

Woodworking

CRAFTS

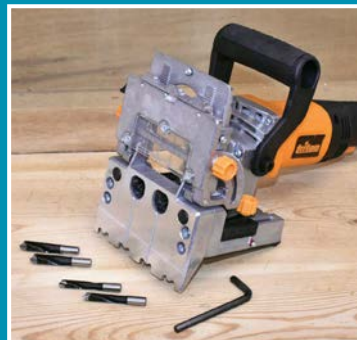
HAND, POWER & GREEN WOODWORKING • TURNING • RESTORATION • DIY

Making an Antikythera mechanism

THE SCIENCE OF THE ANCIENTS

TECHNIQUES
Pullsaw primer
Coffee table repair

THE EDITOR'S TOOLBOX • WOODEN WHEEL • TRITON JOINTER TEST • MEMORY BOX



Clarke TABLE SAWS

LEG STAND KITS
FOR CTS10D
AND CTS11
ONLY £27.59
INC VAT

FROM ONLY
£72.99
EXC.VAT
£87.99
INC.VAT

INCLUDES
LEFT
AND
RIGHT
TABLE
EXTENSION

CTS10D

*was £185.99 inc. VAT
MODEL MOTOR BLADE EXC.VAT INC.VAT
CTS800B 600W 200mm £72.99 £87.99
CTS11 1500W 254mm £149.98 £179.98
CTS10D 1500W 254mm £169.98 £209.98

BEST
SELLER

Machine Mart

65 SUPERSTORES
NATIONWIDE

WHERE QUALITY
COSTS LESS

Clarke TABLE SAW WITH EXTENSION TABLES (250mm)

CTS14

- Ideal for cross cutting, ripping, angle and mitre cutting
- Easy release/locking mechanism for table extensions
- 0-45° tilting blade
- Cutting depth: 72mm at 90° / 65mm at 45°

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

SHOWN WITH
OPTIONAL LEG KIT
CLKS £19.98
EXC.VAT £23.98 INC.VAT

EVOLUTION FURY5-S TABLE SAW

3 YEAR

FROM ONLY £159.99 EXC.VAT £191.98 INC.VAT

- 1500W motor
- 0-60° mitre gauge
- Cutting depth: Steel 3mm, Wood 85mm at 90° or 58mm at 45°

Clarke 40" WOODTURNING LATHE

Ideal for woodturning in the workshop

- 1016mm distance between centres allows for turning longer spindles
- Inc. tool rest, tail stock, drive centre, face plate & 3 chisel
- Large turning capacity of 350mm
- 4 turning speeds

CWL1000B

ONLY £136.99 EXC.VAT £164.39 INC.VAT

LOCKABLE
TAILSTOCK

BENCH
MOUNTED

Clarke DUST EXTRACTOR/ CHIP COLLECTORS

CDE7B

CWVE1

FROM ONLY £109.98 EXC.VAT £131.98 INC.VAT

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

MODEL	MOTOR	FLOW RATE	BAG CAP.	EXC.VAT	INC.VAT
CHVE1	1100W	183 M ³ /h	50Ltrs	£109.98	£131.98
CDE35B	750W	450 M ³ /h	56Ltrs	£144.99	£173.99
CDE7B	750W	850 M ³ /h	114Ltrs	£159.98	£191.98

Clarke MORTISING MACHINE

CBM1B

- Accurately creates deep square recesses
- Table size 150 x 340mm
- Max. chisel stroke 76mm
- Robust cast iron base & column ensures stability & accuracy
- 95mm depth of cut

FROM ONLY £174.99 EXC.VAT £209.99 INC.VAT

CHISELS
AVAILABLE FROM
£8.39 INC.VAT

"Fast and accurate with a good solid feel... Excellent value for money."
See www.machinemart.co.uk

Clarke RANDOM ORBITAL SANDER

CROS3

FROM ONLY £32.99 EXC.VAT £39.99 INC.VAT

- Adjustable front handle improves control
- 7000-14000rpm

INC DUST BAG AND
SELECTION OF 125MM
DIAMETER SANDING DISCS

Clarke ELECTRIC POWER FILE

CPF13

FROM ONLY £49.98 EXC.VAT £59.98 INC.VAT

- Variable belt speed
- Tilting head
- *Black & Decker

MODEL	MOTOR	BELT SIZE (mm)	EXC.VAT	INC.VAT
CPF13	400W/230V	13x457	£49.98	£59.98
KAG90E*	350W/230V	13x455	£59.98	£71.98

*was £203.98 inc. VAT

Clarke 18V CORDLESS DRILL/DRIVERS

CON18Li

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

powered by
Li-Ion

MODEL	VOLTS	BATTS	EXC.VAT	INC.VAT
CON18Li	18V	2 x Ni-Cd	£69.98	£83.98
CON18Li	18V	2 x Li-Ion	£89.98	£107.98

Clarke 18V BRUSHLESS COMBI DRILLS

CON180Li

FROM ONLY £109.98 EXC.VAT £131.98 INC.VAT

powered by
Li-Ion

- 2 forward and reverse gears

MODEL	VOLTS	BATTS	EXC.VAT	INC.VAT
CON18LiC	18V	2 x 2.0Ah Li-Ion	£109.98	£131.98
CON180Li*	18V	2 x 4.0Ah Li-Ion	£159.98	£191.98

*was £203.98 inc. VAT

Clarke BOLTLESS SHELVING/BENCHES

150 PER SHELF

350 PER SHELF

CHOICE OF 5 COLOURS
RED, BLUE, GREY, SILVER & GALVANISED STEEL

MODEL DIMS WxDxH(mm) EXC.VAT INC.VAT

150kg	800x300x1500	£29.98	£35.98
350kg	900x400x1800	£49.98	£59.98

ONLY £119.98 EXC.VAT £143.98 INC.VAT

Clarke WHETSTONE SHARPENER (200MM)

CWS200B

- Produces razor sharp cutting edges on chisels, planes, etc.
- Inc. 3 tool holding jigs, workpiece clamp & support frame, polishing paste & water trough

ONLY £119.98 EXC.VAT £143.98 INC.VAT

Clarke WOODWORKING VICES

STANLEY Record

MODEL MOUNTING JAW (WIDTH/OPENING /DEPTH)mm EXC.VAT INC.VAT

Clarke Bolted	150/152/61	£14.99	£17.99
CHT152			
Stanley Clamped	72/60/40	£18.99	£22.79
Multi Angle			
Record TV5B Clamped	75/50/32	£21.99	£26.39
Clarke VW7 Bolted	180/205/78	£29.98	£35.98

Clarke 13" MINI WOOD LATHE

CWL325V

FROM ONLY £154.99 EXC.VAT £185.99 INC.VAT

- Ideal for enthusiasts/hobbyists with small workshops
- 325mm distance between centres
- 200mm max. turning capacity (dia)
- 0.2HP motor

Clarke AIR TOOLS

CAT165

FROM ONLY £34.99 EXC.VAT £41.99 INC.VAT

HUGE CHOICE
IN-STORE/ONLINE

MODEL	DESCRIPTION	EXC.VAT	INC.VAT
CAT160	6" Dual Action Random Orbital Palm Sander	£39.98	£47.98
CAT165	10mm Air Belt Sander	£39.98	£47.98
CAT168	50mm Right Angle Orbital Sander	£34.99	£41.99

Clarke BELT SANDERS

BS1

FROM ONLY £36.99 EXC.VAT £44.39 INC.VAT

ABRASIVE SANDING
BELTS IN STOCK

MODEL	MOTOR	M/MIN	EXC.VAT	INC.VAT
Clarke BS1	900W	380	£36.99	£44.39
Clarke CBS2	1200W	460	£59.98	£71.98
Makita 9911	650W	75-270	£89.98	£107.98

Clarke CIRCULAR SAWS

CON185

FROM ONLY £41.99 EXC.VAT £50.39 INC.VAT

- Great range of DIY and professional saws
- Ideal for bevel cutting (0-45°)

MODEL	MOTOR	MAX CUT 90/45 (mm)	EXC.VAT	INC.VAT
CCS185B	1200W	65/44	£41.99	£50.39
CCS2	1300W	60/45	£59.98	£71.98
CON185*	1600W	60/40	£62.99	£75.59

*Includes laser guide

Clarke PLANERS & THICKENERS

CPT800

FROM ONLY £179.98 EXC.VAT £215.98 INC.VAT

PRICE CUT
NOW FROM
£215.98
EXC.VAT
WAS £221.99 INC.VAT

MODEL	PLANING MAX THICK. WIDTH	CAPACITY	EXC.VAT	INC.VAT
CPT800	6"	120mm	£179.98	£215.98
CPT600	8"	120mm	£219.98	£263.98
CPT1000	10"	120mm	£299.00	£358.80

BLACK & DECKER POWER PLANERS

TE-P1850

FROM ONLY £54.99 EXC.VAT £65.99 INC.VAT

- 82mm cutting width

MODEL	MOTOR	DEPTH OF CUT	EXC.VAT	INC.VAT
Einhell TE-P1850	850W	3mm	£54.99	£65.99
B&D KW750K	GB 750W	2mm	£57.99	£69.99

TURBO AIR COMPRESSORS

airmaster

FROM ONLY £89.98 EXC.VAT £107.98 INC.VAT

- Superb range ideal for DIY, hobby & semi-professional use
- *V Twin Pump

MODEL	MOTOR	CFM	TANK	EXC.VAT	INC.VAT
8/250	2HP	7.5	24ltr	£89.98	£107.98
7/250	2HP	7	24ltr	£94.99	£113.99
11/250	2.5HP	9.5	24ltr	£109.98	£131.98
8/510	2HP	7.5	50ltr	£119.98	£143.98
11/510	2.5HP	9.5	50ltr	£139.98	£167.98
16/510*	3HP	14.5	50ltr	£209.00	£250.80
16/1010*	3HP	14.5	100ltr	£259.98	£311.98

Clarke HARDWOOD WORKBENCH

CHB1500

FROM ONLY £149.99 EXC.VAT £179.98 INC.VAT

- Includes bench dogs and guide holes for variable work positioning
- 2 Heavy Duty Vices
- Large storage drawer
- Sunken top trough
- LxWxH 1520x620x855mm

Clarke DETAIL SANDERS

CDS-1V

FROM ONLY £19.98 EXC.VAT £23.98 INC.VAT

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

MODEL	WATTS	EXC.VAT	INC.VAT
PS105	105W	£19.98	£23.98
CDS-1V	280W	£29.98	£35.98

ALL MODELS INC. SANDING SHEETS

VAC KING WET & DRY VACUUM CLEANERS

FROM ONLY £49.98 EXC.VAT £59.98 INC.VAT

- Compact, high performance wet & dry vacuum cleaners for use around the home, workshop, garage etc.
- *SS = Stainless Steel

MODEL	MOTOR	CAPACITY	EXC.VAT	INC.VAT
CVAC20P	1250W	16/12ltr	£49.98	£59.98
CVAC20SS*	1400W	16/12ltr	£59.98	£71.98
CVAC20PR2	1400W	16/12ltr	£64.99	£77.99
CVAC23SS*	1400W	19/17ltr	£67.99	£81.99
CVAC30SSR	1400W	24/21ltr	£89.98	£107.98

Clarke OSCILLATING BELT & BOBBIN SANDER

COBS1

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

PRICE CUT
NOW FROM
£155.98
EXC.VAT
WAS £167.98 INC.VAT

- Sand concave, convex, straight or multi-curved pieces
- Dust collection port
- Inc. 6 sanding sleeves/bobbins

MODEL	SHEET SIZE	MOTOR	EXC.VAT	INC.VAT
COS200	190x90mm	150W	£16.99	£20.39
CON300	230x115mm	130W	£29.98	£35.98

Clarke 6" BELT/ 9" DISC SANDER

CS6-9C

FROM ONLY £239.98 EXC.VAT £286.98 INC.VAT

- Includes stand
- 1 HP/ 230V/ 1ph motor

Clarke 1" BELT/ 5" DISC SANDER

CSB1-5B

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

- Includes 2 tables that tilt & lock
- Quality Induction 250W motor

Clarke 4" BELT/ 8" DISC SANDER

CS4-8

FROM ONLY £159.98 EXC.VAT £191.98 INC.VAT

- Includes 2 tables
- 550W 230V motor

Clarke DISC SANDER (305MM)

CSB1-5B

FROM ONLY £124.99 EXC.VAT £149.98 INC.VAT

PRICE CUT
NOW FROM
£149.98
EXC.VAT
WAS £155.98 INC.VAT

- Powerful, bench mounted
- 900W
- Dust extraction port

Clarke SHEET SANDERS

CON300

FROM ONLY £16.99 EXC.VAT £20.39 INC.VAT

*was £39.59 inc. VAT

MODEL	SHEET SIZE	MOTOR	EXC.VAT	INC.VAT
COS200	190x90mm	150W	£16.99	£20.39
CON300	230x115mm	130W	£29.98	£35.98

Clarke OSCILLATING BOBBIN SANDER

COBS1

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

PRICE CUT
NOW FROM
£155.98
EXC.VAT
WAS £167.98 INC.VAT

- Dust collection port
- Inc. 6 sanding sleeves/bobbins

Clarke OSCILLATING BELT & BOBBIN SANDER

COBS1

FROM ONLY £179.98 EXC.VAT £215.98 INC.VAT

PRICE CUT
NOW FROM
£215.98
EXC.VAT
WAS £221.99 INC.VAT

- Sand concave, convex, straight or multi-curved pieces
- Dust collection port
- Inc. 6 sanding sleeves/bobbins

BUY NOW SPREAD THE COST

- Over 12, 24 or 36 months
- Purchases over £300
- 12.9% APR, 10% Deposit*

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NEW PRODUCTS

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AND PRICE CUTS

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GET YOUR FREE COPY NOW!

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- ONLINE
- PHONE

0844 880 1265

Clarke SLIDING COMPOUND MITRE SAWS

• For fast, accurate cross, bevel & mitre cutting in most hard & soft woods

- 1800W motor
- Laser guide

BEST SELLER

FROM ONLY **£89.99** EXC.VAT
£107.99 INC.VAT

CMS10S2

BLADE DIA/BORE DEPTH/ (mm) CROSS EXC.VAT INC.VAT

MODEL	210/30	60/120	£89.99	£107.99
CMS210S	254/30	78/340	£139.99	£167.99

Clarke CONTRACTOR BOSCH JIGSAWS

• Produces fast, precise mitre & longitudinal cut

- 350W motor
- 7.5" throat size
- Cuts in all types of wood

BEST SELLER

FROM ONLY **£15.99** EXC.VAT
£19.19 INC.VAT

CON750 #DIY #Professional

MODEL POWER (W) DEPTH OF CUT (WOOD/STEEL) EXC. VAT INC. VAT

CJS380*	420W	55/6mm	£15.99	£19.19
CON750*	750W	80/10mm	£27.99	£33.59
Bosch PST700E*	500W	70/4mm	£49.99	£59.99

Clarke BENCH BANDSAWS

• Produces fast, precise mitre & longitudinal cut

- 350W motor
- 7.5" throat size
- Cuts in all types of wood

BEST SELLER

FROM ONLY **£129.99** EXC.VAT
£155.99 INC.VAT

CBS190B

• Great for both home & professional use

- Induction 300W motor
- Table tilts up to 45°
- 9" throat size

PRICE CUT **£189.99** EXC.VAT
£227.99 INC.VAT

WAS £228.80 INC.VAT

Clarke PROFESSIONAL BANDSAWS

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

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

QUICK RELEASE FENCE

DRIVE-BELT TENSIONING

SOLID GROUND CAST IRON TABLE

REMOVABLE DUST TRAY

FLEXIBLE LED WORKLIGHT

BLADE TENSIONING CONTROL

MODELS ALSO FEATURE:

- MULTI-STEP DUST EXTRACTION OUTLET
- REMOVABLE DUST TRAY

was £478.80 inc.VAT # was £597.60 inc.VAT

MODEL THROAT DEPTH CUT 90° CUT 45° EXC. VAT INC. VAT

CBS250	250mm/10"	100mm	75mm	£219.99	£263.99
CBS300	305mm/12"	165mm	115mm	£379.00	£454.80
CBS350	340mm/14"	225mm	160mm	£479.00	£574.80

Clarke MITRE SAWS

• Quality Range of Mitre saws and blades in stock

was £71.99 inc.VAT

MODEL BLADE DIA/ MAX CUT BORE (mm) DEPTH/CROSS EXC. VAT INC. VAT

CMS210	210/30	60/120mm	£54.99	£65.99
Einhell TC-MS 2112	210/30	55/120mm	£59.98	£71.98
Einhell TC-SM 2131#210/30	62/310mm	£129.98	£155.98	
Einhell TC-SM 250/30	75/340mm	£159.98	£191.98	
Einhell TC-SM 2534				

Einhell BISCUIT JOINTER

• 11000rpm Operating Speed

- 860W motor
- 14mm Cutting Depth
- Inc. dust bag, storage case and face spanner for cutter change

2 YEAR GUARANTEE

TC-BJ900

£54.99 EXC.VAT
£65.99 INC.VAT

Clarke STATIC PHASE CONVERTERS

• Run big 3 phase woodworking machines from 1 phase supply

- Variable output power to match HP of motor to be run

PC60

FROM ONLY **£229.99** EXC.VAT
£274.80 INC.VAT

WAS £274.80 INC.VAT

Clarke CONTRACTOR BOSCH ROUTERS

• Powerful heavy duty machines ideal for trade and DIY use

CR2 INCLUDES 15 PIECE KIT WORTH OVER £20

FROM ONLY **£44.99** EXC.VAT
£53.99 INC.VAT

CR1200

NEW

MODEL MOTOR PLUNGE EXC.VAT INC.VAT

CR1200	1200	0-55	£44.99	£53.99
CR1C*	1200	0-50	£46.99	£56.99
Bosch	1400	0-55	£89.99	£107.98
POFI1400ACE				
CR2	2100	0-60	£119.98	£143.98

Clarke GRINDERS & STANDS

• Stands complete with bolt mountings and feet anchor holes

6" & 8" AVAILABLE WITH LIGHT

FROM ONLY **£32.99** EXC.VAT
£39.59 INC.VAT

STANDS FROM ONLY **£47.99** INC.VAT

• With sanding belt 8" whetstone & 6" drystone

MODEL DUTY WHEEL DIA. EXC.VAT INC.VAT

CBG6RP	PRO	150mm	£32.99	£39.59
CBG6RZ	PRO	150mm	£42.99	£51.59
CBG6RSC	HD	150mm	£54.99	£65.99
CBG6SB*	PRO	150mm	£54.99	£65.99
CBG6RWC	HD	150mm	£59.99	£71.98
CBG6W* (wet)	HD	150/200mm	£56.99	£68.39

Clarke WORK TABLE SUPPORTS (PAIR)

• Ideal if you have your own work top or want to build a steel or wood workbench

- Inc. mounting holes for worktop, shelf and floor

BEST SELLER

ONLY **£29.99** EXC.VAT
£35.99 INC.VAT

CWTS1

SIMPLY ADD YOUR OWN TOP

Clarke SCROLL SAWS

• 50mm max cut thickness

- Air-blower removes dust from cutting area
- Table tilts 0-45°

CSS400C

BEST SELLER

FROM ONLY **£79.99** EXC.VAT
£95.99 INC.VAT

MODEL MOTOR SPEED RPM EXC. VAT INC. VAT

CSS400D	NEW	120W	400-1600	£79.99	£95.98
CSS16VB	90W	550-1600	£94.99	£113.99	
CSS400C	90W	550-1600	£114.99	£137.99	

Clarke ROTARY PHASE CONVERTERS

• Run big 3 phase woodworking machines from 1 phase supply

- Variable output power to match HP of motor to be run

PC60

FROM ONLY **£229.99** EXC.VAT
£274.80 INC.VAT

WAS £274.80 INC.VAT

Clarke ROUTER TABLE

• Converts your router into a stationary router table

- Suitable for most routers (up to 155mm dia. Base plate)

CRT-1

BEST SELLER

Router not included

£69.99 EXC.VAT
£83.99 INC.VAT

Clarke MULTI FUNCTION TOOL WITH ACCESSORY KIT

• Great for sawing, cutting, sanding, polishing, chiselling & much more

- 250W motor
- Variable speed

CMFT250

£39.99 EXC.VAT
£47.99 INC.VAT

Clarke DRILL PRESSES

• Range of precision bench & floor presses for enthusiast, engineering & industrial applications

FROM ONLY **£66.99** EXC.VAT
£80.99 INC.VAT

B = Bench mounted
F = Floor standing

CDP152B

Clarke CORDLESS STAPLE/ NAIL GUN

• All models include nail/staple pack and tough moulded case

- 18V 2Ah Li-ion power pack
- 18 Staple/Nail Gauge

CONS18LIC

ONLY **£109.99** EXC.VAT
£131.99 INC.VAT

SPARE NAILS / STAPLES IN STOCK

ELECTRIC AND CORDLESS MODELS IN STOCK

Clarke 12" DOVETAIL JIG

• Simple, easy to set up & use for producing a variety of joints

- Cuts work pieces with a thickness of 8-32mm
- Includes a 1/2" comb template guide & holes for bench mounting

CDTJ12

£57.99 EXC.VAT
£69.99 INC.VAT

Clarke ROUTER TABLE

• Converts your router into a stationary router table

- Suitable for most routers (up to 155mm dia. Base plate)

CRT-1

BEST SELLER

Router not included

£69.99 EXC.VAT
£83.99 INC.VAT

Machine Mart Xtra

Professional woodworking tools and machinery from Record, Sheppach, SIP and more!

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Clarke DRILL PRESSES

• Range of precision bench & floor presses for enthusiast, engineering & industrial applications

FROM ONLY **£66.99** EXC.VAT
£80.99 INC.VAT

B = Bench mounted
F = Floor standing

MODEL	MOTOR (W)	SPEEDS	EXC. VAT	INC. VAT
CDP5EB	350/7.5	£66.99	£80.99	
CDP102B	350/5	£79.98	£96.98	
CDP152B	450/12	£149.98	£179.98	
CDP202B	450/16	£189.00	£226.80	
CDP10B	370/12	£198.99	£238.79	
CDP452B	550/16	£229.00	£274.80	
CDP352F	550/16	£229.00	£274.80	
CDP502F	1100/12	£499.00	£598.80	

ONLY
£109.98
EXC.VAT
£131.98
INC.VAT

CONS18LIC

SPARE NAILS /
STAPLES IN STOCK

ELECTRIC AND CORDLESS
MODELS IN STOCK

Clarke® MULTI FUNCTION TOOL WITH ACCESSORY KIT

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

£39.98
EXC.VAT
£47.98
INC.VAT

CMF250

Clarke 12" DOVETAIL JIG

• Simple, easy to set up & use for producing a variety of joints

- Cuts work pieces with a thickness of 8-32mm
- Includes a 1/2" comb template guide & holes for bench mounting

CDTJ12

£57.99 EXC.VAT
£69.99 INC.VAT

MODEL	MAX. MOTOR HP	FUSE	EXC.VAT	INC.VAT
PC20	2HP	10Amps	£229.00	£274.80
PC40	3.5HP	20Amps	£269.00	£322.80
PC60	5.5HP	32Amps	£319.00	£382.80

Clarke ROUTER TABLE

• Converts your router into a stationary router table

- Suitable for most routers (up to 155mm dia. Base plate)

CRT-1

BEST SELLER

Router not included

£69.99 EXC.VAT
£83.99 INC.VAT

MODEL	MOTOR PLUNGE (W)	EXC.VAT	INC.VAT
CR1200	1200 0-55	£44.99	£53.99
CR1C*	1200 0-50	£46.99	£56.99
Bosch	1400 0-55	£89.99	£107.98
POFI1400ACE			
CR2	2100 0-60	£119.98	£143.98

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VISIT YOUR LOCAL SUPERSTORE

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B'HAM HAY MILLS 1152 Coventry Rd, Hay Mills	0121 7713433	GATESHEAD 50 Lobby Hill Rd, NE8 4YJ	0191 493 2520	NOTTINGHAM 211 Lower Parliament St.	0115 956 1811
BLACKPOOL 380-382 Talbot Road	01253 205 170	GLASGOW 280 Gt Western Rd, G4 9EJ	0141 332 9231	PETERBOROUGH 417 Lincoln Rd, Millfield	01733 311770
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CAMBRIDGE 181-183 Histon Road, Cambridge, CB4 3HL	01223 322675	LEICESTER 69 Melton Rd, LE4 6PN	01522 543 036	SIDCUP 13 Blackden Park, Blackden Rd.	0208 3042069
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In the October issue...



Hello everyone and welcome to the October issue of Woodworking Crafts

It's been a busy year for me when I'm away from my desk. I seem to have been making, restoring, reorganising and managing to fit in some holiday in what has been a remarkably hot summer which, as usual, us Brits have had an excuse to complain about. All good things come to an end and we have winter ahead of us, and who knows what weather?

Thinking 'inside the box'

In this issue I finally manage to complete my toolbox. It has been a bit of a mission and, reflecting on it, a bit of an ego trip as it had to be done my way – not just any old toolbox. I learned various things along the way and hopefully you can benefit from some of my trial-and-error experiences if you want to make your own. Every project is a prototype. Perhaps our mission statement should be: 'We make the mistakes, so you don't have to.' Anyway, it has worked out well and the toolbox is ready for teaching and demonstrations, which is the primary purpose.

Astronomical event

Talking of time, you may have seen on television a programme some time ago about the discovery of an ancient analogue computing device called

an Antikythera mechanism, which dates from more than 2,000 years ago. Well, we have as our feature the man who decided to make a scaled-up version on a scrollsaw – beyond most of us I suspect. What it does show is the sheer breadth of knowledge and understanding and supreme engineering skill which the ancients possessed with far fewer technological resources than we can boast of today.

The common theme in this issue, therefore, is time. So now it is time to settle back to read and enjoy the magazine.

To me – to you

That sounds like a reference to the late lamented Barry Chuckle of the Chuckle Brothers, but it is my way of saying – when you saw wood, do you push or do you pull? Most readers I imagine use standard push-type handsaws, whether ripping down board or cutting fine jointwork. We have an article which is an attempt to get more people to use Japanese pullsaws, of which I am an ardent user. As the saying goes, don't knock it till you've tried it...

Anthony Bailey, Editor
Email: anthonyb@thegmcgroup.com



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Woodwork on the web

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



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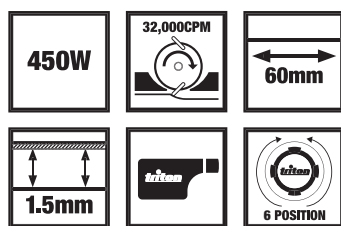


Plane & Simple

450W MINI PLANER 60MM

TMNPL

Engineered Precision



The **TMNPL** Mini Planer is powerful, easy to handle, and includes all the features of a conventional-sized planer and more.

Utilising twin 60mm reversible blades, the **TMNPL** offers the perfect combination of power and balance. Equipped with excellent grip for safe, one-handed operation, while cutting at 32,000cpm.

The 400W motor and 60mm planning width make this planer ideal for fast material removal on small to medium-sized workpieces. Planing depth is adjustable: up to 1.5mm of material can be removed in one pass. Also features 'V' grooves for accurate chamfering in 2 different sizes.

Dual 'V' chamfer grooves



Right side dust/chip extraction port



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Make a Memory box

By Chris Tribe

Boxes are a great way to develop your woodworking skills. You can use various jointing techniques, such as splined or keyed mitre, dovetail or finger joints for the corners. You can also decorate the box in different ways with carving, veneer and inlays. The other advantage of boxes is that, being small, you don't need much workshop space to make them and they are cheap on materials. ►



This box is designed for holding documents and objects of a sentimental value. You can change the dimensions and interior configuration depending on its intended use, perhaps as a jewellery or collector's box. The internal dimensions of this design mean it can take A4 sheets. In this example, the main wood is American walnut, while the top is a quartered burr oak veneer with a boxwood inlay round the edge. Burr oak contrasts well with the walnut. When making boxes, I like the grain to run unbroken round the outside, although there has to be a discontinuity at one corner. Select the wood from a single board, chosen so that there is attractive grain at the front of the box and along the sides. I personally prefer walnut sap free, others like the variation provided by the lighter sapwood. Boxes of this design are made as a single piece, the lid being cut off after glueing. This ensures a perfect fit between top and bottom.

METHOD

Mitring the corners

1 Prepare the parts for the box front, back and sides as a single board. Mark out the position of the parts along the length of the board so that the grain will run round the box when it is constructed. This should be just an approximate layout at the moment, with about 15mm ($\frac{5}{16}$ in) allowance for cutting between each piece. Check and

Cutting list

DESCRIPTION	QUANTITY	WOOD TYPE	LENGTH	WIDTH	THICKNESS
a Front/back	2	American walnut	400mm (15in)	172mm ($6\frac{25}{32}$ in)	18mm ($\frac{11}{16}$ in)
b Side	2	American walnut	300mm ($11\frac{13}{16}$ in)	172mm ($6\frac{25}{32}$ in)	18mm ($\frac{11}{16}$ in)
c Top	1	MDF	374mm ($14\frac{23}{32}$ in)	274mm ($10\frac{13}{16}$ in)	6mm ($\frac{1}{4}$ in)
d Bottom	1	MDF or ply	374mm ($14\frac{23}{32}$ in)		
e Top veneer	4	Burr oak veneer	*	*	0.6mm (0.02in)
f Balance veneer	1	Walnut	*	*	0.6mm (0.02in)
g Inlay	2	Boxwood stringing	*	*	2mm ($\frac{1}{16}$ in)sq
h False bottom	1	Birch ply or MDF	*	*	
Cut and prepare front, back and sides as a single length approximately 1500 x 172 x 18mm ($59 \times 6\frac{3}{4} \times \frac{3}{4}$ in). Boxwood stringing for inlay comes in 1m (39in) lengths to be cut to fit.			* Trimmed as appropriate during making		

mark the face side and face edge on each piece before cutting. The face side should be on the inside, with the face edge at the top.

2 You could groove for the bottom and rebate for the top while everything is in one length. However, there's the possibility of breakout when planing the mitres, so leave this until later. If using the chopsaw, you could groove and rebate now.

3 Cut out the parts. This is straightforward if you have a

compound mitre or chopsaw. Set the tilt on the saw to 45°. Take two test cuts and check the two together form a right angle. Make the cut proper when you are ready. Use a stop to ensure that the paired parts are equal length. If you are hand cutting, rough cut the mitred corners or just cut square across and rely on the shooting board to remove most of the waste. If rough mitring, mark the line of the mitres, then saw just shy of the line with a cross-cut backsaw. Whichever method you use, the face of the mitres should be facing the face side. Check this before sawing.

Making the spline/jig

This jig may be useful in other situations, so it's worth making it so that it can take thicker pieces if necessary.

1 Mitre the ends of two pieces of 18mm ($\frac{11}{16}$ in) MDF or ply for the top and bottom boards. Check that the mitred ends are square with the sides.

2 Prepare two side pieces with mitred ends.

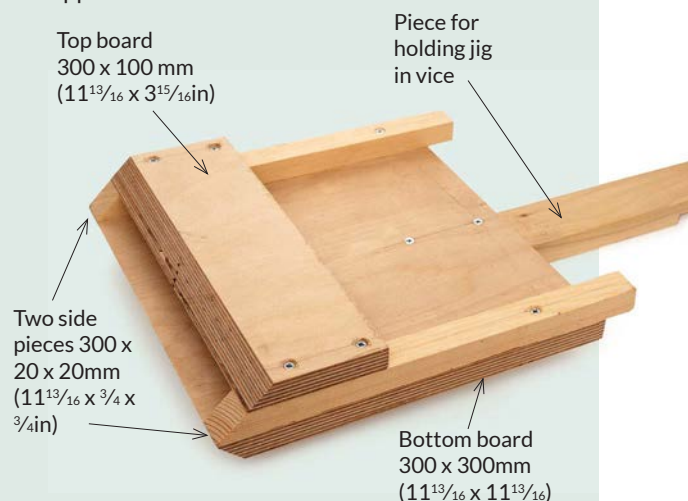
3 Drill and countersink 4mm ($\frac{3}{16}$ in) diameter holes in the top and bottom boards at the positions shown. The countersinking should be on the mitred side.

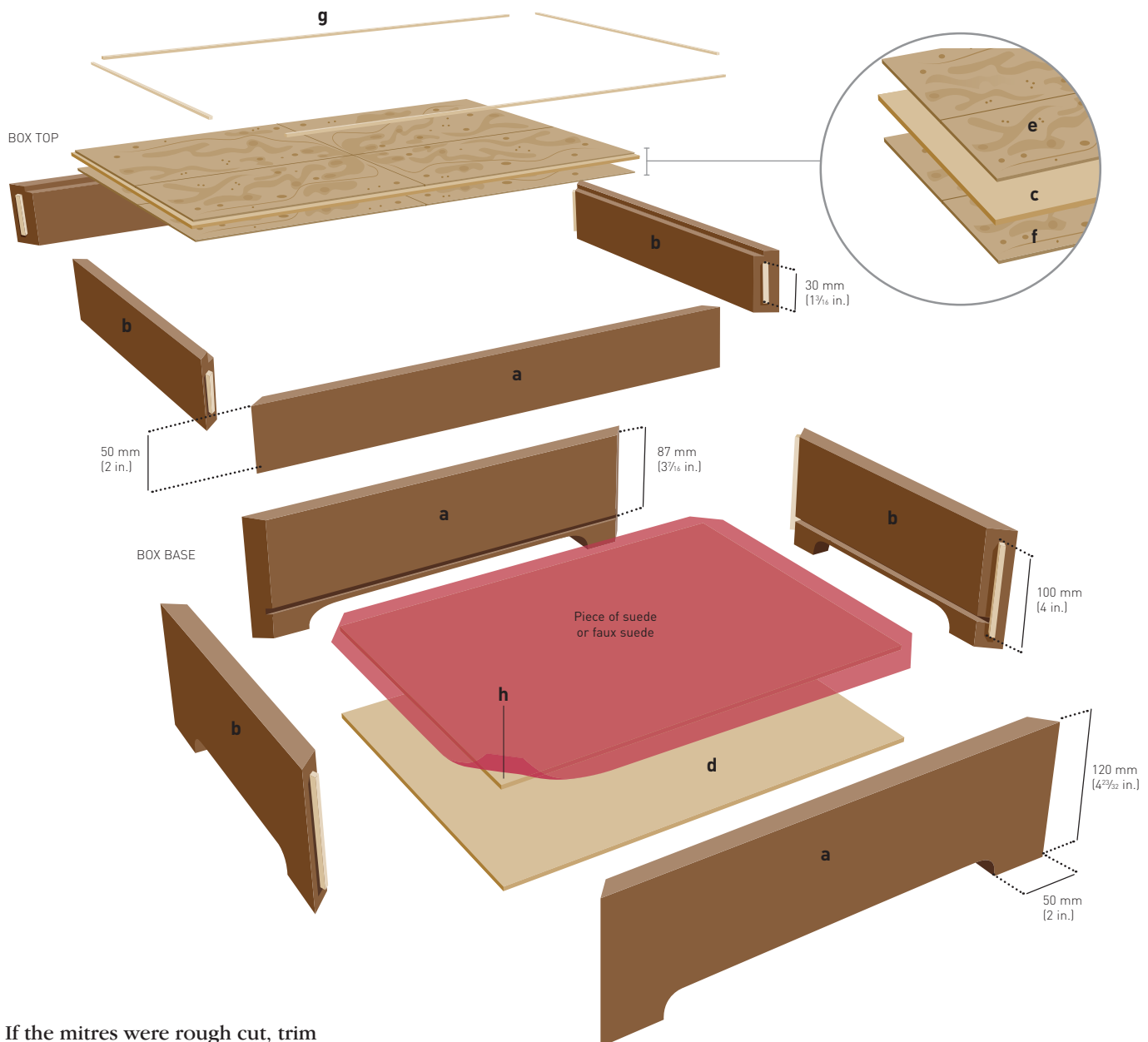
4 Position and clamp the two side pieces on to the bottom board, as shown in the photograph. The mitred ends of the side piece and the board should form a 90° angle. Pilot drill and screw on the side pieces.

5 Position, clamp and screw the top board, as shown. Again, the angle between the mitre on the bottom board and the side pieces and top board should be 90°.

6 Screw a piece underneath, as shown. This is just to hold the jig in the vice at an appropriate angle, so any piece of offcut will do as long as it can locate firmly in the vice.

7 In use, the workpiece is offered up so that the mitred face is flush with the top surface, the router fence bears against the bottom board mitred face and the top board face supports the router base.





4 If the mitres were rough cut, trim them on the box mitre shooting board. Check that the paired parts are equal length.

Reinforcing the mitres

The mitres on their own will not be strong enough – they need reinforcing. My preferred method is to route grooves for splines in the mitre faces. Another method is to fit veneer keys across the corner. If you do use keys, make up a test mitre so that you can check your technique before going at the real thing.

6 There are two spline positions, one for the lid and another for the base. Mark for the groove position on the mitre faces. If you line up the mitred ends with the face edges aligned to create a single flat surface, you should be able to mark across a set.

Mark at 10, 40, 62 and 162mm (3/8, 1 1/8, 2 7/16, 6 3/8 in) from the face edge. ➤



Shoot the mitres



Routing spline grooves

Cut splines to width minus 1mm ($\frac{1}{32}$ in) for wriggle room.

7 The spline will consist of a piece of 6mm ($\frac{1}{4}$ in) thick MDF or ply 12mm ($\frac{1}{2}$ in) wide, so the grooves in the mitre faces will be 6mm ($\frac{1}{4}$ in) wide and 6.5mm ($\frac{1}{4}$ in) deep. Make sure your router cutter will make a groove no wider than your spline material, otherwise you may have to make up some solid pieces for the splines.

8 The problem with routing mitres is that there is no end for the fence to run against. You will need a jig (see panel).

9 Use an offcut of the same thickness as the sides to set up the router. Mitre the end of the offcut and mark the position of the groove on the face, 7mm ($\frac{9}{32}$ in) from the inside edge. Clamp the test piece in the jig so that the mitred face is flush with the top. With a 6mm ($\frac{1}{4}$ in) straight flute cutter in the router, set the fence so that the cutter is aligned with the marked line and adjust the depth stop to give a depth of 6.5mm ($\frac{1}{4}$ in). Make a test cut and adjust until the depth and position are correct.



Mark the spline positions

10 Groove the mitred faces of each side within the previously marked lines.

11 Make up some splines to fit the grooves. Hopefully your 6mm ($\frac{1}{4}$ in) ply or MDF is a snug fit in the grooves – do a test with an offcut. It's best to make the splines as a long strip of the correct width – that is, 99mm ($3\frac{15}{16}$ in) and 29mm ($1\frac{1}{16}$ in). Plane a rounding on the edge, then cut to length – 12mm ($\frac{1}{2}$ in).

12 You can now do a test assembly to check that the joints are OK.

Grooving for top and bottom

The top panel fits in a rebate in the top and the bottom is fitted into a groove in the sides. These must be formed before the box is assembled.

13 The groove for the bottom is 6 x 6mm ($\frac{1}{4}$ x $\frac{1}{4}$ in) 25mm (1in) from the bottom (non-face edge). Make the groove on the router table with a straight flute or grooving cutter. It can also be done with the hand-held router, but it's easier on the table. Make test

cuts to check the fit. Your cutter is not likely to be exactly the correct size, just as long as it's not too big. If it's too small, you will have to groove in two cuts, adjusting in between.

Tip: When making test cuts for grooving or rebating, make the first cut quite long and keep the second cut short. If you make the second cut the full length of the first and it's too wide, you have lost the original groove width for further tests.

14 While you are in this mode, you can form the rebate for the top. The top panel is 6mm ($\frac{1}{4}$ in) board veneered with two leaves of veneer about 0.6mm (0.02in) thick, so it should be about 7.2mm ($\frac{9}{32}$ in). Check this with a Vernier gauge. You want the rebate to be 6mm ($\frac{1}{4}$ in) wide and 0.25mm (0.01in) deeper than the veneered panel. This will mean minimal cleaning up after fitting. This is best done on the router table, but can be achieved using a hand-held router – use an 18mm ($\frac{3}{4}$ in) cutter. Take test cuts, adjusting the fence and checking with the top panel until you have the desired fit – aim for just a smidgen protruding above the panel surface. When you are ready, make the cut in one pass.

Creating the 'feet'

The bottom of the box sides are profiled to give the appearance of feet. This is most easily done using a stopped cut on the router table.

15 Fit a 25mm (1in) straight flute cutter. The recess is 20mm ($\frac{13}{16}$ in) wide, so set the fence to 20mm



Check mitre is flush with top of jig



Make a 6mm ($\frac{1}{4}$ in) saw-cut 50mm (2in) from back edge to prevent breakout



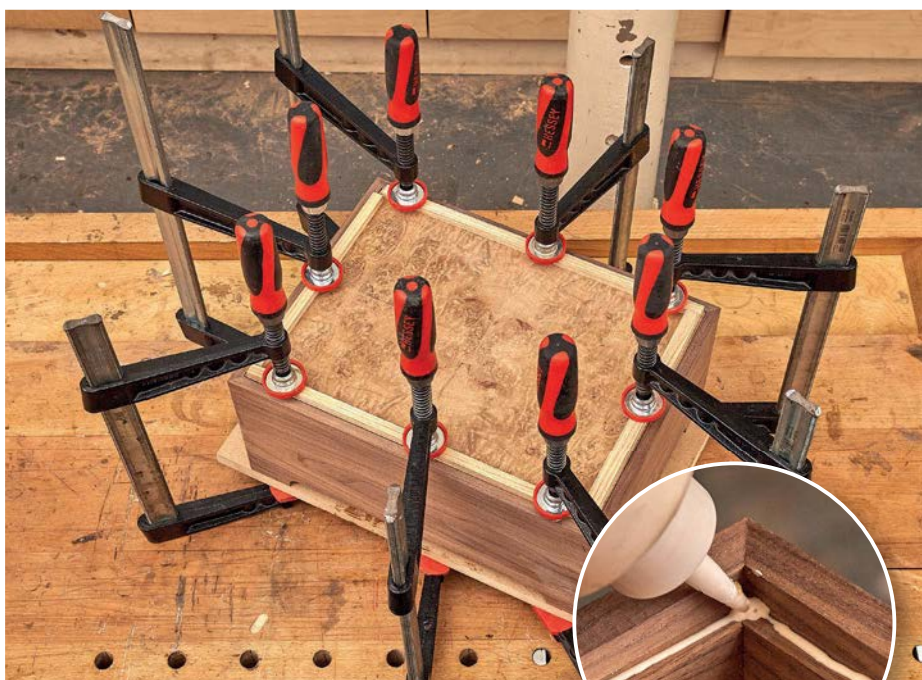
Make a series of cuts to form the feet

($\frac{13}{16}$ in) from the outside edge of the cutter. The cut will be made between stops. For the front and back, the stops should be 350mm (13in) from the far edge of the cutter and 250mm ($9\frac{7}{32}$ in) for the sides.

16 Set the router speed a couple of notches below maximum and the cutter height at about 5mm ($\frac{3}{16}$ in) and make stopped cuts in the bottom. Repeat, raising the cutter 4-5mm ($\frac{5}{32}$ - $\frac{3}{16}$ in) each time, until the recess is complete. If there is evidence of burning after the first cut, reduce the cutter speed slightly. There is a danger of breakout at the end of the cut. Prevent this by making a slight saw cut about 6mm ($\frac{1}{4}$ in) deep at 50mm (2in) from the back end on each cut.

Glue up

Clamp the box by using either a pair of



Above: Clamping the top panel. Don't overdo the glue in the rebate, as squeeze-out will be difficult to remove

strap clamps or mitre clamping blocks. I prefer to use clamping blocks.

17 Before assembly, clean up and sand all parts, lightly planing or scraping, then sanding to 180 grit. Do not try planing the veneered panel. The panels will be sanded further when the inlay is applied.

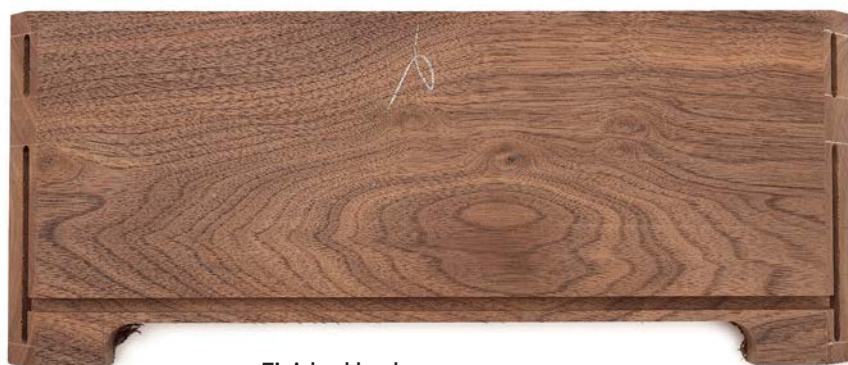
18 If using clamping blocks, dry assemble and clamp each joint individually and check for square and that there are no gaps. If using strap clamps, dry clamp the whole assembly with the bottom in (the top will be fitted later) and check all joints and diagonals.

19 When you are ready, apply glue to the spline grooves and mitre faces. If using straps, clamp up the whole assembly and check. If using

mitre clamping blocks, glue and clamp diagonally opposite corners and check for square on the internal corner with an engineer's square. When the corners have fully set, glue up the other corners with the bottom in place. Make a series of cuts to form the feet. Make a 6mm ($\frac{1}{4}$ in) saw cut 50mm (2in) from back edge to prevent breakout.

20 Now fit the burr panel. The axes of the quartering need to be square and central in the panel. Hopefully the alignment will have been correct when the veneer was laid. To centralise the axes, measure the size of the opening the panel will fit into, then halve these dimensions and mark them from the axes to the edge. This should give you lines to cut to, to fit the panel into the recess. Final fitting should be by trimming with a block plane.

21 When the panel is a snug fit into the recess, apply a thin bead of glue to the corner of the rebate and clamp the top in place with G, F or quick clamps with narrow clamping strips at the edge. Light pressure only needs to be applied at the very edge of the panel – if you clamp away from the edge, you will dish the top. Be sparing with glue, as any squeeze-out will have to be cut away with a chisel after the lid is cut off. The lid can now be cut off (see panel on page 10). ➤



Finished back

Cutting off the lid

Having made the lid and bottom as one piece, they should be a perfect fit when the lid is removed. The best way of cutting the lid is with a slitting cutter on the router table. You could do it with a rip-sharpened backsaw, but it's tricky and you would have more cleaning up to do afterwards.

1 When the top panel is glued, clean up the top – the edges may protrude slightly above the surface. Lightly cut them back with a sharp block plane or scraper.

2 To cut the lid with the slitting cutter, set up the router table with the 1.5mm ($\frac{1}{16}$ in) slitting cutter on a long arbor at a height of 52mm ($2\frac{1}{16}$ in). Set the fence so that the cutter just fails to cut through

the side, leaving a paper-thin wafer. You can check the setting on a suitable thickness offcut. You leave this piece to support the body of the box at the end of the cut, so that it doesn't drop down on to the cutter. A light twist or cutting through with a scalpel will detach the two parts.

3 Now make the cut. Place the box top down on the table and run it against the cutter. Rotate the box anti-clockwise to repeat on the other faces, then detach the lid. The cut surfaces may need cleaning up with a block plane.

4 To saw off the lid by hand, use a cutting gauge to mark carefully round the faces of the box 50mm and 52mm ($1\frac{31}{32}$ and $2\frac{1}{16}$ in) from the top. Place the box in



You can use a rip-sharpened tenon saw or backsaw to saw off the lid.

the vice, angled so that one corner is uppermost, and saw down between the lines, preferably with a rip-sharpened tenon saw. Turn the box and angle the saw as the cut progresses. When you have to clamp the cut part of the box in the vice, slip a narrow packing piece into the kerf. The cut will require some cleaning up. Mark the lid and box to ensure you offer them up the right way round when checking fit.



Left: Setting the cutter to 52mm ($2\frac{1}{16}$ in)

End of first cut. Now turn the box anti-clockwise for the second cut

Inlaying the lid

The join between the burr panel and the solid walnut lid is covered up by 1.8mm ($\frac{3}{32}$ in) or less inlaid boxwood stringing. The groove for the stringing is cut with the router.

22 Set up the router with a 1.8mm ($\frac{3}{32}$ in) or less straight flute cutter. Set the depth stop to cut slightly shallower than the depth of the stringing. If you have a micro-adjuster on your router, insert the stringing into

the gap of the depth stop, then tweak the micro-adjuster to get the final depth. Set the fence so that the cutter straddles the join between burr and walnut, with a bias to the burr side.

23 Make a test cut in a long piece of scrap wood. Check the groove is not wider than the stringing and a smidgen 0.25mm ($\frac{1}{64}$ in) shallower than the thickness of the stringing. Now make the cut. Start and end at the line between burr and walnut – do not

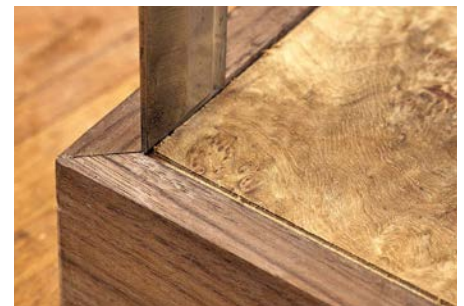
overshoot. Carefully position the cutter before plunging at the start of the cut and take a steady cut to just shy of the join at the other end. There's a lot invested in this piece and it is possible to go wrong. There can be a problem with the router dropping at the end of the cut as the corner drops into the gap in the base. You could arrange some support packing beyond the end of the box. Check it works with a test run before making the cut. Remember to breathe when making these cuts.



Make a test cut in some scrap wood before you attempt to fit the inlay



Route the inlay groove with end packing to support the router



Make a test cut in some scrap wood before you attempt to fit the inlay

Repeat the cut on all four edges. Adjust the fence slightly to get a snug fit for the stringing. Keep testing with short cuts on the test piece until you are happy with the fit, then repeat the cut on all edges.

24 You now have a groove all round the edge, but the corners will be a bit untidy, especially the outside edges. Use a wide chisel aligned along the groove edge to cut into the corners to define them. I use a small tool made from a sharpened nail to remove the cut waste from the corners and along the groove.

25 Hopefully your stringing will fit smoothly into the groove. If it's tight in places, you can ease it slightly using a cabinet scraper. The stringing is mitred into the corners. Start by mitring one end of a piece. Cut the stringing with a very sharp, wide chisel. You can ensure that the cut is a true mitre by looking at the reflection of the stringing in the back of the chisel. If it's at 90° to the actual stringing, the cut will be at 45°. The chisel is only good for trimming – it does not cut cleanly or square vertically if you cut off more than about 0.5mm (1/2in). With one end mitred, lay the stringing in the groove, with the mitred end butted up to the end, and mark the cut position at the other end with a scalpel or chisel. Cut the piece over size with the chisel, then mitre trim back to the line.



Rout the inlay groove with end packing to support the router



Rout the inlay groove with end packing to support the router

Check and repeat for the other pieces. When checking fit, especially if the fit is tight, avoid putting all the inlay in at the same time – it can be a right pain getting it out again. Always make sure that one piece is not fully inserted.

26 Once you are happy with the fit, you can glue up. Remove one piece of stringing and use a narrow-nozzled dispenser to put a very thin bead of glue in the groove. Offer the stringing into the groove with the mitre



Make a test cut in some scrap wood before you attempt to fit the inlay



Scrape back the inlay with a cabinet scraper

butted up, but before you press it home lift the next piece. Press the first piece home and proceed with the next piece in the same way and so on.

27 Press the inlay home fully by rubbing down with a tool handle or similar.

28 Leave overnight for the glue to fully cure, then scrape and sand the stringing back to the veneer surface. ➤

Hinging the lid

The lid is fitted using 62mm (2½in)-long solid brass butt hinges. You could use quadrant hinges, but I find them fiddly to fit. Box hinges with an integral stop are stylish and easy to fit with a router table, but they are quite expensive. Badly fitted hinges can spoil the look of a box, so you may want to practise on some scrap before fitting them.

1 Start by fitting the hinges to the box base. With a pencil and square, mark off the position of the hinges 50mm (2in) from the side. Offer the hinges up and mark the length.

2 Set a marking gauge to the width of the hinge – this is from the flap edge to the middle of the hinge pin. Mark the hinge width between the pencil marks, with the gauge stock on the outside face.

3 Now define the hinge length more precisely with a marking knife or scalpel. With square and knife, mark one of the pencil lines, stopping on the gauge line. Offer the hinge precisely on the cut line and mark the length again with the knife point.

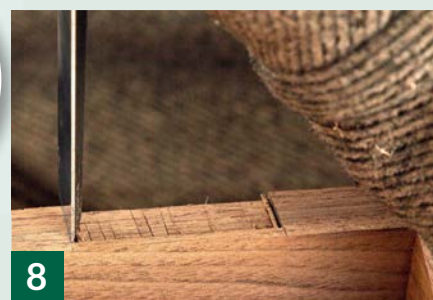
4 Square across with a knife. If using a marking knife, arrange for the square to be on the outside of the hinge area so that the flat of the knife is facing out. ➤



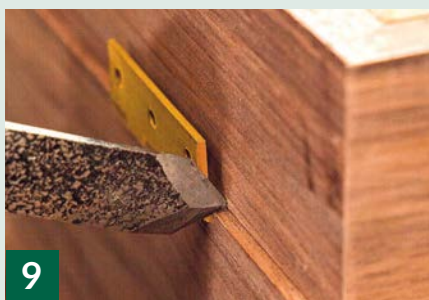
5 Mark the hinge length a short way down the outside face with a pencil. Set the marking gauge to very slightly under half the thickness of the hinge knuckle and mark this between the pencilled lines. If you have two marking gauges, set one to the width and the other to the thickness. Then you can keep these settings for marking the lid later – this ensures greater accuracy.



6 Make light, sloping saw cuts that stop at the gauge lines. Now break up the waste further with chisel chops down at right angles to the gauge lines, stopping short of the knife lines at either end.



7 Pare away the waste, working down to the gauge line. The biggest danger here is overshooting and cutting beyond the width gauge line. Use your index finger against the back to control this.



8 When the waste has been removed, locate the chisel in the knifed lines at either end and chop the length.

9 Offer the hinge up to check the fit and make adjustments. It should be a press fit, with the top of the flap flush with the surface or just below. Fit the hinges into the recesses and mark the centre of the middle screw hole with an awl. The mark could be offset very slightly towards the interior so that the screw pulls the hinge into the recess. Drill pilot holes and screw the hinges in with one screw.

Now offer the lid up so that it is precisely aligned on the base (make sure it's the right way round) and mark the hinge position with knife or scalpel.

You can now mark up and cut the hinge recesses in the lid in the same way as the base.

10 Fit the hinges initially with single screws and check the alignment of the lid. It may be possible to correct any misalignment by adjusting the recesses.

Having just one screw allows slight repositioning using the other screw holes. Check also that the lid sits down on the base easily. If the hinge recesses are too deep, the lid will not come down properly and will leave a slight gap at the front. Correct by planing the areas where the lid is bearing on the base.

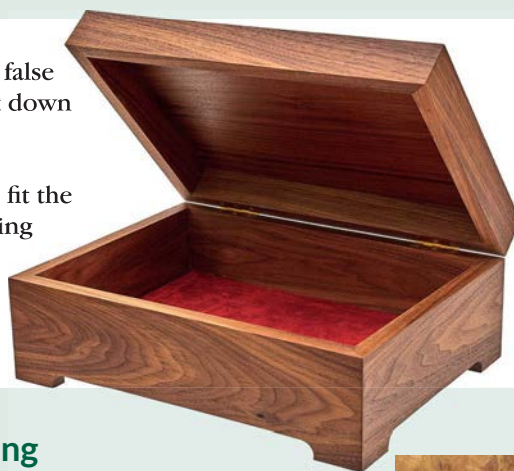
Finishing

A hardwax oil or Danish oil would be a good finish for this piece. The inside can be left unfinished or sealed with shellac sanding sealer.

29 The false base for fitting the suede or fabric bottom should be smaller than the box interior all round by the thickness of the suede. The suede I used was 1mm ($\frac{1}{32}$ in) thick – yours may be different. Test the fit of the false bottom by pressing it into the box with the suede loosely fitted. Trim the suede so that there is an overhang of about 15mm ($\frac{3}{8}$ in) all round and trim off the corners so there is no overlap when the suede is folded over. Lightly stretch and stick the suede where it folds underneath, using a

contact adhesive. Now stick the false bottom in with PVA, weighing it down while it is sticking.

30 Polish up the hinges and fit the lid, avoiding overtightening and breaking the screws. The lid can drop right back when opened. You could fit a light chain to prevent this. ■



This is an abridged chapter from

Complete Woodworking

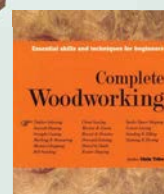
By Chris Tribe

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A woodworking glossary

The letters X, Y & Z

X-ACTO KNIFE This is a razor-like blade in a handle. The blades come in various shapes, very handy for fine work.

X-AXIS Conventionally the left-or-right movement of the cutting tool on a CNC machine.

PHOTOGRAPH COURTESY OF HERCULES PROPELLERS



CNC machining of a wooden propeller using x,y,z axis programming

XYLEM One of the two types of transport tissue in vascular plants, phloem being the other. The basic function of xylem is to transport water from roots to shoots and leaves, but it also transports nutrients. Commonly found in trees and shrubs.

XYLOLOGY The study of trees and wooded plants. Also known as dendrology.

YARDSTICK A wooden rule 36in long, most commonly used for setting out and marking joinery work.

Right: Xylology is tree ring analysis otherwise known as dendrochronology



PHOTOGRAPH BY JON BANFIELD

A David Barron high-angle plane similar to a York Pitch

Y-AXIS Conventionally the in-or-out movement of the cutting tool on a CNC machine.

YOKE A connection between two parts so they move together. An example is the yoke linking the thumbwheel and blade assembly on a hand plane.

YORK PITCH A plane blade bedded at a high 50° angle for working difficult timber.

YORKSHIRE LIGHT A solid window frame, one half of which is fitted with a sliding sash.

Z-AXIS Conventionally the up-or-down movement of the cutting tool on a CNC machine.

ZERO CLEARANCE INSERT Tablesaws have a gap around the blade to allow the angle of cut to be adjusted without cutting into the table. A blank homemade insert closes up this gap so that the workpiece is supported all the way up to the blade, allowing neater cuts.

ZONE LINES The black lines in spalted timber which are demarcation lines between different colonies of fungi as they advance through the timber. ■



PHOTOGRAPH BY GMC/ANTHONY BAILEY

A standard insert plate replaced with a homemade zero clearance version



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Oak indoor planter

Kevin Ley builds a lovely planter

My wife and I received a large indoor plant as a gift and were warned that it would grow to be more than 2m tall. My wife wanted it in our dining room but wanted the pot hidden, so I was tasked with making a suitable planter.

Design

Our dining room is furnished in English country style and the planter was to be in keeping with that. It also had to be large enough for the present pot and stable enough for the potential future size of the plant, without looking too agricultural.

I decided on this simple frame and panel design, refined with a taper to the outside faces of the legs. All the edges of the legs, including the top and bottom, but excluding the inside edge that butts on to the top and bottom rails, were rounded over to soften the look.

The panels would be made from oak-faced ply so they could be glued in all around for added strength.

The base would be a 'drop-in' loose fit so that it could be removed and replaced easily in case of water damage. A satin polyurethane finish would protect the wood from any water splashes or dampness associated with the plant.

Kevin's frame and panel construction can be clearly seen here



Timber selection

The dining room is furnished entirely in English oak, so that was the obvious choice of timber for the planter, and I happened to have a piece of 50mm-thick stock in my wood store that, with careful cutting out, would just be enough for the job. It was originally kiln-dried and had been in my store ever since, so it was ready for immediate use.

1 The stock was surfaced and thickened and two blanks, each for a pair of legs, were cut out.

2 Strips for the rails and base supports were cut next. The pieces were stuck and stacked in the workshop to allow even drying of the exposed surfaces, and to condition the wood during the making.

CONSTRUCTION

Legs

3 The blanks for the legs had been thickened to the correct dimension and were now cut to length. The width of the oblong blank was the sum of the width of the top of the leg, plus the width of the bottom of the leg, plus 4mm for a saw cut down the diagonal and cleaning up with a plane.

4-5 The diagonal was marked on the blank and the first cut made on the bandsaw – this gave the taper to one side of the leg. An adjoining face was marked and the taper cut again on the bandsaw to give the second tapered face at right angles to the first. All the faces of the legs were planed to correct size and sanded down to 150 grit.

6 The outside long edges and all four top and bottom edges of the legs were rounded over with a bearing-guided 3mm radius cutter on the router table.

7 Domino slots were cut for the rail joints and stopped housings for the panels.

Rails

8 The rails were faced and thickened to the correct size then cut to length, and the long edges rounded over with the same 3mm radius cutter. Housings were cut for the panels, and domino slots cut in the ends. ➤



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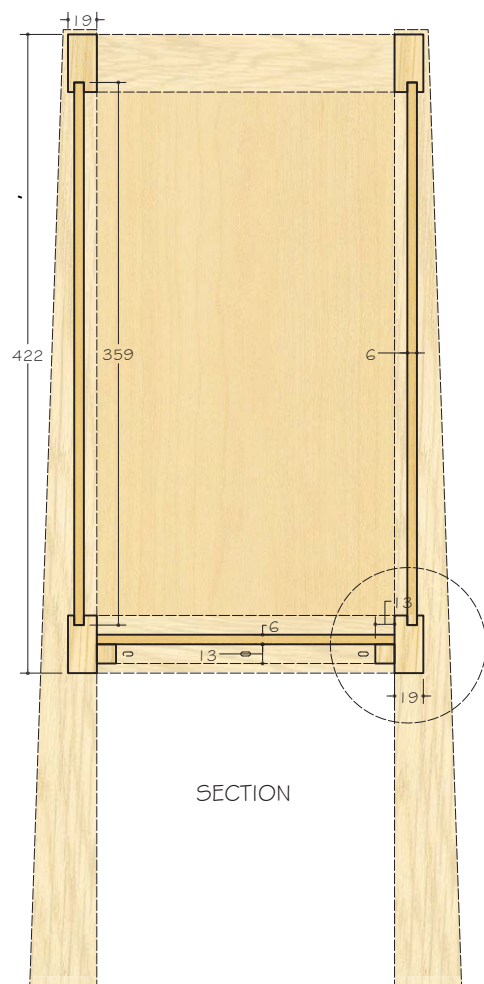
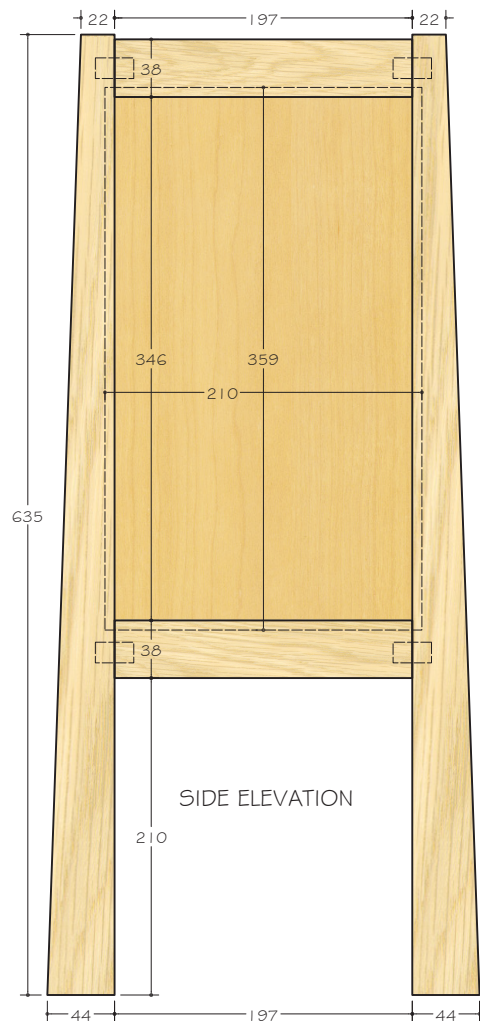
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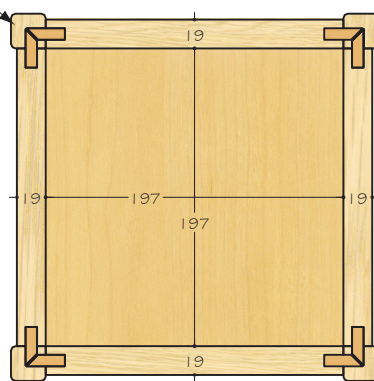
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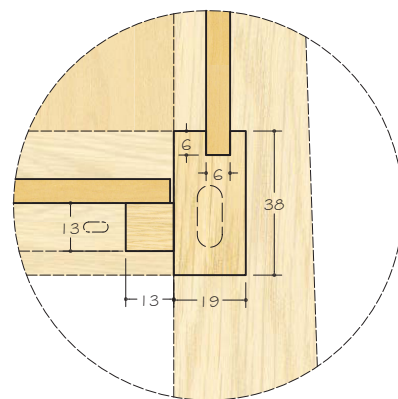
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Dominos mitred for maximum length and glue area



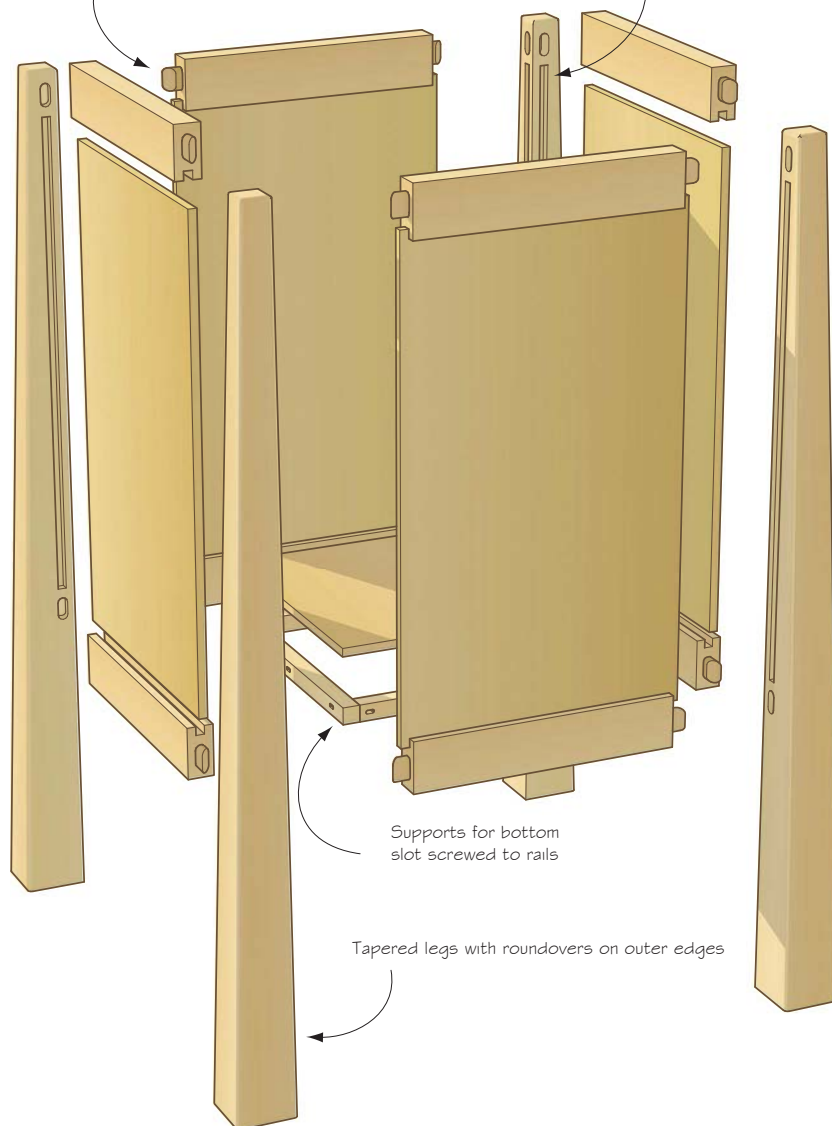
SECTION THROUGH TOP RAILS



DETAIL

Domino joints mitred at corners

Legs grooved for side panels



Supports for bottom
slot screwed to rails

Tapered legs with roundovers on outer edges

9 A dry test-fit found that the dominos ran into each other in the leg and would not allow the joint to close properly. The solution was to either shorten the dominos or mitre the ends – I chose the latter as it made for a stronger joint. The dominos were glued into the rails and mitred on the bandsaw.

Panels

10 The panels were cut to size from a suitable piece of oak-faced ply and sanded, ready for fitting into the housings in the legs and rails.

Assembly

11 All the individual components were power- and hand-sanded down to 240 grit, and one set of joints and a panel test-fitted dry.

12-13 When I was happy, glue was applied to the domino slots in the legs, and the panel housings and the front and back were assembled.

14 I then clamped up the panels, checking the diagonals for square by measuring across the diagonals. Adjustments were made as necessary and they were left to set. When they were ready, the front and back were attached by fitting the side rails and panels in a similar way and clamping up. All the diagonals were checked and adjusted, and the whole piece stood on a level surface and left to cure.

Mouse plane

15-16 The glue ooze was removed using, as well as my usual scraper and abrasive paper, my new mouse plane. I find this a very useful little tool, ideal for removing glue ooze, particularly inside drawers. Its prime function is to flatten hot plastic filler, but I have found myriad uses around the workshop where it is awkward to get a cutting edge flat and up to a face. As with any other edge tool, the sharper the blade the more effective it is, and I keep mine well honed. Well worth the small cost of around £10. ➤



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17 I then glued and clamped the two remaining side panels in place with their bearers, being careful to use blocks so that I did not mar the surface of the oak.

Base

18 Bearer strips for the drop-in base were screwed to the bottom rails, and a ply base cut and fitted.

Preparing for finish

Most of the individual components had been power sanded down to 240 grit prior to assembly. The whole piece was now checked over, any blemishes and clamping marks removed, and finally hand-sanded ready for the PU varnish.

Finishing

19 During plant watering this piece was vulnerable to water splashes, so I chose a PU floor varnish by Liberon, as it has a high resistance to water and is less likely to mark.

A satin finish most closely matched the oiled finish on the oak furniture in the room. The first coat was diluted with 20% white spirit and applied with a sponge. I prefer to apply finishes with a 'one-use' sponge or pad – there are no brush marks or stray hairs, and no brushes to clean.

Once it was dry, a light sanding removed any blemishes missed before that had been highlighted by the first coat. Two more coats of undiluted



18

varnish were applied at eight-hour intervals, with a light sanding to de-nib between coats, again with a sponge. The piece was left in the workshop for a full week to harden fully.

Conclusion

I had made the planter larger than the existing pot to allow for future repotting, so I put a wooden block on the base to stand it on in the meantime. Once the plant and planter were in position I received huge praise and a reward from my better half – well I got a 'that's nice dear' and a cup of tea. Who could ask for more? ■



19



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Meet the contributors...

We put all of this month's professional and reader contributors here, so you know exactly who they are and what they do



Louise Biggs

Having completed her City & Guilds, Louise trained for a further four years at the London College of Furniture. She joined a London firm working for the top antique dealers and interior designers in London before starting her own business designing and making

bespoke furniture and restoring furniture.

Web: www.anthemion-furniture.co.uk



Michael T Collins

British-born Michael has been working with wood off and on for 40 years. He moved to New York in 1996 and over the years has made bespoke furniture, including clocks, inlay work, Adam fireplaces, book cases and reproduction furniture.

Web: www.sawdustandwoodchips.com



Gareth Irwin

Gareth is a hand tool-only woodworker from Mid Wales who uses both green and seasoned timber to make everything from Welsh stick chairs to pole lathe turned bowls to spoons.



Duane Cartwright

Duane is a self-taught woodcarver based in Hartland, North Devon. He has been carving on and off for about 15 years. His interest in carving began while undertaking an apprenticeship in antique furniture restoration. His work can be found in the UK

and as far away as Australia. To see more of Duane's work, visit www.duanescarving.blogspot.co.uk.



Simon Rodway

Simon has been an illustrator for our magazine since 'the dawn of time' itself, drawing on his experience in the field of architecture. He also runs LineMine, a website with articles and online courses on drawing software. His course SketchUp for

Woodworkers is proving really popular.

Web: www.linemine.com/courses



Gary Marshall

Gary has had a life-long interest in woodlands and the countryside. He trained in countryside management and subsequently ran a company working with the local County Councils and Unitary Authority and their Countryside and Rights of Way Teams, as

well as a wide range of conservation organisations.

Your face and details could appear here in our 'rogues' gallery' if you write an article for the magazine, and you could be rewarded for your efforts too.

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PHOTOGRAPHS BY LOUISE BIGGS



Traditional-style coffee table

It takes real skill to make awkward short-grain repairs, as **Louise Biggs** shows

This much-used coffee table had a rather unusual leg arrangement. It resembled two tripod bases with a leg missing on each and replaced by a stretcher rail. The tripod pedestal arrangement was traditionally used on smaller, round tables known as tripod tables. In some cases the top would tilt upright, but in nearly all cases they were a turned pedestal with three cabriole legs and dated from around 1730 up to Victorian times.

Stages of restoration

1 The table had suffered an accident leading to two of the cabriole legs becoming detached from their pedestal. The joints for the stretcher rail and other pedestal were still solid, so how best to restore the broken legs? Pieces of the sliding dovetails were on the pedestal and pieces of the pedestal were still attached to the legs.

2 First I separated the pedestal pieces from the legs – a gentle

Tool List

- Chisels – various sizes
- Mallet
- 'G' clamps
- Waste clamping blocks
- Screwdriver
- Sliding bevel
- Mortise gauge
- Gent's saw
- Drill and drill bits



tap with a chisel and mallet along the joint line released the sections with little difficulty. The pieces could then be aligned back on the pedestal to ascertain whether they would fit cleanly back in their correct places.

3 The smaller pieces of the sliding dovetails were prised from the pedestal in the same way. Before doing anything else the old glue was removed from the legs, the pedestal and all the various pieces. ➤



4 The pedestal pieces fitted cleanly and there would also be room to reinforce the joints. Initially using animal hide glue, the three sections were glued in place. To hold the pieces in place until the glue set, masking tape was wrapped around the pedestal as this put the required pressure on the angle of the breaks. Clamping blocks could have been cut to fit, allowing clamps to be used, but with three broken sections there was the risk of one or more moving out of line.

5 While the pedestal was drying I separated which of the sliding dovetail pieces went with which leg. The first leg was straightforward – in four pieces and from the edges of the

breaks it was clear how they went back together. Each piece was glued in turn forming a rub joint. This entails moving the pieces side-to-side or up and down with the glue until the glue becomes tacky and holds the piece.

6 Using blocks that had been pre-cut to mirror the angle of the dovetail, the joint was clamped until dry. The blocks were coated in candle wax to prevent them sticking. Once dry the sliding dovetail would be strong.

7 The second leg required a bit more work – I was faced with eight pieces and several much smaller pieces and trying to find which order to glue them and where they went was a jigsaw

puzzle. What did become evident was that several much smaller pieces were missing, which prevented the pieces lining up, and left gaps in the sliding dovetail.

8 As a stronger and more economical repair option, I decided to replace the sliding dovetail. This entailed cutting a sliding dovetail into the leg then re-cutting the dovetail for the pedestal. First, two lines were marked which indicated where the dovetail joined the leg.

9 The damaged sliding dovetail was sawn off and the pencil marks followed round to the leg joint surface using a mortise gauge. The depth of the sliding dovetail could then be established as well as the length, keeping the top of the joint down from the top of the leg.

10 The sides of the dovetail were cut using a gent's saw at an angle so the cut reached the furthest points on the dovetail. Care was taken not to disturb the shoulder line of the joint.

11 Using a chisel and mallet, the remaining waste was removed by cutting down the dovetail sides and clearing out at the bottom.



12



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In this situation I was aware of the grain direction of the leg when cutting down the sides as it could split the leg if the grain was running in the same direction.

12 A piece of timber was prepared, large enough to make the two sliding dovetails, and using the leg and a sliding bevel the leg dovetail was marked on the block. The dovetail was cut using the gents saw and trimmed to fit using a suitable chisel.

13 Applying glue to the dovetail, but not the shoulder line, the leg dovetail block was glued in place. When dry the pedestal dovetail was marked on to the block in the same way as the leg dovetail. The angles of the dovetail were cut and a haunch was cut at the top of the leg to correspond with the pedestal. The angles of the shoulder lines were cleaned of any excess glue.

14 With the legs repaired, my attention turned back to the pedestal and how to strengthen the breaks on either side of the legs. There was enough shoulder line that small 3mm holes could be drilled to accept dowels. Initially, the drill was started square to the timber to get a starting

point, before turning the drill to angle the drill bit through the breaks.

15 In each of the three shoulder lines two dowels were angled up and the top dowel was angled down, as shown by the extended ends in the upside down photograph. By angling the dowels it locks the repair in place. When stress is put on the joint it will be more difficult for the break to come apart again. Before gluing the dowels in place a small groove was carefully cut on both sides of the dowels with the corner point of the chisel. This allows any air trapped behind the dowel to be squeezed out with the excess glue as the dowels are inserted. Once the glue had dried the dowels were cut flush to the surface of the shoulder line.



18

16 The leg with the replaced dovetail was test fitted into the pedestal, the dovetail was trimmed slightly with a chisel to acquire a better fit then the two legs were glued in place. As the dovetails were a tight fit no further clamping was necessary. When the glue had dried the existing metal plate was relocated on the bottom of the pedestal.

17 With the table back together the legs were checked with winding sticks to make sure they were level so that the table did not wobble.

18 The repairs around the legs and pedestal were stained and polished out as required and the table was ready to be returned to its owners. ■

KITTED OUT

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

TEST

Rider hand planes

That inveterate collector of handplanes gets his hands on a brand new one!

I was given a No.4 Rider Smoothing plane to try out. It is part of a much wider range of handtools that have been designed by Axminster to meet the needs of the more demanding woodworker on a budget. They have a look and feel that ensures they do not seem out of place in even the smartest of workshops.

The No.4 is the smallest of the large bench planes which run – 4, 4½ Smoothing, 5, 5½ Jack, 6 Fore, 7 Jointer plus a No.62 Low Angle Jack. There are also block and rebate planes to consider. It comes in the standard Rider box which has full foam lining to protect your new acquisition, instruction booklet, plane sock and a

spare blade. Because of its short soleplate, this is to be honest, not the trickiest to obtain a flat sole but it is a nicely turned out plane. Picking it up, the tote or rear handle and the front knob are commendably smooth and not particularly shiny, which I much prefer. The base casting has evenly matching sidewalls and a good thickness of metal all round. Unlike early Stanley planes which were advertised on the virtue of a thin blade, this one is a good thick 01 high carbon steel and equally thick chipbreaker held with a domed cheesehead screw. The frog casting

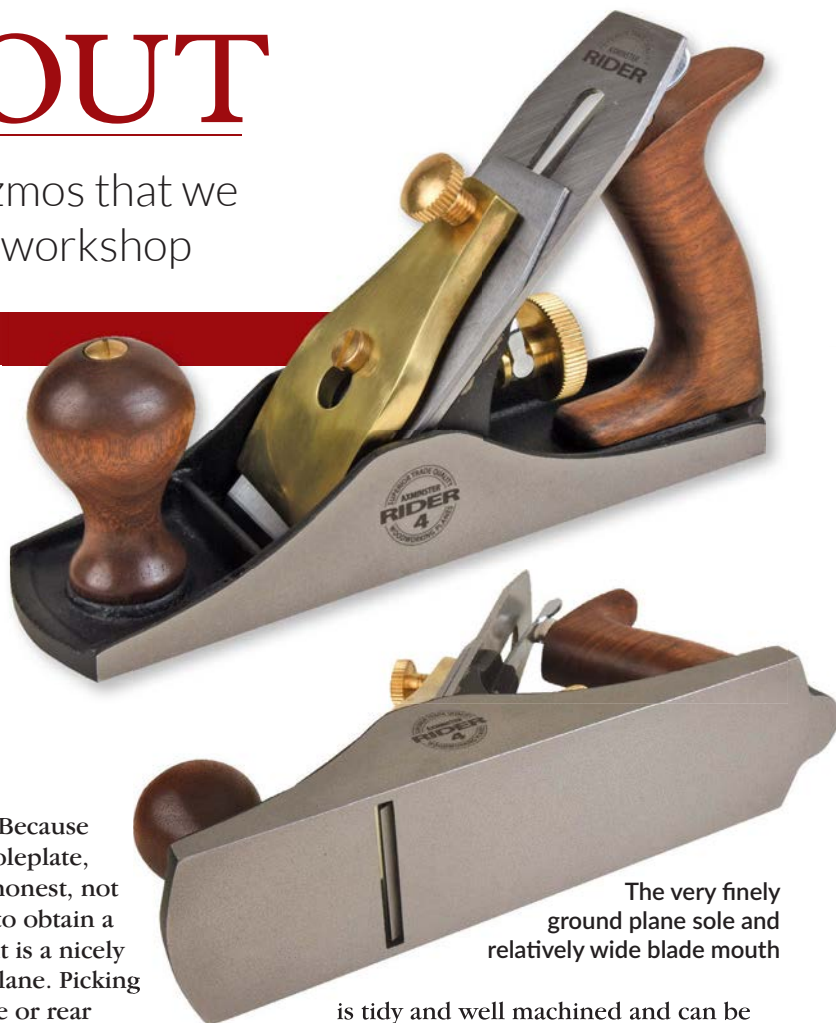
is tidy and well machined and can be adjusted by undoing the screws sitting in the frog and the adjusting screw behind the frog. It is not a Bedrock mounting which I feel is a sales gimmick, really. If you can't plane well with a standard frog mounting then it is down to skill, not casting. The lever blade adjuster is pressed steel, which is strong but not quite in keeping with the overall style. The cap iron is the more recent screw-down type in brass and blade adjustment is by a large brass knurled thumbwheel. This means there is quite a lot of free play in the yoke movement between winding the blade in or out.

On Test

Although each plane comes ready sharpened, I prefer to gain my own edge. However, it cut perfectly well



I managed to acquire some quite fine shavings on a piece of walnut



The very finely ground plane sole and relatively wide blade mouth



The plane sock should be used to protect your precious plane



The high carbon steel blade and chipbreaker assembly plus spare blade

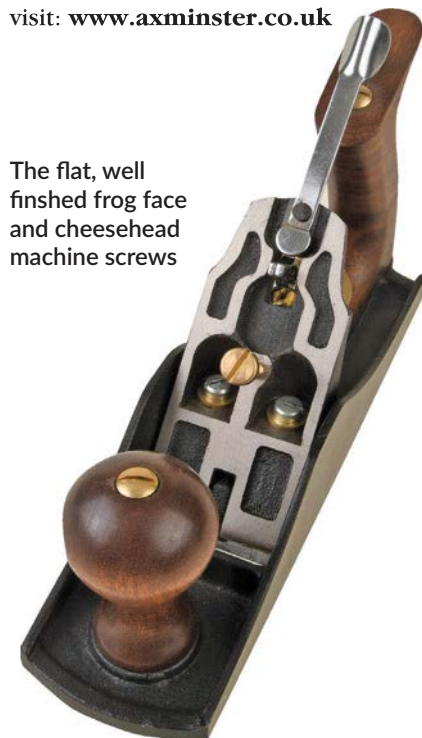
after simply adjusting the blade setting. I feel I improved the result marginally by going through my usual sharpening routine with a 1000 mesh diamond plate and then stropping to lose the fine burr and polish the edge. It was a pleasant plane to use and the carbon steel blades should keep their edge for some time in normal use, but I really need to work with it for a longer period to determine that.

Verdict

I do know that when the range was originally launched there were quality control issues which have been successfully addressed. I'm pleased to say that Rider are hitting the quality mark. The extra blade is intriguing; it's almost like giving away another plane – you could camber the edge or leave it straight and pop it into that cheap old No.5 you already own and for no extra cost have a jack plane as well! However, I suspect in time you will wish to add further Rider models to create a good workmanlike set of tools that deserve looking after.

Price is £89.96 standard or £104.96 to have personalised engraving.

For the full Rider range and prices visit: www.axminster.co.uk



The flat, well finished frog face and cheesehead machine screws

The new Bosch GLM 120 C Professional Rangefinder – Laser spot visibility problems solved

For anyone whose work involves distance measurement on work sites, Bosch is offering upgraded performance in the shape of its new Bosch GLM 120 C Professional Rangefinder with a range 120 metres and accuracy +/- 1.5 mm. In addition to a camera as a viewfinder with integrated zoom function, which solves the common problem of target invisibility, this user-friendly laser measure enjoys all the benefits of Bosch connectivity.

Bluetooth connection with the free Bosch Measuring Master app gives access to a range of useful facilities for recording, processing and sharing information to speed up workflow. The device also comes with GLM Transfer Software which allows simple copying of data and pictures from its own memory to your laptop or PC.

The device's large 2.8inch colour screen with flip display, has a familiar smartphone look. Readability from all angles is possible thanks to IPS (in-plane switching) technology, while optical bonding minimises the effects of condensation or reflected sunlight when viewing the screen outdoors.

The ability to control this laser measure remotely through your smartphone or tablet, from a range of about 10 metres, eliminates any need for assistance from a second person. A timer function adds further convenience.

As well as lengths, widths and heights, the Bosch GLM 120 C Professional Rangefinder's measurement functions include inclines, areas, volumes and more. It can be used to quickly create floor plans and pictures, complete with



measurements and notes. Date and time information can be saved with all records for easy reference and proof of work.

Up to 50 measurements, including pictures, can be stored in the device's internal memory and then transferred to your computer through a micro USB cable. When information needs to be shared urgently, connectivity via Bluetooth means you can send measured values, plans and comments to your colleagues or customers immediately, even while you are still on site.

Robustly constructed for challenging environments, the new rangefinder's housing is sealed to IP54 standard against dust and splashing water, while the screen's Dragontrail cover glass is resistant to scratching and other damage. The Bosch TrackMyTools app (as soon as this service is available) simplifies tool location and management.

Available from specialist retailers, RRP £283.19 (subject to change)

Visit: www.bosch-professional.co.uk

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Triton dowelling jointer test

Can Triton really make a dowelling machine much cheaper than the original brand? There was only one way to find out...

If you are a professional woodworker then it makes sense to buy good quality kit which has a price tag to match. For the rest of us working on a smaller scale and a smaller budget that isn't a realistic option. This is where Triton comes in, powertools that can do the job but at a more budget price. Its incarnation of the Mafell Duo Doweller has to be worth checking out to see if it can in any way match the original.

Decked in the usual livery, it looks the part and has a fully adjustable fence and interchangeable dowel cutters for different size dowels. The premise is simple, take what is usually an unreliable system of jointing with standard beech dowels and turn it into a quick and precise portable jointing method. If you have enough of the right size dowels inserted it can deliver very strong and accurate joints without having to cut mortise and tenons. We looked at three jointing systems in the last issue but now we can use a cheaper doweller to try to achieve similar results.

On test

This test is all about the test – if it can't

joint well it fails, if it can, then it wins. Let's pick it up and examine the fixtures and fittings. The hinged fence and faceplate slide up and down and lock. So far, so good. The fence needs to lock positively at 90°, or at any other angle for that matter. In fact, it runs past 90° so you need to check it truly is correct using a reliable square. The pointer can be adjusted accordingly. There is a scale on one side for setting the fence height, rather like a biscuit jointer.

The edge of the faceplate has a series of bumps and dips. On the Mafell these would locate against a clamp-on fence for multiple hole drilling. In this case no additional fence is available and I'm not sure how accurately the shapes would mesh.

The operation is a plunge action with the mechanism sliding inside the lower casing with a spring return. There is a setting scale to suit different length dowels.

The TCT-tipped twin cutters are interchangeable, the kit came with 8mm and 10mm cutters, the 12mm size being currently unavailable. Changing cutters should be quite easy but, for some inexplicable reason, one cutter, after loosening the grub screw, needed



The fence height setting scale, adjustment and locking knobs



Fence tilt adjustment and drilling depth setting



8mm and 10mm paired TCT tipped dowelling bits



Using cranked pliers to remove a dowelling bit safely

working free with pliers, although it eased after that. It did occur to me that if you were jointing into unequal size components fixed side by side you could fit different size cutters instead of a matched pair.

To drill the holes, make a mark across both components and use the clear plastic sighting plate with its centreline to position the tool, switch on and plunge. The cutters appeared sharp, but in hardwood a bit of effort was required, although it drilled neat holes. Assembling the joint was a slight puzzlement because one side of the end-drilled component was a fraction – only a fraction – higher, which happened on repeat as well. So I cut through that component and reverse-fitted the cut slice, which should have made it dip instead of rise, but it did the same thing. One of life's mysteries which needs a little more research. However, the joint was within normal sanding tolerance. As a short-term means of adjustment, I put washers under each fixing for



Checking by touch to make sure the joint is flush



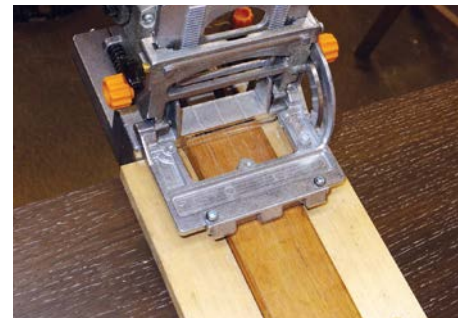
Pressing down on the fence to ensure accurate hole placement

the sighting plate so it was no longer recessed but sitting slightly proud. This did improve matters quite easily.

End-on narrow components may not sit evenly against the faceplate because of the rubber anti-slip devices. You have two choices – remove the rubbers or, more sensibly, as with a biscuit jointer, make up a simple jig to hold narrow components safely, so the faceplate sits against the jig properly. This is where sprung end stops instead of slightly projecting rubbers would give better location. Indeed, when choosing drilling positions you are reliant on the three indent lines on the sighting plate that show centreline and drill positions, so you need accurate marking on your components to show where to drill. Extraction is necessary to control dust output.

Conclusion

In terms of precision this machine isn't a Mafell, but with a bit of care in setting up and learning how to get



A simple jig for end drilling to ensure accurate alignment

the best from it you can quickly and easily create frames for doors, panels and other furniture, since accurate dowelling will give stronger jointing under stress such as chair joints, than a biscuit jointer can. Dowels are reasonably cheap and this machine avoids the extra time and effort needed for mortise and tenoning at a reasonable price. ■

Tech spec

Triton 710w Dowelling Jointer

Motor input: 710 watts

Dowel drills: 8mm supplied

(optional 10mm, 12mm)

Drilling depth: 0-38mm

Drilling centres: 32mm spacing

Fence adjustment: 0-90°

Weight: 2.99kg

Accessories: Hex key, dust port

adaptor

RRP £165

Visit: www.tritontools.com/en-GB



Typical dowel holes and alignment marks for a T-joint

NEWS & EVENTS

All the latest events and news from the world of woodworking

Let's go outside

By Anthony Bailey

The Land Trust is delighted to launch a new education strategy, as the green space management charity looks to inspire people of all ages to spend more time outside and enjoy all the benefits that well-managed green space has to offer. Working in partnerships with local schools and nurseries and providing volunteering opportunities, through projects such as our Green Angels programme, the Land Trust is aiming to increase the amount of time spent by young people outdoors, and give them the opportunity to learn new skills, enhance their future prospects and make a difference in their community.

The time currently spent outdoors by children is worrying low. In fact, it is reported that three-quarters of UK children spend less time outside than prison inmates, while a fifth of children do not play outside at all on an average day. It was these statistics, combined with a crisis in childhood obesity and mental health, that encouraged the Land Trust to act. Director of portfolio management Alan Carter says: "The UK government wishes to use and develop the natural environment to improve the education and lives of all children, with a particular focus on those from



PHOTOGRAPHS COURTESY OF THE LAND TRUST

deprived communities. With more than 60 sites across the country we recognise that we are in a unique position to make a real difference and our refreshed education strategy is the first step in that process.

"Over the next three years the Land Trust will have a strategic focus on developing relationships with schools and nurseries within walking distance of our spaces."

The charity is investing in six new outdoor learning areas across its sites at Wellesley Woodlands, Bewsey, Kiverton, Old Hall, Silverdale and Hassall Green, while also training rangers and teachers as forest school practitioners, to enhance the variety of activity on our sites.

The Land Trust is also working with an external body, Nature-Nurture, to produce an education pack for use by local schools near our site at Davey Down.

There are already a huge number of educational activities going on at Land Trust sites across the country, with the number of school visits rising from 3,500 to 7,500 over the past five years.



Elba Park in Sunderland is a site playing a lead role in this work and was awarded Land Trust Educational Site of the Year after delivering activities to nearly 1,000 schoolchildren over the past 12 months involving local schools and has seen children enjoying activities such as geocaching, pond dipping, meadow sweeps, crafts, surveys and identification, bulb and tree planting, and heritage activities.

"If we can replicate the success of Elba Park across a number of our sites then we can make a huge impact and effect real change in so many people's lives," says Alan.

Visit: www.thelandtrust.org.uk



There be dragons...

Head of Historic Carving at City & Guilds of London Art School, Tim Crawley, has been at the centre of a major renovation project on the Great Pagoda at Kew Gardens which is now complete and open to the public.

Originally built in 1763, each corner of the eaves of this octagonal structure was adorned with highly polychromed dragons varying in length from around 5ft at the top of the tapering tower, to around 8ft at the bottom. In the 1780s the dragons were removed.

Tim was selected to design a new set of dragons to be reinstated on the building. The original colour scheme of the building has been used, with the dragons painted in iridescent glazes and gilded highlights.

A host of carvers are working on the project, which requires 80 new dragons to be crafted, and a number of carving tutors and alumni from City & Guilds of London Art School have been commissioned to carve the sculptures. Seventy-two of the dragons will be 3D printed and eight carved from African red cedarwood.

Tim researched the original dragon designs with reference to engravings and paintings from the time of the construction and analysed similar works from the period. He then modelled prototypes in clay that were translated into full-size carvings by Art School alumnus Paul Jewby in his workshop in Suffolk. These carvings were then 3D scanned.

Art School alumni John Shield, assisted by David White,



PHOTOGRAPH COURTESY OF CITY & GUILDS ART SCHOOL

City & Guilds of London Art School alumnus John Shield in the process of carving one of the dragons

and Robert Randall, assisted by Ashley Sands and David Mendieta, were part of the team involved in carving the dragons.

Tim says "It was a wonderful opportunity for a large group of woodcarvers to work on this unusually grand architectural scale."

Visit: www.hrp.org.uk/kew-palace/explore/the-great-pagoda/#gs.FqWw=GA

www.cityandguildsartschool.ac.uk

COURSES

Multi-Skills Workshop

Based in Polegate, East Sussex, this workshop offers a variety of craft courses in woodworking – beginners and advanced, jewellery making, glass, metalwork and welding. All courses are done in a safe, professional workshop under the guidance of experienced workshop practitioners. New courses start on 17 September, although you can join at any time. To find out more visit: www.multiskillworkshop.co.uk/practical-courses



Multi-Skills Workshop, Polegate

EVENTS

Handmade at Kew – The International Contemporary Craft Event

4–7 October 2018, 10am–6pm
Royal Botanic Gardens, Kew,
Richmond, TW9 3AB
www.handmadeinbritain.co.uk

Autumn Countryside Show

6–7 October 2018, Weald &
Downland Museum, Singleton,
West Sussex, PO18 0EU
www.wealddown.co.uk

Surrey Hills Wood Fair 6–7 October,
Fish Pond Copse, Cranleigh, Surrey,
GU6 7DW www.surreyhills.org

Tweed Valley Forest Festival

20–27 October, 2018, Peebles
Community Centre (The Drill Hall),
Walker's Haugh, Peebles, EH45 8AU,
www.forest-festival.com

Festival of Wood & Country Crafts

21 October 2018, Bakewell Agricultural
Business Centre, Bakewell, Derbyshire,
DE45 1AH. Featuring 2018 World
Stickmaking Championship final round.
British Stickmakers Guild
www.thebsg.org.uk

Woodworking & Powertool Show

26–27 October 2018,
Westpoint, Exeter, EX5 1DJ
www.wptwest.co.uk

Web links for you

YouTube

Strandbeest

Nothing to do with wood but everything to do with mechanisms, lightweight construction and using the power of the wind. These creations of a fertile mind come alive as they creak their way across the sandy beach.



Instagram

@james_son_of_james

Some nice hand tool stuff plus cute dog etc. Just lovin' all things wood really.

Twitter

@SAW_Originals

Steve Asprey – bespoke furniture, workbenches and board games, some nice well executed stuff.

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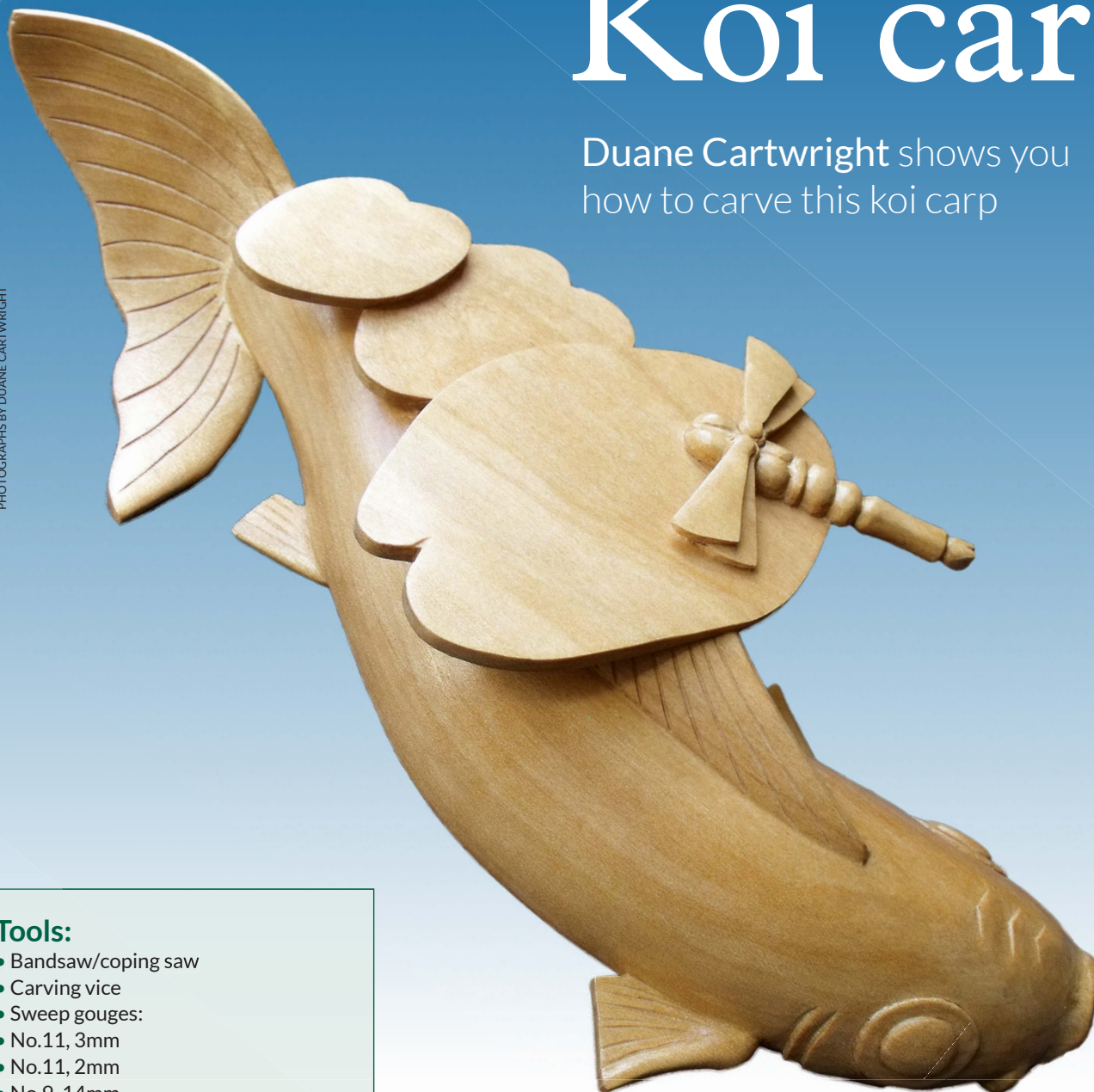
ECO 300 D

An efficient low cost dust extractor

Koi carp

Duane Cartwright shows you how to carve this koi carp

PHOTOGRAPHS BY DUANE CARTWRIGHT



Tools:

- Bandsaw/coping saw
- Carving vice
- Sweep gouges:
 - No.11, 3mm
 - No.11, 2mm
 - No.9, 14mm
 - No.9, 8mm
 - No.8, 25mm
 - No.6, 6mm
 - No.3, 10mm
 - No.2, 20mm
 - No.7, 9mm – eye
 - No.5, 8mm – eye
 - No.3, 6mm fishtail sweep
- Hooked skew
- Left and right No.4 sweep skew gouge – inside mouth
- Abrasive: 150, 240, 320 & 400 grit

Wood:

- Basswood (*Tilia americana*)
 - 300 × 145 × 50mm
- Finishing oil – or any other finish you prefer

I got inspiration for this carving when sitting by my pond watching the fish catching insects on the surface, with dragonflies flying around. I've stylised this koi carp to make the project easier to carve. I've also carved the fins quite thick for strength, as the grain direction goes across the fins, thus making them weaker. You could carve the fins separately and add them, in which case you could carve with the wood grain direction making them thinner and stronger – this could possibly make carving the sides of the fish easier as well.

I've also carved the anal fins sticking out the side so they can be seen, where they would normally be further underneath the fish. The side profile of this carving is squashed, as this piece is a pierced relief and is to be looked at from above. I've not carved any scales on this fish as gaining access under and around the lily pads could be difficult, especially when trying to keep the scales of a uniform size.

You could carve the scales or stab an impression with a stop cut of various sweeps, or even use pyrography to give the impressions of scales. Try these various techniques on a piece of scrap wood before committing it to the carving itself. ➤

1 Begin by printing out the design at the required size for the piece of timber you wish to use, then transfer the design on to the piece of wood. For this, use a carbon stick and rub it all over the back of the printout, then trace the design on to the wood. You could use carbon paper or even glue the printout in place. With the design on the wood, use a red pen and draw around the edge of the design. This will aid visibility while you are cutting it out on the bandsaw. Once you're happy with the placement of the design, begin cutting out on the bandsaw if you have one, but if not, then a coping saw will do just as well.

2 You are now ready to mount the project on your carving vice/clamp. Glue a piece of scrap wood to the front half of the underside of the carving, then fix the vice to the scrap block. With the carving mounted on the vice, draw some guidelines around the edge of the lily pads. This is for the rough thickness of the dragonfly, which is level with the top of the large lily pad and the thickness. Remember the middle pad goes under the other two.

Bolstering in

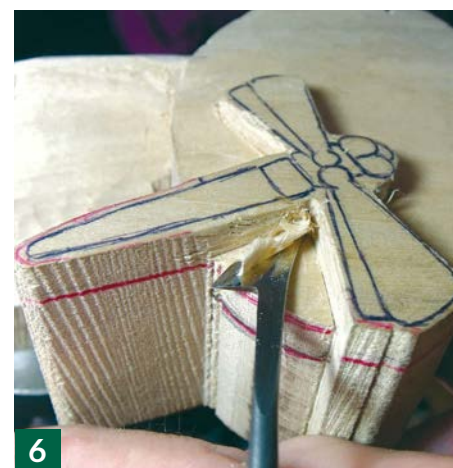
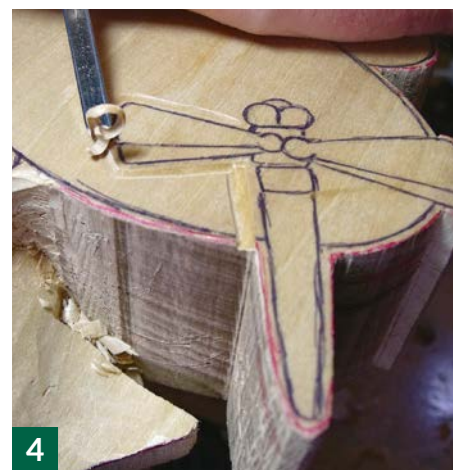
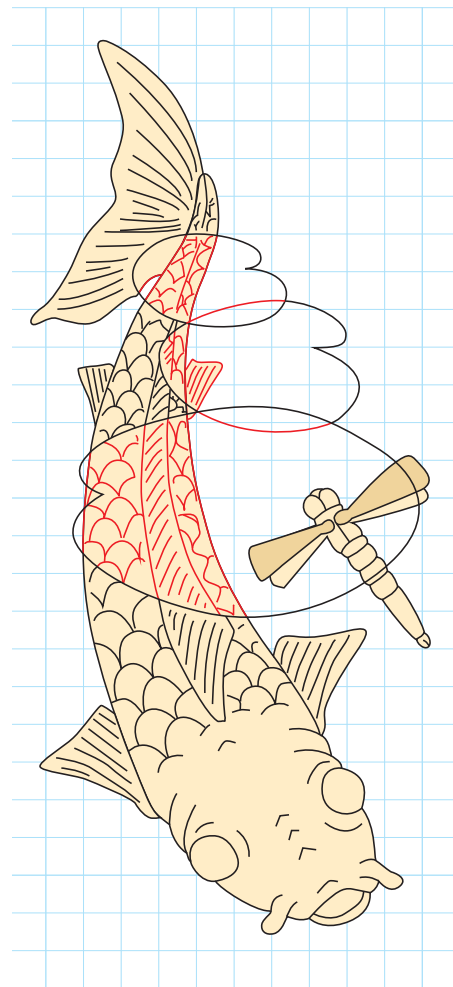
3 Using the No.8 and No.9 sweep gouges, start bolstering in the fish. Start with the No.9 sweep and mark out around the lily pad, then roughly shape the front half of the fish, leaving the dorsal for now, and roughly carve the tail, just enough to separate from the lily at this stage.

Lily pads and dragonfly

4 Using the No.11 sweep, mark out around the dragonfly. Then, using a shallow gouge, take down the lily pad to just above the guidelines drawn on the side.

5 Where the lily goes over the dorsal fin, there is a bend just above it, which is also on the dorsal fin. Draw a line on the lily pad where the dorsal should be. Then, using a No.9 sweep, begin to carve a groove to create the bend/ridge in the lily pad, then continue shaping the pad.

6 With the first lily pad now roughly shaped, cut in and carve down the other two lily pads. The middle pad goes under the other two. Then, using a hooked skew, finish lowering the lily pad and cut in around the dragonfly.



7 With the pads roughly carved to depth and using the red areas on the design pattern as a guide, draw the rough profile of the fish on the underside of the carving, making it a bit larger than actually required. Then, using a No.9 sweep gouge, carve away the waste to the underside of the lily pads. Remember to keep these pads thicker than required for now.

8 Continue carving in the side of the fish, shaping and blending the rest of the fish as you go. While carving the side of the koi carp under the pads, beware of the changing wood grain direction – a rolling slicing cut is required here. With the side of the fish bolstered in, draw the shape of the middle lily pad as it overlaps the outer two from the underside, then cut in and take down the largest pad to its rough thickness. The lily will be carved to its finished thickness later.

9 The dorsal fin bends over as it goes under the pads, adding strength to the project. Using a deep gouge, clean up where the dorsal fin and the side of the fish meet the pads. This will add the inside curve to the dorsal fin. Remember that most of what is carved under the pads will not be seen when the carving is finished.

10 Using a shallow No.3 sweep, move round to the other side and undercut the lily pads so they are an even thickness all round, then, reversing the gouge, continue shaping the fish's body.

Dragonfly

11 I've stylised my dragonfly but you could carve a particular species. The choice is up to you. Use a veiner to separate the wings and a shallow fishtail gouge to take down the lower wings. Using the same gouge reversed, round over the body.

12 Now to draw on the detail. Once happy with the placement, use a veiner to carve in the detail of the head and body, then using the fishtail gouge reversed, round over the eyes, etc. With the head and body carved, use a medium sweep gouge to cut in around where the wings join the body, then round over and use a shallow gouge to slope the wings back. With the top of the dragonfly carved and undercut, round over and carve in the detail of the overhanging parts of the dragonfly. ➤



13 With the dragonfly and the top of the lily pad carved, you can now continue with the other lily pads. Draw a line about 4-5mm from the top of the lily around the edge. This will be the finished thickness of the lily, then, undercut the lily to this line.

14 When undercutting the lily keep checking the placement of the dorsal fin. Using a coping saw, cut out a wedge from under the small lily pad above the tail. This will make shaping the tail area easier and create more shadow.

Carving the tail

15 Use a deep gouge, starting where the body meets the tail. Create a hollow curl to the tail, keeping aware of the thickness and strength as the grain can be weaker near the end. Once you're happy with the shape of the inside curl of the tail, carve back the other side of the tail, following the curvature and keeping an even thickness along the tail.

Anal fins

16 Draw a rough centreline on the underside, then use dividing callipers to measure and make sure the fins are of an equal size and equally apart. Using a deep gouge, carve down between the anal fins and around the bottom of the tail to create shadow at the back of the fish. This also gives you somewhere to place a picture hook later. Slope the anal fins from the outside edge of the fin into the body of the fish.

Head and eyes

17 Draw the eyes roughly in place using the pattern as a guide. Once you're happy with the placement, use a medium sweep gouge that best fits the eye and cut in so you curve the gouge round to create a circle, then carve away around the eye until it's a couple of millimetres in height. The next step is to draw some guidelines from the carved eye over to the other side, which will help to make sure both eyes are equally placed. With the eyeballs now cut in, draw another circle around the outside of the eyeballs and, as before, cut in and carve around. While carving the outer circles of the eyes, cut in and carve two gills on each side behind the eyes, but in front of the two pectoral fins, then round over and shape the fins.



Mouth and barbels

18 Using the pattern as a guide, draw the open mouth in place. The top lip curls up and the bottom lip will protrude. Using a deep gouge, hollow out the mouth. Once the first part is hollowed, you start cutting into end grain. Using skew gouges with slicing cuts, carve the inside of the mouth. Only carve in deep enough to make the mouth look hollow, keeping the inside of the mouth as clean as possible.

19 Using a No.3 sweep fishtail, cut in the corners of the mouth up to the barbels. Use a deep gouge to carve a groove over the top lip from the sides of the barbels and blend in, then round over the bottom lip.

20 Using a hooked skew, cut in both sides of each barbel and round over. Be careful not to undercut the barbels as they will otherwise be too weak and eventually break. Finish carving in the rest of the head detail and round over the eyes.

21 Using a filler knife or spatula, gently prise the carving away from the fixing block. Use a hooked skew to round over the body and behind the fins, generally cleaning up the bottom of the carving.

Finishing off

22 I chose to sand this carving, but you could leave it tooled with facets that could resemble scales. I started with 150 grit. Going with the grain direction, remove all the tool marks until smooth, then brush down before moving on to the next grit size. I finished with a 320 grit and brushed again. Once the sanding is done, use a V-tool and carve some detail lines into the fins and tail.

23 Here's the final carving. ■

Top tips

1. Take a scrap piece of wood/offcut and, using the medium sweeps of your gouges, create some circles. Pick the two circles that best match the sizes of the inner and outer parts of the eyes.

2. When attaching to a fixing block or carving vice, leave the back half of the fish and the mouth area so they can be carved.



18



19



20



21



22



23

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Making a

Wooden wheel

Michael T Collins doesn't try to reinvent the wheel, but he isn't averse to making one...

History of the wheel

Many years ago I acquired a set of 1920 Barnard Jones *The Practical Woodworker Vol I-IV* and spent many hours poring over the text and diagrams, intrigued by the skills and techniques that these books contained. I just loved the language. Over the years, I have made everything from cabinets to boxes, tables to chairs, clocks and other more intricate items, but I have never made a wheel. In *Vol 2*, p440 Jones describes the steps to create a wooden wheel.

In my opinion, the wheel is undoubtedly the most significant invention in human history. It is hard to think of any mechanised system that does not employ wheels. From

watch gears to cars and jet engines, to computer hard drives, the principle is the same. According to the Merriam-Webster dictionary, a wheel is: 'A circular frame of hard material that may be solid, partly solid, or spoked that is capable of turning on an axle.'

Solid wheels first appeared probably around 3500BC in Mesopotamia and then, around 2000BC, the Egyptians introduced spokes, enabling lighter and faster transportation.

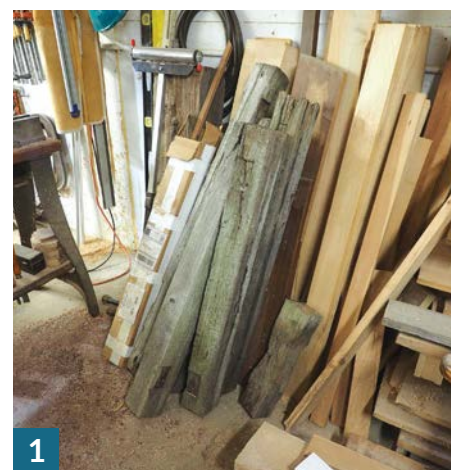
Traditional wooden wheels have hubs made of elm, with its tight convoluted grain structure. Ash, with its flexibility, is used for the spokes and oak, with its hard-wearing properties, best suits the rim of the wheel, known as felloes.

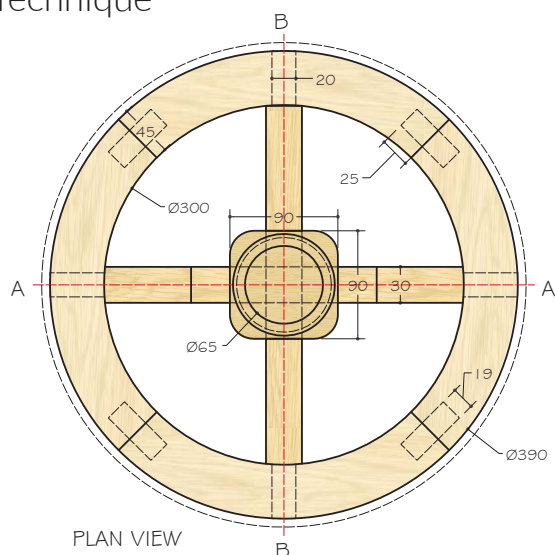
Wheel construction

1 I have a few 40mm-thick oak boards and some old black locust (*Robinia pseudoacacia*) posts that are as hard as nails and would be perfect for the wheel's parts.

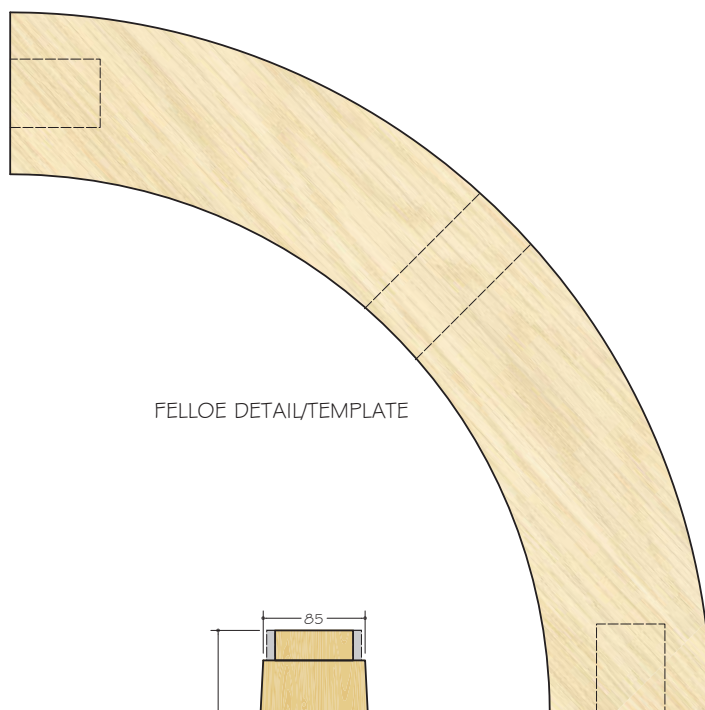
Start with the felloes (note all measurements are approximate).

The felloes, which form the outer ➤

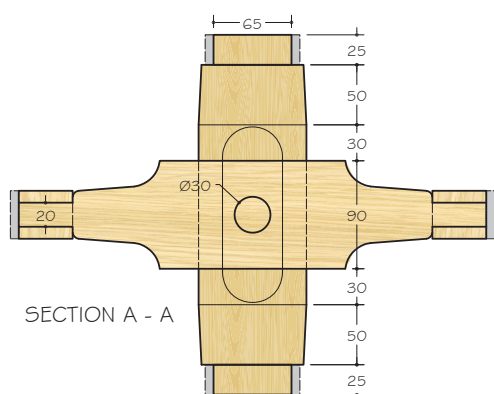




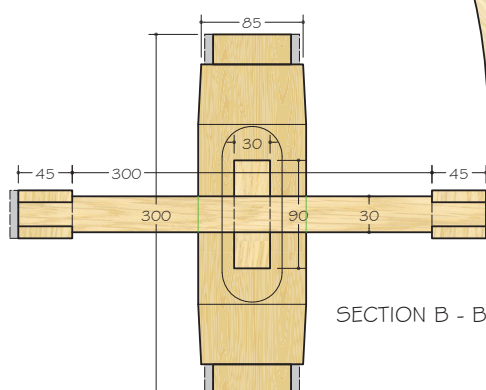
PLAN VIEW



FELLOE DETAIL/TEMPLATE



SECTION A - A



SECTION B - B

rim of the wheel, can be made from any number of pieces and in theory could be made from a single bent wood piece, but in my example, I will be making four felloes from hard white oak, with a spoke positioned at the centre of each.

2 The wheel has felloes that are 45mm wide by 40mm thick and has a diameter of 39cm. The first step is to create a quarter-round template from a piece of 3mm hardboard. Here I have nailed it to a board, and, with a compass set to a radius of 19.5cm, drawn an arc for the outer circumference of the felloe (this will give an outer circumference of approx. 122cm, circumference = diameter x π)

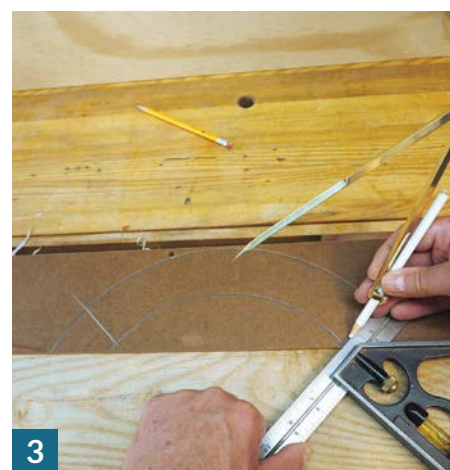
Now set the compass to 15cm, and draw the inner circumference of the wheel.

3 Next, from the same centre point, draw two lines, at right angles, perpendicular to the outer circumference. You should now have a template for making a quarter-circle felloe.

4 Cut out the template and clean up all the edges with a spokeshave.



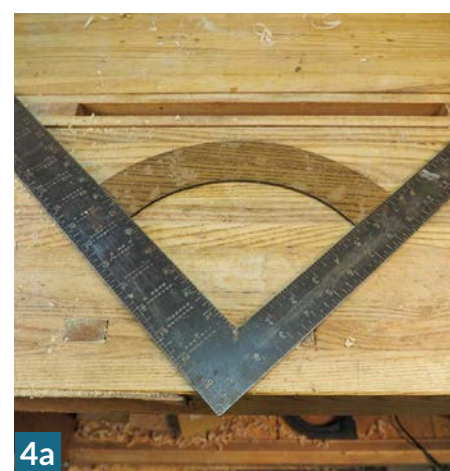
2



3



4



4a

5 Transfer the template to the wood so that the grain runs as long as possible through the felloe that has previously been brought down to final dimension. (See issue 42 p49 on how to dimension wood using hand tools).

***Note:** This is one of the reasons wheels are constructed using many pieces. Unless the grain runs in a curve, fewer pieces would at some point in the felloe have grain running from the inner to the outer and have very little shearing strength.*



6 Cut out the felloes using either a bandsaw or bowsaw. It is critical that the end where the felloes meet is at 90° to the circumference. Check again with the carpenter's square.



7 Clean up the edges using a spokeshave, paying particular attention to the grain direction – you always want to be planing with the grain running downhill.

8 Once the pieces are cleaned mark the mating ends.

9 Lastly, we need a mechanism to hold the four felloes together. To do this, mark the centre of each end...

10 ...and drill a 19mm hole about 25mm deep in each end. This will hold a 19mm x 45mm dowel. The purpose of this is to stop any lateral movement that may occur.

Making the hub

The hub is made from a piece of black locust. This is an amazingly hard species, about two times the hardness and crushability of elm. It is listed as the strongest and stiffest hard wood in North America.

11 Measure the inside diameter of the wheel, which should be about 30cm and cut a piece to this length. The hub is 9cm x 9cm.

12 Turn the hub so that the ends are 65mm in diameter and about 25mm deep, then taper the central section down to this cylinder, leaving a shoulder of about 1cm and the centre section flat. ➤



Chopping the mortise

The four spokes are, in fact, created using just two pieces of wood. The first passes at right angles through a mortise in the hub and the other pair of spokes pass through the other side of the hub, intersecting the first pair of spokes.

13 Start by marking out a 9cm x 3cm mortise using a marking gauge and then remove most of the waste with a drill – do this from both sides of the piece. By drilling from both sides you are more likely to have a mortise meet at the right location on the opposite side of the hub.



13

14 Clean out the remaining mortise waste with a mortise chisel – when working with locust your tools need to be razor sharp, and expect to hone them more frequently.



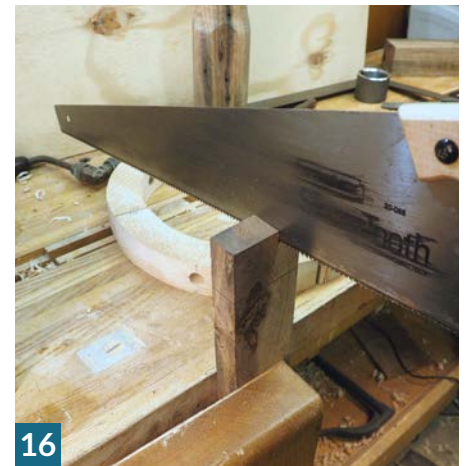
14

15 Position the felloe's spoke holes and, once again, mark the location and drill the spoke holes from both sides of the felloe.



15

16 Cut the final spoke piece to a length of 42cm – this will allow for a little extra to fine-tune the fit. Before turning the 'tenon' spoke cut away most of the waste.



16

17 Turn the spokes down at the ends to 20mm again, making the central area fit within the felloes.



17

***Safety Note:** be very careful when turning non-cylindrical shapes – look at the 'ghost' that the turning block of wood makes so that you are aware of where the wood is – remember steel is harder than wood and wood is harder than skin.*



18

18 Test fit the tenons into the hub – adjust if necessary.

19 Once the parts fit snugly, centre the two parts and drill a 3cm hole all the way through.



19

20 Cut a 64mm threaded coupler in half, and secure it to the ends of the hub. This will prevent the ends splitting with the downward forces on the axle.



20

21 Using a drill press for accuracy, drill a 12mm hole in each end of the hub.

22 Saw a slot in the four spokes that is at 90° to the wheel. A wedge will be inserted into this.

23 Assemble all the parts. This is a little tricky, so ease each spoke, felloe and dowel into place a little at a time.

24 Wedge the spokes and then cut off the excess – I just used wedges made from pieces of the black locust.

The tyre

Traditionally the tyre is made of a steel hoop, heated in a fire and then placed on to the wheel. It is immediately cooled with water, shrinking the tyre on to the wheel. I do not have the facilities for doing more than just basic steel work and certainly cannot do forge work, so in order to bend a steel wheel I opted to use malleable steel that is easily bent and use rivets (aka nails) to secure the tyre to the wheel. Not your traditional method, but for a lightly used wheel perfectly good.

Accurately measure the circumference of the wheel and cut the steel to about 5mm longer (once the tyre is installed the excess can be sawn to perfectly fit the circumference).

25 Using the edge of a vice and a hammer, start hammering the steel into the round. It will take a lot of working, but apply even hits and move the steel bar after each successive hit. Allow the steel to overlap itself – this will give a tighter fit.

26 Fit the tyre and nail into place. These are wrought iron nails and will resist rust longer.

27 And there you have it – a simple wooden wheel. The axles fit into a 12mm ball bearing pillow blocks that will eventually be secured to the wheelbarrow.

So excuse me while I get back to Bernard Jones for advice on making a wheelbarrow: 'Garden Barrows and farm or stable barrows are alike, except that the former have removable top boards for carrying leaves etc., large bodies fairly wide at the front being required for both purposes.' ■



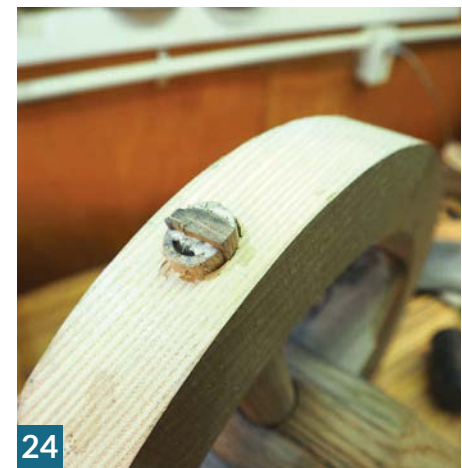
21



22



23



24



25



26



27

*'Like a circle
in a spiral, like a wheel
within a wheel,
never ending or beginning on
an ever spinning reel, as the
images unwind, like the circles
that you find in the windmills
of your mind'
(lyrics - Michel Legrand)*

BUILDING AN ANTIKYTHERA MECHANISM

By Dave Goodchild

Childhood imagination

Many years ago, when I was around 11 or 12 years old, I remember reading a book by Arthur C Clarke entitled *Mysterious World*. For small boys with big imaginations this book was a work of genius as its various chapters discussed colossal subjects such as the Loch Ness Monster, Bigfoot, crystal skulls and, of course, aliens from Space. However, tucked in among the weird and far-fetched was a chapter concerning a small and very ancient device of such complexity that, at the time of its discovery, it simply couldn't be explained.

A Roman shipwreck

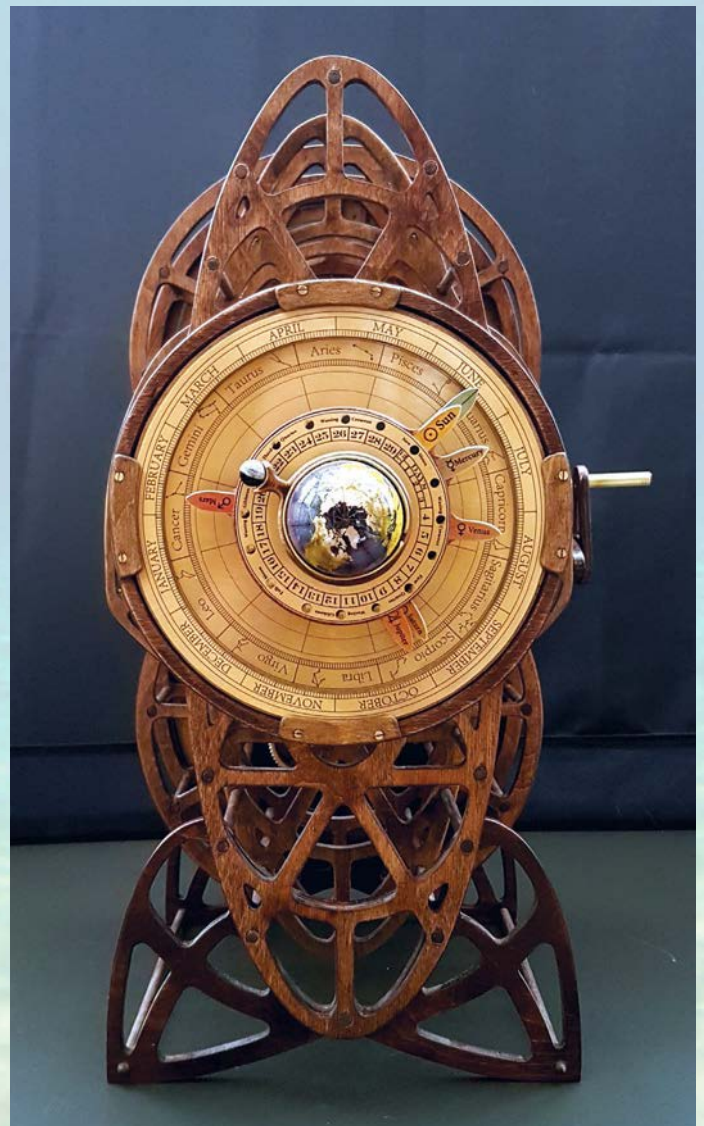
The chapter recounted the tale of a group of sponge divers who, in 1901, ran into a violent storm and were forced to take shelter just off the Greek Island of Antikythera. Once the storm had subsided the captain took the decision to make a short dive in the area, just in case there were sponges to be found and profit to be made. This speculative dive would change their lives as, at a depth of 100m, they accidentally discovered not sponges, but the most important Roman shipwreck to have ever been found, dating from 2100 years in the past.

Wheels within wheels

In the weeks and months that followed, a huge number of statues and artefacts were recovered by the crew and handed over to the Museum of Athens for inspection, cataloguing and cleaning. In among the much more impressive finds was a small shoe box-sized lump of corroded bronze, which seemed to be nothing very special and not worthy of immediate attention. So it sat for almost a year, unnoticed and drying out on a shelf in the basement of the museum. Its anonymous status suddenly changed when the fragment suddenly split into several parts while being moved by a staff member, and inside were seen to be gear wheels – lots of tiny gear wheels...

The appliance of science

After an initial buzz of excitement, and a general understanding that the mechanism was probably an astronomical tool, most of the major research work has only really been carried out in the past 50 years due to scientific advancements. The original machine has now been subjected to countless x-rays, scans, advanced photographic techniques, TV documentaries and books, one of which even supported the idea that it was left here by, yes, you guessed it, space aliens. There has also had to be a small amount of very educated guess work to fill in the gaps in the gearing as some of it is unfortunately missing. Scientists have only now in the past decade or so finally worked out the machine's full complexity and inner workings. ➤





The planet and moon display



Gears waiting to be cut

The first analogue computer

It is, in a nutshell, the world's first analogue computer. It was made of bronze, was hand cranked, had around 11 dial outputs spread over both the front and back faces of the machine and was capable of charting the position and movement in the sky of the sun and the moon as well as all five naked-eye visible planets known to the Ancient Greeks. It could also successfully predict the date and time of both solar and lunar eclipses, as well as the phase of the moon. Subtleties in the gearing even allowed for the apparent slowing down and speeding up of the moon's orbit (the lunar anomaly), and also the sun's variable speed across the sky (the solar anomaly). The planet's pointers on the machine even track backwards and forwards to recreate the retrograde motion that all the planets seem to follow across the night sky over a period of months. It is a stunning piece of engineering for something so old, and it had almost as much impact on the scientific community as would discovering that the Mona Lisa was actually holding an iPhone.

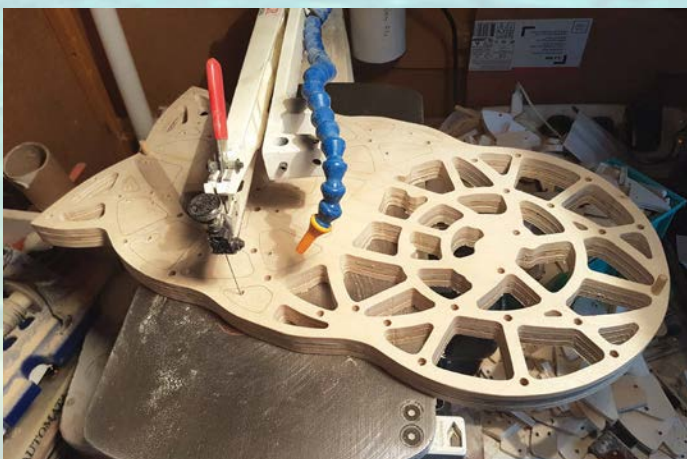
Automata and orreries

So where do I fit into all this? Well I'd always built things – Airfix kits as a child, then big radio-controlled gliders in my teenage years, and then, more recently, I discovered that I had a bit of a skill for designing and building automata (mechanical toys for grown-ups). After a brief dabble with building and selling these stupid and amazing machines, I finally realised my first love in woodwork was in building the mechanisms – all the lovely twisty turny bits – but not, alas, in carving the figures generally required for automata. At around the time my enthusiasm for the art

was beginning to wane I discovered orreries – solar system models – and it turns out that they are 90% mechanism and gear wheels – perfect. So I thought to myself: 'How hard can designing and building a wooden one of these possibly be...?' Extremely hard, as it turned out. However, after a year or so of experimenting, designing and getting reasonably proficient in the art of hand cutting gears on a scrollsaw, I came up with a reasonably unusual design. After releasing it to the world via the medium of YouTube, really just to gauge reaction, I was more than a little surprised that people really liked what I'd done, and I rather quickly found myself in the strange position of being the first and only person in the world offering wooden geared orreries for sale. Over a four year period running up until 2013, I had built almost 20 of various sizes and complexities. Unfortunately my success was almost my undoing. I simply couldn't keep up with demand, and I was too unsure of continued success to rely on it alone to pay the mortgage, so I simply finished the machines I was building and stopped to concentrate on an automata commission that I'd picked up along the way and never finished.

How hard can it be?

At around this time the Antikythera Mechanism re-entered my life in the form of a TV documentary following an American team's efforts to build a giant-size version for a museum exhibit. This programme got me thinking that, although the mechanism was relatively complicated with around 57 gear wheels, it was, when you broke it down, just gears driving gears, and that was something I understood. After a bit of digging I found out that, despite the attention



Cutting out one of the frames on the scrollsaw



Tiny gears



A rare breakage



A moon drive bevel



Planet unit detail

that the machine had received, there was only basic schematic information available, and certainly no plans of any kind. So the poor automata was slowly eased on to the back burner again while I started tinkering with thoughts of mechanical computers. The little voice in my head was once again asking: 'How hard can it possibly be...?'

Mapping the gear trains

My first hurdle was one of size. The original machine was really small – imagine a shoe box filled with gears, with the biggest gear having 223 teeth and being only 14cm in diameter. So my first task was to map the machine's gear train out to try to work out how big, or small, the components were going to be relative to one another, and at the same time ensure that the end of each gear train was at the correct position so the output pointers were in the right places. This was all done with pencil and paper, and lots of trial and error. I knew what the ratios were – these were well published and freely available – I just had no clue as to what sizes or tooth pitches they had to be, so it all took time. Once I eventually had a fair idea of what went where I set myself a skill test to decide exactly how small I was going to be able to produce this contraption – and at this stage, if I'm being totally honest, I still didn't really think that I'd succeed.

Skill test

My skill test was to see how small a tooth pitch I could cut into a gear. The original had gears with tooth pitches of, in some cases, around 1mm. My previous orreries generally had tooth pitches of around 4mm or bigger – quite a large difference – so I needed to see how close I could get. I wasn't too worried about getting my machine as small as the original since, in my view at least, it was possibly too small and probably very difficult to read and interpret – it was only 34cm x 18cm x 9cm – so I reckoned that making my version a little bigger would be no bad thing. In the end, and with the help of a pair of magnifying glasses that I'd inherited from somewhere, I managed a workable tooth

pitch of just 1.4mm, and the pair I cut ran beautifully right off the scrollsaw. These were the pair which had to have the smallest tooth pitch of the entire machine – every other gear would be slightly larger at just over 2mm. These two eventually worked out to be 30% bigger than the originals, which seemed about perfect to me.

Now I knew the exact size of my first two gears I could work back out from there and scale everything else to suit. Simple. In the end, and on paper at least, my finished machine would work out to be around 40 cm tall, so not much bigger than the original. So now I had a plan, kind of...

A marathon build

The first part of the actual build was the marathon of setting up and printing all 57 gear wheel patterns off the computer, sticking them to the wood, and cutting them out. To put that into some kind of perspective, that works out to be 3277 individual teeth, cut by hand, one side at a time.

My method for gear cutting has evolved a bit over the years. When I started building the orreries the gear teeth were, as I mentioned previously, relatively big, and as such would tolerate a fair bit of inaccuracy – and believe me when I say that, although my first efforts worked rather well, they weren't exactly perfect. My method then was to cut out a slightly oversized blank disc of wood, stick the pattern to the wood, cut out the gear from the disc using the tips of the teeth as a cut guide, cut down the right side of each tooth, and then down the left side of each tooth along with the bottom between the teeth to release the little wedge of waste. Finally, the centre hole is drilled and, hey presto, one finished gear in need of very little sanding and finishing. Over the years I have cut literally thousands of gears, and with all this practise my cutting has become ever more accurate and automatic. However, my Achilles heel has always been cutting the centre hole. It is soul destroying to cut a perfect gear, only to get the centre hole in the wrong place, and when your teeth are tiny a small error means that the gears wobble on their spindles and simply don't mesh properly. So for the Antikythera I had a good think ►

(something I don't do very often) and suddenly realised that if I cut the hole first and centred the pattern on the hole I'd have no more problems, and it's worked a treat – perfectly centred, accurate gears every time. Quite why I didn't realise this three years earlier is anybody's guess...

The first prototype

Once the gears were cut (around three months' work), I could finally start accurately setting out the frames and deciding on a look for the finished machine. I am not a fan of boxes, or straight lines, and I know nothing of dovetail joints, so creating a replica that actually looked like the shoe box design of the original was thrown out very early. Instead I wanted to go for a design similar in look and feel to the open oval design I'd used for my orreries which had worked well and had seemed to be popular. It was open and airy and enabled people to see into the all important gearing – why hide the most important part of the machine? So, after carefully setting out on to a piece of blank wood all the pivot points for the gear trains, I set about creating the frame shapes around these fixed and immovable points. The first prototype had three main frames – a central master frame which carries all the pivot positions, and then a front and back frame which were cut and set out from this central frame. The frames themselves are simply mounted on to, and separated by, wooden dowels. These form a big part of the look and feel of the finished machine. The gearing finally got fitted almost two years after I started the project – and it worked. My only problem at this point was a lack of vision at the start of the project and a basic lack of belief that I would ever really get anywhere close to pulling it off successfully, and because I hadn't thought things through to the end I hadn't allowed enough room to fit the great big spiral dials which are a main feature of the machine, I also realised too late that half the gearing was fitted backwards... However, I had built in my humble workshop the first working version of the Antikythera Mechanism anywhere in the world to incorporate all of the latest thinking on the machine's workings, and I had proved to myself that it could be done.

The second prototype

So next up was prototype number two. This incorporated a few changes over my first effort, fitting the gearing the right way around for instance. But also this machine was designed from the start to be 100% finished at the end, so



Feeling frazzled



The first prototype



The second prototype

all the frames were redesigned along the way, dials were designed and created, and actually translated into English from the ancient Greek of the original machine, which again, was a job which had never been done before. The second machine took a little under a year to design and produce, but the finished result was more than worth the effort. I still find it quite mesmerising to crank the handle and watch the multiple dials, pointers, planets and moon slowly dance their way around my tiny wooden cosmos.

The humble scrollsaw

I now find myself in a very similar situation as I did when I was first building the orreries. I am in the lucky position of having taken on five commissions, but they are taking a very long time to build as everything is still being hand cut. I've been at this first batch for almost a year now, and I still have a month or three left to go before I send them off to their new homes. For my own sanity I think that I might have to consider laser cutting for the next batch. Please don't judge me too harshly – 270 gear wheels cut on a scrollsaw is just way too many... If nothing else though, this project has shown that the humble scrollsaw is capable of cutting out more than just decorative coasters and plaques.

And finally, I'm looking forward to finishing this first batch of orders just so that I can spend some time with my poor long suffering wife! Without her eternal patience I wouldn't have ever got even the first one finished, thank you Helen. ■

Pig bench

Even the simplest of seating has style, as Gareth Irwin shows us here

Pig benches are simple, low benches with a single slab top and four legs. These were used, as the name suggests, for butchering pigs but they were obviously used for a multitude of domestic tasks as well. Today, these benches seldom get used for butchery but they remain very practical as seating or a side table.

Old pig benches usually range from 1200mm-1800mm long, 250-400mm wide and 350-400mm tall, but can be made at any size. The tops were often sycamore as butchers' blocks are, with either oak or ash legs. I tend to use oak or ash for the whole piece.

Pig benches can be made using green or seasoned wood, or indeed both. In practice, the piece of wood used for the top will determine the method of construction. As timber dries, it shrinks. If the legs of the bench have more shrinking to do than the top when they are put together, then they will become loose. If the top has more shrinking to do than the legs then the top will tighten its grip on the

legs and the joints will remain tight. If the board used for the top is of dry wood then the legs must also be dry. Because the boards I use for bench tops are usually dry or semi-dry, I tend to make the legs from green timber, then allow them to dry before finally shaping the tenons.

The legs

1 When selecting materials for this project the golden rule is that a strong mortise and tenon joint must be longer than it is wide. I like to make the leg joints 32mm wide, therefore my bench tops are 32mm thick or more when finished. When selecting material for the legs, it must also be remembered that the 32mm tenon needs a tight tapering fit at the shoulder, so material of a greater size is needed. I like to make legs that taper from about 50mm down to their 32mm tenons. This means logs of about 500mm long and 200mm diameter, split into quarters, make an ideal starting point.



2 Starting with the legs as these potentially need time to dry, take the quartered 200mm dia. log and notice the cross section of these quarters is roughly triangle. Using a trimming axe, trim down the sharp corners to reveal the hexagonal form. Each facet of this hexagonal leg can ➤

now be trimmed to form a taper, using a drawknife at the shaving horse or a plane at the bench.

3 Allow these four legs to dry thoroughly before either turning the tenons or forming them with a drawknife and spokeshave. Here a tenon has been formed on the pole lathe.

4 My preferred method for this is to roughly shape the legs, leave them somewhere warm for three or four weeks, then refine the shape and make the tenons. The tenons should be about 65mm long.

The bench top

The top of the bench can now be made with anything from a cleft, half log to a perfectly flat, clean board. A flattish board might be easier if a planed finish is required and in either case I'd say it's not imperative to remove all the twist. I then like to auger the leg holes before working the surfaces. This way, any slight tear-out that might arise from angled augering can be planed off, leaving a crisp edge to the holes.

5 In this example I used a hand plane with a cambered blade to give a rippled effect, which looks good and has a tactile feel to it.

Setting leg angles

The angles that the legs are set at are not critical but a decent angle both in splay (side to side) and rake (end to end) will make for a stable bench and eliminate the 'racking' – movement, associated with vertical legs.

6 Choose the surface that will be the top face and mark where the leg centres will be. I would come in 75-100mm from the side edges and 230-250mm from the ends measured on the bench top face. Now we can drill 6mm pilot holes for the augur. Using two adjustable bevels, set bevel (a) to about 77° and bevel (b) to about 67°. Tape down bevel (a) facing along the bench and bevel (b) facing across, both pointed towards one of the marked spots. Sighting the drill through both bevels 'a' and 'b' will show the compound leg angle.

7 Once all four pilot holes have been drilled right through, take a 32mm auger and follow the pilot hole through from one side, stopping



2



3



4



5



6



7

halfway through. Turn the board over and bore until the hole is through (always auger from both sides to ensure no breakout).

8 The bench top surfaces can now be worked to the required finish, my personal taste being to leave tool marks visible.

9 The last pieces to make are four dry oak wedges that are about 65mm long, the width of the augered hole and which taper from 6mm to nothing.

Fitting the legs

Offer the finished, dried legs into the mortised top and give them a gentle tap in. Mark a line around the legs where they both enter and exit the bench top. Number each mortise and tenon and draw a line across the top of the protruding tenon at 90° to the bench top.

Knock the legs back out and, using a tenon saw, cut a slot down the centre line of the tenon that goes to halfway between the two lines drawn round the leg.

10 To finally assemble the bench, offer the legs back into their respective mortises, ensuring the slots in the tenon tops are at 90° to the bench top (this is to stop the top splitting when the wedges are driven in) and knock them in hard with a mallet. Ensure each leg is on a solid floor and tap a wedge into the slot on the top of each leg tenon until they will go no further. If the tenons fit well and



8

are well dried, glue isn't necessary but use it if you like.

11 All that remains is to trim off the tenon tops.

12 I like to leave them 3mm proud and dome them with a chisel, and finally level the legs.

Levelling the bench

Place the bench on a flat surface and pack under whichever legs bring all the corners of the top to a roughly even measurement from the flat surface.

Let's say the measurement at each corner is 480mm. If we want the bench to be 400mm high we need to take off 75mm, so tape a pencil to a 75mm wide offcut and scribe a line around each leg, 75mm off the flat surface. Cut the legs off at these lines and chamfer the ends to avoid chipping. Your very desirable pig bench is now complete. ■



9



10



11



12

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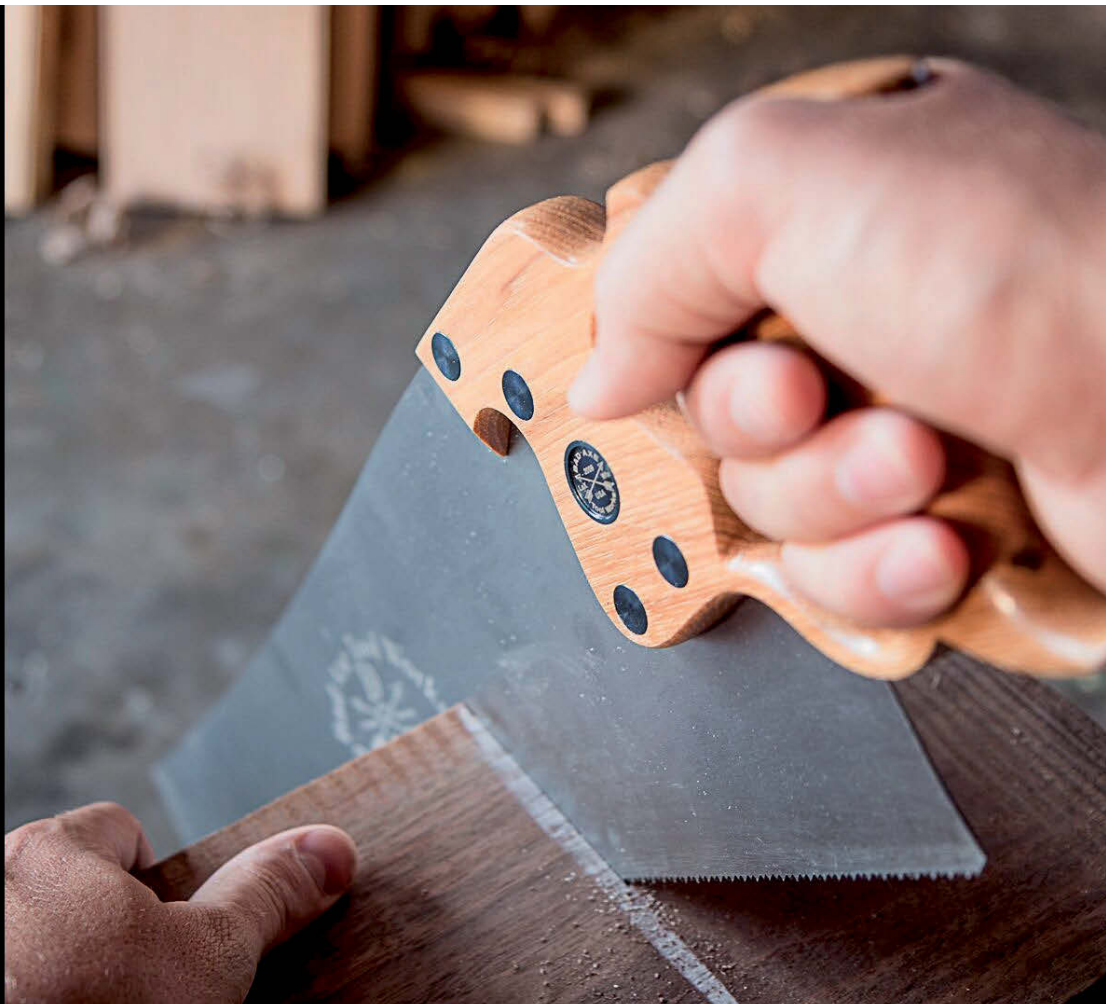


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- Children's utility furniture
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PHOTOGRAPH BY MICHAEL T. COLLINS

Feature:
Bread and board – A visit to The Antique Breadboard Museum



PHOTOGRAPH COURTESY OF THE ANTIQUE BREADBOARD MUSEUM

PLUS: Make a desk tidy; Spoon carving; Kit & tools; News & events and more...

Ask the experts



ANTHONY BAILEY
Editor,
Woodworking
Crafts magazine

Another selection of awkward questions for our experts to answer

ROCK STEADY

Q I have a set of pine bar stools which I want to shorten as I'm not over-tall, and then paint to make them to look more up to date. I've tried cutting the legs off one of them but it rocks and the feet aren't sitting level on the floor. Any advice would be welcome. **Q**

Jenna Reeves

STAR
QUESTION



PHOTOGRAPHS BY GMC/ANTHONY BAILEY

Anthony replies: Anyone making chairs also has the same issue if the legs aren't made to a template and, in any case, even if the feet sit flat on the floor nicely, there is bound to be a slight rocking movement which needs sorting out. Recently I was asked to turn a Windsor rocker into a standard chair prior to repainting. The procedure is basically the same.

1 The rocker strips were cut off as close to them as possible to keep the turned bead detail on each leg. The far front leg is off the ground



2 After sighting across the chair I decided it was the back leg opposite that needed to be lifted with a wedge so the chair was level across before trimming

3 A thin piece of softwood was pressed against the legs and a pullsaw lying dead flat on it is used to trim off the bottom of the first leg

4 The board was slid under the trimmed leg ready for the next one to be cut. All four legs will end up sitting on these boards so the chair remains level



5 Cutting the second leg. The one with the wedge is cut in the same way while trying to avoid disturbing the wedge

6 The wobble test. All four legs sit flat on the reference surface, in this case a tablesaw, but any flat surface will do. The wobble has gone and the legs lie flat

7 The final touch is to file a chamfer on the leg ends so they don't drag or catch

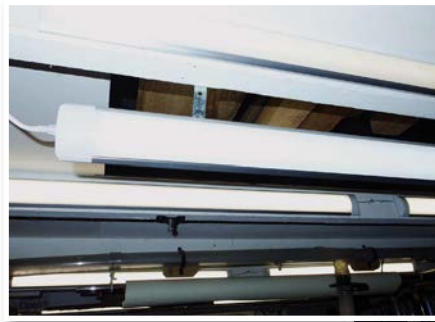
A GOOD BACKGROUND

“I make various things – some are turnings but I do a lot of general woodworking projects which I really enjoy. I like to show friends and family, some of whom live around the other side of the globe, what I’ve been up to. I take photos which aren’t bad but I’m have problems sorting out a decent background, it always seems messy in the workshop or even on the dining room table. I’d quite like to use Instagram to show what I get up to but it’s the background that’s bugging me. Any bright ideas?”

Jez Richards

Anthony replies: This is general advice to any readers, as well as to yourself. Always have clean, clear backgrounds of any projects you send to us – this is what stops a lot of photographs being used in the magazine even though the photos are otherwise OK.

Specifically what you are looking for,



Above: Low-energy LED striplights give plenty of illumination for workshop photographs



Right: The Editor’s own roll-up vinyl background set up using ropes and a pole to support it

Jez, is a suitable background to show finished projects. I would suggest you investigate vinyl photographic background material online, which is what I have been using for some time. You can get combination white/black or white/mid-grey, which is the one I would choose personally. It has a matt finish to absorb reflection, washable

and comes on a cardboard tube to hang it in a scoop shape, a 1m x 2m roll should do for most purposes. There are colour alternatives but I would avoid these as they will give a colour cast to your subject matter and can make it look rather gauche. White or grey ‘sets off’ warm wood colours very well.

NOT SO RUSTY

“Hi, I’ve found that storing tools in a closed toolbox in the summer hasn’t stopped them getting a film of rust, which is a bit upsetting as some of them are quite new. I’ve been investigating different kinds of rust protection, from oiling steel blades to anti-rust vapour compounds which seem a bit expensive. Any suggestions please?”

Nick Englemann

Anthony replies: Just because we have had a hot summer doesn’t preclude humidity in the place where

your tools have been stored. I have various paint tins stored in an insulated roof area of my workshop and they have been known to be damp on the outside due to condensation, even though the weather is very warm. The first thing is to try to remove the rust on your tools. Hopefully it isn’t too serious so a careful rub over with very fine wirewool or a household web scourer and some WD40 or light mineral oil might be enough to remove and retard the oxidation. However, once it occurs, rather like fungus, it doesn’t ever really disappear unless you use a rust-removal compound. For the future, take the very effective, cheap and cheerful route like I have with my new toolbox (see page 71) and

pop a few camphor blocks into your toolbox. It will make your eyes water a bit and clear your nasal passages when you open up your toolbox, but boy – does it stop rust.



Camphor blocks stop rusting and clear a blocked nose



The Tool Marketing Company, or TOMACO, as it is known, which sells a variety of tool brands, including COLT, Sharp Edge and Narex Tools, is pleased to be sponsoring the Ask the Experts section in collaboration with GMC Publications. Each issue’s Star Question

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Pullsaw primer

Some people use them, most people don't and yet they are incredible tools. So why not? I'm talking about Japanese pull saws

Most people, when they see me holding a Kataba crosscut saw, think it is some kind of offensive weapon – that's how it looks to the untrained eye. In fact, wielded with care, it is a precision tool capable of doing fantastic work. That is the problem really. It's a foreign-looking saw whose function, method of use or purpose isn't immediately apparent – so why would you need one? A very good question I'll try to answer for you.

Typical 'western' saws are push-cut – apply forward pressure and the blade digs into the wood. Often the start of the cut, especially with a tenon saw, is a bit jarring as it catches, so you have to draw the saw back to get the cut to start. A Japanese saw with its pull

action is one step ahead, since it only cuts on the pull stroke and does so smoothly from the start. It doesn't have a heavy brass back to stiffen the blade and, where a saw is meant for joint cutting, the folded back is quite light. In all cases the blades are thinner than western blades since the metal isn't in compression and, used correctly, won't bend out of shape. That, of course, is the issue – getting used to only cutting on the pull stroke, never pushing and hopefully not binding in the wood, which can cause the blade to try to fold up resulting in terminal damage to the much lighter blade. These blades are therefore used under tension, where our saws work under compression.

Japanese saws are called nokogiri

and come in a variety of flavours for different purposes. I, along with other western craftsmen, am not engaged in Japanese joinery sitting cross-legged on the floor using special low work supports in front of me – no, instead I use these beautifully turned-out tools for things such as accurate cross cutting and mitre cutting at the workbench, restoration work, flush trimming and taking minute cuts down to size, all things these saws do very well.

I reserve standard western hardpoint saws for heavy-duty rip cutting and rough crosscutting, which they do very well. It's horses for courses, you might say.

Here is a list of the most typical nokogiri and their functions.



The Editor's own set of Japanese saws. From L-R: rip, kataba, dozuki, dozuki-me, flush trim



A dozuki blade being used to cut away previous filling work prior to rebuilding with a wedge of walnut

GENERAL USE

Ryoba

Ryoba means double-edged, a saw with cutting teeth on both edges of the blade. The teeth on one edge of the blade are filed for crosscutting, on the other edge they are for rip cutting. Alternatively, ryoba saws may have teeth on one edge for cutting softwoods and teeth for cutting hardwoods on the other. To prevent a ryoba saw from 'binding', the blade is ground thinner towards the middle, but careful examination of the teeth reveals similar size and set of teeth on each edge. The actual size and number of teeth will vary depending upon the length of the blade.

Kataba

Kataba is backless with teeth on one edge only. A great general purpose

saw, it has a thicker blade, reducing the need for a back, and teeth that are filed for either ripping or crosscutting. The ripping kataba may have smaller teeth to the rear of the blade for starting the cut and larger teeth near the front for faster cutting.

Dozuki

Dozuki means tenon. It is a kataba-style saw but with a stiff back spine. The spine ensures a straight blade for fine, precision joinery cuts but does limit the depth of cut. There is a deeper blade version for large tenon cuts.

The dozuki is the most widely recognised, most used Japanese saw for both hardwood and softwood. The blade of the dozuki is the same thickness over its entire width and, similar to a crosscut saw, the teeth will have the same size and minimal set along the length of the blade. ➤



A small, 150mm dozuki-me blade with a hook tip for starting mid-panel cuts



A genuine mid-panel start thanks to the hook tip



This larger toothed, slightly longer kataba blade was bought to replace the damaged blade at the top

From top: Ryoba saw, panel saw and crosscut saw



Very fine trimming cuts are possible thanks to the fine teeth and the pull action



You can choose between modern-style rubberised grips or traditional bamboo wrapping

OTHER TYPES

Azebiki

Azebiki are mostly in the ryoba style and have a short, curved blade with teeth on each side. This saw is used for centre panel cut starts, something that western saws, apart from a floorboard saw, are incapable of. The short blade permits easy access to tight spots.

Kugihiki

Kugihiki means 'to cut nails', and has a blade with teeth with no set to avoid surface damage. It is designed for flush-cutting wooden nails or dowels. The blade is thinner at the tip for ease of bending and less danger of surface damage. It is thicker at the rear end for better stability when cutting more aggressively.

Sokomawashibiki

Sokomawashibiki means bottom and is a curved cutting saw originally used



The fine, heat-treated teeth do become damaged with use but can be replaced easily

for cutting the bottom for wooden buckets. The curvature of the blade allows cutting of curved profiles and it can be used in hardwood or softwood.

Anahiki

A log or beam-cutting saw for cutting green and seasoned woods. This saw is used for general construction or timber framing, but can be used in the workshop for rough cutting of rough-sawn hardwood or softwood.

Mawashibiki

Mawashibiki means turning cut. It is a narrow, thick-bladed saw for cutting curves or keyholes. ■



If you are replacing a blade, most blades have a legible size number but, if not, study the characters to match with a replacement



Removing an old, damaged blade. Hand protection is essential



Fitting a blade by tapping home, with the vicious teeth covered for safety

Azebiki



A flush cutting saw with a very thin flexible blade and choice of teeth sizes ideal for trimming off dowels, wedges and wooden nails

Suppliers

For a list of suppliers online use search term: Japanese tools UK



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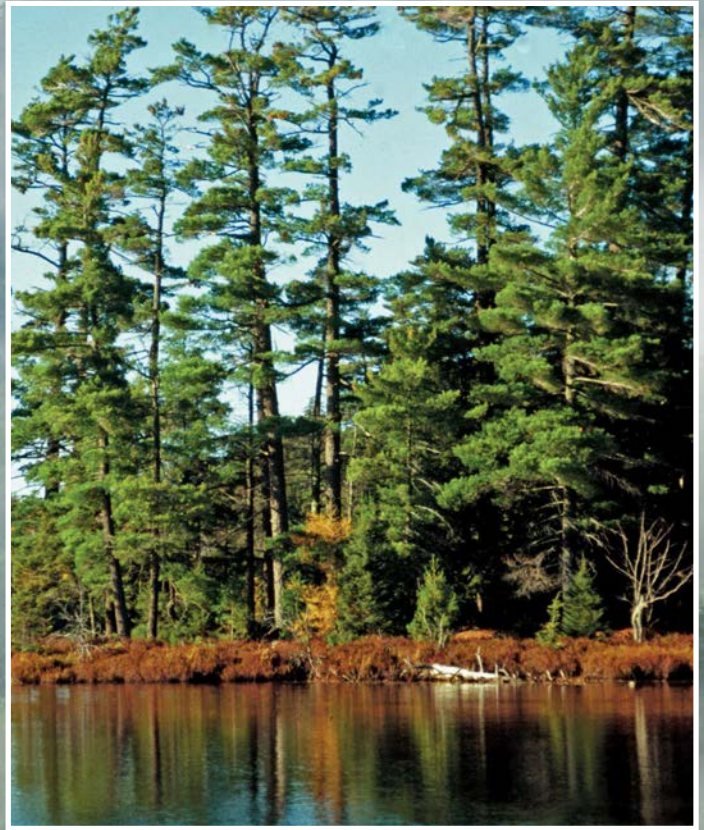
Sources of softwood

The growing, felling, conversion and correct use of softwood is not well understood by end users. Expert woodworker **Walter Hall** explains the many differences

If you want to ensure that the wood you buy for your project is of an appropriate type and quality, then it is important to understand what the different species of softwood are, how they are described and graded and to what use each type and grade is best suited. For the newcomer or inexperienced woodworker, visiting a timber merchant can be confusing and I remember from my early DIY days feeling quite intimidated by the terminology, which was completely alien to me. Terms such as 'unsorted' and 'sawfalling' left me baffled and the codes that were stamped on to some of the boards might as well have been written in hieroglyphics for all they meant to me.

Sources of softwood

About 75%–80% of the world's timber production is of softwood. Most of the world's softwood grows in the northern hemisphere, in a broad band across North America, Central and Northern Europe and the Russian Federation.



PHOTOGRAPH COURTESY OF WIKIPEDIA COMMONS

The redwood pine is tougher than spruce and considered to be better quality. Selected examples were used to build and line the Victorian Gothic interior of the Houses of Parliament



PHOTOGRAPH COURTESY OF WIKIPEDIA COMMONS

Softwood timber being felled using extensive wire roping, working on a precariously steep French hillside



PHOTOGRAPH BY GMC/ANTHONY BAILEY

These logs are ready for the very first step in conversion once they get to the sawmill. Note the very muddy working conditions

Species and their common uses

There are a great many species of softwood but those most readily available commercially in the UK are spruce (*Picea abies*) and pine (*Pinus sylvestris*), often referred to as whitewood and redwood respectively. The timber sold in the large DIY stores is usually spruce, which is lighter in both weight and colour than the joinery-quality pine available from builders' merchants and timber merchants.

Spruce is really only suitable for carcassing, building shelves in the shed or garage for storage or boxing in etc., while redwood is suitable for better-quality joinery work. At a push, the better grades of redwood could be used for simple furniture projects, but for this sort of work it is better to choose one of the more stable timbers, such as Quebec yellow pine (*Pinus strobus*). Here is a list of some of the more important species and their principal uses.

COMMON NAME	SPECIES	COLOUR	DURABILITY	WEIGHT (kg/m ³)	USES
Pitch pine	<i>Pinus palustris</i>	Orange/brown	Moderately durable	660-690	Heavy construction, decking, cladding, flooring
Quebec yellow pine	<i>Pinus strobus</i>	Light yellow/pink	Non-durable	390	Patternmaking, furniture, interior joinery
Southern yellow pine	<i>Pinus palustris</i>	Orange/brown	Moderately durable	660	Stair parts, joinery, pallets
Spruce – whitewood	<i>Picea abies</i>	Light cream	Non-durable	500	Carcassing, framing, studwork
Pine – redwood	<i>Pinus sylvestris</i>	Light yellow/brown	Non-durable	500	General joinery, furniture
Douglas fir	<i>Pseudotsuga menziesii</i>	Light reddish brown	Moderately durable	530	Exterior joinery, doors, windows
Hemlock	<i>Tsuga heterophylla</i>	Pale brown	Non-durable	390	Interior joinery



The non-deciduous spruce is perfectly suited to harsh winter conditions thanks to the thin, weather-resistant 'needles' which cover it

Grade descriptions and other terminology used by timber merchants

The following table shows the standards on which the terminology used to describe softwood is based. Most often you will find that the terms used are 'unsorted', which will consist of all of the better grades and 'fifths', which is what you will normally get if you don't specify anything else. Sixths and sevenths are seldom encountered. 'Sawfalling' and 'fifths and better' are also terms you might come across. 'Sawfalling' is usually used in relation to whitewood and means it has not been graded – not to be confused with unsorted – but in reality is usually what is left after the local joiners have taken all the good stuff, so is best avoided. 'Fifths' and better means much the same, but is generally used to refer to redwood.

You will, of course, also need to decide between sawn or planed timber, the latter being described as

PSE – planed square edged – or PAR – planed all round. Remember that with PSE/PAR timber the dimensions given are those of the sawn stock before planing, so wood described as 50mm square may be up to 5mm less than the nominal dimension.

Softwood comes in standard lengths ranging from 1.8m to over 6m. A good timber merchant will cut longer lengths down for you.



Examples of grading, from left to right:

1. Treated, eased edges graded C16
2. The same but graded to higher standard C24
3. Untreated, eased edges graded C16
4. PAR – prepared all round. This latter, nicely finished piece looks and feels good, but is approximately twice the price of all the other pieces

Nordic Timber Grading Rules (1994) (The Blue Book)

A				B	C	D
A1	A2	A3	A4			

Guiding principles for grading of Swedish sawn timber (1960) (The Green Book)

U/S (Unsorted)				Fifth	Sixth	Seventh
I	II	III	IV	V	VI	VII

Grading for strength

If you are doing structural building work that will be subject to inspection by the local building inspector, you will need to use timber that has been strength graded.

A grade mark looking something like this should be stamped on all structural timber.

'LOGO' is the logo of the regulatory body to whose standards the company grading the wood is operating: 0000/0000 is the grader and/or company reference: WPPA is the species or group of species: BS 4978 and EN 14081 are the British and European standards applied: DRY GRADED is the timber moisture content condition: SS is

the visual grading standard and C24 is the strength class.

Softwood is assessed and graded for strength by reference to a 'grading standard' using visual inspection. Characteristics such as knot-size, distortion and other abnormalities that can affect strength are taken into account.

The standard used for grading in the UK is EN 14081-1. Timber can also be graded by a machine which measures the stiffness of the timber.

LOGO	0000/0000	WPPA
BS 4978		SS
EN 14081	DRY GRADED	C24



PHOTOGRAPH COURTESY OF WIKIPEDIA COMMONS

The eastern white pine is a member of a family of trees that produce very tough, even-grown timber, which is suited to furniture-making, among other things

Common defects to look out for

The main defects to look out for when buying softwood are knots, shakes, cupping and bowing, waney edge, encased bark and resin pockets. Knots occur where branches join the tree. Live knots are firmly attached to the wood and unlikely to fall out, dead knots, however, usually occur where a branch has died and the tree has grown around the bark of the branch, which may cause the knot to loosen or fall out. Shakes are cracks or splits in the timber which can occur either while the tree is growing, during felling or as the timber dries. Cupping and bowing are changes in the shape of the board as it dries due to variations in the stresses within the timber. Cupping is where the cross section is no longer a true rectangle while bowing refers to bending or twisting in the length of the timber. Waney edge is where the edge of the log, either with or without the bark still attached, forms part of the edge of the board. Encased bark is where damage to the tree has occurred and the tree has continued to grow around the bark. Resin pockets consist of an opening in the grain that contains sticky resin. ■



A dead knot such as this isn't 'connected' to the rest of the board, thus rendering the whole piece liable to breakage. Knots that are clearly part of the board and not loose are stronger than this one



Check for shakes as they not only look bad they can also split even more during assembly. Allow extra material when creating a cutting list so you can get rid of defects and still have enough good material



A common sight on 'whitewood' sold in DIY stores. You can dig out resin pockets if the resultant cavities aren't going to be visible or strength compromised

PHOTOGRAPHS BY GMC/ANTHONY BAILEY

Make the right sharpening choice

Selecting the correct sharpening standard is key to getting the best out of your tools.

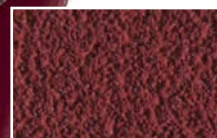
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Weave around that

Quentin Smith draws together geometric marquetry and sand-shading to produce an intricate lattice-work pattern

Before starting

This design is intended to look like a delicate open weave, so the background veneer needs to give the impression of the dark inner void of the closed box. For this reason dark burrs such as walnut or madrona tend to work better than straight-grained veneers.

Choose a piece of veneer large enough for the required panel. If the piece is at all fragile it can be useful to tape the sides as it will be handled quite a lot during construction. It can be tricky to make the design to precise dimensions, so I usually make a panel oversize and trim down to a sensible place in the pattern, taking up any

slack in the panel borders.

There are two ways of making a design fit a rectangular panel. Either prepare a right-angled weave and trim appropriately, or make the weave at a suitable angle such that it runs corner-to-corner across the panel. Whichever method you choose, the marking out procedure is the same.

Marking out

Choose the face side of the lighter veneer and mark one end with pencil or a strip of tape, then trim the long-grain edge. Tape one straightedge to the cutting mat to act as a fence and push the trimmed veneer edge up to it. Position the smaller spacers

What you'll need

- A dark background veneer, e.g. walnut burr
- A lighter, straight-grained veneer e.g. maple
- Two sizes of spacers
- Two metal straightedges
- Soldering iron or pan of hot sand
- Cutting mat, scalpel, masking tape, veneer tape, PVA glue

against the fence and bring the second straightedge up to the spacers. Cut off the thin strip, which will form our lattice. Repeat until you have prepared plenty of strips. This design always seems to need more than you think.

Cut the dark veneer a good centimetre wider all round than the final panel size required. Lightly sand the surface so that the score marks will be easier to see. Visualise the long axis of the panel and select a suitable angle for the first direction of lattice strips – 45° to the long axis is appropriate for a 90° lattice.

Hold one straightedge firmly on the veneer at the chosen angle and lightly score the veneer. Do not cut all the



Taping the edges of your background veneer will help to protect against damage during handling



The background panel with the first set of score marks made...



...and with the design fully marked out

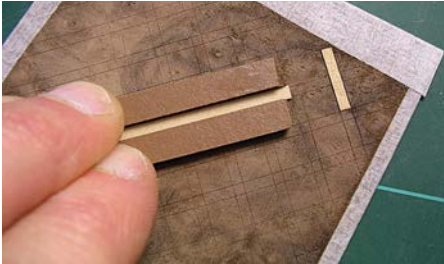
way through whatever you do. Without moving the straightedge, position the large spacers against it and carefully bring up the second straightedge to the spacers. A third hand would be helpful here. Hold the second straightedge firm and release the first. Remove the spacers and bring the first straightedge up to the second. Hold the first one firm, remove the second and make

another score. Repeat these operations using the spacers alternately, gradually walking the straightedges across the veneer until you reach the edge of the panel.

Turn the panel round and carefully align one straightedge with the first score mark made. Repeat the process to the other side of the panel, ensuring that you use the correct spacers for the

first movement so that the pattern is continuous.

Holding everything firm during marking out is hard on the fingers, so have a break before tackling the second direction. Measure the correct angle to the first score lines (90° in our case) and repeat the scoring process across the sheet, using the same spacers.

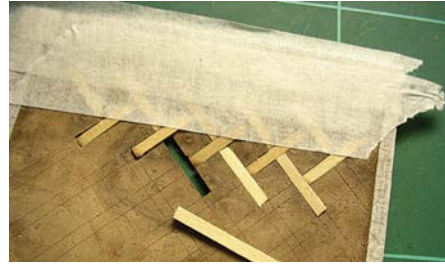


The length of each lattice segment is twice the width of the large spacer plus the width of the lattice strip

Constructing the lattice

At this stage you'll think you've done a lot and achieved little, but the groundwork is there for you to make good progress.

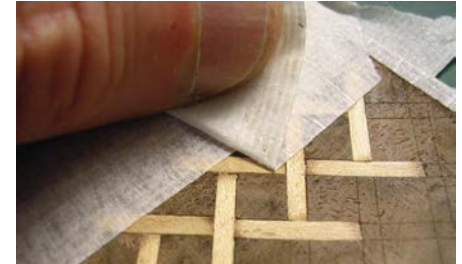
Starting at one end of the background panel, cut out a small section of narrow strip. It should not be necessary to use a straightedge – simply follow the scored line carefully. The removed piece should be two-big-squares-and-one-small-square long. Trim the end of one of the lattice strips square and push it into the hole. It should fit snugly as the same spacers were used to cut the strips and to mark



The lattice elements for each row are taped at one end, and the next row, at 90° to the previous one, is started

the background. Ensure each strip is inserted the same way up (using the reference marks we made earlier) and snip through neatly at the end. Each piece can be shaded and inserted individually, but I prefer to cut in a row of pieces at a time. I then push those through on to the board (keeping them the right way up) and shade them one after another, which I find gives more consistency to the shading.

Gently shade both ends of each piece and carefully push them back in place. I sometimes glue at this point if the background veneer is at all wavy, but otherwise I just hold the pieces in



When removing masking tape peel it right back on itself to avoid lifting fibres

place with masking tape on the face side. I only tape halfway up the pieces so that I have not obstructed the next row.

Repeat the process for the second row, which runs in the opposite direction to the first. Continue across the panel, taping each row as you go. If you haven't glued each row as you worked, glue the back after every five or so rows by rubbing in some PVA adhesive and scraping off the excess. The back can then be taped and the multiple layers of tape removed from the front before continuing construction.



I like to use the position where the lattice strips have just crossed

Trimming and gluing

Measure the size required for the final panel. You may find it useful to cut an opening this size in a piece of paper or card to help choose how to trim the lattice. It is unlikely that the lattice can be trimmed exactly to size while maintaining consistent edges, so it is easier to trim to the next tidy size down and then add a suitable size



Positioning the insert panel, with oversize edging strips, in the box recess

border to take up the slack. If the marking up was accurate, and the panel has not come apart during construction, the lattice should be nicely square. Trim to size.

Except on small panels it is advisable to protect the face of the panel with veneer tape before removing the masking tape from the back ready to glue down.



The oversize panel complete and ready for trimming

Once the glue has cured, remove the veneer tape with a little water. Scrape or sand and finish using your preferred method. I use several coats of Morrells pre-catalysed base-coat applied by brush and sanded lightly between coats, finishing with a medium sponge sanding pad which gives a satin finish similar to the rest of the box. ■

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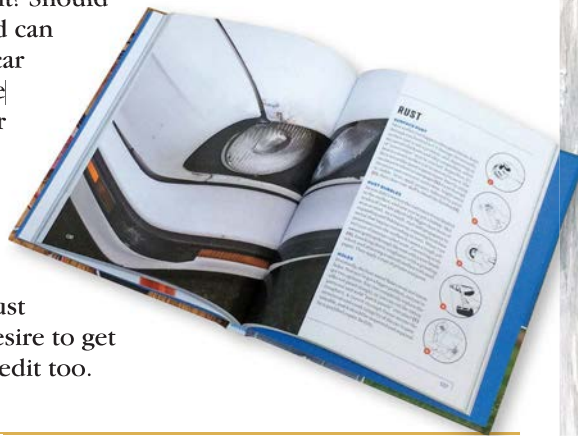
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BOOK REVIEWS

They say you can't teach an old dog new tricks but we caught *Woodworking Crafts'* very own Mr Fixit having a sneaky read of these two DIY tomes...

***Popular Mechanics 'How to Fix Anything'* – 200 home repair solutions that anyone can do**

I wish I had a book like this many years ago. It could have saved me at least a decade of aggravation trying to fix things about which I knew absolutely nothing, instead I had to learn the hard way. Although not every bit of information contained within is pertinent to UK readership, most of it is and the very act of reading and understanding helps inform decisions such as: Should I try to save my computer hard drive or just bin it? Should I really be doing plumbing work and can I avoid flooding the house? Or, my car disc brakes squeal, can I fix it? These questions and many more have their answers residing in this handy and non-threatening paperbound fund of knowledge. If you feel you are a DIY-numpty, a ham-fisted fixer or simply not clued-up rather than clueless – then this book could be just what you want to embolden your desire to get crucial stuff sorted – and take the credit too.



ISBN: 978-1-61837-260-4
PRICE: £17.99
Published by Hearst Books

Tiling Complete 2nd edition – expert advice from start to finish

by Robin Nicholas & Michael Schweit

Tiling. Hmm, tiling – not my favourite activity. There is a skill to it and mine extends about as far as a run of white tiles above a sink to stop splashes on the wall. So this fulsome publication comes as both a skill builder and a bit of a revelation – there is so much more to tiling than you might think possible. The book is split into 10 main sections – Selecting Tile; Tools & Techniques; Installation Materials; Preparation, Planning & Layout; Tiling Floors; Tiling Countertops; Walls & Back-Splashes; Grouting; Caulking & Sealing and Maintenance & Repair. Each of these sections is broken down further into numerous pages devoted to different kinds of tile, décor, patterns, cutting, trimming and fitting tiles, grouting and cleaning tiles and various speciality tiles, grouts and tools plus tile and grout repair. It includes tricky stuff such as achieving neat mastic caulking and tiling around service pipes. There isn't anything missing from this very comprehensive book which is bound to have all the answers to your tiling needs.



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Woodland ways

Woodland archaeology

If you go for a walk in the woods it may be holding many secrets, as **Gary Marshall** explains...

Site of mesolithic rock shelters

To quote Matt Pitts, erstwhile woodland adviser to the High Weald AONB: 'Woodland archaeology can be divided into two broad categories – evidence from past woodland management and evidence from other activities that happened, often before an area became wooded. This latter is very wide and includes the remains of industrial activity, boundaries and settlement sites.'

The difficulty with woodland as opposed to any other kind of archaeology is that woodlands are secret, canopy-covered, dynamic, changing, growing, rooty things.

Roots, falling trees and branches, leaf litter, burrowing animals, woodland fungi and erosion (complex in woodlands) all help to break down and heavily disguise any remains of the

past. Human activity, in a woodland setting or in a setting being reclaimed by woodland, will also be subjected to the laws of nature – in a remarkably short time.

Currently increasing use is being made of LiDAR (Light Detection and Ranging) modelling. This has enabled archaeologists to 3D map areas – even under woodland canopy. For instance, in 2008 Forest Research carried out LiDAR surveys in Somerset over wooded areas in the Black Down Hills AONB on the Somerset/Devon border. Not only did the modelling reveal greater detail of known existing wood-covered hill forts but also showed up more subtle features, such as saw pits or prospection pits.

Dry weather in years such as 1976 and 2018 led to the aerial discovery of

many archaeological sites in open areas where variations in aridity pointed to hidden foundations beneath – but not so in woodlands. Here, prior to LiDAR, archaeologists have had to look for well-hidden clues. These are just some of which I'm aware – and including those I sometimes draw attention to in historic interest bullet points in woodland management plans:

Prehistoric: Tree trunks preserved in bogs.

Mesolithic: Knapped flints and midden pits near to rock shelters and caves.

Pre-Roman: Remains of trackways – sometimes surfaced with coppiced materials.

Roman: Remains of Roman roads – embankments – 'aggers'.

Roman and medieval: Bloomeries – for roasting then smelting iron ore.
Dark ages and medieval: Hollow lanes often pre-dating settlements, pointing to 'transhumance' – the seasonal herding of stock to clearings, fields and wood pastures, often from downland areas.

Norman: Park pales – the boundaries around the old royal hunting forests and other deer parks

Medieval: Shards of pottery, slag and clinker remains in deeply cut stream valleys (gills).

Henry VII's time: First English blast furnace.

From Roman times onwards – particularly pre-industrial revolution: charcoal plats, bell pits, ponds.

All times: Quarries, marlpits, adits and shafts, wood banks, evidence of clearance, hedgelaying, pollarding
Post-industrial revolution (mainly): Enclosure, plantations, forestry – (I once found a pre-industrial billhook now restored, as well as dozens of old bottles).

First World War to 1970s: Large-scale

coniferous planting, fencing, access ways.

Second World War: Pill boxes, fortifications, anti-aircraft gun emplacements, underground HQs, concrete and hard surfaced roads and storage areas beneath woodland canopies.

Post-Beeching and post-industrial: Old railways, tramlines, inclined planes, canals, leats, wharfs and associated remains.

Today: Witches' knickers (that is poly bags caught in branches), other plastic remains and the odd fridge.

When old industries moved away, became outdated and were abandoned or quarries and mines were worked out, first grass and weed seeds sprang up, then shrub, scrub and finally woodland took over. I've visited many a wood established on old workings now providing a rich habitat for nature – but just as interesting is rediscovering the machinery, buildings and detritus of the past.

Happy responsible rooting about, all you prospective archaeologists. ■



Bog pine



Hollow way



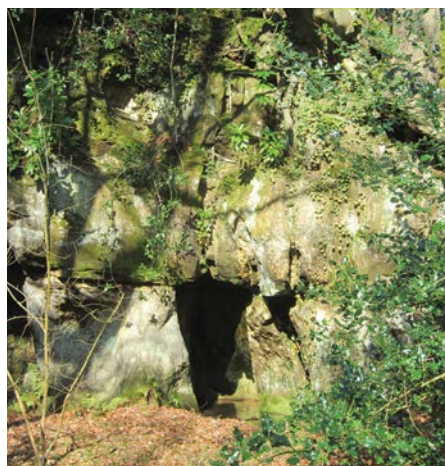
Pre-industrial revolution hammer pond



Ancient wooden trackway slats



Defunct dam in woodland



Old adit



Hopper's hut

PHOTOGRAPHS BY GARY MARSHALL

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Forsa 9.0

3.2m Professional Panel Sizing saw



Schepach Forsa Series professional panel sizing saws are distinctively German from head to toe. German technology - German innovation - German quality - and five models to choose from offering between 1.6m and 3.2m length of cutting stroke. All Forsa Series come complete with patented integral motorised cast iron pre-scoring unit whilst still retaining a 107mm depth of cut for ripping solid timbers plus micro rip fence setting to within 1/10mm. The precision sliding beam can be equipped with optional professional sliding table carriage with telescopic arm and table width extension (TWE) as illustrated. (Both included in prices quoted below.)

Forsa 3.0

1.6m Panel Sizing Saw



Forsa 4.0 & 4.1

1.6m & 2.1m Panel Sizing Saw



Forsa 8.0

2.6m Panel Sizing Saw



Model	Product Group Series	Specification Includes (as per quoted price)	Mc HP / Scorer / Volts	Depth of cut & length of stroke	Price Exc VAT - Plus Carriage	Price Inc VAT - Plus Carriage
Forsa 3.0 P1	Workshop	Inc Professional STC + TWE + TLE + Scorer	5.2 / 1.0 / 415v	87 mm x 1.6 m	£2,895.00	£3,474.00
Forsa 4.0 - P1	Workshop	Inc Professional STC + TWE + TLE + Scorer	6.5 / 1.0 / 415v	107 mm x 1.6 m	£3,895.00	£4,674.00
Forsa 4.1 - P1	Workshop	Inc Professional STC + TWE + TLE + Scorer	6.5 / 1.0 / 415v	107 mm x 2.1 m	£3,995.00	£4,794.00
Forsa 8.0 - P3	Professional	As Illustrated above	6.5 / 1.0 / 415v	107 mm x 2.6 m	£5,420.00	£6,504.00
Forsa 9.0 - P3	Professional	As Illustrated above	6.5 / 1.0 / 415v	107 mm x 3.2 m	£5,575.00	£6,690.00



The Editor's toolbox

Part III

Finally the **Editor** has completed his go-anywhere toolbox

Where I started out two issue ago – wanting to create a personalised toolbox that would hold my tools securely and neatly – and where I have ended up are somewhat different. The final result is a helluva thing, not lightweight but tough, and very neatly ordered inside and I've learnt a few lessons along the way...

BASE SECTION

The largest and heaviest objects reside here. The planes, chisels, mallet,

marking gauge and so forth. The planes were easy enough to place but the chisels posed a problem to fit and the mallet and marking gauge were even worse – but ingenuity solved it.

1 I decided the planes would be held in position by accurately cutting pieces of dowel screwed in place through the base of the toolbox. Two pencil marks indicate roughly where to drill so the dowel would fit closely to its respective plane.

2 Drilling off-centre was all too easy, but had the advantage that once screwed and glued in place with Titebond glue, there was just enough time to turn the dowel for the best possible fit without trapping the plane.





3 The corner and mid blocks are 5mm higher than the dowels holding the planes in place and are there to support the mid deck of the toolbox. Unfortunately this one was preventing the largest chisel from lining up with the others.

4 I used a pull-saw to cut from the outside of the case until it went mostly through the block on the inside. That way I could overcome the problem of cutting away the bottom offending section.

5 Now for a small dozuki pull-saw with a hook tip which could make the final cut without slicing through too much of the toolbox. It was a simple job to chisel out the bottom bit of block and pack the saw kerf with a thick veneer and glue.

6 I opted for five chisels, mostly narrower ones for chopping mortises and a wide one for paring. All the tips are held apart by blocks and a top cover. At the handle end the stepped block has high-strength Velcro hook-and-loop with a cover piece that needs some effort to pull upwards so the chisels cannot fly out.

7 Originally I chose a lovely ebony marking gauge, but I found I still had this brilliant gauge made by Colin Sullivan for sister magazine *Furniture & Cabinetmaking*. He gave me this one – the twist lock makes it really quick and easy to use. The marking point is an old gramophone needle.

8 This really was a case of holding disparate objects neatly in place. To

the left, the round mallet and marking gauge are held with a turnbutton, while in the centre my baby squirrel-tail plane is held under the diagonal Velcro-covered strip, as is a medium-weight Warrington pattern hammer and my wheelbrace.

9 And that's how it works, a bit of cogitating was needed to fathom this motley collection out but it all fits neatly, including the diamond plate lapping fluid at bottom right, held yet again with Velcro.

10 The completed base section. The tape rule clip slides on to a bent metal bracket and the side knob for the wheelbrace screws into a hole drilled at the bottom right of the case. Things seemed to be going well so far...

MID DECK

The mid deck has all the mid-size lighter objects that don't belong in the lid or the base. Some of them were quite awkward to fit in place and I resorted to old-fashioned tool clips, which worked really well. The deck has two finger holes so it is easy to lift out.

1 On the mid deck certain things, such as the bit set which works with the Stanley Yankee screwdriver via an adaptor – were naturals for being held in place with Velcro. Various other items certainly weren't and I needed some creative thinking.

2 The diamond plate was quite heavy, despite its composition core. It had to fit very securely, I found offcuts of uPVC panel from our bathroom refit. With the tablesaw blade set low I cut some slim H-sections that would hold the plate in position.

3 A perfect friction fit, the plate could slide out and be turned over to change grades. The plate could also be used in position it was so firm. Note the corner posts on the mid deck – these press against blocks in the lid so the mid deck cannot move around when the case is closed.

4 Another piece of uPVC, CA-glued to the deck, accepts the clip on the knife body. Every space is a place to be filled. I hoped I could get everything in the toolbox that I wanted there.

5 A vintage profile gauge made in Japan, with Velcro to keep it held in place. Likewise the cabinet scrapers and burnisher pouch to the right.

6 Instead of a rather crude pair of pincers, I invested in a Japanese-made restorer's cat's paw. The flared end prises things carefully apart and

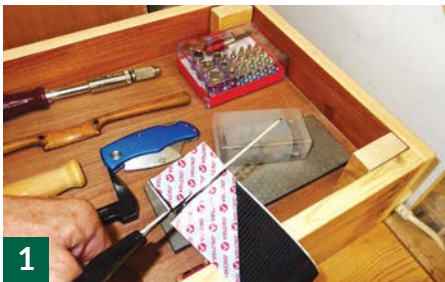
the other end can lift out nails – very handy to have.

7 Instead of a standard drawknife I opted for a Morakniv which does the same thing but takes up less space. A good, sharp blade for shaping tasks.

8 This vintage Eclipse honing guide fits neatly into spring tool clips, like most of the other tools on this mid deck.

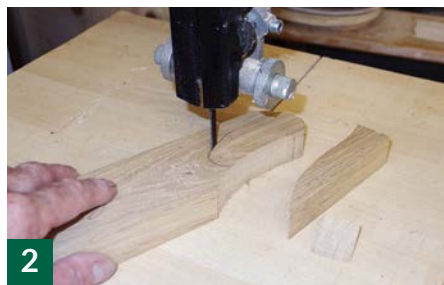
9 The essential finger holes to lift the deck in and out. They had to go where there were spaces left for them. The underside had round-overs done with a small cutter in a router trimmer for comfort.

10 This was an awkward deck to lay out but it is a success and a slim gap in the middle now takes a carpenter's pencil fixed with Velcro. ➤





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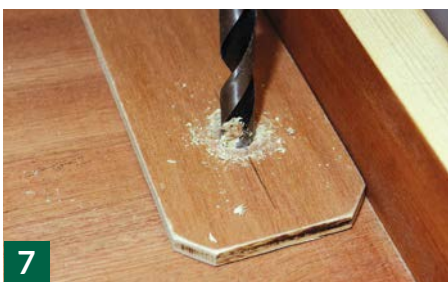
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INSIDE LID

The lid is dedicated to flat objects such as saws and try squares, etc. It seemed an easy one but it entailed both shaped blocks to hold some things and magnets for others. The first job was laying everything in the correct place so it all went in neatly.

1 The handsaw handles would be held on shaped blocks with shaped turnbuttons. The sharp ends of the saws would need securing as well.

2 A quick job on the bandsaw and then sanding on the disc sander and wood file. All exposed edges were 'broken' with abrasive paper to make them comfortable.

3 The Adria dovetail saw turnbutton and, to the right, the flip-out steel rule sits on several round magnets.

4 The corner block that holds the saw blade and keeps the mid deck from floating needed to be bevelled on the underside so the Adria blade could slide in and out.

5 The large ebony and blued steel try square has its own turnbutton. To the right the flushcut saw is held with magnets but this corner block had to be shaped to accommodate the handle.

6 The Turbo saw for ripping has a turnbutton, of course. To the left the baby boat level is held by a cup hook that is turned to release it.

7 Inserting 8mm dia. magnets entailed very slow drilling to make shallow holes for the magnets to sit in. CA glue was dribbled into the holes and each magnet quickly placed and

levelled using a flat, plastic block before it, too, got stuck in place.

8 The flushcut saw is simply plopped in placed and it is held fast by the tiny magnets.

9 The large pullsaw is also held by rare earth magnets, which are surface mounted with CA glue. Note the use of a shaped ply pad to make up the difference in thickness between the blade and handle.

10 For smaller marking out I always use an accurate engineer's square, but its weight needed four magnets for security.

11 Everything in place, including a Japanese marking knife completing the lid fitout.

CASEWORK

As my ideas about this toolbox developed it seemed like using flight-case hardware and case-covering material was the way to go. Except instead of the thin, hard, compressed board used for heavy-duty flight cases, mine was made of much thicker wood. That created problems of its own and it was where the learning curve got steep, but it worked out in the end.

1 22mm aluminium case edging extrusion would cover the rough edges of the case. The arrises and corners would need trimming to ensure the aluminium would fit tightly.

2 A block plane was used to bevel all the edges and corners prior to covering the case.

3 When I bought the flight case hardware I also bought textured vinyl covering. Originally I was going to paint the case, but that didn't make sense – messy, slow and vulnerable to damage, where this stuff is designed for a hard life and quick to apply.



4 A special contact adhesive comes with the vinyl and is applied evenly all over the wood. This is best done outdoors because of mess and solvent fumes. Clean up is done with white spirit.

5 I should have cut the panels undersize so the edges were bare, then the aluminium angle could be bonded to the wood. Trimming back was quick to do though.

6 The vinyl came folded and there were several areas where the fold patterns didn't want to lie down, so a heat-gun on medium heat and a small veneer hammer did the trick.

7 To cut the aluminium angle I used Trend double-sided jig tape to mount a batten with a bevelled edge on the compound mitre saw. The aluminium sat tightly and I checked the fine-tooth blade was in good order. All cuts were at 90° to avoid changing set-up. Safety glasses were worn because of the risk of flying metal fragments.

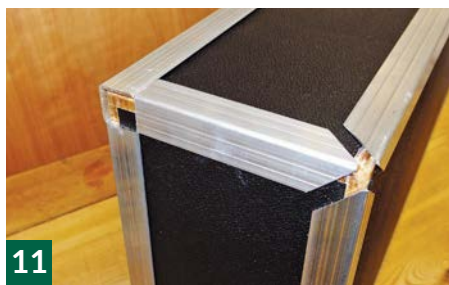


8 Where the corners met I used metal shears to trim at 45°. The corners did not have to need to meet as the pressed steel corners with their rounded internal profile had to sit tightly.

9 As a convert to Gorilla glue, I put my faith in it again, running a bead inside every piece of angle before pressing in place. Longer lengths were lightly clamped to avoid them springing away.

10 I hadn't quite sorted out the lid corners in my clever plan. This was my way of bringing the aluminium angle to a neat meeting on the open face of the lid. ➤





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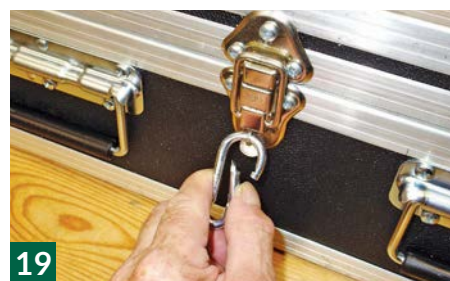
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11 This is how it looked on the lower part of the case. The gaps look alarming but aren't relevant as the steel corners cover them.

12 The lid corners had to fit over the brackets. I tried metal drilling with a standard drill bit but it was hopeless. However, I had a 5mm dia. Trend TCT bit, which can go through cast-iron, steel or aluminium.

13 The base corners were less troublesome to do. When drilling I had to stop immediately the drill tip broke through the metal, to avoid going straight through the wood.

14 The completed case minus hinges and latches. The base and back needed rubber protective feet added so the screws wouldn't scratch surfaces.

15 I used household rubber E-seal strip to seal the lid to the base when closed. It peels into two strips and comes with adhesive backing.

16 The hinges are a lift-off pattern that avoids getting strained when the lid is opened. The lower part was drilled and screwed in place, then

the lid pressed to compress the E-seal before marking the holes for the upper hinge part.

17 Two sprung, flight-case handles had to be fitted to the front between the three catches known as 'drawbolts'. The handles had to be bolted on because of the weight, which could tear screws out.

18 Where the nuts were inside the case they had to be hidden below the surface so they would not contact the planes. I did a heinous thing and ground through a 3D bit shank so the cordless drill and bit would fit inside the case to make the nut recesses.

19 The centre drawbolt is larger than the outer two and rather than using a padlock for security I decided to use a snap hook instead. That way the case can't come open unexpectedly. ■



Case closed!

Suppliers

www.flightcasehardware.co.uk
www.flightcasefittings.co.uk



This toolbox is an unprintable weight, but I found this frame from a shopper trolley which it fits on perfectly and allows it to climb stairs – brilliant!

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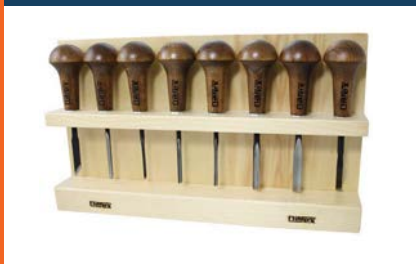
New Products



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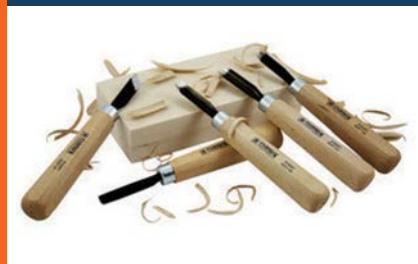
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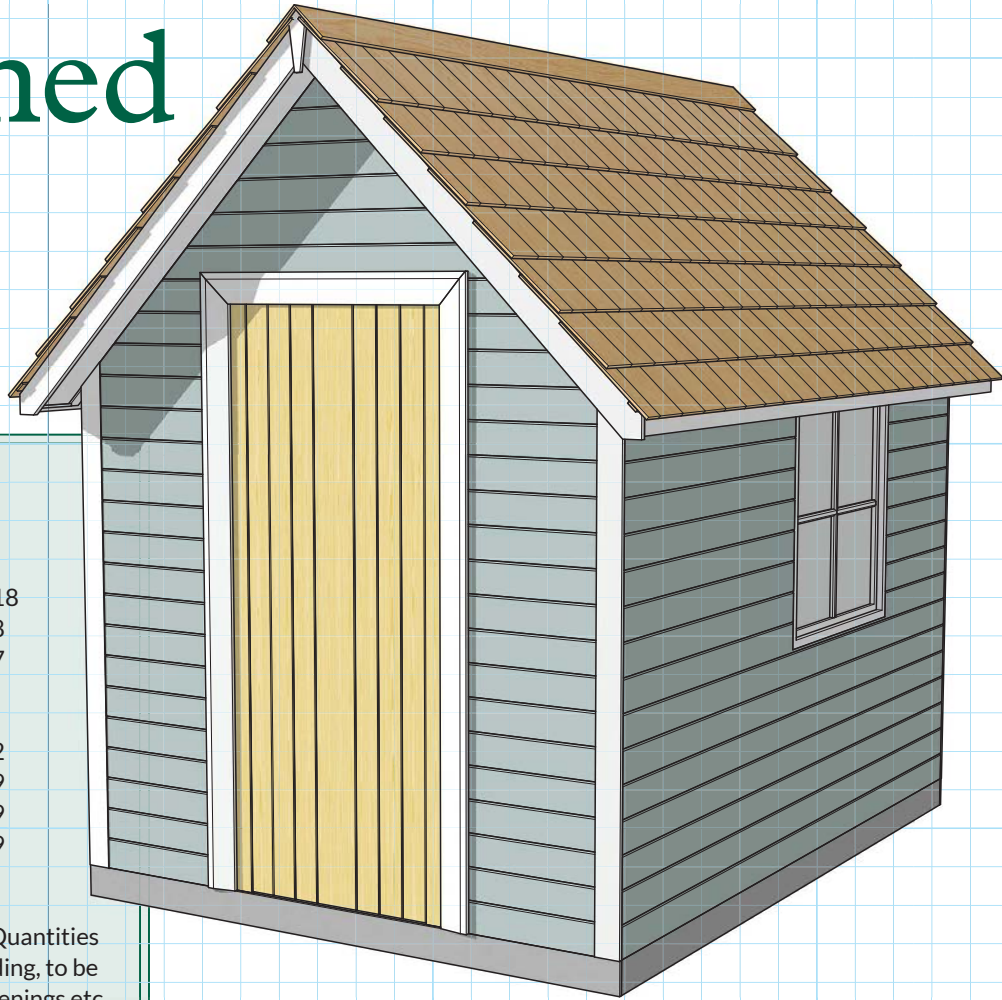


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PLANS 4 YOU

A tiny shed

Simon Rodway wanted a special little hideaway at the bottom of his garden



Cutting list

Floor joists	6 @ 2028 x 94 x 47
End joists	2 @ 2871 x 94 x 47
Floor	2 @ 1220 x 2122 x 18
Floor	1 @ 431 x 2122 x 18
Rafters	10 @ 1705 x 75 x 47
Barge boards	4 @ 1771 x 94 x 22
Fascia	2 @ 3111 x 75 x 22
Ridge board	1 @ 3111 x 150 x 22
Roof sheets (AREA)	2 @ 3111 x 1668 x 9
End walls (AREA)	2 @ 2780 x 2028 x 9
Side walls (AREA)	2 @ 2777 x 1680 x 9
Cladding corner strips	4 @ 1896 x 75 x 22

Note: Only major components are shown. Quantities for studwork, roof covering and outer cladding, to be taken from drawings and will depend on openings etc. Wall areas are given as a total and allowance needs to be made for openings and angled area of end walls.

If you have ever watched “Shed of the Year”, and I freely admit to being a huge fan, then you might have had thoughts of building something a bit special yourself at the end of the garden or some other available space; a shed that’s a little bit more than just somewhere to put a few garden tools. So, if you don’t have a design in mind that you are burning to see built, this month’s project might just fill that space and give you a small building that combines practicality with looks that belie its modest size.

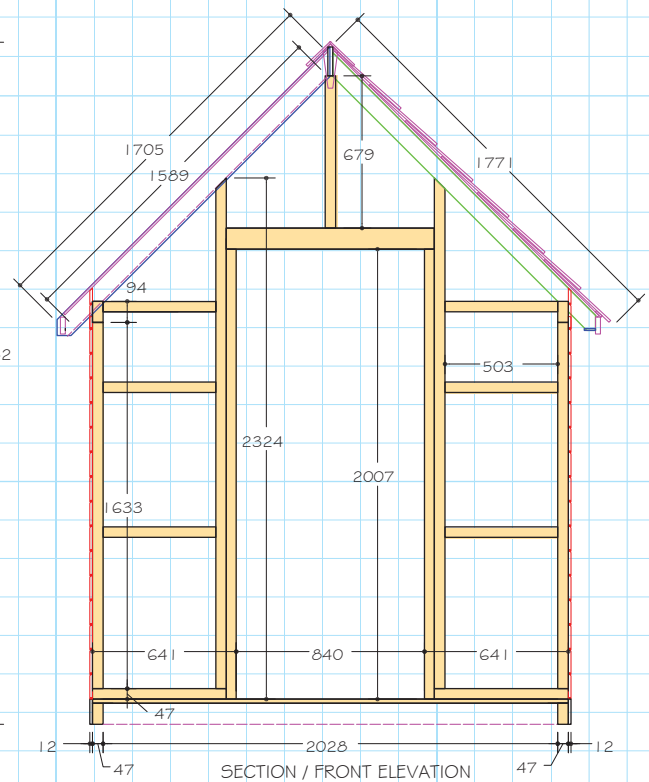
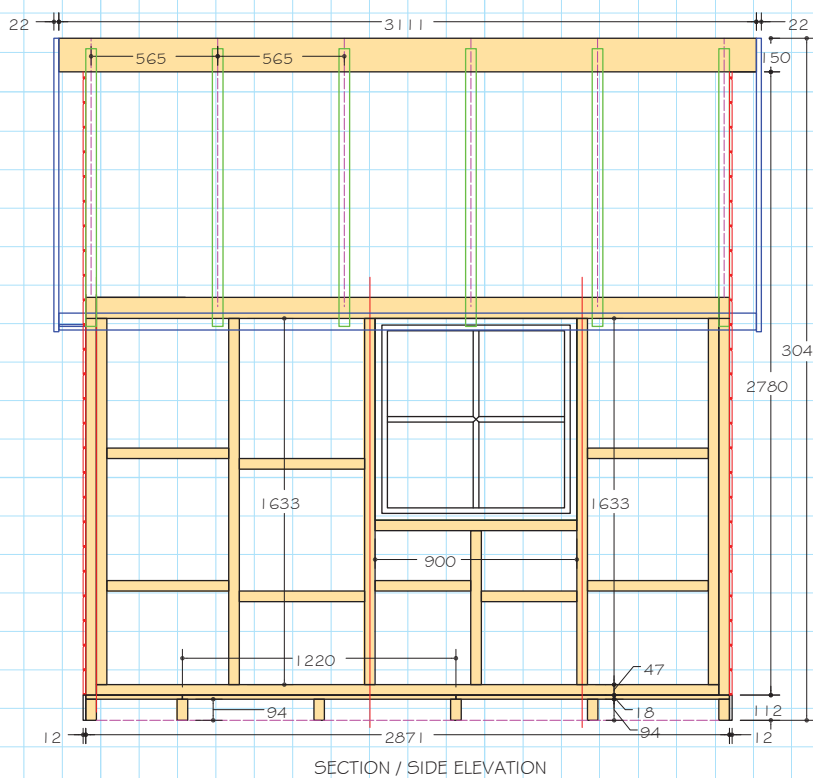
As always, one of the trickiest things with a garden building like this is preventing rot at the bottom. A well drained base will help. A timber bottom frame, with joists running laterally across the shed should have a fibre board cladding all round to form

a plinth. The boards could be fixed with screws to make them removeable so that the timber can periodically be treated with a wood preservative. An 18mm plywood floor is screwed down onto the top of the base frame, then directly onto this a studwork frame of 47mm square section treated timber to form the walls. The larger section of 94 x 47mm pieces are at the head of the side frames, projecting into the end frames to pick up the rafters, which are birds-mouthed over this top piece and fixed to a ridge board at 45 degrees pitch.

On top of the rafters, sheets of 9mm ply are fixed. I have tried to space the floor joists, the vertical studs and the rafters to take account of each and every joint between the plywood sheet, and wherever possible to allow for

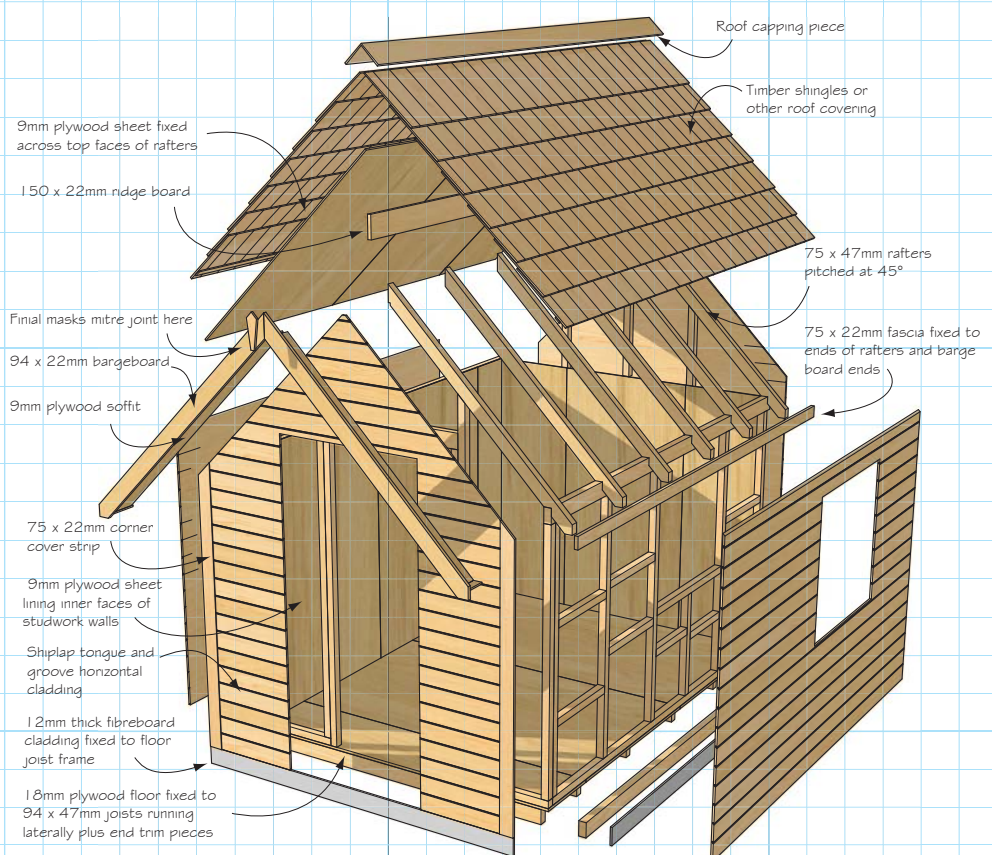
a full sheet width of 1220mm to avoid unnecessary cutting, so if you vary the length or width of the shed, you will need to take this into account. The roof covering is your choice: there are many options available and I’ve shown timber shingles, with a capping piece along the length of the ridge.

On one side of the shed is a window, which I’m assuming will just be bought in, and you will obviously need to adjust the opening for this in the studwork wall to suit. The same applies to the door, which is also an “off the peg” item, and this has additional framing around the opening carrying a lintel of 94 x 47mm timber. The two end walls which are also made from 47mm studwork are essentially planted onto the ends of the side walls. These end walls have an angled top edge which is finished



by joining to the bottom faces of the end rafters. A central vertical stud is needed to pick up the ends of the ridge board, which is projected about 120mm beyond the end walls to form the apex of an overhang on the gable ends. Barge boards are then fixed at the top to the ridge board and at the feet to a fascia board with runs along the length of the shed and is fixed to the ends of the rafters, a classic but simplified timber roof construction, in other words.

The outer cladding for the walls is horizontal shiplap tongue and groove, nailed to the studwork. In the absence of any kind of soffit to close off the space between the rafters you will have carry this up to the underside of the 9mm ply roof covering, cutting and fitting sections of shiplap between each rafter. An angled soffit between the barge boards and the shiplap will finish off the gable end overhangs and a shaped finial hides the mitred joint of the barge boards. Internally the walls are lined with 9mm plywood up to the head of the side studwork, and full height to the ridge at the ends, with an architrave trimmed around the doorway as the finishing touch. ■



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PER ISSUE



Tricks of the trade...

Sub-tables

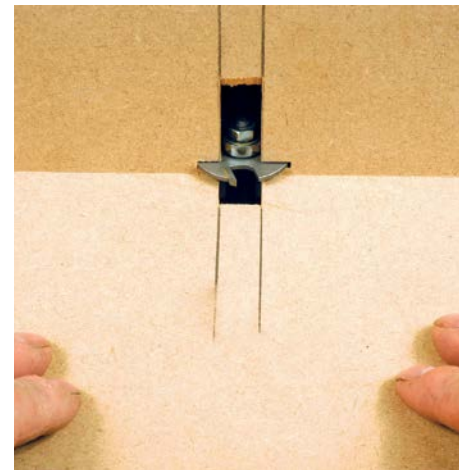
This movable mitre-cutting jig holds the moulding safely and accurately, minimising breakout underneath

If you don't support those small workpieces, don't be surprised when they break up and disappear from view

Sub-beds, sub-tables, sub-fences, break-through fences... they all perform an important function – work support. Smaller sections being fed through the router table, bandsaw or tablesaw will all come to grief if not properly supported. Machine manufacturers supply their saw and router tables with insert plates that are an apparently sloppy fit, so any reasonable-size blade or cutter will fit without contact, and to allow for tilting the blade in the case of a saw. However, we often want continuous support, especially for slimmer or smaller sections that can 'chatter', break up or simply disappear down the

side of the cutter already scarred by unexpected contact.

Sub-beds and sub-fences are easy to make from MDF and can be clamped in place, although adding a glued-on batten can help locate it. A sub-bed doesn't even have to be a fixed item as it can slide in the mitre slot on a saw or router table while giving close support to the workpiece. On a router table you can complete the support process for small sections by creating what is known as a 'tunnel' – which is exactly that. Sized to match the sections being machined, it gives safe all-round, chatter-free support for consistent and reliable results. ■



A sub-bed and a sub-fence give continuous work support – no catching by the workpiece and shielding most of the cutter, making it safer



To complete the technique a tunnel has been clamped in place, holding the workpiece safely without 'chatter'



This sub-bed is useful because bandsawing often produces small pieces of waste wood that get trapped beside the blade

“We design and build woodturning lathes that become an extension of the turner’s creative spirit.”

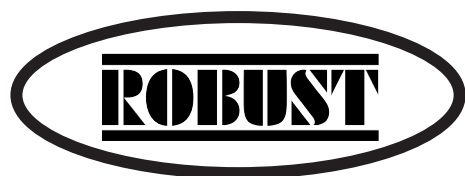
Brent English-Owner of Robust Tools



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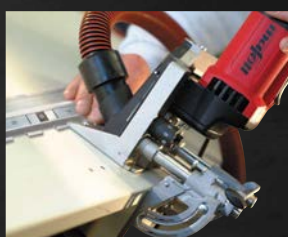
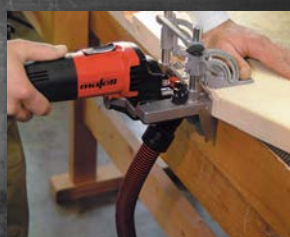


DD40 Duo-Doweller



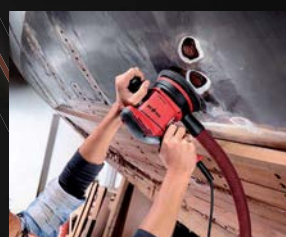
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Andy Bailey, Furniture & Cabinet Making.



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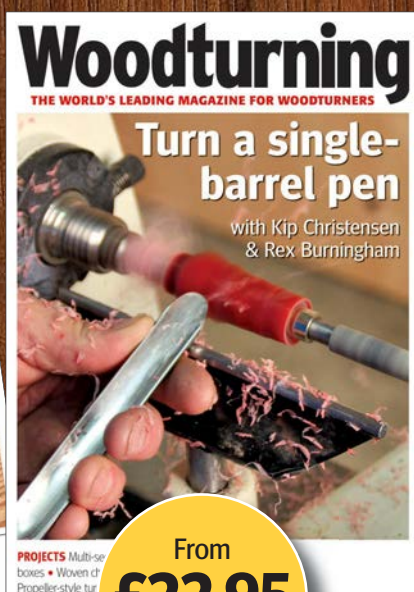


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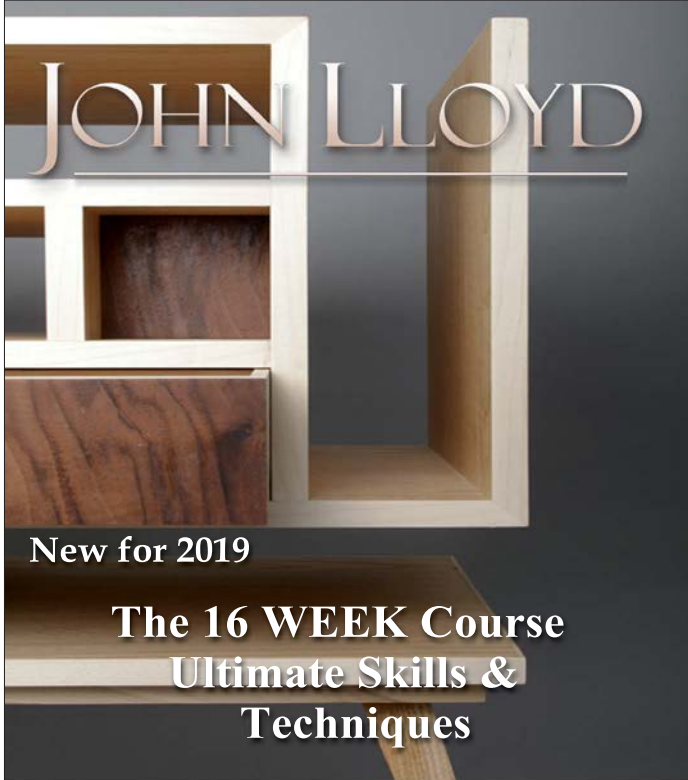
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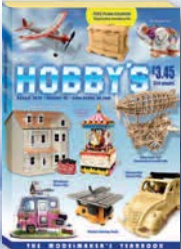
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Focus on...

Police boxes

Finding an old police box is so unusual it is quite an arresting sight...

Before mobile communications came into being the police box fulfilled a valuable role, allowing members of the public to call for help using an emergency landline phone. The first police box was introduced in the United States in 1877, while in Great Britain they were to be found all over the country by the 1920s. They came in different types, from cast iron to wood to concrete, and in different shapes. All of them featured an emergency phone behind a small door with instructions on using the phone. The pattern most people of an older generation remember is similar to the Tardis seen on *Doctor Who* but without the high-tech interior.

It was a place for a policeman to rest, write up notes, contact his local police station or even temporarily detain a prisoner. There would be a stool, an incident book, fire extinguisher and first aid book available. The blue light on top would flash to summon police officers when the alarm was raised, as beat officers only had a whistle to summon assistance from other officers.

The first examples were hexagonal, red-painted cast iron with a gas lamp on top, introduced in Glasgow in 1891. The first wooden shed constructions were built in Sunderland in 1923 on the orders of Chief Constable Frederick J Crawley, who saw them as a miniature police station where the public could seek assistance from all the emergency services. Gradually they spread to many northern cities. The Metropolitan Police introduced them between 1928 and 1937 with the best-known design created by the Met's own surveyor and architect, Gilbert MacKenzie Trench, in 1929. The first batch of 43 had wooden sides and a concrete roof. The later versions were made entirely of concrete for



Above: A sour-faced sergeant (re-enactors)

Right: The Tardis police box at BBC Television Centre

durability but they were cold and damp compared to the wooden variety, even with an electric heater.

By 1953 there were 685 police boxes in Greater London, plus 72 smaller police posts. Between 1923 and 1960 police boxes were adopted by most provincial police forces with the design and construction at the discretion of each force, thus there were various different patterns all over the country.

Although the concept of the police box fell out of favour with the advent of modern communications, there are still some to be found, often saved and repurposed (see *WWC36 Edinburgh Tool Library*).

Places to look include: Glasgow; National Tramway Museum, Derbyshire; Kent Police Museum, Chatham; City of London 'call posts' and next to Earls Court tube station.

Time warp

The concept isn't entirely lost, Glasgow introduced computerised kiosks in 2005, Manchester has help points with a siren, Liverpool also has help points with CCTV and Boscombe in Bournemouth has an old-style police box opened in 2014 with yellow phone, security cameras and defibrillator.

To find out more visit Wikipedia – 'police box' ■



A decrepit police box in Covent Garden



1920s design with pediment-style roof and split panes

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