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The Woodworker & Woodturner

October 2012

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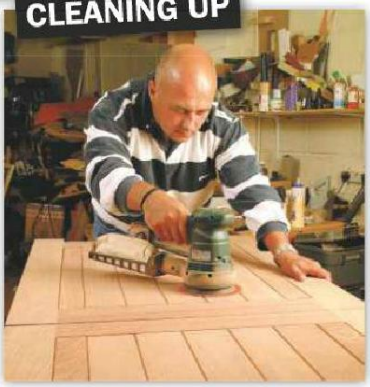
PROJECT
KID'S TRIKE

WORKSHOP
CLEANING UP



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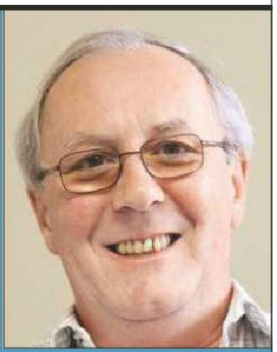
welcome



By the time you read this, summer will probably be over... although this crazy year of weather is sure to throw up the hottest, driest October on record simply to spite the forecasters! I always measure summer's passing with the close of the county cricket season, and this year I'll also mourn the end of the extraordinary sporting spectacle that the Olympics and Paralympics have brought us. The participants in the latter had so many personal obstacles to overcome, and delivered so many astonishing performances to remember, that it reminds us all just what everyman (and woman) can do when they put their minds to it. Awesome!

Back to the future

Normal service having resumed, let me tell you what we have in store for you this month. Keith Smith brings all his skills to bear on making a superb oak front door and frame for a period cottage, while at the other extreme Alan Holtham presents an unusual take on the traditional kid's tricycle. Paul Bodiam starts to put the body of his ukulele together, Duncan Rose makes a stylish mini mantelshelf, and Ian Wilkie turns a set of neat pincushions that will make perfect presents. Ron Fox tackles some more template routing and Ben Plewes offers a different perspective on some simple bench aids. There's certainly plenty to tempt you back into the workshop...

Under the microscope

Roger Berwick's test of Liogier's amazing hand-made rasps included some close-up images of the blades (left) that really amazed me. Every one of those tiny teeth is hand-cut, and I had to admire the tool-maker's patience in creating them. Then I saw this close-up of Abranet abrasive mesh, and realised that there's a lot more to woodworking than meets the eye if you bother to stop and take a look! Amazing...

Mike

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The Woodworker & Woodturner

October 2012

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On the desk

FAST CHANGE SPEEDCLIC

MANUFACTURER: Dremel
PRICE: from £4.75

Dremel recognises the need for users to be able to change accessories quickly and easily when working on a project, so the company has set up the new EZ system with features such as the EZ twist-nose cap, plus special Quick Change accessories under the name EZ SpeedClic. This enables easy keyless accessory changes in less than 10 seconds, thanks to a unique patented screw-less mandrel.

Three new accessories have now been added to the range: sanding discs SC411 (60 grit) and SC413 (240 grit), and the sanding mandrel SC407. They're available now from dremel-direct.com, tool-shop.co.uk, amazon and B&Q.

AUTUMN PRICE CHILL

MANUFACTURER: SIP Industrial Products
PRICE: big discounts

SIP has announced the launch of the company's biggest ever winter promotion, called 'BIG PRICE CHILL'. The promotion runs from September 1st to December 31st 2012 and features over 350 selected products including many power tools and woodworking machines, all with big discounts. The deal is available through more than 1,000 SIP distributors in the UK and the Republic of Ireland. SIP has also announced several additions to its range of woodworking machines. They include a 12in table saw (model 01531), a scroll saw (01928), two planer thicknessers – a 10 x 6in model (01550) and an 8 x 8in model (01552) – plus a 6in planer (01543). See the website for details.

Contact details of products and services mentioned in this edition of *ON THE DESK*...

Axminster	03332 406406	www.axminster.com
Dremel	08447 360107	www.dremel.co.uk
Record Power	01246 561520	www.recordpower.co.uk
SIP Group	01509 500307	www.sip-group.com

DIARY

OCTOBER

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28 Sept NEW Pyrography
2-3 & **8-9** Beginners routing
9 Penmaking
15 Festool demonstration day
15-16 Beginners woodturning
22-23 Bowls and platters
23 Introduction to Leigh jigs
24 Fine goblets
Check website for places available
Unit 10 Weycroft Avenue,
Axminster EX13 5PH
0800 975 1905
www.axminsterskillcentre.co.uk

John Boddy's Courses
10-11 Woodturning: Simon Whitehead
18-19 French polishing: Ted Vickerman
01423 322370 ext 257
www.john-boddys-fwts.co.uk

John Boddy's Demonstrations
12 Woodturning: Simon Whitehead
20 Wood finishing: Ted Vickerman
Details as above

John Lloyd Courses
15-19 Veneering & laminating
01444 480388
www.johnlloydfinefurniture.co.uk

Orchard Woodturners
13 David Reeks
Village Hall, Milstead, Kent ME9 0SD

Robert Sorby Demonstrations
26-27 Scotland's National Woodworking Show (see below)
0114 225 0700
www.robert-sorby.co.uk

Scotland's National Woodworking & Power Tool Show
26-27 Royal Highland Centre,
Edinburgh EH28 8NB
01474 536535
www.nelton.co.uk

Shropshire Association of Woodturners
6 All-day seminar: Sue Harker
Bicton Village Hall, Bicton SY3 8EL
01743 240661

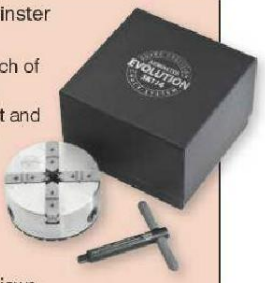
Southern Fellowship of Woodworkers
25 Mytchett Centre, Frimley GU16 6AA
01252 376797

NOVEMBER

Strictly Woodturning
1-2 Axe Valley Community College,
Axminster, Devon EX13 5AZ
03332 406406 for tickets
www.strictlywoodturning.co.uk

EVOLUTION OF THE SPECIES

MANUFACTURER: Axminster
PRICE: from £159.95



This autumn sees the launch of Axminster's new Evolution SK114 chuck. The concept and design was born from the company's desire to create the best chuck possible. Axminster's R&D team decided on a stainless steel body with newly-designed mounting jaws. These low-profile jaws offer a greater contact area within the slide-ways of the chuck, minimising vibration during use. As a result this chuck is both super-accurate and a joy to use.

The ultra-compact design keeps the workpiece as close as possible to the headstock bearings to minimise overhang and to prevent unwanted vibration during heavy stock removal. The chuck is fully compatible with all existing Axminster jaws, and is available in five thread sizes.

RECORD VALUE

MANUFACTURER: Record Power
PRICE: £369.99

The BS12 bandsaw is built to offer exceptional performance and value for money. Record's brief was to create a machine that could compete in the entry-level market while offering better features and performance than most of the competition, and then to apply their five-year guarantee with absolute confidence.

This machine offers all the features expected on a machine at this price, such as aluminium extrusions for fence, rail and mount, an extruded alloy guide post, aluminium band wheels and an effective tensioning system. In addition, the doors can be opened easily without the need for tools, the guides are easy to adjust, the large table insert makes access and adjustment very easy, and the steel rack-and-pinion trunnion allows one-handed operation, giving excellent support and accuracy in use.

What's new from D&M TOOLS

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D/LIFT/A DOOR JACK

MANUFACTURER: Trend
D&M PRICE: £16.99inc

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FMM250Q MULTIMASTER QUICK START LIMITED EDITION KIT

MANUFACTURER: Fein
D&M PRICE: £166.80 (110V Or 240V)

The best-selling Fein MultiMaster is now available as a QuickStart Edition. Incorporating the QuickIN rapid tool change system, it's supplied with a range of accessories including a 44mm E-Cut universal saw blade, a rigid stopping knife, a non-perforated sanding pad and 20 assorted sanding sheets, all packed in a hard-wearing limited edition nylon holdall.

WERA JOKER COMBI RATCHET SPANNER

MANUFACTURER: Wera
D&M PRICE: from £13.99

The Wera Joker is an innovative combination wrench with a unique jaw design which means that it can do everything a conventional combination wrench does... and more. Made from durable chrome molybdenum steel and coated with corrosion-resistant nickel-chrome, it's a truly high-quality wrench. It features:

- a patented open-end fastener-holding function;
- anti-slip double-hex jaws with a 30° return angle;
- a fine-tooth ratcheting box-end;
- teeth that grip and turn even rusted bolts.

Wera Joker spanners are available individually in 10, 13, 17 and 19mm sizes, or as a set of four in a rugged case.

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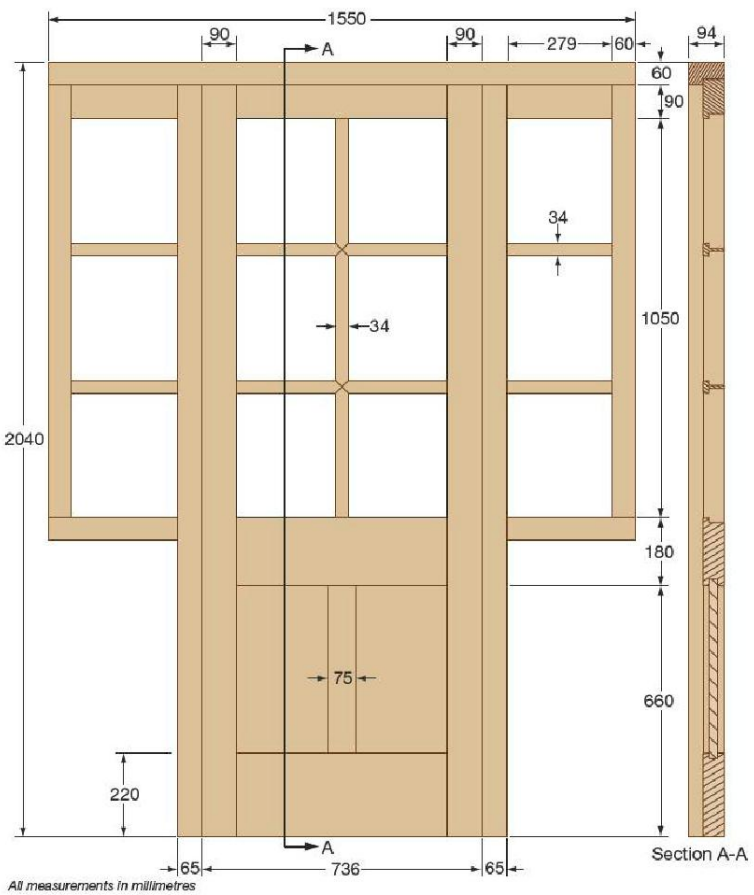
BY KEITH SMITH

A grand entrance

They say that your front door speaks volumes for what lies within. This old house certainly deserved a brand new entrance in keeping with its period and character. Here's how we set about providing it



This new door and frame were built for an 18th-century timber-framed house, and were to replace the originals on an almost like-for-like basis. The house is a Grade II listed building, and we had to undertake a rather lengthy process to get the plans passed by the local council's Conservation Department. Part of the problem was the conflict between keeping the design as original as possible and obtaining good thermal efficiency.

The door we were replacing was clearly not original to the cottage; nor was the frame for that matter. With its glazing set at various heights and with stick-on leaded light details, it left a lot to be desired. Even so, it took us four months to obtain permission to start work. Fortunately we didn't need Building Regulations approval, as this is required only if the area of glazing exceeds 50 per cent of the total door area. Ours didn't!

The glazing problem

The door and frame were to be fitted with 24mm thick double-glazed units. These are known as 4-16-4 units; 4mm glass, 16mm cavity and 4mm glass. For greater thermal efficiency, the internal pane has a low-emissivity coating – in this case Pilkington K glass. To house these units we chose a door thickness of 56mm; this allowed a 41mm rebate (15mm for the glazing bead, 24mm for the glazing unit and 2mm for the silicone sealant bed).

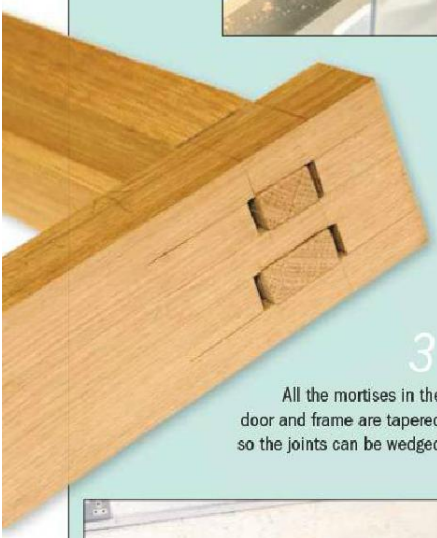
The glazing bars had also been an issue with the Conservation Department. They had wanted them as thin is possible, but

1

The first machining job was to prepare the glazing bars on the spindle moulder

2

The frame stiles are jointed into the head with twin mortise-and-tenon joints



3

All the mortises in the door and frame are tapered so the joints can be wedged

4

The cramps were removed from the frame once all the wedges had been driven in

5

I laid out the various door components on the bench to select the best grain match

6

I cut the mortises to half their depth, working from each side of the door stiles in turn

7

Double tenons on the middle and bottom rails help to retain maximum strength in the stiles

I don't think it's a good idea to use fine glazing bars in a door fitted with heavy double-glazed units. We finally settled on a 34mm wide bar; this gave us a 13mm rebate and an 8mm tongue.

Standard double-glazed units have an edge seal that projects some 12mm from the edge, and a 2mm gap all round is recommended. So as you can see, 13mm was something of a compromise, especially when we wanted the aluminium spacers inside the double-glazed units to sit below the glazing beads.

An expensive option

Double-glazed units such as Slimlite and Slimline have a much smaller edge seal, projecting by just 5mm on the Slimlite units and 7mm on the Slimline ones. These units are primarily aimed at the vertical sliding sash window market, and have cavity widths of between 4 and 6mm; their relatively high thermal values are obtained by filling the unit with krypton or xenon gas. We could have used them in this door, and they would certainly have simplified the design. However, they're relatively expensive and my customer didn't like the idea of trusting the thermal efficiency to a gas he couldn't see!

This door has its glazing fitted from the inside, so the glazing beads are on the inner face of the door. This was partially due to Conservation Department constraints, but it does have the advantage that the outside edge of the double-glazed unit doesn't need to be drained, as it should never get wet with this design.

A tailor-made frame

The frame is very specific to this job, so I haven't included a lot of construction details. Making a frame like this is as difficult as making a door. Nearly all the joints are twin mortises and tenons, and these are further complicated by having various door and glazing rebates to contend with. With this frame there's also no sill, which makes fitting the doorframe (and subsequently the door) infinitely more complicated as existing stone sills are rarely level. What's more, the existing stiles are often jointed into the stone sill with metal pegs, and it can be very difficult to fit the new frame onto them.

Selecting the timber

I bought the timber for this project as prime A-grade sawn boards from my local timber yard. I paid £85 per cubic foot for the 65mm thick boards for the door, and £95 per cubic foot for the 80mm thick boards for the frame. There's always a fair amount of

waste involved when machining up timber for a job like this; I bought a total of 8.2cu ft, which cost £728.

This oak came from Croatia and, although it was clean and clear of knots, I must say I wasn't too happy with it. Once it had been machined I could see that there were some fine splits (heart shakes) in many of the boards; this can be a problem if they come through to the surface once the timber is planed. These heart shakes are often caused by kiln-drying the timber too quickly.

Initial machining

I planed all the timber to size and then cut it to length, leaving the frame head, the frame sills to the sidelights and the door stiles 100mm over-long in order to have 50mm protective horns at each end. As the tenons will be wedged, it's vital to leave enough material for horns as they will also prevent the end grain from being pushed out as the wedges are driven into their mortises.

The next step was to machine all the glazing bars for the frame and door. I used a rebate block in the spindle moulder to make the T shape, and then machined an 8° chamfer on both edges to ensure that rainwater wouldn't collect on them. To support the bar as it ran past the block, I stuck a piece of softwood to the outfeed fence with double-sided tape, **photo 1**.

Making the frame

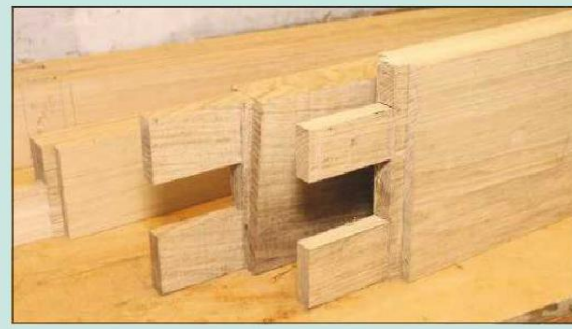
A substantial door needs a substantial doorframe. In this case there was also the possibility of some additional loading from the oak canopy, so I purposely over-engineered the frame. The opening was well out of square too, which complicated the construction even more.

I cut twin mortises and tenons for all the joints such as those into the frame head, **photo 2**. To give a secure fixing that doesn't completely rely on glue, I cut a taper to all the mortises, **photo 3**, so they could be wedged after assembly.

With all the other joints cut for the rails and the sidelight glazing bars, I then machined the grooves in the frame to take the Aquamac draught seals I planned to use (they're available from Axminster, by the way). I actually fitted two types of seal: an Aquamac 21 wiping seal and an Aquamac 63 compressing seal. The advantage of making such a deep frame for a 56mm thick door is that there's enough room behind the hinges to fit a continuous seal; normally the seal has to stop at the hinge.

Assembling the frame was reasonably straightforward; the cramps were removed once the wedges had been driven in,

8 The shoulders on the middle rail need angling slightly on their inside faces



9 The 15mm glazing rebate was then cut to the shoulders of the three rails

10 It's easy to machine the wrong edges for the glazing rebates; identify the right ones with a marker pen

11 A spindle moulder with a power feed is the quickest way of machining grooves for the glazing units and panels

12 One shoulder of some of the grooves then has to be removed to form a glazing rebate

Mark out the position of the muntin and cut its mortises and tenons in the door rails

I cut the letterbox opening at this stage, using the mortiser and then a bearing-guided router bit

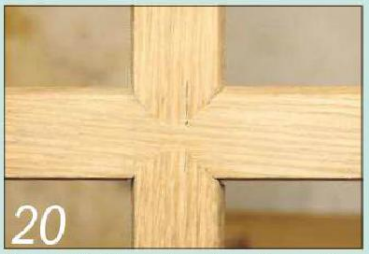
The opening needed some modifications to accept the letterbox hinges and spring

I marked out the positions of the glazing bar mortises and cut them all by hand

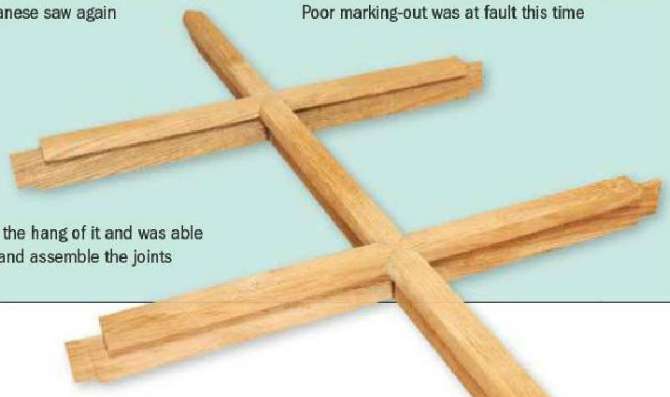
I used a fine Japanese saw to cut the tenons on the ends of the glazing bars

After marking the cross-halving joint on the glazing bead, I decided to make some trial cuts

My first attempt was a poor fit, so I tried using my fine Japanese saw again



The second effort was better but still not perfect. Poor marking-out was at fault this time



I finally got the hang of it and was able to glue up and assemble the joints

photo 4. To keep the frame square and to support it in transit I screwed a piece of ply across the bottom of the stiles (just visible in **photo 4**). The stiles were left over-long, as they couldn't be cut to length until the old frame had been removed; only then could I take accurate measurements.

Making the door

My first job was to lay the timber out on the bench and pick the orientation of each piece to give the best grain match, **photo 5**. The joints were then marked out and cut. I used a 20mm mortise chisel to cut the mortises, cutting half the depth from each side, **photo 6**; this ensures that the mortise is as square to the face as possible. This is important because the door will cup when it's assembled if the mortises are cut even slightly off-square.

The next job was to cut the tenons on the rails, **photo 7**. For the middle rail the tenons don't need to be haunched at this stage, but the outer tenons in the top and bottom rails need to be set well away from the outer edge. This is for two reasons. First, there needs to be enough timber to prevent the wedges from breaking out the end grain. Second, as the door needed to be cut down to fit the asymmetrical opening, I wanted to ensure that I would be a long way from exposing the tenons.

A clever match

The door has a small gunstock profile on the inside face of the stiles. This is to match up the edges when the door is assembled, as the top half of the stile is rebated for the glazing unit while the bottom half is not rebated but is grooved to take a solid panel. For this reason the shoulders of the middle rail needed to be angled on the inside face only, **photo 8**. A 15mm glazing rebate was then cut to the shoulders on the outside face of the middle rail, on both the inside and outside faces of the bottom rail (shown in the foreground of **photo 9**) and on just the outside face of the shallower top rail (visible in the background).

Grooves and rebates

It was now time to groove the edges that would take glazing units or panels. To make sure I didn't get carried away and machine the wrong edges, I used a red marker pen to show which ones needed machining, **photo 10**. I used to use a combination of table saw and router table to cut grooves like these, but now I'm lucky enough to have a spindle moulder fitted with a power feed, **photo 11**.

Grooving all the components in this way, **photo 12**, will help to ensure that the

rebates and grooves all line up perfectly. However, to create the rebates where the glazing units were to be fitted, one shoulder of the groove had to be removed. This was easily done for the top and middle rails but the stiles were more of a problem, because the shoulder is removed up to the middle rail but then has to be cut at an angle corresponding to the angled shoulder cut on the middle rail (the gunstock detail mentioned earlier).

The final joints

The frame could then be dry-assembled and the joints marked out for the muntin. Once the mortises for this had been cut in the rails, **photo 13**, and the muntin itself had been tenoned, the frame could be dry-assembled again to check everything for fit and to ensure that it sat flat and square on the bench.

At this point I removed the middle rail and marked out the position of the letterbox. I cut this out to half its depth with the mortiser, **photo 14**, and then used a bearing-guided router bit to remove the remaining waste. The hole needed quite a bit of modification to fit it well round the letterbox hinges and spring, **photo 15**, so the flap could move freely.

The Japanese solution

The glazing bars were next on the agenda. To ensure that they fitted perfectly squarely in the door and the sidelights, I made a rod to mark out the positions of their mortises in the door stiles and rails; these were all cut by hand, **photo 16**. The glazing bars were then cut to length and the tenons formed on each end, **photo 17**.

Once I'd marked out the joints where the glazing bars crossed, **photo 18**, I got cold feet and decided to make a few test joints first. This turned out to be a good move, as my first attempt was pretty poor! For my second effort I used a Japanese saw, photo 19, and the result was quite a lot better… although still not perfect, **photo 20**. In my defence this is an awkward joint to cut and, as I didn't want to use any filler, there was little room for error. I finally had the glazing bars jointed to my satisfaction, **photo 21**, and I could then check that they fitted within the door, **photo 22**.

Some final cuts

With the door's frame and the glazing bars dry-assembled, I took measurements for the two bottom panels which I then cut to size. These were treated with clear wood preservative, **photo 23**, before being oiled. While this was drying I cut the tapers in the

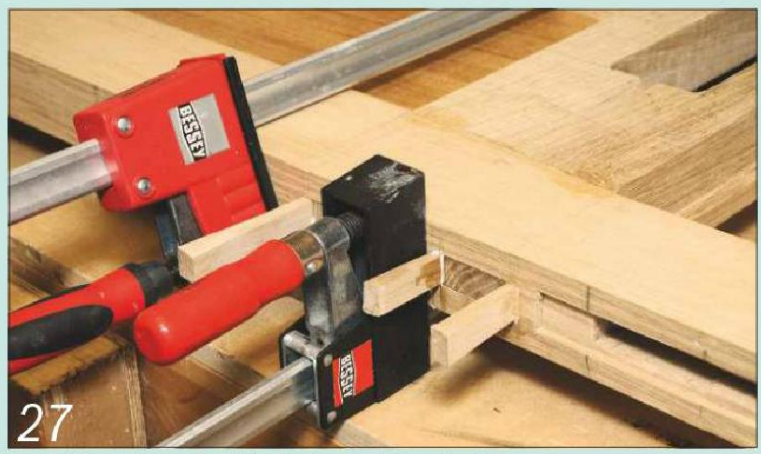
I could then check that the assembled bars fitted correctly within the door's frame

The two solid infill panels were treated with clear preservative before being oiled

A taper is cut to the mortises on the outside face of the door stiles to take the wedges

I glued short strips of neoprene window seal in the panel grooves to keep the panels centred

Check that the assembled door is cramped up square before driving in the wedges



Leave all the wedges proud until the glue has cured; then trim off the excess

28

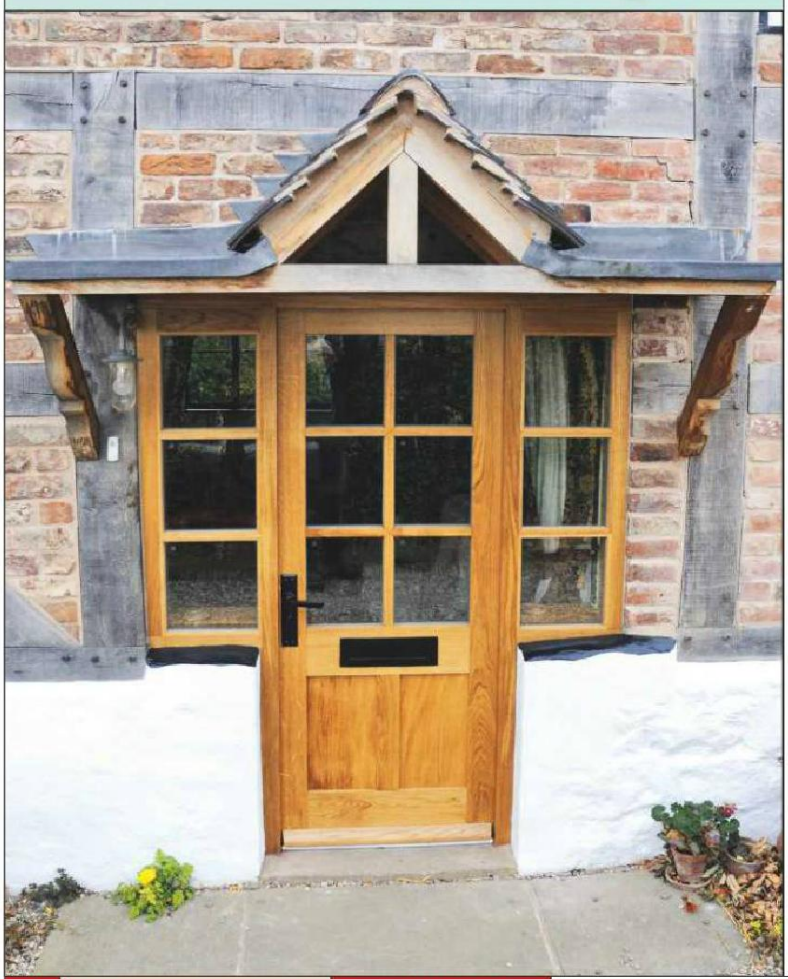
Plane the outer edges of the stiles lightly to leave all the wedged tenons perfectly flush

30

Using a false fence on the mitre saw makes cutting glazing beads safer and more accurate

29

I test-fitted the door into the frame in the workshop, using four hinges to take its weight



frame mortises for the wedged tenons, **photo 24**, and prepared a selection of wedges. One final job at this stage was to cut out the mortise in the door stile, ready to receive the lock.

Assembly time

Before assembling the door, I fitted short neoprene strips into the grooves that would house the lower panels, **photo 25**. These should help to centre the panels, which I'd deliberately cut slightly undersize to allow for wood movement.

There is a particular sequence to assembling a door like this, and there wasn't a lot of time to spare as the D4 pva adhesive I was using dried relatively quickly. With hindsight I may have been better off using a two-part epoxy or a slow setting polyurethane adhesive, but these are particularly messy and I wanted to keep the door as free of glue stains as possible.

Check before wedging

With the door assembled and clamped up, **photo 26**, it's vital to check it for square before driving in the wedges. Once these are in place, the door shape is set and it's no longer possible to fit a diagonal cramp to bring the door back into square. I left all the wedges proud while the glue cured, **photo 27**, and then trimmed them almost flush with a sharp chisel.

Once the glue had cured completely I planed the ends of all the wedged tenons flush, **photo 28**, and then hung the door on its hinges to check it for fit within the doorframe, **photo 29**. It was time to set up the mitre saw, ready to cut all the glazing beads to hold the sealed units in place, **photo 30**.

Finishing touches

I gave the completed door and frame a liberal coat of clear preservative. This was done to reduce the chance of black marks (mould spores) appearing under the finish once the door was exposed to the elements. I then applied multiple coats of superior Danish oil to ensure a durable weatherproof finish.

Fitting the new door and its frame was challenging to say the least. The existing oak canopy was held on the wall with just two screws, and was perched on top of the old doorframe! Before removing an old frame like this, it's well worth checking to see if it's load-bearing, even if it shouldn't be!

I used a dry glazing strip to glaze the sidelights in the doorframe, but preferred low-modulus silicone glazing sealant to glaze the door as this leaves a thinner seal. In went the glazing beads, on went the new black iron door furniture, and the job was done.

BY ALAN HOLTHAM

Four wheels good!

This little wooden trike is great fun to make, as the construction is very simple and uses the minimum of materials. The end result is a sturdy toy that will last forever and will probably become a family heirloom

This push-along trike – in reality a sort of mini quad bike, I suppose – is aimed at children from 18 months old onwards, the four wheels and chunky construction making it both robust and stable. The trick is to achieve a compromise between being sturdy but not being too heavy; hence a lot of the cutting and shaping work in the final stages.

To make it I used a selection of hardwood offcuts – pieces of gonçalo alves, ash and maple – but you can use whatever you have to hand. You could even use plywood and paint it in bright primary colours.

A minimal toolkit

You won't need a lot in the way of tools to make it either. A decent jigsaw and a router are essential, but that's about all. The curved surfaces are easy to finish if you have access to a bobbin sander, but you don't necessarily need a sophisticated version; just a simple sanding drum held in the drill press will work perfectly if your equipment is more limited.

Trial and error

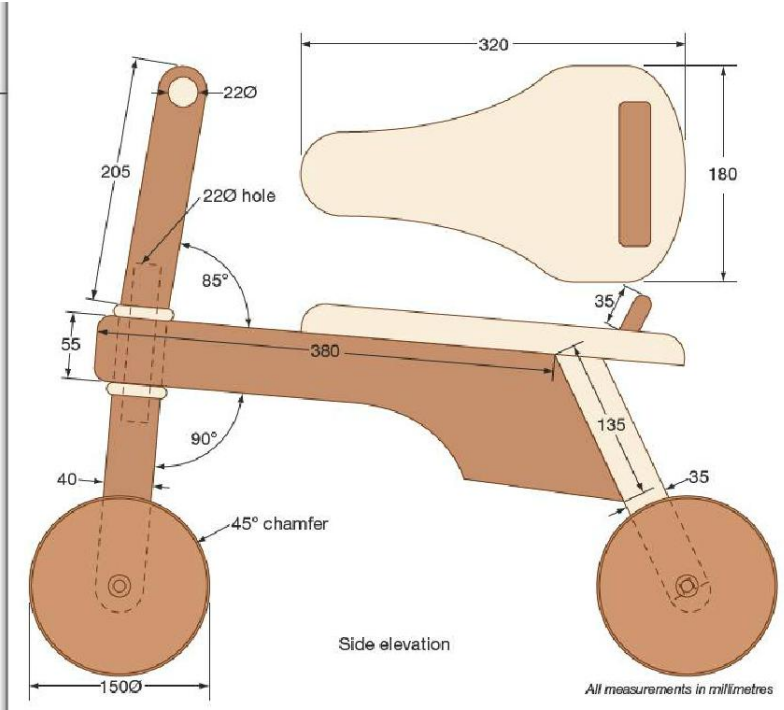
Before I started I was concerned with some of the technical issues like the steering mechanism, how to make suitable bearings in the wheels and what to use for tyres. In fact these were all easily overcome, the only real problem being that I had no plan to work to, so I had to make it up as I went along. This suck-it-and-see approach is rarely successful, but there was no option here, although I did start with a simple sketch drawn to scale to determine the main dimensions.

There was inevitably a certain amount of trial and error involved, and I had to remake a couple of the components which were obviously the wrong size when I could see them in the flesh. The most critical part is probably the seat height, which really depends on the age of the child you're making the toy for. I suspect I've probably made it a fraction too high for very young children. But you can easily alter this, and I did consider putting it on riser blocks to allow for some adjustment as the child grows.

Making the wheels

I deliberated for a long time about the wheels. You can buy ready-made plastic wheels with rubber tyres, but I felt that these would spoil the appearance of the finished toy. To me the wooden wheels add to the trike's chunky solidity. The problem with home-made wheels is getting them truly round, and then making some sort of bearing and finding suitable tyres.

The bearings I used are cut from a short length of metal tubing (found in my local B&Q); this is a perfect clearance fit over the 10mm studding I planned to use for the axles. Using studding allowed me to attach the wheels using cap nuts (also bought from B&Q). You will also need some steel washers to go behind the nuts, and some nylon washers to fit between the wheel supports and the wheels. My total hardware bill came to about £8!



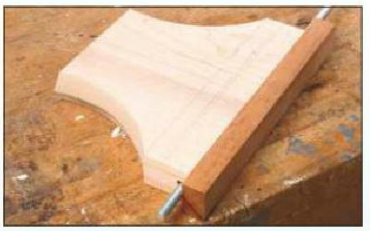
1 I started with the central strut component, setting out a curve that maintains the strength but minimises the weight as much as possible

2 A jigsaw with a sharp blade should cut through thick hardwood with reasonable accuracy. Cut just clear of the line to allow for cleaning up

3 Take your time to sand the strut back gently to the marked line using the bobbin sander. Try to maintain the smooth flowing curve

4 The 22mm hole for the steering pin must be drilled dead square, so use a drill press and keep clearing the bit to prevent it binding

5 For the rear wheel support I didn't think I could drill the very long hole for the back axle accurately enough, so I routed a slot deep enough to take the piece of 10mm studding for the axle



6 I decided to cap this slot with a piece of contrasting timber, working on the principle that if you can't conceal it, make a feature of it!

7 The hole for the axle in the front wheel support is much shorter, and I managed to drill it using a long 10mm bit. Back the drill out regularly to clear the waste; otherwise it gets pushed off-line

8 Use the pillar drill again to make the 22mm hole for the steering pin in the front wheel support and the handlebar sections. The latter was drilled at an angle of about 5° so it leans back slightly on the finished trike

9 The rear axle support and central strut are simply screwed together, so again I made a feature of this by counterboring the holes and fitting contrasting plugs cut from some scrap material

10 The steering pin is a 22mm dowel glued into the bottom wheel support. Do a trial assembly with the handlebars to see that everything lines up

11 Glue and cramp the capping strip shown in photo 6 over the rear axle slot. Set it aside to dry, then round it over neatly (see photo 29)

12 Cut the seat to shape with the jigsaw. I had to make several attempts before I was happy that the profile was suitable for small bottoms!

13 The support at the rear of the seat isn't essential, makes a nicely contrasting detail. This will be just be glued in place, but don't do it yet

14 Start by cutting out the wheels with a jigsaw, working on the waste side of the line. Don't force the saw, or you'll end up with angled rims

15 Trim them on the lathe, or rout them using the Trend N Compass jig, which allows you to cut circles smaller in diameter than the router base

16 To use this jig you have to drill a 5mm pivot hole, but before you do this use a Forstner bit to drill a shallow recess for the steel wheel washer

17 Then it's just a question of routing round the edge of the wheel, taking several light passes with a straight cutter to produce a perfect circle each time

18 For the tyres I went to a local rubber supply company and scrounged some offcuts of ribbed floor matting which I cut into suitable strips

19 I stuck the strips to the wheel rims with contact adhesive. Coat both surfaces and wait until they're touch-dry before bonding them

20 Overlap the ends of the rubber strip, then slice through the two layers with the aid of a steel straightedge to get a perfect butt joint

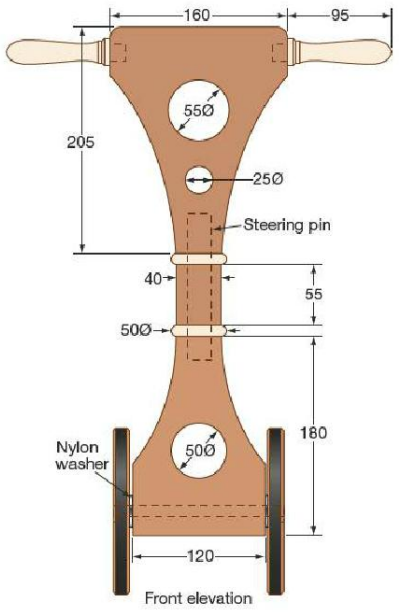
21 Once the adhesive is dry, use a bearing-guided 45° chamfer cutter in the router to cut back the edge of the timber and the rubber strip

22 The smell of burning created by the process of routing the rubber isn't particularly pleasant, but it does leave a perfectly fitted tyre with a neat edge profile!

23 Enlarge the axle holes to take short lengths of the metal tubing. Knock these into the wheel to act as axle bearings. A touch of epoxy glue ensures that they stay in place

24 I shaped the two steering handles on the lathe, but you can use straight pieces of 22mm diameter dowel as an alternative if turning is not an option for you

25 A trial assembly showed that everything worked. However, the trike was rather on the heavy side, both in appearance and in weight, and needed to be made lighter in some way



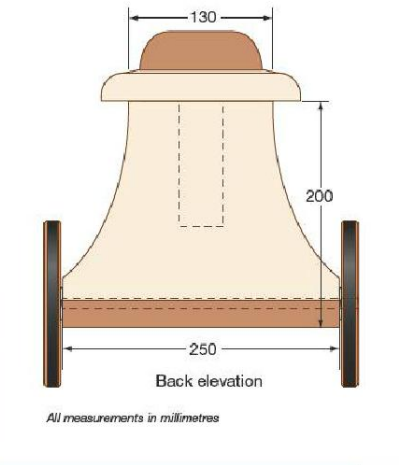
All measurements in millimetres

26 I achieved this by drilling large holes through the front axle support and the handlebar assembly and then rounding over the edges

27 The steering components and the central strut didn't meet perfectly, so I turned a couple of large wooden washers in contrasting timber

28 I rounded over all the edges to save weight. The seat and rear axle support are screwed to the central strut; plugs fill the counterbores

29 Fit a nylon washer between each wheel and the axle support to maintain a small gap and reduce friction between the two components



All measurements in millimetres

30 Cap nuts and washers provide a secure fixing for the wheels. Fix them with a touch of epoxy glue when you've applied the finish

31 All that remains is to give all the surfaces a final sanding and to make sure there are no remaining sharp edges

32 I used an acrylic spray lacquer over a sanding sealer. This finish complies with the EN71 European standard for toy safety

33 Apply several thin coats, then reassemble the trike. Glue the top half of the steering pin into the handlebars and re-fit the wheels

BY PAUL BODIAM

Body building

4: BEGINNING THE ASSEMBLY

Last month I concentrated on creating the front and back of the ukulele and fitting the internal struts and braces. This month I'll be making the fingerboard, cutting the neck joint and starting the final assembly

Making the fingerboard is the first job to tackle. Since this tapers in width from end to end, some thought must be given to the sequence of operations used to create it, to ensure that the frets are positioned correctly and that they end up precisely at right angles to the strings.

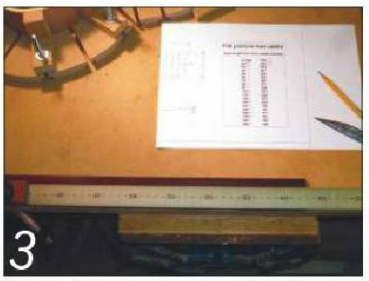
Prepare the fingerboard blank to a uniform thickness of 4mm. Then plane one side true, **photo 1**, and cut the end that will eventually form the edge of the nut channel square to this edge, **photo 2**.

Fretting without tears

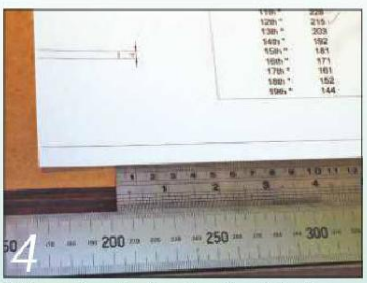
The next step is to mark and then cut the grooves into which the frets will be fitted.

Plane one side of the thicknessed fingerboard blank true and square with a sharp plane

Cut one end square to the planed side to form the edge of the nut housing



Align the 430mm mark on the ruler with the nut end of the fingerboard



Slide another ruler along it and mark the fret positions. Here I'm marking fret 13 at 203mm

I use a tailor-made mitre box for cutting fret slots, with twist drills as depth stops

The fingerboard must be firmly clamped into the jig. If it moves, it will be ruined

The position of the first fret (nearest the nut) is given by the equation

$$d = s / 17.817$$

where d is the distance from the nut to the first fret, and s is the overall scale length of the string.

When calculating the position of the second fret, use the same equation again, but this time s will be the distance from the first fret to the saddle. This formula produces some inconvenient fractions of millimetres in the fret positions, but in practice they can be rounded to the nearest 0.5mm. The inaccuracies in pitch produced by this rounding are much too small to be discerned by even the most sensitive ear.

Practical measuring

The plans for this ukulele helpfully give the measurements for the fret positions, so you won't have to get the calculator out. Slightly less helpfully, they're given as distances from the saddle rather than from the nut. So to transfer the fret positions to the fingerboard, we can either subtract each measurement from 430mm to get the distance from the nut to the fret, or we can clamp a long ruler to the blank so that the square (nut) end of the fingerboard is aligned with the 430mm marking on the ruler, **photo 3**. This enables the fret positions to be read directly from the long ruler. I find the easiest way to get accurate positioning is to slide another ruler against the first one to the desired position, and then to use a sharp marking knife against its square end to mark off the position of each fret, **photo 4**.

A fretting jig

Luthiers' suppliers stock fret wire of varying sizes, suitable for different instruments. For this ukulele we need a fine (small) fret height. In the supplier's catalogue, the dimensions of the fret wire will be given; we're interested in the depth of the tang that anchors the fret into the fingerboard. If the slot is too shallow, the fret will not sit down properly into the fingerboard and the strings will buzz when played. If the slot is too deep, there will be an unsightly gap below the fret when the fingerboard is viewed from the side.

To get fret slots that are perpendicular to the strings and of uniform depth, luthiers usually resort to a variation on a mitre box which incorporates some form of depth stop. My fretting jig uses the shanks of a couple of twist drills as the depth stops at each end of the cut, **photo 5**, since they come in handy 0.5mm increments. As the

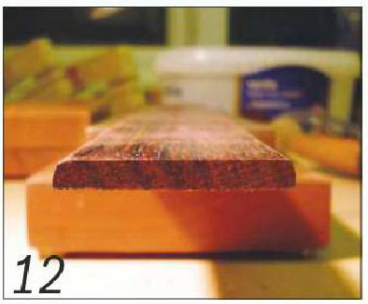
I use a Japanese pull-saw with minimal pressure to cut the fret slots

You should end up with a series of parallel slots, all precisely 1mm deep

Stick masking tape to the fingerboard and mark the centre line; then centre-punch the dot positions

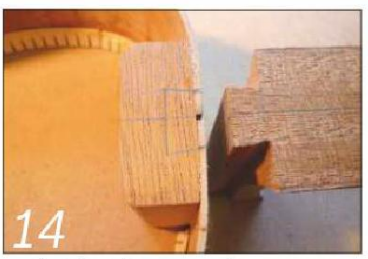
Drill blind holes for the dots, using a pillar drill fitted with a depth stop

Plane each edge of the fingerboard down to a knife-line to form a gradual tapered shape



To improve player comfort, round over the top corner on each side of the fingerboard

Cut the dovetail pin on the end of the neck marginally oversize...



...and mark out the corresponding socket on the neck block

fingerboard is 4mm thick and the tang on the fret wire is 1mm deep, a pair of 3mm drills do the job perfectly for this project.

A fine cut

The first step is to find a saw with a suitably narrow kerf so that the fret wires will be a tight fit in their slots. I find that a Japanese *dozuki* pullsaw is ideal for fine fret wire, but if this is your first time using a particular supplier's wire it's best to try a selection of saws on an offcut of fingerboard until you find the one that gives the best slot width.

Cramp the fingerboard into the fretting jig with one of the marked fret positions accurately aligned to the jig's saw slot, **photo 6**, and then carefully cut down until your saw just touches the depth-stops, **photo 7**. Don't put any pressure on the saw once it touches the depth stops, though; otherwise you risk damaging the saw's fine teeth.

It's important to take your time and ensure that the fingerboard is perfectly aligned in the fretting jig for each cut. You should end up with a series of parallel slots of uniform depth, getting gradually closer together as you get nearer the soundhole end of the fingerboard, **photo 8**.

Guiding the fingers

The dots on a guitar fingerboard are there to help the player identify the positions of certain frets. Experienced players don't actually need them, using memory rather than visual cues when placing their fingers on the fingerboard; in fact, traditional classical guitars don't have any dots at all.

On folk guitars and ukuleles, however, markers are traditionally placed to identify the third, fifth, seventh and twelfth frets. They may be fitted to other frets for aesthetic reasons, but these are the important ones for the player.

These markers can range from plain discs to exquisite pieces of marquetry artwork. Your supplier will sell them in a variety of sizes, and in materials such as mother-of-pearl, abalone, bone or plastic. I went for 4mm mother-of-pearl dots.

On the dotted line

Begin by sticking a piece of masking tape down the middle of the fingerboard and marking the centre line on it. Then mark the position of each dot exactly half way between the fret slots you've already cut, **photo 9**. I've placed dots below the third, fifth, seventh, tenth, twelfth, fifteenth and seventeenth frets.

Working on a piece of scrap the same thickness as the fingerboard, drill several

test holes to set the depth stop on your pillar drill so the dots sit around 0.5mm proud of the surface. Then drill the holes in the fingerboard itself without changing the drill settings, **photo 10**.

Tapering the fingerboard

Before removing the masking tape, use the centre line as a datum to mark out the finished taper on the fingerboard, and then plane the board carefully down to the lines, **photo 11**. I prefer to use a marking knife for marking out the fingerboard, since planing down to a knife-line is much more accurate than working to even the thinnest pencil line.

Remember that the thinner end of the fingerboard is at the head end (where the frets are wider apart). More than one novice maker has ruined a fingerboard by getting this wrong!

Once you've planed the fingerboard to its final width, round over the top corner on each edge so it will feel comfortable for the player, **photo 12**.

The neck joint connects...

At the end of the first article in this series, I cut the shoulders of the dovetail joint on the end of the neck and started shaping the heel. Now it's time to finish cutting the dovetail, **photo 13**. Leave this 0.5mm or so over-size for now.

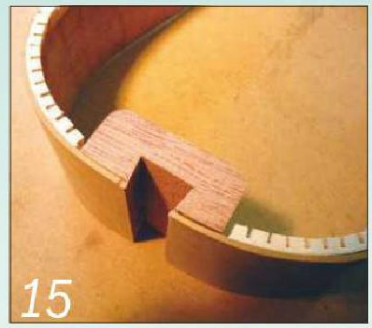
Mark out the socket for the dovetail in the neck block, **photo 14**, and cut it out, **photo 15**. Then pare the dovetail pin carefully to ensure a really tight joint with the body, **photos 16** and **17**. You'll have to separate this joint a couple of times during the assembly process and it mustn't go floppy, so the tighter you can get it now the better.

Back to the solera

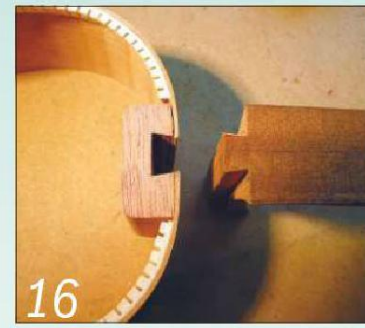
It's now time to start assembling the body of the instrument. The first challenge is to ensure that the neck, front, and sides are all held firmly in place during assembly.

Drill two holes through the solera on the centre line of the neck, roughly 120mm apart (the exact position of these holes is not critical. Carefully cramp the neck to the solera, aligned on the centre line and with the shoulders of the dovetail aligned with the outline marking of the body. Then transfer the position of the screw holes to the top surface of the neck by poking a scriber or narrow punch up through the holes in the solera.

Remove the neck from the solera and drill a blind pilot hole no more than 10mm deep into the neck at each position you have just marked. A pair of 30mm long



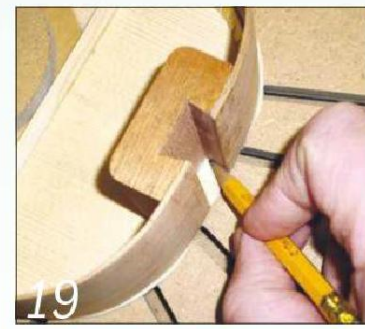
Cut the socket so it has clean internal corners and smooth edges



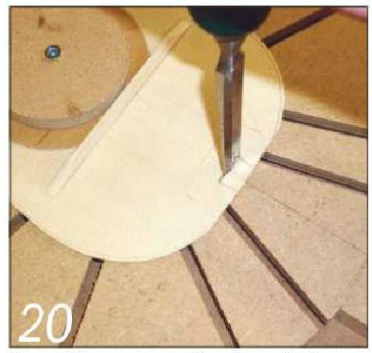
The dovetail pin on the end of the neck needs to be a really tight fit in its socket

Shave the pin carefully until it's a tight sliding fit in the neck block

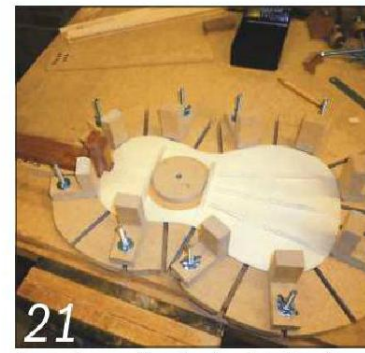
Turn an mdf clamping caul to fit in the soundhole and use it to secure the soundboard to the solera



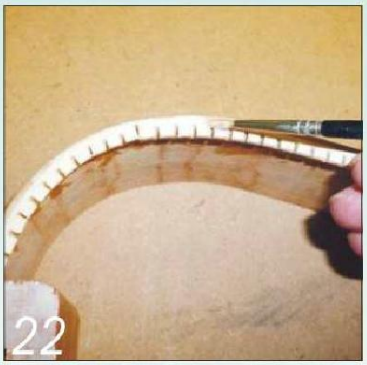
Place the body on the soundboard and mark the position of the dovetail socket on it



Cut out the waste area with a sharp chisel so you can remove and refit the neck later



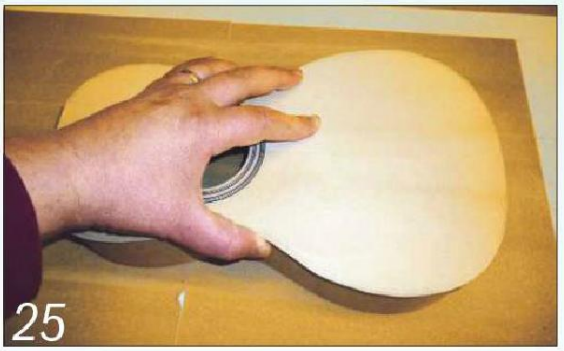
Secure the soundboard and neck to the solera, and set the clamping blocks in position



Apply glue to the top linings and the top edge of the ribs; keep it well away from the dovetail

Use long cramps to hold the ribs tightly against the soundboard. Leave the assembly to set overnight

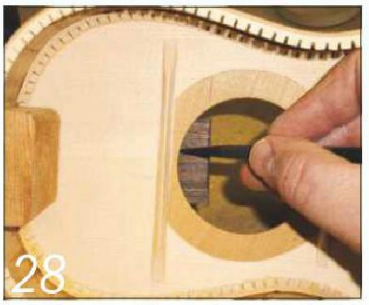
Remove the neck. Prepare and fit the bottom linings that will hold the back on



Sand the bottom linings flush with the ribs and the neck and tail blocks

Fit the neck back into the body assembly and cramp the fingerboard in place...

Accurately align the twelfth fret slot with the perimeter of the instrument's body



Scribe the curve of the soundhole on the back of the fingerboard, ready to be cut along the line

Stick the dots in place in their blind holes with epoxy resin adhesive

Sand the dots flush with the surface of the fingerboard, working down to 400 grit

woodscrews driven up into these holes from underneath the solera will then hold the neck in place securely during assembly.

Securing the soundboard

Using the half-template we created in part 1 of this series, mark the position of the centre of the soundhole on the solera, and drill a small pilot hole to take a woodscrew here. Make a cramping caul that can be screwed down in this position to hold the soundboard firmly to the solera while the sides are fixed in position. I have a lathe, so I turned an mdf disc with a lip which is a snug fit in the soundhole, **photo 18**, but a simple strip of wood extending across the soundhole will serve just as well.

Place the soundboard face down on the solera, ensuring it's accurately positioned on the centre line, and fix it in place by screwing the cramping caul to the solera.

Getting ready

Place the body on the soundboard and mark the position of the neck block dovetail socket on it, **photo 19**. Then use a sharp chisel or knife to cut out the dovetail shape, **photo 20**; this will allow you to remove and refit the neck later on in the assembly.

Position the neck back on the solera and screw it in place from underneath. Then arrange the cramping blocks around the perimeter of the soundboard so they line up exactly with the body outline drawn on it, **photo 21**. The 3mm cutout in the blocks (see part 2 of the series for details) provides clearance where the soundboard has been cut slightly oversize.

The moment of truth

Apply glue to the top linings and the top edge of the ribs, **photo 22**, including the faces of the neck and tail blocks. Be very careful not to get any glue into the dovetail itself or you won't be able to remove the neck. While it is possible to build this instrument from here onwards with the neck permanently fitted (classical guitars with through necks are built this way), having a removable neck makes finishing the body much easier.

Fit the ribs to the neck and soundboard and secure the whole assembly to the solera, **photo 23**, using the long cramps also featured in part 2. Leave it overnight for the glue to dry thoroughly.

Fitting the bottom linings

Remove the neck, then prepare and fit the bottom linings that will hold the back in place, **photo 24**. Use all the cramps you can lay your hands on! For a reminder on how to make and shape the linings, see part 2 of the series again.

Leave the body assembly on the solera while the glue holding the linings sets. Otherwise there's a small risk of the body distorting through being handled off the solera, and this distortion being fixed permanently in place by the linings.

Once the linings are thoroughly dried, release the body assembly from the solera and use a sanding table to ensure that the linings are perfectly flush with the ribs and the neck and tail blocks, **photo 25**.

Back to the fingerboard

With the fingerboard shaped and the fret slots cut, it's now time to mark and cut it to length. Fit the neck back into the body assembly and lay the fingerboard onto the neck. Align it carefully to the centre line of the neck and soundboard and cramp it lightly in place, **photo 26**.

For aesthetic reasons, the join between neck and body should align exactly with one of the frets – usually fret 12 or 14 – so the perimeter of the body appears to flow continuously through the fingerboard. This instrument has fret 12 on the neck-body join; carefully align the slot with the marked perimeter line and tighten the cramps, **photo 27**.

Scribe the position of the soundhole on the back of the fingerboard, **photo 28**. Then release the fingerboard, cut along this line with a scrollsaw or coping saw, and sand the curved edge to a fine finish.

Spot fixing

There's one last cosmetic job to do before the fingerboard can be attached to the neck, and that's setting the mother-of-pearl dots into their drilled holes using a suitable adhesive, **photo 29**; I used a quick-setting epoxy resin type.

Once the glue has thoroughly dried, sand the dots down until they're flush with the fingerboard. For this job I use a length of 50mm square PAR timber, about 300mm long, with a different grade of abrasive paper – from 150 grit up to 400 grit – glued to each face. This allows me to work up through the grades until the dots and the fingerboard have a perfectly smooth and polished surface, **photo 30**.

In next month's article I'll be fitting the back of the instrument, adding the bindings and decoration to the body, and creating the bridge.

In case you need reminding at this stage of the build, the full plans for this ukulele are available from Zachary Taylor's website at **www.zacharytaylor.co.uk**

POSITIONING FRETS

The physics of a vibrating string dictate that the pitch of the string is affected by three properties: its length, its mass, and its tension. You can't alter the string's mass, and it's impractical to alter the tension, so if you want to change the pitch you have to change the vibrating length of the string by holding it down just behind a fret. The exact position of each one has to be pre-determined as the instrument is built.

Simple ratios

We're used to hearing certain frequencies (or, more accurately, the ratios between different frequencies) as being 'in tune'. In Western music, the smallest increment between two adjacent notes is called a semitone, and the frets are positioned so that stopping the string behind it raises the pitch by one semitone.

The location of some frets is easily found. For example, the twelfth fret is at the mid-point of the string's length. Halving the string length gives twice the pitch, so stopping the string at this fret raises the note by an octave. The fifth fret is three-quarters of the string's length from the bridge. The others aren't so simple to place, so our challenge is to find a formula to position every fret on the instrument.

Eighteen to one

Early guitar makers settled by trial and error on a ratio of 1/18 of the string length for positioning each fret. So if an instrument has a scale length of 360mm, the first fret will be 360 ÷ 18 = 20mm from the nut. The second fret would be 1/18 of the remaining string length (340 ÷ 18 = 18.9mm) from the first fret, and so on.

The problem is that the 1/18 ratio is an approximation which leads to each fret being a little too near the nut. This error is cumulative, to the extent that most musicians will describe a genuine period instrument as playing flat as they finger the frets nearer to the soundhole. The true ratio should be 1/17.817, which gives an accurate position for each fret all the way along the fingerboard.

Angling the saddle

The situation is further complicated because the stiffness of the string where it passes over the fret and the saddle has a small effect on pitch, causing it to play a little sharp. On the higher sounding strings this is negligible, but it gets more noticeable the thicker the string gets.

To compensate for this effect, bass guitars and most steel-strung folk guitars have the saddle fitted into the bridge at an angle. For instance, on one of my folk guitars with a 650mm scale length, the sixth (bass) string is roughly 4mm longer than the first (treble) string. It sounds perfect!

BY DUNCAN ROSE

Minimal mantel

This simple fireplace mantel is based on the traditional design of a shelf held by two supports. The initial brief evolved into this shapely project, with a gently curved shelf and supports that create an attractive and modern look

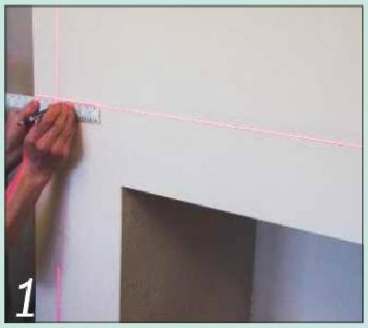
This fireplace mantel was made for a customer who commissioned my first piece of furniture some years ago. An initial chat gave me all the basic information I needed regarding the mantel's purpose, appearance, preferred materials and overall dimensions. The brief was for a simple design consisting of a mantelshelf with a pair of supports made in North American cherry, with the shelf positioned to hide an persistent crack just above the existing fireplace lintel. It was to be shallow on purpose, to avoid clutter being placed on it. It was a pretty minimalist design!

The design evolves

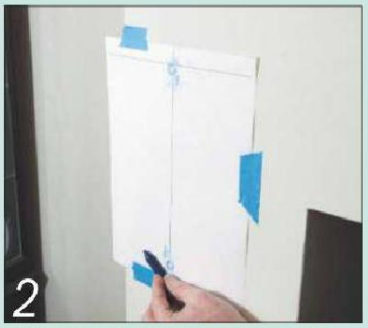
After measuring up the fireplace I set about creating some drawings using my CAD software. The first drawing closely followed the initial brief: a rectangular shaped shelf with rounded corners, 22mm thick, with a quadrant moulding along the underside. However, when we reviewed the CAD drawing we both agreed that the shelf looked thin and out of proportion.

The customer suggested making the shelf from thicker material to give it a more substantial appearance. My second drawing illustrated another rectangular shelf 42mm thick and without the moulding. This had better proportions but it now looked rather plain.

After pondering the design for a few days, I redrew the shelf using the thicker material but with a gentle curve along the front. I also shaped the supports similarly to reflect the profile of the shelf. The customer greeted the design with instant approval.

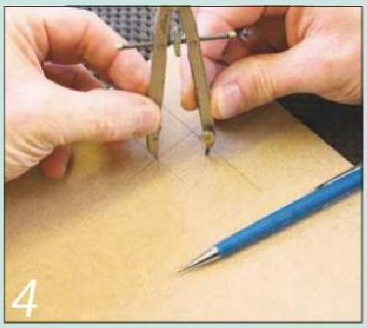


I used a laser line to mark the positions of the wall fixings on the chimneybreast



Drill the holes, fit the plugs and make a paper and crayon rubbing of their positions

Select a suitable piece of 50mm thick cherry from the timber yard's stock for the mantelshelf



Prepare 9mm thick mdf templates for the three components. Start with the rounded corners

Fixing practicalities

To achieve a high-strength fixing, I wanted to attach the mantel supports to the wall using screws and plastic wallplugs. However, when drilling holes in masonry the drill bit can have an undesirable tendency to drift. Also, I was uncertain about the extent of the existing fireplace lintel and how it might influence the positions of the fixing holes.

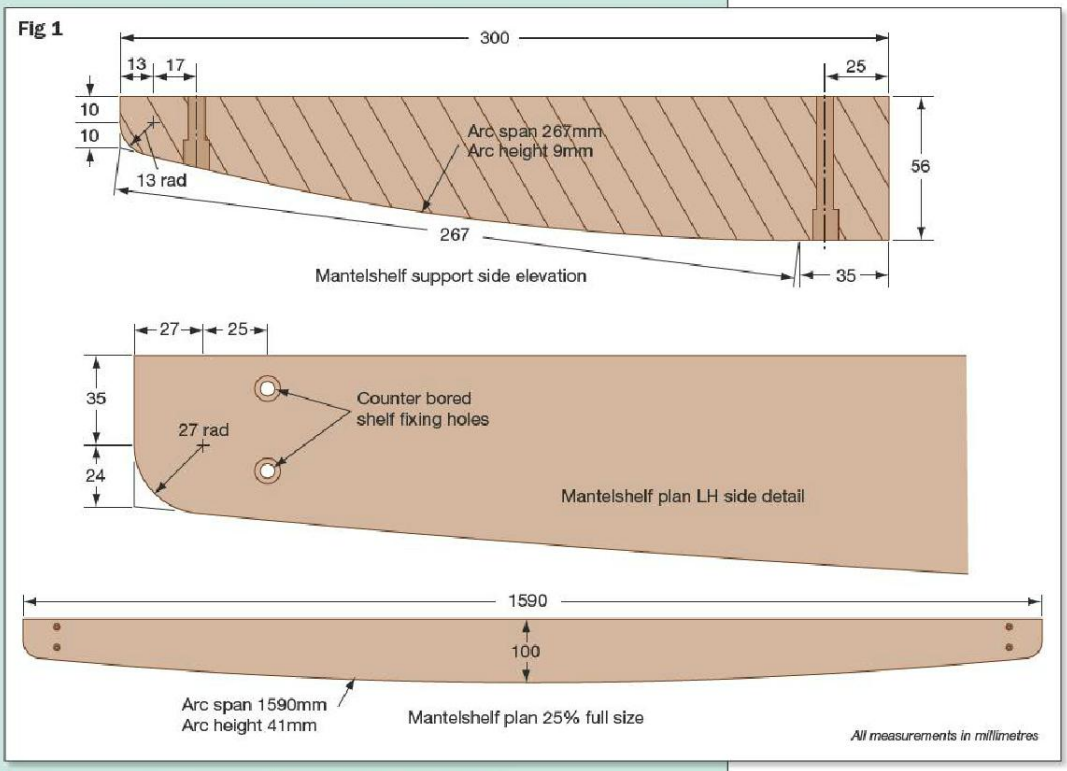
With this in mind I decided to start the project by drilling the wall with holes for the fixing plugs. Should the positions of these drift, then I would compensate by drilling the holes in the mantel supports with a matching offset. By doing this, I hoped to ensure that the supports would fit vertically. That was the theory, anyway.

Tackle the wall first

Start by marking the chimneybreast wall with the ideal positions for the fixing holes. I used dimensions taken from the CAD software and marked the positions with the help of my laser level, **photo 1**. This brilliant tool projects horizontal and vertical lines and makes this sort of setting-out job very straightforward and accurate.

Next, use a cable and pipe detector to check the wall for hidden metalwork. There probably won't be any on a fireplace wall,

Fig 1



but it's best to check. Then drill the holes in the wall to suit the wallplugs. My plugs required holes 8mm in diameter and 65mm deep. Initially I drilled a small pilot hole and then increased this to 7mm, before finishing with an 8mm bit with the hammer action on the drill switched off.

Insert the plugs and make a note of any drift. Three of my holes had moved a couple of millimetres! I recorded these empirically on a sheet of paper held vertically over the plugs by taking a crayon rubbing of their positions, **photo 2**. Back in the workshop I planned to use the paper to transfer the relative positions of the plugs onto the supports before drilling them.

Buying stock

I already had sufficient cherry in stock to make the supports, which were designed to be 56 x 22mm in cross-section and 300mm long when finished. I still needed a suitable piece for the shelf, so I visited a local timber merchant and was able to select a 50mm thick board of sawn North American cherry, **photo 3**.

This fine hardwood finishes with a reddish brown colour, and will darken on exposure to light. To improve its stability above the hot fireplace, I selected a quarter-cut board with straight grain. I also made sure that the board contained sufficient heartwood to complete the shelf without including any sapwood. Once I got it back in the workshop, I left it for a week so its moisture content could acclimatise before I started machining it.

Making the templates

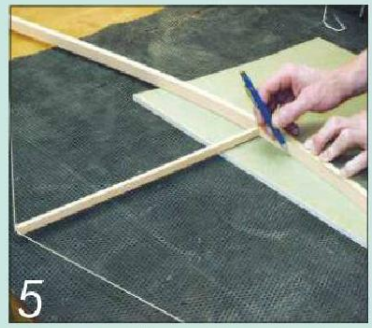
I made the templates for the mantel supports and shelf from 9mm thick mdf because it's easy to mark, cut and sand smooth. Make the template for the supports a little longer than required to give a lead-in for the bearing-guided cutter that will later trim the supports to shape.

Start by drawing the required shapes on the mdf. Mark the rounded corners first, **photo 4**, and then the long curves. I drew the curves using a simple string bow, **photo 5**, tensioned with a spreader to set the required arc span and height. The arc dimensions are given in **fig 1** opposite.

Now rough-cut the templates to size, sawing on the waste side of the drawn outline, **photo 6**. I cut these using the bandsaw and then sanded the edges back to the line using the belt sander until they were smooth to the touch, **photo 7**.

Making the support blanks

Next, make the two mantel support blanks a few millimetres wider than required, so



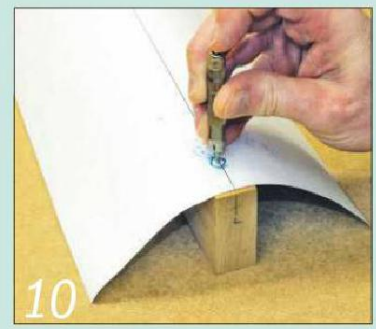
Then use a string bow to set the required arc span and height, as shown in the drawing opposite

Rough-cut the two templates to size on the bandsaw, working close to the marked lines

Then use the belt sander to finish the curved edges back to the marked line

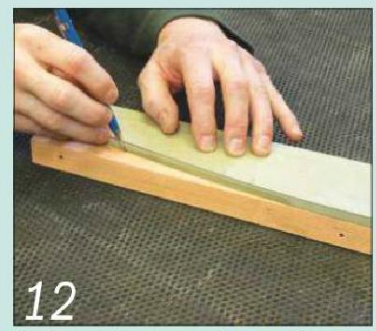
Rip the mantel support blanks to their approximate width on the bandsaw

Plane the two supports flat and square one edge, then cut them to length



Use the paper rubbings to mark the fixing hole positions on the support blanks

Prevent the drill bit from drifting by drilling the holes from opposite sides



Pin the mantel support template to each blank in turn and draw round it

Remove the template and rough-cut the supports a little larger than their final size

Pin the template back in position on each support in turn...

...and trim it accurately to shape along its long edge. Don't trim the corners yet

To avoid cutter snatch, sand the rough-cut corners to shape on the belt sander

Finish the supports by rounding over the shaped edges with abrasive paper

Drill counterbores big enough to accept the heads of the fixing screws

Use the shelf template to select the best section of the raw timber

there's room to mark each with the required shape. I made these from a plank of sawn cherry 25mm thick, cross-cut slightly over-long and then ripped down the length using the bandsaw, **photo 8**. If you plane one side flat before ripping it, the work is easier to guide against the bandsaw fence. Plane the work flat, square up an edge, **photo 9**, thickness it and then cross-cut the two blanks to their final length.

Now drill pilot holes through the support blanks, in positions that match those of the wallplugs. This is easy to do while the supports are rectangular. I marked the centres of the holes on the support blanks using the paper rubbings I made earlier, **photo 10**. You can prevent drill drift by marking and drilling from opposite sides, **photo 11**.

Shaping the supports

Pin the mantel support template to the blank and draw the outline on it, **photo 12**. Then remove the template and bandsaw the supports roughly to shape, cutting on the waste side of the line, **photo 13**. Keep the offcuts, as these will be useful later for making the wooden plugs that will conceal the fixing screws.

Next, secure the template to the support again, **photo 14**, and trim the long curved edge to shape using a bearing-guided straight cutter in the table router, **photo 15**. I stopped cutting before reaching the corners, as these include end-grain and I wanted to avoid the risk of cutter snatch. Also the supports are relatively small, which makes the work more difficult to control. You can prevent the cutter from scorching the cherry by keeping the work moving and using a moderate router speed.

Remove the template and shape the remaining rough-cut corners by sanding. This is easily done as cherry is relatively soft to work. I started with the belt sander, **photo 16**, again avoiding scorching by keeping the work moving and using a moderate belt speed. Then I finished by hand sanding the corners using grit grades 120, 180 and 240 until they were smooth to the touch and free from scratch marks. I also sanded the curved edges of the supports to give them a small roundover, **photo 17**.

Drilling the counterbores

The next task is to counterbore the mantel supports so the heads of the fixing screws can be recessed. Before drilling the holes, use a piece of scrap and check that the bore diameter is a good fit with your wooden plugs. Also check that the bores are large enough to accept the heads of your fixing screws. I planned to use No 10 imperial

screws, which have a thread diameter slightly larger than their metric equivalents.

Drill the counterbores using the pilot holes you drilled earlier to align the positions correctly, **photo 18**. I cut these using a 10mm Forstner bit to a depth of about 12mm, followed by a slightly smaller countersink bit so the screw heads would seat well. Then drill clearance holes in the supports to suit the diameter of your fixing screws' shanks.

Making the shelf

Next, make the mantelshelf following the same method used for the supports. I placed the shelf template on the uncut sawn board to help select the most suitable portion to use, **photo 19**. Then rip the board to the approximate width required and plane it flat.

Next, square an edge, thickness it slightly wider than required, and crosscut the shelf blank to its final length. Use the template to mark the shelf and then trim it to shape along the long curved edge, avoiding the corner end grain as before, **photo 20**. Again I shaped the corners by sanding and used my router table to round over the facing edges, **photo 21**.

A trial assembly

You can now temporarily attach the supports to the wall and place the shelf on top. Check that the shelf is a close fit to the wall. If it's not, use a spacer and pencil to scribe the wall profile onto the underside of the shelf, **photo 22**, and shape it for a better fit. I found a scraper worked very well, **photo 23**.

Replace the shelf and mark the positions of its fixing screws. Remove the shelf and drill it with four counterbores and clearance holes, **photo 24**. Reposition the shelf and mark the exact positions of these holes on the tops of the supports, then drill pilot holes in the supports to suit your shelf fixing screws.

The final stages

Disassemble the shelf and supports and give them a final rub-down, removing any unwanted marks, **photo 25**. Then apply three coats of hardwax oil to the work using a foam brush, **photo 26**.

Assemble the mantel for the last time and fit cherry plugs into the eight counterbores. I made the matching plugs with a plug cutter, **photo 27**, applied a little pva glue and gently tapped them into place.

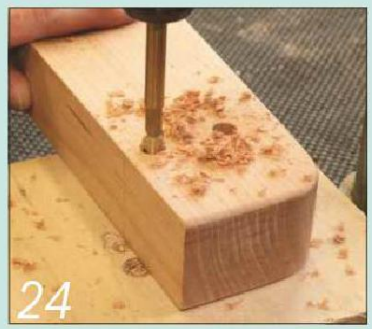
When the glue has dried, you can either leave the plugs proud of the surface as a decorative feature, or trim their tops flush using a sharp chisel. Finally, apply some hardwax oil to the plug tops and finish the mantel and supports with a coat of wax.

As before, leave the end-grain corners and shape them using the belt sander

Round over the shaped edges of the shelf using the router table

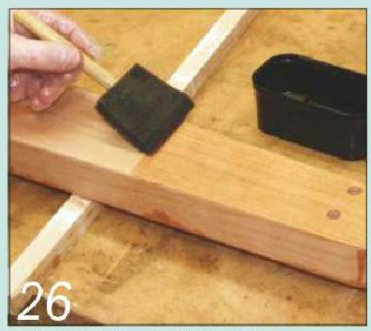
Scribe the mantelshelf to the wall if the chimneybreast surface isn't flat

Scrape the excess material from the shelf to improve its fit against the wall

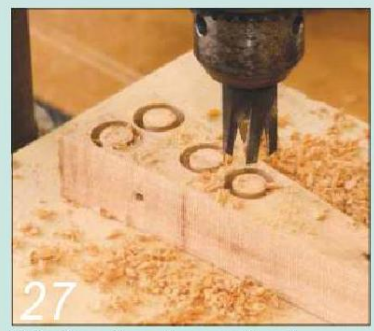


Mark the positions of the shelf fixing screws, then drill and counterbore the holes

Give all three components a gentle final sanding to remove any blemishes



Apply the finish to the shelf and the supports. I used three coats of hardwax oil

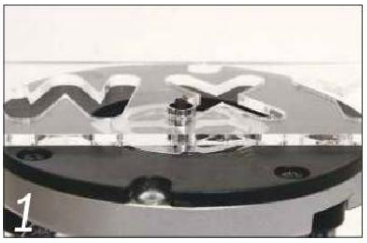


Make cherry plugs using a matching plug cutter to hide the counterbores

BY RON FOX

Letters and numerals

In the second of this occasional series of articles on routing techniques using templates, I'll show you how to use commercially available letter and numeral templates for making signs and name boards



The Triton ½in guide bush has a relatively short projection through the template

Skilled woodcarvers cut elegant letters and numerals by hand, but for the rest of us templates used with a router, a guide bush and a straight cutter provide a means of making acceptable signs and name boards.

For a one-off job it would be possible to make your own template, cutting the outlines with a scrollsaw, but for more than the isolated job commercial templates are available from several suppliers. The ones I've used in this article are from Trend, but similar alternatives are available from other suppliers such as Rutlands.

Prices and sizes

Trend have two separate sets: one for capital (upper-case) letters – TEMP/LUC/57 costing £45.24 – and one for numerals – TEMP/NUC/57, £22.56. They're made of clear plastic 4.8mm thick, with a nominal character height of 57mm for both letters and numerals. The typeface is Trend Vogue.

The templates are used with a plunge router fitted with a 13mm diameter guide bush and an 8mm straight cutter. The guide bush should have a short projection from the router base, **photo 1**, because the templates are only 4.8mm thick. Standard-length bushes will be too long.

Bases and guide bushes

If your router already includes a ½in (12.7mm) bush in its kit you can use this, but check the projection. If it's more than the 4.8mm thickness of the templates you could possibly cut it down, but a less drastic method is to make a sub-base for your router to increase the base thickness and reduce the guide bush's projection.

If you already have the odd-numbered Trend plastic guide bush set GB/SET/2 (£31.13), you'll have a suitable 13mm bush for these templates. If not, an accessory pack (TEMP/LN57X1/4) containing the appropriate guide bush and cutter and priced at £15.88 is available from Trend.

This guide bush is a standard Elu/

Lots of non-Trend routers take the Trend 13mm plastic guide bush

If your router has a non-Trend base configuration, you might need the Trend circular sub-base

Cramp the template to the workpiece with its top edge butted against a thin timber batten

O and P are turned into Q and R with the diagonal tails on the template

DeWalt/Trend (EDT) type. It's 60mm in diameter, but it's only 5mm deep to allow for the thin templates. It fits a wide range of medium-power routers that have adopted the EDT base configuration, **photo 2**.

If your router has a non-Trend base configuration, you might need the Trend Unibase or circular sub-base to take the bush, **photo 3**, but at least you will then be able to use the entire range of EDT bushes.

The right router

You need a router that can take, or be adapted to take, the Trend guide bush supplied for use with the templates. Alternatively, if your own router includes either a 13mm or a ½in guide bush among its accessories you can use that, subject to the warning about the projection mentioned above. I've found the most convenient models to be the DeWalt DW26204K, the Trend T5, the DW 615 and their clones – not forgetting the original Elu 96.

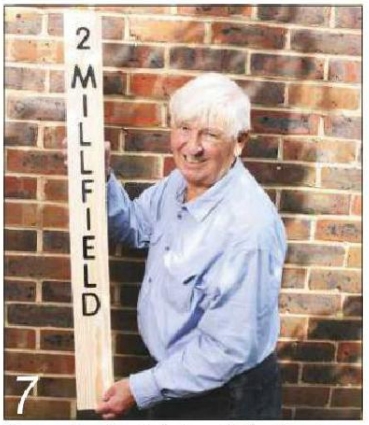
All these models take the required guide bush directly; in addition they all have a fairly small, neat base, which is a great help in clamping the work without impeding the path of the router.

Cutter ups and downs

The recommended cutter is an 8mm diameter straight. I've used this with good results, and also tried 8mm spirals in both upcut and downcut versions. All these gave good results so long as the cutter was sharp. In particular the spirals tended to give a less chipped cut in brittle hardwood. The best advice is to treat yourself to a new cutter and to reserve it for your signs if you're likely to be making a number of them.

You can try other cutters – narrower straights, V-groovers or cove cutters, for example – to give a certain amount of

This simple bench set-up makes it easy to produce a vertically cut sign on the centre board



The completed vertical sign with the characters picked out in black gloss paint

variation in the appearance of the cut. However, having tried a range of alternatives, I settled for the recommended 8mm straight. As always, make a test cut before you tackle your expensive workpiece.

Setting up for the cut

The instructions recommend that you use the templates to trace the outlines of the letters and numerals on the workpiece before cutting them. This helps to get the initial feel of the job, and also allows you to check the spacing of the characters. However, after a little practice you'll probably be confident enough to position the templates for each character without drawing the outlines first.

It helps if you draw a pencil line along the workpiece to align the template, or better still butt one edge of the template against a thin batten to keep the characters level.

In **photo 4** the workpiece is clamped against a piece of equal thickness, and a thin batten is tacked to the extra piece. After each character is cut, the template is repositioned for the next one with a suggested gap of 10mm in between.

Making the cuts

The recommended depth of cut is 2 to 3mm. You may want to sand or plane the surface of the sign after cutting, in which case you can add a bit to the depth.

Stand the router with the guide bush in the cut-out for the first character. Switch it on and plunge gently while moving the router forward. This will help avoid rings in the wood where the cutter was plunged. The guide bush is slightly loose in the template. Make the cut in a clockwise direction with the bush pressed lightly against the outside edge of the template, then come back with the bush pressed against the inside edge.

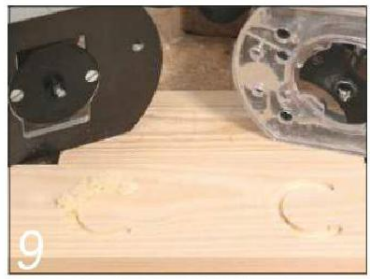
Two-part characters

Some characters such as the letters Q and R have to be made in two cuts, with the template repositioned for the second one. For example, R is made by first cutting P and then moving the template along the guide batten to add the diagonal tail, **photo 5**. You can also see these diagonals next to O and P in **photo 4**. Indent marks along the top edge of the template enable you to position these second cuts accurately.

Creating vertical signs

Most of your signs and name boards are likely to be cut horizontally along a board, but they can also be cut vertically if required. To do this you have to improvise a way to hold the workpiece and position it accurately while each character is cut.

Sand away both sides of the flange to allow the dust to pass through the gaps



Dust extraction is much improved using the modified guide bush (right)

Signs often look better with the characters picked out in paint or stain

Photo 6 shows the set-up I adopt. The workpiece is clamped between two pieces of wood of the same thickness. Then a thin batten is tacked at right angles across these two pieces and the template is butted up against it.

A centre line is drawn down the length of the workpiece to help align the characters, and even vertical spacing is achieved by positioning the top edge of the template outline 10mm below the bottom of the previously-cut letter.

Note that if you are usng the end character on a template you need to butt another template against it to prevent the router tilting as you make the cut. **Photo 7** shows a completed vertical sign.

Better dust extraction

With the recommended guide bush and cutter fitted to one of the suitable routers, dust extraction is virtually non-existent because the guide bush fills nearly all of the cutter aperture in the router base, and the cutter occupies the inside diameter of the bush, leaving no space in between for the dust to pass through. The situation is even worse if you use a router fitted with an adaptor plate to take the bush (**photo 3**).

Fortunately the problem is quickly solved for the T5 and similar routers. Since the guide bush is plastic, it's easy to modify it by sanding both sides of the main flange so the dust can pass up through the gaps, **photo 8**. The result is excellent dust extraction, which also makes for a cleaner cut. Compare the two letters cut in **photo 9**, with the modified guide bush on the right. This particular trick can also be played with other guide bushes, but the shaping is much easier with plastic rather than metal bushes.

Finishing touches

Signs and name boards in some timbers can be left as plain cuts in the raw wood, but most look better if the characters are picked out in paint or stain. You might also want to mould the edges of the board for a more pleasing effect, and to allow water run-off if the sign is meant for outdoor use. Finally, you might want to apply one or more coats of varnish to the entire sign. Here's a sequence of operations that I've found works pretty well.

- After cutting the sign, lightly sand the surface of the board and apply one or two coats of sanding sealer, including the incised characters.
- Paint the characters with an artist's brush when the sanding sealer has dried, making sure that the paint fills the incisions. The little pots of black and gold enamel paint I used came from the local toyshop.
- When the paint is dry, lightly sand the surface of the sign. Any overbrushed paint will be lying on top of the sanding sealer, and will be removed cleanly when you sand off the surface.
- Proceed with the final finishing coat of lacquer or vanish. Apply two or three coats for outdoor use.

Postscript

All the signs shown in this article were cut in wood, but there's no reason why you shouldn't make them in acrylic sheet (Perspex), so long as you have a suitable cutter and a variable-speed router to run that cutter at its recommended speed for plastics. They look brilliant when lit from the back!

FURTHER INFORMATION

- Trend
- 01923 249911
- www.trend-uk.com
- Rutlands
- 01629 815518
- www.rutlands.co.uk

BY ANDY KING

A clean sweep

You've prepared the components, cut the joints, checked the fit and put right any mistakes you've made along the way. All your project needs now is a final clean-up and the application of a finish

Even if the fit from your jointing is good, there's still the need to clean everything up, although easy-to-access faces or external edges can (and in most instances, should) be done last, after the glue has dried. The exceptions are internal areas, recesses, panels and the like which should always be cleaned up first, as it's often impossible to access them once the work is assembled.

At this stage of the project, you should be looking to remove any remaining setting-out marks, plus the inevitable grubbiness that accumulates from handling the work, so a fine clean-up should be sufficient. But what's the best method to choose?

USING A BENCH PLANE

A good sharp plane is the traditional method of cleaning up flat surfaces, but there's always a danger of hitting a bit of wild grain and tearing a chunk out. This isn't the end of the world if the work is to be painted as you can fill it, but for a polished piece it's disastrous!

Bevel-up planes are the current clean-up favourites with many hand-tool enthusiasts, and their advantage is that by steepening the pitch of the grinding and honing bevels, the cutting action becomes more of a scrape than a cut and is therefore less prone to tearing the surface of the work. The downside is the need for additional irons unless you're prepared for regular re-grinding whenever you want a different cutting action.

The ruler trick

Furniture maker David Charlesworth has come up with a novel technique for honing traditional bevel-down Bailey planes. He raises the flat back of the iron fractionally by placing a steel ruler on the edge of the honing stone to angle the iron's back edge very slightly.

This has two consequences. It eliminates the need for prepping a large area of the iron to get it flat on the back, and can resurrect a badly pitted blade at the same time. It also increases the effective pitch of the iron to give it that 'scrape' action and reduce tear-out.

1 A traditional handplane will do the majority of cleaning up where necessary...

2...but for wild and interlocked grain, a low-angle bevel-up plane gives better results

A finishing plane

In the majority of instances the plane you choose should be reserved for cleaning-up work only. If you're taking away swathes of stock to bring one piece level to another – a rail to a stile, for example – then there's something awry with your jointing work. The only solution here is to remove stock all round in equal amounts. Take too much off on one surface and you then begin to compromise the fit on any shoulders on a framed piece, or opf shelves into housings and so forth.

You can go straight from the plane to the application of the finish if you are proficient enough, and on narrowish stock you can do so easily enough, but wider areas especially may need a bit more cleaning up using another method.

USING BLOCK PLANES AND SPOKESHAVES

Block planes aren't essential tools in the kit, but they're very useful for fitting smaller stuff, shooting in and easing cabinet doors and the like. They're also far easier to control on a narrow edge, working well in situations such as where a moulding has been formed and the resulting quirked flat needs a quick clean-up to remove marks before assembly.

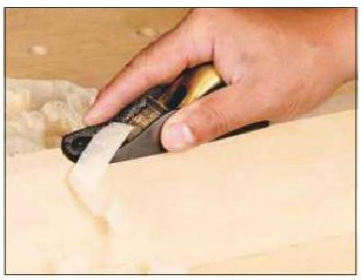
The block plane shouldn't be discounted either as a great tool for cleaning up end grain or for knocking off arrises. You can of course use abrasives for arrising, but a block plane allows a more controllable, crisp finish.

Coping with curves

The spokeshave is a superb tool for cleaning up any curved areas before assembly, but some people struggle to control them. The knack is to roll the wrists slightly while you apply forward pressure to the tool with your thumbs.

A light touch works wonders but it does take practice, especially with the curved-sole models as they can chatter more readily than the flat ones if you aren't skilled at driving them.

If you struggle with either sole type, skewing the tool slightly to give a shearing cut can help eliminate the chatter effect. Persevere, and you'll find a pull stroke is as easy to execute as a push.



1 You need to remove only a fine shaving to clean a surface with a block plane

2 Block planes are also useful for cleaning up end grain and working on narrow stock

3 Set finely, the spokeshave works fantastically well for cleaning up curved work

USING SCRAPERS

You can own the best plane in the world and still end up frustrated when it decides to lift a piece of grain, so it's ironic that one of the cheapest bits of kit around can beat any plane at cleaning up a surface.

A card scraper is easy to use once you get the hang of it, but it's not a tool designed to remove lots of stock. It simply allows you to take a very fine shaving cut on areas that would lift if a plane were used. The scraper is particularly good in situations where wild grain or grain reversal are involved. You simply work in the direction of the grain to tame the wild bits, and even against the grain the action doesn't dig and lift.

The correct angle

You have to introduce a curve across the blade to prevent the corners from catching and digging in on large flat areas, and that can be quite fatiguing on the fingers. The angle at which you present the scraper to the work also has an effect on the cutting action. The more you tilt it towards the work, the more aggressive the cut will be as the hook of the scraper bites deeper.

Remember that a scraper can quite easily produce a hollow if you concentrate of one area, so work well beyond it to lessen the effect and feather the area you're working on into its surroundings.

Variations on a theme

Gooseneck and other shaped scrapers can cope with almost all areas of cleaning up, from large flat areas down to intricate mouldings, and they work as well in stripping back old finishes as in cleaning up new surfaces.

If your budget allows, there are various devices to hold card scrapers at a constant curve and pitch so the cut is uniform. And if you do a lot of work with difficult timbers, a dedicated scraper plane is well worth looking into. The Veritas model has the ability not only to flex a curve into the blade, but also to vary the pitch so you can fine-tune the cut very easily.

Summing up, scrapers tend to be better suited for large flat areas rather than thin edges (or for mouldings if a shaped one is used). They work well alongside a razor-sharp plane.

1 The success of a scraper depends on blade curvature as well as the cutting angle

2 A sharp scraper will cope equally well with end grain and wild or interlocked areas

3 Gooseneck and other shaped scrapers earn their keep for cleaning up mouldings

4 Scraper planes are expensive, but worth it if you do a lot of work with difficult timbers

HAND AND POWER SANDING

1 A sanding block prevents local overworking when sanding by hand

2 Skewing a belt sander gives faster stock removal when cleaning up jointed work

3 The sander should then be straightened up to remove any cross-grain scratching

Hand sanding is the bane of many a woodworker's life, but it's the most controllable way of getting a good, clean surface. On a large flat area, a sanding block is the best bet to prevent localised overworking. Where you have jointed intersections – rails to stiles, frames in panels and so on – or areas of curvature, hand sanding really has true value.

Of course it goes without saying that the use of any powered sander will remove the hard work of cleaning up an entire project, but you need to make sure you select the correct machine for the job you want it to do. Here are the main choices

The belt sander

Belt sanding is the quickest way to remove swathes of stock or old finishes. It works particularly well on large flat areas such as tabletops. The belt sander can also tackle more delicate stuff if it's used with the appropriate sanding frame to ensure that it cuts to a uniform depth.

You can remove stock quicker with a belt sander by moving it up and down the work with the sander held at an angle to the grain direction, before straightening it up to run up and down the grain profile and eliminate any cross-grain scratching.

Even with a fine grit you have to work with care, as the belt can cut at an alarming rate; if you don't keep it moving it will easily carve a rut in the work.

The orbital sander

Standard orbital sanders are the first choice for a more controlled sanding action as they work the sanding platen with a uniform circular motion. The half- and third-sheet models intended for sanding bigger areas are complemented by a smaller quarter-sheet palm version. Models are also available with different orbit diameters; the bigger the orbit, the faster the stock removal.

Orbital sanders will remove stock reasonably quickly if fitted with a coarse

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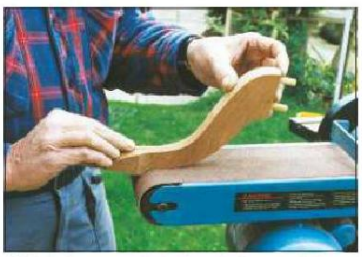
HAND AND POWER SANDING

4 Some belt sanders can take a frame to prevent over-sanding on delicate surfaces

5 Standard orbital sanders are perfect fine finish sanders for flat, square surfaces

6 The random orbit sander can tackle large flat areas and smaller clean-up tasks



7 The belt on a static belt and disc sander is the perfect choice for cleaning up curves...

8 ...while the disc and its work table allows precise finishing of components such as mitres

9 A sanding drum fitted in a drill press is a low-cost alternative to a bobbin sander

paper, but they are really designed to be finishing sanders first and foremost. They're especially good on thin veneered stock.

A big plus with orbital sanders is their ability to use abrasive paper cut from inexpensive sheet or roll sources. Velcro-fastened options are available too, but at a higher initial cost. However, they do have the advantage of allowing dust extraction through the baseplate.

Although these sanders can be used in any direction on the grain, the way they work leaves the surface with a uniform circular scratch pattern and the eye can pick this up quite easily.

The random orbit sander

To overcome this problem, the random orbit sander has established itself as the main player in many a workshop. It has a round base that orbits (oscillates) in a random fashion instead of in tiny circles, so it leaves a fuzzy scratch pattern. Although you can see this if you look closely, it fools the eye so you don't see it so readily.

There's a choice of base diameters – usually 150 or 125mm – along with a palm-sized option. Different orbit sizes are also available, with some models having dual orbit functionality so you can have very fast stock removal or a finer finish as needed.

Random orbit sanders are very capable on larger areas as well as on smaller stuff, such as flushing up frame intersections.

The downside is that the sanding plate is circular, so it has to rely on a Velcro attachment, making it more expensive to use. This also means that if you're sanding an area with internal corners it won't get right into them, so you'll need a further option to clean it up. This is a good reason to pre-sand prior to assembly if you have the option!

However, the cut of a random orbit sander is far quicker and less prone to clogging than a standard orbital sander. As a recommendation, a random orbit sander would be top of the list when it comes to power sanding. It has the ability to remove stock quickly as well as producing a fine finish, but with easy control throughout.

The detail sander

If you find yourself stuck and have to clean into a corner, a scraper will certainly do the job. However, a delta sander is a good tool to own alongside a random orbit model. Its rounded triangular blade offers three cutting points and edges on each abrasive sheet. I prefer to use them more for cleaning up old stuff before applying a new finish rather than as a tool to clean up new work, but they do a decent job in both cases.

The standard models are fine, but if you have a bit more cash, the multi-tool versions are becoming quite affordable now and give you a lot of extra functionality. Multi-tools used as sanders with the appropriate attachments have a different oscillation pattern to a dedicated delta model, and tend to cut faster when sanding.

Workshop sanders

While hand-held sanders prove their value, static sanders also have their place in the workshop. For example, if you aren't overly proficient with the spokeshave, any shaping work is easier to clean up (or indeed to shape) on a static model such as a disc, belt or bobbin sander. A belt-and-disc combination machine will give you the best of both worlds.

The combination option, while giving a good belt size, often has to compromise on the disc size; the smaller discs don't give a big working area. But for fast shaping of external curves as well as easing in flat faces, tweaking mitres and so forth, they are well worth the investment.

One of the beauties of owning additional sanders for shaping is the ability to clean up more intricate work. A bobbin sander has the upper hand on cleaning up internal curves, but you can also work external curves and flat edges with a bit of care.

The bobbin usually oscillates as it rotates, so the sanding action is quick as well as distributing the sanding over a wider area for increased durability of the sleeves.

Alternatively, if you have a drill press you could use sanding drums. These aren't as efficient as the bobbin sander, however, as the drum sands in a single position and tends to clog more readily.

BY BEN PLEWES

Working in harmony

I can't think of any woodworking jigs that outrank the humble bench hook and shooting board combo. When used together, these simple shop-made devices yield results far superior to what most powered saws can achieve

It's always struck me as odd that both these items should be viewed in isolation; most woodworkers make both jigs independently of each other. Perhaps it has something to do with the way we learn to work wood, and the progressive nature in which we develop our cutting techniques.

Driven by need

The bench hook usually comes first as we practise how to use a backsaw to crosscut work accurately. A simple traditional design is shown in **photo 1** overleaf Then, a little later, as our curiosity grows and our desire to clean up those freshly-sawn ends becomes a necessity, **photos 2** and 3, we take things further and make a shooting board for one of our favourite planes – often a No.5 jack. And there we leave it: both jigs work, and usually quite well. But can these simple jigs be improved upon? Can they give us even more?

MAKING THE BENCH HOOK

The bench hook, **photo A**, is a very simple device consisting of three components – the board, the fence and the cleat. Traditionally it can be used either way up, but by incorporating a full-width rebated cleat and one rounded corner, my version has a definite top and bottom.

If you opt to use solid wood for the board, then both the fence and the cleat need to be fastened by way of two screws driven through counterbored holes. One is enlarged into a slot, **photo B**, which will allow the board to increase and decrease in width without warping or splitting. On the other hand, if you decide to use dimensionally stable mdf or plywood in place of solid wood for the board component, you can do away with an expansion slot because man-made boards are stable enough for expansion and contraction not to be an issue.

A The bench hook and crosscut saw are partners made for each other

Nearly square

Both the fence and cleat should be fixed approximately square to the edge of the board. But, unlike the shooting board, this isn't critical because your eye will be guiding the saw to cut square during use. Put another way; the saw is not being physically guided by any part of the jig, unlike the plane on the shooting board.

Another departure from tradition is the full-width cleat, **photo C**. This gives the hook more support against the edge of the bench. It's also good to maximise contact between the cleat and the wall rail rebates when hanging it vertically for storage.

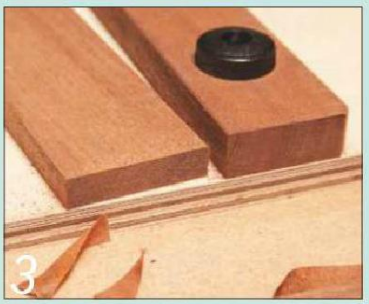
Lastly, I prefer a hand-planed finish for solid wood jigs such as this. It's a subtle difference, but taking the time to create silky smooth surfaces and to remove sharp arrises adds a little joy each time it's used.

B The counter-bored hole and slot cater for any expansion that may occur

C The full-width cleat gives the hook greater support against the edge of the bench

The traditional design of bench hook can be used either way up as the cleats are identical

This rough-cut end has just been sawn by hand using a bench hook



Its now clean-cut end is the outcome of being shot with a sharp plane

Why use power?

For many of us, using a bench hook and shooting board becomes central to our workflow. The ability to crosscut at the bench with an astonishing level of accuracy, unsurpassed in speed or finish by any machine and with the advantage of generating very little noise and dust, makes a lot of sense. Couple this with the ease in which a cut can be trimmed for a perfect fit (see **photo 4** overleaf), and you're left with a compelling reason to leave your mitre saw gathering dust in a dark corner of the workshop!

Room for Improvement

After making several bench hooks and shooting boards over the years, each with improvements over their predecessors, I chose to remake both at the same time and to integrate some ideas I'd been mulling over, with a view to improving the overall functionality of both items. While the bench hook and shooting board are used separately, they tend to be used in sequence with a singular goal in mind – accurate crosscutting – and this leads to my first improvement.

Mutual support

The trouble with the traditional forms of these jigs is that a long workpiece overhangs the left-hand side of the jig (assuming you're right-handed). This means you have to hold it down flat on the jig with your left hand while you use a saw or plane in your right hand. This doesn't make for accurate work.

What I've done to avoid this problem is to standardise the distance between the supporting fence and the cleat that hangs over the edge of the bench. With both bench hook and shooting board fences aligned at the same distance from the bench edge, one can support the other when working long pieces, **photo 5**, while

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MAKING THE SHOOTING BOARD

The shooting board, **photo 1**, is more complex than the bench hook and takes a little longer to build. The first job is to laminate the two 12mm boards together. The narrower top board forms a shallow rebate wide enough to house your plane, and a lateral guide rail keeps the plane running true.

Laminating the base

I find a series of F-clamps with transverse cauls gives good even pressure for this kind of glue-up, **photo 2**. Whatever you use, ensure that even pressure is applied to the upper surface; both boards need to be as flat as possible while the glue sets. Any discrepancy here will have a direct effect on the accuracy of the finished shooting board.

Don't worry at this stage about keeping the top and bottom board edges flush. Instead, cut the boards slightly oversize – by 10 to 20mm – on each edge. The inside angle of the rebate needs to be at exactly 90°, perfectly straight and free from glue squeeze-out because this edge will form the running guide for your plane soleplate. When the glue has set, trim each edge to its final size on the table saw, or use a router with a flush-trimming router bit.

Adding the hardwood

The next steps involve fitting the three hardwood components – the fence, the cleat and the lateral guide rail that will keep the plane supported against its rebated running edge. The cleat can be secured in position with counterbored or countersunk screws, as it doesn't need to be adjustable. However, I've made both the fence and the lateral guide rail adjustable so the shooting board's accuracy can be tweaked over time, **photo 3**.

Cunning hardware

The fence has two thumbscrews with T-bolts fitted. These came from Axminster's 148-piece jig-making set (item number 950114, priced at £35.60 and available from www.axminster.co.uk). The left T-bolt goes through a routed slot, **photo 4**, while the right one goes through a close-fitting hole to minimise the risk of the plane's forward motion inadvertently throwing the fence out of square. Once the thumbscrews and T-bolts are loosely fitted, use your most accurate square to align the fence at right angles to the rebate; then tighten both thumbscrews to lock it in position.

A sliding fit

Lateral guide rail accuracy isn't so crucial. This just needs to be adjusted from time to time to ensure that it's holding the plane against the adjacent running edge along the rebate's length. Both edges will wear slightly over time, so it's useful to be able to tighten things up when necessary.

Both T-bolts are located through holes in the rail, and then through grooves in the baseboard wide enough to provide ample adjustment, **photo 5** (10mm should be fine). I counter-bored the holes for the thumbscrew collars to keep them as low as possible to the rail, **photo 6**. It's also important to place the furthermost thumbscrew behind the fence so it doesn't interfere when being used as a shooting board support.

1 The shooting board has a running rebate and a lateral guide rail for the plane

2 Use multiple clamps and cauls to laminate the two boards together. Note the overlap on the right creating the rebate

3 I used four thumbscrews to attach the fence and the lateral support to the baseboard

4 The left T-bolt that attaches the fence goes through a routed slot

5 The routed and counter-bored slot for the T-bolt allows adjustment of the lateral guide rail

6 Counter-bore holes for the thumbscrew collars to keep them as low as possible on the rails

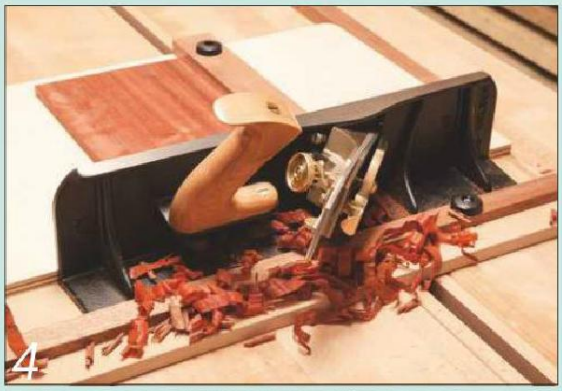
7 I designed this version of my shooting board for a Veritas low-angle jack plane

Easily adapted

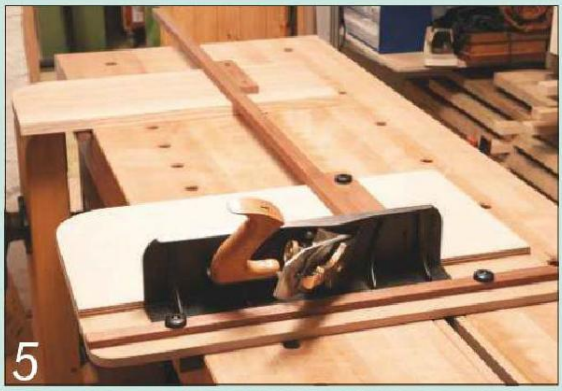
You'll notice that I've designed this jig around the use of a Lie-Nielsen No.51 shooting board plane. The lateral adjustment rail was inspired by the shooting board plans that came with the plane. But the design I've outlined here can be adapted to virtually any plane commonly used for shooting. I have a similar version I made several years ago for use with a Veritas low-angle jack plane, which works very well, **photo 7**. I could easily add a lateral support rail to it; customisation is the key here. You can also adapt any of the measurements to fit your own equipment and preference.

Summing up

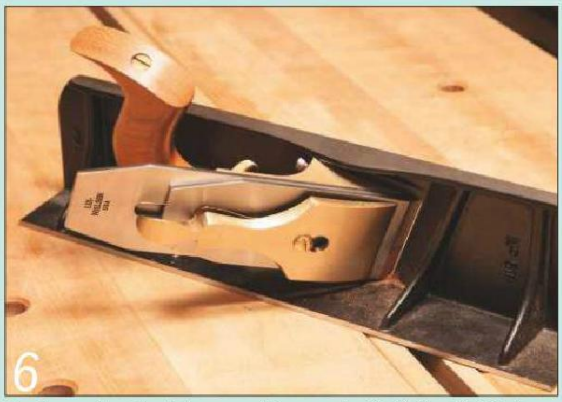
If you can find the time to create this pair of complementary bench jigs, I'm sure you'll be reaping the benefits for years to come. Working quickly and accurately while minimising dust and noise – both of which require physical protection that, let's face it, we'd rather not have to wear – can only add to your woodworking enjoyment.



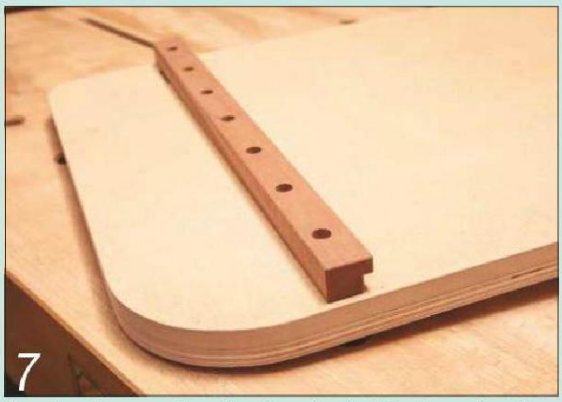
A sawn cut end can be trimmed, sliver by sliver, for a perfect fit



The workpiece rests across shooting board and bench hook simultaneously



The shooting board can't be reversed for use with a Lie-Nielsen No.51 plane



The radiused corner is shown from the underside of the shooting board

still keeping the work snug to the fence. This simple tweak costs virtually nothing, but significantly reduces the strain on your supporting hand.

By the way, both jig designs can be made as mirror images for left-handed users, although the shooting board can't be reversed for use with a Lie-Nielsen No.51 plane, **photo 6**, due to its dedicated right-handed design.

A common curve

The next improvement applies to both jigs, and further increases comfort and holding power. By cutting a fairly large radius on the bottom left-hand corner of each jig – shown from underneath in **photo 7** – it's possible to apply pressure against the bench with your thigh to hold the jig securely in position. This is particularly useful when you're using the shooting board, because the backwards motion of the plane has a tendency to bring the jig away from the edge of the bench. Even if no pressure is applied to the jig in this way, there's still a definite improvement in user comfort.

A hanging cleat

Now comes the question of storage. These jigs tend to be put away flat, often under the bench where they take up valuable space. However, by modifying the bench cleat to include a small rebate, **photo 7**, both jigs can hang securely from a similarly profiled rail screwed to a wall or to the side of your bench. You can machine one length of wood to form the cleats for both jigs as well as for the wall-mounted rail (see below).

A longer hook

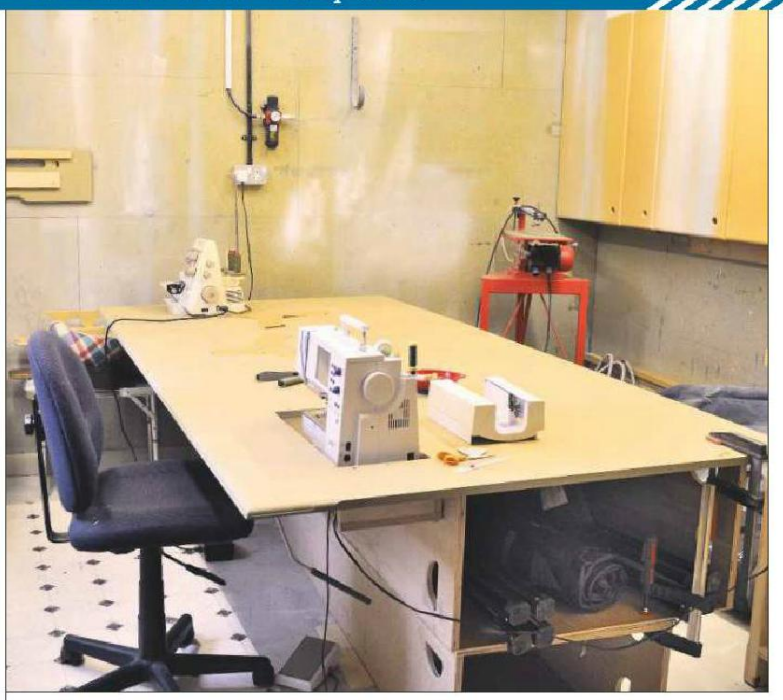
The long-established size for a bench hook is around 255mm long, 150mm wide and 25mm thick. The design shown here features an increased length of 585mm to allow the bench hook's fence to align with that of the shooting board. Having used both sizes of bench hook, I now find the longer one more comfortable to work with.

Some of the sizes listed here derive from the dimensions of the offcuts I had available when making them. Please don't feel you have to stick rigidly to them. So long as the relationship between the cleat and fence of both jigs is kept consistent, you have free rein to adapt the dimensions I've given as you please.

Matching cleats allow both aids to hang vertically on the wall or bench end for storage

Choosing materials

Let's now look at what else sets these designs apart. My material choices for the jigs are different. I've chosen solid hardwood for the bench hook because I prefer my saws to bed into natural wood as opposed to man-made board. However, man-made boards were my first choice for the shooting board because, unlike the bench hook, the priority here is dimensional stability. I've used 12mm mdf for the lower part and hard-wearing birch ply for the upper part. The fence and bench cleats on both jigs were made from sapele offcuts.



BY KEITH SMITH

Shop notes

Two months ago we were booked by a medieval re-enactment society for 12 weeks of solid work. We've made furniture, lighting and doors for them and now we're sewing! If my mother could only see me now...

Their logic was that woodworkers are good with their hands, and could therefore sew as well! So we bought a second-hand sewing machine and converted our finishing room into a sewing room (see above). The job has involved handling large pieces of fabric, which are unmanageable to say the least! To create a suitable work table I used an 8 x 4ft sheet of 18mm thick mdf (still destined to become a kitchen cabinet for our next job) and cut a hole in it to mount the sewing machine so the sewing plate was flush with the board surface. So far sew good (I had to get that one in!). We've now nearly finished sewing things, and can get back to making the three doors and the flight of steps they still want.

Something completely different

Two years ago we went to W10 at the Birmingham NEC. This is a biennial woodworking show (W12 opens on October 7th) aimed at furniture designers and manufacturers, and they had some very impressive machinery set up and working in the hall. However, what particularly caught my attention were the comparatively tiny Invis connectors on offer from Lamello. It's not often that something completely new arrives for joining wood, but with their Invis System Lamello has produced an invisible fixing that can be de-mounted at will.

A solution at a price

Unfortunately this is a very expensive way of joining timber or sheet materials, and isn't going to replace traditional joints. It could however solve many build problems, particularly in modern high-tech furniture.

At the show it seemed to be shop and exhibition fitters who were most interested, especially those with CNC machines, as Invis connectors need to be fitted with pin-point accuracy.

An ingenious concept...

The Invis MX is a relatively simple idea, **photo 1.** A hole is drilled and a male connector called the jointing element is fitted into the timber using a special driver bit. A corresponding hole is drilled into the mating timber into which the short female connector is driven, **photo 2.**

The male connector contains a spring-loaded threaded stud which is magnetised. Bringing a revolving magnet called the MiniMag, **photo 3,** close to the fitting causes the stud to revolve and screw itself into the female connector. If the joint needs to be taken apart in future, the stud can be unscrewed simply by reversing the direction of the spinning magnet. Very cunning!

...but the price is high

Although the idea is a simple one, the engineering needed to produce this joint is very precise, which is reflected in the price. I'm sure they cost a lot less for the big manufacturers buying in bulk, but for us lesser mortals they work out at over £4 per connector. I remember thinking it was a great idea, but way too expensive for me to consider. Then recently we were confronted with the problem of making an invisible fixing of a removable oak panel to a kitchen base unit, and the Invis seemed the best option. So I thought I'd better get some...

It's possible to buy the Invis as a starter kit for £231.95 from Axminster, but to save money I bought the MiniMag with driver bit on its own for £80.50 and added a set of 20 connectors for £83.50.

Trial and error

As the product was new to me, I tried a few practice joints first. I'm glad I did, as the Invis was trickier to use than I'd imagined. The big problem is lining up the holes perfectly. Although there is some play in the revolving stud, the two connectors need to align perfectly if they're to mate correctly.

Using one fixing was easy, but when I fitted two or three in a line and screwed in the first stud, the others wouldn't grip

consistently. What I needed was a foolproof way of aligning the holes accurately, and it will come as no surprise to discover that there is one; it's called the Lamello Rasto drilling jig.

Simple is best

This jig is another very simple design idea, **photo 4**. It consists of a clear plastic plate with two large threaded holes in the middle. Surrounding them are several accurately spaced holes into which steel pins can be fitted. A metal drill bush is screwed into a threaded hole. Then, by positioning the pins, the bush can be centred over the desired drill location and a very accurately positioned hole can be drilled. If the plate is then turned over and placed on the mating face of the joining piece, an identically positioned hole (albeit a mirror image) can be drilled which will align perfectly with the first hole.

I'd seen the Rasto before I bought the Invis, but at £102.50 for the basic kit – which consists of a plastic plate, four drill bushes (6, 8, 10 and 12mm) and three locating pins – I thought it was ridiculously expensive. However, I couldn't see how I could fit the Invis connectors without one, so having spent so much money on the Invis system I reluctantly bought a Rasto as well.

Poor instructions

Considering the high cost, I was somewhat disappointed to find that it just came in a cardboard box, but the parts themselves are very well made. One of the uses for this type of jig is to drill perfectly centred holes along an edge. By putting a pair of pins in corresponding holes at either side of the bush, centring a hole is easy and foolproof …or so I thought. After drilling a number of holes for another project, I found that they didn't line up.

Then I noticed that only one of the bushes sits centrally within the pin matrix; the other one is offset to give the bush mounting holes a 32mm spacing, **photo 5**. This isn't made clear on the jig, and the instructions consist of a handful of drawings with no text, so I felt justifiably annoyed to discovert this idiosyncrasy the hard way.

After this it took a few trials with the jig to get my confidence back, but once mastered I have to say it does a good job. However, if I were reviewing it I'd still give it just one star for value for money!

1 The male and female connectors are both screwed in with a driver bit supplied with the MiniMag

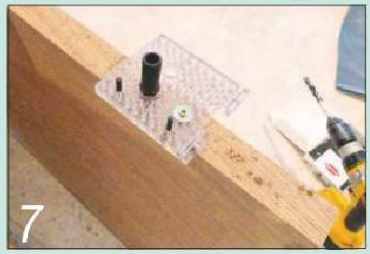
2 The female connector has a very fine thread on its outer surface and needs a perfect 12mm hole

3 The Minimag has a revolving magnet which turns the threaded stud. It needs to run at 1200 to 1500 rpm, not at the 120rpm given on page 347 of the Axminster catalogue!

4 This is the complete basic set of the Rasto drilling jig; you don't get a lot for your £102.50

5 I discovered the hard way that one of the bush mounting holes is not symmetrical to the pin holes

6 For the first hole I fitted three pins to locate the jig, and then screwed it in place to ensure that the drill didn't move the jig as it began to cut



7 The remaining holes still had to be drilled following pencil lines, but at least I could guarantee that they were all equidistant from the edge

8 The connectors are screwed in with the driver bit until they're flush with the surface

9 Once the two parts are pushed together there's no indication of where the connectors are, so I stuck some tell-tale patches of masking tape over them so I could locate the MiniMag. Once tightened, these fittings gave a very strong and completely invisible joint

BY IAN WILKIE

Needles and pins

My eldest grandson got married recently, and his wife is a talented needlewoman. So this article on turning pincushions was written with Jenny in mind, and she'll have the pick of the crop to add to her collection

This is a simple exercise in turning, requiring small blanks of interesting wood, and is ideally suited to the midi-sized lathe. It's also extremely easy to make up and fit the stuffed pincushion inserts. I experimented with three different designs, and to add a personal touch I inserted a £5 Diamond Jubilee coin in one of the bases to record the year of my new daughter-in-law's marriage!

This first example is turned from a blank of olive wood 100mm in diameter and 70mm deep. Olive wood is very pleasing to work, with its wavy grain and attractive brown and cream colours. It also turns well, and finishes beautifully with my favourite Speed an eez friction polish.

Mounting the blank

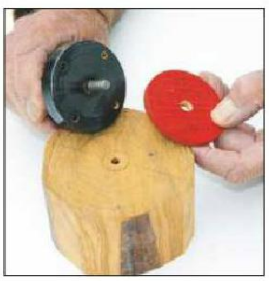
Start by marking the centre of the blank. Then drill a pilot hole to suit the screwchuck insert you plan to use. I always use my dedicated Peter Child screwchuck with a spacer, which requires a pilot hole 6.5mm in diameter and 14mm deep. The spacer is a 6mm thick plywood disc which protects the front surface of the chuck, **photo 1**.

Screw on the blank, mount the chuck in the headstock and bring up the tailstock with a revolving centre fitted to give extra support, **photo 2**. Position the tool rest and check that the blank rotates freely without any obstruction.

Turning and boring

Set the lathe speed to 1500rpm, turn the blank to a diameter of 85mm and check the size with callipers, **photo 3**. Then move the tailstock back and remove the revolving centre before facing off the front surface.

Now drop the lathe speed to its lowest setting. Mount a drill chuck in the tailstock,



1 I use a 6mm thick plywood spacer with my screwchuck to protect it

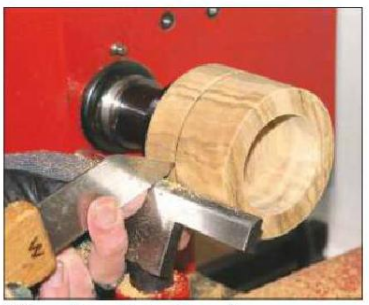
2 Mount the chuck in the headstock and bring up the tailstock for support

3 Turn the blank to a diameter of 85mm and check the size with callipers

4 Fit a chuck and Forstner bit in the tailstock and drill out the recess to a depth of 35mm

5 Check that the drilled-out recess is the right size by using a depth gauge

6 Mark a pencil line all round the blank, 40mm from the front face



7 Use a thin parting tool to make a cut at this point to a depth of 20mm

fit a 60mm diameter saw-tooth Forstner bit and wrap tape around the shaft to act as a depth guide at 35mm.

If you don't have a Forstner bit as large as this, I suggest you use the largest size you do have and then hollow out the rest with a gouge and a beading tool.

Drill out the recess to a depth of 35mm, **photo 4**. This will leave enough waste wood in the base to avoid any risk of damaging the screw chuck. Draw the drill bit back from time to time to allow the shavings to clear, and check the final depth of the recess with a depth gauge, **photo 5**.

Finishing the shaping

Mark a pencil line on the blank 40mm from the front edge, **photo 6**, and use a thin parting tool to make a cut at this point to a depth of 20mm, **photo 7**. Then reduce the diameter of the blank next to the headstock, and shape the curved section that will become the body of the pincushion, **photo 8**. Sand it well.

Reposition the tool rest so you can cut through the inside edge of the drilled-out recess with a parting tool, **photo 9**. When the two cuts meet, the ring will separate from the waste wood. This can happen quite suddenly, **photo 10**, so be prepared!

From the wood left on the screwchuck, turn a plug insert 15mm thick with a diameter to suit the inside of the ring, and check that it's a good fit, **photo 11**. Gently dish the front face of the plug and remove it from the screwchuck.

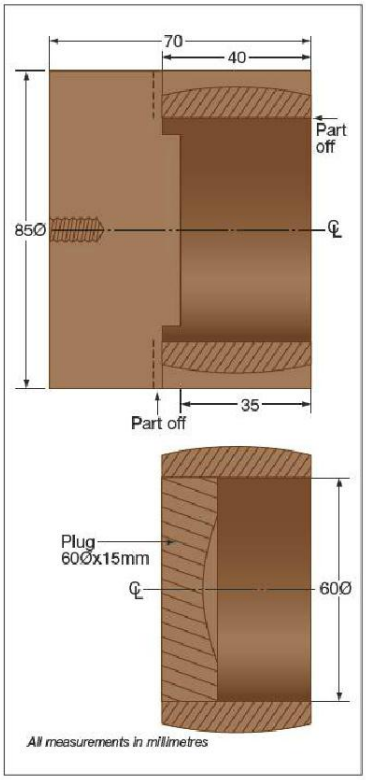
Making the cushion

Make up the stuffed fabric cushion to fit tightly inside the ring. Try several dry runs until you're satisfied before applying glue to the dished surface of the plug. Position the cushion on it and cramp it lightly, **photo 12**. Take care to protect the fabric so it doesn't become marked, and leave it to cure. As I experimented, I found that hot-melt adhesive also worked well. However, it's wise to try a sample first in case the glue melts the fabric you're using!

Finishing touches

Make a jam chuck from scrap wood to hold the ring so you can apply the finish. I used friction polish, which brought up the attractive colours in the olive wood, **photo 13**. I then gave it a final buffing with a polishing mop.

Push the cushion, now securely glued to the top of the plug, up through the bottom of the ring, **photo 14**. Apply a little glue around the edge of the plug and continue to push it in until the base is flush. Tidy up the underside of the pincushion by adding a circle of stick-on felt.



8 Reduce the diameter of the blank next to the headstock and shape the curved section

9 Reposition the toolrest and cut through the inside edge of the recess with a parting tool

10 The ring will separate from the waste wood when the two cuts meet. Be ready to catch it!

11 Turn a plug insert on the stub of the blank and test its fit inside the ring

12 Make up the cushion, stick it to the plug insert and cramp it lightly

13 Make a jam chuck to hold the ring so you can apply the finish; I used friction polish

14 Push the cushion and plug into place after gluing the plug's edge, and add a felt base disc

THE DECORATED DRUM

This second design is made in sycamore with inlaid strips of walnut and a top ring and base plug turned from some reclaimed mahogany. The grooves are routed with the aid of a simple fluting jig and a flexible drive unit. Details of how to make the jig were given in ***The Woodworker*** last year (August 2011 page 61).

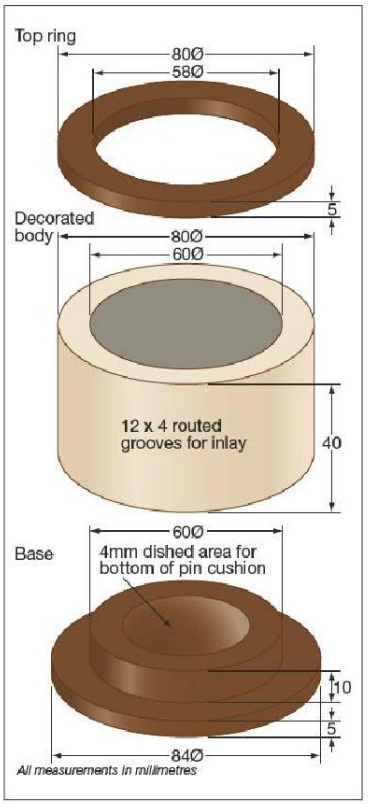
Turning the drum

First turn the 100 x 100 x 60mm sycamore blank to a cylinder 80mm in diameter and with a wall thickness of 10mm, using the same technique as for the wedding ring design. Next, turn a plug to fit in each end. Remount this assembly on the lathe, set up the fluting jig in the tool rest holder and fit a parallel flute router cutter in the flexible drive unit's handpiece, **photo 1**.

Creating the flutes

Prepare the walnut strips 4mm wide and 4mm thick. Isolate the lathe and cut 12 grooves around the circumference of the drum with the router cutter, **photo 2**, using the lathe's indexing system to locate them.

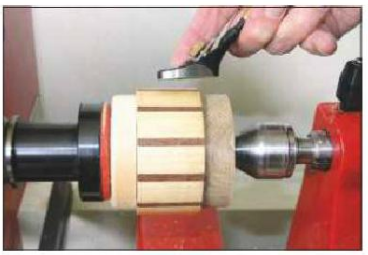
Remove the work from the lathe, hold the cylinder in a vice, glue in the inlay strips, **photo 3**., and plane down any that are slightly proud of the surface, **photo 4**. I'm using the little Veritas palm plane I tested recently, and working with the fluted drum mounted back on the lathe so I can rotate it freely as I trim the strips. Sand the drum well and then apply the finish.



1 Turn a hollow drum, plug its ends and set up the fluting jig in the tool rest holder alongside it

2 Use the lathe's indexing system to cut 12 equally-spaced grooves around the drum

3 Hold the fluted drum in a vice and glue in the 4 x 4mm inlay strips



4 Use a small plane and abrasive paper to finish the strips flush with the drum

5 Turn a ring for the top of the drum, and a base with a centre spigot

6 Push the base and cushion in from underneath, then glue on the top ring

Topped and tailed

Mount a mahogany blank measuring 90-100mm in diameter and about 25mm thick on the lathe. Turn and part off a narrow ring to fit on the top of the drum, **photo 5**. Then turn the rest of the blank to form the base. This is 84mm in diameter and 15mm thick, with a 60mm diameter spigot 10mm long that will fit into the bottom of the drum. Create a dished central area to receive the bottom of the pincushion. Sand both these components smooth and apply a finish.

Finishing touches

Make up the cushion pad as before and insert it from below. Apply a little glue to the spigot and the edge of the base, and push this up into the cylinder until it fits flush. Finally, glue the ring to the top of the cylinder, **photo 6**.

I was having so much fun with this technique that I also made the plain fluted version shown in the main picture above.

This design was also turned in olive wood, starting with a blank 100mm square and 75mm long. The idea was to undercut the rim so the edges of the stuffed cushion would tuck neatly underneath it and glue would not be required. Although the Jubilee coin could have been incorporated on the underside of any of the pincushions shown, I had only one coin and used it for this particular design.

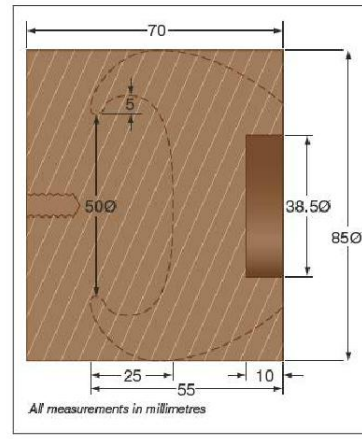
Simple turning

Mount your blank on a screwchuck, turn it to a cylinder 90mm in diameter and face off the end. Mark the recess for the coin, **photo 1** – it measured 38.5mm in diameter – and turn it to a depth of 10mm. Check the measurement, **photo 2**, and test the fit of the coin.

Now you can shape the outside of the bowl using a small bowl gouge, **photo 3**. Aim for a gentle curve up from the base with a maximum diameter at the waist of 85mm, and then form a steeper curve down to about 60mm in diameter as you work back towards the screwchuck.

Hollowing out

Remove the bowl from the lathe and reverse it. Then expand suitable chuck jaws into the coin recess to grip it securely, and move the tool rest into position so you can start hollowing out the interior. I used the Sorby Sovereign multi-tip scraper for this task, **photo 4**. Aim for an internal rim diameter of about 50mm.



All measurements in millimetres

When you've removed most of the waste to a depth of about 25mm, **photo 5**, cut back the interior in a gentle curve beneath the rim. Create a smoothly rounded recess with an undercut of about 10mm all round and an internal diameter of about 60mm. When you've finished the shaping, sand the interior and exterior of the bowl smooth, ready for the finish to be applied.

Finishing details

I decided to decorate the top of the bowl with four shallow concentric rings, cut with the tip of a slim parting tool, but this is an option you don't have to include. Then apply the finish of your choice, keeping it clear of the coin recess.

The last turning task is to create a thin retaining ring of contrasting wood to fit the inside diameter of the coin recess. Put the coin in position and secure the ring with adhesive round the rim, **photo 6**, making sure you don't get any on the coin.

Finally, make up the cushion pad as before and simply push the pad into place, tucking its edges underneath the rim of the bowl. Job done!


1 Turn the blank to a cylinder, face it off and mark the recess for the coin


2 Hollow out the recess to a depth of 10mm and check the measurement


3 Shape the outside of the pincushion body using a small bowl gouge


4 Reverse the body onto an expanding chuck and start hollowing it out


5 Cut back the interior to a gentle curve underneath the rim of the bowl


6 Apply your chosen finish, insert the coin and glue in its retaining ring

FURTHER INFORMATION

Speed an eez friction polish
- Record Power
- 01246 561520
- www.recordpower.co.uk

Screwchuck
- Peter Child Woodturning Supplies
- 01787 237291
- www.peterchild.co.uk

Sovereign hollowing tools
- Robert Sorby
- 0114 225 0700
- www.robert-sorby.co.uk

Kaizen Bonsai

The cutting edge of UK Bonsai

Right at the cutting edge

Power Carving has in recent years rocketed in popularity.

It is true that in these so-called austere times, a skill and hobby like this is a very cost effective skill or hobby!

More and more manufacturers are seizing this opportunity and are developing a whole range of new tools for the carving enthusiast.

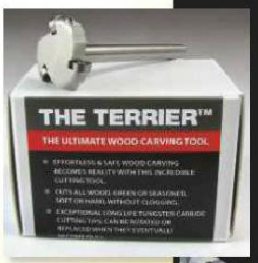
Kaizen Bonsai which as it name suggest is actually a company specialising in Bonsai, but in recent years they have arguably become a market – leader with their comprehensive range of carving tools.

Having spent over twenty years using carving tools to create Bonsai, Graham Potter the owner of Kaizen Bonsai then spent two years researching and developing his own tools after experiences with other tools which were just ok, reasonable or even dangerous!

His idea was to make a tool that was versatile for working both large and small projects. The cut rate needed to be exceptional but with a very long cutting tip life and above all the tool needed to be safe.

And so Terrier™ and Little Terrier™ where born!

Their Terrier™ and Little Terrier™ ranges are receiving much acclaim the world over being CNC machined from 3032 high carbon stainless steel from a solid Billet with tips which are replaceable. They are created from polished Tungsten carbide which allows a much faster cutting rate, a shortened loading time and an enhanced lifetime of the tools themselves *(which are not to be confused with cheaper less effective imitations that are made in parts).*



Behind the cutting edge of both the Terrier™ and Little Terrier™ is a groove which serves to present it at a positive rake to the project making it a faster and cleaner cut. Conveniently, once the cutting face becomes dull, you simply loosen the retaining screw and rotate the tip to a sharper new section. It is reckoned by the manufacturer that the tip should last for a continuous 20 hour drilling session, so these pieces really are at the cutting edge!

The 27g Terrier™ is the larger of the two Overall with a length of just 65mm and designed with a 1/4″(6.35mm) shaft primarily for the tools safety. This allows use in an array of die grinders and flexible shaft machines. It really does remove wood effortlessly and cleanly and its 25mm head removes wood effieciently at higher speeds A chip limiter prevents the tool from 'digging in' to the work.

Unlike some larger tools the Terrier™ has a responsive cutting action that is very pressure sensitive. A light action by the user produces a fast delicate cut but with a little more pressure the tool bites harder without fear of it 'grabbing' or kicking back like some other tools.

For more confined areas the 15mm Little Terrier™ which weighs just 23g just seems to get in anywhere with much greater control and is a solid and robust as its brother and delivers an equally clean job. It's not difficult to see why this tenacious, robust piece of kit which works well at both high and low speeds gets its name!

Both cutters work well at most speeds but the manufacturers recommend best results are achieved at between 1500 & 2000 rpm.

Economically priced at just £44.95 inc VAT and p&p, the Little Terrier™ is a great little investment which should, when used correctly last a good few years and its big brother the Terrier™ at just £54.95 inc VAT and p&p represents equally good value.

Replacement cutting tips and screws are available separately.

All can be purchased from:

www.kaizenbonsai.com

or by telephoning them on:

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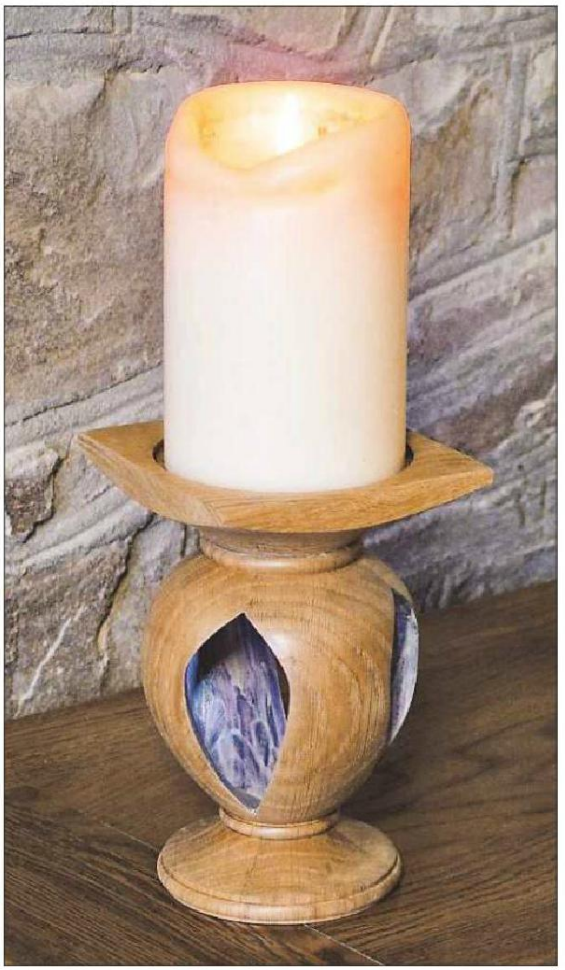
Exceptional tools for exceptional woodworkers. Call for a free catalogue 0800 4580 672 or 0044 (0) 1493 781 834 or see our web site. Fast worldwide delivery.

www.kaizenbonsai.com

BY COLIN SIMPSON

Turned inside out!

Woodturning lathes can be used for a great deal more than simply turning round items such as bowls, boxes and vases. If you want to make something that's a bit different, give involuted turning a try



This technique is often called 'inside out turning' because you turn the inside of the object first. In this article I'm going to make a simple candlestick, but you can use the technique to create all sorts of unusual objects from hanging ornaments and abstract flowers to amazing wood sculptures.

For this piece you'll need four pieces of wood that are exactly square in section and about 125mm long. I'm using 50mm square oak, machined in my planer/thicknesser, **photo 1**. This is the easiest way to ensure the accuracy you need.

A four-square blank

These pieces need to be joined together temporarily but securely to make a blank 100mm square. One way of doing this is by gluing them together with paper joints between them. Use PVA glue and assemble them in stages. Stick the first two pieces together, then the other pair, cramp them up and allow the glue to cure, **photo 2**. Then clean up the glue joints and stick the two pairs together in the same way, **photo 3**.

The screw option

Alternatively you can simply screw the four pieces together instead. Cut them about 50mm longer than you need for the turning and drive the screws through the waste wood at both ends, **photo 4**.

It's important to glue (or screw) up accurately here. Number each of the four pieces and draw an arrow pointing towards the centre, **photo 5**. These arrows will help you orientate the pieces later on.

Preparing to turn

It's also important to mount the blank on the lathe accurately. Centre-punch the middle of the two ends so the drives locate in the exact centre of the blank. Also note that I'm using a cup centre in the tailstock, **photo 6**. This is particularly important if you're using the paper-joint method, as a standard 60° revolving centre could act as a wedge and force the joints apart.

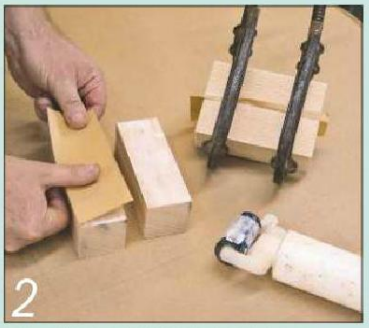
Photo 7 shows a screwed blank mounted between centres. Note the pencil lines drawn on it. The outer two lines mark the waste wood where the screws are. You must leave some of the blank unturned; that part is shown by the inner two lines.

Cut and colour

Use a spindle gouge to cut the shape in between these lines. I'm simply turning an eccentric cove here, **photo 8**. Don't turn the workpiece to a cylinder first: part of it must remain square. **Photo 9** shows the shape I've turned and then sanded to a smooth finish.

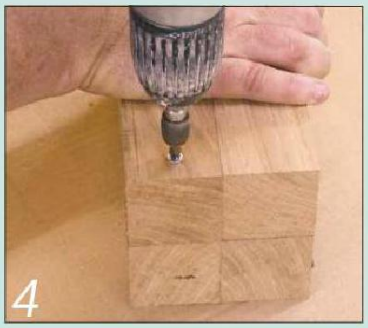
You don't have to do the next step. You

Size your blank components accurately; I used my planer/thicknesser

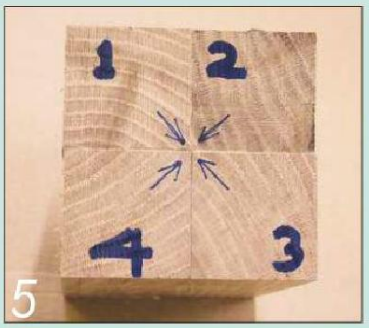


Glue and cramp the components together in pairs using paper joints

Clean up the glue joints and stick the two pairs of blocks together with more paper joints

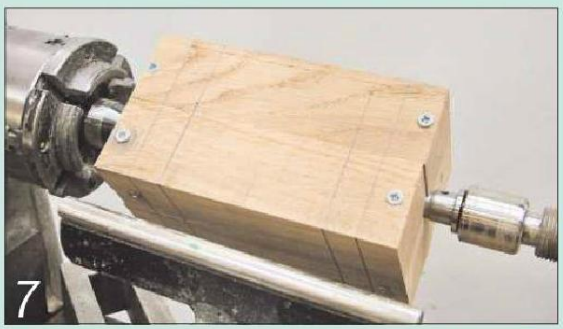


You can use screws and over-long blocks as an alternative to using paper joints

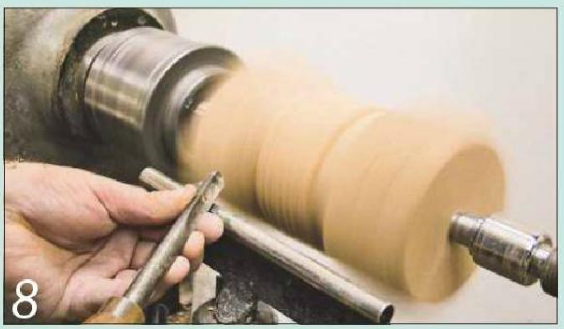


Number the blocks and draw an arrow on each one, pointing to the centre

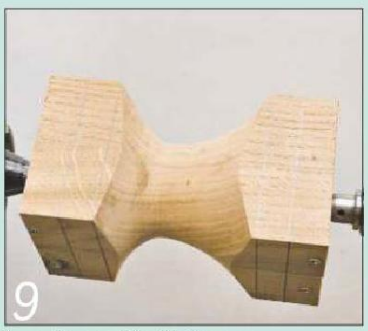
With paper joints, use a cup centre rather than a revolving centre to avoid forcing the joints apart



Mount the blank between centres and mark the inner section that won't be turned. The outer pair of lines show where the fixing screws are



Use a spindle gouge to cut the shape in between the inner pair of lines. I'm cutting an eccentric cove



Leave the rest of the blank square, then sand the cove smooth

Mask off the parts you don't want to paint and spray on ebonising lacquer

I experimented with some mixed iridescent colours, applied with a sponge brush

can just leave the wood natural, but I liked the idea of painting the cove. It will be on the inside of the candlestick when I've finished and I wanted it to look a little bit like oyster-shell, so I decided to use special iridescent paints on a dark background.

Spray away

Mask off the parts of the blank where you don't want paint, and surround the area with scrap cardboard to prevent overspray. Then, with the lathe running very slowly, spray the cove with ebonising acrylic lacquer, **photo 10**. Leave this to dry, then brush on the iridescent paint. I used several different colours and gently blended them together. Leave them to dry and then spray acrylic gloss lacquer over them, **photo 11**.

Together again

The next stage is to remove the workpiece from the lathe and disassemble it. Undo the screws, or gently prise apart the paper joints with a sharp chisel and scrape off the debris. Then stand the pieces on their ends so you can see the numbers, and rotate each piece through 180° so the arrows point out towards the corners, **photo 12**.

Glue the four pieces back together in this orientation; no paper joints needed this time! Use the glue sparingly as cleaning up any squeeze-out on the inside of the joints will be very difficult. Cramp the work and leave it to dry, **photo 13**. Now you can begin to see why it's often called inside-out turning!

No turning back

When the glue has dried, mount the piece between centres and turn the outside to shape. This time you can turn the piece to a cylinder first using a spindle roughing gouge; then cut the shape with a spindle gouge, **photo 14**. You'll see some ghosting as the holes in the sides rotate, and this will give you an idea of how the shape is coming on and how thin the walls are. Don't rely on this alone, though; it's a good idea to stop the lathe frequently to check your progress.

Finishing the base

The foot of the candlestick is a simple curve, so for decoration I cut a bead at the junction of the foot and the main body, **photo 15**. I cut another bead at the top of the body and then turned a 12mm spigot about 15mm long, **photo 16**. Now you can sand and polish the outside, **photo 17**.

If you decorated the inside with acrylic paint and lacquer, use an acrylic finish on the outside too. Don't let it run into the inside; cleaning up later will be very difficult.

Before removing the work from the lathe,

12

Separate the four blocks and rearrange them with the arrows pointing outwards


13

Glue the four pieces back together, taking care to keep glue away from the interior


14

Turn the piece to a cylinder, then start shaping it with a spindle gouge


15

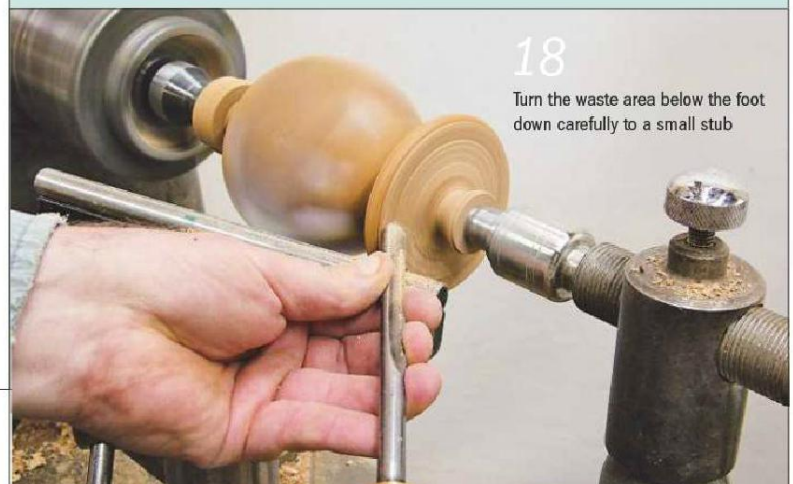
I cut a bead for decoration where the foot and the main body meet...


16

...and added another at the top before turning a 12mm spigot there


17

Sand and polish the outside. I do this with a long strip of abrasive paper


18

Turn the waste area below the foot down carefully to a small stub

Cut off the waste from the top spigot and set the candlestick body aside

Stick the blank that will form the top section to a faceplate with hot-melt glue

Remove the tailstock support and turn a recess in the top for the candle

Reverse the top onto a jam chuck and drill a hole to accept the spigot on the body

Stick the top and body together, using tailstock pressure as a cramp while the glue sets

turn the waste below the foot down to a small stub, **photo 18**, but don't turn it all away just yet. With the lathe stationary, cut off the waste from the 12mm tenon, **photo 19**, and put the body of the candlestick on one side until the top is turned.

Turning to the top

The top is made from a piece of oak 100mm square and 30mm deep. I mounted it on the lathe by gluing it to a small wooden faceplate with hot-melt adhesive. Mark the centre of the piece and use the revolving centre in the tailstock to mount it centrally on the faceplate before sticking it on with hot-melt adhesive, **photo 20**. When the glue has set, remove the tailstock support and turn a recess in the top for the candle, **photo 21**. Sand and polish it.

The final shaping

Reverse-chuck the top onto a jam chuck that fits the candle recess, or use a four-jaw chuck in expanding mode in the recess to hold the piece. Sandwich a paper kitchen towel between the jaws and the wood to help prevent damage to the piece, and tighten the chuck only enough to hold it in place.

Now turn the underside of the top – another gentle curve, but this time going through the square section of the top – and drill a 12mm diameter hole in it, **photo 22**, to accept the spigot on the main body. Sand and polish as normal, but take care not to get polish in the hole.

Top to tail

Finally, glue the body of the candlestick to the top. I used the lathe as a cramp by applying a little tailstock pressure on the small stub at the bottom of the piece until the glue had cured, **photo 23**. Then turn the stub away, or, if you prefer, cut it off with a saw and then tidy up the base by hand sanding.

The finished piece is shown on the left. How did it turn out? I think the windows in the body could have been a bit larger, and this could have been achieved easily if I'd cut the original eccentric cove a bit deeper. I'm also not convinced that the colouring enhances the piece the way I thought it would. My biggest critic likes the effect, though. What do you think?

If you want to have a go at involuted turning, I recommend you to practise on softwood offcuts and play with some shapes. Once you're happy with a particular shape, make a cardboard template of it so it can be repeated. Don't be afraid to experiment; it'll be fun!

Lie Nielsen's shooting board plane is designed for just one task: trimming end-grain and mitres on a shooting board. *It's a traditional product with a hefty price tag. Can it possibly justify a place in the modern woodwork shop?*

TESTED BY
BEN PLEWES

Lie-Nielsen No 51 shooting board plane

£433.96

The No 51 shooting board plane is based on an old Stanley design that first went into production in 1909, and came with a matching metal shooting board. Lie-Nielsen has plans to offer a companion shooting board for this plane in the future, but until then you'll have to make your own. In my opinion this is no bad thing; I'd much rather use a shop-made wooden board over a weighty metal equivalent.

Horses for courses

The 51 is one of the priciest planes on the market. Unless you're into buying very expensive hand-made tools or valuable collectables it's a very difficult purchase to justify, but justification often comes down to priority. If you're happy with your current set-up – perhaps you crosscut everything mechanically, or you use a low-angle jack plane and shooting board combination – then there really isn't a good reason to consider purchasing this plane.

On the other hand, if crosscutting at the bench forms a significant part of your workflow and you want to achieve the best possible results as consistently and as quickly as possible, then perhaps you should take a closer look at the 51. To put things into perspective; many people wouldn't hesitate to spend £450 on a dedicated mitre saw, so why not a dedicated plane? It really comes down to priorities: how you choose to work, and whether you can go without food for a month or two!

Simply the best

Before trying this plane out, I took the time to make a new shooting board with a lateral support rail to keep the plane running tightly against the board's edge (see pages 49-52 for more details), and I believe this offers quite simply the best shooting solution I've ever used.

I can't fault this plane in any way. It's comfortable to use for long periods. Its weight carries it through end-grain like the proverbial hot knife through butter. Its skewed iron makes slicing end-grain even easier. It's a doddle to dismantle, adjust and maintain. Everything about this amazing plane is optimised for the job it does: there are no compromises. And to my hand at least, it's a perfect fit.

The tailor-made packing crate provides an ideal storage solution

The plane is supplied in a solid wooden case and comes with detailed plans (in imperial measurements only) for making a shooting board. And if you ever need a replacement blade, it will cost you a mere £43.40!

SPECIFICATION

LENGTH	380mm
WIDTH	90mm
SHOULDER HEIGHT	54mm
BLADE WIDTH	60mm
WEIGHT	4kg

VERDICT

The price will give you sleepless nights, but this plane will give you endless satisfaction and last you a lifetime.

PROS
- Superb build quality
- Uncompromising performance
- Comfortable to hold and use for long periods

CONS
- Eye-wateringly expensive!

VALUE FOR MONEY ■■■■■□

PERFORMANCE ■■■■■■

FURTHER INFORMATION

- Axminster Tool Centre
- 03332 406406
- www.axminster.com
- www.lie-nielsen.com

Every component of this plane exudes engineering excellence

The skewed iron removes the finest wood shavings with surgical precision

Lithium ion batteries deliver longer battery life and greater power than NiCad ones. *Hitachi has mastered this technology and introduced many new cordless tools, including this kit containing a combi drill and an impact driver*

Hitachi KC18DKL/JA cordless combo

£371.99

If you do any on-site work, there are two cordless tools that are indispensable: the combi drill and the impact driver. The first takes care of all the drilling jobs, and the second provides rapid and easy insertion of even long and large-diameter fixings with the minimum of effort. This Hitachi kit provides a high-quality pair of tools powered by mighty 4Ah 18V Li-ion batteries with tremendous power and excellent runtime.

DV18DSDL combi drill

This is a chunky, well-balanced machine that can be used as a screwdriver with adjustable torque, as a normal power drill and as a hammer drill. It has rather striking styling, with lots of soft-grip rubber padding on both the main body of the tool and the handle. The two-speed gearbox is controlled by a sliding switch on the top. In front of this is a 22-position torque ring with additional drilling and hammering settings. A Jacobs chuck is fitted with a maximum capacity of 13mm.

The battery is housed at the base of the handle, and slides on and then locks in place. On top of the battery mounting are two push-buttons. One is used to switch on the LED worklight, which is mounted above the trigger, and the other illuminates the battery power meter which gives an indication of the battery's state of charge. An enormous side handle is supplied to provide additional support when hammer drilling. There's also a useful belt hook and a wrist strap.

WH18DSAL Impact driver

Impact drivers are straightforward tools with few frills; the only controls are the power trigger and a sliding switch for selecting the direction of rotation. They can also be used for drilling if fitted with suitable plug-in drill bits and flat bits. This model is again attractively styled and sits comfortably in the hand. On the front, in place of a conventional chuck, there's a hexagonal bit holder with a locking ring to keep the bit in place. It also has a belt hook, a wrist strap and an LED worklight which illuminates automatically when the trigger is squeezed.

Charging the batteries

An intelligent fan-cooled charger is supplied with the kit, and a full charge takes approximately an hour. As most modern chargers do, it uses a variety of flashing lights and colours to indicated the battery's condition and charging state. However, it shows a constant light when charging and a flashing light (presumably to catch your eye) when charging is complete. Most other chargers do exactly the reverse. However, this in no way affects its performance, which is excellent.

The fan-cooled charger delivers cooling air through a vent to the battery

The 4.0Ah batteries use the new Hitachi standard slide-in fitting

The 22-position torque control and gearbox selector are located on the top of the body

The combi drill can be fitted with a big soft-grip side handle for heavy work

TESTED BY ANDY STANDING
with additional words and pictures by Peter Parfitt

Using the combi drill

With both these tools you really do notice the power: they feel inexhaustible. They're not exactly lightweight tools, but they're comfortable to hold and use and their excellent performance means that the job is completed quickly.

The combi's adjustable torque setting allowed the full range of screws to be driven in correctly, including large 80 x 6mm Spax screws. Normal drilling was also impressive. I tried a 48mm Forstner bit in oak with no significant difficulty; the machine behaved as though it was working on a mains supply.

I then started drilling into a concrete block with a 12mm diameter bit; it went in like a hot knife through butter. Larger 18 and 25mm bits were also no problem, although Hitachi's stated maximum drilling limit is 16mm in brick.

Using the impact driver

If you've never used an impact driver, it's difficult to appreciate how easily it copes with the toughest of screwdriving tasks. I used every large screw I had to try to defeat this machine, even some long 8mm monsters, but it hardly flinched. The quick-release hex chuck takes all standard hex driver bits.

The short body length of this tool makes it particularly good in confined spaces, and the automatic worklight is especially welcome when you're working in dark corners.

Summing up

This is an excellent pair of professional tools. It's remarkable how much power and performance Hitachi has managed to cram into them. Throughout three days of testing these machines, I've not had to recharge the batteries. They're certainly the most powerful 18V tools I've used to date, and I'd certainly be pleased to have them on site with me.

With some careful searching on the internet you should be able to buy this combo kit for under £350. The three-year warranty, including the batteries, is particularly generous, and at the time of writing Hitachi is offering a third battery free of charge.

SPECIFICATION

DV18DSDL COMBI DRILL		
BATTERY		18V 4Ah Li-ion
CHUCK		13mm Jacobs
NO-LOAD SPEED		0-400 & 0-1800rpm
TORQUE		92Nm
MAX DRILLING CAPACITY	wood	65mm
	metal	13mm
	masonry	16mm
MAX SCREW SIZE		100 x 8mm
WEIGHT		2.2kg
WH18DSAL IMPACT DRIVER		
BATTERY		18V 4Ah Li-ion
BIT HOLDER		¼in hex
IMPACT RATE		0-2600/min
TORQUE		145Nm
MAX SCREW CAPACITY		8mm
MAX BOLT CAPACITY		M14
WEIGHT		1.7kg

VERDICT

This is a top-quality kit with considerable power and excellent runtime, making it ideal for the busy professional.

PROS
- High power
- Long battery life
- Multiple safety circuits
- Three-year warranty

CONS
- The price (but look for web deals)

VALUE FOR MONEY

PERFORMANCE

FURTHER INFORMATION

- Hitachi
- 01908 660663
- www.hitachi-powertools.co.uk

The complete kit includes a carrying case, a side handle and a screwdriver bit

The huge torque means that two hands are needed with this big Forstner bit

The 25mm masonry bit is soon driven through this 6-inch thick concrete block

The impact driver's worklight operates every time the trigger is pressed

TESTED BY
ROGER BERWICK

You may recall reading my review in last November's magazine of the new four-flute bearing-guided template cutters from Radian Tools. *Now five more cutters have appeared, creating a range that threatens to become a formidable force in the market*

Radian four-flute router cutters

from **£45**

Rebate cutter

Chamfer cutter

I first reviewed Radian's four-flute guided trimmer last autumn. I've been using it in my workshop regularly ever since, and despite a lot of use it's still cutting as new. Now the range has been extended with the introduction of five brand new cutters – a chamfer cutter, a rebate cutter and three roundover cutters with varying radiuses, all featuring the four TCT cutting edges on a ½in shank.

A range of sizes

The rebate cutter features a shear cutting angle. The basic cutter is 25mm in diameter and has a cutting edge length of 35mm. It's supplied with a range of different bearings, enabling rebates of 6.5, 7.9, 9.5, 11.1 and 12.7mm to be cut

The roundover cutters come in three sizes – 6.3, 9.5 and 12.7mm – and each cutter is supplied with additional bearings which convert them into ovolo cutters. It's a very clever concept.

Using the cutters

I've used these cutters in a hand-held router and a router table, and the results have without exception been excellent. The chamfer cutter leaves clean, crisp edges, and you can cut stopped chamfers with no trace of break-out. When machining some timber with a particular difficult interlocking grain, the rebate cutter gave a perfectly smooth cut while the finish left with my surfacer was significantly torn.

The blades hold their edge remarkably well, and even after significant use I've seen no reduction whatsoever in the quality of cut, with fine shavings being taken and exceptionally smooth surfaces being left at the end of the cut. The additional cutting edges significantly reduce the strain on the cutter by reducing heat build-up, and also on the router itself.

The pricing of these cutters is very keen compared to other high-quality cutters, especially when you remember that you're getting a cutter with twice as many edges!

THE CUTTER COLLECTION

19 x 51mm guided trimmer (1023)	£57
19 x 25mm guided trimmer (1024)	£45
45mm chamfer cutter (1029)	£66
6.3mm radius/ovolo cutter (1030)	£54
9.5mm radius/ovolo cutter (1031)	£57.60
12.7mm radius/ovolo cutter (1032)	£64.80
35mm rebate cutter (1034)	£66

VERDICT

The only verdict I can give is that the performance of these cutters is little short of incredible.

PROS
- Excellent quality
- Micrograin tungsten carbide cutting blades
- Fine finish whether cutting with or against the grain

CONS
- None to mention

VALUE FOR MONEY ■■■■■■

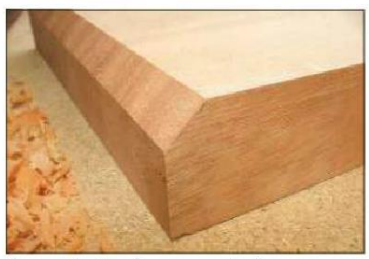
PERFORMANCE ■■■■■■

FURTHER INFORMATION

- Radian Tools
- sales@radiantools.com
- www.workshopheaven.com

The roundover cutters create smoothly flowing edges on a frame

End-grain rebates are cut cleanly with the minimum of breakout



Cross-grain chamfers are cut crisply with machine-like precision

Each cutter shank carries the K mark and vital operating information

TESTED BY IAN WILKIE

'Axminster White' is a range of tools and equipment that is made to Axminster's own specification and marketed by them, *and these two handpieces designed for use with flexible drive units are part of that range*

Axminster flexible drive unit handpieces

When married up to a flexible drive unit and with the appropriate tooling fitted in their chucks, these two handpieces are ideal for carrying out a wide variety of small-scale tasks including drilling, sanding, shaping, polishing and grinding.

They're made to fit the Axminster heavy-duty hanging motor unit (product code 300228, reviewed in *The Woodworker* in August 2010). They will also fit the flexible shaft of the Foredom SR-FCT Flexi Drive (also reviewed in *The Woodworker*, in August 2011). They're both made of machined aluminium alloy with a satin finish, and are designed to click-fit into the end of the flexible shaft.

Keyless chuck version

The smaller handpiece (product code 910340) is fitted with a keyless chuck with a maximum capacity of 3.2mm. A slim (and easily lost!) tommy bar is supplied for use when loosening and tightening the chuck.

This handpiece has a narrow serrated waist section and can be held like a pen for intricate freehand work. The chuck will take all miniature accessories for grinding, polishing, sanding and engraving, as well as twist drills with shank diameters of 3.2mm and below.

Both handpieces are designed to click-fit into a flexible drive shaft

Keyed chuck version

The larger handpiece (product code 910342) has a parallel-sided body with raised ribs to give a good finger grip. This heavier-duty model has a Jacob's-style keyed chuck with a maximum capacity of 4mm, and this caters for all standard accessories. A matching chuck key is supplied.

The end of the body partially covers the chuck, and a U-shaped cut-out allows access for the key. This means that the chuck's gear ring is virtually covered in use, and there are therefore no sharp edges to catch the fingers.

Using the handpieces

Both handpieces proved to be extremely accurate and safe to use. I particularly liked the slim version which I found very comfortable to hold, offering good accurate control with no vibration. In quality they compare very favourably with their equivalents in the Foredom range, and they're about half the price! I'm very impressed.

Making a choice

The collet-type chuck is usually preferred for really accurate and prolonged use. However, you need a number of collets to suit the shanks of the accessories you're going to use. By contrast the Jacob's-style chuck has the advantage that it can be set to take any diameter shank within its stated range. This type of chuck is quick and easy to use, more versatile in function, and would probably be the better choice for the hobby woodworker.

£25.99 (keyless)

£27.40 (keyed)

SPECIFICATION

KEYLESS CHUCK HANDPIECE	
LENGTH	115mm
DIAMETER	14mm
CHUCK CAPACITY	3.2mm
KEYED CHUCK HANDPIECE	
LENGTH	130mm
DIAMETER	25mm
CHUCK CAPACITY	4mm

VERDICT

These two handpieces are ideal companions for your flexible drive unit.

PROS ■ Good quality machining
■ Comfortable in use
■ Keenly priced

CONS ■ None that I found

VALUE FOR MONEY ■■■■■■
PERFORMANCE ■■■■■■

FURTHER INFORMATION

■ Axminster Tool Centre
■ 03332 406406
■ www.axminster.co.uk

The slimmer unit can be gripped like a pen for intricate freehand work...

...allowing good, accurate control with no discernible vibration

A U-shaped cut-out gives access to the keyed chuck's gear ring

Liogier is a French company specialising in hand-made rasps and rifflers for woodwork and stonework. *The range of tools available is enormous; we've selected a cabinetmaker's rasp and a brush-and-rat-tail riffler for our review*

Liogier rasps and rifflers

When I was asked to do this review, I had just acquired a Dupli-Carver and was putting it through its paces. Rasps and rifflers are the ideal finishing tools for cleaning up the router cuts it makes.

Liogier tools are individually hand-made by skilled craftsmen who undertake all the tempering and forging of the blanks before each tooth is created ('stitched' is the correct term) using hammers and a range of special punches.

The result is a huge range of over 800 tools, from standard flat rasps and specialist half-rounds to double-ended rifflers for finer detail work. They're available in different versions for right-handed and left-handed users, and come in Traditional or Sapphire finishes. Which you select depends on the tool hardness you require.

Liogier sent me a 250mm half-round cabinetmakers' rasp and a small riffler with rat-tail and brush ends. They arrived in sturdy square plastic tubes, which will be excellent for storage to protect those precious teeth. Both were from the Traditional range.

Tool features

The half-round rasp features a beautifully finished beech handle, with a blued ferrule meeting the tang of the file. The stitching is present along the whole length of the file, to within an inch of the edge of the ferrule. It extends across the full width of both faces as well as along the edges, right to the fine point, making it a very versatile tool designed for rapid removal of stock.

The 200mm long riffler boasts a 50mm long curved rat-tail at one end; this tapers from about 6mm diameter down to a point. The

The tools are packed in two-part plastic tubes that are ideal for safe long-term storage

The rasps all feature a beautifully finished and very comfortable beech handle

Each tooth is individually hand-stitched in carefully-graded rows

The cabinetmakers' rasp removes a lot of stock in next to no time

brush end is again curved, with both faces being slightly rounded in cross-section; it tapers to a rounded end and also is stitched all round its edges.

Using the tools

As with all rasps and rifflers, the teeth are designed to cut on the push stroke. To give them a good test, I tried them first on some square-edged offcuts to see how fast they removed material. As mentioned earlier, I also wanted to try them more specifically for their designed purpose. I therefore quickly roughed out the start of a 'Green Man' face on the Dupli-Carver, intentionally leaving it in a very unfinished state.

I was extremely impressed with how easily the riffler made light work of removing both the roughness and the router marks. Obviously the coarse-toothed pattern didn't leave a finished surface, but it was certainly good enough for final finishing with finer files or abrasive paper.

Both tools were such a pleasure to use that I couldn't really put them down once I started! Even after a prolonged period of use, the teeth were showing little if any sign of clogging. The small amount of sawdust (or should that be raspdust?) that was left on the teeth was easily removed with a stiff brush.

Summing up

Overall I've got to say I was very impressed with these tools – not only with their quality of manufacture, but also with their ease of use and their ability to remove large amounts of stock when pushed hard. I also found that a delicate touch could deal with finer detail using the stitching on their ends and edges.

I've not previously had tools like these in my workshop. However, I can see that they're going to get more and more use, particularly in conjunction with my new carving machine, and I would be quite happy to recommend them to amateur and professional users alike.

TESTED BY ROGER BERWICK

THE RANGE

TYPE	LENGTH	GRAIN*	PRICE (from)**
Cabinetmaker's rasp	150 to 300mm	3 to 10	€51.20
Half-round rasp	100 to 300mm	3 to 15	€47.75
Modeller's rasp	150 to 300mm	3 to 15	€52.22
Very tapered rasp	150 to 200mm	13 to 15	€53.34
Flat rasp	150 to 300mm	2 to 15	€48.91
Rat-tail rasp	100 to 300mm	3 to 15	€43.81
Square rasp	150 to 300mm	5 to 15	€51.51
Sage-leaf rasp	150 & 180mm	10 to 15	€52.08
Curved rasp	200 to 300mm	3 to 15	€52.27
Plump rasp	250 to 300mm	5 to 8	€47.77
Needle rasps (4 types)	185mm	13 to 15	€34.96
Rifflers (8 types)	150 to 300mm	8 to 15	€41.52

* The grain number refers to the height and spacing of the individual teeth. The range runs from 1 (the coarsest) to 15 (the finest).

** €1 equals about 80p at the time of writing, so €50 = £40.

VERDICT

The two tools I tested would make a valuable addition to any workshop. I can't find fault with them.

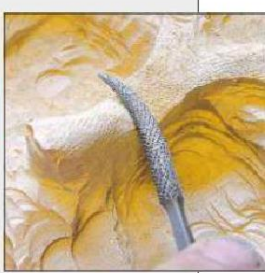
PROS ■ Excellent quality
■ Hand stitching cuts very quickly
■ Teeth don't clog and are easy to clean

CONS ■ None

VALUE FOR MONEY
PERFORMANCE

FURTHER INFORMATION

■ Liogier
■ www.liogier.com



The rat-tail riffler will smooth both convex and concave surfaces

Unlike machine-made rasps, the stitching extends right to the edges of the blade

The curved rat-tail end of the riffler is toothed all the way round and right up to its tip

The brush end of the riffler is finished in a smooth rounded shape

TESTED BY
ROGER BERWICK

Veritas have a reputation for making very high-quality and often innovative tools. *Following a lot of speculation their new bench chisels have now arrived, and first impressions suggest the wait was well worth it*

Veritas bench chisels

£47.44

THE RANGE

¼in (6.3mm)	£47.44
⅜in (9.5mm)	£47.44
½in (12.7mm)	£51.46
¾in (19mm)	£55.48
1in (25.4mm)	£59.50

SPECIFICATION

O1 tool steel bevel-edged blades with caramelised hard maple handles and stainless steel ferrules.

VERDICT

These are excellent chisels which have been machined to extremely fine tolerances, and are a pleasure to use.

PROS
- Need only light honing before use
- O1 tool steel holds an exceptional edge
- Comfortable well-shaped handles

CONS
- Variable handle shades

VALUE FOR MONEY ■■■■■■
PERFORMANCE ■■■■■■

FURTHER INFORMATION

- Veritas
- www.veritastools.com
- Axminster Tool Centre
- 03332 406406
- www.axminster.co.uk

I have a number of Veritas planes and other tools in my workshop, and have always been very impressed with their quality. The company has built up a reputation for making extremely fine tools, some of which are very innovative.

There have been rumours over the years that Veritas were planning to introduce their own range of chisels, and I was pleased to hear from Rob Lee at Veritas a short time ago to say that some were on their way to me for testing.

Their design is a combination of both Western and Eastern chisels, taking the better features from each. There is a tang on the blade that enters the handle; the ferrule is more akin to a socket chisel. The advantage is that the socket will not loosen due to the tang, but progressive use will tighten the joint due to the ferrule and socket.

First Impressions

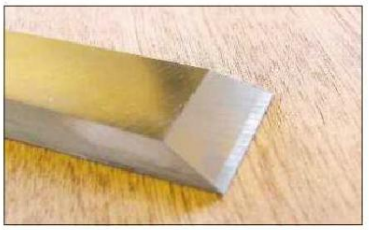
The chisels are marketed as bench chisels, but are really very good bevel-edge chisels. Each tool arrives in a plastic storage tube with a blade guard, an information sheet and an oiled pad to protect it in transit.

The two narrowest blades have a primary bevel of 30° and a secondary honed bevel of 32°. The wider ones have a primary bevel of 25° and a secondary bevel of 27°. The blade section is 125mm long to the base of the stainless steel ferrule, and with the handle the overall length is 250mm.

Blade perfection

The blades are beautifully ground – not to a polished finish, as some grinding marks are still visible – but they're superbly smooth and ooze the feeling of quality. The faces of the blades are flat-ground to a tolerance of 0.0005in, and the information sheet supplied indicates that no additional lapping is required. I put this to the test, and after just a few passes on the scary film that I use the face was perfectly polished, so I'm happy to

The chisels feature smooth well-shaped caramelised hard maple handles



Each tool arrives with a primary and secondary bevel, and is ready for use straight from the box

Each chisel is supplied with a well-fitting plastic blade guard

The blades are flat-ground to almost zero tolerance, with a very smooth finish

accept Veritas's claim.

The side edges of the bevels are ground to a fine edge, allowing the chisels to get right into the bottom of dovetails. This does leave the edges a bit sharp, but a couple of passes with a diamond stone soon resolved this satisfactorily.

Handy handles

The handles are made from hard maple and have been heated to harden and caramelise the timber. My only criticism of this process is that the colour of the handles does vary slightly, but this is in no way affects the chisels in use. The rounded shape certainly feels very comfortable to hold and use.

Using the chisels

It's good to get a set of chisels that can actually be used straight from the box. These came with a razor-sharp edge that removed the hairs from the back of my hand with ease, and in use they've retained their edge really well. I've been using them for nearly a month now and have yet to re-sharpen them!

The chisels are well balanced and fit the hand beautifully. They're a pleasure to use; fine enough for very delicate cabinet work, yet also strong enough for all general carpentry. Mine are now taking preference over my other chisels, but I'll be keeping them for best!!

The blade produced a succession of fine shavings working with the grain...

...and cut through end-grain as smoothly as a knife through butter

TESTED BY MARK CASS

Makita BMR101 DAB Job Site radio

While the workshop or workplace radio is hardly a new phenomenon, *the purpose-built branded version has only been around for a few years. Makita has now stepped up a gear with this DAB version*

£116

Goodbye battered old radio cassette player. Today's site sound systems now proclaim your allegiance to your favourite power tool manufacturer. This new version from Makita ticks all the boxes, especially as it offers DAB (Digital Audio Band) reception as well as regular FM.

Operation is pleasingly straightforward, but you can take it up a notch to the advanced settings if you wish. I made do with basic levels of adjustment, and was very pleased with the results. You can also plug in your mp3 player, via either an easy-access front port or the out-of-harm's-way socket inside the battery compartment.

Performance matters

This radio's sound quality is great. Power comes either from a mains connection via a DC adaptor, or from pretty much any battery Makita has made in recent years except the mini 10.8V ones. I found that reception was fine despite the seemingly stubby aerial supplied, but if you're in a tricky reception area it takes just a moment to fix up a supplementary aerial in the shape of a long wire run up to the ceiling.

It's a very solid construction, with rubber bumpers on the corners and chrome bars to protect the controls, and it's got quite a small footprint so it won't get in the way on the job. It wouldn't surprise me to learn that it might occasionally double as a site hop-up from time to time!

This snap-on cover conceals the mp3 player connection

You can plug in almost any battery Makita has ever made

SPECIFICATION

POWER	mains adaptor or battery (9.6-24V)
SIZE	263 x 305 x 166mm
FREQUENCIES	87.5-108MHz FM
	5A-13F DAB
WEIGHT	4.2kg

VERDICT

This radio will improve the quality of every workshop day!

PROS
- DAB
- Great sound quality
- Sturdy construction
- Ease of use

CONS
- Would benefit from a longer, stouter power cable

VALUE FOR MONEY ■■■■■□

PERFORMANCE ■■■■■■

FURTHER INFORMATION

- Makikta
- 01908 211678
- www.makitauk.com

Wera screwdriver and bit sets have been the first choice for electricians and plumbers for years, *but now the woodworking community is taking advantage of these exceptionally well-made and durable tools*

Wera screwdriver and bit sets

I used to buy cheap and cheerful bit sets and drivers, but I eventually realised that this was an expensive pastime as they never lasted very long and were definitely not tough enough for use in an impact driver. I bought my first Wera bit set just over 14 years ago and have broken just five bits in all that time.

The bit sets come in folding cases made of tough plastic, and each has a quick-release bit holder as part of the kit. I bought every item on test from Screwfix, who seem to beat everyone else on price. The individual product codes are given in the panel opposite.

BITorsion diamond bit set

This was my first purchase in 1998. It came originally with three Pozidriv No 1 and six Pozidriv No 2 bits. I've broken just three of the larger Pozidriv bits (all with my impact driver) and I've since added some slot-head bits. The current sets include one No 1 bit, seven No 2s and one No 3.

The Rapidaptor bit holder included is perfect for use in one of my cordless drills, where it spends most of its time. Bit changes are very quick: you just slide the outer shell of the bit holder towards you and the bit is released.

BITorsion Impact bit set

The impact driver can take a heavy toll on screwdriver bits, and I soon came to realise that ordinary bits purchased from the local woodwork store or DIY chain were a waste of money. I had read an article about Wera in a trade magazine, and discovered that they had designed both bits and bit holders especially for impact tools.

My set started with seven Pozidriv No 2 bits and two Pozidriv No 3s. I've broken one of each size in nine years of fairly heavy use. The current sets of S2 steel bits contain the same bit configuration.

Kraftform Kompakt 20 bit-holding screwdriver

The Kraftform Kompakt 20 has a very comfortable handle within which there is storage space for six bits. There is a recessed button on the end of the handle which, when pressed, allows the handle to open and reveal the stored bits. The bit holder is very easy to

from **£29.99**

My original sets include the Diamond (above) and the Impact (below)

The Kompakt 20 screwdriver in compact mode (left), showing the bit storage (centre), and with the bit holder fully extended (right)

A No 3 Pozidriv bit is ideal for tightening up the fixing bolts on this kitchen table

TESTED BY PETER PARFITT

The bit ratchet is shown here with the bit holder attached, ready for use

operate and can be used one-handed. The bits are held securely, yet are released easily.

There is a (green) spring loaded collar at the business end of the handle. When pressed this allows the bit holder to be released. In the first position the bit holder, with its long shaft, is still retained in the handle so that it now resembles a normal screwdriver. One more press of the green collar and the bit holder is released completely so it can be used with most drill-drivers.

I carry this tool with me everywhere, either in my pocket or in the glove compartment of my car. It's the most brilliant bit-holding screwdriver I've ever seen.

Bit ratchet and bit-check set

This is my latest purchase and is the most welcome member of my Wera collection, since I'm a little arthritic and try to avoid driving screws by hand. The small ratchet is deceptively tough. It allows plenty of torque to be applied, and has a ratchet lever for clockwise and anti-clockwise operation. I now use this with the hex drive bits rather than reaching for an Allen key; it's easier and quicker. Bits can be placed directly in the ratchet or in the bit holder, which can then be inserted in the ratchet.

The set includes no fewer than 28 bits in a range of types for slotted, Philips, Pozidriv, Torx and Hex-Plus screws. A ¼in square drive adaptor is also included, and this allows small sockets to be fittted. Wera produce a set that includes some sockets, but my existing ones work well enough.

One of the more useful applications of this tool is to get at screws in very tight spots where even a conventional right-angled driver is just too big. It can operate in spaces as shallow as 30mm.

Summing up

I've broken just five Wera bits in 14 years. To put this in perspective, in that time I've got through two cordless impact drivers and three rechargeable screwdrivers. That's durability for you...

ITEMS ON TEST*

Kraftform Kompakt 20 bit-holding screwdriver	(67700) £30.99
Bi-torsion 10-piece diamond bit set	(21717) £29.99
Bi-torsion impact bit set	(38206) £32.99
Bit ratchet and bit-check set	(44291) £34.99

* Screwfix product codes given in brackets

VERDICT

The quality and durability of these tools is exceptional. Wera continues to be my first choice for screwdrivers and bit sets.

PROS
- Made from high quality steel
- Industry standard fittings
- Ideal for impact drivers
- Well-thought-out combination packages

CONS
- Not widely known to woodworkers

VALUE FOR MONEY ■■■■■
PERFORMANCE ■■■■■

FURTHER INFORMATION

- Wera Tools UK
- 01246 277756
- www.wera-tools.co.uk
- Screwfix
- 0500 414141
- www.screwfix.com

The bit holder collar can be held with your free hand to help steady the screwdriving operation

Any ¼in square drive sockets can be used with the set using the adaptor provided

The ratchet can get into very tight spots that will defeat right-angled drivers

TESTED BY
IAN WILKIE

Say the word Dremel, and everyone knows what you mean; it's now almost a generic term for any small-scale power tool. *Here's a look at their latest tool-and-accessory package to hit the market*

Dremel 8000JG Li-ion cordless drill/grinder

£74.95

The Dremel 8000 comes in a soft blue zip case with a battery charger and 60 accessories. This huge range allows the user to carry out a wide range of cutting, polishing, grinding, engraving, shaping, drilling, sanding and light DIY work. For some of the other tasks suggested – routing, circle cutting, cleaning up grouting and so on – an extra accessory may be required. Dremel products are readily available in DIY superstores.

Battery facts

This drill/grinder has a 10.8V lithium-ion battery that clicks neatly into the end of the drill body. With the battery in place, the tool will stand in an upright position on the bench when you need to set it down. Alternatively you can simply hang it up out of the way using the foldaway wire loop.

The battery takes three hours to charge fully, and will hold its charge for six times as long as an equivalent NiCad battery. A neat charger is supplied, and the battery can be recharged at any stage without causing damage. The amount of charge available is clearly shown on the drill body by means of three neon lights: full, half-full and a third remaining. A spare battery costs £36.95 if you feel the need to have a charged battery on stand-by.

Operating features

The brush motor is reasonably quiet in use and gives a speed range of 5,000 to

SPECIFICATION

BATTERY	10.8V Li-ion
RECHARGE TIME	3 hours
NO-LOAD SPEED	5,000-35,000rpm
COLLET SIZE	3.2mm
WEIGHT	425g

VERDICT

The Dremel 8000 is well designed and made, and the set offers a useful selection of accessories.

PROS
- Neat package
- Well balanced and comfortable to use
- Good battery charger

CONS
- Collet and chuck options not included
- Quite expensive

VALUE FOR MONEY ■■■■□
PERFORMANCE ■■■■■

FURTHER INFORMATION

- Dremel UK
- 08447 360109
- www.dremel-direct.com

The small 10.8V battery clips neatly into the end of the drill body

The fold-down wire loop allows you to hang the tool out of harm's way

The neat charger will deliver a full recharge in just three hours

A keyless chuck and three more collets are available as optional extras; I think safety goggles should be included too

35,000rpm. The on/off and speed switches are well positioned on the soft-grip body and are clearly visible. The spindle can be locked by means of a well-placed knob at the top of the machine, which is unlikely to be touched by accident.

The drill is fitted with a standard 3.2mm split aluminium collet. This is designed for a particular accessory shaft diameter to give accurate rotation. The nose cone has spanner flats, should extra pressure be required to tighten it.

Available options

All the accessories provided in the kit have a shaft diameter of 3.2mm, which is standard throughout the range. Three other collets are available: 0.8, 1.6 and 2.4mm. An optional keyless chuck accessory priced at £9.94 can also be used instead of the collets. This chuck will take accessories with shanks from 3.4mm down to 0.4mm – a point worth considering if you already have a collection of accessories and want to continue using them. Finally, the nose cone screws off to enable various other fittings to be screwed on: for example a flexible shaft, a router table and a grouter.

Using the tool

It's often convenient to have a small drill without a flex to get in the way. This drill/grinder is very comfortable to hold and well balanced in use, and I like the soft grip body. It can be held in either of two positions. This is an easy drill to charge, and I particularly like the battery charger and the lithium technology.

I would prefer to see all four collet sizes included in the kit, together with the keyless chuck. I accept this would add to the price, but it would be much more convenient for the purchaser and the machine could then be used to its full capacity.

When shaping a small section of wood, you have to be very careful to keep your fingers well away from cutting discs, burrs and the like which are rotating at very high speeds. When drilling, it's best to secure the workpiece in a vice rather than trying to hold it by hand. I didn't test the machine in its routing mode, but I think it would be suitable only for making very small-scale pieces such as dolls' house furniture.

Summing up

If used within its design limitations, the Dremel 8000 will be suitable for the model maker, jewellery maker, engraver and those undertaking similar work. In its attractive zipped case it would make an excellent gift for any hobby enthusiast.

Finally, I have one small comment about safety to add. Even though this is a small machine, safety glasses are essential and I think a pair should be included in the kit.

You can either hold the slim soft-grip body like a pencil...

...or adopt an over-hand grip if you need power rather than precision

It's best to use a vice to hold workpieces securely when drilling them

Make sure you keep your fingers well away from fast-spinning burrs and cutting discs

Lie-Nielsen tenon saw

TESTED BY BEN PLEWES

£143

Buying a crosscut tenon saw from Lie-Nielsen represents a significant investment. *Is it just a luxury treat, or can paying 20 times the price of a superstore saw be justified?*

From the minute you pick it up, there's no going wrong with this saw. It's very well balanced and comfortable to hold. Unlike some other premium saws I've used, there's no need to take abrasive paper to any sharp handle edges left by machine tools during manufacture; it's finished beautifully. It cuts like a dream too. Cross cuts are easy to start, and minimal effort is required to see them through.

This 300mm x 12tpi model is a good general-purpose size. It's too big to tackle very fine work, but for the 80 per cent of jobs between very small and very large it provides ample capacity, yet remains light and agile enough for long periods of use.

It's worth adding here that there's no substitute for picking a tool up and handling it prior to purchase – much more so with hand tools than power tools. If you're in the market for a new saw, try to get to a good tool store or a woodworking show so you can pick up a range of saws and see which feels best for you.

VERDICT

This saw is a good investment for any discerning woodworker looking for reliable quality and long-term use.

PROS ■ Comfortable and well balanced
■ Easy to start cuts

CONS ■ Only the price!

VALUE FOR MONEY ■■■■■□
PERFORMANCE ■■■■■■

FURTHER INFORMATION

■ Axminster
■ 03332 406406
■ www.axminster.co.uk
■ www.lie-nielsen.com

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01270 522237 (Cheshire)

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02380 790340 (Hampshire)

Black & Decker Workmates Dual-height professional model; £100. 626 model; £30. WM25 model; £20. Wolf dowelling jig; £15.
01992 627927 (Herts)

DeWalt portable thicknesser, model DW733, with spare set of blades, in good condition; £180.
01304 215121 (East Kent)

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Triton ½in router, router table and stand; Trend router lathe; Trend ¼in router; Trend and Jesada cutter sets plus other items. Serious offers please.
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01434 682419 (Northumberland)

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01572 723976 (Leics)

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Workshop sale of hand tools, portable power tools and static machinery; please call for details.
01443 822272 (Mid-Glamorgan)

Axminster extractor, model WV200P, 4in outlet with hose, in good condition; offers please.
07969 016924 (Surrey)

Air-dried elm, 5 x 4in rough-cut, about 6 cu ft; 300. Cherry, about 5cu ft; 200. Also some burr chestnut; phone for details.
0353 (0)86 320 6308 (Co Clare, Eire)

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A bigger blast...

'A washstand is seldom required in the modern bedroom suite, as most homes nowadays have a bathroom.' So begins the first article in the October 1927 issue of *The Woodworker*. It's hard to imagine now how families coped without a facility we take completely for granted...

Household furniture design was still stuck firmly in the Victorian era back in 1927, if the pages of *The Woodworker* can be taken as a style guide. The lead article features the fourth piece in a series entitled 'Bedroom Suite in the Carolean Style' that began in the July issue with a late Stuart bedstead and was followed by a twin-door wardrobe in August and a dressing table in September. As you can see from the opening page (right), the design for this piece – and the others in the series – was rooted firmly in the past.

It took the influence of the Art Deco movement in the late 1920s and early 1930s to give English furniture design the impetus to modernise... and then along came World War II. As the wartime Utility Furniture Scheme was introduced, things changed forever. Its aim was to ensure the production of strong, well-designed furniture while making the most efficient use of scarce timber resources. The designs were largely in the tradition of the Arts and Crafts movement, and were severe in their simplicity and lack of ornamentation, entirely contrary to the popular taste of the immediate pre-war period. No more would bedrooms – or any other part of the house – be furnished in the Carolean style!

There were several other furniture projects included in this issue. The Dresser for the Small House was a classical base cupboard/drawers/open shelves design, living up to its title at barely 750mm (2ft 6in) wide. The book and magazine stand (see below) in stained oak featured four elaborately turned legs linked by decorated panels, while the china display cabinet in mahogany was to a much plainer design, with straight legs and plain glass doors.

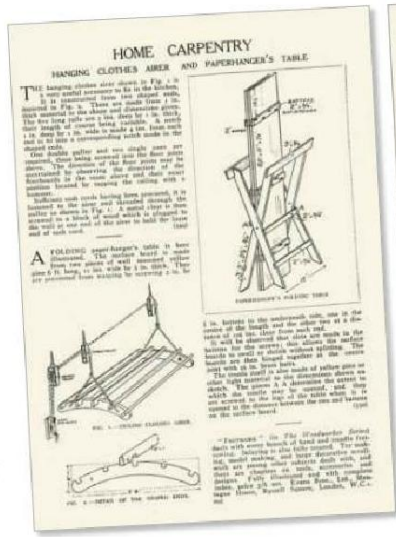
If your taste was for more practical things to make, you could tackle the hanging clothes airer or the folding paperhanger's table shown below, create a lady's folding-stand work bag, inlay a small letter rack for the desk or hall table, or knock up a clever set of portable shelves. There were even plans for making a small toothing plane.

Last but by no means least, if you weren't worn out by all this cabinetmaking and household woodwork, there was a four-page article on erecting and glazing a span-roof greenhouse measuring 3 x 2.4m (10 x 8ft), with a ridge height of 2.6m (8ft 6in). This was a massive project, requiring 10m of 75mm sq wood, 30m of 50mm sq stuff and 60m (200ft)of matchboarding for the cladding, not to mention the other ten timber sizes given in the cutting list. This was a project for a man with deep pockets and a big workshop! But then there was no shortage of home-grown timber back in the 1920s...

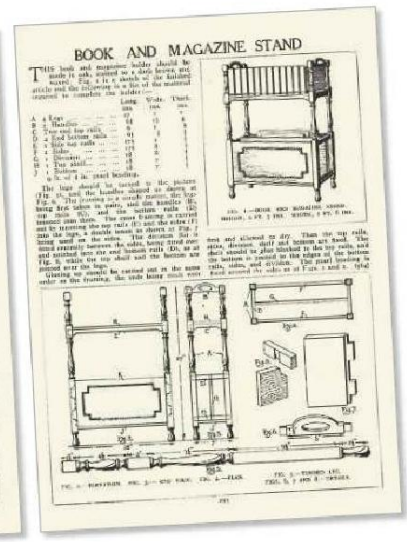

THE WOODWORKER

BEDROOM SUITE IN THE CAROLEAN STYLE

IV.—LATE STUART DRESSING CHEST WITH CUPBOARD


HOME CARPENTRY

HANGING CLOTHES AIRER AND PAPERHANGER'S TABLE


BOOK AND MAGAZINE STAND

More from The Woodworker archive next month...