 5mm plywood base to the frame using the longest screws that would not break through, countersinking had to be done carefully to ensure no breakthrough.

I held the pieces of the frame very firmly using bench clamps to make each corner as true as possible while it was drilled and screwed. When the plywood base was added I adjusted – i.e. twisted – the frame to fit the base and used bench clamps again.

Having made the first drawer I laid in one set of drills and immediately thought about how I could minimise their movement. If, for example, I carried the cabinet of drawers in my car, how could I avoid finding a complete jumble of bits at the end of each journey? Thanks to the Internet, I quickly found and bought some magnetic adhesive strip which, to my surprise, arrived within two days and was immediately cut and fitted once the drawers were made and they worked well.



The basic drawer components



Edge detail of the drawer construction



Glue and screws were all it needed



Making sure the drawer frames were flat



'L'-section aluminium was cut to length and drilled



Setting out the first runner



A block was used to get the correct spacing



A test fit was required to make sure the drawers would slide

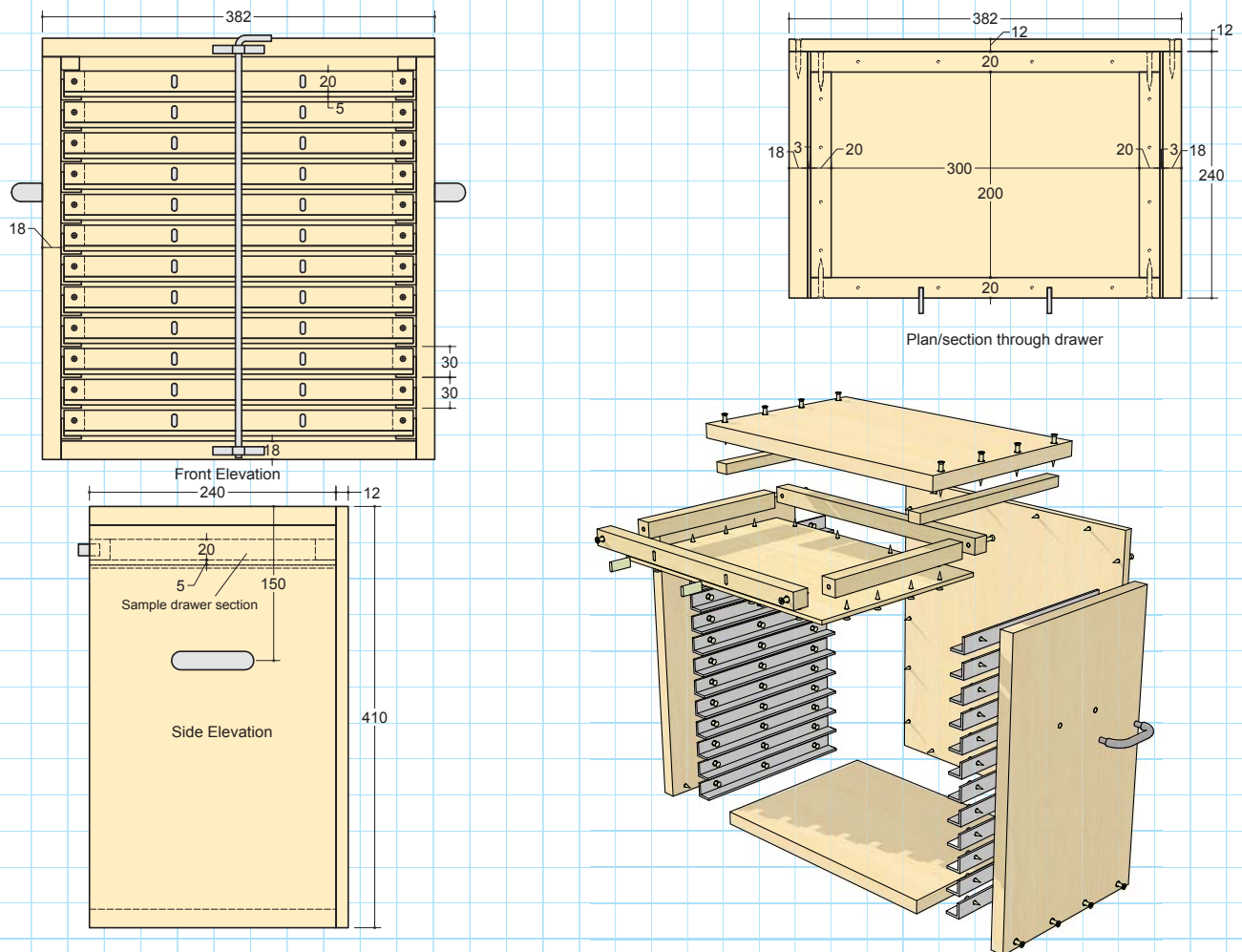
Holding the drawers

With the drawers made, I turned my attention to how they would be held in the cabinet and a quick trip to my local DIY store produced some alloy 20 × 20mm angle-strip. I cut this into 240mm lengths with three holes drilled and countersunk ready to attach them to the cabinet sides.

I found a panel of 18mm plywood and cut it to produce a 242mm wide strip long enough to make the two cabinet sides. The height of a side being calculated from the total height of the 12 drawers, plus 2mm clearance for each drawer, plus 18mm for the base panel and extra clearance for the top drawer, which was to contain items that were 'taller' than the drawer.

Careful use of a piece of wood for a thickness gauge and a set square quickly produced a 'ladder' of metal supports and then cutting the panel gave me the two cabinet sides I required. Having checked the fit of a drawer, I then cut a base panel and screwed that into place thereby securing the two side panels ready to fit a top panel.

I had belatedly decided to store



some hole saws in the top drawer, which were higher than the drawer – I had allowed for this when calculating the height of the side panels.

To keep the same clearance on this drawer's 'runners' and to ensure the drawer wouldn't tip, I screwed two strips along the top inner edges of the side panels – I was then ready to add the cabinet top. The top was another piece of 18mm plywood carefully cut true and square and then screwed onto the two side panels. The rear of the cabinet was typically not going to be seen so I found a piece of 12mm MDF, which I cut and screwed onto the frame of the cabinet formed from the sides, base and top. Whether the back was added before the top and which was screwed to which is a bit academic – it all went together very satisfactorily.

The last part was to decide on 'pullers' for the drawers, handles for the sides and how to stop the drawers from sliding open. A forage in the hardware box turned up a suitable pair of handles, a set of wooden dividers that I could bend into suitable 'pullers' and two clips, plus a piece

of metal rod to drop down the front. Hopefully the photo of the finished cabinet shows how it all fitted together. This solution works really well for me and can be moved around when necessary.

Magnetic strip

Because the total storage space is relatively large I was also able to use one drawer for the 'oddities' that I often have trouble finding – including the things I never use but just can't bring myself to discard! Wooden dividing strips were then glued into the drawer.

In my case, 10 of the 12 drawers use magnetic strips to hold drills in place – the strips can be seen clearly in the upper half of the tray. The magnetic strips are not strong enough to 'lock' the items in position, but do help to minimise the chances of the items moving into untidy jumbles.

For items in other drawers the magnetic strip was not suitable due to item weight and non-ferrous metals. I therefore made some thin wood dividing strips – coloured black – and simply glued them into place. ■



The unit was now ready for its 'top'



Nearly complete apart from side handles and a locking bar

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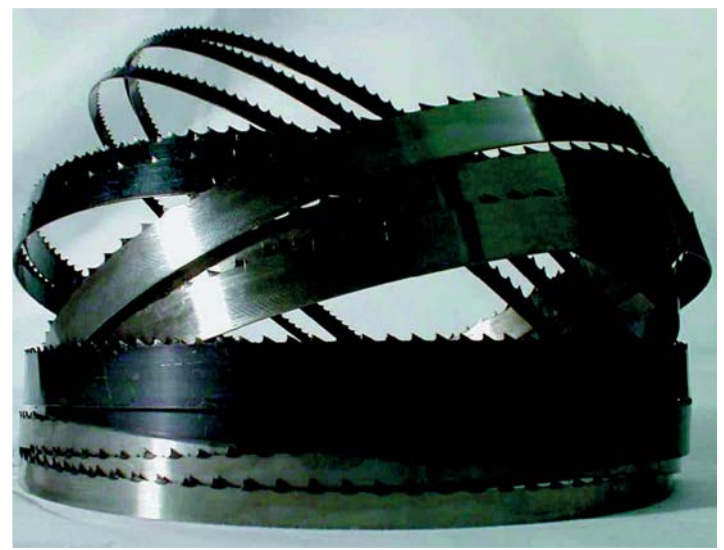
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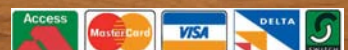
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A look at... **veneering with hide glue**

When veneering in the traditional way it is important to have the correct equipment at hand and to plan ahead, as **John Bullar** shows when he works on Bill Kirkbright's sofa table



PHOTOGRAPHS BY BILL KIRKBRIGHT

When veneering with hide glue, plan to have all the equipment within easy reach because once you begin the process, you won't have time to be looking for tools. Ensure your work area is tidy and that there is plenty of bench space, that the groundwork and veneer is prepared and the glue is at the right temperature and consistency.

Heat and moisture are the two most important factors when using this

type of adhesive: too much or too little of each will cause problems.

Place a quantity of pearls in a plastic container, and add enough cold water to cover the glue. Once the water has been absorbed, the pearls will turn rubbery and can be placed into a cast-iron glue pot. With the aid of an electric heater, you can then warm up the glue and add small amounts of water until the glue runs from the brush in a steady stream.

Things you will need

- Cast-iron glue pot and electric heater
- Plastic container
- Veneer hammer
- Electric iron
- Stanley knife
- Steel rule
- Straightedge
- Pearl glue
- Water - tap access

PREPARATION



STEP 1

Pearls awaiting water...



STEP 2

... and mixed to the correct consistency



STEP 3

Using a cloth to smooth down the veneer by hand

LAYING VENEER



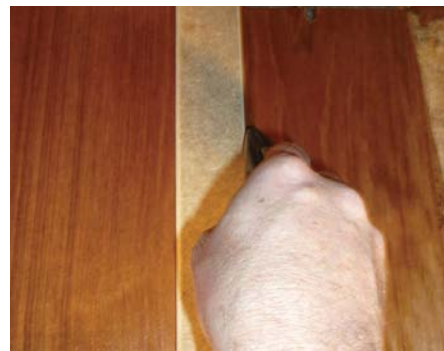
STEP 4

Using a veneer hammer to flatten the veneer



STEP 5

The second leaf laid and overlapping the first, with glue applied to the face sides



STEP 6

Using a knife and straightedge to cut the join in the leaves of the veneer

The tabletop is constructed from 15mm MDF with a mahogany (*Kbaya ivorensis*) lipping fixed to it using size '0' biscuits. Prior to veneering, both sides of the top were coated in glue size, a thinned version of animal glue, and used to seal the substrate.

- Lay the veneers face-side down on newspaper to prevent bowing
- Apply the balancing veneer to the underside of the top. I chose a mahogany veneer as it would match in with the exposed solid timber of the inside of the carcass
- Brush the glue onto half the substrate, position the first piece of the backing veneer and then smooth it down with your hand
- Brush glue onto the top of the veneer, to ensure stability, evening out the natural tensions in the wood
- Flatten the veneer. Starting in the middle and using the veneer hammer, apply plenty of force, pushing toward the outside edges. If necessary apply a hot iron to any areas where the glue has chilled, using it lightly over the

whole veneer and keeping it moving all the time to avoid sticking

- Lay the second piece of the veneer in the same way, but overlap with the first piece by 12mm, then, using a straightedge and a Stanley knife, cut through both pieces, remove the waste from the top layer and then carefully remove the waste from underneath
- Press down the join and work the veneer hammer towards the join line
- Clean up the surface using a cloth, which is hot and damp but not wet
- Working at speed and using the same technique, lay the burr veneer, in this case two pieces which were book-matched to ensure a beautifully figured top

While the glue was still bubbling away I veneered the carcass and end standards. Rather than use crossbanding on this piece, I decided to use the offcuts from the burr leaves and continue the pattern and theme onto all the edges, which I think worked well and produced something a little different.



STEP 7

Book-matched veneered tabletop

Veneer preparation

As the veneer had been lying in the workshop for some time it required taming before it could be used. This is achieved by sponging the veneer with hot water and placing it between two boards with brown paper to absorb the moisture, then putting weights on the top surface to apply some pressure.

John Bullar on veneering

For examples of more traditional veneering techniques and other woodworking techniques, see John Bullar's YouTube channel: www.youtube.com/user/johnbullar ■

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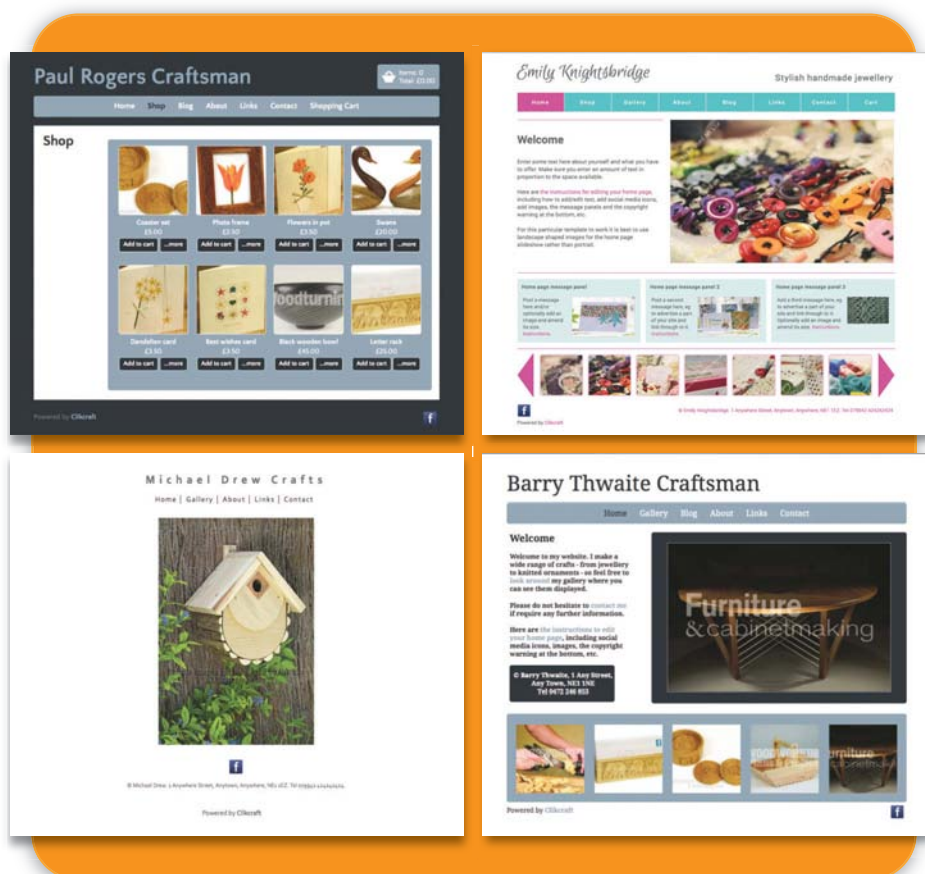
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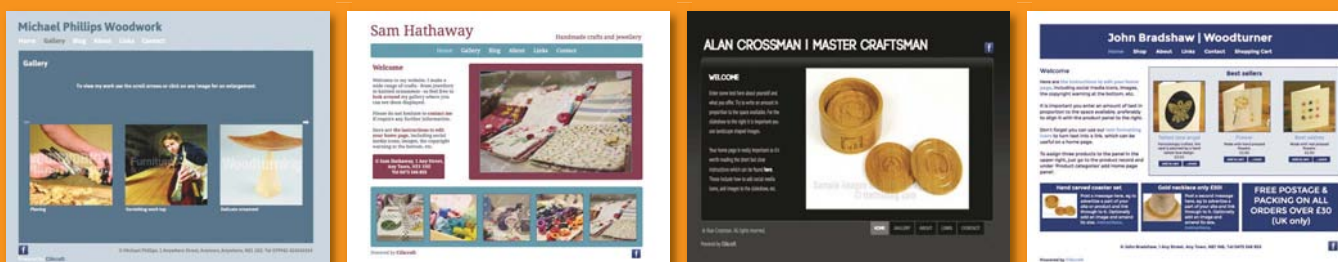
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