

The Woodworker

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BRITAIN'S BEST-SELLING WOODWORK MAGAZINE

£2.75 February 2001

**ALL ROUTER CUTTERS
ARE CREATED EQUAL
OR ARE THEY?**

**Getting the
most out of
your RAS**

**Six of the best
workshop boots**

PROJECTS:

- Music box
- Step stool
- Dulcimer



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in quality control, ensure that Trend tools continue to be the leaders in routing performance.

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NEW CATALOGUE



The Woodworker

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EDITORIAL

Microscopes are far too much fun to leave in the hands of children. They bring a grainy new dimension to a world we think we know. One of the highlights of my trip to the Dome was the chance to see an electron microscope being used in the Body Zone. A visitor was asked to sit in a reclining chair and the machine focused on his eyebrows. Under the 1250 magnification, the creepy crawlies that live in our lashes are brought to life. A bit like watching locusts strip a cornfield.

So it was with a schoolboy sense of excitement that I grasped the CD of images sent to me by Gervais Sawyer of the Forest Products Research Centre. The monotone scans shown on page 29 show the tip and edges of a dozen 1/2in straight router cutters - one of the bread and butter consumables found in many a home and trade workshop. The Mondeo of the routing world. Like the car, there are good and bad examples and our tests showed just how much abuse an apparently sharp edge has received after cutting only fifty metres of chipboard. This is a technology we hope to make use of in future issues, so let me know of any other items you would like to see under the microscope (woodworking-related, of course). Thanks also to Dave Martin who had the job of putting the whole test together and ripping through over 600 metres of chipboard with his trusty Felder. The headache tablets are in the post. Does anybody need some ash? I have a 12m high tree that needs felling and planking up. So if you live in the Surrey/Sussex area, please call our editorial office and ask for the Editor with the worried look when it blows a gale...



Mark Ramuz



The Woodworker Hot One Hundred: 1

Each month throughout our centennial year we'll be giving you the chance to win one of our Hot 100 products brought to you by some of the UK's top woodworking manufacturers and suppliers. This month, thanks to Trend, we've got 100 of their fantastic full-colour Routing Guide booklets to give away. These 265-page pocket sized guides contain a wealth of invaluable routing tips and techniques. From caring for your cutters, collets and router all the way through to how to produce panel doors.

For your chance to win simply write your name and address on a postcard or sealed envelope and send it the following address: The Woodworker 100/Trend, Nexus House, Azalea Drive, Swanley BR8 8HU.

The Woodworker Volume 105, Issue 2
19th January 2001
Published monthly
Back issues & Subscriptions:
Nexus Subscription Services, Tower
House, Sovereign Park, Lathkill Street,
Market Harborough, Leics, LE16 9EF.

Back issues/Subscription hotline:
01858 438897
North American Subscription Agent:
Wise Owl Worldwide Publications, 1926
S. Pacific Coast Highway, Suite 204
Redondo Beach, CA 90277-6145, USA
Tel: 310-944 5033; Fax: 310-944-9963.
Visa/MC/Discover accepted.

Periodicals Postage Paid at Rahway, NJ.
Postmaster:
Send address
corrections to:
The Woodworker, c/o Mercury Airfreight
International Ltd, 2323 Randolph
Avenue, Avenel, NJ 07001.



Published by
Nexus Special Interests Limited
Nexus House, Azalea Drive,
Swanley, Kent BR8 8HU
Tel: 01322 660070 Fax: 01322 667633
www.nexuswoodworking.com
Nexus Special Interests is a wholly
owned subsidiary of Highbury House
Communications plc

EDITORIAL

Group Editor

Mark Ramuz

Deputy Editor

Neil Mead

Technical Editor

Andy Standing

Editorial Administration

Sarah White

Stacey Kerr

Photography

Concept

PRODUCTION

Designer

Yvette Masson

Illustrator

Michael Lindley

Production Manager

Mike Burns

Production Executive

Claire Medland

Printing

Polestar

Origination

Atelier Dataset

SALES

Senior Telesales Executive

Reza Zaman

Northern Area Display Sales

Colin Walker

Tel: 0161 776 4460 Fax: 0161 777 6524

MANAGEMENT

Group Managing Director

Tony DeBell

Divisional Managing Editor

Dawn Frosdick-Hopley

Divisional Sales Manager

Roy Kemp

Newstrade Sales Manager

David Pagendam

SUBSCRIPTIONS

UK - £33.15pa

Europe - £42.64

O/S Surface mail - £48.36

O/S Airmail - £54.34

USA Surface mail - \$70.00

USA Airmail - \$80.00

nexusdirect@compuserve.com



NEXUS

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ISSN 0043-776X

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CONSUMER PRES

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Roy Sutton 1918-2000

It is with great sadness we have to report that one of routing's best known ambassadors and greatest innovators passed away on the 16th November 2000. Roy Sutton will always be remembered for his enthusiasm for the router as well as his friendly and approachable manner. He was always willing to share his near sixty years of experience with other router users, either through his books, videos, or woodworking courses. Roy will be sadly missed by all who knew him.



Leading edge

A new line of edgebanders and combination machines have been launched by IDM, part of SCM Group. The Activa machines come in various lengths, with a wide variety of processing units that can be adapted to meet all machining requirements and individual customer needs. The use of a technically proven feed system ensures high performance results and feed speeds of up to 30m/minute. Other features that come as standard include a fully equipped PLC control unit for the management of processing units, and axes for the fast change-over of machining tools, edged types and finishing processors.

For further information, contact SCM Group on 0115 9777818

One-stop shopping

Two market leaders - Hitachi and Price Tool Sales - have recently teamed up to offer outstanding levels of product expertise and availability to customers. Price Tool Sales has become a full-range stockist of Hitachi tools and, supported by Hitachi, now stocks every machine in the Hitachi catalogue. Additionally, the company has also become a full range stockist of DeWalt power tools. Based in the Midlands, Price Tool Sales is a leading distributor of power tools accessories, offering year round value for money offers and one-stop shopping for customers.

For further information, contact Price Tool Sales on 0121 689 2000.

Correction

We apologise for a mistake which appeared in the 'Low angle hollowing plane' article by John Holiday on page 70 of the last issue. An error-free version of the copy is available free to anyone who sends an SAE to *The Woodworker/Mini-tools*, Nexus House, Azalea Drive, Swanley, Kent BR8 8HU.

WHAT'S NEW

Try before you buy

A new, independent DIY shop recently opened its doors in Christchurch, Dorset. Owned by Glen Tizzard, The Tool Store is aimed at the craftsman, DIYers and professional tradesmen who want to try before they buy in the outlet's in-store demo room. Stock includes a varied range of hand tools, power tools, compressors/air products and consumables.

For further information, phone The Tool Store on 01202 486240.



Reader offer!

We've got 30 pairs of free tickets (10 pairs per show) to give away for Creative Stitches & Hobbycrafts at The Brighton Centre (2-4 February 2001). Creative Stitches & Hobbycrafts at the SECC Glasgow (8-11 March 2001) and Sewing for Pleasure & Hobbycrafts (15-18 March 2001). All three shows feature a vast selection of textile crafts and hobbies, including wood working.

If you would like to go along to one of the shows, put your name and address on a postcard and send it to: The *Woodworker/Hobbycrafts* shows, Nexus, Azalea Drive, Swanley, Kent BR8 8HU. The closing date for entries is 16th March 2001.



Fuss-free furniture

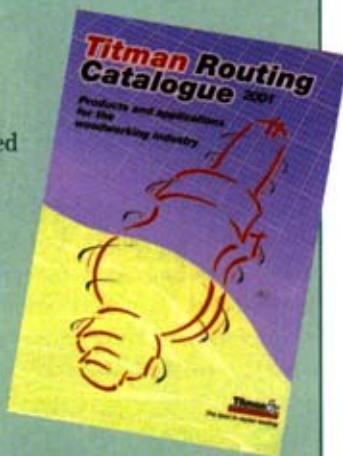


The versatile Contiboard and Contishelf range of real wood veneers enables both DIYers and furniture manufacturers to create stylish furniture and quality shelving with the minimum of fuss. Pictured is rich, warm mahogany, which comes in easy-to-cut particleboard.

For further information, contact the Conti Careline on 01769 575 400.

New from Titman

A host of new products can be found in the new 2001 Routing catalogue from Titman. Items include the pine cut range of router cutters, specially designed to give maximum performance on softwoods and the unique aluminium worktop Ali-Jig, which is stronger and more versatile than normal compact jigs. Also featured is a complete section of spindle tooling as well as the largest range of UK manufactured quality TCT router bits.



For your free copy, contact Titman's sales department on 01255 220123 or ask your local stockist.

Back to basics

If you want to polish up your DIY techniques, the DIY Academy provides a series of practical weekend courses designed to help beginners get to grips with basic home improvement techniques. Courses, which are held in Somerset, London, Kent and Yorkshire, include basic DIY skills, furniture making techniques, home electrics and routing. Gift vouchers, costing £99 inc. VAT, are also available if you'd like to treat a friend or colleague.

The Academy is sponsored by leading DIY companies Bosch, Focus Do It All, Stanley Hand Tools, Richard Burbidge, UHU Adhesives, Dremel and Sadolin.

For further details, contact 020 7564 4832.

Tool tidy

Chesterman Marketing has introduced a solid hardwood multi-purpose chest to its range. New to the UK, it comprises five storage

compartments suitable for tools and other items. The unit measures 23 x 11 x 14.6 ins. (58 x 27.95 x 37cms), has a high polish finish and felt-lined drawers. Other features include brass-plated drawer knobs, lid safety catches, carrying handles and protective corner plates. The chest costs £79.85 inc. VAT and is available from stock.

For further information, contact Chesterman Marketing on 01785 250341.



Two into four

Minicraft are including two free project plans in each of their four most popular ready to use kits - the MB186 engraving and security kit, the MB1000 mini rotary tool kit, the MB5001 mini



variable speed rotary tool kit and the MB 8571 super rotary tool kit. The projects have been written by John Everett, and give the necessary know-how required to create, repair and build. They include refurbishing small metal objects, engraving drinking glasses and mirrors, re-grinding and sharpening, carving and making a small Celtic love spoon.

For further information, a free catalogue and details of stockists, phone Minicraft on 01388 420535.

New tool dot com

tooltastic.com is a new on-line shop for DIY, gardening and car maintenance tools. Owned by tool distributors Buck & Hickman, it features over 800 tools from leading manufacturers at

competitive prices, along with the promise that orders will be delivered the next working day, from stock, for an additional £3.95, regardless of order size.

Multi-buy offers are a regular feature, and DIYers registering now will receive a free steel measuring tape worth £4 or alternative (while stocks last).

For further information, contact Buck & Hickman on 024 7630 6444.



In a spin

A completely revised spindle-moulder has been launched by Sedgwick, to include models SM3ii, SM4ii and SM255-t - the first of the company's spindle moulders to feature a fitting spindle. All three feature an interchangeable top spindle, and are capable of carrying both 30mm and 1 1/4in bore tooling, as well as counter-bored tooling for tenoning, and router cutters. There is also an option to store additional spindles with pre-set stacked tooling on them for repetition work. Optional extras include a sliding table, a ring fence and cage guard set, and cast aluminium table extensions.

For further information, contact Sedgwick on 0113 257 0637.



Back to school

Professional woodworker and *Woodworker* contributor Mark Finney is encouraging woodworkers to go back to the school room. Mark, who runs a series of courses at his Wood School in Sheffield, also offers private tuition. Reduced course rates are available for Wood School members, who also receive a 10% discount on all furnishing materials bought through the Wood School shop. Other benefits include help with sourcing materials, advice on project designs, and access to a free Woodworker's helpline.

All courses are hands-on and practical, and pre-booking is essential.

For dates, courses and course fees, contact Mark Finney direct on 0114 258 8399.



Hand tool SOS

Thousands of tools are needed by small communities in Africa who wish to be self-supporting by making things in wood and self-empowering their local economy. In great demand are: cross pein and claw hammers; jointers, rebater and plough planes; jack planes; mortise chisels; brace bits; carpenter's vices and saw sets.

Tools need not be in first class condition and it may be possible to arrange for collection. If you can help, please write, phone or fax to: Tools for Self Reliance, Netley Marsh, Southampton, Hants. SO40 7GY tel: 023 8086 9697 fax: 023 8086 8544 e-mail: tools@gn.apc.org



Carpenters and tools required overseas...

If you are a skilled carpenter, aged between 22 and 68 years of age, and looking for a career change, the VSO would like to hear from you. Carpenters have an essential role to play in VSO's overseas programmes, as the demand for their specialised skills continues to increase throughout the developing world.

Reader Michael Carr works with the VSO as a voluntary carpentry instructor at Ngelani Youth Polytechnic in Kenya. He is aiming to build a secure and appropriate storage area for tools, as well as to enlarge the college's tool collection which currently consists of blunt and broken tools.

'If any readers or tool suppliers have teaching materials such as books, posters or products that they could donate, we would be very grateful,' Michael explained. 'Anything that can be donated will help to improve the training of students and, ultimately, help them find work.'

Items can either be sent to: Mr. and Mrs. Carr at 16 Derby Road, Garstang, Preston, Lancs. PR3 1EU (tel: 01995 603111) or direct to Michael at Ngelani Youth Polytechnic, PO Box 700, Machakos, Kenya.

...apply within

Following a 16% increase in the demand for technical volunteers, carpenters are being eagerly sought for the VSO's overseas programmes. Volunteers are required to work with limited resources, so a lot depends on initiative. If you're skilled and looking for a change of career, have a sense of adventure, are aged between 22-68 and would like to learn more about opportunities with the VSO, contact the VSO direct on 020 8780 7500 for a timetable of forthcoming information evenings.

Reg Slack turning set

A new set of tools has been created by Reg Slack, together with Tony and Barry Isles of the Ashley Tools Company. The trio, who know and understand the problems that woodturners come up against, have pooled their years of practical experience to cover a wide range of turning with the minimum amount of tools. The set features a 1/2in (12mm) roughing out gouge; a 1 1/4in (31mm) skew chisel; a 1/4in (6mm) spindle gouge; a 1/8in. parting tool; a 3/4in (19mm) round nose scraper and a 3/8in (9mm).

The tools can either be purchased as a boxed set or individually, with or without handles.

For further information, contact the Ashley Isles Tool Company on 01335 360829.



DIARY

January

20 Turning and texturing burr bowls with Tony Witham

Peter Child Woodturning Supplies, Halstead, Essex
Tel: 01787 237291

20 Finishing with Stephen Hardcastle

John Boddy's Superstore
Tel: 01423 322370

20 Turning using a Record lathe

Tewkesbury Saw Company
Tel: 01684 293092

February

2-4 Introduction to turning

West Dean College, Chichester
Tel: 01243 811301

3 Turning lamps with Derek Phillips

Peter Child Woodturning Supplies, Halstead, Essex
Tel: 01787 237291

3 Carving with Peter Wright

John Boddy's Superstore
Tel: 01423 322370

3 Turning bowls with Tony Witham

Craft Supplies, Buxton, Derbyshire
Tel: 01298 871636

3 Pyrography with Christine Witham

Craft Supplies, Buxton, Derbyshire
Tel: 01298 871636

4 Turning bobbins with Bob Sargent

Craft Supplies, Buxton, Derbyshire
Tel: 01298 871636

4-8 Letter carving course

West Dean College, Chichester
Tel: 01243 811301

4-9 Turning with Eric Moulder

West Dean College, Chichester
Tel: 01243 811301

10 Finishing with Philippa Barstow

John Boddy's Superstore
Tel: 01423 322370

16-18 Country chair making with Jack Hill

West Dean College, Chichester
Tel: 01243 811301

16-18 Carving for beginners

West Dean College, Chichester
Tel: 01243 811301

17 Making earring and ring stands with Tony Witham

Peter Child Woodturning Supplies,
Tel: 01787 237291

17 Turning with Simon Whitehead

John Boddy's Superstore
Tel: 01423 322370

17 Design turning with Ian Wilkie

Tewkesbury Saw Company
Tel: 01684 293092

22 Woodworking joints discussion

The Mytchett Centre, Surrey
Tel: 01252 542901

23-25 Fine furniture making course

West Dean College, Chichester
Tel: 01243 811301

25-28 Tool sharpening course

West Dean College, Chichester
Tel: 01243 811301

25-28 Woodcarving for beginners

West Dean College, Chichester
Tel: 01243 811301

25-Mar 2 Caring for furniture

West Dean College, Chichester
Tel: 01243 811301

25-Mar 2 Caring for furniture

West Dean College, Chichester
Tel: 01243 811301

March

1-4 Fine furniture making course

West Dean College, Chichester
Tel: 01243 811301

4-8 'How to use a tree' course

West Dean College, Chichester
Tel: 01243 811301

3 New project with Derek Phillips

Peter Child Woodturning Supplies,
Tel: 01787 237291

3 Turning with Marsden Howitt

John Boddy's Superstore
Tel: 01423 322370

3 Turning miniatures

with Len Grantham
Craft Supplies, Buxton, Derbyshire
Tel: 01298 871636

4 French polishing with

Stephen Simmons
Craft Supplies, Buxton, Derbyshire
Tel: 01298 871636

9-11 Picture framing with John Hill

West Dean College, Chichester
Tel: 01243 811301

17 Routing with

Ted Heathcote-Walker

John Boddy's Superstore
Tel: 01423 322370

17 EHA Exhibition 2001

Hylands House, Chelmsford, Essex
Tel: 01268 523542

17 Turning hollow vessels

with Tony Witham

Peter Child Woodturning Supplies,
Halstead, Essex
Tel: 01787 237291

22 Furniture craft today with

Colin Eden-Eadon

The Mytchett Centre, Surrey
Tel: 01252 542901

24 Veneering with Robert Cooksey

John Boddy's Superstore
Tel: 01423 322370

International Woodworking Exhibition

22nd-25th February 2001

Next year, the show moves from the old Wembley location to Alexandra Palace, so make a note in your diary today.

Free parking

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Visit the Nexus website at www.nexuswoodworking.com for more details.

Winning ways with wood

Traditional architectural woodcarver Sarah Berry has won a Queen Elizabeth scholarship worth £1300, to help her achieve her ambition of becoming an ornamental woodcarver specialising in narrative. Her award was presented to her at a special ceremony by The Rt. Hon. The Lord Weatherill. Sarah, from Capel Curig, Conwy, is pictured showing an example of her work to Michael Skinner, president of The Royal Warrant Holders Association. The scholarship will enable her to complete a postgraduate diploma in ornamental woodcarving at the City and Guilds of London Art School. Sarah's long-term ambition is to run her own workshop and to establish herself as a master carver, restoring historic carving and producing and developing ornamental woodcarving design.

For further information, contact The Queen Elizabeth Scholarship Trust on 0207 828 2268.



In the groove

Trend has recently added two new bearing guided, V-groove router cutters to its Professional Range of tooling. The cutters have been specially designed to make intricate veins and grooves in panels or drawers. The first cutter (ref. 11/20) has a 60 degree V-groove, a diameter of 12.7mm and is mounted on a 1/4in shank. The second (ref. 11/41) is a 45 degree V-groove tool and has a diameter of 19.1mm with a 1/2in shank. Both are two-fluted, tungsten carbide tipped tools and can be guided by the shank mounted ball bearing along a template edge or batten, which is held securely onto the shank by a collar.

Ideally suited for many routing applications, the cutters can be used on all timbers and man-made boards with hand routers and fixed head machines.

Prices start from at £22.95 exc. VAT.

Send diary entries to us at least 5 weeks prior to publication. As details can sometimes change readers should always contact the venue concerned in advance. Please mention The Woodworker when calling.

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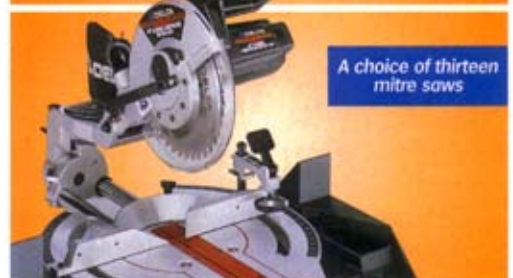


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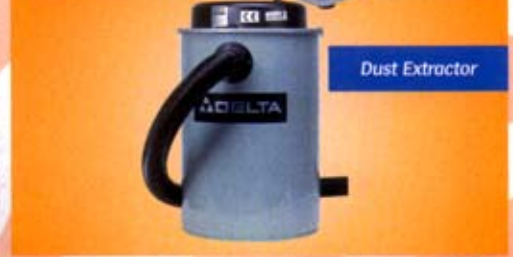
A choice of thirteen mitre saws



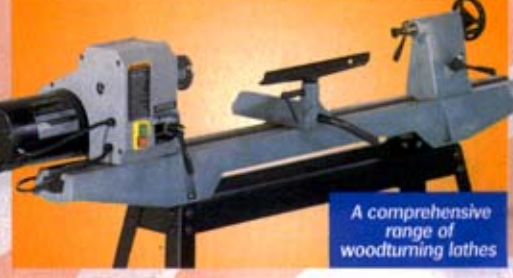
Table saws



A choice of four scroll saws



Dust Extractor

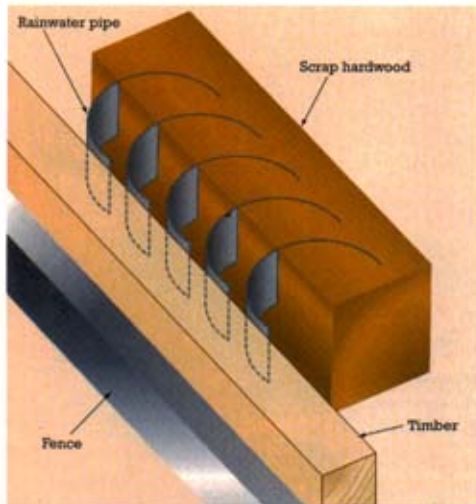


A comprehensive range of woodturning lathes

TOP TIPS

Win a fantastic Freud JS102 Biscuit Joiner, worth over £250!

That's right. All you have to do is send us details of your own workshop tip and you could win a Freud Biscuit Joiner. The powerful 710 watt machine comes with a 2.5m cable, dustbag, storage case and blade-changing spanners. The joiner has pre-set depth stops, an easy-to-read mitre scale and smooth plunge action. The rugged construction should see you through years of workshop joint-ups. Runners up receive a free book.



Piping hot

For several years, I've made use of a workshop jig that will hold a workpiece in any situation for routing, bandsaw or table saw work. Starting with a piece of scrap hardwood, make several cuts with a holesaw to around half the depth of the timber. Match the cut diameter to a size of DIY plastic piping – 50, 75 or 100mm.

Cut the wood in two pieces along the axis, cut ring sections from the rainwater pipe and set them in the saw cut. You can use a spot of Araldite but most will be a push fit. Clamp the jig to the worktable and adjust against the edge of the work to provide strong vertical or horizontal pressure. What's more this method doesn't mark the timber surface.

Barrie Price, W. Midlands



It's the Daddy-oh

This custom template jig makes dados much quicker to produce. Clamp a straight edge to your workbench and butt up a piece of plywood. Insert your choice of straight cutter and cut the dado where you want it, set the template on the dado edge mark with a setsquare. Clamp a straight edge as shown and remove the template. Set the depth of cut and cut your dado. Make a small hole with the cutter in the template to show the size of cutter used.

My second tip is for a router base accessory for use with straight cutters. Drill holes in the rectangle to suit your base screw holes. Cut the plywood slightly oversize and fit to your router. Mark the centre using a V-groove bit. Now cut to size so that each edge gives a different size spacing for cutting various thicknesses of dado, as shown in Fig 4.

Mark Andrews, Plymouth



Figure 1
All measurements in inches

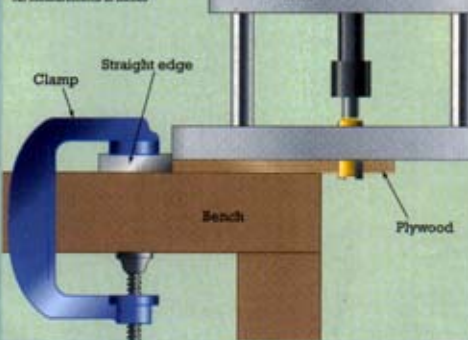


Figure 2
All measurements in inches



Match template with size of router bit used. Drill hole in corner being on wall. Make more templates for different size bits.

Figure 3
All measurements in inches

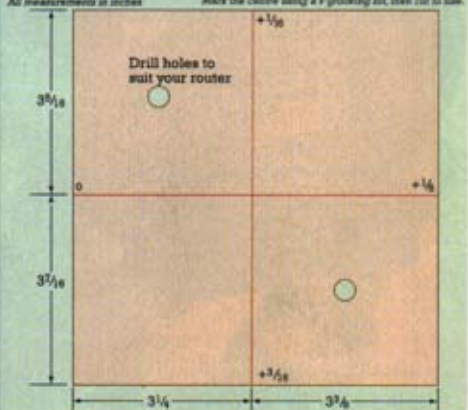
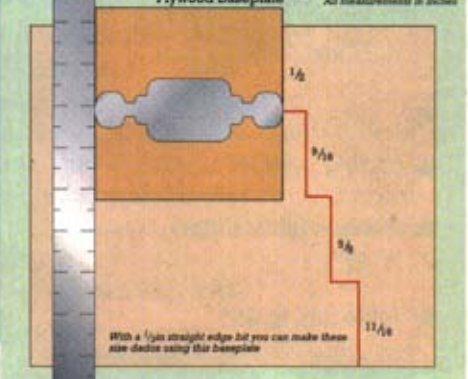


Figure 4
All measurements in inches



With a 1/8 inch straight edge bit you can make these size dados using the baseplate

Board meetings

Here's my way of jointing thin boards edge-to-edge, where biscuits or dowels just don't fit. I keep a number of steel rods in the workshop, 1/2in diameter and about 30in long. I make up a pair of cramping boards from thick plywood, with paired 1/2in holes at 4in intervals. The space between each hole is determined by the thickness of the timber to be joined.

The steel rods are pushed through the holes in the cramping boards and the work is planed to thickness so it is a close fit between the pairs of rods. Once the work is in the jig the rods can be separated, one at a time, and the glue applied. The clamps can now be applied with the knowledge that the alignment is accurate and the boards can't spring out.

It's a great jig for making up chess boards as all seven joints can be aligned. I now have pairs of cramping boards drilled for 1/4, 3/8 and 1/2in thickness stock.

John Prince, Bournemouth



Figure 1 Cramping board

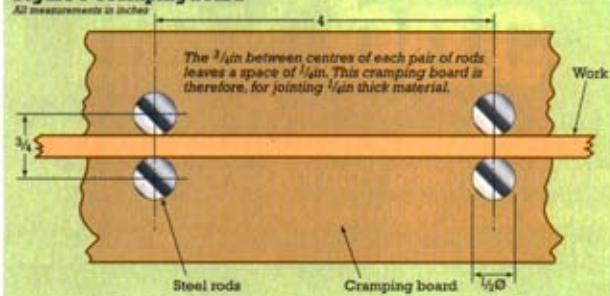
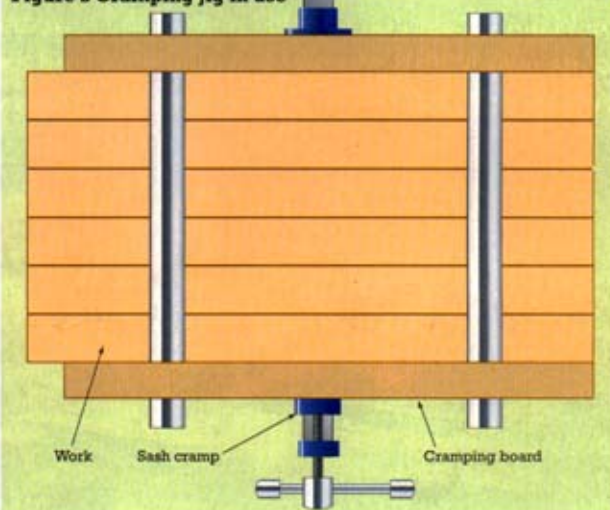


Figure 2 Cramping jig in use



Ball racer

Here's a tip for mounting a ballrace, used to press work against a fence for jointing or, used in a group, to steady long workpieces for between centre turning. First, turn two wooden supports from hardwood. Each support consists of two parts: a spigot that fits into the inner ring of the ballrace and a flange that bears against the inner ring. Drill a 6mm hole through the centre of both supports while the work is still in the lathe. Prepare two pieces of flat metal, 4x 25x 100mm. Drill three holes (6mm) through both flat metal strips; mount with 6mm bolts, spring washers and nuts. The ballrace is mounted at the end of the arm and must rotate freely.



HH Lawson, Johannesburg

Four quick tips

Here are some quick tips that may be of interest to other *Woodworker* readers:

- Install junction boxes at the back of your bench and along the front face so you can always choose a power source that doesn't mean tangled leads all over the bench.
- Before starting a new project, sand flat your bench surface. This will reduce any chance of makring and staining from the previous project.
- A box of wooden tongue depressors (about £1) is a good investment. You can cut them with scissors to make custom glue spreaders or even use them as fillets.
- Keep your quick-action clamps closer to the bench than your sash cramps. You'll need them first.

Paul Stickley, Lymington, Hampshire

Hard pressed

Alan Holtham's article on removing dents from timber reminded me of a description of pressed and raised wood in *Wood Carving* by CG Leland (1901).

If a panel of finely grained white wood such as holly or larch is taken and a line pressed into it with a wheel or tracer, all the wood is still there but merely compressed. In doing so, great care must be taken not to break the fibres. It may be best to dampen the wood with a sponge. By working gradually, deep depressions can be made.

When the pattern is finished, a flat gouge or chisel can be used to reduce the surface to a perfect level. The wood is then dampened or steamed and the compressed outline will swell out in relief above the planed area. This pattern can be outlined when dry and the background decorated with punches.

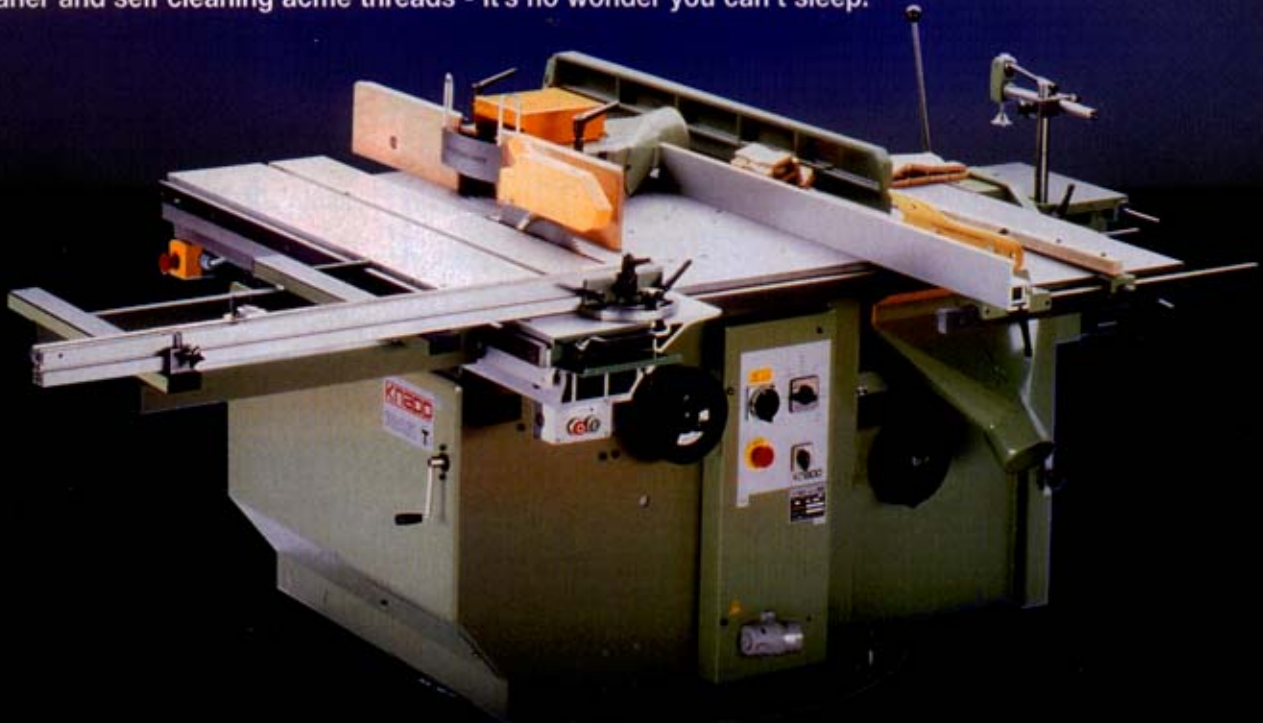
Stephen Copestake, Sedbergh, Cumbria



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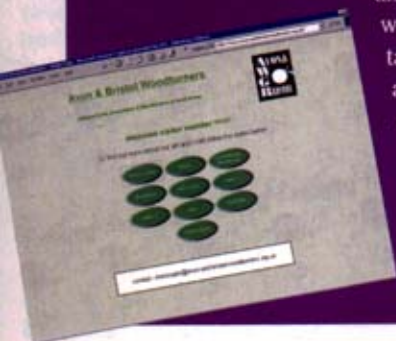
Surf's up

Clicking on more woody websites, Dave Mackenzie sorts the wood from the e-shavings

This month a couple of the sites have been recommended by our readers and the rest caught my eye when I was casually surfing the net, hanging out and passing the time of day.

Avon-and-bristol-woodturners.org.uk/

Avon & Bristol Woodturners started on the 15th February 1989, at a cost of just £5.00! This was the fee required to hire a room at the 'Green Dragon' pub at Downend where 14 people eagerly gathered to further their woodturning knowledge and skill. The club is active in and around Bristol and as well as regular meetings, workshops and seminars, it has taken part in several shows and exhibitions. The site gives a good idea of the activities of the members and features their work in a couple of gallery pages. If you are interested, get in touch through their web site



Vintageminiatures.com/

Vintage Miniatures collectibles were first created by Pennsylvania artist, Mark Motich, in 1985. He has produced models that are both historically accurate and intricately detailed. They are mainly of log cabins and other early American wooden buildings. If you are interested in model houses made from wood and plaster this site is worth a punt.



greenbuilder.com/sourcebook/WoodTreatment.html

An interesting but very technical site for anyone concerned about the impact of wood treatment on the environment. Wood treatment refers to protecting wood from damage caused by insects, moisture, and decay. Three primary methods of wood treatment currently prevail: creosote pressure-treated wood, pentachlorophenol pressure-treated wood, and inorganic arsenical pressure-treated wood. All of these treatment processes involve potentially harmful chemicals.



home.att.net/~iso9k1/bird/patternb.html

Dexter Hansen runs a site that features a number of different hobbies ranging from martial arts to woodcraft projects. I chose the ornament bird section because I liked the subject matter and the instructions are free.



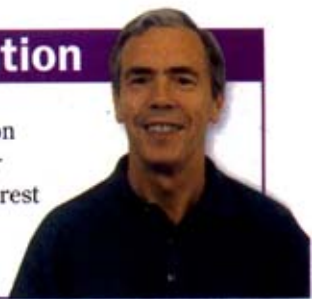
oneoceankayaks.com/index.htm

This is a commercial site that sells amongst other things plans for the construction of high-performance wooden sea kayaks. However there is also lots of information and first-class pictures on the subject, which will make a visit rewarding for anyone who is remotely interested. I must declare a bias here, as I built a wooden canoe many years ago and although at the time I was well pleased with the result it could not bear comparison with the canoes featured here.



Further information

If you would like your site featured on this page or would like to share your favourite woodworking site with the rest of us you can e-mail me at: dave@sawmag.demon.co.uk



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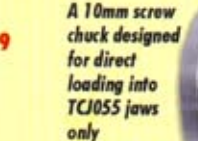
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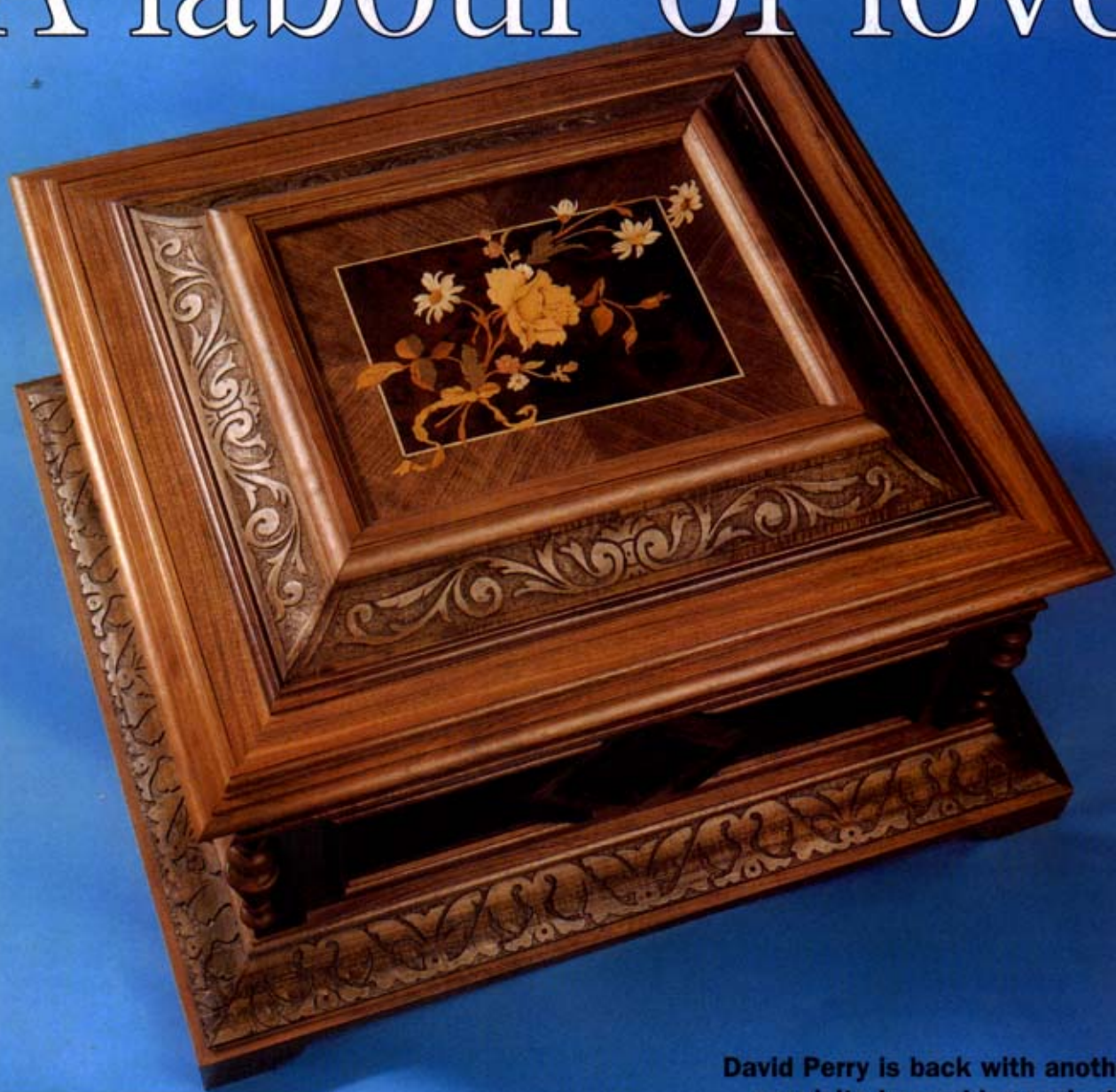
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A labour of love



David Perry is back with another exquisite boxmaking project...

The Polyphon movement in this article is known as Style No. 45, described in the reference books as having 154 teeth in music comb. It uses 39.8 cm discs and a Duplex comb. Sometimes called the "Sublime Harmonic Piccolo" style in Polyphon literature, Style 45 is one of the most beautiful table models ever made. The case is of Walnut with elaborate carving and inlay.

This movement belonged to my wife's grandmother, and had been in the possession of my brother-in-law for the past 20 years. Sadly it had been badly neglected, and was in serious danger of deteriorating beyond repair. No cabinet existed, presumably having rotted away in the damp shed where it was kept. I had long tried to persuade my brother-in-law to part with the movement so that I could have it restored and build

the correct cabinet for it, and eventually, a few months ago, I purchased it from him. Not until I had taken the movement to a specialist restorer, did I realise how bad the damage was. The estimate for full restoration, which included making several missing parts, was £1650! Nevertheless, as the value of the finished article would be far in excess of that, I had the work done, and the transformation was dramatic.

PROJECT

All I had to do now was to make the cabinet. Eventually, I had a real stroke of luck when a friend for whom I do restoration work on musical boxes, gave me the name of someone he thought might be able to help. That someone turned out to have a Style No. 45 cabinet in for restoration, and allowed me to measure it up, photograph it, and take rubbings of the carving.

How to make the carcass

In order that the sound of this instrument is reproduced to its maximum potential; it was crucial to use the correct materials, and to follow the method of construction exactly. Yellow pine, English walnut and lime were the order of the day, and I was fortunate to be able to obtain well-seasoned and matured supplies of these woods.

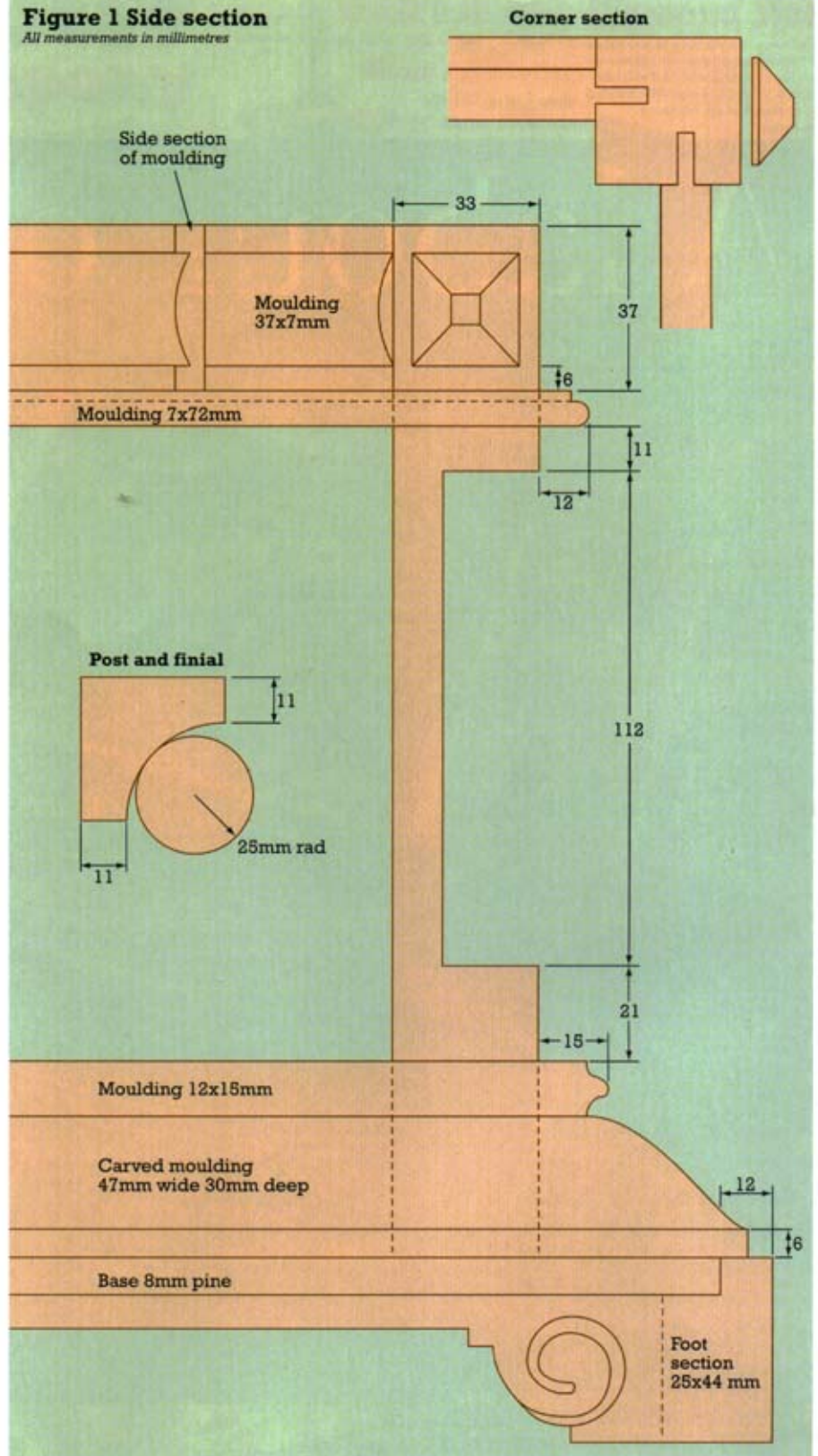
This cabinet consists of three separate sections - the lid, main carcass and base. We begin with the main carcass, which is relatively straightforward in construction. It is made of 12mm yellow pine, which is first cut to size and then veneered, on both sides. The insides are veneered with plain walnut, with a straight grain as you can find. The outsides are veneered with the same veneer, but with burr walnut panels to the front and two sides. The panels are later outlined with moulding. The rear panel is plain walnut without the moulding. Each burr walnut panel is bookmatched, and instead of cutting these in after the ground veneer had been laid, I made up the panels first, securing them with veneer tape, and laid them as one piece. In order to get the burrs flat and supple, I soaked them in boiling water for an hour, and then interleaved them with newspaper and placed them in a bookpress. The paper was changed at regular intervals until the veneers were almost dry. They were then easily worked.

Mortise and tenon carcass

The four sides are joined to 33mm square corner posts by full depth tenons, which should be 4mm wide and centred on the width of the sides. The tenons are

Figure 1 Side section

All measurements in millimetres



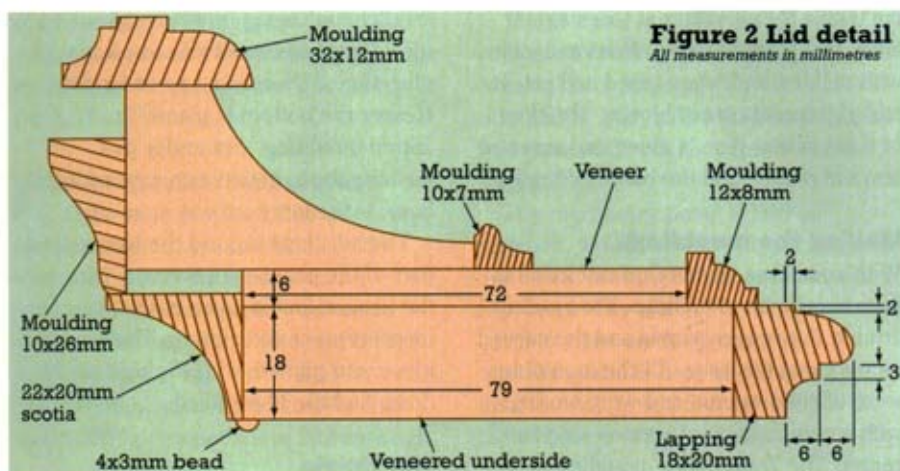
seated 12mm. Into the corner posts. The panels are set back 7mm from the front faces of the corner posts. I cut the tenons on the router table, and as always, when routing across the grain, I scored the veneer with a knife to prevent splintering.

At this stage, I found it best to scrape and sand the panels and applied three

coats of sanding sealer, rubbed down between coats and left ready for final waxing. I also glued and screwed the movement and sound board supports and the base securing battens to their positions on the inside faces, remembering also to drill and countersink the base battens for securing to the bottom board.



David Perry's finished polyphon box – based on an original and featuring a movement restored at a cost of over £1,600.



The corner posts need to be prepared with great care. Mark them up clearly with their front and side edges, and always bear their orientation in mind as you perform the five cutting operations. Begin with routing the two full length grooves to take the tenons. These are

cut on the two inner facing edges. Next, rout two grooves to take the mouldings. One is a 7mm groove, which is 37mm down from the top, and the second is a 12mm groove 30mm up from the bottom. This operation needs to be done on both outside facing edges of the posts, and

should be a snug fit to the mouldings. Finally, from a point 55mm down from the top, for a depth of 112mm, a radiused section has to be cut out to accommodate a turned finial. I must admit that I couldn't think of a mechanical method of doing this while still retaining all my fingers, so I marked off the two ends of the radius and drew a diagonal line across. This gave me a triangular section which I could cut to depth at each end on the bandsaw, and then chisel out the waste. This done, the radius was achieved with carving gouges and a shaped scraper.

Applied to the two outward faces of the posts at the top, are ornamental buttons, 25mm square and 12mm thick. These are cut at 45 degrees and the point is filed off to form the flat. Do not put them on the back of the two rear posts because they would stop the lid opening properly.

PROJECT

Assembling the frame

When satisfied with the fit, it is time to glue up the carcass. As we are dealing with a structure without a base at this stage, you must ensure that you keep it dead square. To do this, I measured the diagonals accurately, and made four rods with right angles at each end, which would fit, into the corners. I put two of these corner to corner on the top and bottom, and pulled the whole thing together with webbing straps, protecting the edges with corner blocks. Excessive pressure was not needed, and with weighted boards across the top to keep it flat, the result was perfect.

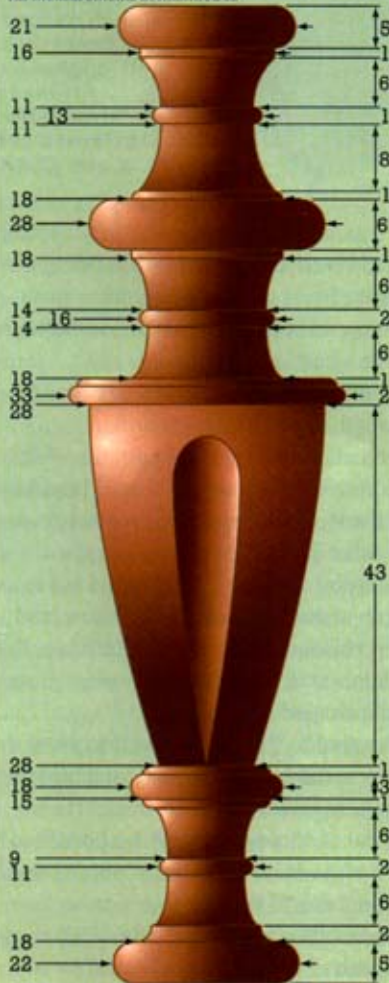
The base

The base consists of an outer framework of 25 x 44mm walnut with a rebate on the top inner edge of 13 x 8mm. The sections were cut to shape on the



Figure 3 Finial

All measurements in millimetres



bandsaw, and finished with files and scrapers. The carving on the feet can be cut with a V-tool, either at this stage or later. The framework is mitred and joined with splines, and when glued and set, I added internal corner blocks. The floor of 8mm yellow pine is glued and screwed into the rebate, and the base is complete.

Making the mouldings

With your base carcass assembled, it is time to add the mouldings, the beading around the veneer panels and the carved moulding at the base. All the mouldings were of solid walnut, and were worked with a combination of scratch stock and router. The 7mm upper moulding is placed in position first. It should fit snugly into the routed grooves and be against the face of the sides. This moulding also provides a platform on which sits the 7 x 37mm convex moulding which takes up the recessed gap between the corner posts. This moulding is plain on the back and sides,

but on the front there is a carved pattern, which surrounds the escutcheon. Again, this was cut with a V-tool. These pieces all stay in place with glue alone. There is no need for pins. Nearer the bottom is placed the 12 x 15mm moulding, and under that, forming the seal between carcass and base, is the large carved moulding.

The beadings around the burr walnut part of the panels sits over the joins in the veneer, and is just a case of careful measurement and cutting. These are glued and pinned, with the pins punched down and the holes filled.

The finials

The finials, which were quite elaborate on this model, were turned from cabbage wood because walnut proved to be too grainy in appearance, which took the eye away from their detail. These finials simply stand in their recesses, and are secured by one screw through the inside of the carcass.

Figure 4 Lid moulding detail



Built up lid

The lid appears to be quite complex, but reference to the diagram shows it consists of seven mouldings built up on a frame. The basic frame is pine, 100 x 18mm, which is lipped with walnut 20 x 18mm, secured with glue and splines. The underside of the frame is then veneered with a nicely figured walnut. This used to be done in different ways such as bookmatched or quartered etc., but this particular example used a continuous run. The moulded edge was formed on the router table. On top of this frame is placed another piece of pine 72 x 6mm, which has a 25mm strip of walnut veneer laid up to its front edge, and another small walnut moulding 12 x 8mm glued around the front edge. This moulding conceals the join below it and stands 2mm proud of the veneer.

Next, a 22 x 20mm scotia moulding is glued to the inside edges of the frame. On top of this montage, and 3mm in from the back edge, sits the large carved moulding. I glued this away from the box, as it was difficult to keep it square. When in place, another small moulding was glued to its front edge, butting against the 25mm strip of veneer, and on its back edge and sitting on the scotia, yet another moulding which provides the support for the picture and marquetry panel.

Marquetry panel and picture

It was this assembly that had me running halfway around Kent. Just where did I find the picture and a pattern for the marquetry? Salvation came when the person who had let me measure up the cabinet he had for restoration, remembered that he had made such a cabinet some 20 years ago,

Rubbings for the carving templates

The large carved mouldings on the lid and base are both in lime. This is a beautiful material to carve, but first you have to shape the mouldings. It was all done with the help of an old round bottomed wooden plane, gouges, scrapers and sandpaper wrapped around suitably rounded objects.

I had taken rubbings of the patterns, which although seemingly the same on all four sides, were in fact slightly different because of the dimensions of the carcass. I had to re-draw the patterns onto tracing paper, and with the use of carbon paper, transferred them onto the shaped mouldings.

I thought that the carving was going to be horrendously difficult, but once into the swing, it became really a matter of patience. I soon discovered that the best method was to cut around the outline with a chip carving knife and then remove the background with mini carving tools. It actually took me three days to complete, which I thought was pretty good. When the carving was completed, the background was punched with ground punches, which gave an almost professional finish. No fools these Victorians.

and thought that he may have had more than one marquetry panel made at the time. I didn't hold out too much hope, but several days later he telephoned to say that he had one. This was a real bonus since it was essential that the pattern and the woods used were entirely authentic. I think you will agree that it is a beautiful thing. I was also very lucky with the picture, which, although used inside the lid of most models made, seemed to be very hard to find. I was eventually put in touch with the President of the British Musical Box Society, who, believe it or not, had a print, which had been made from one of 22 copies taken from the original!

The marquetry panel is laid on plywood, which was counter, veneered, and is the backing for the picture, which is protected by glass. The whole assembly sits on the projecting moulding, and is held in place by the final moulding, which is secured to the top of the carved panel only.

Final finish

There were still a few operations to carry out. The top edge of the carcass had to be veneered, and I had noticed that on the original, the joints had telegraphed through. Therefore I cut some 2mm veneer on the bandsaw, which should prevent that occurring. When this had been applied, I cut in the lock and the hinge positions. You have to be very careful here, as the bottom hinges are treated normally as regards depth and protrusion, but because the lid overhangs the carcass all round, the top leaves of the hinges are sunk in. Position is therefore critical. When successfully fitted, add a lid stay.

Now, before fitting the movement, I had to establish the exact position of the winding handle and the on/off lever. I quickly knocked up a dummy panel, and tested that for fit before proceeding. Fortunately, it all worked out correctly, and I was able to insert the movement, which sits on two bearers and is secured by two screws at each end.

Figure 5 Base moulding detail



Straight cutters

Beauty is more than skin deep when it comes to router cutters. David Martin ploughs through 600mm of chipboard and Gervais Sawyer puts the 'dirty dozen' under a microscope. Here are the results

When you get a new router cutter catalogue, do you skip over the straight

cutter section and marvel at the latest Roman Ogee or Lambs Tongue

Sash Bar cutter? Well, you're not alone but what you have skipped is the workhorse of the router cutter world.

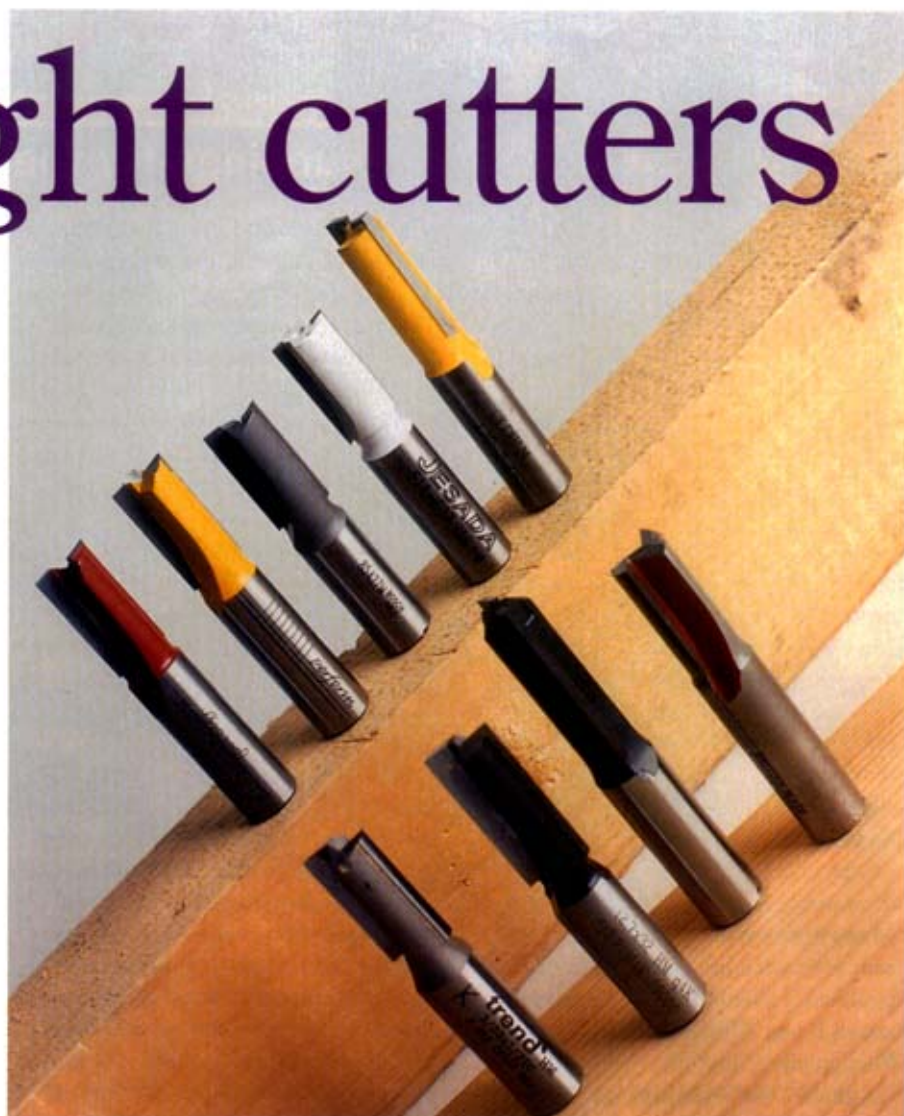
The humble straight cutter can be used to cut mortise and tenons, half-lapped joints, bridles, through and stopped housings joints, box comb joints, dovetail pin sockets, grooves for fixed and liding panels, grooves for inlays, hinge recesses, copy profiling using templates, trimming laminate edges, jointing post-formed work tops and it will even cut the hole for the proverbial kitchen sink.

The price of this versatility is a bewildering range of prices, shank sizes, cutter diameters, blade lengths and terminology. This review is an attempt to shed some light on these issues. In addition, twelve different makes of straight router cutter have been tested to see if you get what you pay for.

In the following descriptions the 'bottom end' of a router cutter refers to the portion nearest the tip whilst 'top end' refers to the portion nearest the shank.



We tried a dozen of the top brands for our test



Non stick coatings

A number of brands have brightly coloured non-stick coatings applied to the part of the cutter body above the shank. These coatings are designed to minimise the build up of residues on the cutter. However, unless very oily or very resinous timbers are being machined, this should not normally be a problem.

As residue build up is more likely to occur on the blade itself, all brands of cutter (with or without non-stick coatings) will benefit from being sprayed with a lubricant such as a PFTE spray before being used.

Shank diameter

The most common shank diameters used in the UK are 1/4in and 1/2in with the metric sizes 8mm and 12mm becoming

more common. Other sizes less widely available are 6mm and 3/8in.

Always try to use the largest shank diameter available as this will minimise chatter, breakages and give a better grip in the collet. It is also worth bearing in mind that if the diameter of the straight cutter is equal to or less than that of the shank, it will be impossible to hone the full length of the cutter blades.

Shank length

The shank is the part of the cutter below the blades which is gripped by the router's collet. It therefore needs to be in good condition. Normally, at least two thirds of the length should be in the collet (*see this month's Saw Doctor*) but make sure that it does not actually touch the bottom of the router's drive shaft. Shank lengths vary greatly between manufacturers and cutter types. Some

Test sample shank lengths varied greatly



types of cutter are made with extra long shanks for deep working. The temptation to use the shank as a means of increasing the working length of a cutter by placing only a small part of it in the collet should be resisted as it risks the cutter becoming loose. Instead, invest in a cutter with a longer blade.

Cutter blade length

Always choose the shortest length that will do the job. Paying for unused blade length only wastes money and increases the chance of chatter and a poor finish.

Shear angle

When hand planing hardwoods or wild grain, the finish is often improved and the effort reduced if the plane is skewed so that it cuts with a slicing action. A router blade with shear angle achieves the same results - a smoother cut with a better finish. To achieve a shear angle the blade on a cutter is set at an angle relative to the centre line of the cutter body. Either a negative or a positive shear angle can be set depending upon whether the cutter is designed to produce a clean cut on the top or bottom edge of the workpiece. More common terms used for the shear angle on straight cutters are up-cut and down-cut. Up-cut blades cut with an upwards slicing motion to produce a fine bottom edge finish whereas down-cut blades work in reverse.

Anti-kickback

Cutters incorporating an anti-kickback or chip limitation design reduce the risk of the workpiece or router being kicked back by limiting the depth of cut made by each revolution of the cutter. This is

achieved by restricting the distance that the blade protrudes beyond the cutter body to no more than 1.1mm.

The need for an anti-kickback design becomes increasingly important the larger the diameter of the cutter.

BLADE TYPES

High speed steel

Straight cutters made from high speed steel are available from a number of manufacturers. These cutters, when freshly honed, produce a very fine finish and are often used for inlay work and cabinet joint work. The drawback to HSS is that it loses its edge very quickly and so is only suitable for softwoods and non-abrasive hardwoods - definitely not for chipboard, ply or MDF.

TCT

Tungsten Carbide tipped router cutters are the most common type available and are the first choice for the majority of router users. They are manufactured by brazing tungsten carbide blades onto a steel cutter body and, although more expensive, they last much longer than HSS cutters.

TCT cutters are able to cope with the rigors of manufactured boards such as MDF, Ply and MFC, and with abrasive hardwoods. They will not produce as fine a finish as a correctly sharpened HSS cutter. TCT cutters can usually be re-sharpened several times and honed in-between using a ceramic or diamond stone.

Solid tungsten carbide

Because of the brazing process it is not always practicable to make small diameter TCT cutters, so some ranges of small diameter straight cutters are made entirely from Tungsten Carbide. Another use for STC is the spiral cutter (see below) where again it would not be practicable to use a TCT.



Choosing the right feed speed

Low router speed and/or low feed rates actually cause router cutters to wear more quickly. This is because at low speeds the blade is making smaller cuts and thus making more cuts per mm than at higher speeds. Having said that, the problem is what speeds should be used? Router speeds should be set within the following ranges depending upon the size of the cutter and barring any specific advice from the cutter manufacturer:

- up to 25mm - 24,000rpm
- 25 to 50mm - 18,000rpm
- 51 to 75mm - 16,000rpm
- 76 to 100mm - 12,000rpm

As for feed speed, with manually operated routers the best advice is if it sounds, feels and looks right then it probably is right! If either the sound or feel changes, stop and check to see if the cutter has lost its edge or become damaged. The chippings are not being cleared away or the cutter has become loose in its collet.

If burning is a problem then, assuming the cutter is sharp, try increasing the feed rate. If this does not work, or is not practicable, then try again by reducing the router speed. Burning often occurs on curves or corners when the natural tendency is to slow down. Another cause of burning is when you stop feeding the cutter to change position when working on a long or large workpiece.

Blade materials

High speed steel(HSS)

High speed steel has long been used to make cutting tools. Various grades and hardnesses are available. Uses for HSS include machine planer blades and woodturning tools as well as router cutters. HSS steel retains its edge at higher temperatures than other types of tooling steel. It can be honed razor sharp although it loses its edge quickly when used to cut abrasive materials.

Tungsten carbide(TC)

Tungsten carbide is a very hard material which makes it ideal for a whole range of wood cutting tooling - saw blades, spindle moulder cutters and router cutters. As well as being very hard, TC is also brittle so cutter tools utilising TC need to be handled with care to avoid chipping the cutting edge.

TC is manufactured by moulding the metal powder carbide with binding mixtures at high temperatures and pressures. The binder mixtures contain tungsten and other metals such as cobalt and titanium. Thus TC is composed of a matrix of carbide grains and binders. In simple terms wear occurs as the grains of carbide break away from the binder. In theory this means that the smaller the carbide grains are the stronger the matrix will be - the grains will be packed closer together and so there will be less binder surrounding each one. Finer grains should also mean that wear occurs at a slower rate than with larger grains.

Polycrystalline diamond (PCD)

Polycrystalline diamond applied to cutting tools produces an extremely hard wearing and durable cutting edge. As well as router cutters, PCD is also used for saw blades. Tools utilising PCD are extremely expensive to produce but last for a very long time and so are aimed at large scale production environments.

WHAT TYPE OF CUTTER SHOULD I BUY?

Single flute

Generally, single flute (one blade) cutters are used for free-hand work and have a limited size, range and availability. They have higher feed rates, better chip clearance and greater strength than two flute cutters but the finish is poor.

Availability of cutter types

Single flute

Bosch, Freud, KWO, Perform, Titman and Trend

Twin flute HSS

Bosch, Freud, KWO, Perform, Titman and Trend

Twin flute TCT

All brands

Replaceable tip

KWO, Titman, Trend and Wealden

Spirals

CMT (STC), Freud (STC), Jesada (STC), KWO (HSS), Titman (CNC use only) and Trend (HSS & STC)

Pilot trim

All brands except Screwfix and Viper

Bottom bearing-guided

All brands

Top bearing-guided

All brands except Makita and Screwfix

Mortising

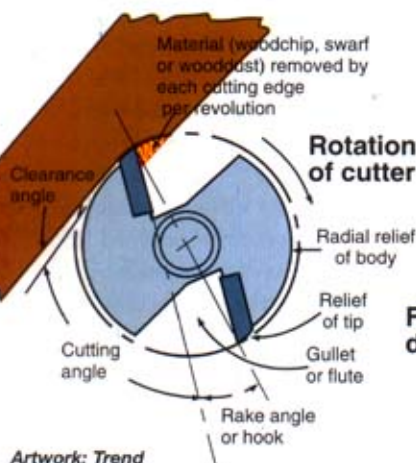
Bosch, CMT, Jesada, Perform and Viper

Tenoning

CMT, Jesada and Wealden

Rebating

All brands except Makita



Artwork: Trend

Disposable tip

Disposable tip cutters have TC blades that, when worn or damaged, can be easily replaced whilst retaining the original cutter body. Although the initial cost of this type of cutter is higher than

that of an equivalent TCT or STC cutter, the cost is offset by the relatively low price of replacement blades. The blades themselves, because they do not have to be brazed onto the cutter body, are made of much harder grade of Carbide which gives them a prolonged life. So, if you frequently use the same size straight cutter consider buying a disposable tip version next time it needs replacing.

Polycrystalline diamond coated cutters

The PCD coating is usually applied to a TC blade. Because of the nature of PCD coated router cutters they are only recommended for use in CNC controlled routers where the correct feed speeds can be maintained. They are also very expensive!

Not just a trade tool: spirals are a real alternative for many applications



Twin flute

With two blades, the twin flute cutter provides a superior finish to the single flute and is the type generally used.

Spiral cutters

Spiral cutters, I suspect because of their price and association with CNC use, have not really taken off in this country. This is a great pity because for many straight cutter operations they offer faster working, less vibration, superior finish, more efficient chip clearance and a much extended life.

The spiral cutter takes the shear angle blade concept to the extreme. The blades are formed from two helical shaped flutes winding round the cutter.

Unlike normal straight cutters, a spiral cutter always has a cutting edge in contact with the workpiece. Because of their shape it is not practicable to make TCT spiral cutters - instead they are machined from either solid carbide or high speed steel.

There are three variations of spiral cutter - Up-cut, Down-cut and Up-Down cut.

Up-cut or right hand spiral cutters pull waste upwards from the cutter tip. This makes them ideal for deep mortising and grooving operations where waste removal would otherwise be a problem. The upward cut does, however, leave a slightly frayed top edge but the bottom edge has a fine finish. Because the waste is ejected upwards, eye and face protection are essential. A further side effect of the up-cut action is to exert an upward pulling force on the workpiece so it must be firmly clamped down, double-sided sticky tape is out. If used inverted in a

Health & Safety

Routers are noisy and produce prodigious quantities of dust and chippings. Both these factors can pose serious health risks. To minimise these risks use a battery powered respirator with a face shield, ear defenders and dust extraction. This may seem a 'belt and braces' approach but how many eyes and lungs can you afford to damage? Using blunt cutters will considerably increase both noise and dust levels and be particularly careful when cutting manmade sheet materials and known toxic timbers.

As yet there are no compulsory UK or European design and safety standards for router cutters unlike spindle tooling which must comply to chip limiting standards by December 2003. There is, however, a non-mandatory design standard EN847-1 (1997) which can be applied to router cutters and two further provisional design standards covering shanks (psEN847-2) and collets (psEN847-3).

For Germany the Munich based Holz BG Institute has developed a series of standards and certification tests which incorporate design and safety features relating to a wide range of round bodied tooling including router cutters. It is very likely that the Institutes's tests will eventually form the basis of a European wide set of design and safety standards. In the meantime manufacturers are free to submit cutters on a voluntary basis to the Holz BG Institute for certification and to adopt the relevant EN847 design standards.

Of the cutters reviewed, Freud, KWO, Titman and Trend state adoption of EN847 design standards and/or Holz BG test certification. It should also be pointed out that any manufacturer of router cutters has a vested interest in making them as safe as possible, particularly if they are trying to sell into the professional user market.

SAFETY TIPS

- Try to avoid using collet reducing sleeves as they do not grip the cutter as securely and can damage the collet.
- Never over tighten collet locking nuts.
- Keep collets clean so that they and the cutter are seated properly.
- Check collets regularly for signs of wear/damage and replace if seen.
- Ensure that at least two thirds of the shank length is inserted into the collet but do not bottom the cutter in the router spindle.
- Make deep/wide cuts in stages.
- Check that the router spindle speed is safe for the diameter of the cutter being used - for larger diameter cutters (over 25mm) always check with the supplier if details are not supplied with the cutter.

router table, this force then becomes beneficial as the workpiece is pulled down onto the table.

Down-cut Spiral cutter operates in the opposite fashion to the up-cut one. Waste is pushed downwards so leaving a fine top edge to the cut whilst the bottom edge may be left slightly frayed. This

downwards force also pushes the workpiece down so making it safer when cutting small or odd-shaped workpieces held using double-sided tape or non-slip mats.

If you want both top and bottom edges to be fine cut then the Up-Down cut Spiral cutters offer the perfect solution.

GIANT TEST

The top half of the blades has a down-cut spiral whilst the bottom half has an up-cut spiral. Waste removal doesn't seem to be a problem.

Plunge/bottom cut

If a straight cutter is to be used for boring type operations such as mortises, it must have a 'plunge capability'. That is, the tip must be able to cut down into the material. Most makes of straight cutters now have this capability as standard but do check with the supplier if in doubt.

Several different techniques are used to provide the plunge capability. Some manufacturers simply extend the cutter blades beyond the tip of the cutter body - this only works if the cutter is also moved laterally otherwise it 'grounds' on the flat tip. Others grind the end of the cutter body to provide a cutting edge between the two blades, whilst for the best plunge action a separate Tungsten Carbide cutter is brazed across the end of the cutter body between the main blades.

Pilot-guided

Pilot guided cutters, also referred to as pierce and trim, laminate trimmers or panel pilot, have a non-cutting section below the blades which is the same diameter as that of the blades. This tip is used to 'pilot' the cutter along a template or the edge of the baseboard as when trimming the plastic laminate on a work top. Most of these cutters are made from solid carbide as they are made in small diameters. This type of cutter is not designed for long runs, a fact reflected in their price.

Some pilot guided cutters have sharpened points so that they can first pierce through the workpiece - referred to as pierce and trim.

Bearing-guided

Bearing guided cutters use an enclosed ball bearing race to guide the cutter along the workpiece or template. Most ranges of this type of cutter offer the choice of either top or bottom mounted bearing to allow for workpieces mounted, on or under a template. The ball bearing race eliminates the friction associated with a pilot guided cutter and gives a smoother action and generally produces a better finish. However, bearing-guided cutters are more expensive than a pilot-guided cutter and are not available in such small diameters.

Bearing-guided cutters are referred to by a mind blowing range of names such as Bearing Flush Trim, 90 degree Trimmers, Template Trim, Panel Trim, Pattern Trimmer, Trimming Profiler, Template Profiler, Rebate cutters, Tenon cutters, Planner cutters and Hinge mortising cutters.

Bearing-guided trimmers

The main feature of this group of cutters is that the bearing is of the same diameter as that of the blades (actually, the bearing is very slightly larger to avoid the risk of the cutter scoring the template). This means that the cutters can be used to trim plastic laminate and veneer edges flush with the baseboard using the baseboard itself as the template. Trimming cutters are available

The Verdict...

You can clearly see that on many cutters the tips are chipped. This can only be a grinding fault, as they were only cleaned in a degreasing solution. Others have rather coarsely ground edges. The Makita bits have the sharpest edges but are let down by the chipped tips. The final finish is important, particularly on the MDF. During the first period of cutting a little abrasive wear occurs and the edge settles down to a small radius. Since the carbide grains are little more than a micron, one should expect better edges than this.

Most of the bits have a flat end to the cutters or very slightly bevelled, but the Bosch has a full a 10in bevel. How this affects performance I am not sure.

It was interesting to note that in most cases, the abrasive wear was more from chipping than pure abrasion which would suggest that the grade of carbide is too hard for this application, although it may perform well in MDF or solid wood. The Viper bit was superior in every way. Not only was the initial edge very sharp but the wear was minimal. In some cases, the cutting edges were chipped as new, but this seems to have had little effect on the mode of wear.'

Gervais Sawyer

with either top or bottom mounted bearings and in up-cut and down-cut versions.

Although non-bearing guided straight cutters can be used for template work using guide bushes, the use of a trimming cutter means that the template is made to the exact size of the finished article rather than having to take the guide bush offset into account.

Bearing-guided rebaters

Rebate cutters have a bottom-mounted bearing and usually a down-cut shear angle. The bearing diameter, smaller than the diameter of the cutter, controls the width of the rebate relative to the edge along which it runs whilst the down-cut shear angle ensures a clean shoulder. Rebate cutters tend to be squat and have a fairly large diameter. Such

Thanks to FPRC...

The diameter variation chart shown on p27 and all the micrograph scans shown on these pages were produced by Gervais Sawyer of The Forest Products Research Centre (FPRC). The Centre was established in 1996 and it is now the largest academic department in the UK's university sector that specialises in wood science. The FPRC conducts research, supplies consultancy services and provides training. Its services are organised into three groups: Wood Protection, which conducts research on the biodeterioration and preservation of wood in both the terrestrial and marine environments; Wood Materials, which investigates the physical and mechanical properties of wood and wood-based products; and Environmental monitoring, which studies the environmental impacts of the wood growing and wood using industries. The centre offers a wide range of courses from bespoke training sessions to PhD studies.

WOODWORKER STRAIGHT BIT SURVEY

Make	Origin	Stated size	Dia at tip	Dia 10mm from tip	Dia 20mm from tip	Shank dia	Comments	Package
Bosch	USA	1/2"	12.71	12.73	12.73	12.66	10 degree bevel on tip	Bubble pack
CMT	Italy	1/2"	12.68	12.69	12.67	12.64		Acrylic box
Freud	Italy	1/2"	12.8	12.83	12.83	12.65		Bubble pack
Jesada	USA	1/2"	12.71	12.74	12.72	12.68	Teflon coated and limited chip, anti-kick back design	Large acrylic box
KWO	Unknown	12.7	12.79	12.81	12.75	12.66		Soft wallet
Makita	Japan	1/2"	11.88	11.98	12.02	12.65		Bubble pack
Makita	Japan	10mm	9.96	9.94	9.93	12.65		Bubble pack
Perform	Unknown	Not stated	12.67	12.71	12.7	12.66	Teflon coated and reference lines on shank. Superior finish	Soft wallet
Screwfix	Unknown	12.7mm	12.7	12.74	12.74	12.65		Bubble pack
Titman	UK	1/2"	12.66	12.66	12.66	12.67	Claims to have a centre point but doesn't	Wallet & tube. Convenient Good tips booklet
Trend	UK	12.7mm	12.76	12.75	12.76	12.65		Soft wallet
Viper	USA	1/2"	12.69	12.67	12.67	12.65	Teflon coated and limited chip, anti-kick back design	Large display pack
Wealden	UK	12.7mm	12.66	12.72	12.73	12.66	Superior finish. Has a separate carbide centre cutter	Plastic tube. Convenient

All dimensions in mm unless otherwise stated

cutters are often sold with a set of different diameter bearings to produce a range of rebate widths.

Bearing-guided tenoners/planers

Tenon/planer cutters combine large shear angled tip cutters (down shear) with down-cut shear angle blades. When

used to cut tenons this type of cutter produces exceptionally clean shoulders and smooth tenon faces. Such cutters can also be used, with a suitable jig, to surface plane stock. Confusingly, this style of cutter can also be referred to as mortising cutters or hinge/lock mortising cutters.

Our test rig

The trimming was done on a spindle moulder using a high speed router shaft.

This means of testing was chosen as the spindle moulder offered very good dust extraction, a large table and a quiet motor able to run for the hours it took to reduce 600 metres x 15mm x 3mm of chipboard back to chips.

The chipboard was hand fed through the cutters which allowed some sense of 'feel' for how well individual cutters were performing. Hand feeding is also more representative of how most routers are actually used. However, to avoid too many subjective judgments being made, the twelve cutters were first

electron micrographed, tested and then re-micrographed so that the scale of wear could be identified.

Dave's test rig: a Felder universal with router spindle and plenty of guarding

THE TEST

The test part of this review consisted of using each of the twelve straight TCT cutters to trim 3mm off the edge of 50 metres of 15mm chipboard. Chipboard was chosen as it is one of the best materials to quickly produce wear on a cutting edge.

Each cutter tested had a 1/2in diameter shank. Shank lengths varied between 25mm (Makita) and 40mm (Titman). All cutters had a blade diameter of 12.7mm (1/2in) except Makita with 12mm. Most had blade lengths of 25mm or 25.4mm with Makita at 30mm, KWO & Viper at 32mm and Wealden at 35mm.

It is important to appreciate that like is not being compared with like in these tests. Some of the cutters come from budget ranges where one would expect more wear to occur than on cutters from industrial ranges. However, the tests will provide comparisons between cutters within a certain price band.

Note: subjective terms such as medium, thick, good etc. are based on comparisons made within this group of cutters.



BOSCH

Robert Bosch Ltd.,
Denham,
Uxbridge.

Medium-sized
range of cutters
included in their
Power Tools
Accessories
catalogue.

**For nearest
distributor/
catalogue:**
01895 838743

**For technical
advice:**
01895 838402

Cutter tested:
Ref 85427M
Price £28.48

Packaging:
Bubble pack
Shank length:
30mm
TC Blade width :
4.75mm
**TC Blade
thickness:**
Medium
Blade finish:
Very Good
Test run:
Cut very smoothly
throughout test
run.

CMT

Available from
The Woodcut
Trading Company,
Bexhill-on-sea,
East Sussex

Good range of
cutters, plus
advice, drilling,
boring and spindle
moulder tooling.

**For mail
order/catalogues:**
0800 378027

**For technical
advice:**
01424 819903

Cutter tested:
Ref 811-627
Price £12.00

Packaging:
Acrylic box
Shank length:
33mm
TC Blade width:
5mm
**TC Blade
thickness:**
Thick
Blade finish:
Very good
Test run:
Cut smoothly
throughout test
run.

FREUD

Freud Tooling UK
Ltd.

Comprehensive
range of cutters.
Catalogue also
includes saw
blades, power
tools, accessories
and spindle
moulder tooling.

**For nearest
distributor/
catalogue/
technical advice:**
0113 2453737

Cutter tested:
Ref 12-116
Price £16.18
incl. VAT

Packaging:
Bubble pack
Shank length:
38mm
TC Blade width:
5mm
**TC Blade
thickness:**
Very thick
Blade finish:
Very good
Test run:
Cut smoothly
throughout test
run.

JESADA

Available from the
Axminster Power
Tool Company,
Axminster,
Devon.

Good range of
cutters included as
part of APTC's
mail order
catalogue.

**For mail
order/catalogues:**
0800 371822

**For technical
advice:**
01297 33656

Cutter tested:
Ref 611627
Price £12.28

Packaging:
Large acrylic box
Shank length:
36mm
TC Blade width:
3mm
**TC Blade
thickness:**
thick
Blade finish:
Very good
Test run:
Started smoothly
but felt a little
rough towards
the end.

KWO

Kwo Tools(UK)
Ltd., Tonbridge,
Kent

Good range of
cutters. Catalogue
also includes
drilling and boring
tooling,
and spindle
moulder tooling.

**For nearest
distributor/
catalogue/
technical advice:**
01732 364444

Cutter tested:
Ref 27615
Price £11.42

Packaging:
Soft plastic wallet
Shank length:
35mm
TC Blade width:
4.5mm
**TC Blade
thickness:**
Very thick
Blade finish:
Very good
Test:
Cut smoothly
throughout test
run.

MAKITA

Makita (UK) Ltd.,
Milton Keynes,
Bucks.

Small range of
cutters included in
their main power
tool catalogue.

**For nearest
distributor/
catalogue/
technical advice:**
01908 211678

Cutter tested:
Ref 793088-4
Price £20.70

Packaging:
Bubble pack
Shank length:
25mm
TC Blade width:
4mm
**TC Blade
thickness:**
Medium
Blade finish:
Good
Test run:
Cut smoothly at
first, then began
to feel & sound
rough after
about 30 meters.



PERFORM

Available from the Axminster Power Tool Company, Axminster, Devon.

Good range of cutters included as part of APTC's mail order catalogue.

For mail order/catalogues:
0800 371822

For technical advice:
01297 33656

Cutter tested:
Ref P104451A
Price £8.15

Packaging:
Soft wallet

Shank length:
38mm

TC Blade width:
4.5mm

TC Blade thickness:
Medium

Blade finish:
Very good

Test run:
Cut smoothly to start with but began to feel & sound rough after about 25 meters.

SCREWFIX

Screwfix Direct, Yeovil, Somerset.

Small range included in Screwfix Direct catalogue which also includes routers and a few routing accessories

For mail order/catalogues:
0500 414141

Cutter tested:
Ref 3987
Price £6.99

Packaging:
Bubble pack

Shank length:
38mm

TC Blade width:
3.5mm

TC Blade thickness:
Thin

Blade finish:
Fair

Test run:
Fairly smooth to start with but started feeling and sounding rough after about 20 meters.

TITMAN

(Industrial Range)

Titman Tip Tools Ltd., Clacton-on-Sea, Essex

Big range. Catalogue also includes details of the cheaper Tipcut Range and routing accessories. Separate catalogue details the Pine Cut range developed for softwoods.

For nearest distributor/catalogue:
01255 220123

For technical advice:
01255 421912

Cutter tested:
Ref H121*1/2
Price £17.10

Packaging:
Soft wallet with plastic tube

Shank length:
40mm

TC Blade width:
5mm

TC Blade thickness:
Very thick

Blade finish:
Very good

Test:
Cut very smoothly throughout test.

TREND

(Professional Range)

Trend Machining & Cutting Tools Ltd., Watford

Comprehensive range. Catalogue also includes lots of advice, details of the lower priced Tradesman & craft ranges, saw blades, drilling and boring tooling, routers and accessories.

For nearest distributor/catalogue:
0800 487363

For technical advice:
01923 224681

Cutter tested:
Ref 3/08x1/2TC
Price £19.45

Packaging:
Soft wallet

Shank length:
35mm

TC Blade width:
5mm

TC Blade thickness:
Thick

Blade finish:
Very good

Test run:
Cut very smoothly throughout test run.

VIPER

Made by Oldham and available from Tilgear, Cuffley, Hertfordshire.

Small range available in the UK.

For mail order/catalogue/technical advice:
01707 873434

Cutter tested:
Ref 120-2-DFS
Price £11.46

Packaging:
Large plastic pack

Shank length:
38mm

TC Blade width:
4.5mm

TC Blade thickness:
Very thick

Blade finish:
Very good

Test:
Cut smoothly throughout test run.

WEALDEN

Wealden Tool Company, East Peckham, Kent

Comprehensive range including drilling/boring tooling, spindle tooling and circular saw blades. The Catalogue also has an excellent section on cutter care.

For mail order/catalogues:
0800 3284183

For technical advice:
07000 565

Cutter tested:
Re T1412.7m
Price £13.20

Packaging:
Plastic tube

Shank length:
38mm

TC Blade width:
4mm

TC Blade thickness:
Thick

Blade finish:
Very good

Test run:
Cut very smoothly throughout test run.

GIANT TEST

All micrograph scans at 150 magnification

BOSCH

Light wear on used tip but heavy abrasion on edge

New tip



Used tip



Used edge



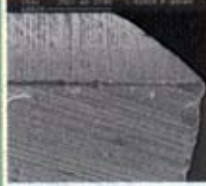
CMT

New tip slightly chipped. Used edges shows moderate abrasion

New tip



Used tip



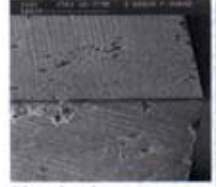
Used edge



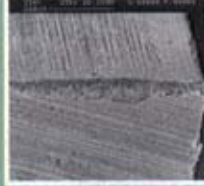
FREUD

Moderate abrasion on used tip and edge

New tip



Used tip



Used edge



JESADA

Moderate wear on both tip and edge

New tip



Used tip



Used edge



KWO

Only light abrasion to tip. Moderate on edge

New tip



Used tip



Used edge



MAKITA

Tip shows light abrasion. moderate to heavy on edge

New tip



Used tip



Used edge



PERFORM

New tip mis-ground. Chipping on used tip. Moderate wear on edge

New tip



Used tip



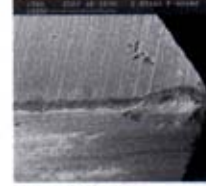
Used edge



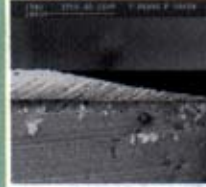
SCREWFIX

Light wear on tip. Moderate to heavy abrasion on edge

New tip



Used tip



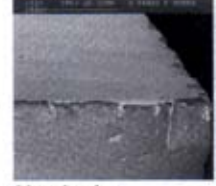
Used edge



TITMAN

Light abrasion to edge. Tip chipped but only moderate abrasion

New tip



Used tip



Used edge



TREND

Light/moderate abrasion on edge ant tip

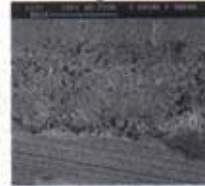
New tip



Used tip



Used edge



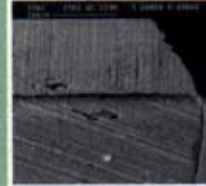
VIPER

Light tip wear, good edge wear

New tip



Used tip



Used edge



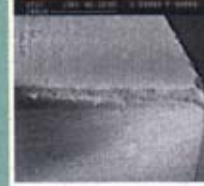
WEALDEN

Light wear to tip, moderate on edge

New tip



Used tip



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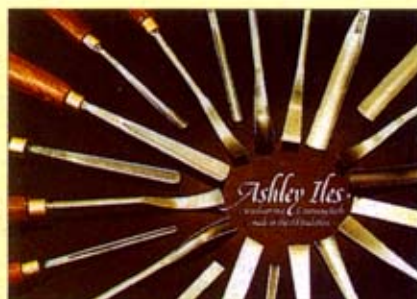
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Safety boots

JCB Grafter

Price: £75

Pacific Brands: 01925 212212

Like their excavators, JCB boots are hard to ignore. Large and businesslike with heavily treaded Goodyear welted soles, these boots will survive the worst conditions. Made from light tan oil nubuck leather they are smart and easy to clean. The tongue and collar are deeply padded and the inside is lined with Cambrelle, for odour resistance and comfort. Comfortable to wear with stiff supportive soles. Sizing is generous, leaving room for thick socks. A stylish boot offering great protection.



Until recently, safety boot makers seemed to think that we all shared Hermann Munster's taste in footwear. However, the use of modern materials and manufacturing techniques means that a wide range of pretty stylish boots and shoes is now available, catering for a variety of uses. All the examples featured here have steel toecaps with a 200 Joule rating, and anti-static, solvent-resistant soles. Some even have odour absorbent inner soles. They all comply to BSEN 345. These boots are made for working...by Andy Standing

Dickies Tradition Boot

Price: £45

Dickies: 01761 419419

The Tradition is a particularly smart looking boot with a Goodyear welted sole and high quality leather upper. The padded collar is picked out in a contrasting colour to the rest of the boot. This boot comes from the Deluxe range and features a breathable Cambrelle lining. The sole is deeply treaded providing a good grip. This boot has a neat lacing system, with metal 'D' rings instead of eyelets at the top, making the boots easy to get on and off. Overall, a smart and comfortable boot at an attractive price.



BEST BUY

Dr Martens 4 Eyelet Safety Chukka Boot

Price: £46.49

Dr Martens: 01933 653111



The ever popular 'DM' boot in safety guise. Made in matt leather finish with padded ankle protection. Excellent air cushioned sole provides comfortable support and impact absorption. The steel toe cap is rather bulbous, but the whole boot is surprisingly light. The leather upper is soft and pliable and the sole also flexes easily making this a good boot for those who need to kneel down. Overall, a soft and comfortable choice.

De Walt Safety Trainer

Price: £46.98

De Walt: 01753 567055

For those who want foot protection but without the weight of a boot, a trainer could be the answer. The DeWalt is a contemporary looking trainer with a light composite sole and leather and fabric upper. The inside is generously padded and lined with an anti-odour inner sole. The steel toe cap is unobtrusive and the sole is well-shaped and supportive. The laces run through plastic guides for easy tightening. These particularly impressed the children. As my young son said, 'You could run the London Marathon, and then go and do some work.'

De Walt Midi Safety Boot

Price: £39.99

De Walt: 01753 567055

The Midi boot from DeWalt has a very similar sole to the Dickies Tradition, though feels somewhat stiffer. Smartly made in shiny black leather with the bright yellow DeWalt logo, these boots will no doubt be popular on site. The interior is deeply padded and insulated for warmth. The collar is also padded as is the tongue. The quality of manufacture is high with plenty of strong stitching and a fabric pull tab on the back. Overall a solid boot ideal for cold winter days.



Dickies Legend Safety Trainer

Price: £30

Dickies: 01761 419419

A trainer for those who prefer their shoes to be leather. With a slim profile and a snug fit these trainers would be ideal for jobs such as roofing and are also comfortable for driving. The collar and tongue are well padded and the sole is comfortably contoured to give good support. They are robustly made with good stitching, though supplied with rather short laces. Well priced.



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PLANING BEDS L X B	1090 X 260 MM	1090 X 260 MM	1240 X 310 MM	1700 X 410 MM
MATERIAL PLANING BEDS	CAST ALUMINIUM	CAST ALUMINIUM, HARDENED	CAST IRON	CAST-IRON
DEPTH OF CUT - PLANING	0 - 3 MM	0 - 3 MM	0 - 3 MM	0 - 5 MM
THICKENING BED L X W	400 X 260 MM	400 X 260 MM	550 X 310 MM	670 X 405 MM
MATERIAL THICKENING BED	CAST ALUMINIUM/STAINLESS STEEL	CAST ALUMINIUM/STAINLESS STEEL	GREY CAST-IRON	CAST IRON
THICKNESSER FEED RATE	5M PER MIN	5M PER MIN	5M PER MIN	7M PER MIN
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Woodworker of the Year 2000

Dr Brown, winner of this year's Woodworker of the Year title and a trip for two to Sweden



Congratulations to Dr Aubrey Brown of Ballycastle, Co. Antrim - our Woodworker of the Year 2000. Aubrey is a lifetime woodworker who has 'made everything in the house except the TV and the fridge.' Pictured right is his spectacular veneered table (also an entry in the competition) but the clear winner was Aubrey's elliptical desk inspired by Thomas



Sheraton's design for a library table. Dr Brown's adaptation of Sheraton's 18th century piece is based on an elliptical carcass constructed from vertical pinewood staves veneered and counter-veneered with English walnut.

The plinth was built-up in the traditional 'brickwork' fashion, the end-grained bricks blinded with a 1/16in veneer of birch aero plywood and

then veneered with walnut. The desk top, meanwhile, is Imbuya hardwood blockboard, crossbanded with Irish ash veneer around a tooled hide covering.

There are 19 drawers, eleven on the front and eight on the rear (not forgetting the cupboard in the kneehole and a concealed compartment that's, well, concealed), and every one of their curved fronts is hand-dovetailed to their sides.

All in all, it's a substantial piece of furniture - as its 12 castors testify - and an outstanding winner. We will be featuring the project in a future issue.

COMPETITION

Our runners-up all receive boxed sets of Sandvik professional quality chisels

Runners-up

Experienced hand at the 'elm?

It's not to everyone's taste, admits Terry Illsley, but the figuring in the spalted elm adds interest to the seat of his Mendlesham chair - a graceful style of C18th Windsor chair made in the eponymous Suffolk village by the Day family. In keeping with the native and fruit woods used in the originals, Terry has used elm and yew in the rest of the chair, which despite claims to be 'a fairly inexperienced turner', was completed in around 64 hours.



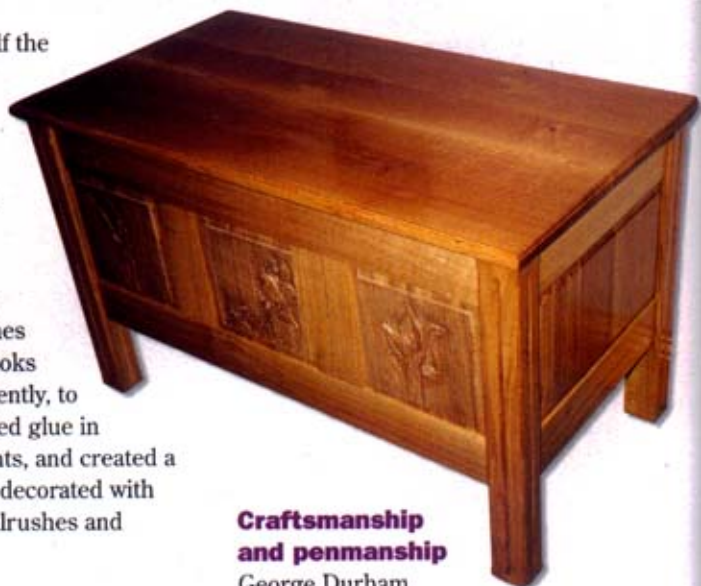
Music stand changes tempo

Dr Gilchrist's quartet music stand has more than one string to its bow. A detachable table top means that when the stand's not in use, it doubles as a table and - with the Brazilian mahogany's chequered inlay - as a chessboard, too. When it's none of these, the space-saving stand folds down and stands close to the wall. Dr Gilchrist's offset pivot geometry also means that the tilting top is stable in the horizontal without the need for catches.



Back to nature

Peter Iddon set himself the task of building a blanket box with traditional design and joints - or 'no short cuts', as he puts it - but using modern machinery. With reference to antiques, woodworking magazines and natural history books (and deference, apparently, to his wife), he's eschewed glue in favour of dowelled joints, and created a piece of oak furniture decorated with carved bullfinches, bulrushes and blackberries.



Craftsmanship and penmanship

George Durham combines walnut veneer and MDF to good effect in his lady's writing desk. The burr-finished desktop and the three sides are lipped with American black walnut. Black stringing provides extra detailing on the desktop, the curve of whose front edge is matched by the shaped and veneered plywood drawer fronts. The same forming technique was used to make the back of the chair, whose black walnut frame matches the desk's plinth.



Heart of (recycled) oak

Old fence posts, a broken bed, salvaged drop leaf tables and school desks: they're the unlikely but successful ingredients of Peter Vivian's kitchen dresser, 80 per cent of whose timber is recycled. With the exception of his router, drill and planer (and a little help with thickening from a local joiner!) Peter



used handtools and traditional mortise and tenon construction techniques throughout the project.

Mix and colour-match

Woodworking's a continual learning curve, isn't it? After trading a career in engineering for a retirement in woodworking, Mr Piercy tackled this mahogany corner cabinet project, which combines a reclaimed table top with new timber. Between teaching himself new jointing techniques and making form cutters from 4mm plate, the job went well - until he took specialist advice on finishing colour-matching the old and new mahoganies. That's when he discovered the old mahogany is actually walnut: 'I used French polish and a polisher's mop and left the colour matching for another day!'



Folded linen for blanket box

Thirty five years after his apprenticeship as a pattern maker, David Mead has returned to his hand tools and taken to woodworking. After warming up on a little furniture restoration, this ash blanket box is his first scratch-built project and the result of six months' planing, jointing, carving, sanding and polishing. The 10 panels were biscuit-jointed and the design router outlined before carving the linenfolds themselves.



Tables turned on waste

Substantial though they are, Tony Bambridge's mini table and table top are a practical solution to the problem of moving large tables around the house. Made from 18mm plywood faced with offcuts of pale oak T&G flooring, the table top is positively located on the mini table base with Tony's 'wishbone' frame.

'It was delightful,' says Tony, 'to see beautiful wood, destined to become rubbish, used to create something for the home.' Couldn't have put it better ourselves.



What price ingenuity?

Three tools and £11.50 - that's all Barry Norman needed to construct his hall cabinet. Made completely from spare wood, the project began life as a light-hearted request for 'something for the hall' - light-hearted because when Barry began woodworking after retirement he admits that he, 'couldn't break a matchstick properly.' The result however, is a handmade piece of furniture finished with carving achieved with a ground-down screwdriver! Ingenious types these woodworkers.



Stereo unit: sound construction

One of three cabinets made for the same room, James Broly's oak-framed stereo unit combines practicality - there's storage for LPs and carousels for 168 cassettes behind those piano-hinged doors - with solid construction. The front and rear frames use mortise and tenon joints, while the oak door frames are joined with biscuits. The door panels and unit's sides are oak-faced MDF, and the veneered top is lipped with American red oak.



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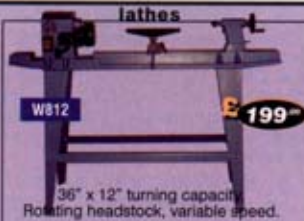
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£249.00

Charnwood W610 Specification

Table Size	700mm x 465mm (1110mm x 465mm)
Maximum ripping width	300mm (450mm)
Cutting depth at 90°	60mm
Blade size (dia x bore)	10" x 5/8"
Motor	1500W

Floorstand £14.00
Extension Tables £11.00

Charnwood W620 Specification

Table Size	757mm x 660mm
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Motor	1400W

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Woodwork widows...

We hear of so many projects made for woodworkers' wives that we've decided to introduce a new section to the letters page. Here's a chance for your wife/partner to really show their appreciation for all your hard work. Just send in a few snaps of your partner's work and you could win a one-year subscription to *The Woodworker* if they are chosen for publication.

I was interested to see your new section on the letters page. It was nice to see Julie Hirst's husband had been inspired by some of my published *Woodworker* projects. My wife is also a long-suffering woodwork widow who copes with an endless stream of shavings between the workshop and the house. Do I qualify for a prize subscription?



Jim Robinson

After more than 50 published projects in *The Woodworker*, it's the least we can do Jim.

MSR

LETTERS to the EDITOR

Taut a lesson

I would like to thank you for producing such a helpful magazine. With reference to the September edition, 1999, I was very impressed with the Viola da Gamba series. I thought I'd write and let you know that a friend who plays this instrument told me that the original instruments didn't have the sophisticated method of tensioning the bow. Originally, players would hold the end of the bow in their palm and tension the bow with the thumb. I suppose that most modern players would prefer to use the more advanced system, however.

Mark Crowder, London



Latino ledging

During a recent trip to Brazil, I was intrigued to note a style of joinery I have not seen in my 25 years as a carpenter in this country. In particular, the method of ledging and cladding, apparently used for centuries, on shutters and doors of all sizes. There were no signs of sagging on the examples I saw. Staircases and door panels are also made in a distinctive style, with lattice panels.

*Barrie Scott, Ledbury,
Herefordshire*



Models for Alexandra Palace

Thank you for your help in obtaining plans for the Jethro Tull seed drill featured in the July issue of *The Woodworker*. I may not be able to finish this project on time but I do have a model of a Monmouthshire wagon. Is this suitable? It's made from Sydney blue gum and Tasmanian oak.

Des Kendrick, New Zealand

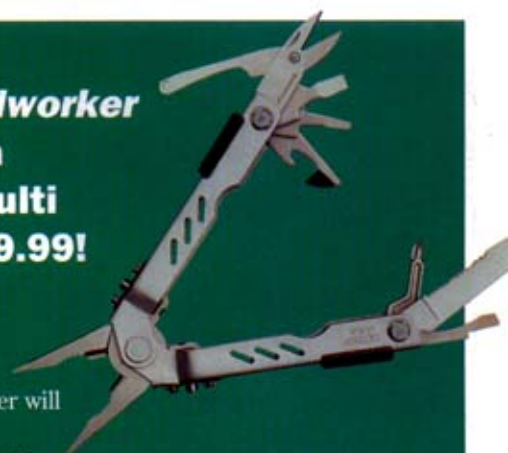
Yes, you can enter any horse drawn farm vehicle or implement in this year's Modelmaking competition at Alexandra Palace (22-25 Feb).

MSR

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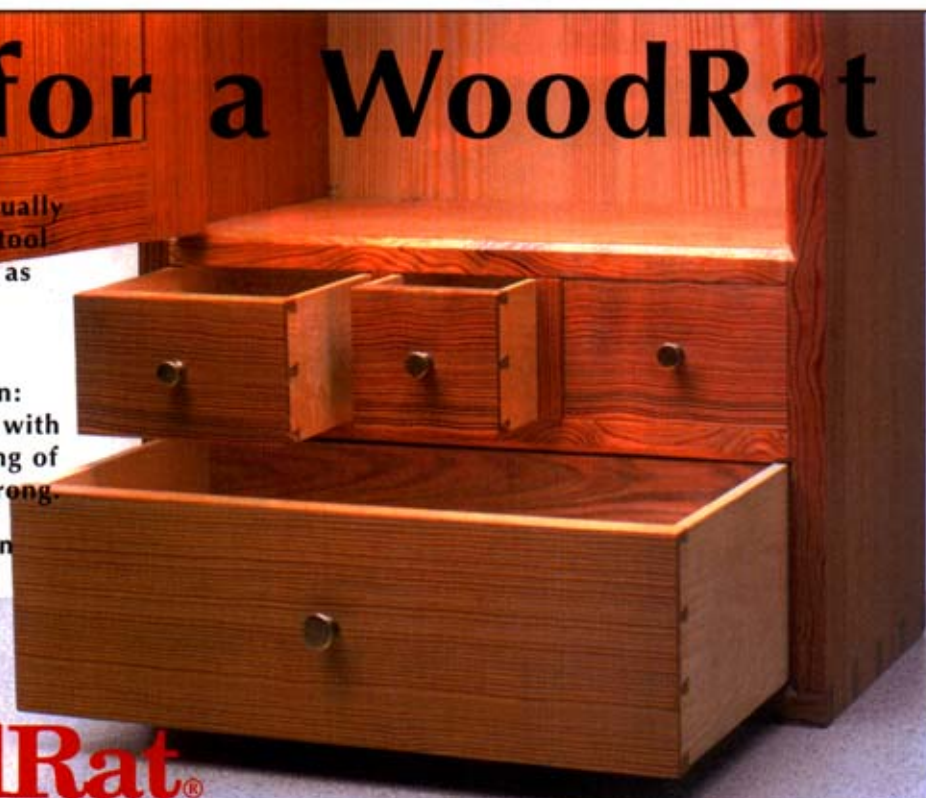
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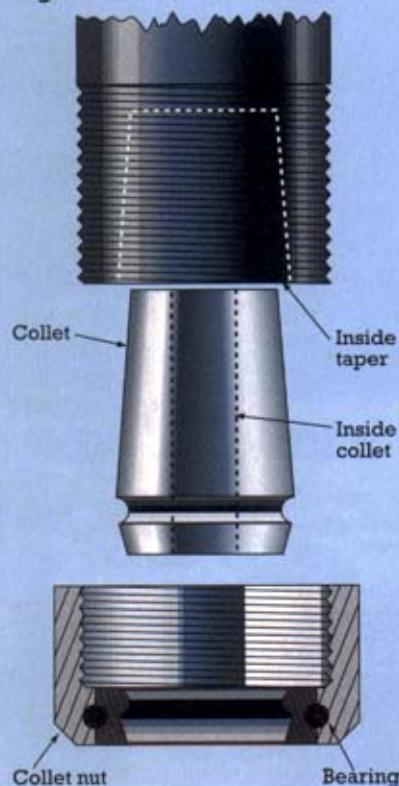


The Saw Doctor

The Saw Doctor's back, this time with a health check for your router collets

Collet maintenance - or rather the lack of it - is one of the most common causes of inadequate tool life and bit breakage. Since a router bit is only as good as the collet that holds it, it makes sense to maintain your tool's performance by taking a little time to regularly inspect and clean the key elements of your collet system.

Figure 1 collet maintenance



1 The most important element is the inside of the collet, where you'll often find a build-up of resin which has migrated up through the slits in the collet. If it isn't removed, this accumulation leads to uneven grip on the tool shank and results in resonance and slippage. The symptoms of 'collet burn', the blackening of the resinous deposits, are easily spotted and just as easily remedied. A brass tube-type brush will remove resin build-up effectively without damaging the collet.

2 The inside and outside tapers of the collet spindle are two other favourite haunts of resin - inspect and clean them regularly!

3 Check the inside taper of the collet nut for burrs. These will not only skew the collet and tool, but promptly ruin a new collet if a worn nut's tightened against it. Some collet nuts have an integrated thrust bearing on the inside taper which serves to reduce friction wear between the collet and nut as the nut is tightened. It's critical to keep these bearings in smooth operating condition as rough or frozen bearings will lead to run-out or out-of-tolerance operation.

Send us your own sharpening problems and we will attempt to answer them free of charge. Just address your letter to Saw Doctor, The Woodworker, Azalea Drive, Swanley, Kent BR8 8HU.



Further information

Saw Doctor Association:
01844 354747

Remember, maintenance will extend your collet's life, but it will eventually wear out. Bellmouthing or burring inside the collet means it should be replaced, and even if no damage is apparent, metal fatigue makes periodic replacement advisable. Collets are made from spring steel to allow a certain elasticity, but the heating and cooling cycles to which a working collet's subject steadily remove the steel's temper, making it hard and brittle. A work-hardened collet requires ever more tightening to keep the tool in position, and this over-tightening will in turn distort the collet and the tool holder, leading to further problems.

Finally, don't forget that to work effectively, a bit must be properly colleted. A tool (whether it's HSS, carbide tipped, solid carbide or diamond) shouldn't be colleted below the end of the flute fade-out area. Over-colleting - or gripping the bit between this fade-out area and the tool's cutting edge - causes uneven collet pressures and often results in tool breakage.



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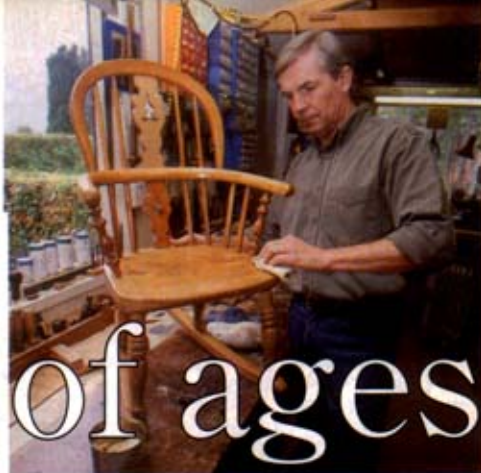
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Rock of ages



Don't throw out that heap of spindles in the corner of the garage. Peter Braun tells how to bring a rocker back to life



Taking apart the remnants

In all restoration work, the golden rule is to salvage and not replace. The original must be preserved as far as is practicable. The finish, however, was not worth saving but before I started stripping the varnish I decided to check which parts of the chair could be salvaged. There is little point in cleaning pieces that are not reusable.

Whilst it is possible to repair the ends of the legs, by giving them new tenons, I felt I had to consider the safety aspect. This was a rocking chair and boring a hole down the legs and inserting a peg or splicing a piece may not have given adequate strength. The holes on the underside of the seat and in the rocking bars were made-up with the remains of leg ends. The first task was to clean out these holes so that their condition could be assessed. I drilled out the pieces of leg blocking the holes with a small twist bit, **pic 2**. A bit the exact size of the

This little rocking chair is over one hundred years old and has been in the family for four generations, passed down from an aunt of my great grandmother, born circa 1890.

The chair is made of ash and the construction was typical of a bentwood chair whose method of jointing is drilled holes at angles. The backrest and armrest are both bentwood with a number of drilled holes for the spindles. The spindles fitted into the top of the

backrest pass through the armrest into angled holes in the seat. The legs and armrest spindles are turned on the lathe. On the underside of the seat are four holes again at an angle to splay the legs, which are then fitted into the rockers.

The chair's demise came about when an adult accidentally sat on it some fifteen years ago and all four legs snapped off, **pic 1**. The seat, armrest and backrest were remarkably sturdy but the top splat was missing. The chair had a brushed coat of varnish that was in poor condition. I was convinced that it was not the original finish.





Stripping old finish

The stripper was applied according to the manufacturer's instructions and brushed well into the surface and left to blister. The blistered old finish was then removed with a paint scraper (pic 3) and awkward corners and turnings with a brass wire brush (pic 4). Another coat of stripper was applied but this time medium wire wool was used and rubbed in the direction of the grain to remove any remaining varnish. The stripper must be neutralised with white spirit and this was applied with medium wire wool and in the direction of the grain.

original hole should not be used as it could wander and leave an elliptical shape or a hole in the wrong position. Drilling with a smaller bit enables the pieces of broken leg to be cut away with a narrow chisel or gouge. A drop of hot water in the hole will release the glue holding the remaining pieces.

Whilst cleaning out the last of the wood, I discovered two pieces of sacking or hessian which had been used as packing. The variation in the legs' diameters meant that at least two of the legs were too small and sacking had been wrapped around the tenon ends to make a tight fit.

Making up the new legs

I was fortunate that I had some ash that was old and well seasoned. I took what I considered the leg most in tune with the chair. The contours were set out on a template board marking the lengths where the shape and size altered and making careful note of the various diameters at each of these points, pic 5.

I cut the stock about 25mm longer

than required and as the wood was already standard 45 x 45mm, it gave adequate waste allowance on the width and thickness. I used the roughing gouge first, removed the corners and then finished off with the skew chisel, reducing the wood down to the largest diameter required for the leg.

Using the template board, I marked the length of the leg leaving maximum waste at the headstock end of the lathe (Photo 6). The other points, which required cutting in with the skew chisel, were then marked. These sections were reduced to the appropriate diameters and the leg shaped.

When completed, the leg was parted off to size. A saw cut was made in the rocker end of the leg to take a wedge when assembling.

How to make a splat

I was informed that the missing splat was the same shape/design as the bottom splat. However it was longer so I had to expand the smaller one to fit

the upper gap. I started by taking the length of the bottom splat and finding the ratio of its width to its length. This formula could then be applied to the top splat. I knew the top splat's length by measuring between the backrest and armrest. From this measurement I could calculate the missing width. A drawing of the splat was carried out on a piece of card. I started by marking a centre line on the card along the length and then folded the card along this line. Allowances for the length of the tenons at each end were, of course, added. This posed a slight problem as the splat needed to fit between the backrest and armrest which were firmly joined, and I had no wish to separate them. However, by checking the depths of the mortises, I found I was able with some adjustment to make the top mortise in the backrest twice the depth of the



RESTORATION



bottom mortise in the armrest. This would enable the splat to be pushed up into the backrest aligned into position and pulled down into the armrest. The measurements for the tenons could now be added and the template cut to shape. The folded card was cut and then unfolded giving a symmetrical shape for the splat, **pic 7**.

The card was used as a template and traced onto a piece of prepared timber, which had been planed to the correct thickness. It was important to ensure the



thickness was accurate before cutting the shape as to reduce the thickness afterwards may have been more difficult and risked damage to the delicate shape. Cutting the shape was performed with a bandsaw, coping saw, **pic 8**, and trimming by paring with chisel, gouges and finally sanding.

Colouring

The ash used for the replacement pieces was a good match but being relatively new wood there was a slight lightness in the colour compared with the mellow tone of the chair. The colouring was easier at this stage, rather than after it had been assembled, to avoid stain penetrating any part of the chair. I tried various stains on an off-cut of the ash used and found that of all the colours antique pine was an excellent match, **pic 9**. One coat was applied using both a brush and rag and left to thoroughly dry.



Assembling the pieces

I did not use any cramps for assembling the chair. Instead, I simply applied glue and knocked the legs into the holes and then wedged from the underside of the rockers, **pic 10**. Although animal glue was the original glue used on this chair I settled for PVA. Glue was applied to the mortises and the splat was pushed up into the top mortise and down into the bottom mortise, **pic 11**.

When the glue was set I applied a little distressing on the new parts by using the ball end of a ball-peen hammer.

Wax recipe for success



I decided traditional waxing was more in keeping with the style and age of the chair. In addition this kind of finish would be more sensible for a piece of furniture bound to receive many knocks. A re-polish of wax at a later date would be straightforward and dare I say could become child's play. Start them young and keep the traditions alive.

I made-up my own wax polish with 12 grams pure beeswax dissolved in 250mls turps. The wax was applied using a course rag, with a fairly vigorous rubbing action working well into the grain and using a toothbrush for the turnings and other awkward corners. I left the wax to dry out and then burnished with a soft duster. After a couple of days I applied a second coat.

I recommend another coat of wax after six months and then once a year. You can wax more often if you wish depending upon your required finish.



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