

January 2000, No.21

The Router

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Trend Unibase

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Foreword

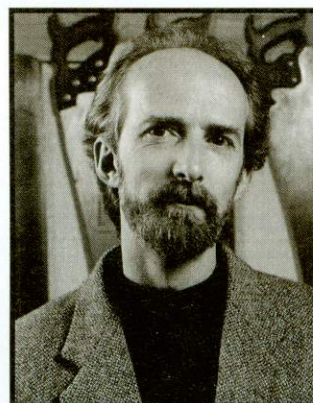
“ Welcome to the first issue of *The Router* that doesn't bear the smiling mugshot of its launch Editor. For those of you who missed the last issue (what's your excuse, by the way?) Alan Goodsell has flown off to pastures new, and for the time being I will be filling the hot seat – so perhaps I should tell you who I am.

After 15 years as a professional woodworker, I opted for the easy life of journalism and became Editor of *The Woodworker*. Next came *Furniture & Cabinetmaking* magazine, which I launched with Alan's help in 1996, followed by *The Router* a year later – this time with Alan as Editor.

All of which will, I hope, reassure you that *The Router* will continue to be the same unique blend of projects, technical articles, equipment tests and stuff that you know and love.

In fact, you can help – I know that you aren't a shy lot, so I'd like to invite you to send in article ideas for publication. Are you making something with your router that other readers will find interesting? If so, get in touch and we'll help you to turn it into a Router Project – write to James Shanahan and ask for our Authors' Guidelines – who knows, you could be the next routing superstar!

So (almost) in the words of Alan, get routing and get writing.

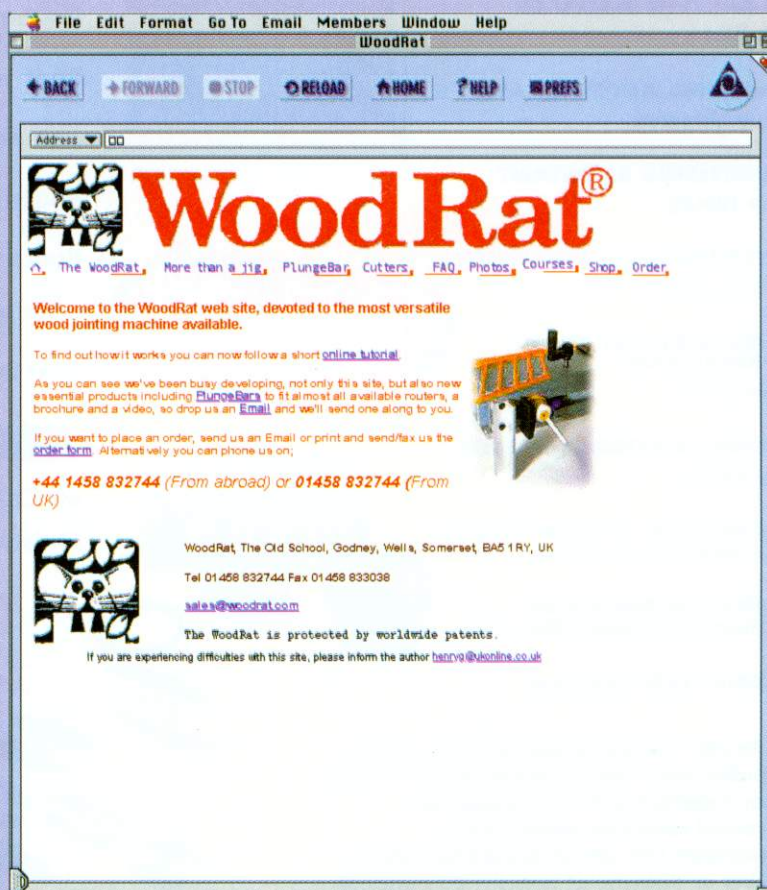


Webwatch

with James Shanahan

Once again I've been waltzing around the web looking for the best wood-working sites, and this time the Woodrat site gets my vote. It is arguable that the Woodrat workstation has an advantage over standard router tables and jigs, and this site sets out to show you why. There's an on-line tutorial on how to use the workstation, with diagrams and text outlining its benefits. Very handy if you're trying to decide which way to go.

Other areas of the site include a debate as to the relative merits of HSS and TCT cutters, and details of a new plungebar system they're working on. Plus you can find information about Woodrat-related courses in your area, and download an order form to buy their products. You do however have to post or fax the order form back, but the site is under constant development, so hopefully it won't be too long before you can buy on-line. All in all a useful site if you need to know about Woodrat products, and the rat logo is pretty nifty too. Go to: www.woodrat.com



The Router contents

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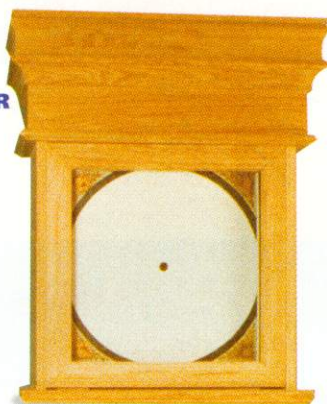
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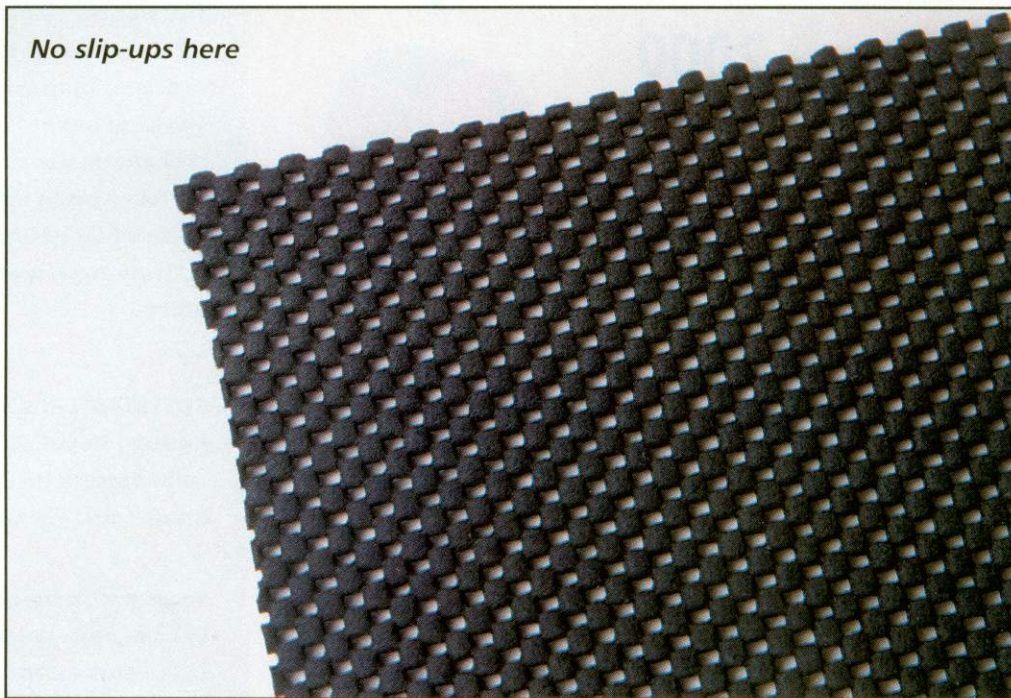
Slip stop

New from Planet Engineering is the Anti-Slip Workmat, a nifty little device to prevent your workpiece from jumping about the workbench. So now, instead of clamping and reclamping as you rout, you can just pick up the workpiece and move it as you wish.

Not only will this save you time, it will cut down on the number of different clamps you may need to hold awkwardly shaped bits of wood.

The mat can also be used to line draws and toolboxes to stop the contents from sliding around. It's easy to cut to shape and can be cleaned with a mild detergent and water to keep it in mint condition. Sheets come in three

No slip-ups here



sizes, 36 by 24in, 4 by 36in, and 96 by 48 in. They cost £7.05, £11.45, and £22.91 respectively. All prices include VAT.

Contact: Planet Engineering on 01686 626260.

Cool combo

It's Combo time from Ryobi – a cordless power tool kit including an 18V Combi drill and an 18V circular saw – designed to handle 90% of the tasks faced by most on-site workers. The Combo includes the CPD-1800 Combi which has a unique housing made from a material Ryobi call 'Power Grip'. The grip has a velvety matt finish which is said to give an astonishingly secure grip. As Ryobi say "just pick one up and instantly you'll see what I mean." Sounds sexy.

The 18V power pack means it's capable of drilling up to 38mm in wood, provides a hammer action with up to 20,800 blows per minute, but can also function as a screwdriver with 24 torque settings – two double-ended screwdriver bits are included.

The 18V circular saw accepts a 150mm blade, and comes with a standard 140mm 'Ultra Thin Kerf' blade which reduces power drain and increases cutting capacity, ideal for cutting laminates. The base of the saw is also designed to tilt by up to 50° for bevel cuts.

Two 18V 2/ah battery packs come with a durable carrycase making it ideal for site work.

See Contacts on page 71 for Ryobi's details.

◀ *A great combination*



● Contact the Assistant Editor, James Shanahan, with news and product information. Items must be sent to him at *The Router*, GMC Publications Ltd, 86 High Street, Lewes, East Sussex BN7 1XN at least 10 weeks before publication



Nail it

Rapesco have introduced a new electric nail gun to beat all others – they say – called the Master Nailer. It's capable of firing up to 30 nails a minute and has a patented quick release magazine for easy loading.

The lightweight design has a rubber safety grip and a comfortable two finger soft trigger so you can work for longer without feeling the strain. Other features include an impact power adjuster and an extra-long nozzle for tongue-and-groove panels which should make those nailing tasks easier.

Good for flooring, displays and shopfitting, the Master Nailer should take care of all you nailing needs.

Contact: Rapesco Ltd, Rapesco House, One Connection Business Park, Otford Road, Sevenoaks, Kent, TN14 5DF. Tel 01732 464800, fax 01372 464900.



Get nailing with the Nail Master

Pushing at the boundaries of modern technology once more, Makita's new cordless circular saw, the 5621DWB, combines their long life high torque Marathon motor with high capacity NiMH batteries to provide all the mechanical muscle you'll need.

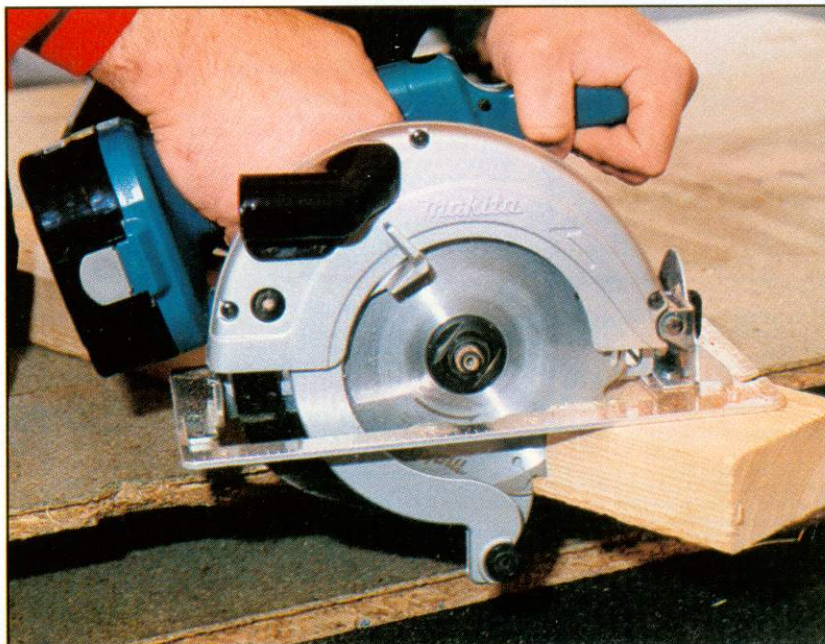
The saw is built to industrial spec. with a narrow kerf, 165mm 24 tooth TCT blade supplied as standard, reducing blade drag, with a 54mm maximum depth of cut at 90°, great for crosscutting 4 by 2in timber.

For safety, stability and accuracy the blade is set to the right of the machine, as with mains powered circular saws. The motor frame pivots for setting cut depth using a cam locking system, and the blade can be locked in the zero position for safe accurate plunge cutting.

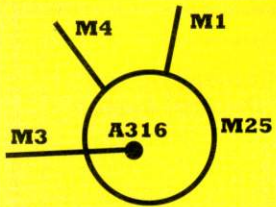
Other key features include a fan-cooled motor, permanent magnetic field coils and replaceable carbon brushes. Precision engineered gears mean a substantial reduction in noise, it weighs in at only 3.8kg, has a dust extraction port, and an electric brake which pretty much stops the blade dead. Bzzzz! See page 71 for Makita's details.

► *Super circular saw*

Cutting edge



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inc Stand & Mitre Fence

- 200mm depth of cut
- 300mm throat depth
- Tilting solid cast-iron worktable (0-45°)
- Dynamically balanced bandwheels
- Reversible rip fence
- Self-lubricating Meehanite guide blocks
- Manufactured in England



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inc VAT

Carriage £30 UK Mainland



351E

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- 350mm throat dept
- Tilting solid cast-iron worktable (0-45°)
- Dynamically balanced bandwheels
- Reversible rip fence
- Self-lubricating Meehanite guide blocks
- Manufactured in England

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- Powered by a 2 1/2 HP induction motor
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Phosphor Bronze Bearing

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Router tips

The Router is offering £75 for each issue's Top Tip and £20 for each of the others published alongside. Send your tips, supported by illustrations if relevant, in envelopes marked Router Tips, to The Router, 86 High Street, Lewes, East Sussex BN7 1XN

Plugging end grain

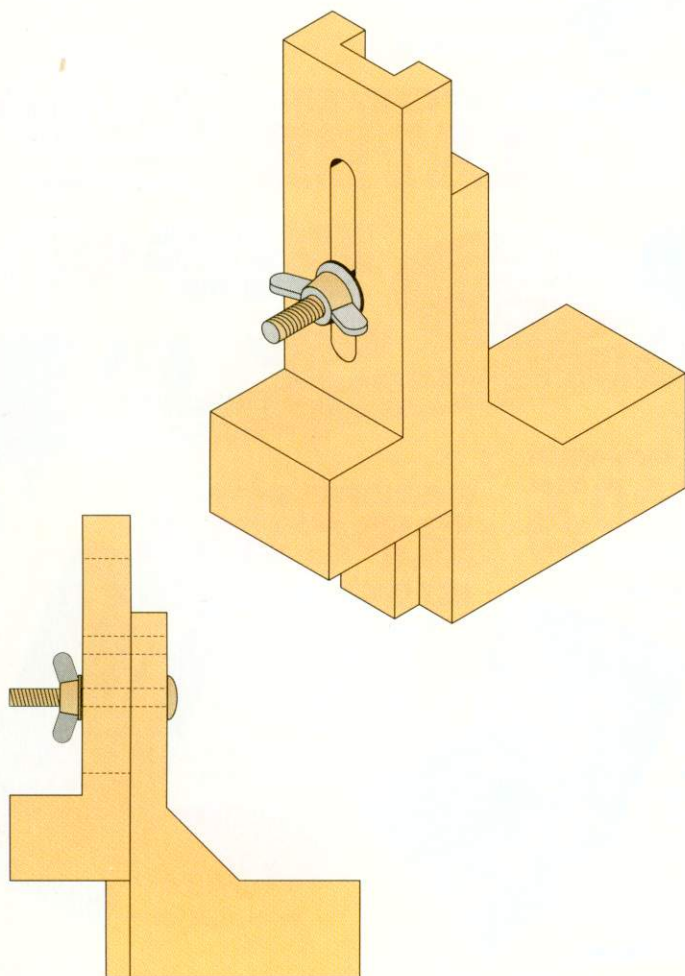
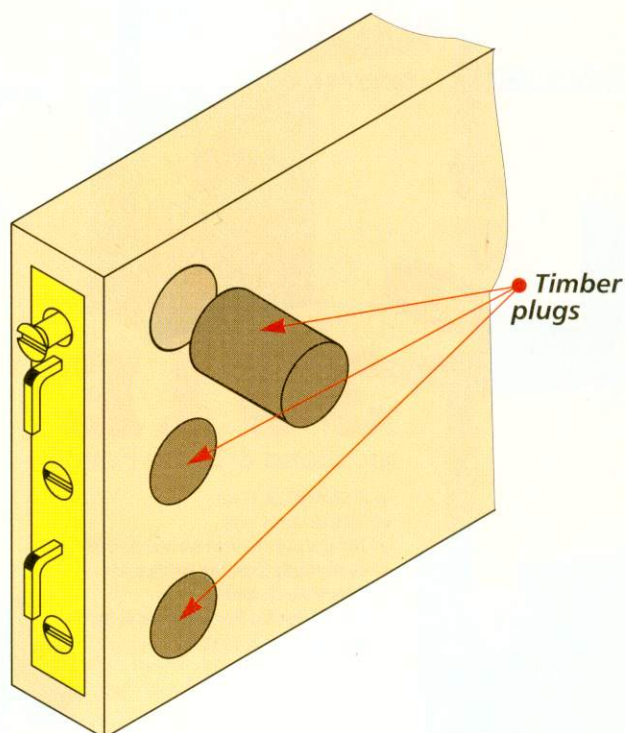


Having driven some screws into the end grain of a piece of wood I was disappointed when they pulled themselves out pretty swiftly. I needed a to make a stronger joint by giving the screws some face grain to hold into.

I drilled a hole into the face of the workpiece, the diameter of a piece of dowel. The hole was located so that the screw heads fell completely inside the hole. I then glued a length of dowel into the hole, with the dowel's grain at right-angles to the end grain.

Having cleaned up the ends of the dowel so they were flush with the surface, I could drill in my pilot holes, safe in the knowledge the screws would stay where I put them.

Conor McCarthy, Cork

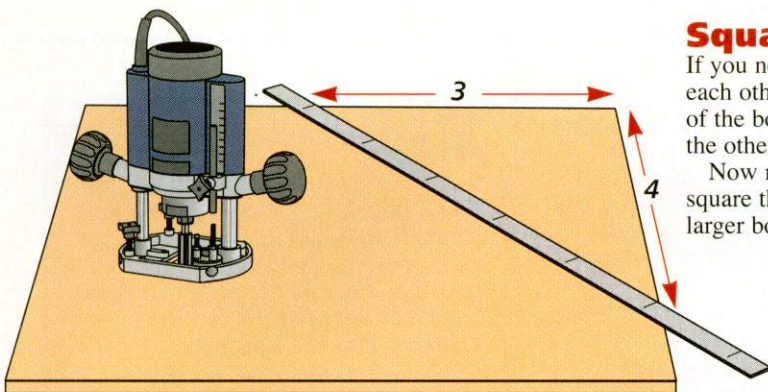


Flexible depth gauge

After seeing a fixed depth gauge in *The Router*, I set out to find something more flexible, and came up with this design. An hour's work later, some leftover pinewood, and I have a depth gauge for any size, metric or imperial, for router or saw. I'm now looking for some nice hardwood to make a really nice tool.

When making this depth gauge, make it wide enough so it will not fall over. Sometimes you need two hands to adjust your router or saw, and it's nice if it stays where you put it. Make it any size you like.

Michael Andersen, Australia



Squaring large boards

If you need to find out if the edges of two large boards are square with each other, here's a handy hint. First, make a mark along the edge of one of the boards, 3ft out from the corner, then mark 4ft out along the edge of the other board.

Now measure diagonally between the two marks. If the boards are square the diagonal measurement should be 5ft. If you need to check larger boards just increase the multiples of 3, 4, and 5.

Adam Metcalf, Croydon

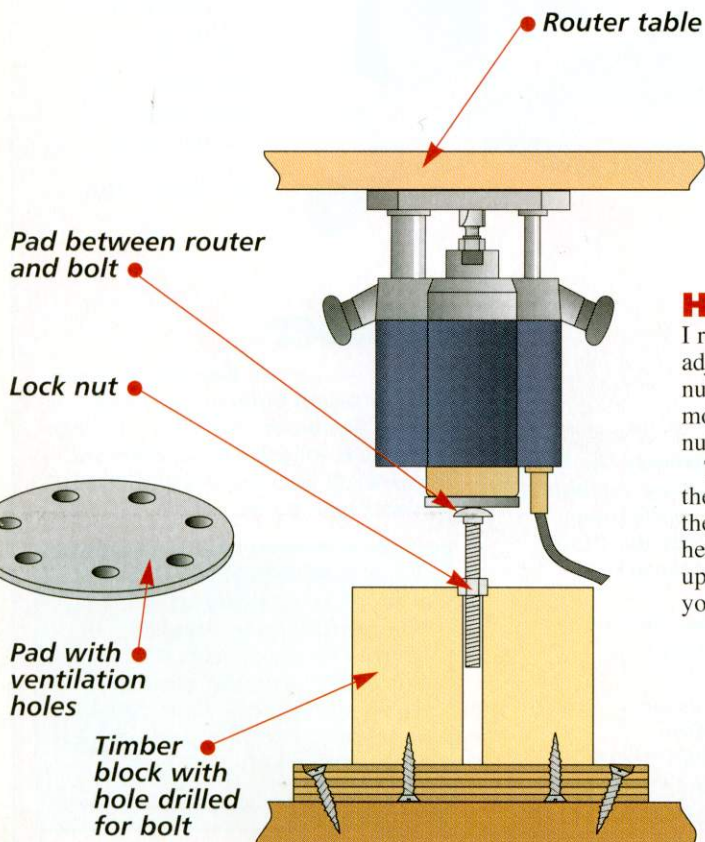
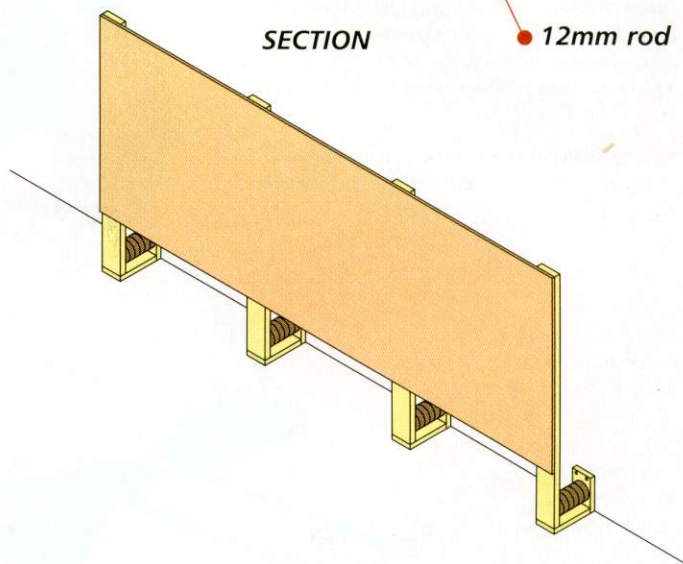
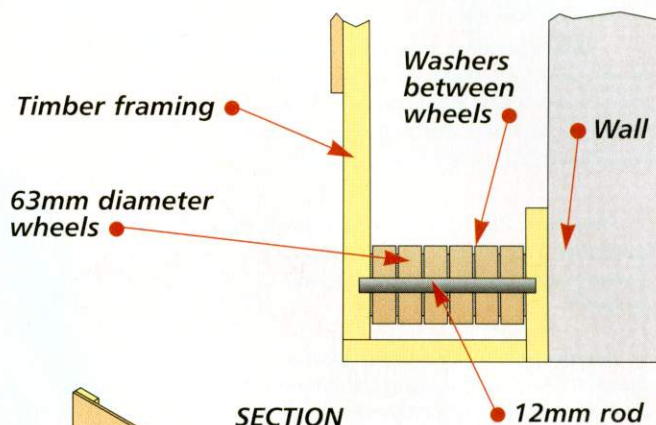
Solving storage

With storage space at a premium I find it useful to have sheets of plywood tight-stored ready for when I need them, but I have a hard time getting the plywood out without damaging the edges.

I managed to improve my plywood storage area with the help of some homemade rollers. I made the storage space from a 2 by 4 framework set about 6in in front of the wall. By placing perforated hardboard on the front I created a handy tool holder and space for my plywood.

Next I cut some roller wheels from $\frac{3}{4}$ in stock and put them on wood axles, but you could use metal axles if you like. I'm now able to slide individual sheets in and out of the storage slot with no effort at all. Simple.

Tony Motion, Canada



Homemade height adjuster

I recently came up with a simple and cheap way to make a fine height adjuster, this time for a router table. You'll need a long $\frac{3}{4}$ in bolt and two nuts to fit it. Take a block of scrap wood and drill a $\frac{1}{2}$ in hole in it, then mortise a recess for one of the nuts. Using superglue, fix one of the nuts in the recess.

The second nut will act as a locking nut. Thread it onto the bolt, then thread the bolt into the block of wood. Now mount a shelf under the router, and insert a pad with ventilation holes between the bolt's head and the router, this will protect the router. By threading the bolt up and down you can easily make fine adjustments to the height of your router table.

William Brock, Somerset

Tips must not previously have been submitted or published elsewhere. All tips may be reproduced in a compilation booklet.

..... The Router diary

December

18 - 19 Finishing, free demonstration from 10am to 3.30pm, by Stephen Hardcastle, John Boddy's Fine Wood & Tool Store, Riverside Sawmills, Boroughbridge, North Yorkshire YO5 9LJ Tel: 01423 322370

January

8 - 9 Woodturning, free demonstration from 10am to 3.30pm, by Tony Wilson, John Boddy's Fine Wood & Tool Store, Riverside Sawmills, Boroughbridge, North Yorkshire YO5 9LJ Tel: 01423 322370

15 Routing Clinic with Tony Wilson, at Yorkshire Woodcraft Supplies, Cottingham, East. Yorks. Tel 01482 844200

15 Everyone's a winner The Devon Guild of Craftsmen touring exhibition, until 27 February, Oriel Myrrdin, Church Lane, Carmarthen, Wales SA31 1LH Tel 01267 222775 contact: Sian Griffiths

15 - 16 Machinery Workshop, Rexon, 10am to 3.30pm, John Boddy's Fine Wood & Tool Store, Riverside Sawmills, Boroughbridge, North Yorkshire YO5 9LJ Tel: 01423 322370

22 - 23 Finishing, free demonstration by Stephen Hardcastle, 10am to 3.30pm, John Boddy's Fine Wood & Tool Store, Riverside Sawmills, Boroughbridge, North Yorkshire YO5 9LJ Tel: 01423 322370

29 - 30 Woodturning, free demonstration by Reg Sherwin, 10am to 3.30pm, John Boddy's Fine Wood & Tool Store, Riverside Sawmills, Boroughbridge, North Yorkshire YO5 9LJ Tel: 01423 322370

February

17 - 20 International Woodworking Exhibition, Wembley Exhibition Centre. Tel 01322 660070

March

11 & 12 Show for the East of England woodworking and tool show at Ipswich Showground. The show will cover wood-working, carving and woodturning. For

further information on prices and advance ticket offers contact either: Roy Coe Woodturning on 01787 211539, e-mail roycoewoodturning@btinternet.com or East of England Exhibitions on 01787 21139, e-mail east_ex@btinternet.com

11 - 31 Everyone's a winner The Devon Guild of Craftsmen touring exhibition, Bridport Arts Centre, South Street, Bridport, Dorset DT6 3NR Tel: 01308 427183 contact: Chris Huxley



Go along to the Rexon show to see machinery like this beast of compound mitre saw, the MS-12RA

April

1 - 23 Everyone's a winner The Devon Guild of Craftsmen touring exhibition, Bridport Arts Centre, South Street, Bridport, Dorset DT6 3NR Tel: 01308 427183 contact: Chris Huxley

14 - 16 Yandles Show, Martock, Somerset. Tel 01935 82207

14 - 16 Midlands Woodworking and Woodturning exhibition, Warwickshire Exhibitions Centre, Lymington Spa. Contact Meridienne Exhibitions: 01926 614101

May

5 - 18 June Everyone's a winner The Devon Guild of Craftsmen touring exhibition, Cornwall Crafts Association, Treloarwarren Gallery, Mawgan-in-Meneage, Helston, Cornwall TR11 4HN Tel: 01326 221567 contact: Jane Bragazzi or Rod Shaw-Sands

6 - 7 Poolewood Spring Show, Pett Far, Nr Sittingbourne, Kent. Tel 01622 884651

July

1 - 28 August Everyone's a winner The Devon Guild of Craftsmen touring exhibition, Bankfield Museum, Ackroyd Park, Boothtown Road, Halifax, West Yorkshire HX3 6HG Tel: 01422 354823 contact: Dee Barns

September

8 - 16 October Everyone's a winner The Devon Guild of Craftsmen touring exhibition, Walford Mill Craft Centre, Stone Lane, Wimborne BH21 1NL Tel: 01202 841400 contact: Christine Lawry

October

28 - 10 December Everyone's a winner The Devon Guild of Craftsmen touring exhibition, Burton Art Gallery & Museum, Kingsley Road, Bideford, Devon EX39 2QQ Tel: 01237 471455 contact: John Butler

While every effort is made to ensure the accuracy of information printed here, readers are advised to check with the venue and/or the organisation listed, before setting off. Have fun at the shows, and if you see me at one, come and have a chat.

James Shanahan

Letters to **The Router**



The Router welcomes letters on anything to do with routing, and wants to know what you think about the projects featured in the magazine, along with your tips and technical points – so much so that we are offering £10 per letter published. In the meantime, crisp tenners are winging their way to this month's writers

Write to us at: *The Router*, GMC Publications Ltd, 86 High Street, Lewes, East Sussex BN7 1XN

Making mouldings

I should very much appreciate some advice. I am interested in producing various mouldings for picture frames, using quite modest sized stock, such as 38 by 25mm or similar.

It seems to me that for this sort of application an overhead set-up would be the best approach, such as shown on page 27, photo 6, of *TR18*. The stock can then slide through on the widest section at the bottom while being machined, plus this offers the best view of the work.

Could you please tell me where I can see and buy the Routerack system shown, and whether you agree that the overhead approach is the best one. Many thanks.

John Everett, Colchester

The Routerack is one answer, albeit a rather expensive way to go. Paul Richardson reviewed the Routerack in issue 13, so have a read of this before taking the plunge. Your nearest Trend retailer is Kent Blaxill, (tel 01206 216000), and if they don't have one in stock I'm sure they will be able to put you in touch with a stockist in your area.

Remember though, that while the basic Routerack stand costs £179 including VAT, you will probably need accessories for it depending on the kind of work you want to do, which will bump up the price.

However, personally I don't think this is the way to go. If you have a large router and face moulding cutters capable of machining 38mm thick boards, it is far better to have a board which you can mould on the router table, then cut down to 25mm wide on the table saw. This is safe and you can repeat the process as many times as you need. See Contacts on page 71 for further Trend details.

Alan Goodsell

Cabinet confusion

I'm writing in regard to the file cabinet project in *TR18*. After writing, faxing and phoning

Brighton Tools they tell me that they've never heard of the project.

I wonder if could you give me some part numbers for the Hafele runners, as they have many different types. If you have part numbers for the Tonk strip and door handles this would be even better. Oh, and wish me luck.

Brian Hogan, Ireland

Sorry you have had a problem Mr Hogan, I understand a number of readers have had the same trouble. I spoke to Arthur Hyde, the boss of Brighton Tools & Fixings, who hadn't received a copy of the article as he should have done – oops! This meant he wasn't in a position to accurately identify the items in the Hafele catalogue, on account of its sheer size.

In the meantime Arthur has sent out Hafele information to several people and by the time you read this he will have produced his own special Hafele catalogue with all the most popular items in, including the information you seek. For a copy of the catalogue contact Brighton Tools & Fixings on 01273 562020, and good luck.

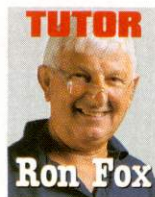
Alan Goodsell

Troubleshooting

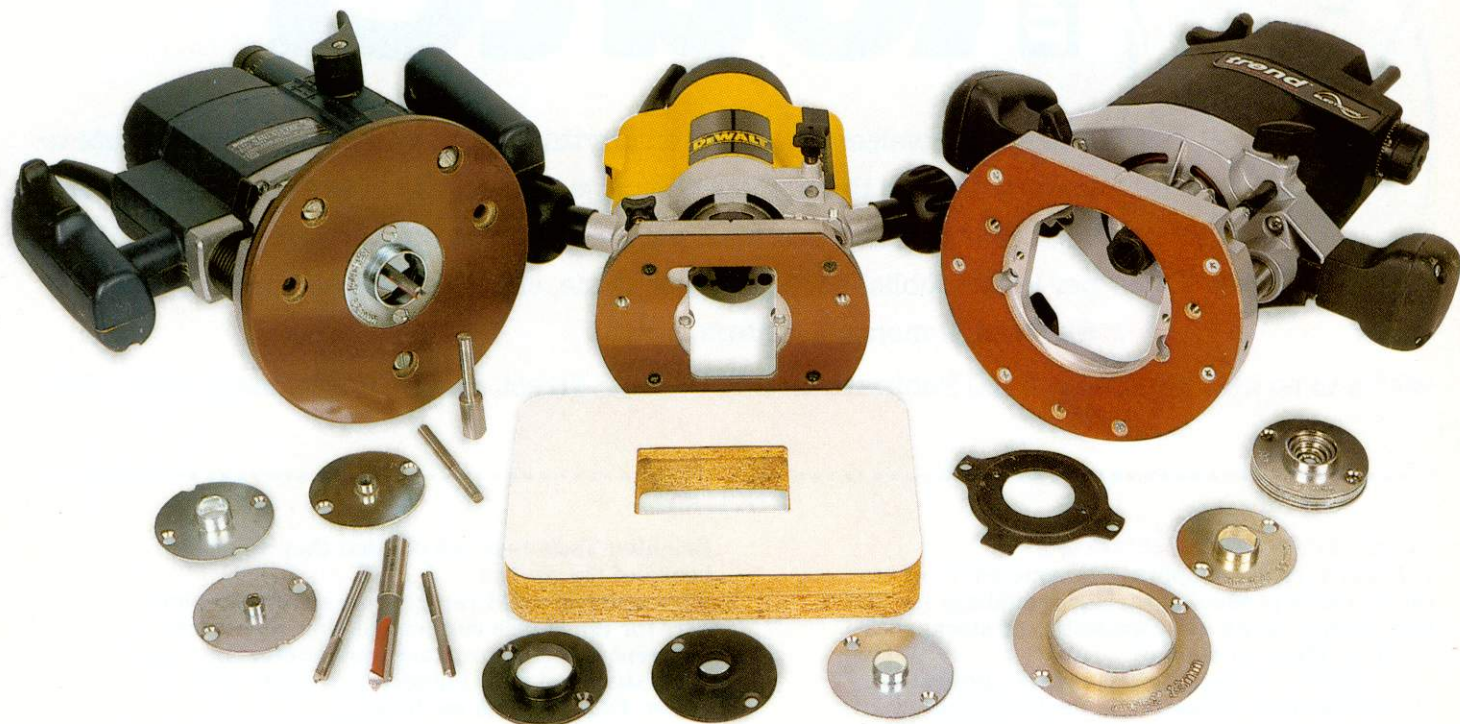
Should you have any routing queries that have you flummoxed, please drop us a line explaining in detail what you are trying to achieve. We will then put it to our panel of experts who will do their best to solve the problem.

We will publish successful ones, and although we will do our best to reply to all queries we cannot guarantee that all that aren't published will receive a response.

Published letters will be edited to fit the space allocated



Guidebush buster



▲ Routers, a selection of guidebushes, some long reach cutters, and a homemade router stand

Ron Fox gets to grips with guidebushes so you can tell the good from the great

AMONG the many accessories available for the router, guidebushes are one of the most useful. This month I'll explore the range available, and show how guidebushes can be interchanged between models or homemade for particular routers.

Guidebushes

Most router manufacturers include a guidebush as part of the standard kit, but not all provide an additional range as accessories. A wide range is provided by DeWalt for the DW621 series and these are specific to the routers, being made in skeleton form, apart from the two largest because of their narrower flanges, to retain the excellent dust extraction of the DW621.

Hitachi also offer a wide range, and Hitachi guidebushes fit any one of the Hitachi models, the ZK 2008, M8V and M12V.

Trend, however, provide the largest range of all, with thirteen different diameters which fit both the T5 and the T9, and a further three large-diameter bushes – 50mm, 60mm and 70mm – for the T9 only. A very useful feature is that the size is clearly marked on each bush. On top of this there are bushes for specific accessories such as dovetail or letter-box jigs.

A number of other medium-power routers accept the Trend T5 range of guidebushes. These include the DeWalt 613, Perles OF 808/E, HolzHer 2356, Atlas Copco OFSE 1000, Einhell EOF 850, and Power Devil PDW 850. This is extremely useful when you want to extend your range of bushes, since the Trend T5 bushes are the most widely available.

With some of the Trend-compatible routers, the Trend guide bushes or their screw-heads stand proud of the router base, because some bases have too shallow a recess. This presents no problem; all that

is necessary is to make a false base plate of Formica or similar material and fasten it to the router base with double-sided tape. This deepens the recess by raising the base by a small amount.

Photo 4 shows some of the other routers which will take the Trend standard bushes.

"Most router manufacturers include a guidebush as part of the standard kit"

Trend, Elu and Hitachi

The Trend, Elu and Hitachi guidebushes happen to be exactly the same diameter,

▼ The DeWalt DW621 router with its complete set of guidebushes



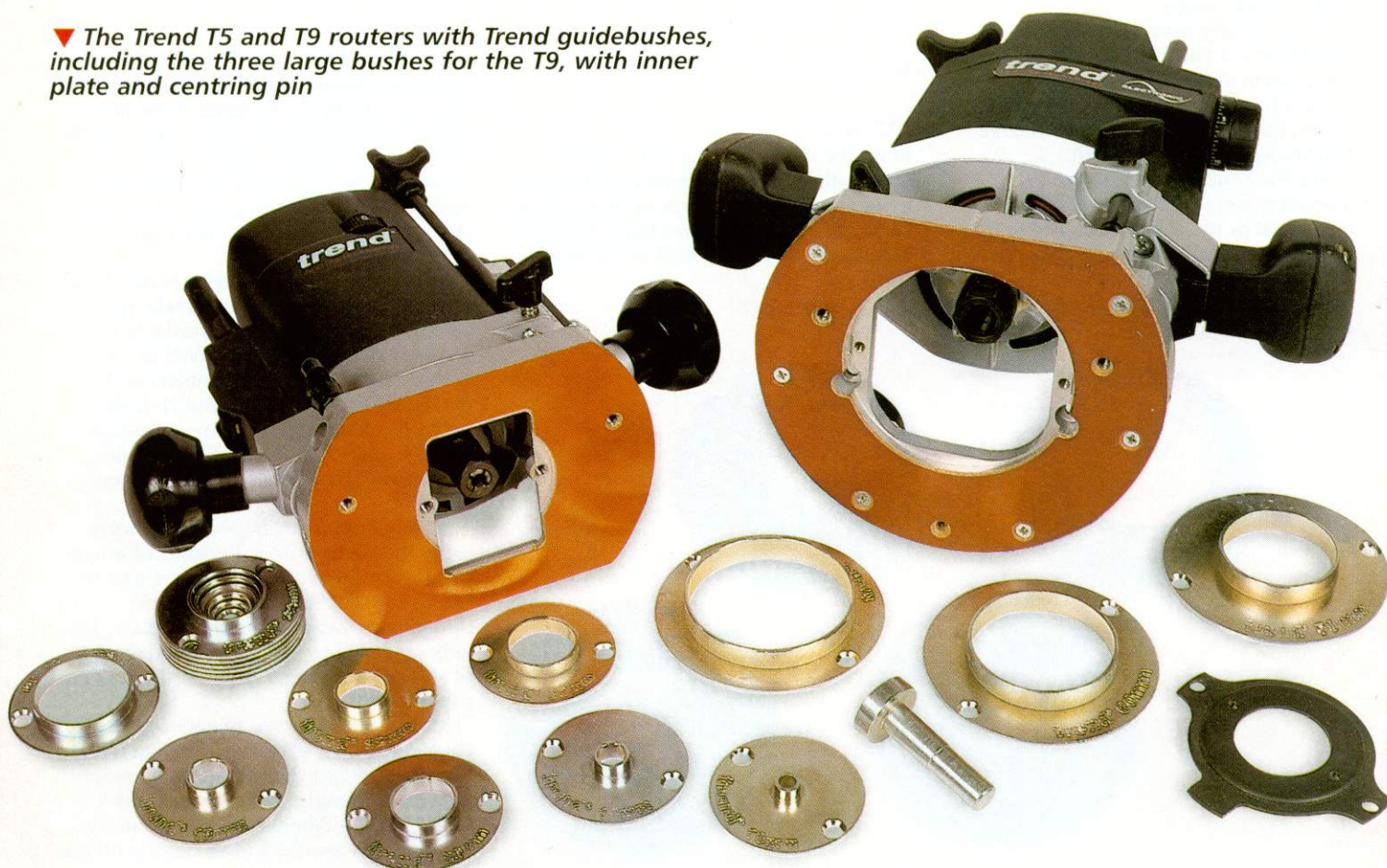
but their modes of fitting are slightly different so they are not directly interchangeable. However, they can easily be made so by drilling two holes in the

Hitachi or filing two notches in the Trend.
The benefit of this is that one set of bushes can cover a Hitachi plus any one of the Trend-compatible routers.

Trend to Hitachi

Place the Trend bush in the Hitachi router with the Trend fixing holes at 90° to the Hitachi fixing points. Scratch the positions

▼ The Trend T5 and T9 routers with Trend guidebushes, including the three large bushes for the T9, with inner plate and centring pin





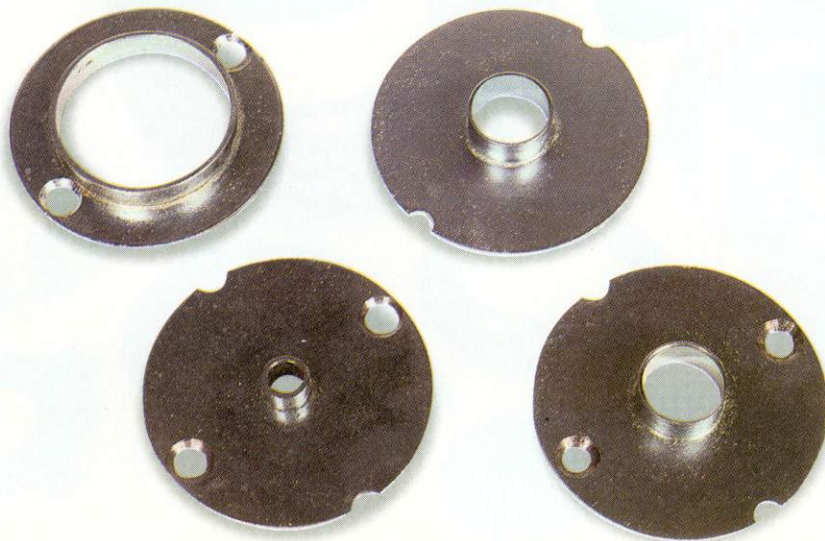
▼ Routers which take the Trend bushes, the homemade Formica sub-base gives the guidebush screws clearance

of the required notches on the Trend bush by reference to the screw holes in the base of the Hitachi router.

If you already have one of each – you should have if you have got a Hitachi router – tape them together and scratch round the Hitachi fixing points to mark the positions on the Trend bush. Cut, grind or file the notches and clean off any burr.

The filed notches do not have to be absolutely precise because the bush is positioned by the recess machined in the router base rather than by the fixing points.

▼ A selection of modified Trend and Hitachi bushes



"Cut, grind or file the notches and clean off any burr"

Hitachi to Trend

Mark the position of the two required holes either from the Trend router base or by taping one of each type of bush together. Drill and countersink two 6mm holes. As before, the bush is located in the recess in

the router base, so slightly over will not affect the accuracy of the fit.

Bush benefits

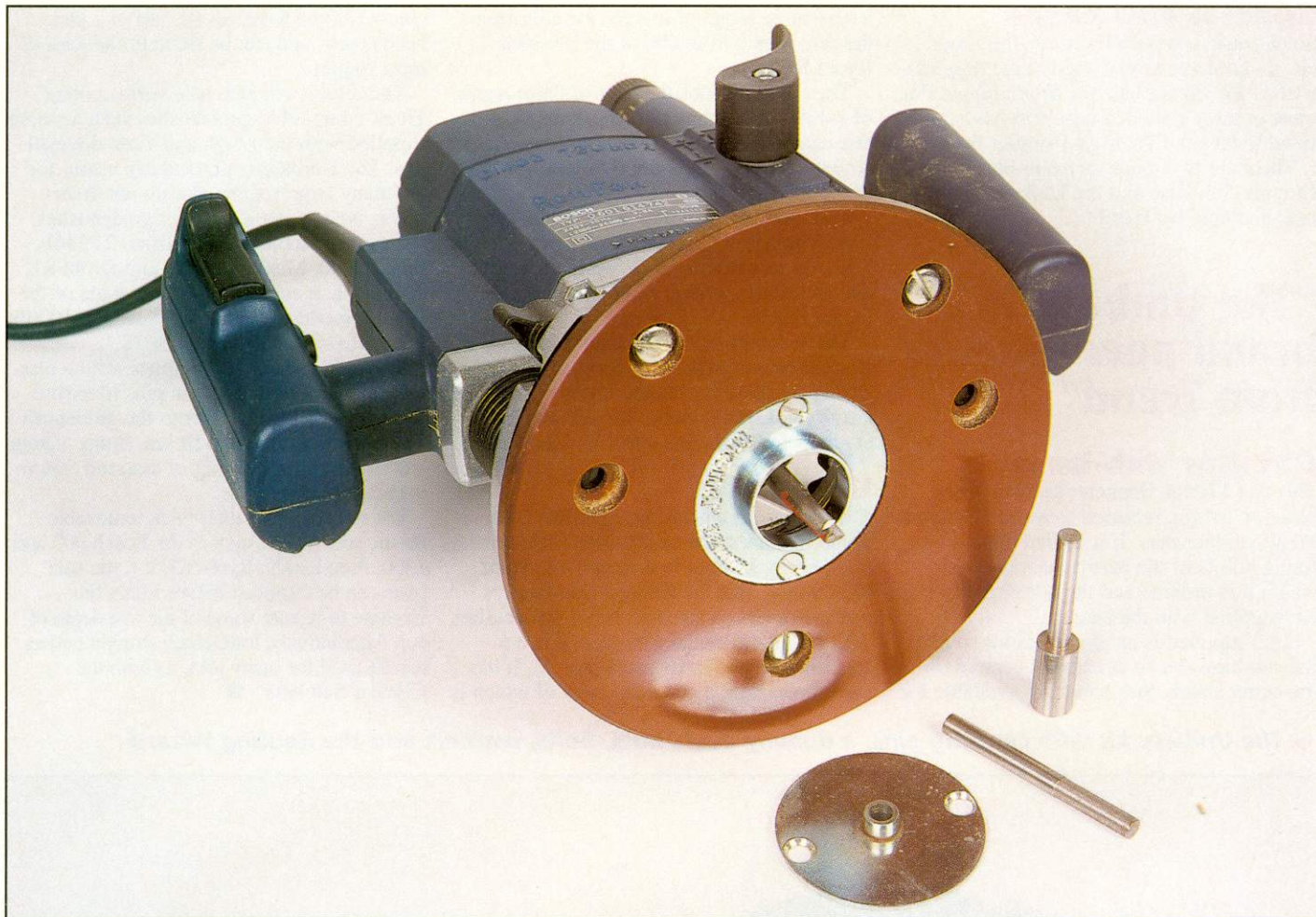
Apart from the obvious benefits of one set of bushes fitting more than one router, and the fact that the Trend range is the most widely available, there is the major benefit to owners of Hitachi, HolzHer and other models, of being able to buy accessories such as the DeWalt, Titan and Trend dovetail jigs, and use the bush that comes with them, or quickly adapt it.

With the much more sophisticated Leigh dovetail jig, adaptor plates to take the standard Leigh bushes are available for virtually every make and model of router.

One further point. With routers such as the Trend T5, Perles 808, and HolzHer 2356, the collet can be plunged through the base plate. The best models for this are the HolzHer 2356 and Atlas Copco OF 1000.

This feature is extremely useful when using the router with a guidebush for template work because it enables the user to regain some of the depth of cut lost through the thickness of the template. This only applies, however, if the guidebush is of sufficient diameter to allow the collet to pass through it.

Most medium-power routers come equipped with a 17mm or 18mm guidebush as standard. This is too small to let the collet through, so we have to buy a larger bush. A 24mm bush will do nicely, indeed years ago the Elu 96 came with this



▲ *Bosch GOF 900 ACE with a Trend sub-base, bush, a Titman long-reach cutter and centring tool*

size. Then, for reasons best known to themselves, they changed it to 17mm. That's progress.

A word of warning. Trend guidebushes are fitted to most routers by means of two 5mm countersunk screws, but the DeWalt DW613 and the Power Devil have plain holes, which require nuts and bolts.

With the Trend T9 router the standard guidebushes are screwed to the inner plate by means of two 2 BA screws, whose thread is nearly but not quite the same as 5mm. Check the screws before you fit the bush. ▶

"A very useful feature is that the size is clearly marked on each bush"

▶ *Unibase fitted to a Porter-Cable router with Trend guidebush and cutter fitted*



Special sub-bases

Some routers, especially heavy-duty models, do not have a very good range of guidebushes and do not take the Trend range. For most of these routers a false sub-base can be fitted to take the Trend and similar bushes.

There are two main such sub-bases, the Circular Sub-base and the Unibase, both manufactured by Trend.

"The Unibase is a brand new product from Trend"

Circular sub-base

This is a 170mm diameter by 8mm thick piece of Tufnol, recessed to accept standard Trend guidebushes. It is drilled to suit the fixing points of the particular router for which it is ordered and the necessary fixings are supplied with the base.

Also supplied is an alignment kit so that the sub-base can be accurately centred on the cutter shank. Sub-bases are available for

a very wide range of routers, ranging from the tiny Bosch POF 400 to the massive Ryobi RE 601.

The sub-base robs the user of 8mm depth of cut but with many guidebush applications this can be overcome by buying long shank straight cutters. There are two ways of doing this.

The first way is to buy 'long-reach' cutters from Titman, or 'pocket' cutters from Trend. These have extra metal between the shank and the blades, giving as the name implies, longer reach.

The second method is to buy Leigh-jig straight cutters, which have extra-long shanks to allow for the thickness of the Leigh jig dovetail comb. Most cutter suppliers include Leigh-jig cutters in their range.

Unibase

The Unibase is a brand new product from Trend. It consists of an injection-moulded plastic disc, 170mm in diameter and 8mm thick which, like the Circular Sub-base, is recessed to accept standard Trend guidebushes.

Unlike the Circular Sub-base it is not specific to a particular router model. It has more holes than a colander, each of which is

counter-bored to recess the top of a pan head screw, and can be fitted to the base of most routers.

The recess will also take various other Trend-compatible guidebushes such as those supplied with the Leigh and Titan dovetail jigs. The Unibase is particularly useful for the many large routers that do not themselves boast a good range of guidebushes.

Examples include the Felisatti TP246E, Freud 2000, Makita 3612C, and Ryobi RE 601, but it is equally useful for some of the smaller models such as the Festo OF 1000E, Mafell LO50E and Makita 3620.

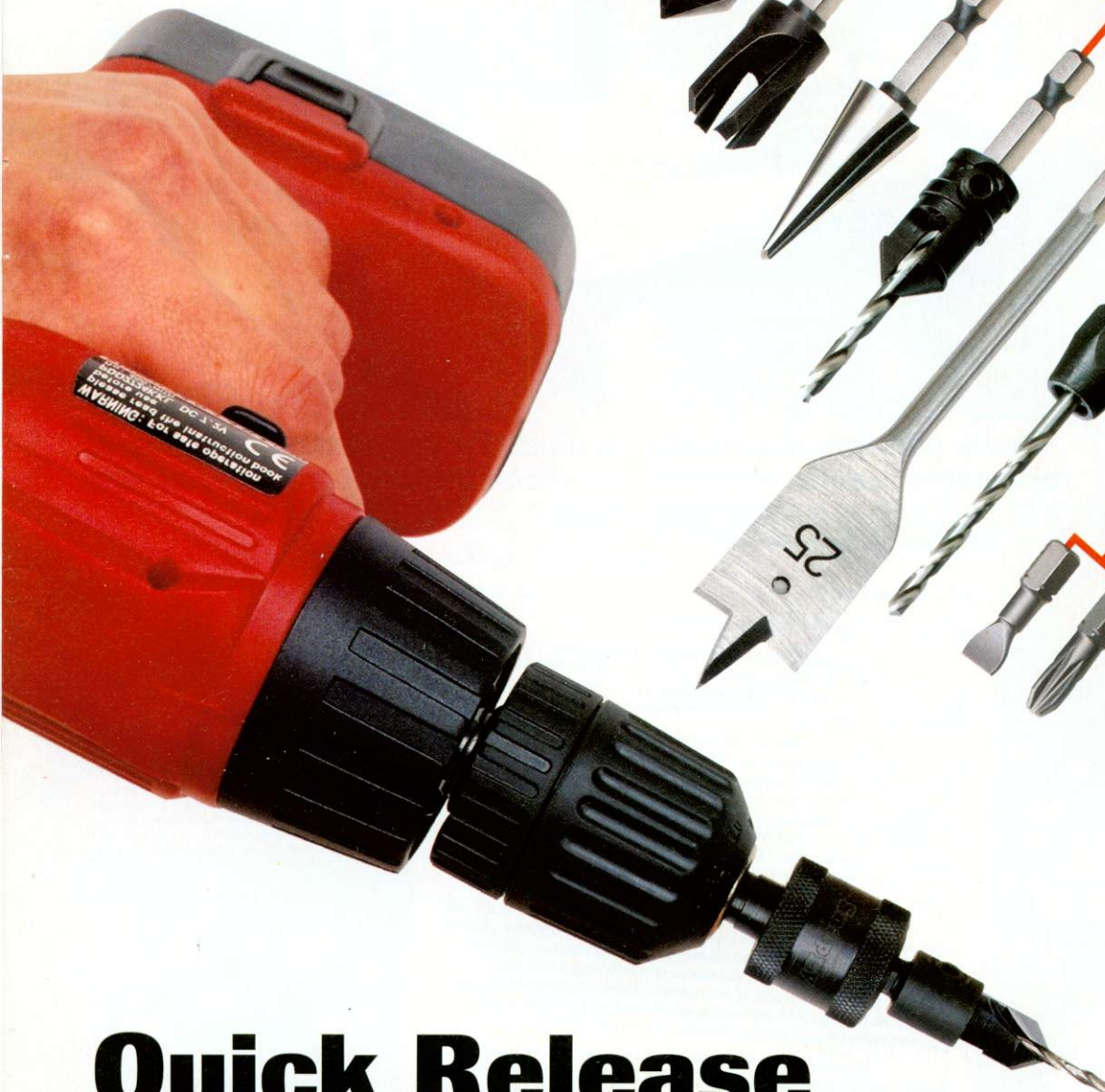
The Unibase comes complete with a plastic alignment bush and two pins to ensure concentricity of the cutter to the guidebush. The pins are stepped to fit $\frac{1}{4}$ in, 8mm, 12mm and $\frac{1}{2}$ in collets. A packet of assorted fastenings completes the kit.

For routers with rather thick removable plastic sole plates, such as the Bosch 900 and 1300, Freud 2000, Ryobi RE601, the sole plate can be removed before fitting the Unibase to restore some of the lost depth of cut. Alternatively, long-reach straight cutters can be used for many jobs, as with the Circular Sub-base. ●

▼ The Unibase kit with centring pins, a dummy bush, nuts, bolts, washers and the Routing Wizard



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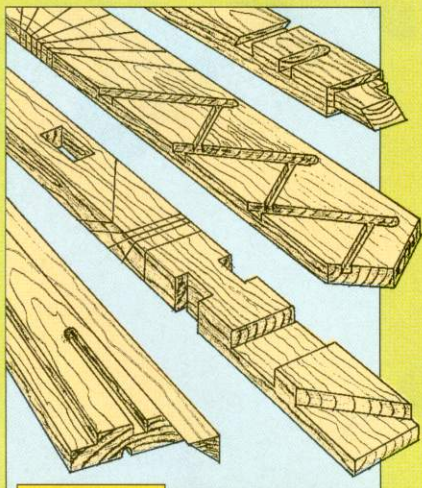
Rip and crosscut work to the precise dimensions and angles you require.



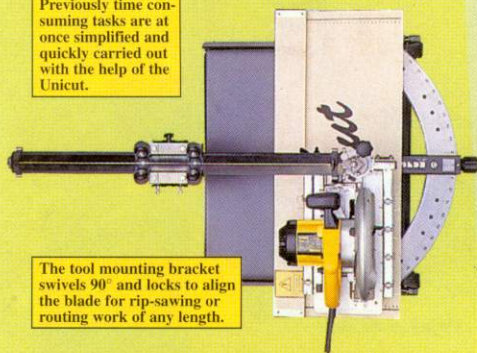
Machine rebates, tenons, housings etc. anywhere in a work face or edge.



Cut metals, pre-score or groove stone, ceramics etc. with speed and accuracy.



ACCOMPLISH MORE: Previously time consuming tasks are at once simplified and quickly carried out with the help of the Unicut.

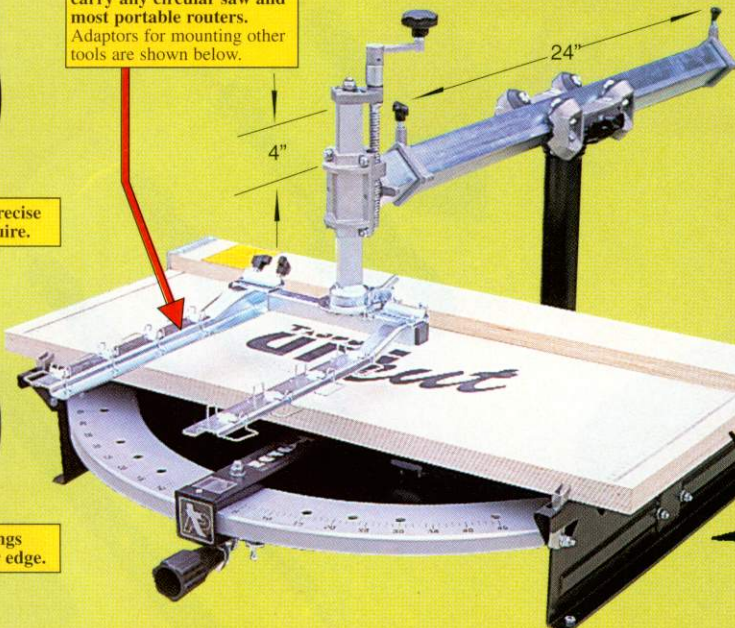


The tool mounting bracket swivels 90° and locks to align the blade for rip-sawing or routing work of any length.

Radial arm adjustment: 45° - 0° - 45° (0.15, 22.5, 30 & 45° pre-sets)
Crosscut stroke: 0 - 24" (620mm) with adjustable travel stops
Vertical adjustment of toolholder over table: 0 - 4" (100mm)
Swivel adjustment of toolholder for longitudinal feed: 90°
Table size: 32" x 12" (810 x 305mm) with dual scale graduations
Fence: 32" x 4" x 1" (810 x 100 x 25mm), adjusts across table width
Weight (machine): 40lbs (18kg); optional floorstand: 24lbs (11kg)

This adjustable tool mounting bracket is designed to carry any circular saw and most portable routers. Adaptors for mounting other tools are shown below.

Arm has 0 - 24" cutting stroke and 0 - 4" vertical adjustment.



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We are delighted to offer you this marvellously versatile new machine, the "Typhoon Unicut". You will see that it combines many of the virtues of the most useful power tools and workshop machines in a single unit. It is also very simple to use.

A portable circular saw for example is ideal for reducing large workpieces to manageable sizes but cannot be relied on for cutting finished project components (especially small ones) to the exact dimensions and angles you require. Mounted on the Unicut however, your portable saw becomes a precision tool for just this purpose. For this reason alone, at a VAT inclusive cost of less than £200, the new machine is fantastic value. (Currently, a mid-priced radial arm saw costs around £1000 and requires more-or-less permanently dedicated workshop space.) But the Unicut does indeed bring you much more:

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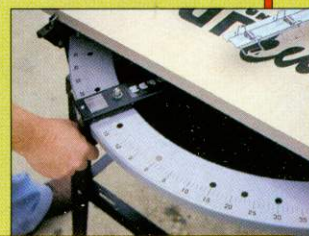
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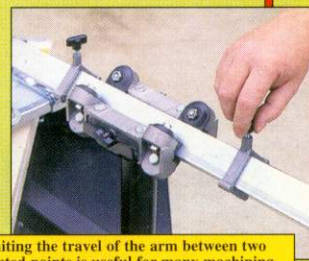
Roger Buse

Roger Buse.
(M.Dir. Unicut U.K.)

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Brilliant

**Router
Project**

Breadboards



Bill Cain gets his router out to make a neat little Christmas gift

▲ Complete your kitchen with a beautiful breadboard

▼ You can prepare your timber by hand without expensive machines

BREADBOARDS make useful Christmas gifts, and can come in all styles and shapes. Some would say that they are uninteresting; and that generally was my view before I was asked to make one. How then to keep it practical, yet at the same time a bit different from the plain slabs of timber available over the counter from kitchen shops?

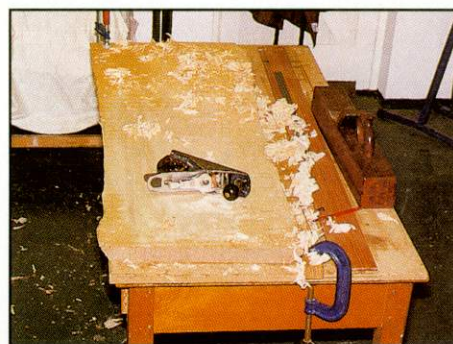
Design considerations

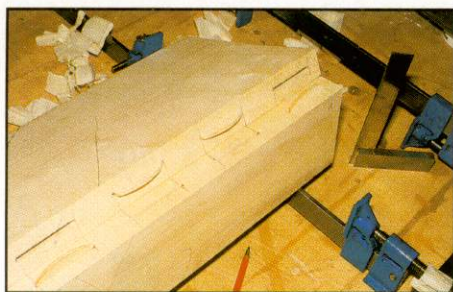
A food related item such as this needs to be constructed from taint-free timber. It must

be durable, stable, easy to clean (so no fancy mouldings), and of course something to make it look a bit different from the rest. I have tried to meet all the above objectives and keep it simple to make.

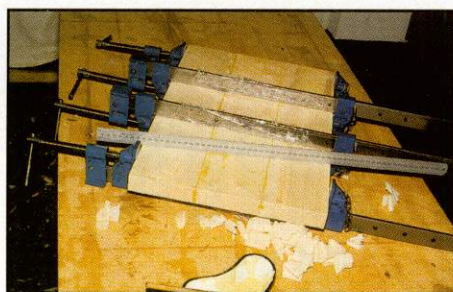
Timber wise I chose sycamore (*Acer pseudoplatanus*) for the board body, and contrasting teak (*Tectona grandis*) for the edge inserts and handles.

Sycamore is a super wood to work in, it cuts and glues well and finishes to a silky cream surface. Beech would have done the job but is so boring, while teak always





▲ Dry assemble the biscuit joints to check for fit



▲ Cramp up the boards evenly and check for flatness



▲ Sycamore is great to plane and has a fine finish



▲ Routing the 1/4in rebate. Note the high fence



▲ Gluing the handles onto the board. Note the masking tape and foaming adhesive

looks good, particularly when set against a contrasting wood.

In order to keep the board stable in width it is constructed in three pieces (with the grain alternated), biscuit jointed together, and with the handles inset into the end grain of the board at each end.

Adhesives need to be of the 'waterproof' type. I used Titebond 2 for the board, and Titebond polyurethane for the teak-to-sycamore joints.

By the way, if the teak is 'greasy', as it often can be, then degrease it with cellulose thinners or meths just prior to gluing to achieve good adhesion.

"Sycamore is a super wood to work in"

▼ The teak insert is hardwearing and looks good



Construction

Nothing difficult, just a little care to ensure all prepared timber is true and square and that edges to be jointed are gap free. On jointed edges it always helps to keep your timber lengths a bit longer, only finishing to length post-gluing.

Having prepared timber for the board, biscuit joint the boards together with size No. 20s. Leave the teak for now as its thickness needs to be a snug fit into the rebated edges of the board.

A 'loose' 6mm (1/4in) thick plywood tongue into a groove will do just as well if no biscuit jointing facilities are available. Glue up and cramp, ensuring the board remains flat under the cramping pressure.

When jointed, the board faces will need to be cleaned up, with the width and length finished to final size, making sure all edges are both true and square. Finish sand the ends into which the handles are to be fitted.

The edges now have to be rebated to accept the edge-handle inserts. With the 35mm thickness of board, I used a 12.7mm dia. Jesada spiral cutter in three passes to a depth of 20mm on the centre line of all four edges, but any other suitably-sized cutter would do just as well.

The advantage of a spiral is that it cuts very cleanly and results in a constant sized groove. Depending on your set up and cutter, if the work is to be presented to the cutter in a vertical mode, a high fence and 'hold in' pressure device should be used for your own safety. This should ensure that the work remains both stable and vertical when presented to the cutter.

"Beech would have done the job but is so boring"

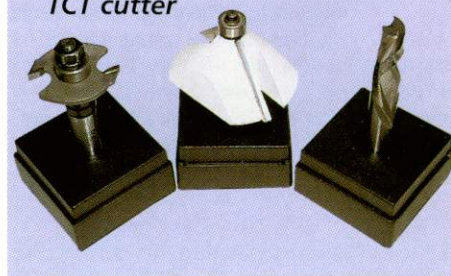
Finishing off

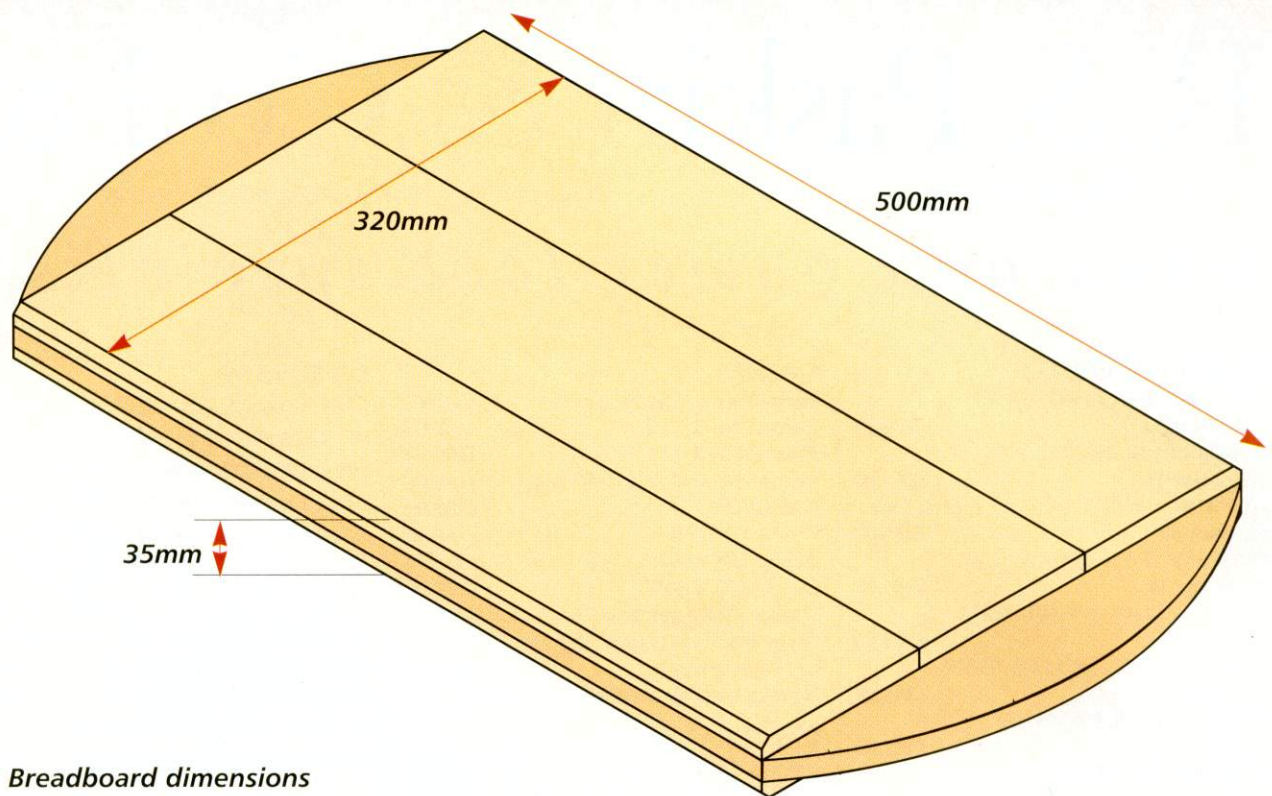
The contrasting timber (teak) should now be thickened to achieve a 'snug', but not too tight, fit in the board rebate. The width of the side inserts should be left over size, about 5mm, so that there is something to cramp onto and clean up after gluing.

Dry fit the inserts and mark off to length whilst inserted, identify the inserts so that they go back into their fitted positions, and

Tooling up

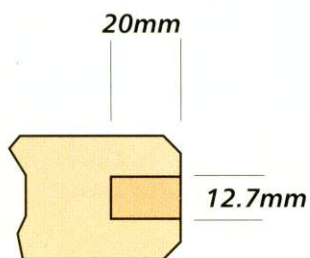
- Elu 177E router mounted in an Elu table
- Trend 342 biscuit jointing cutter set
- Jesada 1/4in dia 880-520 spiral TC cutter
- Jesada 45° chamfer 636-950 TCT cutter



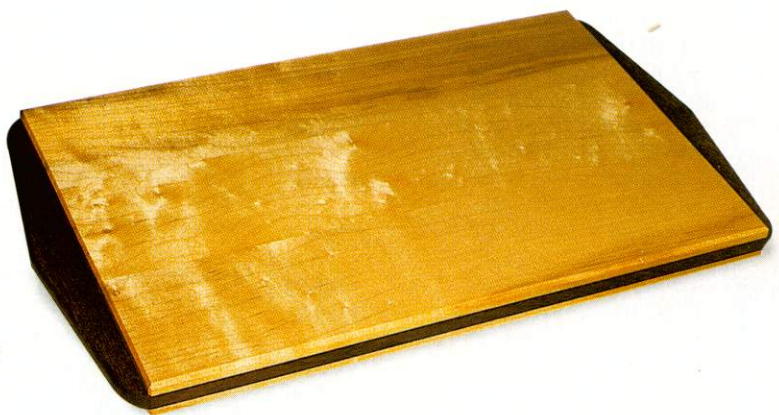
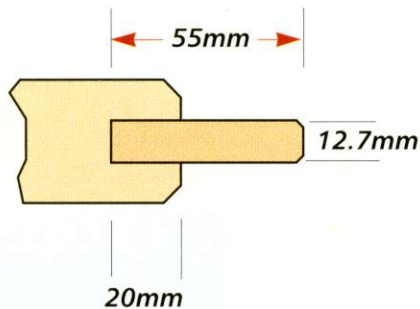


▲ Fig 1 Breadboard dimensions

► Fig 2 Side section

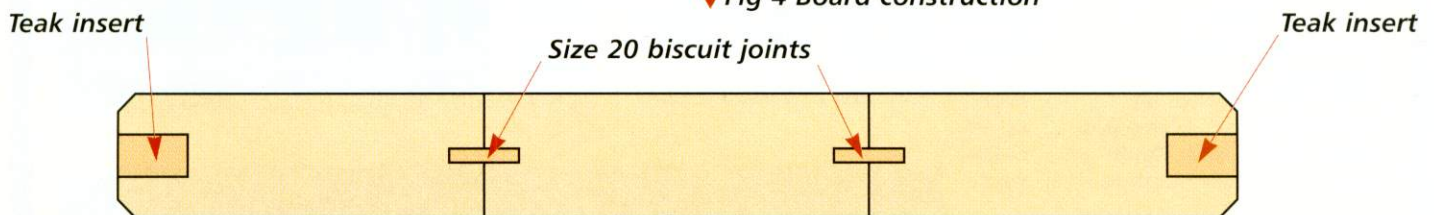


► Fig 3 End section



▲ Get chopping on your new breadboard

▼ Fig 4 Board construction



mitre cut to length. Glue the inserts into the board. When dry, plane the inserts back to the board width and remove surplus dry adhesive from the mitred ends.

Make up and mitre the handles to suit the board sizes and side insert's mitres. Finish sand and apply a chamfer or moulding to the handle top edges, stopping it short of the mitred ends. Glue and cramp the handles into the board.

I have found that when gluing joints of this nature, it is far better to mask off the

finished faces of the work than trying to clean up surplus adhesive after it has set. This is very quick and easy if you use a foaming polyurethane such as Titebond since, when set (about 30mins), the masking tape can be removed complete with the surplus adhesive. No further clean up of any kind is required. Blend or hand chisel the end of the handle chamfers.

Finish sand the completed board and rout a small chamfer or moulding around its faces. A quick rub over with olive or

sunflower oil is all that's required to complete the board and bring out the colour and texture of the timber. ●

"A spiral cuts very cleanly and results in a constant sized groove"

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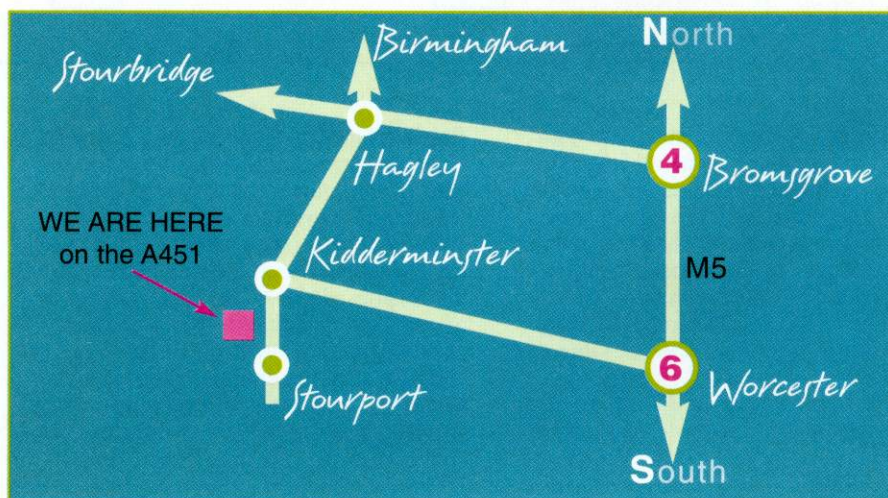
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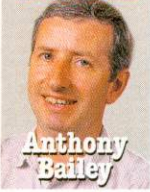
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TESTER



Anthony Bailey

Mr Universal

▼ The Unibase kit with its centring pins, nuts and bolts, a dummy bush and the Router Wizard



Anthony Bailey checks out the Unibase from Trend, probably the most universal guidebush device available

It isn't too often that someone devises a routing device that will cope with many situations. Usually what will work with one router won't be compatible with another or won't give quite the same result.

Now, Trend have produced the Unibase, a product meant to simplify and make universal the fitment of Trend guidebushes to any

router on the market. It is done with several aims. One aim is to encourage the use of Trend products, for example, when using the Unibase and guidebushes you know you can use their dovetail jig without problems.

The Trend range of guidebushes on their own is extensive even without special jigs, as guidebushes are handy things when making up templates to go with certain size cutters.

"This simple gadget has more usability than you might think"



◀ **The Unibase stops a small router dropping into a large hinge recess**

has to be accurately aligned with the cutter axis, this automatically makes the external diameter concentric to it as well.

What, might you ask, is the use of that? Router bases have one flat face, two flat faces or are circular, but invariably cutter-to-base edge distance varies slightly from side to side or all round.

So, when you make a cut along a straight edge, the positioning of the router base against it will affect just how precisely the cutter will follow your intended line on the wood.

Not any more. Unibase sorts this one out and allows precise machining, even if the base turns as you move the router, just so long as you keep it pressed against the straight edge.

What you get

So what do you get in the Unibase box? The box itself is tough corrugated cardboard, worth keeping to protect the Unibase kit when not in use. On it is a list of routers and corresponding parts needed, plus the Trend range for handy reference.

The Unibase itself is tough PC/ABS plastic, 170mm in diameter, with a bewildering array of holes carefully

Matching up

Just to make the point of how universal the Unibase is, here is a list of compatible makes, listing all the models would take up even more space! So, Trend, Atlas Copco, Bosch, Casals, DeWalt, Elu, Felisatto, Festo, Freud, Hitachi, Mafell, Makita, Metabo, Perles, Peugeot, Ryobi, Skil, Sparky, Wadkin.

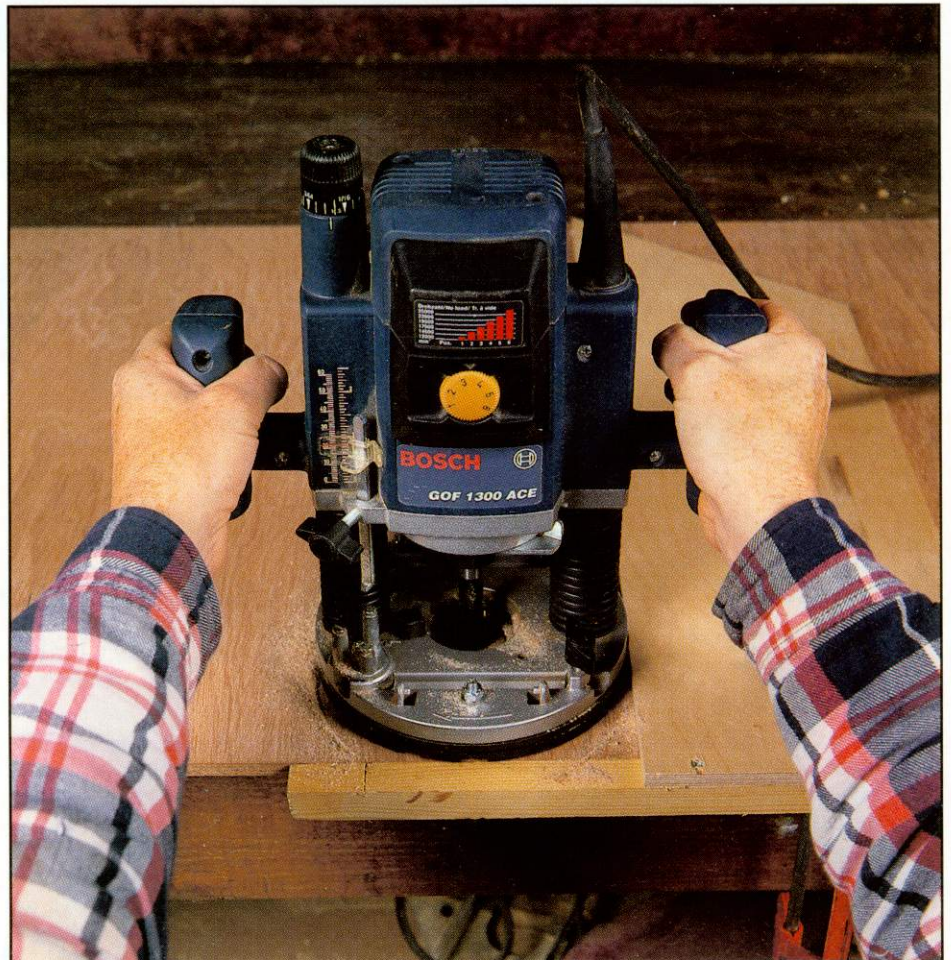
I mention all these because this simple gadget has more usability than you might think. Ok, so you can fit almost any router. Then there's the fact that all Elu accessories, or any jigs you might have made for a perhaps now defunct Elu machine (this applies to DeWalt models and some other brands too) which need guidebushes, can be used with your new router – no problem.

The large external and small internal diameters of Unibase would suit small routers when you are looking for extra base support in freehand mode, particularly when you are oversailing an edge and your average router becomes unstable.

This also applies to hinge morticing, where the normal baseplate can drop into the recess you are creating if you aren't careful!

Lastly, there is the inherent concentricity of Unibase. Because the centre

▶ **Exact cutter-to-fence distances are possible with Unibase**



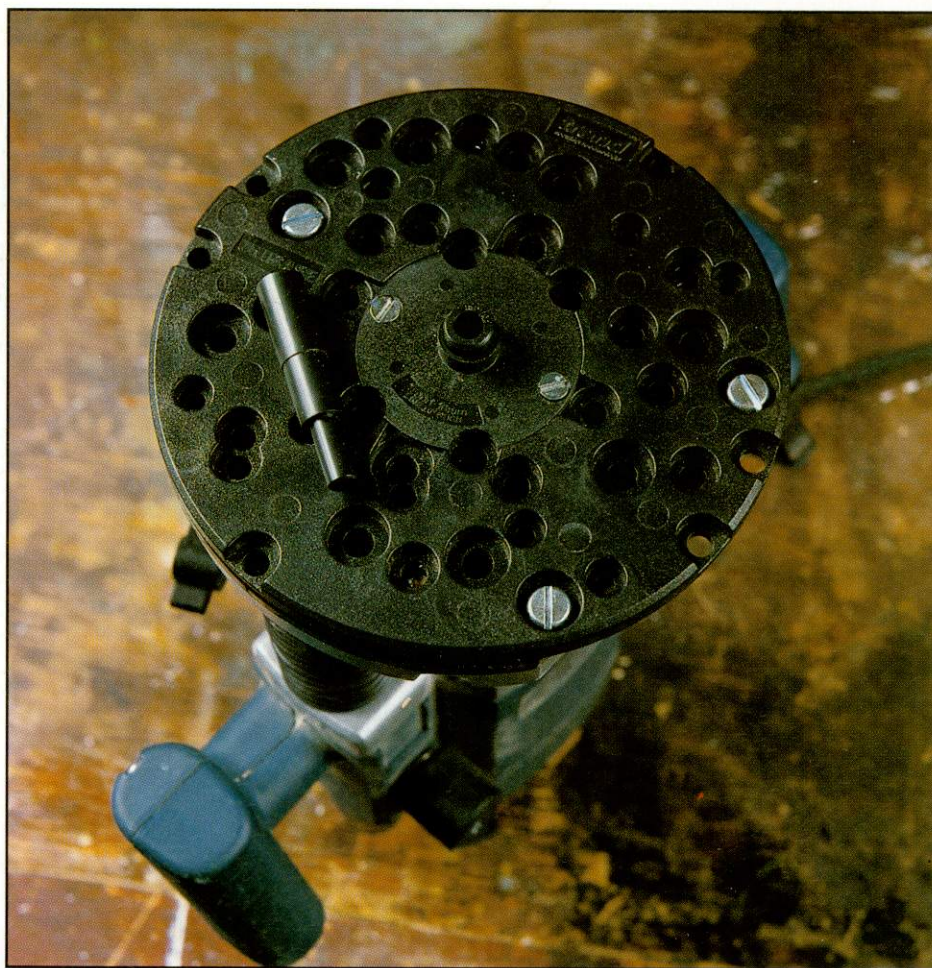
► **The Unibase with its centring pin and a dummy guidebush in place**

positioned to match any suitable router. There is a guidebush recess and two threaded brass inserts for fixing them in place.

The edge of Unibase is bevelled so it won't catch on uneven surfaces. A bag of machine screws and nuts to suit all fixing needs is supplied, along with a special 16mm overall diameter plastic setting up guidebush and two plastic centring pins, one for 8mm and 12mm collet sizes, the other for $\frac{1}{4}$ in and $\frac{1}{2}$ in collets. This allows accurate centering with any standard collet.

These plastic parts are only for setting up, proper guidebushes and cutters are then substituted. Also included is the handy Trend 3 in 1 Routing Wizard for working out template offsets for guidebushes, metric to imperial conversions and slotter or cutter-to-bearing diameters when doing bearing-guided work.

"Getting the setting up guidebush in position is a doddle"



In use

I tried it on several different routers which it fitted without any trouble. There are one or two notable exceptions, such as the big Bosch machines, which Unibase will not fit.

Some cheap guidebushes that will fit may be slightly inaccurate, whereas the Trend ones are exact and the bush itself isn't simply pressed steel but a seamed collar giving a very square junction with its plate.

Inserting the plastic guide pins, and getting the setting up guidebush in position is a doddle. Then simply do a swap for the real items and you are ready to go. The hard, slightly textured plastic glides easily over the wood.

Conclusion

It's hard to tell just how long something will last with heavy use, but the Unibase is made from one of the toughest plastics and should stay accurate for a long time to come.

Being able to extend its use, both as a sub-base for awkward freehand work and its inherent concentricity once set up properly, extends its value well beyond the catalogue price of £14.70 inc VAT. ●

See Contacts on page 71 for details

◀ **A Trend guidebush and cutter installed after centring the Unibase**



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Supplied with the same cutters as the three piece sets but with two additional cutters, one for glue jointing panels together and a second for precise drawer manufacture.

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Patrick Spielman is an internationally recognised woodworking authority



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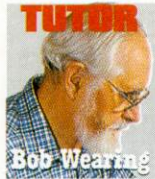
600-505 Thirteen piece Set

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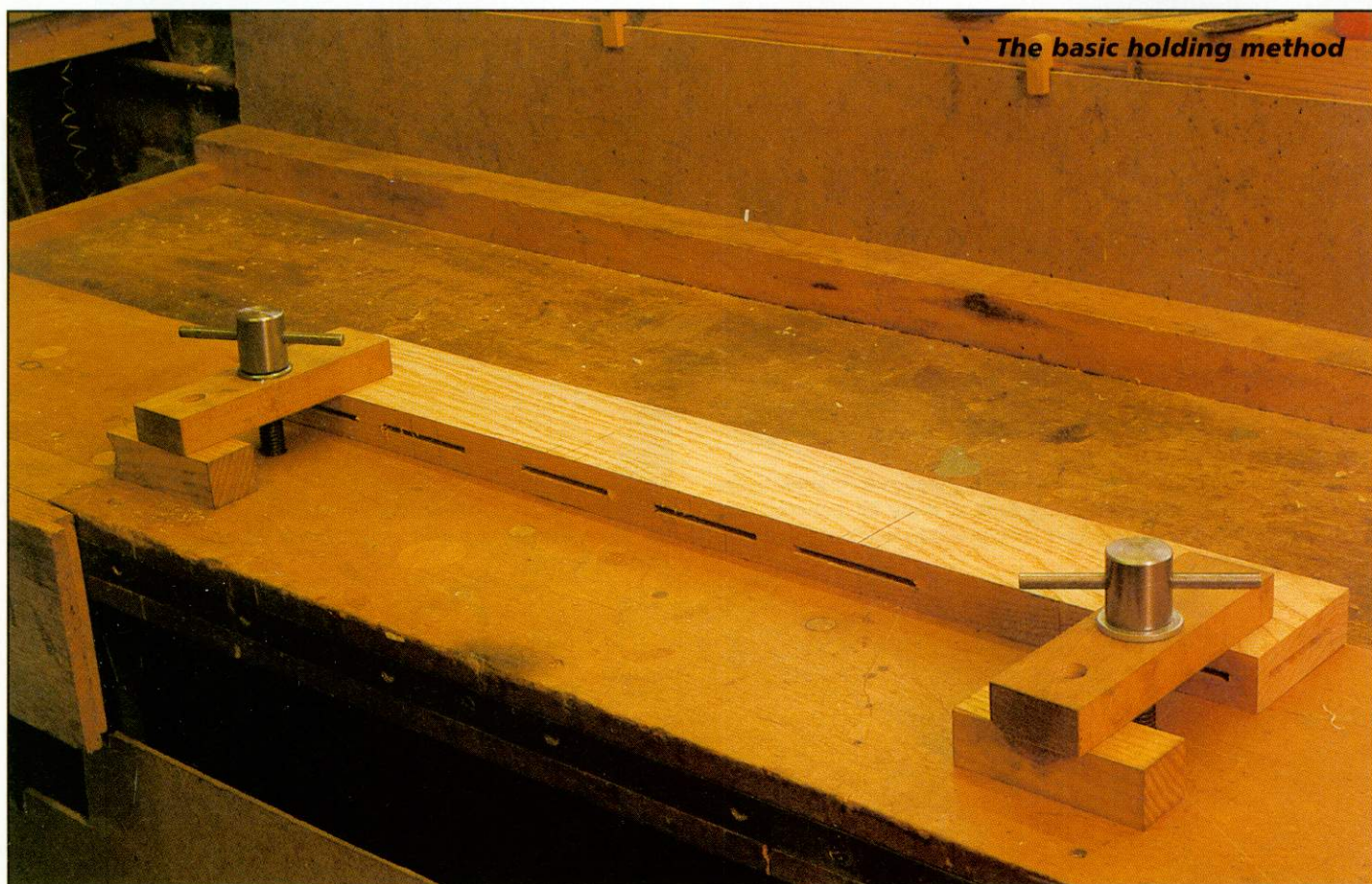
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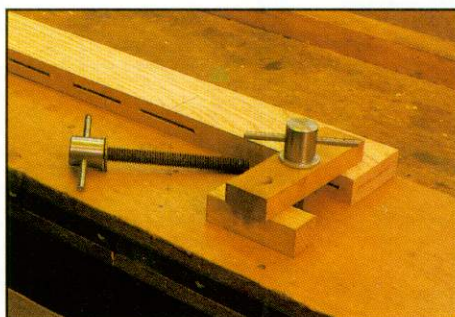


Bob Wearing takes the pain out of workbench clamping with a simple hold-down system

THE 'bench holdfast' is the common method of holding work firmly to the benchtop while working it either by hand or with a router. Apart from the cost, of two hold-fasts, there is the inconvenience of making a number of large holes in the benchtop, probably of about $\frac{1}{4}$ in in diameter, through which smaller items are likely to fall.

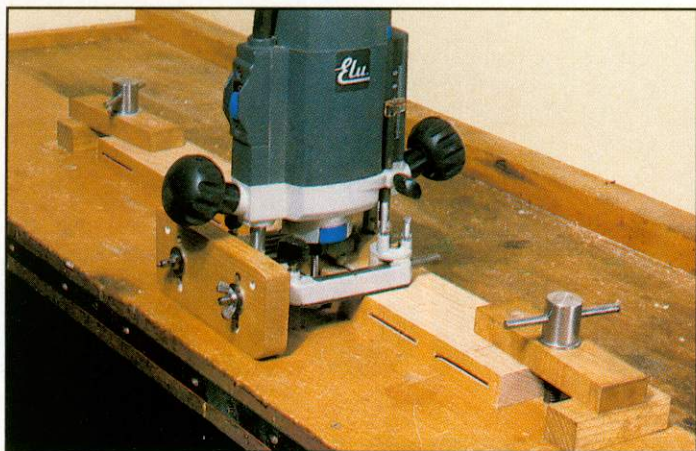
Some holdfasts are supplied with steel bushes, which are let in flush with the benchtop. Several of these on the work surface can prove quite a hazard to any edge tools coming into contact with them. 

▼ *Detail of the hold-down bolt*

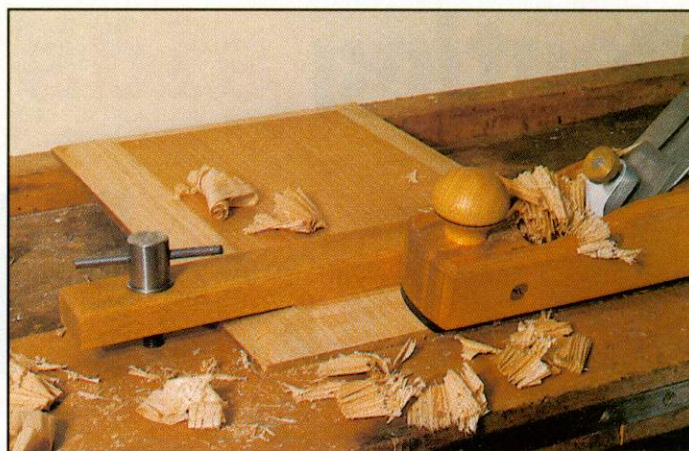


The drilling aid ensures truly vertical holes





▲ Holding for biscuit routing...



▲ ...and for a stepped fielding. The batten acts as a fence

"No-one likes to deface their benchtop, but holes of this small size will have no ill effects"

Bench work

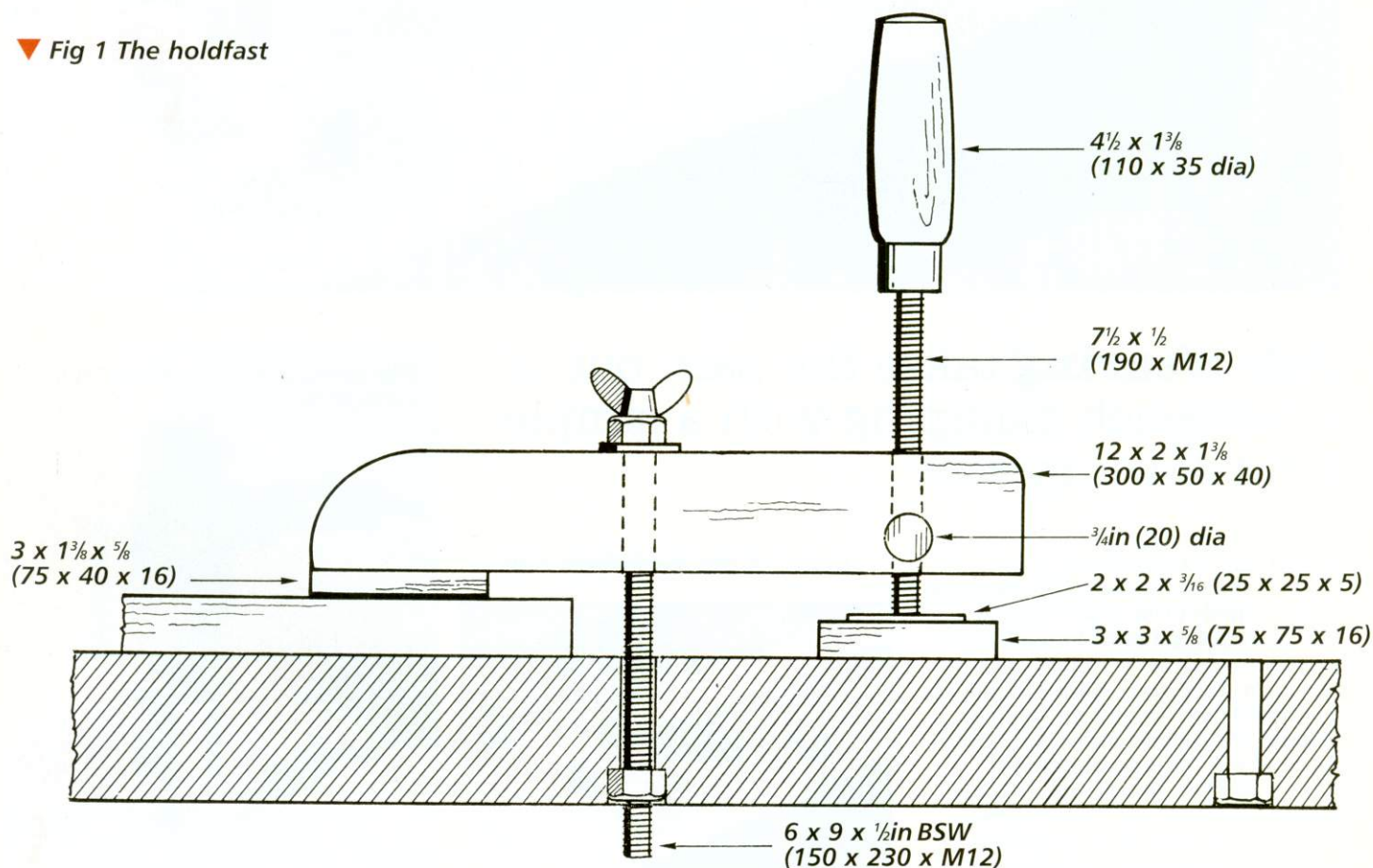
However, there is another way to go about holding your work securely to the bench that costs very little and avoids the objections just described. A complete kit is made to my design and supplied by Vanguard Tools of Sheffield.

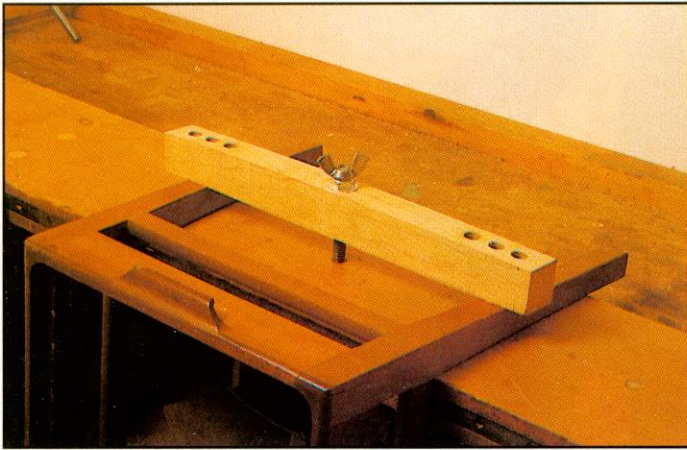
To set up, mark the centres of a row, or two rows of holes in the benchtop. I would suggest spacing them at about 8in between centres. No-one likes to deface their benchtop, but holes of this small size will have no ill effects.



▲ Remember to site dowels or biscuits well clear of the fielding

▼ Fig 1 The holdfast





▲ A single bolt holding helps to clean up a stool construction

On these centres, drill through 3mm pilot holes. A drilling aid is useful here as it guarantees a truly vertical hole. Now go to the underside of the benchtop and bore holes to accept the nuts supplied. The diameter is the size across the flats, which is also the same as the spanner size. The nearest size of an economical flatbit is $\frac{1}{4}$ in.

On these pilot holes, drill to a depth of about 12mm, then from the top, on the same pilot, drill through at 13mm. Pull a nut into each cavity. Do not merely hammer in the nut, as this may damage the thread and will almost certainly drive the nut in askew. Instead, use a bolt, washer and bored wood block to do this.

The workpiece can be held in a number of ways. A useful method, for example, when using the router to biscuit joint, is to prepare two small hardwood blocks, bored about 14mm. These are used with two small off-cuts from the job.

"Do not merely hammer in the nut, as this may damage the thread"

Clamping battens

A further method, useful for panel fielding, and of course for other work, is the use of clamping battens. These are best made from hardwood, and can span two, three or more bench holes.

Drill holes to match, for instance, at 8in between centres. For ease of operation, bore these at 14mm. The batten simply clamps across the workpiece. In some situations the batten may also act as a fence for a plane or a power-router.

Stools and small tables can be held securely after the glue-up for cleaning up by plane, scraper or abrasive paper. One clamp is used centrally, but for larger work use two screws.

Morticing in the vice is generally viewed as a bad idea as it weakens the vice-fitting, and the work can be damaged by sliding down the vice jaws. A substantial block, retained for this job, can be bolted to the

benchtop and the workpiece cramped to it. This is particularly useful on benches which have a front apron piece.

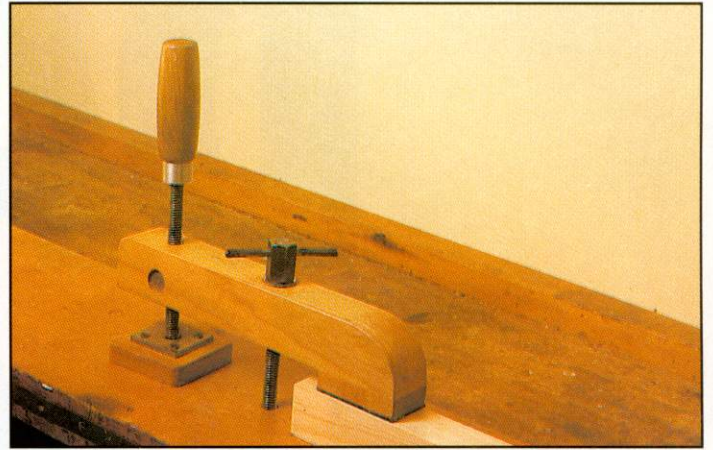
Single cramping

A holdfast can be made for single cramping, working on the principle of the handscrew. Slightly oversize holes will make for easier working. Position the holdfast using the centre screw, then apply pressure with the handled one. Aim to keep the tool as horizontal as possible.

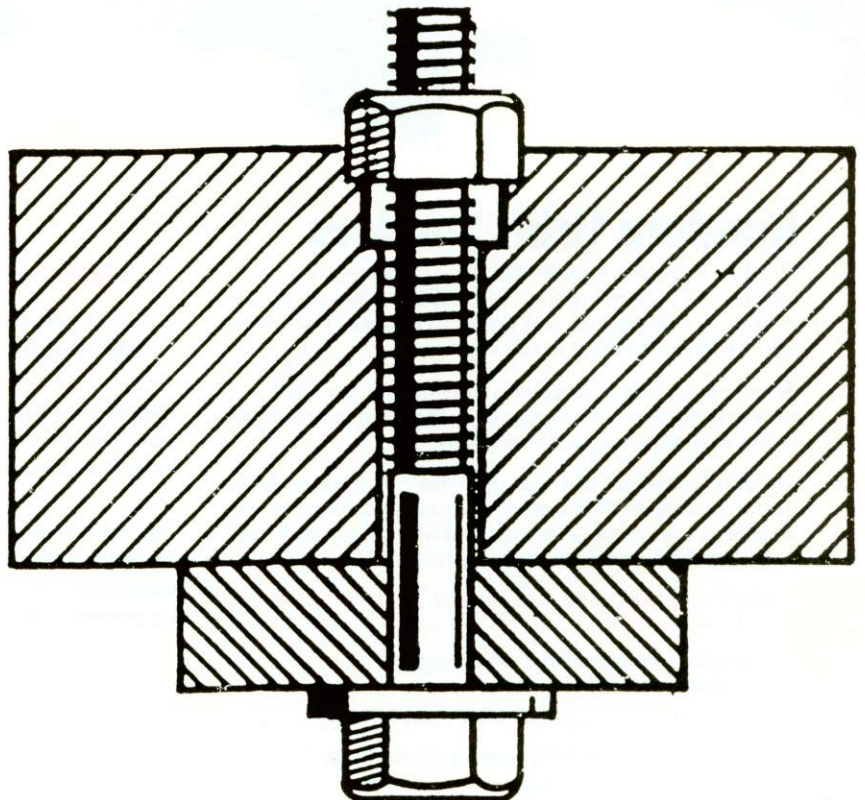
Now about these holes, which nobody welcomes in the benchtop. Drop a piece of

12mm dowel into each hole, then plane flush with the benchtop. When a hole is required, the dowel can easily be pushed out with a pencil, or better still, a short piece of 8mm metal rod. Chisel a small facet on the entry end of the dowels; this will ensure that they always go in the same way.

A set of clamping two screws, with tommy bars, two large heavy washers and six nuts, are all available from Vanguard Tools, 102 Harvest Lane, Sheffield, S3 8EG. Tel 0114 2737677 for more details. Further M12 nuts are available from all good hardware shops. ●



▲ A homemade holdfast to work with the system



▲ Fig 2 Draw the nut in with a bolt, don't hammer it in

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Random Orbit Sanders

Frankly, a German built Metabo Random Orbit Sander isn't for everyone. For starters the entire line is built to a standard, not down to a price. For some people that standard is too high.

But for the professional who knows that the best power tools are the cheapest in the long run Metabo is the only way to go. Here's why:

Metabo Random Orbit Sanders are hand assembled at our factory in Nürtingen, Germany from parts we engineer ourselves. Tools are individually tested and then checked out feature by feature;

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These Random Orbit Sanders are tough but light, they have excellent balance and fit snugly into your hands, overall this makes them a lot less tiring to work with.

So, the bottom line. Is a Metabo worth the extra money? The long answer is that life's far too short to mess around with second-rate power tools which end up costing a fortune.

The short answer, of course, is worth 'every pfennig.'

MODELS FEATURED: Sanders: SXE400, SXE425, SXE450



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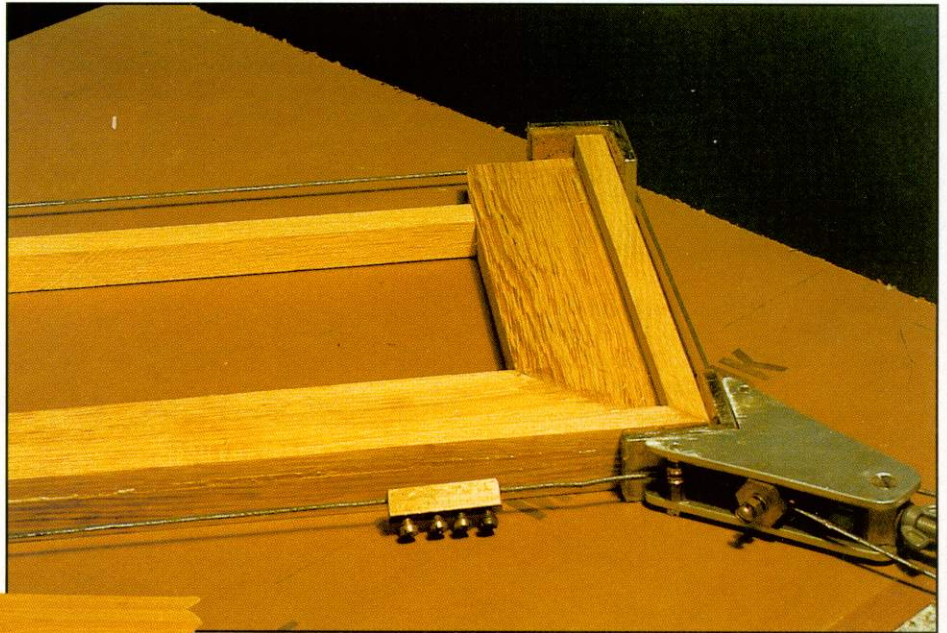
Under the hood

David Tippey finishes off his longcase clock project with an artfully designed hood

THE hood is really just a dust cover for the movement, but is also where the clock builder has the most influence over the clock's appearance. With the trunk you can have a different shaped door or foot, possibly adding a stopped chamfer to the front corners, or alter the shape of the mouldings, but the rest of its looks are down to the choice of timber and finish.

Without the hood in place they all look very similar. With hood design you can run riot and add almost any number of mouldings, columns and brass adornments. They exhibit great individuality. Square dials are often housed in simple hoods with a cornice like this one, with grander versions having caddy tops or 'Greek temple' architectural designs.

▼ *The longcase clock, top section*



▲ *The hood base glued and cramped. Note the scrap wood spacer*



The break arch dial usually has an ornate top with swept swan neck pediments, and all the grander examples are adorned with polished brass finials or eagles mounted on polished orbs.

The round dial was usually confined to the precision, astronomical or watchmaker's regulator, but it also appears as a typically Scottish design, often with a rather classical style hood.

Hood

In essence the hood is simple, a box without base or back which slides onto the case from the front, supported on the large moulding fitted around the trunk above the door. A door is fitted to allow you to set the hands without removing the whole thing, and it also houses a dial mask

which fits up to the edge of the dial, preventing you from seeing past it into the case.

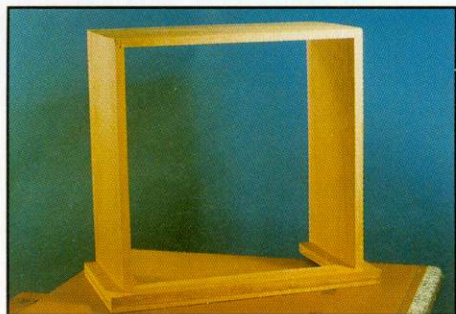
Some early hood examples lifted upwards, but it was soon realised that this wasn't a very practical alternative.

You could use any of the hood designs to construct the case for a wall hung clock, with the pendulum and weights hanging below.

Construct the hood in exactly the same way, but make a backplate and bracket, based on the top section of the trunk in last month's article. You can cut away the sides to form a bracket below the hood support moulding, and add a decorative mould to the bottom of the backboard.

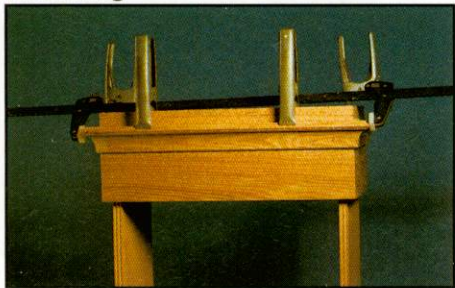
Base

I started by constructing the base of the box, a three-sided frame with moulded edges, which slides onto the support moulding already fitted to the waist. The three pieces were mitred, the joints reinforced with biscuits and an extra strip added around the lower edge which would form the small mould which overlaps the top edge of the waist moulding.



▲ *The hood assembled to check for fit*

▼ *Take care to avoid marking the moulding*



I glued these together, clamping them with a picture-frame clamp. Use a piece of scrapwood cut to length to support the open end of the frame. The size of this base frame will have to be adjusted to suit the trunk and hood support moulding.

A small moulding was glued and pinned

to the bottom edge of the base to locate it on the trunk and cover the plain edge of the hood support moulding.

Once this base section is assembled, slide it into place and screw and glue blocks to the top of the trunk sides, forming a runner for the base to slide into.

Hood body

Cut the two main sides and the top for the hood, joining the three pieces together using lock mitres and reeding the front edge of the two sides to get rid of the rather solid look.

Some cases have small windows in the hood sides and these could be routed from the solid sides, or the side panels could be made as frames.

I attached them to the base frame using a butt joint reinforced with biscuits, using a 4mm solid carbide router cutter for the base section, as the biscuit cutter wouldn't reach far enough to line up.

Before gluing up, the hood was temporarily assembled onto the waist to check the fit. The internal size of the basic box structure should be the dial size, plus twice the door frame width, plus opening clearance. The glazed area of the door is often



▲ *Built up mouldings on the hood with the door in position*

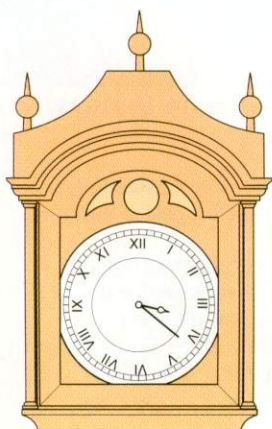
slightly smaller than the overall dial size.

When gluing up check everything carefully for squareness as it is very easy to glue up this partial box out of alignment.

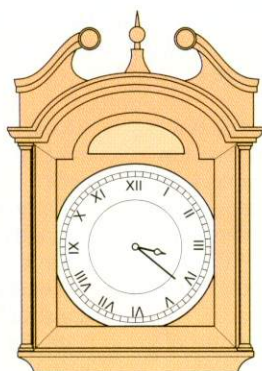
Backboard

As when fitting the base, the backboard

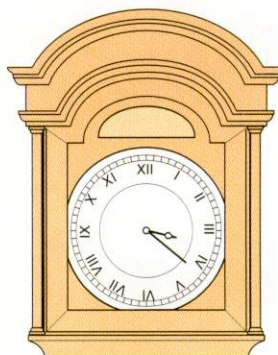
"Having completed the basic box, the decorative cornice moulding is constructed"



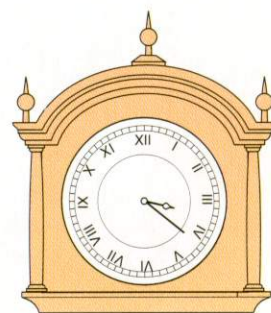
▲ *Pagoda top*



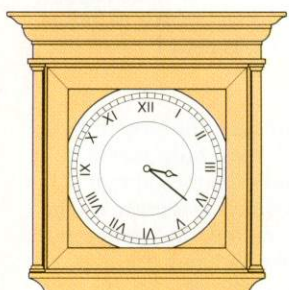
▲ *Swan neck pediment*



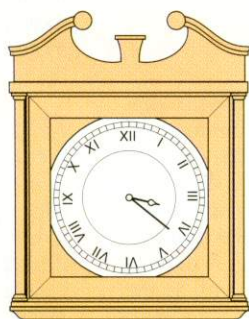
▲ *Broken arch*



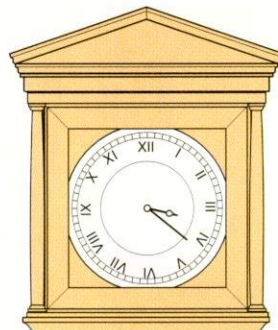
▲ *Round dial*



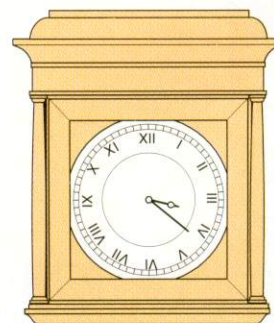
▲ *Country style with pillars*



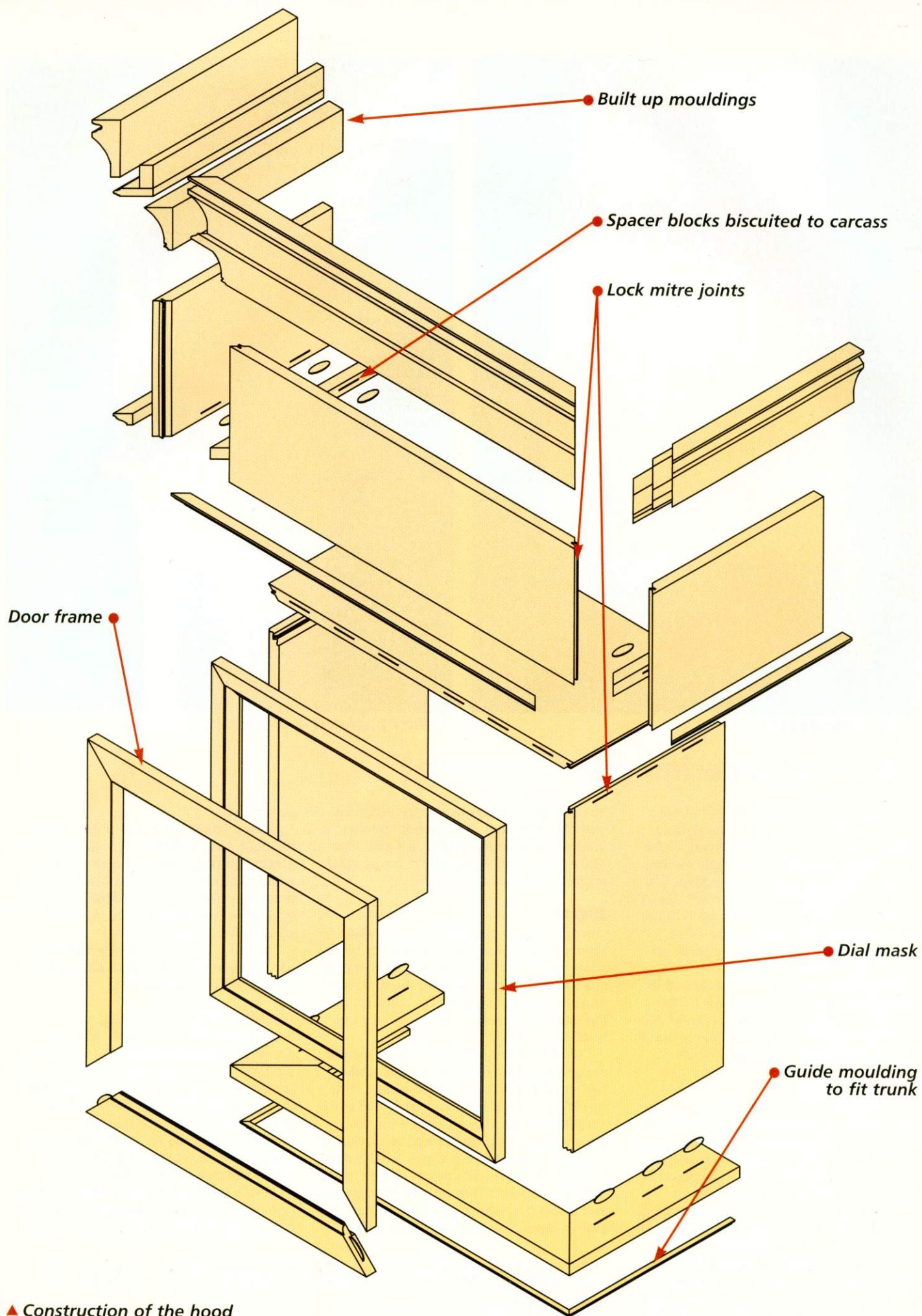
▲ *Swan necked*



▲ *Architectural*



▲ *Caddy top*



▲ Construction of the hood



▲ *The filler pieces*



▲ *The completed case awaiting finishing*

"With hood design you can run riot"

needs to have two filler pieces fixed to its edges, to make it out to the correct width to fit the inside of the hood. I also had to trim the backboard height so the hood would slide over the top edge. The clearance between hood and waist doesn't want to be so tight that the hood will not slide on easily, but needs to be close enough to keep too much dust from getting to the movement.

Once fitted the hood does not need to be removed often, as access for winding the clock is gained through the hood door with key-wound movements, or the trunk door if it is a chain-wound movement.

Dial mask

A dial mask is fitted behind the door, the inside edge is chamfered and fits right up to the dial, overlapping it by about $\frac{1}{8}$ in all round. This frame is made to fit snugly into the case and will finally be glued in place when the hood is complete.

This mask stops you seeing the edge of the dial when viewing the clock obliquely. The dial and movement mounted on the seat board are really needed at this stage, to check that everything will line up.

You can easily align the movement laterally, but you may have to alter the seat

board to get the dial to line up vertically with the apertures in the mask and door if your movement and dial aren't available. Make sure that the pendulum hangs clear of the backboard of the trunk.

Door

Once glued up, the basic box and slide runner base is ready for the door to be made and fitted. The majority of longcase clocks have pillars flanking the dial, and on some clocks the door fits right across the front of the hood and the pillars are fixed to the door.

I chose to omit pillars, giving a simple design with the feel of an earlier 'caddy top' style, but if you include pillars with this style of internal fitting dial, make sure there is enough clearance for the door to open with them fixed in place.

I made up some mouldings for the door and mitred the frame corners. I used some cut down biscuits to reinforce the corners and glued it up using a picture frame cramp, carefully checking the door for

squareness.

Picture-frame glass was used to glaze the door, held in place by a smear of clear glazing silicone adhesive and a small wooden bead. You can use conventional brass butt hinges, but the traditional swan neck style hinge throws the door well clear of the pillars if fitted.

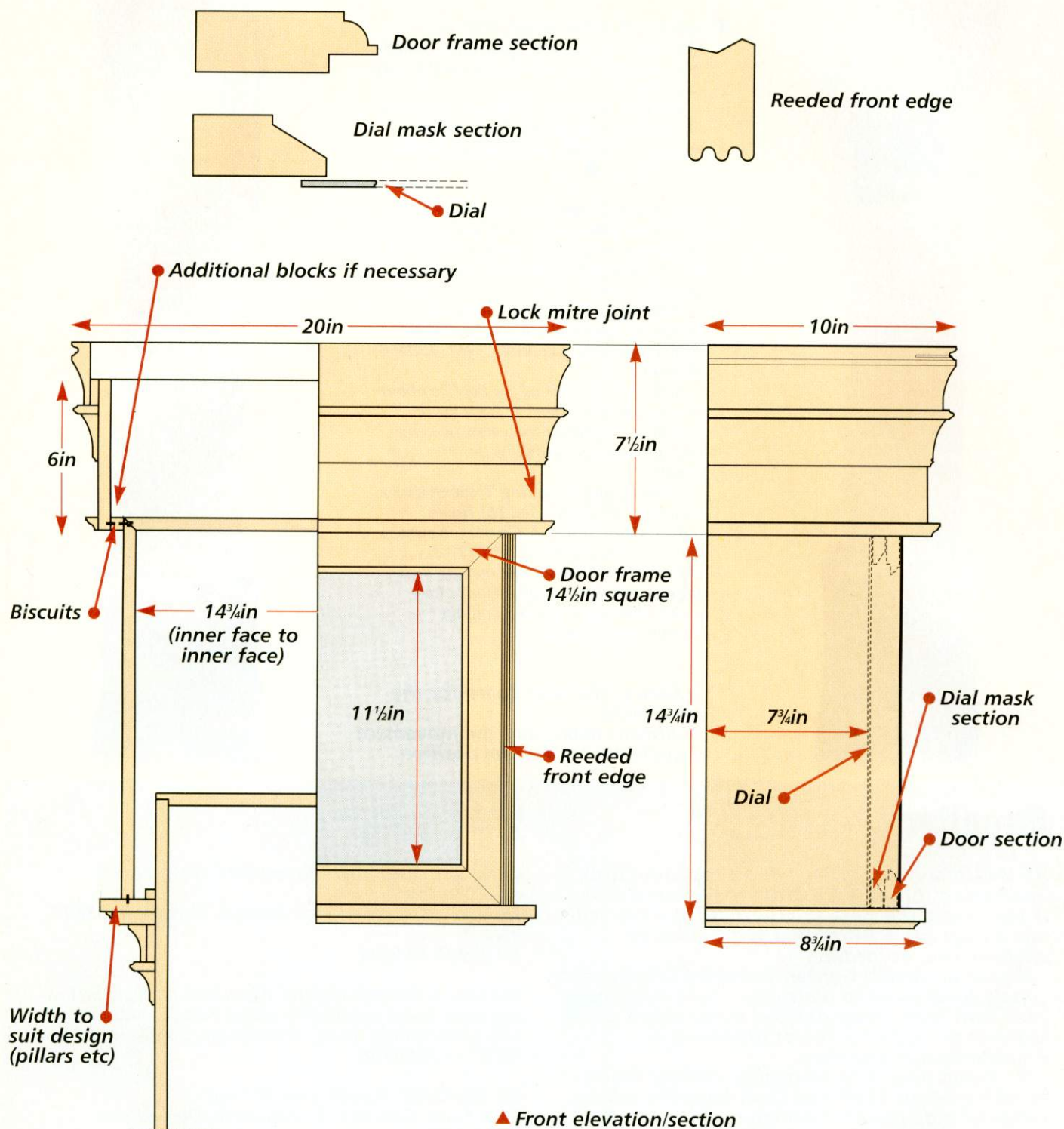
I added a brass knob and a miniature ball catch to keep it closed, although a lock could be used instead.

Hood moulding

Having completed the basic box, the decorative cornice moulding is constructed. First an inverted skirt was made to fit to the top of the basic hood. I used three pieces of 6in wide material, with lock mitre joints at the front corners.

The three pieces were fitted to the top edge of the box, using biscuits to add additional support. If pillars are being used or a wider hood top is desired, spacer blocks will need to be fitted between the top of the hood and the inverted skirt.

"I started by constructing the base of the box"



"Once fitted the hood does not need to be removed often"

After gluing the skirt to the top of the hood, I assembled the various mouldings. The large swept mouldings were produced with a Perform vertical panel raising cutter. Most of the other mouldings were cut with multi-form and classical bead cutters, all supplied by Axminster Power Tools.

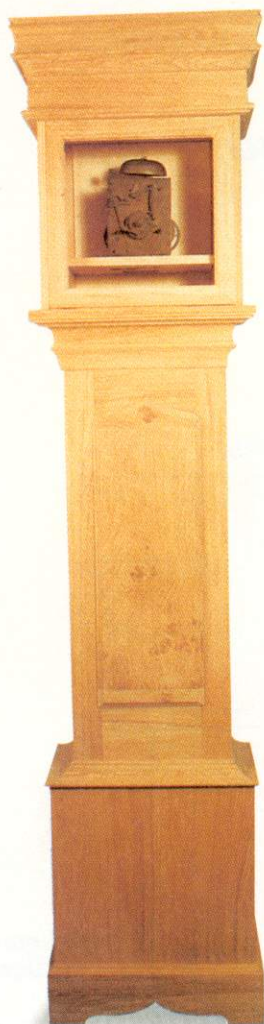
A small moulding was fixed around the bottom of the skirt, then a plain fas-

cia section left, before the large cornice moulding was built up from four separate pieces, each applied individually. I didn't consider further reinforcing of any of the joints necessary, but you may like to fit glue blocks to add additional strength to the inverted skirt and cornice moulding, which would be more vulnerable to damage when removing the hood.

Finishing

With the construction completed, I now have several weeks to stain and polish the case whilst the movement and dial are restored. I will use an 'antique' type finish to blend the new clock with my older furniture, using finishing techniques I have found successful in the past.

After rubbing down and scraping the case, I will stain it with walnut stain and



◆ seal it with button polish, then use 'Jacobean' scumble to darken the mouldings and corners, sealed with another coat of polish.

The case will then receive several coats of coloured wax polish, the first being applied with 0000 wire wool to de-nib the surface. ●

The specialist suppliers are listed below, but I have come across two good books in the library which are worth looking out for if you wish to construct your own longcase clock.

'Making an Eight Day Longcase Clock' by Alan Timmins, published by TEE Publishing, Leicester, 1981, ISBN 0 905100 37 9.

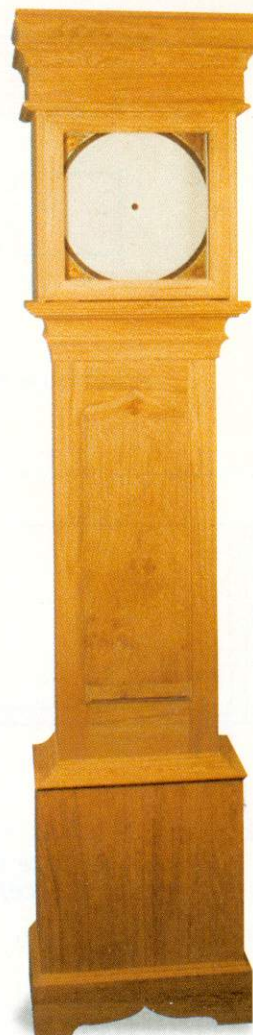
Although the bulk of the book is about making the movement, it contains an excellent chapter on case construction and dimensioned drawings for two case designs.

'Making and Repairing Wooden Clock Cases' by VJ Taylor and HA Babb, published by David & Charles, Newton Abbot, 1986, ISBN 0 7153 8727 8.

Full of traditional case making techniques and sketches of various clock cases although it doesn't contain measured drawings.

◀ Above: the seat board for the movement

▶ Above: make sure the movement is centered on the dial position



Suppliers

HS Walsh sell some very good reproduction, enamelled, break arch dials for around £50. If you want the best, Richards of Burton will hand engrave a brass dial with silvered chapter ring to order.

If your budget is tighter, Yorkshire Clockmakers supply hand painted dials. You could even make your own from spray painted metal sheet, using Letraset or applying one of Meadows & Passmore's dial transfers.

HS Walsh have a good-quality striking movement for about £250 and Craft Supplies sell a range of high-quality German chiming movements costing up to around £500. I also found a cheaper striking movement for about £105 at Yorkshire Clock Builders, so shop around.

All these movements will need a dial and possibly hands too. As well as a movement, dial and hands, you will need various specialist case ornaments and fittings, depending on which style case you plan to build.

The following suppliers (with the exception of Craft Supplies) are specialists in clock parts and carry a very wide range of reproduction parts for clock restorers and builders.

Meadows and Passmore Ltd: Dials and transfers, hands, case fittings;
Medmaw House, Farningham Road, Crowborough,

East Sussex, TN6 2JP.
Tel 01892 662255.

Craft Supplies Ltd: Movements, dials, hands, case fittings;
The Mill, Millers Dale, nr. Buxton, Derbyshire, SK17 8SN.
Tel 01298 871636.

Yorkshire Clockbuilders: Movements, dials including ones hand painted to order, hands, case fittings
646 Chesterfield Road, Woodseats, Sheffield, S8 0SB.
Tel 0114 2550786.

GK Hadfield: Hands, case fittings
Rock Farm, Chilcote, Swadlincote, Derbyshire, DE12 8DQ.
Tel 01827 373466.

Richards of Burton: Hand engraved brass dials, hands, case fittings
Woodhouse Clock Works, Swadlincote Road, Woodville, Swadlincote, Derbyshire, DE11 8DA.

H Walsh & Sons Ltd: Movements, dials including high quality enamelled dials, hands, case fittings
243 Beckenham Road, Beckenham, Kent, BR3 4TS.
Tel 0208 7787061.

JMW (Clocks): Hands, case fittings
12 Norton Green Close, Sheffield, S8 8BP.
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Bosch PHD1582	DIY	500	1.6mm	82	£42.95
Skil 1525	PRO	750	2.5mm	82	£84.95

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B&D KS840	DIY	550	3500	40/26	£49.95
B&D KS865N	DIY	1300	4000	65/40	£79.95
Skil 5466*	PRO	1350	5500	66/51	£99.95

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Variotec 66	Up to 66	All jigsaws	DIY Routers*	£82.95
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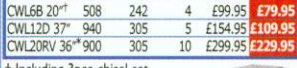


Clarke WOODWORKING LATHES

A photograph of a lathe machine. On the left is a large electric motor with a label that includes the number '110'. A long metal bedpost runs horizontally across the frame. In the center, there is a tool rest mounted on the bedpost. To the right of the tool rest, there is a tool holder or chuck mounted on the bedpost. The background is a plain, light-colored surface.

† Including 3pc chisel set

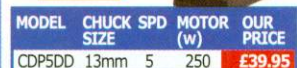
* With reversible head and steel stand



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CDP100B	13mm	5	245	£59.95
CDP150B	13mm	5	300	£89.95
CDP200B	13mm	12	360	£119.95
CDP250F	13mm	12	360	£139.95
CDP300B	16mm	12	510	£159.95
CDP350F	16mm	12	510	£179.95

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JIGSAWS



MODEL	POWER	STROKES/ MIN	CUT DEPTH	OUR PRICE
B&D KS350	370w	3200	55mm	£18.95
Clarke CS350*	350w	0-3000	55mm	£22.95
B&D KS633E	400w	800-3200	60mm	£39.95

*CS350 includes 3 free blades for wood, metal & plastic.

Clarke SCROLL SAWS



MODEL	DEPTH OF CUT	THROAT DEPTH	OUR PRICE
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CSS400	50mm	400mm	£56.95
CSS18B	35/50mm	457mm	£89.95

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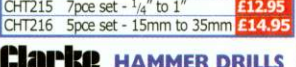
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SANDERS



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Bosch PSS23 1/2 sheet orbital	150w	13,000rpm	£24.95
B&D KA85K Belt Sander	600w	80-200m/min	£69.95

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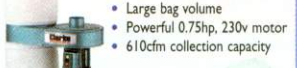
MODEL	RPM	MOTOR (w)	WHEEL DIA. (mm)	OUR PRICE
CBG5RSC	2800	150	125	£15.99
CBG6RZ	2800	210	150	£18.95
CBG6RSC*	2950	250	150	£29.95
CBG6RL*	2950	250	150	£37.95
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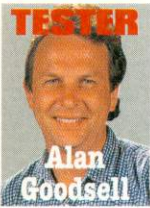
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Top or body

Alan Goodsell sees if his jigsaw preferences still hold true, by testing a pair of jigsaws from Hilti

JIGSAWS are a favourite power tool of mine, apart from a router, and rather surprisingly have caused many an arguments with fellow woodworkers. Why is this? You may well ask, and the answer is one of personal preference.

Regular readers of sister magazine *Furniture & Cabinetmaking* may have already read my viewpoint, but for those who haven't, here it is.

I like jigsaws with a 'body grip' because for my type of cabinetwork the tool gets used mainly for detailed scrolling piercings where fine control of the saw is required. The 'body grip' with its knob of a handle on the top enables one hand to be



▲ The Hilti jigsaws, left: the WSJ 240-EB body grip; right: the WSJ 240-ET top handle grip

positioned directly over the blade to act as a pivot and the other hand merely steers – fantastic precision.

To my way of thinking the 'top handle' design of jigsaw is cumbersome, as the hand that controls the steering of the saw is too far away from the action and there is far too much handle to get in the way.

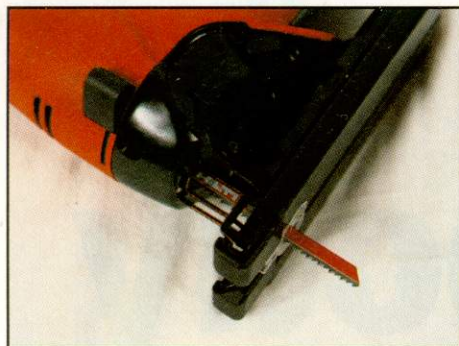
I feel this design may be better for the brute force type of work that involves roughly trimming sawn timber to length on building sites, but that will upset those who think otherwise.

It has become increasingly rare to see a 'body grip' jigsaw in the UK as 'top handles' apparently sell a lot better, so

▼ The WSJ 240-ET's power switch is on top...

▼ ...but the WSJ 240-EB's power switch is better placed, on the bottom





▲ The soleplate is cast-aluminium with a steel insert for strength and a 45° tilt



▲ On both models a dustspout can be fitted at the rear

companies don't tend to bother mentioning that they have them in their range – well done Hilti.

In Europe however, the 'body grip' outsells the 'top handle'. Does this mean that they are more switched on to the ergonomics of power tools? Or do European jigsaw users tend to use them for finer work and the rough stuff is left to more brutish tools such as hand-held circular saws.

There you are, my thoughts on jigsaws. Do my preferences hold water in the real world? I think they do, but you are listening to a man who invested heavily in a Betamax video system knowing that it was better than VHS, therefore it must win the format war – wrong.

By testing this pair of jigsaws from Hilti side-by-side I had the opportunity to either change or confirm my views.

Common features

Apart from the obvious handle difference

▼ The WSJ 240-ET with dustspout, soleplate and bladeguard



▲ The clear plastic bladeguard can obscure your sight of the blade

the two jigsaws are identical but they do look somewhat familiar, this is because they made by a larger more familiar power tool company.

This is no bad thing as their quality of build is superb and the jigsaws have features to make the operator's life as comfortable as possible.

The smooth running gearbox hides beneath the saw's plastic shell and although in the prime of its life showed no signs of ending up sounding like a bag of nails – both common and predictable on many lower budget models.

It conveys power from the variable speed motor to the blade without fuss and the switchable pendulum action, for setting the viciousness of the cut, works well, although the switch is a little small. Another small switch controls the dust blower, either on or off, and it does a creditable job of keeping the path of the blade clear of debris.

The power switch is the only difference between the two models, the top handle's one is positioned under the handle so it fires into life when the tool is picked up – bad. The body grip is placed on the side of the body in exactly the right position to be thumbed into life – good.

What does baffle me however, is why there is a soft-start. Jigsaws are hardly

► Both models come in a durable plastic case



scary, unlike a big router, and the time-lag before the blade gets up to speed is just irritating.

The soleplate is cast-aluminium with a steel insert for strength and can be tilted 45° either way if required. There is the useful facility of fitting a dustspout out of the rear and the less useful one of being able to obscure sight of the blade with a removable clear plastic cover.

What I like best of all is the method of fitting and removing blades. To fit one, simply push the blade up into the shaft and it clips securely into place. Then to remove it, swing a lever on the front of the saw and the blade ejects itself, eliminating the need to have any finger contact with a hot, skin-removing blade.

Conclusion

As expected, I found the jigsaws to be well made and they both performed extremely well – almost faultless in fact. What testing the pair of them didn't do was to change my mind about which style I prefer, the body grip still wins hands-down for control and handling. ●

Freephone 0800 886 100 for details.

Specifications

WSJ 240-ET Top handle price
WSJ 240-EB Body grip price
Power
Stroke rate
Stroke
Cutting depth in wood
Orbital settings
Soleplate tilt
Dust blower
Dust extraction
Weight

£292 inc VAT
£304 inc VAT
400W
500 to 3,000 per minute
26mm
Up to 110mm
4
0 to 45° each way
Yes
Yes
2.3kg

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Answer these two questions:

1. What is the maximum depth that the Hilti orbital action jigsaw can cut to?

☐ Less than 75mm ☐ Between 75 and 100mm ☐ More than 100mm

2. What is the discount on a UK subscription to The Router for 24 issues, as advertised in this issue?

☐ Less than £5 ☐ Between £5 and £10 ☐ More than £10

Now complete the tie-breaker in less than 25 words

I would use my Hilti jigsaw to make

.....

.....

.....

.....

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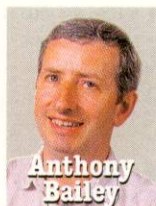
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Projects in print



**Anthony
Bailey**

gives away the
tricks of the trade

and reveals how to photograph your projects



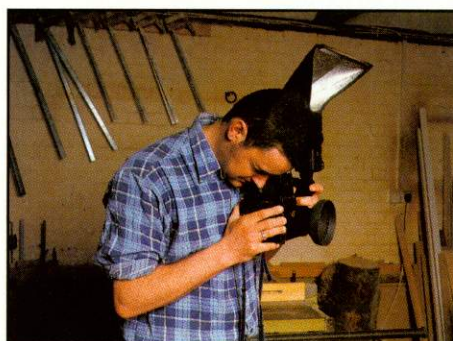
I WAS chatting to one of our readers recently and was struck by a startlingly obvious idea for a feature – How to Photograph your Projects! Since this magazine relies on contributors to produce articles with text, photographs and drawings, this makes perfect sense. Unfortunately, what tends to happen a lot of the time is that the text is ok, and can be knocked into shape (sub-edited), and the drawings can be used by our illustrators as a basis for magazine-quality drawings which can incorporate various clever cut-through views, or dimensions etc.



▲ **Good value medium format Rolleiflex and Mamiya cameras give great images**

But, the photographs... to be honest, unless someone has a lot of experience of photography for publishing, the images just aren't up to the mark. Where possible I, or another professional, will take the pictures, but this isn't always possible.

"Most of our images are shot on medium format film"



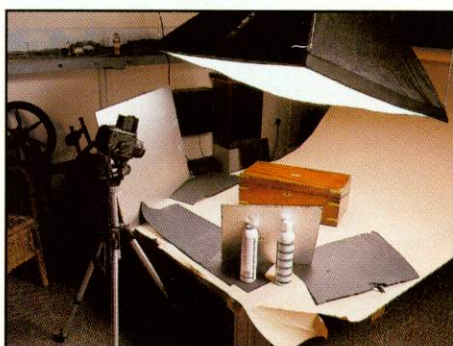
▲ **A bounce card fitted to a flash-gun gives even light coverage for a slight loss of flash power**

Choosing film

So what is wrong with the average photograph that makes it difficult to reproduce in the magazine? Here is the essential list of do's and don'ts to help you take better pictures in the workshop, not just for projects but for your own use as well.

Most of our images are shot on medium format film, which is expensive but produces high quality results, however 35mm

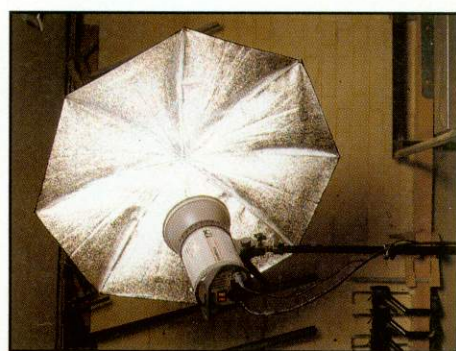
▼ **A typical setup for a small still shot. The softbox, flash-head and reflectors fill-in the lighting**



▲ **A vintage Olympus SLR with full operator control and plenty of accessories, check out the secondhand shelves of your local camera shop**

(not APS or smaller) is fine, but you need to use transparency film not print film.

The reason for this is that colour prints are quite fuzzy when examined closely and have defects that mean they will not reproduce well. Transparency images when correctly exposed and focused yield very crisp, clear images capable of being scanned (by a high quality film scanner linked to a computer), resulting in high reproduction quality.



▲ **A flash-head, umbrella and stand give even soft light coverage for a professional touch**

If the pictures are just for a record then colour prints are ok, exposure is not too critical. It should be at the correct exposure or a bit overexposed, as this leaves more information on the negatives, the lab will automatically make any corrections when printing. Use 200 ASA negative film.

For reproduction, as I have already said, transparency film is vital, it is much less



▲ Tungsten lights can create strong shadows unless some form of diffusion is used



▲ Show the router and any special fitments clearly

Lucid lighting

That isn't the only step needed, good lighting is essential. Ordinary room lighting, whether ordinary lightbulbs or fluorescents, give really nasty colour casts that cannot be corrected properly afterwards. Also, the resulting light looks very drab and unpleasant.

Daylight through workshop windows if it is bright-overcast on a sunny day can be good, if it lights all of the subject well. Use some clean white boards or boards covered with the matt side of aluminium cooking foil to 'fill-in' the shadow side of the subject so it doesn't go too dark.

Remember that film produces much more

contrast than our eyes, which can tolerate difficult lighting conditions and funny colour casts too – film doesn't!

Flashguns give a nasty harsh light and people in pictures have 'red-eye' caused by the flash bouncing off the retina of the eye. Better to use a Lastolite bounce card or hood to diffuse the light. Work-in-progress shots can be lit quite well in this way.

If you take photography seriously then a monobloc flashhead and stand with an umbrella reflector fitted will give excellent results for around £270. We use monobloc heads here at the magazine. Reflectors or white boards help by 'filling-in', and a special flash meter is needed.

You can use tungsten lights such as site lights, but you need a special 80B plus an 81A conversion filter on the lens to correct the colour temperature to match that of the film.

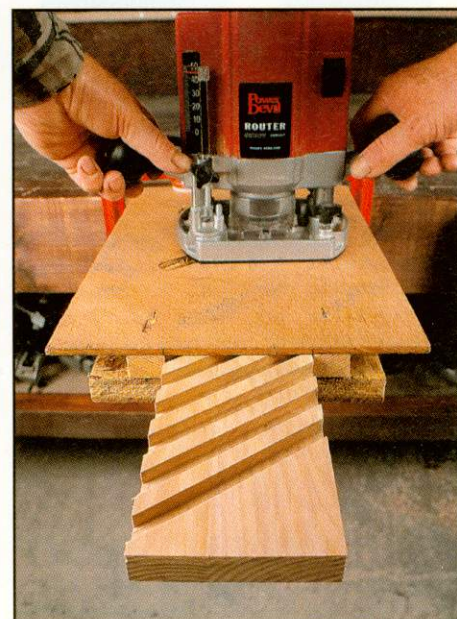
"Remember that film produces much more contrast than our eyes"

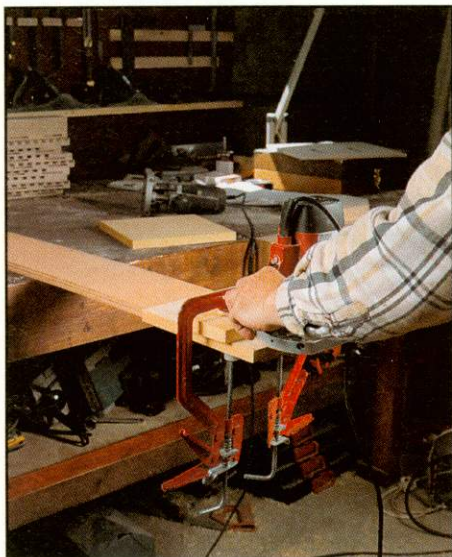
Getting focused

The next thing is focusing the image to get it sharp. Cheap point and shoot cameras don't give the facility to adjust focus, and autofocus cameras, especially cheaper ones, may put the point of sharpest focus where you don't want it to be.

Also, there is something called depth of field, basically if a lens has an adjustable aperture that can be closed down when the light is too bright, the resultant image produced by the lens becomes sharper. This is important, as the photograph becomes much more usable as more of the picture is in focus.

▼ A hands-on image looks good, but turn the router off for safety – no-one will notice





Only expensive SLR cameras allow this vital feature. The best advice is to buy a cheap secondhand manual SLR such as the Olympus (pictured). This camera lacks automation, it has full adjustment of shutter speeds and apertures and has a reliable built-in meter.

Your camera should be mounted on a tripod so you can compose the picture and get it just right. Also, it avoids camera shake at slow speeds and if you want to be the craftsman in the shot, you can set the self-timer and appear in the photo!

Helpful hints

For project shots intended to end up as an article, it helps to do the following things. Sketch neat clear drawings or the piece with dimensions, preferably in metric. These give you a clear understanding of what you are going to make, and we can use them to create proper magazine drawings or illustrations.

Make a proper cutting list, you can use

▼ **Part assemblies are great for showing how the piece fits together**



▲ **Show more of the workshop as long as it's not distracting**

► **Do a sequence of the operation to get a choice of images**

it for ordering materials and cutting to required sizes, and we can use it in the article if needs be.

Photograph each key stage of making your project, taking care to exclude unwanted background or unnecessary clutter or junk that makes the picture confusing. Try some close-ups – using a 1 dioptre close-up lens on the camera – of the router and cutter machining components.

Don't shoot with the router running, it isn't necessary and may be dangerous. Just leave some dust or chippings lying about to make it look more realistic. Take a group shot of all the cutters you have used.

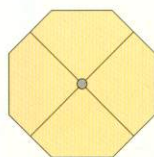
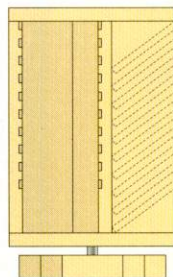
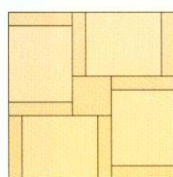
Take more care with pictures that show any major sub-assemblies or the completed piece without its finish applied. These pictures give readers a clear idea of what you are trying to make or have made, and are vital. If you just have 'making' operations no one will be able to tell what you were trying to make. Try different shooting angles that will explain what each part is and its relationship to another part.

Dressing it up

Finally, take shots of the completed project with its proper finish on. Start with a 'three-quarter view', that is, showing the top, front and an adjacent side with the camera aiming towards the nearest corner.

This should be the most flattering and informative viewpoint. Don't have the camera too high up or the sides will angle outwards due to distortion caused by the angle

▼ **A basic plan or elevation with photos will allow our illustrator to create...**



▲ **Don't forget a close-up shot of the cutters you used**

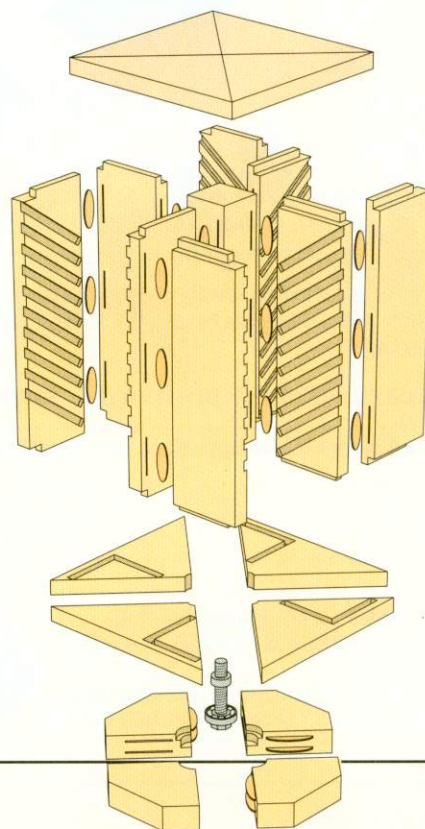
of perspective of the lens.

Shoot from some other positions too. Then try putting the finished piece in an actual or pretend setting, as I do with my projects, and 'dress' the setting with various props to make it look interesting and convincing. We may not use this shot but it gives us the choice.

Take a look at the projects in the magazine and see how other people do them, especially the professionally photographed ones, and try and understand the mechanics of how each one has been composed, lit and cropped to fit.

I hope these tips will inspire some of our readers to have a go and try getting into print. If your article is accepted it's something to show off to your friends and you get paid too! ●

▼ **...this! A goodlooking and explanatory exploded 3D drawing**



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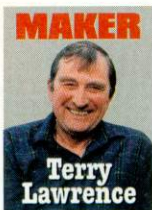


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Crazy mazes

Terry Lawrence makes some mazes that are as much fun to play with as they are to make

I SUSPECT that you will get as much fun from making these little mazes as your friends will from solving them. Once you've solved the concentric maze try to move several balls simultaneously from the outer groove to the centre, or vice versa. Even then, you can compete with others on a timed run. With the square, trap maze, run as many balls as possible from top left to bottom right, keeping your balls out of the traps.

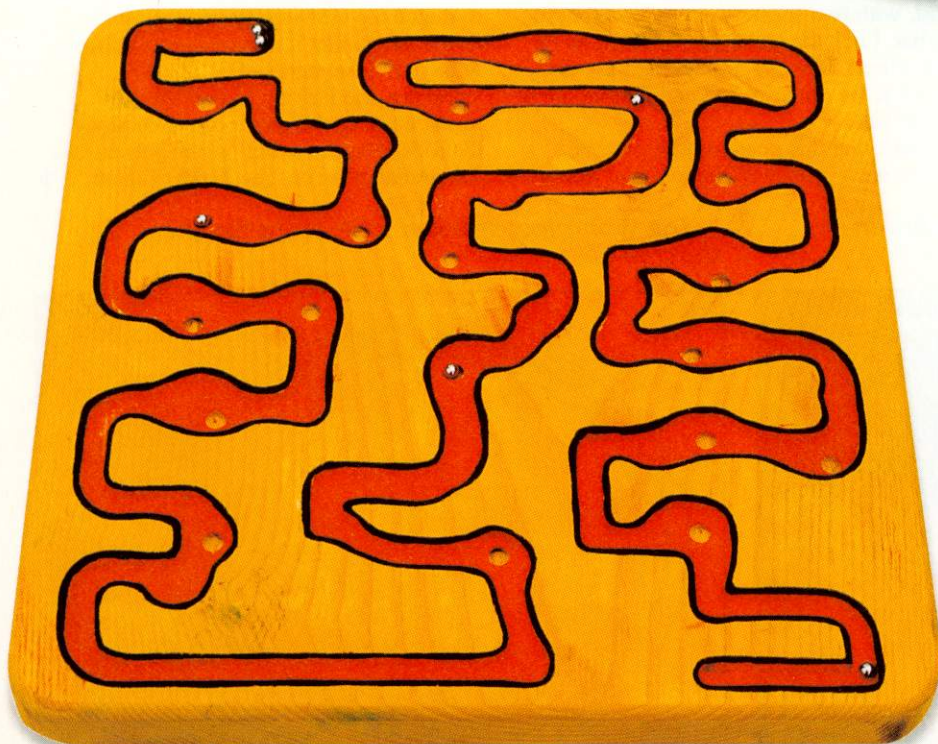
Concentric maze

This one requires a disc of $\frac{1}{2}$ in MDF, 325mm in diameter. However, you will need a piece of faced chipboard or MDF from which to rout a jig base. The thickness should be a minimum of 15mm, the diameter should be between 454mm and 490mm maximum.

I used 15mm melamine-faced chipboard, actually an old cupboard door! The balls



▼ The freeform and formal mazes ►



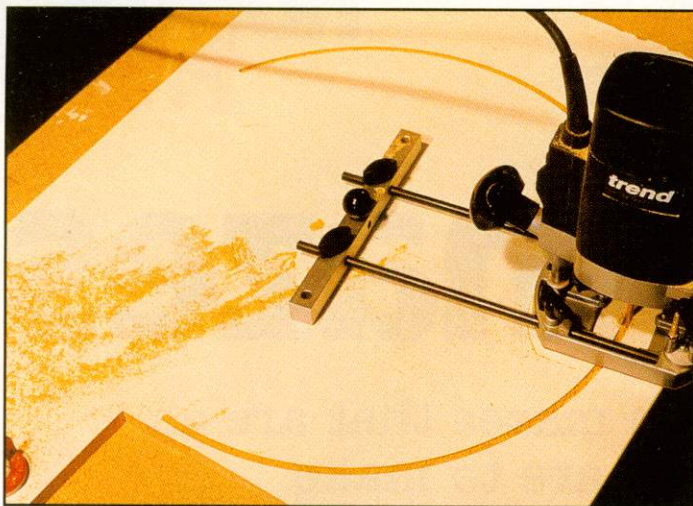
are $\frac{3}{16}$ in steel ball bearings, obtainable from Hindleys of Sheffield, tel 0114 2787828.

Getting started

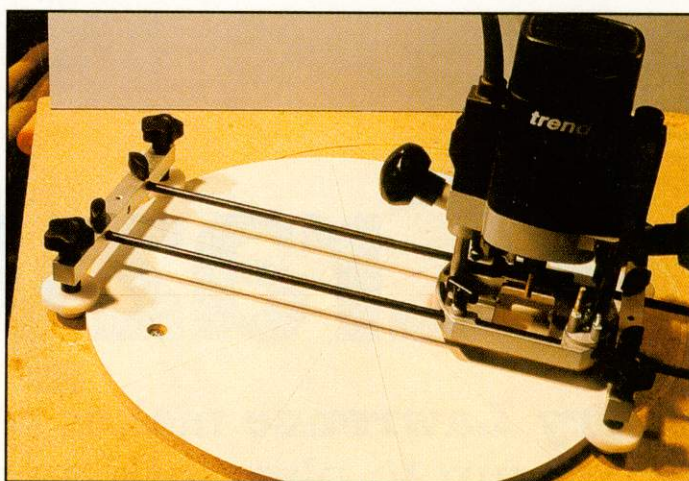
You will be pleased to know you don't need to draw the complete pattern onto your MDF blank. Just keep the magazine beside you, or better still, have a photocopy enlarged to full size.

Tooling up

- Trend T5 router
- Short and long fence rods
- Trend Pivot Frame Jig
- 6mm radius half-round cutter
- 6mm straight cutter
- Trend 14mm guide bush
- 1 pair Trend 500mm long fence rods (8mm dia)
- 12mm radius round-over cutter
- 45° bevel cutter



▲ Routing the baseplate for the Pivot Frame jig



▲ The baseplate, divided at 30° intervals, screwed to the worktop

The outer groove of the pattern has its outer edge 137mm from the centre; its inner edge is 131mm from the centre. All routed grooves are 6mm wide, and the raised areas between them are 5mm wide.

Base disc

The Pivot Frame jig needs a base disc, at least 15mm thick, to run on. I cut this from faced chipboard, using part of the jig, in trammel mode. All cutting was done on my workbench mounted with a sacrificial top of ¼in chipboard.

First, rout a 6mm hole at the centre of your base material. Mount the long fence rods into the base of your router, slip onto the other ends of the rods one bar of the pivot frame, without wheels, but with the trammel point centrally mounted.

Place this point into the central hole you have just routed, wrapped once with tape for a snug fit. Mount a 6mm straight cutter in the router's collet, and adjust the router on the rods so it will cut a circle of the required diameter.

In my case, trammel point to inner edge of the cutter measured 227mm, to give a disc of 454mm diameter. With a high speed (27,000rpm), rout a circle at a depth of about 3mm and repeat, increasing the depth of cut 3mm each time, until the cutter just breaks through into the sacrificial bench.

Mark the resulting disc with scribed lines at 30° intervals. If you use white melamine-faced board, as I did, rub a bit of dark acrylic paint into these lines, and wipe off any excess.

Drill two mounting holes 6mm diameter right through, and on these centres rout a countersink ¼in diameter, about 3 to 4mm deep. Drill matching holes 5mm dia. in the bench top, and you will find that M6 by 20mm roofing bolts will cut their own thread to hold the disc firmly.

Making mazes

Cut your ½in MDF maze blank 325mm diameter in the same way, with the same cutter. A central 6mm locating hole can be plugged after you have finished routing. With a 25mm long, 6mm diameter steel rod or wood dowel as a locator in the centre of base and workpiece, fix the MDF to the base with a couple of pieces of double-sided sticky tape.

Assemble the pivot frame jig, with the flanges of the white nylon wheels uppermost, with two spacer washers each below the bar. Lock the bars onto the rods, so all four wheels are snug around the base disc, and lock the router at one end, butting up to the jig bar.

Check that this position will give an outer routed groove of the required diame-

ter. Refer to your maze drawing, and mark in pencil where the groove stops are located. In the case of the first, outer, groove, there are stops at 330° and just before 180°.

I suggest that the depth for your grooves should be a minimum of 3mm, when using 5mm ball bearings. My grooves are 6mm deep, achieved with two passes, the first at 3mm, and the second with the depth stop firmly locked to give 6mm.

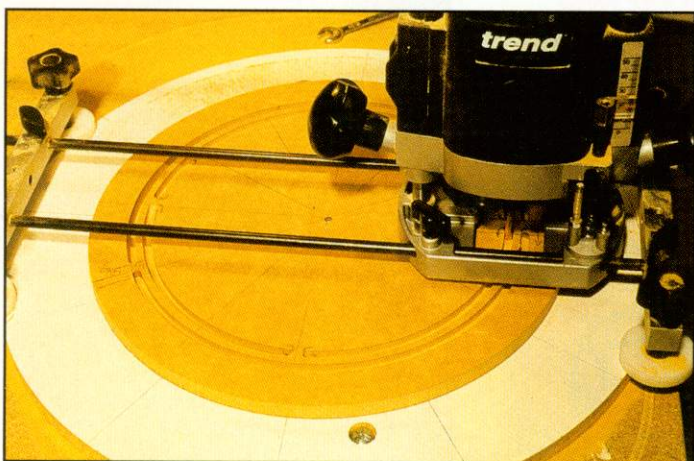
Note that the cutter will extend more than 6mm from the router base, as that base is proud of the workpiece when mounted on the jig.

Proceed to the next circle, inboard of the first, and mark the stops in pencil. Mark 5mm in from the first groove and slide the router along the rods to match this mark. Lock the router onto the rods again, and cut the second set of curves. Proceed in this way to the centre, removing the locating pin (if it is metal), before routing the centre circle.

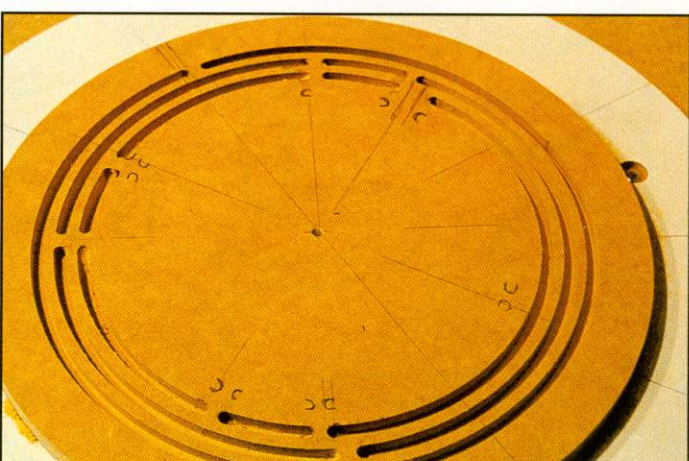
With the concentric grooves completed, you now need to join them with radial cuts, to match the drawing. Rotate the pivot frame jig, so that it is north/south in line with your base marks of 0° to 180°.

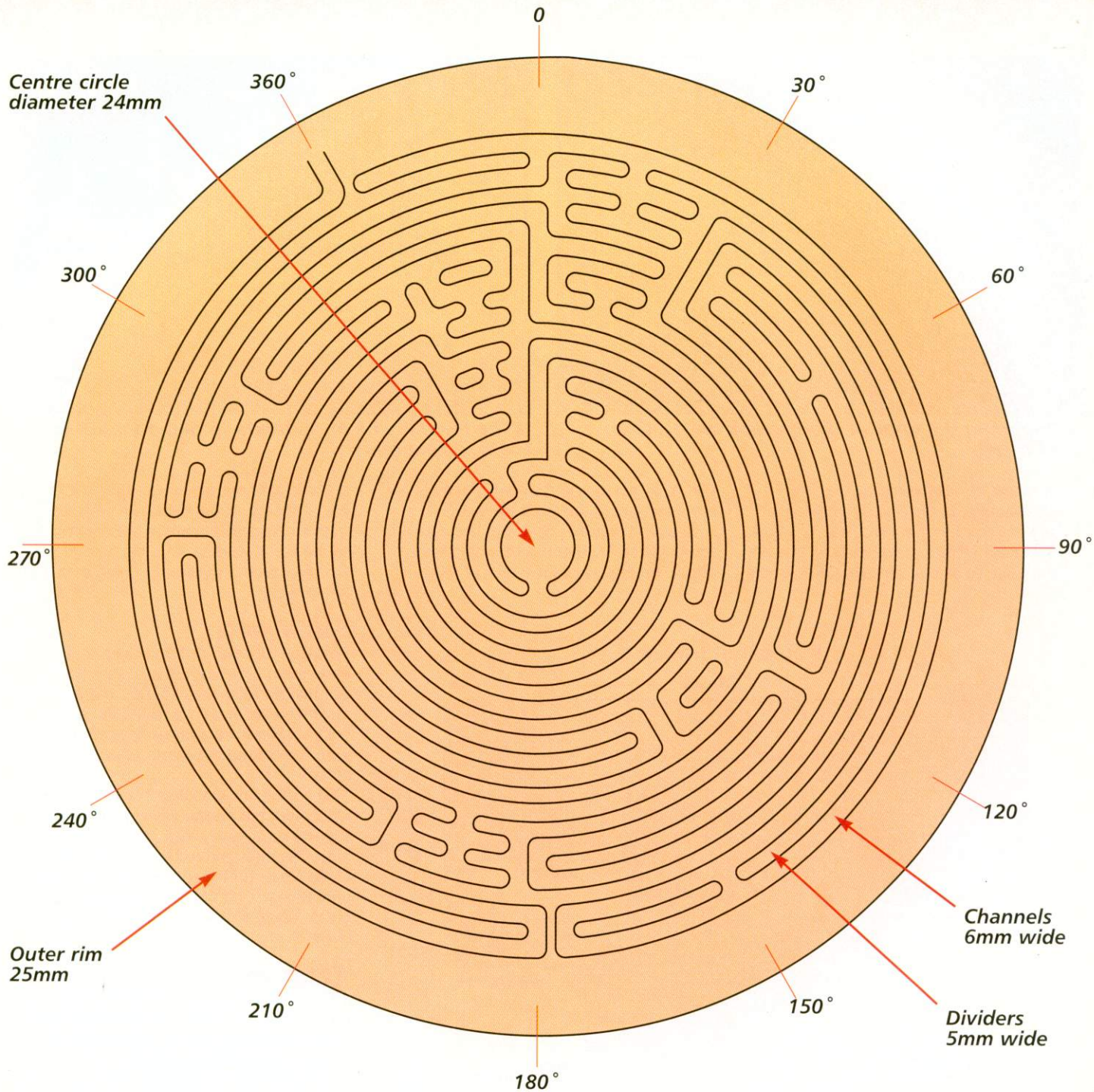
Release the locking screws on your router base, so the router can slide along the rods. Mark in pencil where you need to rout radial grooves. The depth of these

▼ The first two concentric grooves routed in 12mm MDF



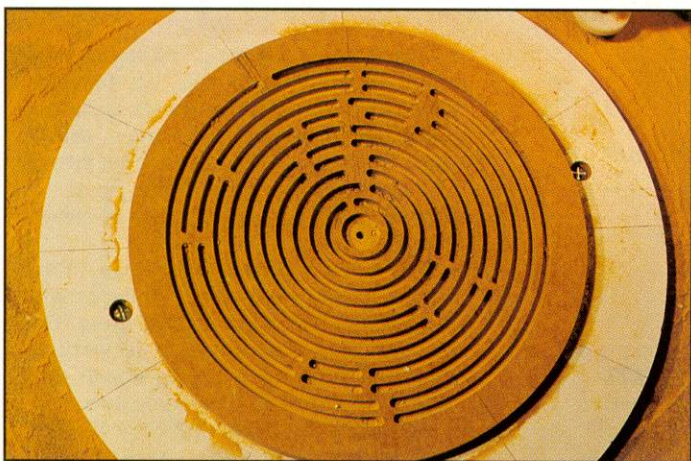
▼ The workpiece marked with stops for the third circle





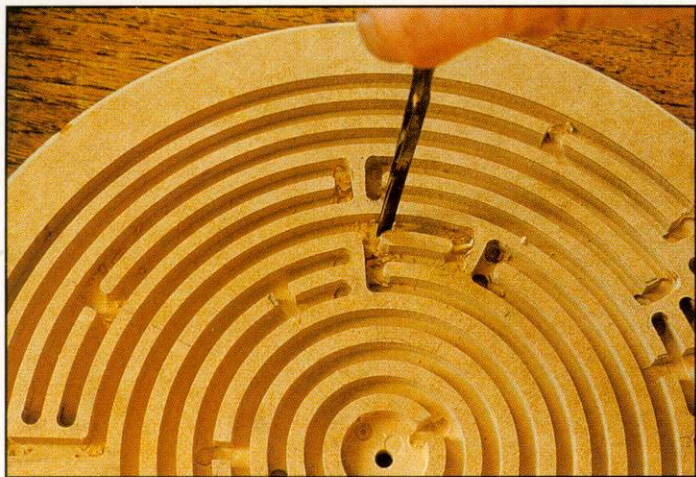
▲ Formal pattern, overall diameter 316mm

▼ All the concentric rings routed to 6mm depth

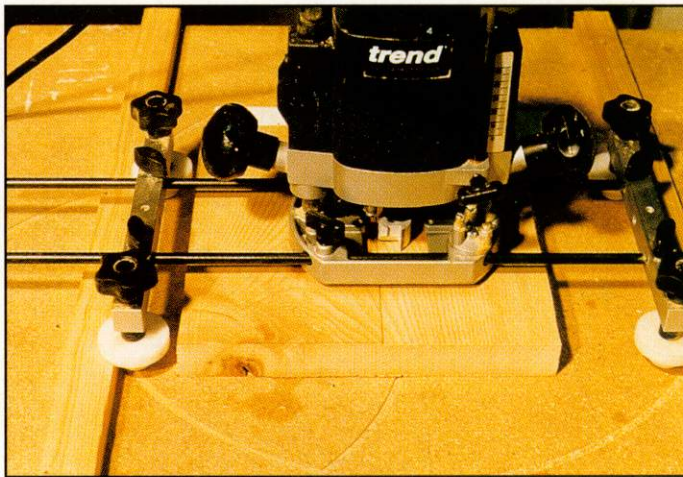


▼ Cutting the radials between rings





▲ Rounding the ends of the barriers with a 6mm butt chisel



▲ The Pivot Frame in ski mode to plane timber for the freeform maze

must match the concentric ones.

For example, in the first jig position (180°) you need to join rings 1 & 2, 3 & 4, 11 & centre; 10 & 7, 6 & 3, 2 & 1. It is not as complicated as it might seem. For exam-

ple, at jig position 60° to 240°, there is only one join to cut – between rings 3 & 4.

Round all square corners of the channels for neatness. I did this with a 6mm butt chisel. Finally, sand the edges of the

grooves with fine abrasive (240 or 320-grit). The rim of the maze was finished with a 12mm radius round-over cutter, on the top surface, then, with the bottom surface uppermost, slightly bevelled with a 45° cutter.

Finishing

I took advantage of the variations of absorption between the smooth pressed original surface of the MDF, and the machined surfaces. I painted the piece with Chestnut blue wood dye, after plugging the central hole with a 6mm diameter dowel.

The grooves and edge bevels finished matt blue, but on the unworked surfaces, it dried turquoise green, which I enhanced with Chestnut green dye applied with a cloth. Wear rubber gloves for both these operations. Two applications were sufficient. When dry, buff with a clean soft cloth.

Trap maze

This maze is in marked contrast to the first piece; square in shape, ash instead of MDF, freeform (almost!) rather than formal in design, warm colours instead of cool.

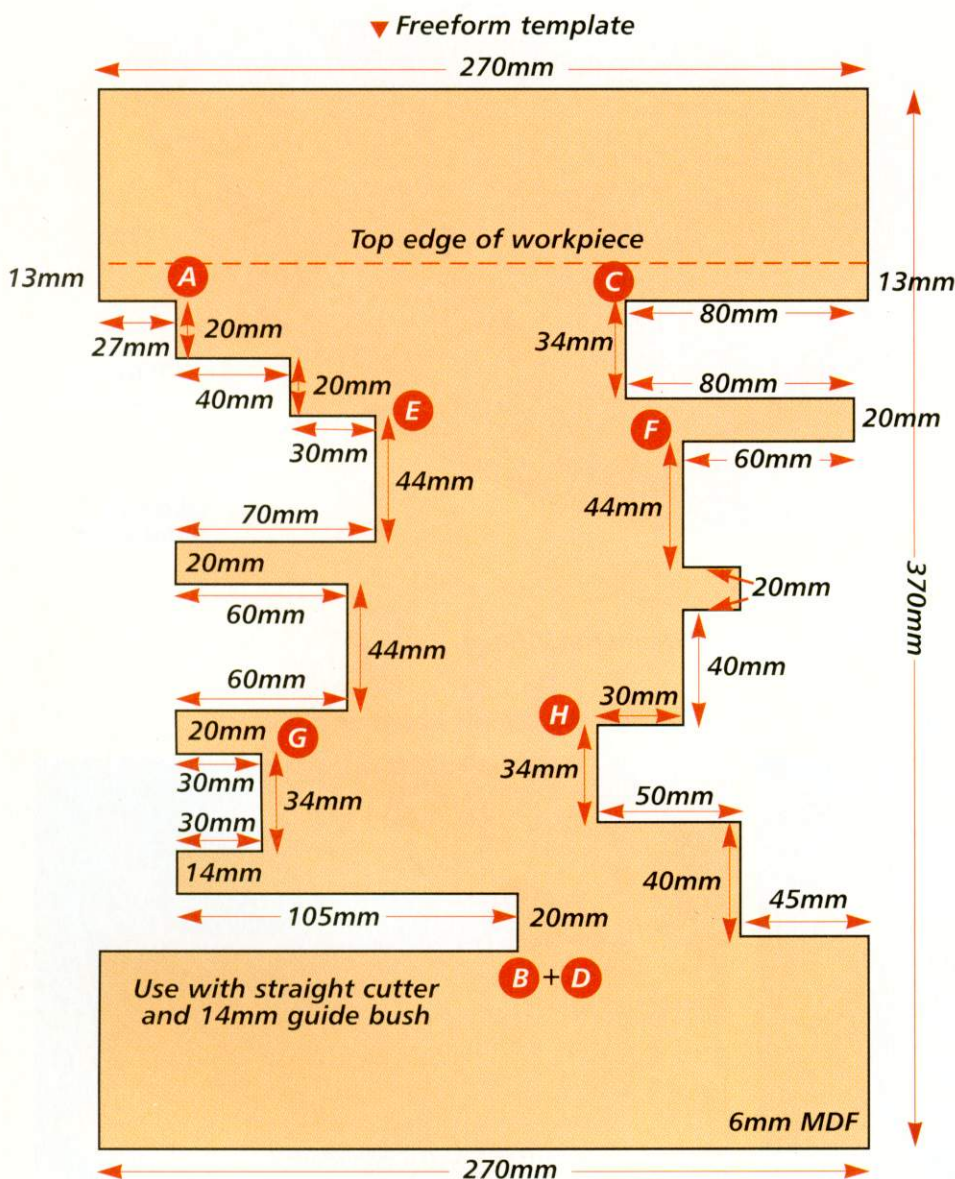
It started life as a structured design, using a double template of MDF and a guidebush, but I opened it up a little to make it more interesting. If you prefer a structured design, use the template first, you can then vary it with freehand routing.

Choosing timber

I wanted to use a piece of white ash, as it will accept light-hued dyes, but the only plank I had in stock was rough-sawn, weather-stained grey, and warped, with edges 5mm above the centre. This proved a good test for the Pivot Frame jig, to convert this to a 250mm square of clean, flat timber.

Two strips of timber, in my case 19 by 38 by 600mm, were pinned to the bench top, parallel and about 450mm apart. This was enough to accommodate the work-piece and allow the nylon jig wheels to run either side of it, flange uppermost.

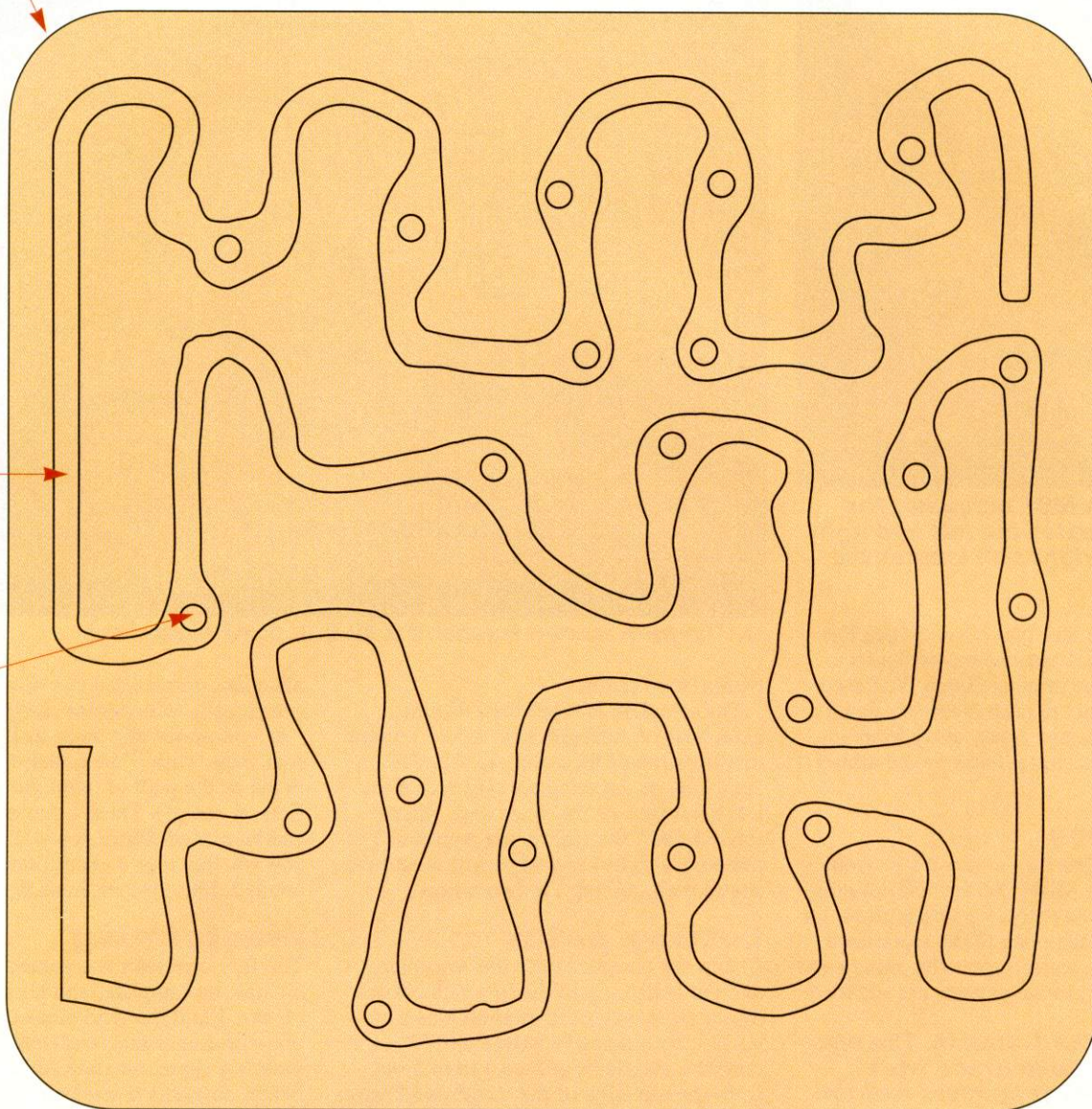
The timber, to finish at 250 by 250mm, was cut slightly oversize, and placed,



External corners rounded with a 3mm radius

Depth of channel 4.5mm

Traps 6mm diameter, 2.5mm deep



▲ *Freeform maze full size 250 by 250mm*

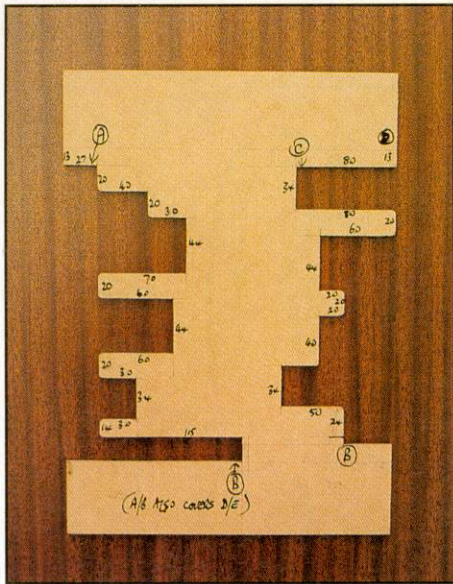
convex side up, between the runners and secured with scrap strips fore and aft. The router, with a 1in straight cutter fitted, was mounted on the Pivot Frame jig with the long rods.

I adjusted the cutter height to suit the timber, in this case with washers above and below the crossbars. I fitted a fine depth adjuster to the router, and set the cutter depth to 0.5mm below the surface of the timber as measured at its raised centre.

Starting at the right, at top speed (27,000rpm) I pushed the router away from me and back, then moved and locked it just under 25mm to the left. In this way I shaved the top off the crown of the warped timber and, by increasing the depth 0.5mm at a time, I was able quite quickly to plane the whole piece flat. ➡

▶ *The white ash blank and its original home in a warped plank*





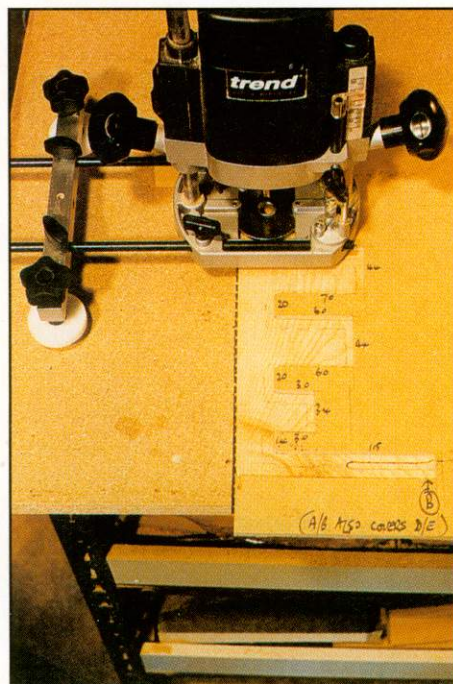
▲ The 6mm MDF template. The left side creates the left and right paths, the right side creates the centre

I could then turn it over and flatten the underside, too. I reduced the thickness to 20mm from the original 30mm. You need to be careful not to push the router down onto the wood; just gently away from you, or you will see cutter tracks on the timber surface.

Template

Cut the template on the scroll saw from a piece of 6mm MDF, 265 by 350mm minimum. I allowed extra, top and bottom, for clamping the template to the workpiece. The drawing clearly shows the pattern and dimensions; external corners are rounded

▼ Routing the first path. The template is clamped to the workpiece, the Pivot jig gives anti-tip support



▲ The path routed freehand with ball traps routed too

with a 3mm radius.

The template is sized for a 14mm guidebush. A different size would require modification of the template. The left-hand side of the template will create the left-hand path of the maze and, when rotated 180°, the right-hand path too. The template's right-hand edge will create the centre path, joining the two others.

Cutting paths

Clamp the template onto the workpiece and the bench. I slid the loose chipboard top of my bench over to allow this sandwich to be clamped easily. Point 'A' of the template should be placed 13mm down from the top edge of the wood and 27mm in from the left edge. Using a 14mm guidebush, the centre of the cutter will start 20mm in and down, at the top left-hand corner.

I used my short fence rods in the router base, with one half of the pivot frame jig attached, to create a non-tip assembly. To achieve the correct height, each of the two nylon wheels had one Trend 5mm washer and two ordinary steel (8mm hole) washers between it and the alloy frame bar.

The maze was cut slowly, in one pass, with the cutter set to achieve a depth of 4.5mm, and at top speed. The cut edges needed light sanding with 320-grit abrasive cloth, and the sides of the trench showed some burning, but this was covered later at the painting stage.

Rotate the template 180° and align corner 'A' exactly as before. Repeat the operation. Rotate the template 180° again. Mark a vertical line on the workpiece 16mm to the right of point 'E', and another 26mm to the right of point 'G'.

Clamp the template to the wood so that lines 'A' and 'C' of the template are 13mm below the top edge of the wood, and points 'F' and 'H' are on the lines you

have just drawn. You can now rout the centre path, which joins the previous two.

If you prefer this maze as it is, then just rout traps, with a 3/8in cutter, to the same depth as the path (4.5mm, but check it first on scrap!). These circular depressions can be placed where you wish on the path, and you can rout a central 6mm hole, about 2.5mm deeper, in each.

Freeforming

The freeform path was routed by hand; no clamps, no template, and no securing blocks. I laid the workpiece on a piece of non-slip router mat, and used the non-tip pivot jig again, on short rods, with the height adjusted as necessary.

An anglepoise lamp close to one side gave good visibility for me to rout (with the 6mm straight cutter again) to the lines I drew on the workpiece, outside the original routed path. I routed 6mm traps with the same cutter, to a depth of 2.5mm below the ball track.

Finishing

Round the corners of the square workpiece, to a radius of 18mm, and clean these curves on your disc sander. I rounded the edges, top and bottom with a 1/8in radius half-round cutter at 27,000rpm.

Clean all edges with fine abrasive. If you find that your channel walls are furry (along the grain), trim these with a scalpel or miniature chisel – you can grind one from an OBO nail and mount it in a dowel handle.

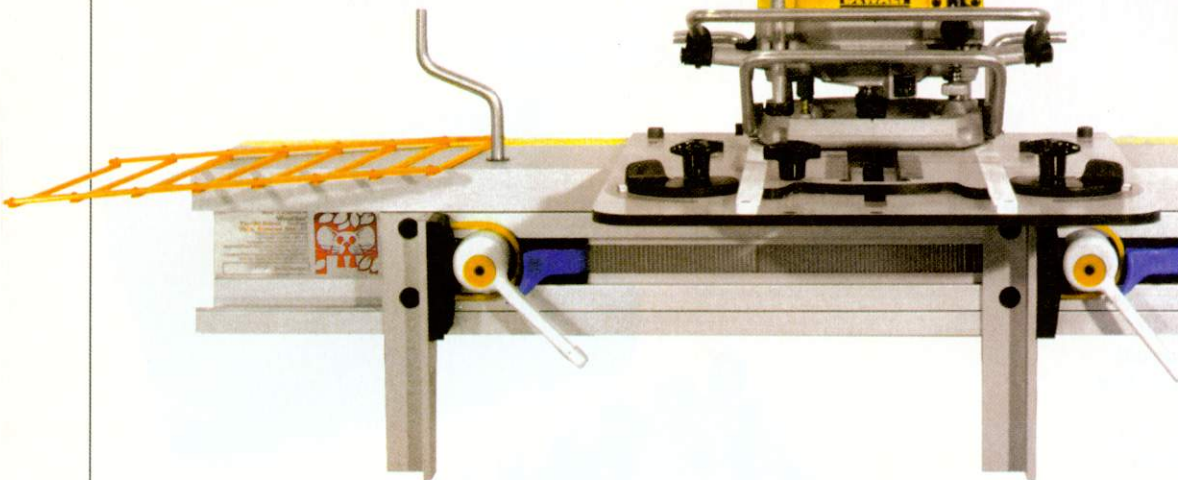
I dyed the piece with Chestnut yellow wood dye. When dry, the bottom and sides of the track were painted with acrylic craft paint (bonfire orange shade) and the edges outlined in black. I used a No. 0 artist's brush for the outlining, whilst a No. 2 was ideal for the orange track. ●

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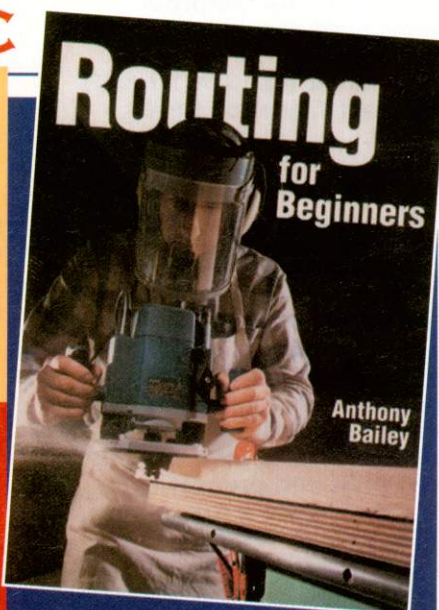
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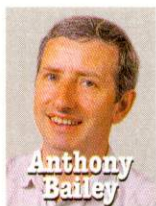
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Anthony Bailey catches up with Router-regular Bill Cain and renews an old acquaintance



WE have many contributors to

our woodworking magazines, so I can perhaps be forgiven for forgetting that I

had briefly met Bill Cain at the last Axminster Show – almost upon us again as I write this article!

Bill reminded me of our encounter when I rang him to discuss whether he would mind being put on the hotspot that is 'My Router Workshop'. One is immediately struck by the fact that he is real livewire, someone who is interested in not just woodworking but a whole range of subjects that have spanned his extensive and busy life. As such he is an ideal mainstay of *The Router*, always there when we need an article, often in a hurry!

Boyhood Bill

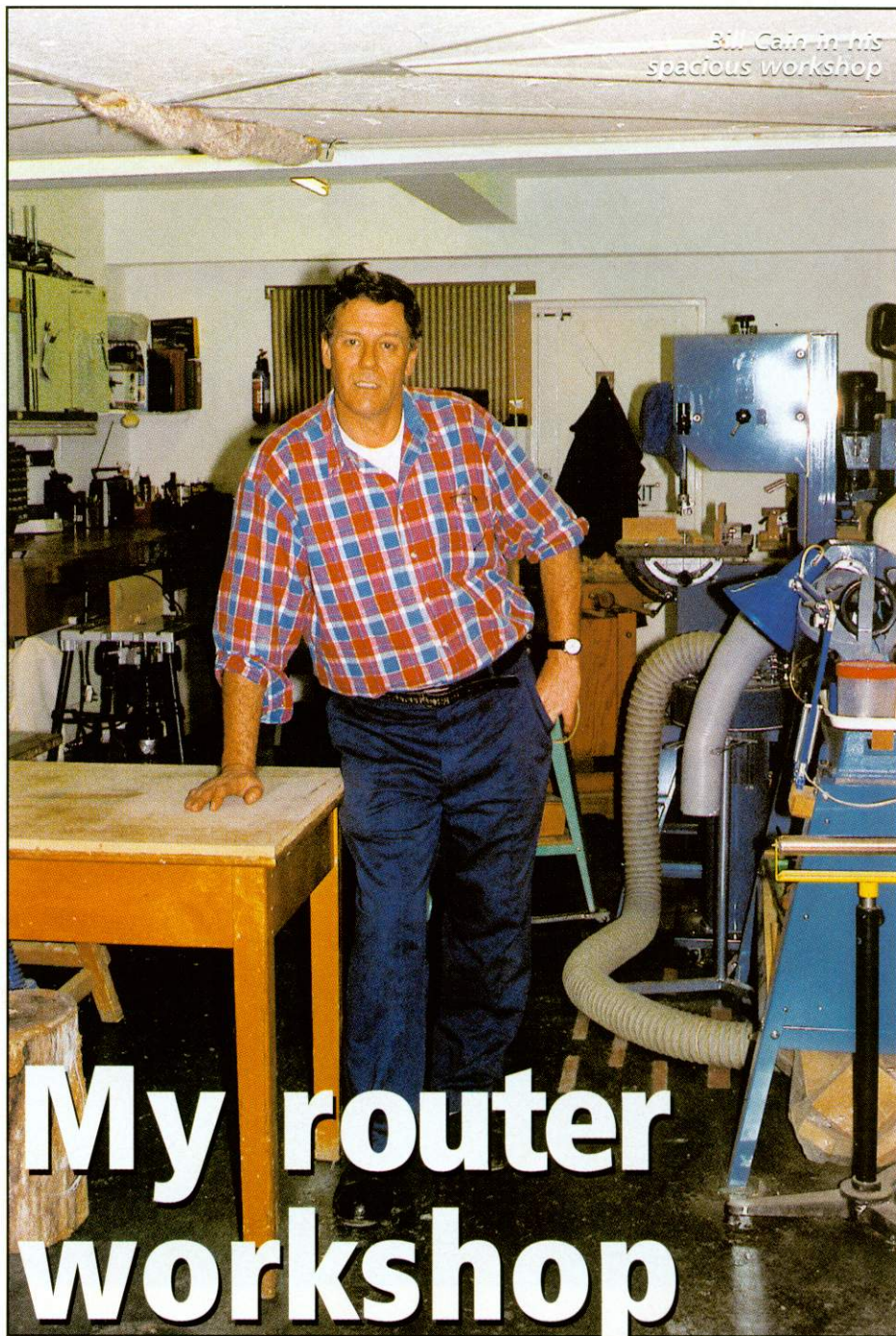
Bill lives with wife Betty on the edge of the delightful and oh-so-very English Cotswold hills, enjoying an early but far from relaxed retirement. In his own words Bill was "involved" with wood and metal working from 9 years old. He had very tolerant parents.

"I did quite a bit in the cupboard space in my bedroom as a boy, shavings went everywhere!" He is very grateful to the excellent teachers at school who gave him "a terrific grounding and interest in wood and metal work".

Bill spent 35 years in the aerospace industry, starting with a five apprenticeship in manufacturing, followed by inspection, product and customer support, marketing, commercial management and international trading!

Bill has enjoyed it all "well – most of it" and travelled worldwide "at someone else's expense!"

His workshop is 24ft by 13ft with plenty of artificial light, and so well insulated that it stays warm in winter and cool in summer. "I could do with more space though" says Bill. His principal machines are a Kity 10ft by 6ft planer/thicknesser, a 6in cut bandsaw, lathe, dust extractor, industrial vacuum (all APTC models), pillar drill, chisel mortiser, pullover saw and too many other smaller powertools to mention! ➤



Bill Cain in his spacious workshop

My router workshop



Some of Bill's larger machines include a lathe, vacuum extractor, bench drill and a Kity planer/thicknesser

Bill often uses an old Elu 177E and table



▲ Bill's routers include a couple of Trend T5s, a big Elu 177E and a Craftsman 750W from the USA

a couple of Trend T5Es and a Craftsman 750W model from the USA. "I like the 177E, plenty of grunt, I've never managed to stall it!"

Cuttin' Cain

Bill has a variety of cutters, but mostly uses moulding profiles in the table. "I'd say 80 to 90% of my work is done in the router table". He uses up or down cut spirals for rebates and housings, "they cut cleanly and sweetly and don't give the router a bumpy ride".

Also favoured are bearing-guided cutters, Bill often swaps the bearings around to get the best profile for the job. He seldom uses bearings when working softwood as it marks so easily, choosing the table fence instead. "I hate pin-guided cutters for the same reason" he says.

Bill likes really good quality HSS cutters for softwoods as they give a better cut than TCT. "Having said that, I do like the Jesada range, they clear waste well, have good shear angles and cut sweetly – it's not surprising, you can pretty much see your face in them they're so highly finished!"

He also likes KWO cutters with coated disposable tips that seem to last the claimed four times longer than other makes. "Don't bother plunging though. Unless you have a fixed head machine they tend to wander". Finally, Bill uses his two wing Trend biscuit jointer blade all the time for carcass building.

Cain and table

Bill says "I've got an old Elu table and a home-made one that works pretty well. Most of my work is done on the table rather than freehand. I'm looking for a

new router table at the moment. Most are too small. It needs to have very fine fence adjustment and an accurate cross-slide that doesn't waggle!"

For routers, he has a big Elu 177E router,

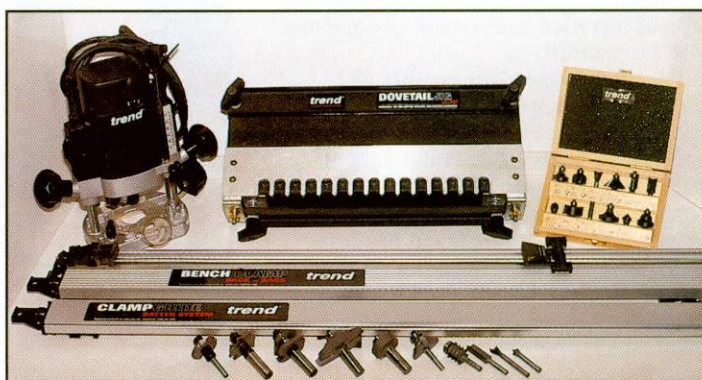
Bill's beef's

Favoured woods are English and European oak, sycamore – "I love the silky finish it takes on" – mahogany, when he can get it, and teak.

▼ A selection of Bill's cutters...



▼ ...and some more, to be used with the Trend T5, dovetail jig and clamp bench





▲ A few of Bill's accessories, note the side fences, guidebushes and ear defenders

◀ Homemade jigs make freehand and profile routing a lot easier

One of his main gripes is that timber merchants don't warrant the moisture content of the timber they sell. Invariably it is drier on the outside and it moves once machined, so whenever possible, Bill part prepares his wood and leaves it under the bed to dry out properly, ready for use later on.

Most of what Bill does is for home use, even if it starts life as a magazine project, with the occasional commission from family and friends. "My principal weakness is design – I have no real artistic flair but I seem to get by."

"I don't use many router jigs, I tend to make them up as and when required, principally for profile routing on the table or freehand. My pet hates are – dust, noise, and inappropriate use of aluminium and plastics for fences and suchlike in machines!"

Cain's comments

"Take time to think your way through a job before you cut anything – remember, measure twice, cut once. Always prepare more than you need, it takes time to set up, even longer if you have to go back and try to reset everything as it was.

"Think safety at all times, ensure both the router and the work are secure, a 2hp router has a lot of 'grunt' and an 'event' will happen faster than you can react. Don't overload the machine or cutter, vary the speed to suit the material and the cutter size. Listen to the motor note, it will tell when the speed or the feed rate are wrong. Finally, purchase the best cutters you can afford, cheap ones don't last".

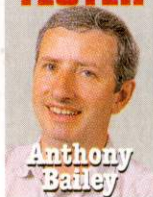
Among all this woodworking activity Bill Cain still finds time for the occasional round of golf, whilst Betty, who often assists with the photography and provides a 'ladies view' for his *Router* articles, enjoys quilting and making home furnishings. Just goes to show that retirement means never having to be bored again! ●

"Purchase the best cutters you can afford, cheap ones don't last"

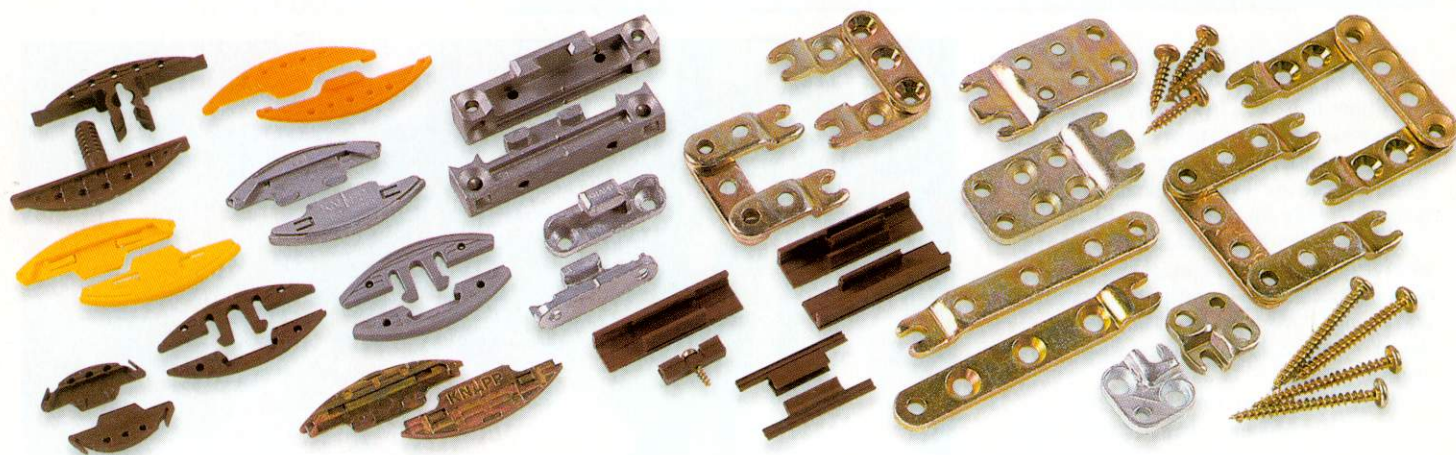


Sometimes a hand plane will do the job just as well as a power tool

TESTER



Get your fix



Anthony Bailey gets some retail therapy and tests out some Knapp fixings

▲ The new Knapp fixings range

CONFESS it, I am a fixings junkie – show me a new and interesting means of assembling wood and my mind starts doing somersaults as I try to figure out all the different applications for it, and how to get my hands

on a boxful to try out!

One look at the Knapp range is enough to give me the shakes because of the vast range of different fixings solutions based around the biscuit cutter or the router. Designed and made in

Germany to exactly high standards, and using some very cunning ideas, Friedrich Knapp GmbH have produced answers to just about every fixing problem you can think of. There should be a fixing for every occasion.

▼ One half of Chico routed in. Note the stop tab and overlength slot to allow for assembly



▼ The Duo 100/15 is useful for bed frames





▲ The Acro 90/90 will take a substantial load



▲ The S-Klick clips straight in to mount small sections

Router-only fittings

'Jumbo' and the smaller 'Chico' cast alloy two part fittings are routed-in using a single slot for each component half. They make an excellent way of surface mounting (Jumbo only) or invisibly joining worktops, exhibitions stands and removable walls. In fact, a key feature of all Knapp fastenings is their ability to de-mount easily. Jumbo can have lock pins added whilst Chico has an integrated stop.

'Acro' and 'Duo' are a large range of heavy-gauge pressed-steel fasteners which are pretty much indestructible. Their code numbers indicate the physical dimensions, thus Duo 46/15 is a small two-piece fastener 46mm long by 15mm wide, whilst Acro 90/90 is a large five-piece set which once in place will take a substantial loading.

Duo 100/15 has been developed especially with bedframes in mind, a common requirement. Duo's are used a lot for conservatory building, allowing quick on-site assembly. A massive variant aptly called 'Gigant' is now available in three sizes.

Tap the Silver in for positive fixing



Note Metal's barb and screw fixings to hold it in place

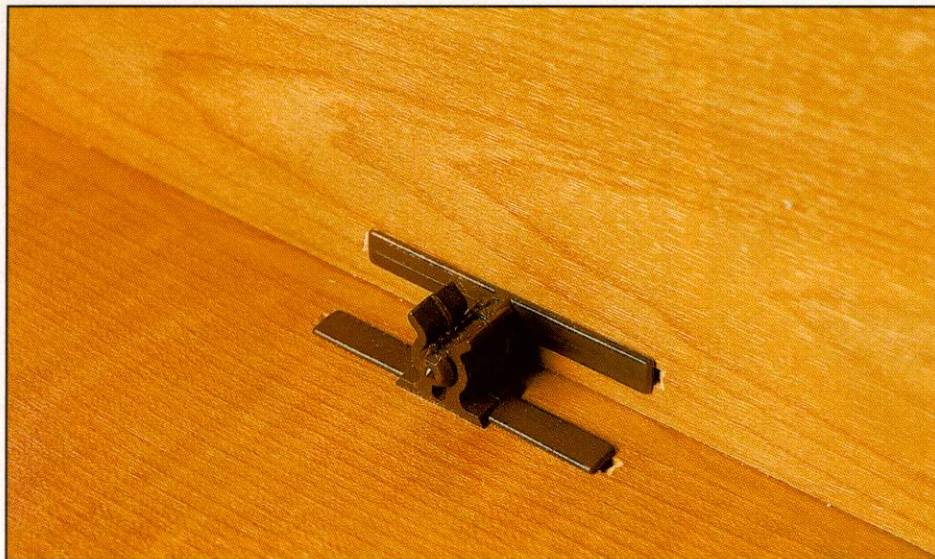


They are 40mm wide by 120mm, 150mm and 180mm long, and fixed with 10mm diameter woodscrews. Use them for large conservatories, decking and the like.

Whatever combination is used they are routed-in using special templates – the adventurous can make their own! The components are screwed in place with heavy-duty screws, then the resulting fork-on-fork coupling can be assembled.

All fittings are yellow chromatised to give weather resistance and can be used for saunas, pergolas, staircases or furniture. Knapp supply special hardened screws as an additional item.

The final router-based plastic fastening system is the 'Klick'. It is possible to mount coverings, profile mouldings, cornice and infills. The key to Klick is the springy arrowheaded U-shape that pushes into a dovetailed slot, using the Knapp HM router cutter.



▲ *With a degree of height adjustment, Clips are ideal for kitchen cupboards*

There is either a double-headed pattern (Klick) or screw mounted (S-Klick) or 'mini-Klick' which clips into a straight groove, or 'Klick Pro' which when stapled or screwed in place accepts the Klick version.

Biscuit cutter fittings

These can be installed with a biscuit cutter on a router or a dedicated jointer. In alloy there is 'Silver' which is tapped into the end of the slot, cutting a thin slit into the wood as it goes to prevent it from being pulled out.

There's also 'Metal', which has ridges for permanent insertion in solid wood with two screws for additional fixing, both have a slide-apart de-mountable action.

There are several plastic variants. 'Champ', which is similar to Metal but has holes to allow special Knapp polyurethane

glue to expand through and lock them in place. 'Mini', as the name implies, needs a smaller cutter which Knapp can supply, it has flexible ends to help locate it and again is glued in place.

'Sunny' (bright yellow) acts like Silver with a knife-edge for tap in insertion and has locking tabs which can be broken off if needed. Then there is 'Quick' (brown), and 'Fast' for easy mounting of mouldings, cornice and infills etc. Lastly, the very handy 'Clips' which allow easy fitting and adjustment of kickboards, skirting and panelling, due to its right-angle coupling.

On test

Using these different fastenings in a one-off test doesn't give adequate time to really get to know them all inside out.

"Knapp are aiming at the professional whether on a small or large scale"

However they all perform well and even though I had to make up templates for Acro and Duo these still weren't difficult to use.

I'm not sure that I have a favourite, but as I am a biscuit fan these types appealed most, although it depends what situation you are working in. The Knapp polyurethane glue makes a big difference to joint performance and its expandability means each slot is filled tight. The Duo 100/15 for bedframes solves a problem that has come up time and again for me and many furniture makers.

Conclusion

Clearly Knapp are aiming at the professional, whether on a small or large scale. There is the cost, which needs to be built into each job, and the selection of a limited range of fittings that will meet most needs without overstocking. An excellent range of high quality products.

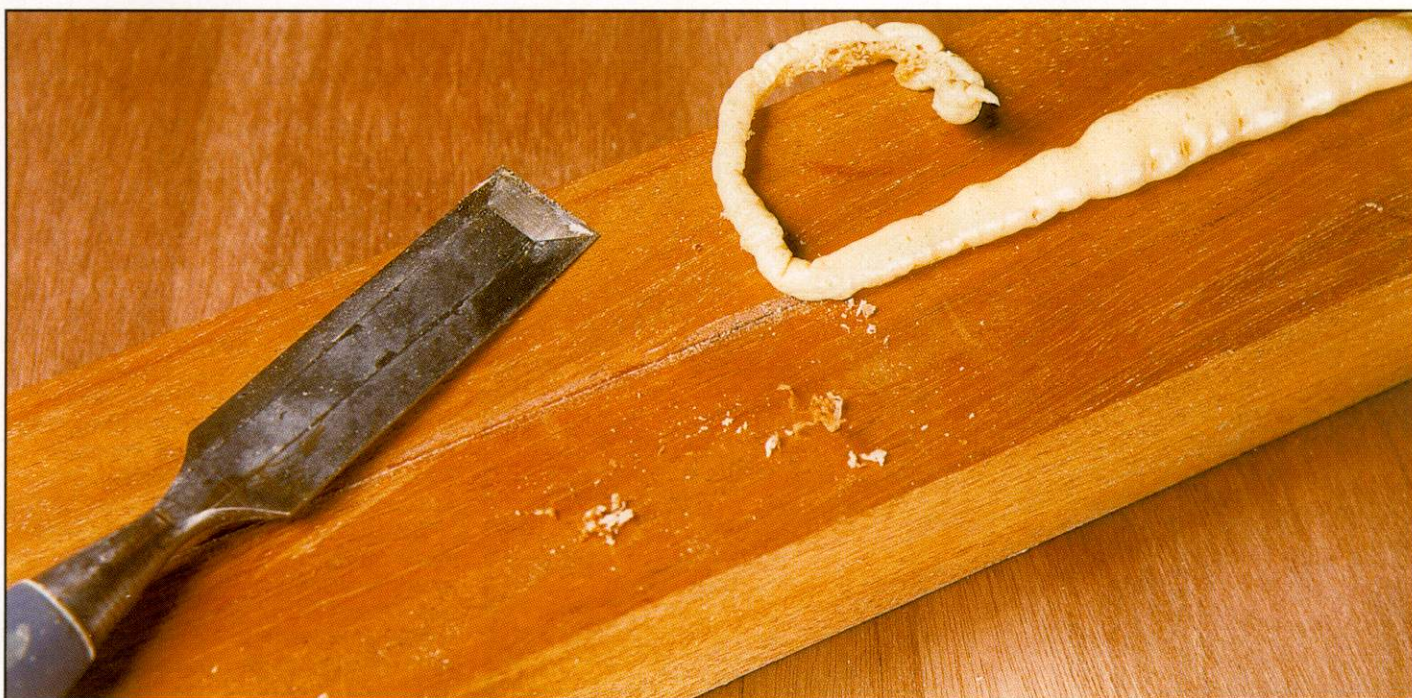
Duo comes in 50 and 100 pair packs, all the biscuit based ones come in 50, 100 and 250 pair packs, and Klick variants in 500 and 1000 pair packs. Prices vary according to which type, but Projoin can supply a catalogue and price list.

Victor or Stuart Clarke at Projoin will effortlessly guide you through the range and identify which products would best suit the applications you need solutions for.

Contact: Projoin Products - Rolleston Hall, Rolleston Road, South Croydon, Surrey, CR2 0PT.

Tel 0181 686 4405. ●

▼ *Polyurethane glue makes a big difference to joint performance*



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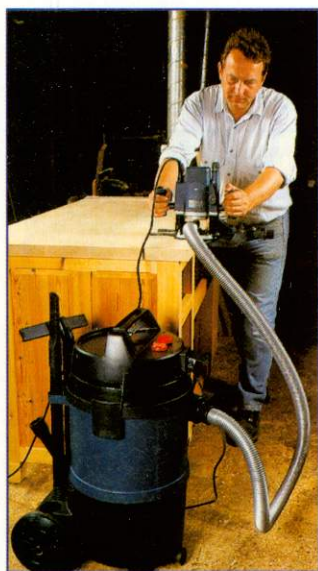
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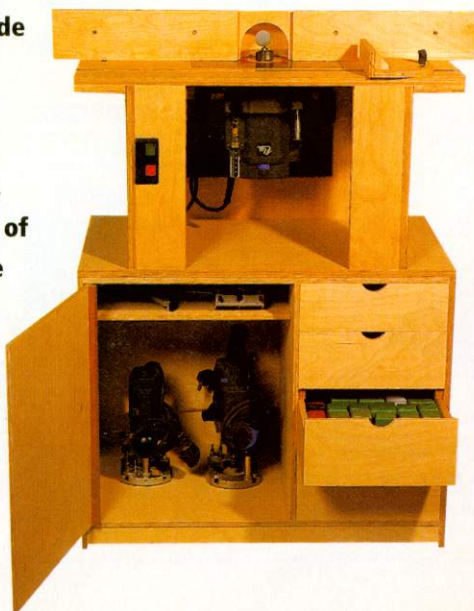
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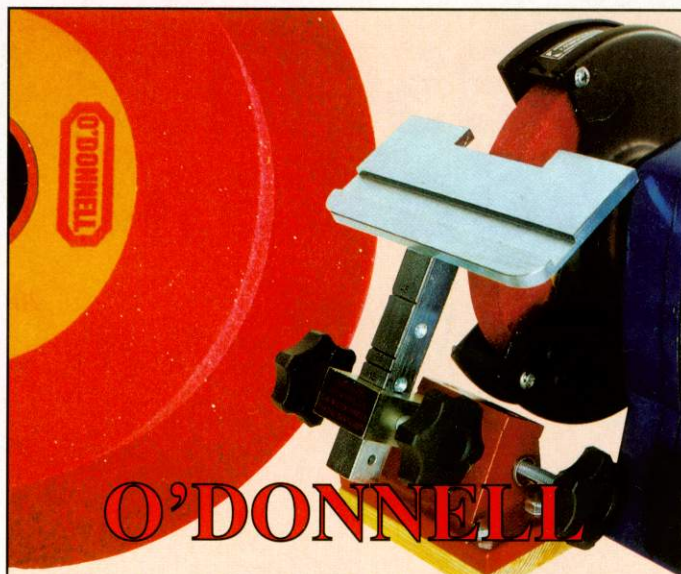
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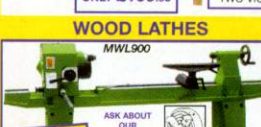
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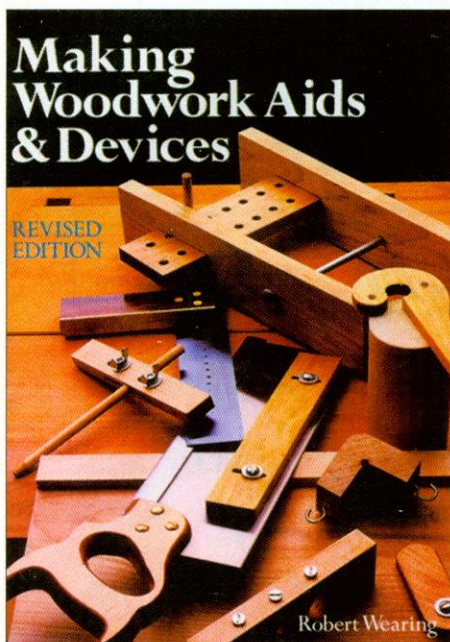
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BOOK reviews



Making Woodworking Aids & Devices

By Robert Wearing

GMC Publications, 1999
£9.95, Softback
224pp, B&W illustrations
ISBN 1 86108 1294

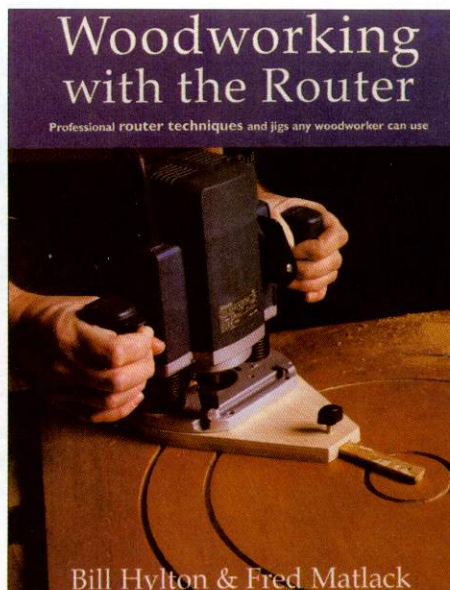
EVEN THE MOST well-equipped woodworker sometimes needs a special tool or apparatus to handle a particular task; this book offers over 200 ingenious and original solutions. The ideas range from simple jigs, marking aids and holding devices, to more complex working aids and specialist tools.

You can eliminate difficult procedures, speed up time-consuming and repetitive jobs, reduce costly material waste, and even avoid purchasing expensive equipment specific to certain tasks by using tools you already own. All the projects feature easy-to-follow instructions and explanatory line illustrations.

Robert Wearing, a professional furniture-maker, teacher and regular contributor to *The Router*, has dealt with just about every awkward situation that comes up in the workshop. In this fascinating compendium he shares a lifetime's 'tricks of the trade'.

So, whether it's aids or devices to eliminate the need for difficult skills, a desire for greater accuracy, speeding up production or cutting costs, this is the book for you.

James Shanahan



Woodworking with the Router

by Bill Hylton and Fred Matlack

GMC Publications, 1999
£14.95, Softback,
344pp, Colour illustrations, B&W
photographs
ISBN 1 86108 128 6

THERE ARE so many good router books available it is a pleasant surprise to find one that contains even more information about routers, jigs and cutters, and how to use them. This one written by Bill Hylton and Fred Matlack kicks off with descriptions of routers including the, unfamiliar in the UK, fixed body routers – although plunge types are also featured.

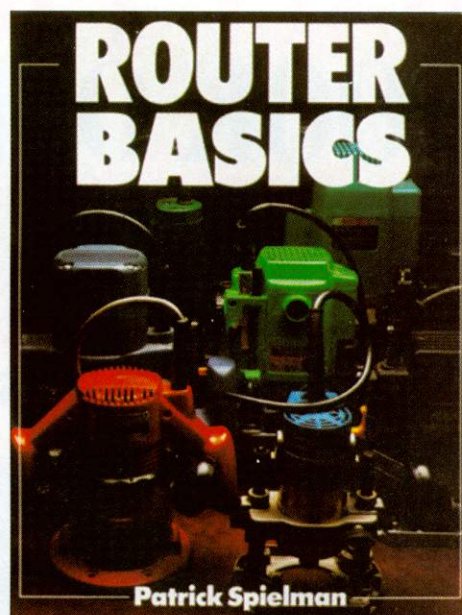
A chapter follows on cutters and their maintenance with instructions on how to make a rather nice storage box for them. Throughout the book there are 'try this!' sections which give useful tips on every aspect of routing.

Making custom baseplates to enable routers to achieve specialist tasks isn't a subject commonly seen, and the authors cover this well. There is a large and comprehensive section on router tables with an unusual router bench featured, complete with construction details.

"It's tall, it's skinny – but don't let its looks deceive you", is how this handy item is described. There are chapters on cutter profiles, template routing, and joint and jig-making – in fact there is too much contained in this book to list, let alone describe.

All the subjects are covered fully and although American in origin, the information is relevant to router users of any nationality – and ease of reading is helped with good photos and illustrations. I recommend it.

Alan Goodsell



Router Basics

by Patrick Spielman

Sterling, 1990
£8.99, Softback,
128pp, B&W photos
ISBN 0 8069 7222 X

IT'S JUST POSSIBLE that you might not have heard of Patrick Spielman. If this is the case, I should tell you that his first routing book, *Router Handbook*, sold about 600,000,000,000 copies – all right, I exaggerate, but it was a lot – in America alone, and pretty much established the tool and its use there, so he knows his stuff.

To save time, here's what this book isn't. It isn't colourful, glossy, well-photographed or illustrated. Other than that, it's fine. The pages are packed with useful stuff for the beginner. Spielman really does answer most of the questions the newcomer is likely to ask about routers, cutters, joints, safety and so on, as well as throwing in a few instructional projects like a workbench, for teaching mortice and tenons, a bookcase, for teaching rebates, grooves and rounding-over, and a dead simple router table.

I would expect this book to be covered in workshop tea stains and dust for most of its life, so the dingy production isn't the issue. Where it scores is as a good, affordable, basic tutor to be kept by the bench.

Paul Richardson

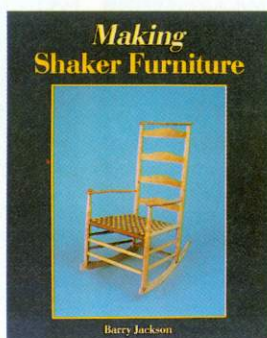
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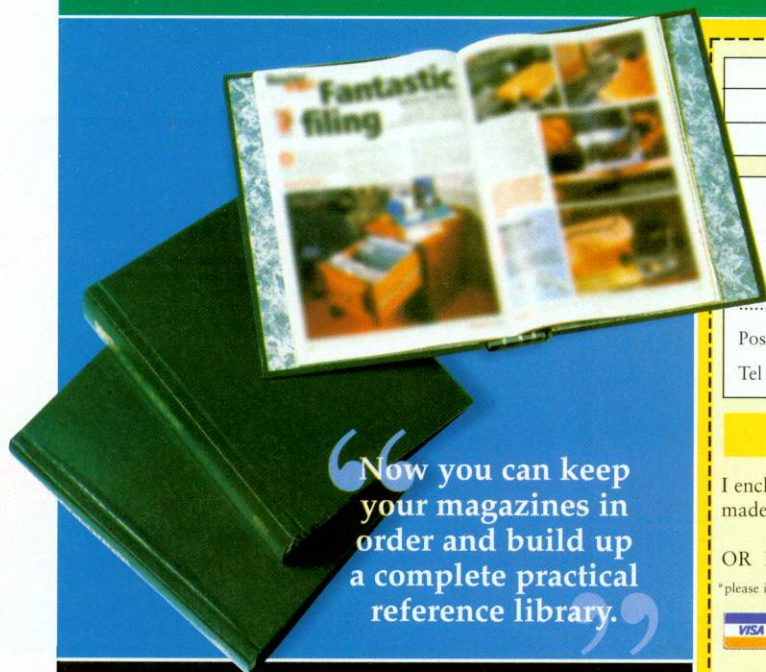


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Router specifications

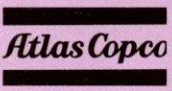
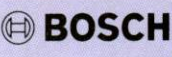
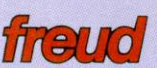
Brand name	Model	Wattage	6mm collet	¹ / ₄ in collet	8mm collet	³ / ₈ in collet	12mm collet	¹ / ₂ in collet
AEG	OFE 710	710W	No	Yes	No	No	No	No
Atlas Copco	OFSE 1000	1000W	No	Yes	No	No	No	No
Atlas Copco	OFSE 2000	2000W	No	Yes	Yes	No	No	Yes
Black & Decker	KW 780	600W	Yes	Yes	Yes	No	No	No
Black & Decker	KW 780E	600W	Yes	Yes	Yes	Yes	No	No
Bosch	POF 500 A	500W	Option	Yes	Option	No	No	No
Bosch	POF 600 ACE	600W	Option	Yes	Option	No	No	No
Bosch	900 ACE	900W	Option	Yes	Option	No	No	No
Bosch	GOF 1300 ACE	1300W	Option	Yes	Option	Option	Option	Yes
Bosch	GOF 1600 A	1600W	No	Yes	Option	Option	Option	Yes
Bosch	GOF 1700 ACE	1700W	No	Yes	Option	Option	Option	Yes
DeWalt	DW613	800W	Option	Yes	Option	No	No	No
DeWalt	DW620	900W	Option	Yes	Option	No	No	No
DeWalt	DW621	1100W	Option	Option	No	No	No	No
DeWalt	DW625 EK	1850W	Option	Yes	Option	No	Option	Yes
DeWalt	DW670	600W	Option	Yes	Option	No	No	No
Einhell	EOF 850SP	850W	Option	Option	Yes	No	No	No
Elu	MOF96E	900W	Option	Yes	Option	No	No	No
Elu	OF97	900W	Option	Yes	Option	No	No	No
Elu	OF97EK	1100W	Option	Yes	Option	No	No	No
Elu**	MOF177	1600W	Option	Yes	Option	No	Option	Yes
Elu	MOF177EK	1850W	Option	Yes	Option	No	Option	Yes
Flex Porter Cable	OFT3 12VV	1710W	Option	Option	Option	Option	Option	Yes
Festo	OF 1000 Plus	900W	Option	No	Yes	Option	No	No
Festo	OF 1000 EB Plus	900W	Option	Yes	Yes	Option	No	No
Festo	OF 2000 Plus	1600W	Option	Option	Yes	Option	Yes	Option
Festo	OF 2000 E Plus	1800W	Option	Option	Yes	Option	Yes	Option
Freud	FT2000E	1800W	No	Yes	No	Yes	Yes	No
Hitachi	ZK 2008	550W	No	Yes	No	No	No	No
Hitachi	M8	800W	No	Yes	No	No	No	No
Hitachi	M8V	800W	No	Yes	No	No	No	No
Hitachi	M12SA	1600W	No	Option	No	Option	No	Yes
Hitachi	M12V	1850W	No	Yes	No	Option	No	Yes
Holz Her	2355	800W	No	Yes	No	No	No	No
Holz Her	2356	1010W	No	Yes	No	No	No	No
Kress	FM6955	550W	Yes	Yes	Yes	No	No	No
Mafell	LO 50E	900W	Option	Yes	Option	No	No	No
Mafell	LO 65E	1800W	Option	Option	Option	Option	Option	Yes
Makita	3620	860W	Option	Yes	Option	Yes	Option	Option
Makita	3621C	1850W	Option	Yes	Option	Yes	Option	Yes
Makita	3612	1650W	Option	Yes	Option	Yes	Option	Yes
Metabo	OFE 1229 Signal	1200W	Option	Yes	Option	No	No	No
Metabo	OFE 1812	1800W	Option	Option	Option	Option	Option	Yes
Power Devil	PDW5027	850W	No	Yes	Yes	No	No	No
Perles	OF 808	850W	No	Yes	Yes	No	No	No
Ryobi	RE 120	570W	No	Yes	No	No	No	No
Ryobi	RE155K	800W	No	Yes	Yes	No	No	No
Ryobi	R 600N	2050W	Yes	Yes	Yes	Yes	No	Yes
Ryobi	RE601	2050W	Yes	Yes	Yes	Yes	No	Yes
Skil	1875UI	1400W	No	Yes	No	No	No	Yes
Sparky	X52E	500W	Yes	Yes	Yes	No	No	No
Trend	T5E	850W	No	Yes	Yes	No	No	No
Trend	T9E	1800W	Option	Yes	Option	Option	Option	Yes
Virutex	FR77C	850W	Option	Option	Yes	No	No	No
Virutex	FR78C	850W	Option	Option	Yes	No	No	No
Virutex	FR66F	1100W	Option	Option	Yes	No	No	No
Woodcut	WTC-1800E	1800W	Option	Option	Option	Option	Option	Yes

Information is correct at time of going to press as supplied by manufacturers. If any new models become available please let us know. Prices are all manufacturers' list prices – shopping around will help to find discounts.

Key: TR# = The Router issue tested; NYT = not yet tested by The Router; ** = tested as DeWalt 621.

Max. plunge	RPM	Soft start	Voltage	Spindle lock	Dust extraction	Weight	Test	Price
50mm (2in)	10,000–30,000	Yes	240V	Yes	No	2.9kg	TR10	£234
50mm (2in)	8,000–25,000	Yes	240V	Yes	No	2.7kg	NYT	£355
75mm (3in)	8,000–24,000	Yes	240V	Yes	Yes	5.2kg	TR3	£478
55mm (2¼in)	30,000	No	240V	Yes	Yes	3.0kg	NYT	£135
55mm (2¼in)	8,000–30,000	Yes	240V	Yes	Yes	3.0kg	TR10	£153
52mm (2in)	27,000	No	240V	No	Yes	2.4kg	NYT	£131
52mm (2in)	12,000–27,000	Yes	240V	No	Yes	2.0kg	TR10	£184
50mm (2in)	12,000–26,500	Yes	240/110V	Yes	Yes	3.5kg	TR1	£341
60mm (2¾in)	12,000–24,000	Yes	240V	Yes	Yes	4.8kg	TR9	£401
75mm (3in)	25,000	No	240/110V	Yes	Yes	5.7kg	TR2	£398
75mm (3in)	8,000–23,000	Yes	240/110V	Yes	Yes	5.8kg	TR7	£488
35mm (1½in)	27,000	No	240/110V	Yes	Yes	2.8kg	TR1	£233
55mm (2¼in)	24,000	No	240/110V	Yes	Yes	3.1kg	NYT	£282
55mm (2¼in)	8,000–24,000	Yes	240/110V	Yes	Yes	3.1kg	TR1	£376
64mm (2½in)	24,000	Yes	240/110V	Yes	Yes	5.1kg	TR3	£562
22mm (1¾in)	30,000	No	240/110V	Yes	Yes	1.9kg	NYT	£233
50mm (2in)	24,000	No	240V	Yes	Yes	n/a	TR1	£165
55mm (2¼in)	8,000–24,000	Yes	240/110V	Yes	Yes	2.9kg	NYT	£329
55mm (2¼in)	24,000	No	240/110V	Yes	Yes	3.3kg	NYT	£282
55mm (2¼in)	8,000–24,000	Yes	240/110V	Yes	Yes	3.3kg	TR1**	£364
65mm (2½in)	20,000	No	240/110V	Yes	No	5.1kg	NYT	£493
65mm (2½in)	20,000	No	240/110V	Yes	Yes	5.1kg	TR1	£535
73mm (2¾in)	10,000–21,000	Yes	240V	No	Yes	7.8kg	TR5	£685
55mm (2¼in)	10,000–22,000	Yes	240/110V	Yes	Yes	2.7kg	NYT	£321
55mm (2¼in)	10,000–22,000	Yes	240/110V	Yes	Yes	2.7kg	TR11	£321
65mm (2½in)	25,500	Yes	240V	Yes	Yes	5.1kg	NYT	£445
65mm (2½in)	12,000–22,000	Yes	240V	Yes	Yes	5.1kg	TR3	£525
70mm (2¾in)	8,000–22,000	Yes	240V	Yes	Yes	5.9kg	TR2	£341
52mm (2in)	27,000	No	240V	No	No	2.3kg	TR10	£143
50mm (2in)	25,000	No	240/110V	Yes	No	2.7kg	TR1	£264
50mm (2in)	10,000–25,000	No	240/110V	Yes	No	2.8kg	NYT	£328
62mm (2¾in)	22,000	No	240/110V	Yes	No	5.2kg	TR2	£339
62mm (2¾in)	8,000–20,000	Yes	240/110V	Yes	No	5.3kg	TR3	£469
50mm (2in)	25,000	No	240/110V	Yes	No	2.7kg	NYT	£235
50mm (2in)	8,000–25,000	Yes	240/110V	Yes	No	2.7kg	NYT	£310
44mm (1¾in)	8,000–25,000	Yes	240/110V	Yes	No	2.7kg	NYT	£310
50mm (2in)	10,000–22,000	Yes	240/110V	Yes	Yes	1.6kg	TR10	£199
65mm (2½in)	8,000–20,000	Yes	240V	Yes	Yes	5.5kg	TR4	£395
35mm (1½in)	24,000	No	240V	No	No	2.4kg	TR10	£220
60mm (2¾in)	9,000–23,000	Yes	240/110V	Yes	Yes	6.0kg	NYT	£432
60mm (2¾in)	22,000	No	240/110V	Yes	Yes	5.8kg	NYT	£398
50mm (2in)	5,000–25,500	No	240/110V	Yes	Yes	3.4kg	TR1	£428
80mm (3½in)	8,000–22,000	Yes	240/110V	Yes	Yes	5.1kg	TR3	£570
43mm (1¾in)	9,000–28,000	Yes	240V	Yes	Yes	3.7kg	TR16	£50
50mm (2in)	25,000	No	240V	No	No	n/a	NYT	£185
55mm (2¼in)	17,000–28,000	No	240V	Yes	Yes	2.2kg	TR10	£199
50mm (2in)	16,000–27,000	No	240/110V	Yes	Yes	3.0kg	TR1	£298
60mm (2¾in)	23,000	No	240/110V	Yes	Yes	6.2kg	NYT	£398
60mm (2¾in)	10,000–23,000	Yes	240/110V	Yes	Yes	6.2kg	TR2	£469
63.5mm (2½in)	8,000–22,000	Yes	240V	No	Yes	4.5kg	TR2	£316
52mm (2in)	8,000–33,000	Yes	240V	No	Yes	2.2kg	TR10	£105
50mm (2in)	8,000–24,000	Yes	240V	Yes	Yes	3.1kg	TR7	£217
75mm (3in)	8,000–22,000	Yes	240/110V	Yes	Yes	5.2kg	TR9	£351
50mm (2in)	24,000	No	240/110V	Yes	Yes	3.1kg	NYT	£182
50mm (2in)	8,000–24,000	Yes	240V	Yes	Yes	2.9kg	TR15	£190
60mm (2¾in)	23,000	No	240V	Yes	Yes	3.8kg	TR15	£175
80mm (3½in)	8,000–24,000	Yes	240V	Yes	Yes	5.1kg	TR6	£259

Router contacts

Product	Company	Address	Tel	Fax
 	Atlas Copco Tools Ltd	PO Box 79, Swallowdale Lane, Hemel Hempstead, Herts HP2 7HA	01442 261201	01442 240596
 	Atlas Copco Tools Ltd	PO Box 79, Swallowdale Lane, Hemel Hempstead, Herts HP2 7HA	01442 261201	01442 240596
   	Axminster Power Tool Centre	Chard Street, Axminster, Devon EX13 5DZ	01297 33656	01297 35242
  	Black & Decker Power Tools Ltd	210 Bath Road, Slough, Berkshire SL1 1YD	01753 511234	01753 500843
   	Robert Bosch Ltd	PO Box 98, Broadwater Park, North Orbital Road, Denham, Uxbridge, Middlesex UB9 5HT	01895 834466	01895 838388
  	CMT Tools (UK)	8 Wainwright Road, Bexhill, E. Sussex TN39 3UR	01424 214233	01424 730674
  	DeWalt Power Tools Ltd	210 Bath Road, Slough, Berkshire SL1 3YD	01753 567055	01753 521312
 	Blades	271 Botley Road, Burridge, Southampton, SO31 1BS	01489 885221	01489 885221
 	Hamilton Power products	Unit 12, Grangeway Business Pk, Whitehall Road, Colchester, Essex CO2 8HF	01206 798600	01206 798799
   	Minden Industrial Ltd	Saxham Business Park, Saxham, Bury St Edmunds, Suffolk IP28 6DX	01284 760791	01284 702156
  	Freud Tooling UK Ltd	Unit 3 Emmanuel Trading Estate, Springwell Road, Leeds LS12 1AT	0113 245 3737	0113 243 8883
   	Hitachi Power Tools	Precedent Drive, Rooksley, Milton Keynes, Buckinghamshire MK13 8PJ	01908 660663	01908 232868
  	Cheetham Tool Group distributor	Rhosddu Industrial Estate, Wrexham LL11 4YL	01978 291771	01978 290068
  	Jesada Tools UK	Weycroft Avenue, Millwey Rise Ind. Est., Axminster, Devon EX13 5HU	01297 33656	01297 35242

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Product	Company	Address	Tel	Fax
 	BMJ Power	305 Dewsbury Road, Leeds, West Yorkshire LS11 5LJ	0113 2714019	0113 2778341
  	KWO Tools (UK) Ltd.	4 Strawberry Vale, Vale Road, Tonbridge, Kent TN9 1SJ	01732 364444	01732 351144
 	NMA Agencies	34 Elmfield Road, Birkby, Huddersfield, West Yorkshire HD2 2XH	01484 531446	01484 432906
   	Makita (UK) Ltd	Mitchigan Drive, Tongwell, Milton Keynes MK15 8JD	01908 211678	01908 211400
  	Draper Tools Ltd	Hursley Road, Chandlers Ford, Eastleigh, Hampshire SO53 1YF	01703 266355	01703 260784
  	Cheetham Tool Group distributor	Rhosddu Industrial Estate, Wrexham LL11 4YL	01978 291771	01978 290068
  	Ryobi Power Equipment (UK) Ltd	Pavillion 1, Olympus Park Business Centre, Quedgeley, Glos GL2 6NF	01452 724777	01452 727400
   	Screwfix Direct	Screwfix Direct, Yeovil, BA22 8BF	0500 414141	0800 056 2256
 	Skil Power Tools	PO Box 98, Broadwater Park, North Orbital Road, Denham, Uxbridge, Middlesex UB9 5HT	01895 838743	01895 838802
  	M & M Tools (UK)	8 Wainwright Road, Bexhill, E. Sussex, TN39 3UR	01424 216897	01424 730674
  	Titman Tip Tools Ltd	Kennedy Way, Valley Road, Clacton-on-Sea, Essex CO15 4AB	01255 220123	01255 221422
   	Trend Machinery & Cutting Tools Ltd	Freepost, Penfold Works, Imperial Way, Watford WD2 4WD	01923 249911	01923 236879
  	Ney Ltd	Falkland Close, Charter Avenue Industrial Estate, Tile Hill, Coventry CV4 8UA	01203 420300	01203 420360
  	Wealden Tool Company	31 Branbridges Industrial Estate, East Peckham, Kent TN12 5HF	0800 3284183	07000 564636
   	The Woodcut Trading Company	8 Wainwright Road, Bexhill, E. Sussex TN39 3UR	0800 378027	01424 730674

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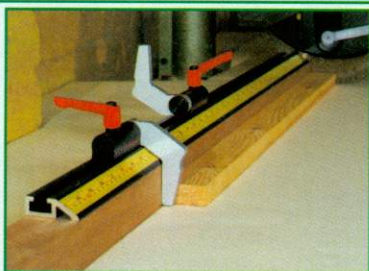
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