Woodturning

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Woodturning 317

"With large blanks mounted you can use the variable speed control to keep the machine stable and vibration free...Would I recommend this lathe? Yes without a doubt, it's well designed and built to a high standard."
Online Review

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Online Review

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Brent English - Owner of Robust Tools and Turner's Edge

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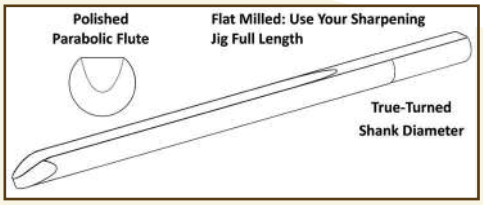
Turner's Edge is manufactured by Robust Tools. Our first entry into this product line is a 5/8 (16mm) bowl gouge. Limited quantities are available now. Look for other offerings through the summer and fall of 2019.



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For the love of timber

PHOTOGRAPH BY ANTHONY BAILEY/GMC PUBLICATIONS

It is interesting that many young people do not know what they really want to do when they leave education. I think that comment would apply to many of us.

I think I've mentioned in the past that I had two things I loved and wanted to work within. The dominant thought was to be a geochemist, the secondary, albeit only slightly behind the primary option, was to be able to work with timber. Various home and life factors saw me go down the working with timber route and I have not been disappointed with that choice in any way whatsoever.

I was fortunate that my schooling included art, metalwork, woodwork, technical drawing, domestic science and – wait for it – needlework among the science, languages and other things we needed to do. Just to let you know I did well in most of them and we stopped having some of the subjects from the age of 14 so we could concentrate on some specific subjects. Some we chose to do and others we had to do. I think on the whole we had a very rounded view of education.

Sadly, the craft subjects are often no longer taught in schools as individual aspects and I, like many, believe that people are missing out. How do they know they will like metalwork, woodwork or other subjects if they do not try them? Grrrr! Don't get me started on this – it winds me up. Anyway, many of my relatives worked with timber and I have to say that the material and the ability to shape and construct with it fascinated me then and even more so today.

I was recently asked what my favourite timber was and that foxed me a bit. After thinking about it for a while, I decided there is a timber that stands out for its ability to be used for many items, cut cleanly, be available in large sizes, ease of drying, ability to take detail and colour well, and can also exhibit amazing figuring. The timber I would choose is sycamore (*Acer pseudoplatanus*). Bland and boring some people call it, but I disagree. We all want to have the visual wow factor, but for sheer variety of what can be done with it, what it can be used for and pleasure of working it my choice has to be sycamore. Don't get me wrong, I love all of the timbers, for various reasons – I have had the opportunity to work with hundreds over the years. I can't say that some haven't been nasty and difficult to work with. Some I would call foul, but I have loved them for that too. If all were as easy to work with as sycamore, things would be very bland. I love a challenge and whatever we make throws up challenges but, no matter what, I still love working with timber.

Let me know what your favourite timber is and why. I have asked this before, but maybe thoughts have changed and you have come across a new favourite since you last thought about it. We have access to a huge variety of timber species and it can be bewildering and expensive when selecting timber to work with, but it is all a wonderful part of the journey that is working with wood.

Let me know what you have been making. Have fun, Mark

markb@thegmcgroup.com

COVER IMAGE: Andy Coates (see page 34)

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can all be found on www.woodworkersinstitute.com. These all appear on the magazine homepage and you can see a bigger selection by scrolling down the page and clicking on the individual stories. We also have an extensive online archive for you to browse, or see us on Facebook & Twitter.

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HEALTH AND SAFETY

Woodturning is an inherently dangerous pursuit. Readers should not attempt the procedures described herein without seeking training and information on the safe use of tools and machines. All readers should observe current safety legislation when turning and wear appropriate personal protective equipment (PPE) and respiratory protective equipment (RPE).

Party popper cannon

Colwin Way shows how to make an explosive toy

I've always said when asked where I get my inspiration from that it's the people I meet and the places I go to through this wonderful woodturning journey. The project for this month is no exception and has been inspired by a demonstration I once watched at the Irish Woodturners Guild's annual seminar. It was by one of the best demonstrators and teachers of the craft, Eugene Grimley. Eugene is well known for his demonstrations and to my knowledge manages never to repeat the same demo twice. Anyway, watching him turn and eventually fire his party popper cannon was hugely entertaining and left me completely inspired to have a go when I got back to my own workshop.

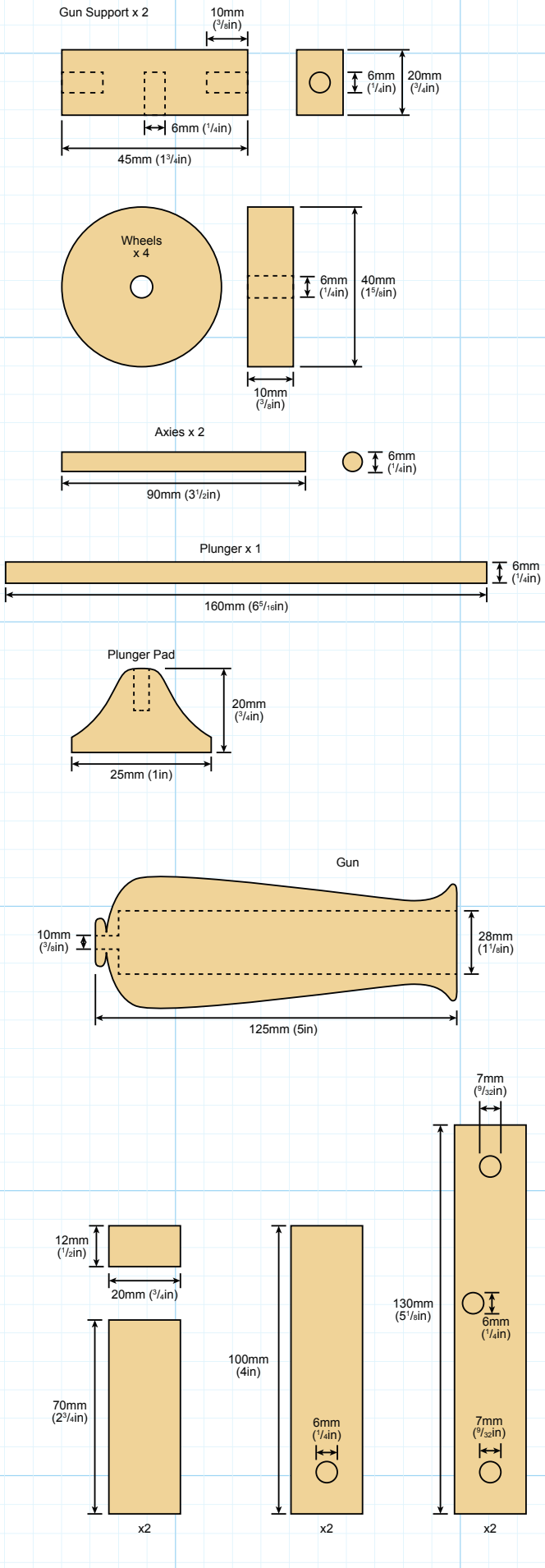
It was a wet and windy day in the Easter holidays, my youngest son was eight at the time and was bored, so I suggested we go to the hobby shop and pick up something we could make together. After having a good look around the shop and coming away uninspired I suddenly remembered Eugene's demo. 'Party popper cannon,' I excitedly screamed at my son. His ears pricked and his eyes lifted and through a smirk he said: 'CANNON!' We went back into the shop and grabbed a huge bag of party poppers.

When we got back home we looked at images of cannons, printed a few off and busied ourselves in the workshop. We firstly decided on size only restricted by the party popper itself, then how many wheels – two or four – then what timber, before we finally started cutting and preparing materials for the lathe. I have to say that my son made the cannon completely by himself with me there to advise and ensure all things health and safety were done correctly. The joy of firing the cannon for the first time was a little overwhelming. As I watched him pull the string I thought he was going to explode with excitement himself.

This was a real memory-making moment which we still talk about. This inset picture shows his creation.

Image of the cannon made by my son and I

PHOTOGRAPHS BY COLWIN WAY



TOOLS AND MATERIALS

- Personal and respiratory protective equipment (PPE & RPE)
- Skew chisel
- Thin parting tool
- Bowl gouge
- Chuck
- Drive spur
- Revolving tailstock centre
- Drill chuck
- Pillar drill
- 28mm sawtooth bit
- 7 & 6mm drill bits
- Rule
- Square
- Pull saw
- Brass brush
- External callipers
- Dividers
- Drilling clamps

MATERIALS

- Timber of your choice to make the project
- Bag of party poppers
- Quick-set epoxy adhesive
- Abrasives down to 320 grit
- Finish of your choice

HEATH & SAFETY

Party poppers propel their contents at speed. Always read the manufacturer's usage instructions supplied on the packaging and never aim or fire the popper cannon in anyone's direction.

The cannon body

1 For this cannon I decided to use one of my favourite timbers, oak (*Quercus robur*), but you can use a suitable hardwood of your choice. All the dimensions are on the line drawings page but to drill the hole for the party popper available to me – other makes might have a different diameter requirement – I'm using a 28mm sawtooth bit.

Just a quick bit of info if you didn't know already, sawtooth bits are for drilling end grain such as in this case whereas Forstner bits are designed to cut side grain and burn and struggle through end grain.


1

2 While drilling the hole, hold the piece of timber in your four-jaw chuck. Centre up the end to drill and bring the tailstock up to this point while tightening the chuck to ensure the drilling is done dead on centre. If you have a swivel-head machine it's worth doing a kiss test first to make sure the head and tail are aligned.


2

3 The party poppers I used were 25mm(ish) in size, hence the 28mm drill bit so check yours before going with the 28mm drill bit. Once the hole is drilled, double check the tightness of the chuck and soften the end of the cannon as this will be the last time you can get to this area. When you've put a radius on the end, sand this area.


3

4 The main 28mm drill bit should be drilled through leaving 10mm at the end undrilled, this section should then be drilled through using a 10mm drill. This will be to take the neck of the party popper. Again, check and measure your poppers before choosing the drill size. This hole also needs to take the string as you feed it though.


4

5 The cannon is supported with a friction drive or light pull centre in the headstock running though the 10mm hole, and a live tailstock centre in the tailstock. This centres the cannon around the holes you've drilled and keeps everything firm on the lathe. You can now start to shape your cannon. Cut a maximum depth line with a parting tool to ensure you don't cut into the centre hole, then shape the cannon to your desired shape.


5

The cannon mount

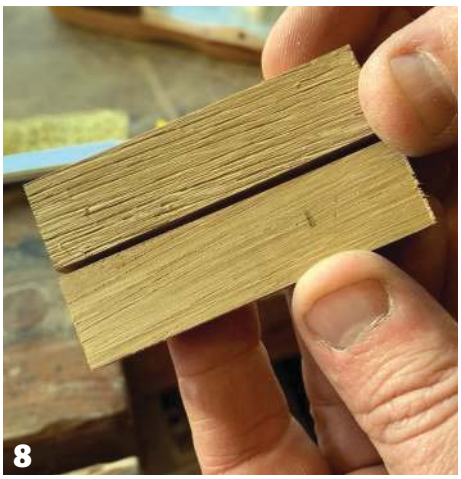
6 For the cannon mount/stand I am once again using oak. Mark out your sizes ready to cut. Lay them out to get the configuration you like then cut them out remembering how many you need of each size.


6

7 For these small projects a small pullsaw works really well and under supervision can be safe enough to let children use instead of using powered saws. Put a piece of scrap wood down before cutting to protect your workbench and saw.


7

8 Once cut, give them a sand on all the corners and edges to soften them a little. Also, to make the timber look weathered, brush them with a brass brush. You can see here the difference it makes, especially on timber such as oak.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9 You can now glue these pieces together ready for drilling. Use an epoxy glue to get a quick dry time. Here I'm using a five-minute set time. Mix a small amount of resins together and put a thin layer on the timber, avoiding the edges so you don't get excess glue squeezing out when pressed together.

10 This is what the base pieces should look like so far, all glued up. It's worth going over them again with the wire brush to clean off any glue overspill. Now these pieces are dry they can be drilled through using your pillar drill. The holes to fix the gun mounts on to are 6mm but the holes for the axles are 7mm to enable the axles to turn.

The plunger

11 On to the plunger to feed the party poppers into the cannon. Measure the hole in the cannon and take off 1mm. This will be the outside diameter of your plunger. Using your chuck hold another piece of oak and turn down to a cylinder.

12 Using your callipers and a parting tool cut the finished diameter of your plunger before drilling a 6mm hole 10mm into the timber. Now you can shape the plunger top to a concave shape but slightly rounded over into the hole you've just drilled.

13 The handle for the plunger can be turned, however I've used a piece of 6mm dowel which is cut to length and then inserted into the hole in the plunger. Give them both a sand before parting off and sanding the plunger face on a disc sander or piece of abrasive laid flat on the work bench.

14 Don't take the waste wood from the plunger out of the lathe, instead turn it into a drive to turn the wheels in a moment. Turn the piece of timber down to 15mm diameter and flatten the face, leaving a small hole in the centre about 3mm in diameter. You can simply do this with the toe of the skew and it is only there in case the tailstock centre needs something to sit in when turning the wheels.

The carriage wheels

15 To make the wheels, prepare your timber to the correct thickness, which in this case is 10mm. Mark them out using a set of dividers or a compass, leaving enough timber between the wheels to cut them out easily.

16 Here are the blanks cut ready for the wheels. Because you used a set of dividers there's a neat centre hole ready for drilling. As the blanks are so small it's safer to cut them with your pullsaw, which might take a bit longer but will allow the youngsters to help if you are working on this as a joint project.

If you do not want to turn the wheels, you can buy them. Wooden wheels are available in a variety of sizes so you can scale the project up or down accordingly. Truthfully, wheels are nice to turn and it gives some repetition and accuracy practice that is always desirable to learn techniques.

17 Now your blanks have been cut to near size, you can drill the hole to fix them to the cannon's axle. This hole will also be the means to hold the blanks on the lathe ready for turning. Make sure that you either clamp securely or hold in a vice when drilling.

18 To hold the blanks on the lathe I went to the waste from the plunger that we prepared earlier. It is always advisable to use scraps and offcuts of wood rather than waste them.

In the tailstock use a standard pointed revolving tailstock centre through the 6mm hole previously drilled in the wheel blanks and push the blank on to the waste, which will now act as a friction drive. Make sure the wood is secured between the two centre and the friction drive, then shape as required. I chose to leave plain wheels, but you could make them more fancy which may require you to flip the wheel over and turn both sides.

19 After you've turned all the wheels give them a rough sanding and once again weather them by brushing with a brass brush. Again, for little fingers it will be worth holding the wheels in a clamp to do this.

Assembly

20 To hold the two sides of the gun carriage together and to support the gun you will need two further bits of oak measuring 20mm x 45mm x 12mm. These will need to be drilled in three places – one hole at either end and one in the middle. To see exactly where follow the line drawings. Again, such small pieces will need to be held in a vice for safety.

21 So here are all the pieces you should have ready for assembly. The axles and joining pins are all made from bought 6mm beech (*Fagus sylvatica*) dowel, but if you really wanted to then you could turn these sections.

22 To join the gun to the gun carriage you will need a couple of holes drilled into the gun. The distance between the holes is the same as between the two holes you drilled in the gun carriage sides, so easy to work out once you have these pieces in your hand. The picture shows the gun held in a V-block for drilling. If you drill too far and go through don't worry too much – as long as the dowel doesn't go through and interfere with the party popper then there's no problem.

Dry fit and testing

23 So there we are. The cannon is dry-fitted together and being primed for its first fire. The plunger is absolutely necessary and not just for show as the popper is a good fit. It does need to be in order to generate the force to fire.

24 This project is a great bit of fun to share with those close to you. I hope you enjoy building yours. Thank you for the memories Eugene and for allowing me to pass them on. ●


17


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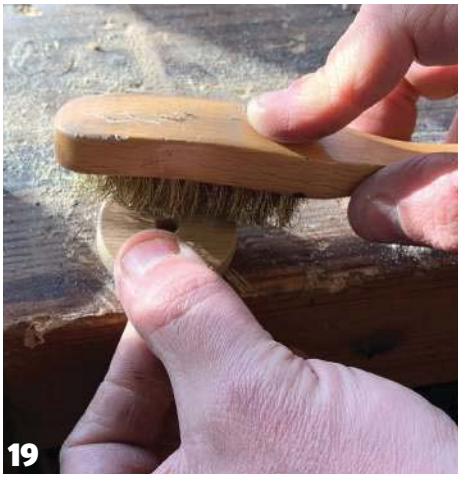
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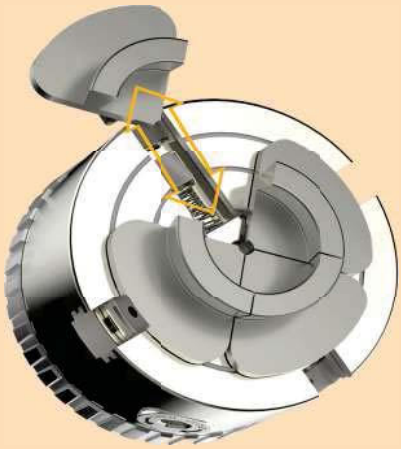
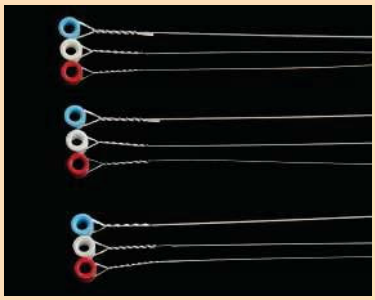


TURNING TOOLS AND ACCESSORIES FOR MAKERS



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Community news

We bring you the latest news from the world of woodturning and important dates for your diary

We try to give accurate details on forthcoming events. Please check with organisers for up-to-date information if you are planning to attend any of the events mentioned.

SHOWS AND EVENTS

Kent Woodturners Exhibition & Sale
When: 8-16 June 2019
Where: North Barn, Aylesford Priory, Kent, ME20 7NX
Web: www.kentwoodturners.com/exhibition

Snainton Woodworking Supplies – Woodturning Demonstration by Sue Harker
When: 15 June 2019
Where: Bakers Lane, Snainton, Scarborough, N Yorks, YO13 9BG
Web: www.snaintonwoodworking.com

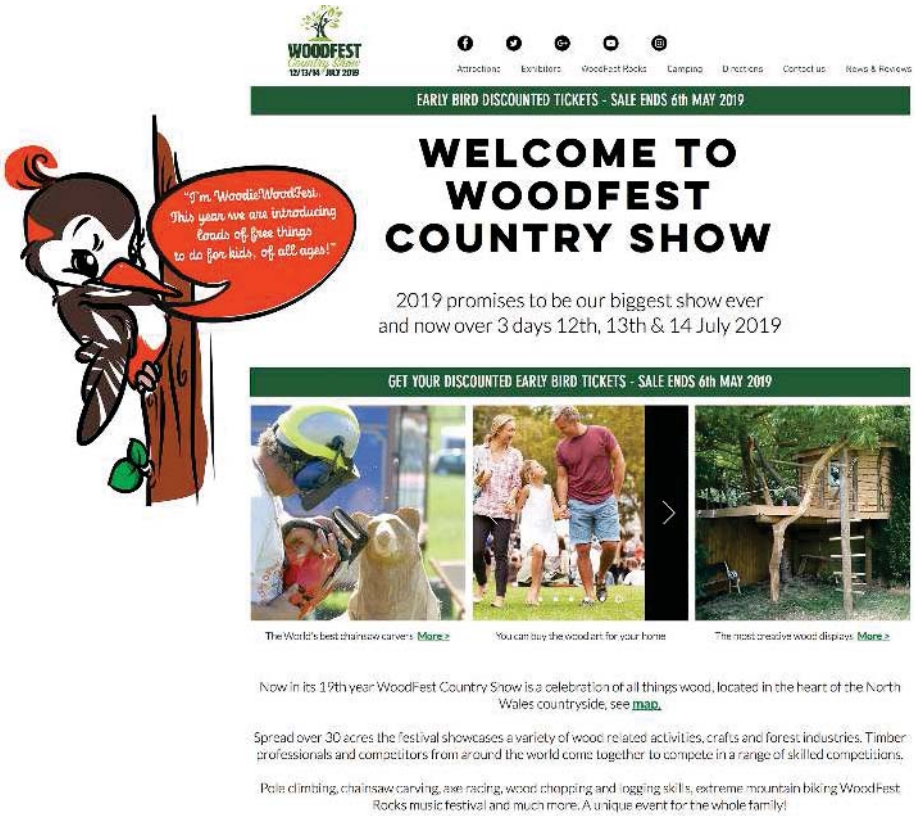
Henfield Contemporary Craft Show
When: 22-23 June 2019
Where: The Henfield Hall, Coopers Way, Henfield, West Sussex, BN5 9BD
Web: www.thesussexguild.co.uk/sussex-guild-events/henfield-contemporary-show/

Handmade Oxford – The International Contemporary Arts Festival
When: 27-30 June 2019
Where: Waterperry Gardens, Waterperry, Oxford, OX33 1LA
Web: www.handmadeinbritain.co.uk/events/handmade-oxford

AAW Symposium
When: 11-14 July 2019
Where: Raleigh Convention Centre, 300, Salisbury, Raleigh St, NC27601, USA
Web: www.woodturner.org

Woodfest Country Show
When: 12-14 July 2019
Where: Pen-y-cefn, Caerwys, North Wales, CH7 5BP
Web: www.woodfestcountryshow.co.uk

Chestnut Products' Woodturning Weekender
When: 3-4 August 2019
Where: Springfields Event & Conference Centre, Spalding, Lincolnshire
Web: https://chestnutproducts.co.uk



Snainton Woodworking Supplies Open Day
When: 10 August 2019
Where: Bakers Lane, Snainton, Scarborough, N Yorks, YO13 9BG
Web: www.snaintonwoodworking.com

Celebration of Craftsmanship & Design
When: 17-26 August 2019
Where: Thirlestaine Long Gallery, Bath Road, Cheltenham, Gloucestershire, GL53 7LD

Yandles Woodworking show
When: 6-7 September 2019
Where: Hurst Works, Hurst, Martock, Somerset, TA12 6JU
Web: www.yandles.co.uk

Rocky Mountain Woodturning Symposium
When: 14-16 September 2019
Where: The Ranch, Larimer County Fairgrounds, 5280 Arena Cir, Loveland, CO 80538, US
Web: www.rmwoodturningsymposium.com

North of England Woodworking Show
When: 15-17 November 2019
Where: Hall 1, Great Yorkshire Showground, Harrogate, HG2 8NZ
Web: www.skpromotions.co.uk

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Red gum burr vessel

Andrew Potocnik creates an interesting lidded vessel from a delightful Australian timber

PHOTOGRAPHS BY ANDREW POTOCNIK

Some time ago I saw an image of a ceramic piece that consisted of a pale lower form capped with a dark upper. To cut a long story short, the image lingered in the back of the 'cranial computer', begging for a way of being converted into a wooden vessel when, in a moment of illumination, I saw the light and realised my normal view of natural-edged forms could be flipped.

Various design options that came to mind drew me to burr caps on a plain-grained vessel with the natural edge of the burr facing up, much like a natural-edged bowl. Then the penny dropped – flip the burr and use the natural edge as a form of wandering 'skirt' that contrasts with the clear grain of the vessel. Now why hadn't I thought of that in the past several decades of turning?

Sometimes the obvious is just so obvious that traditional thinking and use prevents our minds from thinking of an alternative perspective. Maybe turning images of things that inspire us or catch our attention should be rotated a quarter or half-turn to change how we process elements that attract our eye, then we could identify exactly what it is that appeals to us and develop designs based on the new vision we have acquired.

Once I'd had my eureka moment it was time to scour my stash of treasures to find wood best suited to this project.

Focus on red gum

- **Red gum:** *Eucalyptus camaldulensis* & *Eucalyptus tereticornis*
- **Grows:** Australian mainland
- **Average dry weight:** 825kg/m³ – 890kg/m³

There are two distinctly different types of red gum in Australia, forest red gum (*Eucalyptus tereticornis*) and river red gum (*Eucalyptus camaldulensis*) which is the species used in this project, and that which grows prolifically in my neck of the woods. Because of its previous abundance it was used for fence posts, railway sleepers and house stumps, all due to its resistance to rot and termites. However, while it is a beautiful timber and rich in colour, I find wonderful working qualities that are wasted, both in use and in pricing, if it's only processed into dried, furniture-grade material.

River red gum heartwood is red to reddish brown with sapwood of up to 40mm wide, which is yellow in colour. The wood's texture is relatively fine and even with grain that is often interlocked producing an attractive ripple or fiddle-back pattern, however gum veins can often be found. Shrinkage is about 2.5% radial, 8% tangential. It is also described as being 'very dense and does not float'.

The tree is a medium to large hardwood found adjacent to most rivers of mainland Australia. It is the most widely distributed of all eucalypts in the continent but thrives mainly in Victoria. However, it strangely gains its botanical name from a private estate garden near the Camaldoli monastery near Naples.

Red gum grows over a wide range of climatic conditions from warm to hot, sub-humid to semi-arid with the mean maximum temperature for the hottest month in the range 27-40°C and the mean minimum for the coldest month around 3-15°C.

It can stand long periods of flooding, something that maintains the wellbeing of river red gum forests. The trees generally grow in open areas where they tend to spread rather than form a long trunk that is usually short and thick. The tree is commonly up to 20m tall but occasionally up to 45m, with a trunk diameter most often 1-2m and occasionally up to 4m, living to an estimated age of 400-600 years.

Unfortunately, the species does not enjoy a positive reputation throughout the world, especially in countries where it has been introduced as a plantation tree, intended to help the local community and environment. Its high ability to tolerate extreme conditions such as drought and soil salinity, coupled with prolific seed production, potentially rapid growth and the ability to reproduce at a young age contribute to its ability to become invasive. It has therefore been declared an 'invasive species' in a number of countries, including South Africa where it colonises watercourses. Other areas to list it as invasive include Pakistan, Bangladesh, Spain, California, Hawaii and Jamaica. Fortunately it can be harvested for furniture-making uses or as a fuel in developing countries.

Uses in the past have generally included flooring, sleepers, heavy furniture, decorative turnery, panelling and fence posts. However, now it is appreciated more for its fine woodworking qualities. I find the wood turns very well, takes all types of finishes easily and carves to a fine surface, providing you use sharp tools. Its hardness and dense grain allow for fine detail both in turning and carving.

Besides the standard health risks associated with any type of wood dust, no further health reactions have been associated with river red gum.

Red gum is a favourite of mine simply because I have access to both air-dried and 'green' material. I source most seasoned wood from fence posts, while fresh wood is available after storms or from arborists' trimmings, which are considered necessary in suburban areas. When turned green the wood has a rich red colour which I find can be retained providing you sand through to final grades of abrasive then allow the finished bowl to distort as it dries. Kiln-dried material is now available for furniture making, elevating the status and commercial value of this fantastic timber.

Clear red gum. One sanded plain timber & one part oiled

Quilted red gum

Fiddleback red gum

Burr red gum

Black-stripe red gum

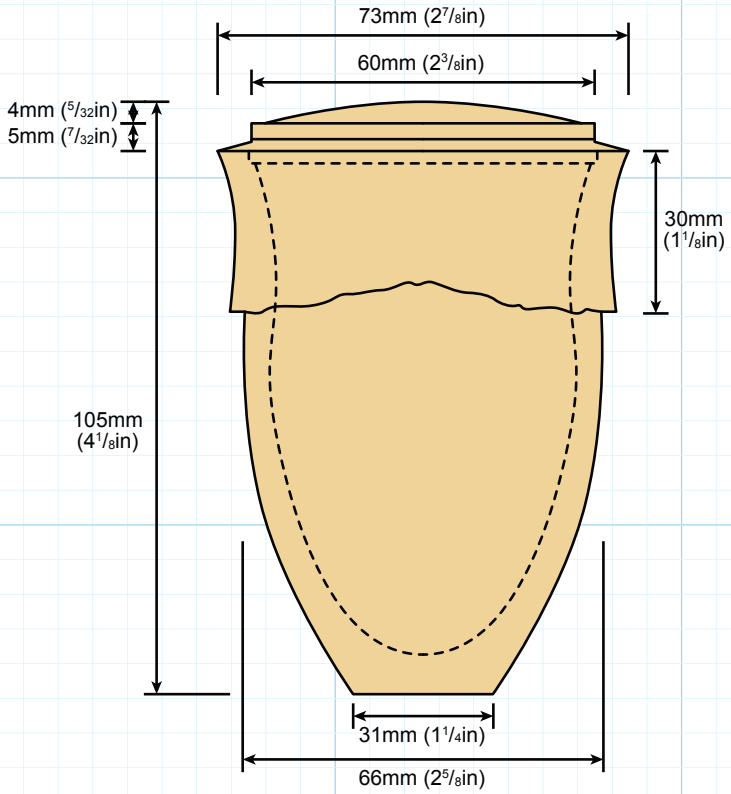
Ancient red gum

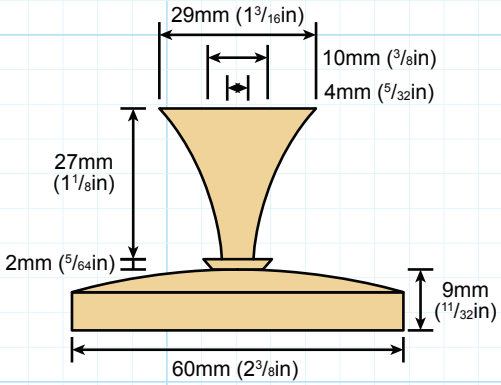
TOOLS AND MATERIALS

- Personal and respiratory protective equipment (PPE & RPE)
- Spindle roughing gouge
- Bowl gouge
- Spindle/detail gouge
- Parting tool
- Round-nosed scraper and granny tool scraper
- Skew chisel or pointed scraper
- Chuck
- Drive spur
- Revolving tailstock centre
- Callipers
- Fine-toothed saw
- Drill chuck
- 3mm drill bit

MATERIALS

- Timber of your choice for the main body and natural-edge/burr-edge section for collar
- Abrasives down to 320 grit
- Cyanoacrylate adhesive (CA)
- Epoxy resin
- Finish of your choice





MAIN BODY

1 For this project I've used air-dried wood from my favourite source, fence posts, which are generally cut to about 70mm x 120mm sections.

Mount your timber between centres. Check everything is secure and then, using a spindle roughing gouge, Create a cylinder of timber of a uniform diameter just over the size required for the main body. Check that the corners of the wood do not foul the rest before starting the lathe .

2 For those new to turning, the flute of the spindle roughing gouge is rolled over and should always point in the direction of travel. The cut occurs on the lower wing, just past the bottom of the flute and not at the bottom of the flute.

3 Once the timber has been turned down to a cylinder you'll need to cut a tenon to suit the chuck you'll mount it in using a parting tool. You could use a beading and parting tool to achieve the same result.

4 With the cylinder reversed and mounted in a scroll chuck, the outer form can be created. Keep the tailstock in position as long as possible to prevent your wood from moving if you have an accidental catch as you trim the form's base in preparation for hollowing. I used a fingernail-shaped bowl gouge to shape the outer form, however you could achieve the same result with a spindle gouge.

If required, use a scraper to refine the form without cutting the base section too fine as support is needed when hollowing the box's interior.

5 Depending on tools you have available and feel comfortable using, hollow the interior of the form. I used several tools, beginning with a 10mm bowl gouge, followed by a carbide-tipped hollowing tool and then a shear scraper of a suitable shape to clean up the inside.

6 It's always important to provide ample support for the tool you are using and sometimes the toolrest needs to fit inside the opening of the form you're working on. In this case the opening was about 60mm in diameter, so the toolrest I used had the underneath edge ground away to allow it to fit deeper into the form. There are various configurations of toolrests made by manufacturers but when all else fails, if you have the capacity, make your own, just as I did.

7 Upper areas of the shaped form can be sanded through to 320 grit, which is my chosen level, and then a finish can be applied to areas that will later be covered by the collar. I prefer to use a wipe-on, wipe-off polyurethane finish, but the choice is yours, providing you take into account surfaces that will later need to be glued and an appropriate finish is used.

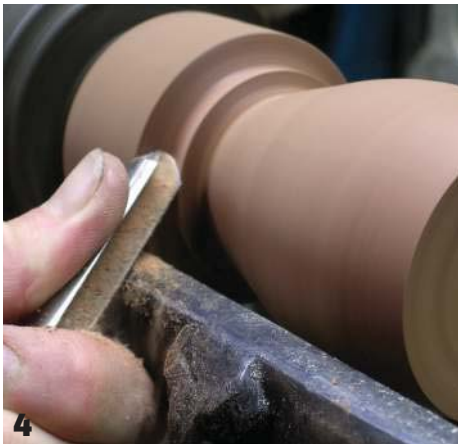
THE COLLAR

8 Now for the collar. Choose material according to how it will look when turned upside down. Cut material and trim off corners. I used a bandsaw, but you can use handsaws to remove material that may cause problems in the roughing process for inexperienced turners.

9 To achieve a fairly even underside to the natural-edged profile of the collar it's best to secure it between a drive spur. This one has a short head and is held in the chuck jaws. Secure it in place with a revolving tailstock centre.

10 Check the irregular-shaped timber does not foul the rest and then turn it to the required diameter. Then cut a tenon that suits the capacity of chuck jaw you have.


3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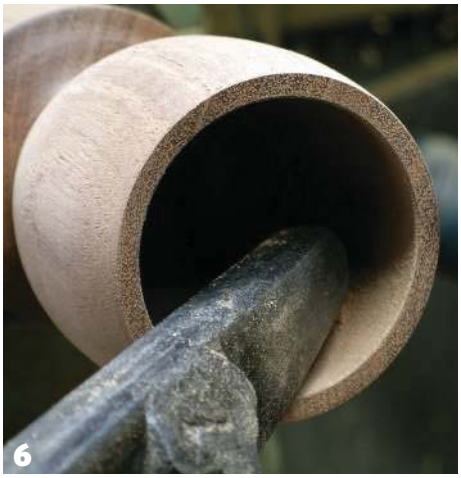
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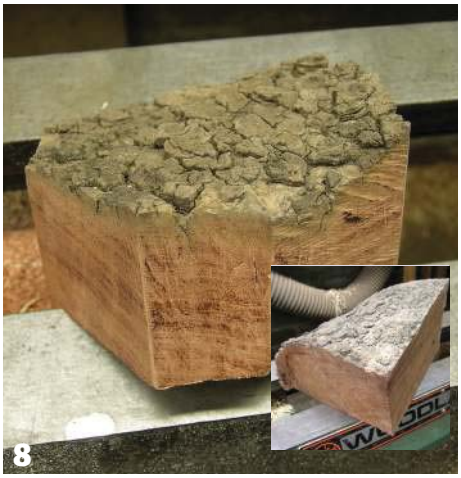
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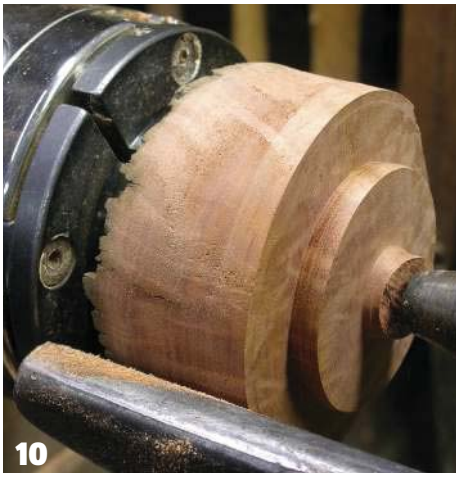
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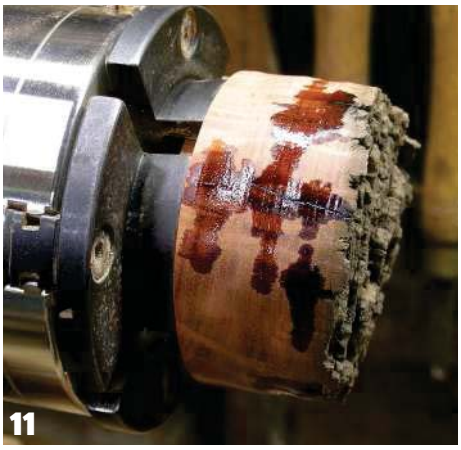
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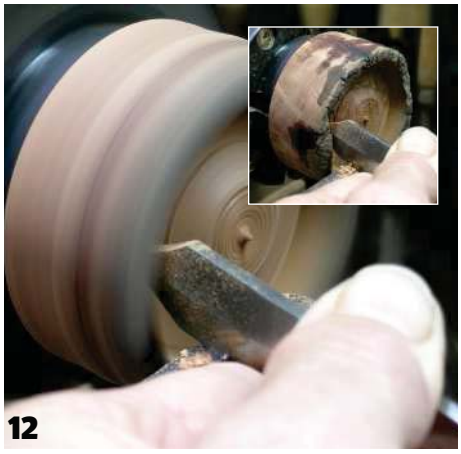
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11 Reversed and ready for further shaping, I noticed cracks in the wood that needed bonding before working with it. I used thin, runny CA which gets sucked into cracks well beyond where the eye can see, which is great for these situations. Always be careful of damaged timber and check that it is safe to turn. Work at a much lower speed than normal and if there is any doubt about the integrity of the wood not holding together, don't use it.

12 Left overnight for the glue to set I could cut the interior recess that allowed the collar to fit over the main body of the container. I used a sharpened parting tool to neatly cut both the sides and base of the recess so both parts meet perfectly.


13


14

13 Before you head off for the day, don't forget to run some CA glue into cracks exposed in turning the inside of the collar. In case you're working with burrs that are not riddled with cracks, you'll be able to speed the process up and spend more time on other projects.

14 I like to think two steps forward whenever I can, just like when driving a car, to solve problems before they arise. For this reason I apply finishes to components before they are assembled, and here I advise to apply a finish to the vessel section that the collar partially covers. After allowing the finish to dry you can bond the vessel and collar. I used two-part epoxy glue holding the collar in position with the tailstock centre pushed into the centre mark left from the roughing stage so it sat true.


15


16

15 Once the glue has set you can trim the collar down to its final shape and reduce material from the right-hand side to create visual balance to the collar's height and diameter. I roughed it with a fingernail-shaped bowl gouge, followed by a round-nosed scraper. During the process a few more cracks were uncovered and needed a bit of attention with more CA glue.

16 Keeping the tailstock in place for support for as long as possible, waste material was turned away until I broke through the collar and was able to trim it down then blend it into the existing interior form with gouges and finally a scraper.


17


18

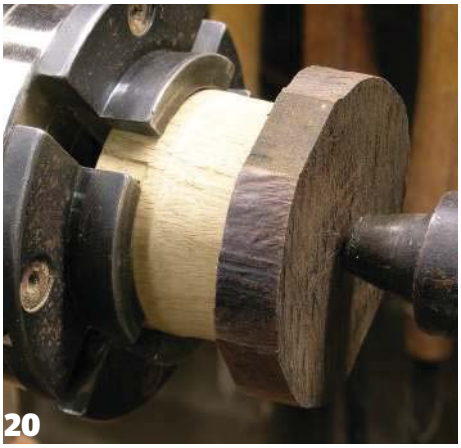
17 The collar is ready for sanding, inside and out, but it's worth keeping in mind when making hollow forms how far your fingers can reach inside the inner surface so it can be sanded appropriately without wearing away the webbing between your fingers. I generally work my way through grades of sandpaper ending at 320 grit.

18 A small recess is needed for the lid to sit in. I used a granny tooth scraper which is ground on the left, front and right of the protruding 'tooth'. You could use a skew laid flat on the toolrest or a parting tool pushed directly into the collar.

With your 320 grit sandpaper held diagonally across the opening, lightly remove sharp edges of the cut recess. Once sanded, apply a finish while it's easy to wipe on and wipe off.

19 Reversed on to a chuck fitted with Cole jaws, I finished off the base of the container. You could use a jam chuck. Use support from your tailstock revolving centre for as long as possible while finishing off the base and only remove it to clean off the last teeny bit of wood with the lathe stationary. Remember, the work us being held by the collar, which is only glued to the body of the container so you are relying on the quality of the glue joint. Always err on the side of caution, even if it takes a little more effort or time, rather than rush something and break it or lose it off the lathe.


19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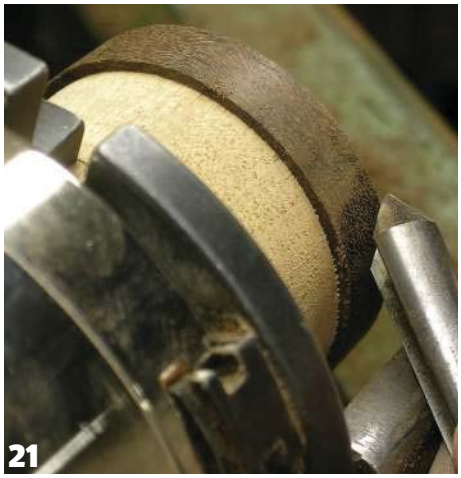
THE LID & FINIAL

20 To begin the lid I glued a piece of ancient red gum – wood that has been submerged in mud and water and darkened to various shades of black, just like bog oak – to a carrier held in a scroll chuck.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22

21 Trim the lid down to its final size I used a bowl gouge. A shearing cut or scrape will clean up the edge nicely. Because I opted to use side-grain wood that would fit into an end-grain collar, I wanted to reduce sanding, so the cleanest cut off the tool and negligible sanding was necessary. Generally I would use end grain for the lid so alignment of all grain is similar in the vessel, collar and lid. However, in this situation I wanted to exploit the colour and quilted figure of the timber.

22 Once the wood is turned to size and sanded, the underside of the lid can be shaped and sanded. I like to cut a couple of V-grooves to add detail to the surface and break the form visually. A skew laid flat on the toolrest or a three-point tool will work well for this.


23


24

23 & 24 To complete the upper surface of the lid fit a scrap of wood to a chuck and turn a jam-fit carrier using the granny tooth scraper used earlier. You will notice that I drilled a hole through the centre of the carrier, which will later allow me to insert a padded dowel through the base of the chuck and push the lid free of the carrier. Turn the lid to shape, sand it and cut a crisp V-line to create a visual border. Once done, drill a centre point that will later accept the finial that I feel is needed on a container of this type. You could drill this hole on a drill press or by fitting a drill bit in a drill chuck inserted in the tailstock. I used a 3mm centre drill.


25


26

25 Much thought about a suitable finial or handle for the lid led me to a natural-edged form that tapers down to a thin base, echoing the curve of the collar. Personal tastes vary, as do abilities to create finials. Some may opt to top tall boxes with elongated finials, some may prefer squat forms, while others may choose to just do away with anything more than a domed lid.

26 All components were finished with a coat of wipe-on, wipe-off polyurethane, You can use what finish you like and, once dry, the finial is glued into place. Then it, along with the lid, is fitted into position ready for placing on the display. ●

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Kurt's clinic

Kurt Hertzog gives some answers to readers' questions

CBN wheel

Question: I'm going to buy a CBN wheel for my grinder. Which would you recommended – 180 grit or a finer, higher grit?

Regardless of the wheel media, the grit size is imparted on the steel of every tool it touches, creating the serrated cutting edge

The reasons to select a CBN wheel over AlO2 is the lifetime without dressing and, depending on the type of wheel selected, the ability to grind safely on the side face as well as the front

PHOTOGRAPHS BY KURT HERTZOG UNLESS OTHERWISE STATED

Answer: The grit you choose for your grinder, whether CBN or traditional aluminum oxide wheel, is really dependent on your end use and needs. Every tool you sharpen is really a 'serrated knife' edge with the serrations' pitch based on the grinding wheel grit.

Even with a fine wheel, as you note, you'll still have a serrated edge, albeit a pretty fine one. It will be excellent for putting a keen edge on your already shaped tools but will be less than ideal if you need to shape any tools. Removing a lot of stock with a fine wheel grit is a slow, tedious, and heat-generating process. If you'll only sharpen your tools, you can use a fine grit, whether 180 or some other grit in the fine category. If you need a wheel that will do shaping as well as sharpening, you probably will be better served by selecting a coarser grit. That grit could be in the 80 or 120 range – coarse enough to do shaping and fine enough to do sharpening. The grit selection suggestions are identical whether you are using AlO2 or CBN. Both wheels are identical in function. The CBN advantages are lifetime, no dressing, and possibly, side of wheel use.

Equipment needed

Question: I am new to woodturning and don't have any equipment. I'm on a tight budget and need to be very cautious about my spending. I'll probably be buying used so what should my first purchases be and what should I watch out for?

Answer: Buying used, but smart, is a fine way to get quality tools and equipment at a good price. To get started, you'll need four things. Be certain to obtain and use the necessary personal and respiratory protection equipment (PPE & RPE) – eye protection lung protection should be first on your list. Include a face shield, goggles or safety glasses along with your dust mask first.

Your lathe should be tailored as best you can to your intended turning tasks. If you intend to turn smaller items such as tops, bottle stoppers, pens, ornaments and the like, you'll do nicely with a mini or midi-type lathe. If you plan to turn platters, larger bowls, hollow vessels, furniture parts, or other larger parts, you'll need a larger floor-mounted lathe. Your measurements should be distance over bed bars for the diameter capability and the distance between centres for length of work capacity.

Unless abused, there is little that can go wrong with a quality lathe that can't be fixed or repaired/replaced. Buy a quality lathe rather than a clunker. It's a false economy to buy a low-quality lathe that won't please you and certainly will have little resale value. In addition to your key tools, you'll need a sharpening system. Don't forget this key item. If you can't sharpen tools, you'll turn all tools into scrapers and use them as such. Bad habit.

So the four key items are PPE & RPE, lathe, tools, and sharpening system. There should be included a valuable fifth item: get some instruction from a capable turning friend, turning club member, or training class. Self-taught turners rarely get too far because they don't build on solid fundamentals. Get into a class or a club or both.

There are many niceties in a turning workshop but they all revolve around the lathe, tools, sharpening system, PPE and RPE

PHOTOGRAPH BY MARK BAKER

Often overlooked by newcomers is a sharpening system. It is a huge mistake. Sharp tools and good fundamentals are key to turning

Drill chucks

Question: I want a drill chuck to mount in the tailstock of my lathe, which is a Powermatic 3520a. Looking online just made me more confused. Can you point me in the right direction?

Answer: Your woodturning retailer should be able to offer you several different quality levels of drill chuck mounted on the appropriate Morse taper for your lathe. For the Powermatic 3520a, you'll need a #2 Morse taper for both the headstock and tailstock.

Don't limit your use of the drill chuck to just the tailstock. You can use a drill chuck in both the headstock and tailstock, depending on your application. Knowing your taper needs, your next choices involve the drill chuck size and quality. For size, most chucks have a maximum-size drill shank that they can accommodate. If you'll be doing larger drillings, get a drill chuck that will accept drills in the size that you'll need. Not usually quoted but worth knowing is the minimum size drill. Most think every chuck will grip a very small drill. The larger the chuck size, the less likely it will accept a very small drill. If you need to use very small drills, be certain your drill chuck will accept these smaller sizes.

Sometimes you'll need two chucks. One large enough to handle your large drills and one small enough to do the precision drilling with small drills. Quality speaks for itself. You can buy a No.2 Morse taper drill chuck that will accept up to a 13mm drill for £15 on sale. You can also buy the same thing, more machine-tool grade, for £220 with other choices in between those prices. Choose as your budget and precision/durability needs dictate.

Selecting a drill chuck requires the taper size and the desired maximum drill shank. Notice the precision mini chuck with a collet mount

A Morse taper was never intended to provide high retraction force. Good practice requires the operator to provide this force

Send in your questions to Kurt's email: kurt@kurthertzog.com

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Three-legged bowls

Les Symonds turns a three-legged bowl from mineral-stained alder

PHOTOGRAPHS BY LES SYMONDS

Children of the 1950s knew little of the anguish and austerity of the former decade, rather, they grew up in exciting times in which the design of furniture and homewares was being heavily influenced by the early days of the space-race. Sputnik, the communications satellite, ranged out of sight in the skies above, yet its characteristic spindly legs became echoed in our furniture. Formica introduced innovative designs in its laminates, with names such as Starburst and Skylark. Enid Seeney brought us the Homemaker range of tableware, which proved to be hugely popular and which featured images of the contemporary style of furniture and accessories.

The bowl that I will be making in this article draws its influence from those days. Clean, simple lines, unadorned by beads and coves. A feeling of lightness, accentuated by spindly legs which lift the bowl clear of the table, almost as though it were about to take off.

I will be working with alder (*Alnus glutinosa*), a distant member of the beech family, with a little sycamore (*Acer pseudoplatanus*) for contrasting legs. Alder is a timber not to be taken lightly. It is of low density, so can be quite soft and its grain can tear easily, thus sharp tools and gentle techniques will be essential. If you need to use scrapers to finish the surface, that's fine, but you will need to raise a burr on the edge of the tools and to replace that burr after every few passes across the surface of the wood.

I will also offer a couple of possible variations to develop the design, one using legs pierced through the bowl body with caps set on to them, and another with ball feet instead of legs.

HEATH & SAFETY

There aren't any major H&S issues with a design such as this, although you will need to exercise some caution with the leg spindles when the tailstock is removed and the bottom end of the leg radiused and parted. At this time, the leg will need to be supported by hand to reduce the effects of vibration and flexing, so a few simple precautions should be taken. Reduce lathe speed, move the toolrest away from the surface of the timber to minimise the risk of trapping a finger, and ensure that you don't have any baggy/open-ended sleeves.

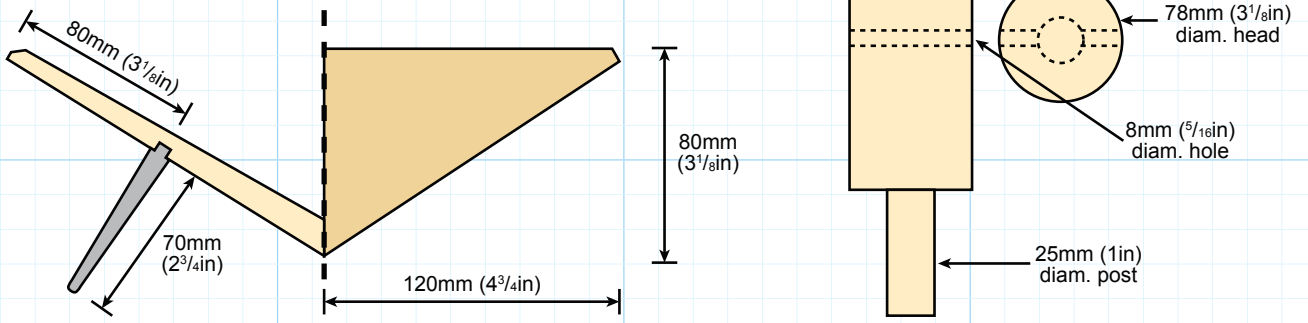
TOOLS AND MATERIALS

- Personal and respiratory protective equipment (PPE & RPE)
- Lathe with graduated spindle lock or indexing head
- Faceplate
- Chuck with 50mm jaws
- 12mm bowl gouge with long grind
- Scrapers – square and round-nosed (optional)
- Parting tool
- Skew chisel and spindle gouge (for legs)
- Spindle roughing gouge (for drilling post)
- Dividers and callipers
- 8mm drill (lip & spur type)
- 3mm drill
- Drill
- Drillchuck to fit your lathe
- Bench chisel
- Abrasives
- Sundry items – ruler, pencil, live centre etc.
- Pressure/friction pad for bowl reversing

MATERIALS

- Alder bowl blank 250mm diameter x 85mm thickness
- Wood screws, 10-gauge x 35mm (for faceplate fixing)
- Sycamore for legs – 3 No, 100 x 12 x 12mm
- Scrap timber for drilling post 200 x 100 x 100mm
- Two-part epoxy adhesive
- Sanding sealer and wax finish
- Masking tape

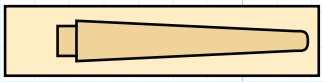
Three-legged Bowls
Main drawing and details of bowl and drilling support



Half section showing leg socket and tenon

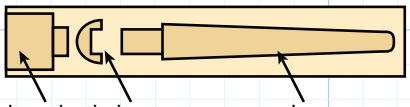
Half front elevation. Leg omitted for clarity

Layout for cutting legs from various spindle blanks



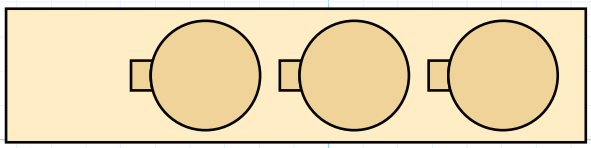
Standard leg cut from

3 No, 100x12x12mm (4x 1/2 x 1/2in)



Layout for cutting capped leg for pierced bowls

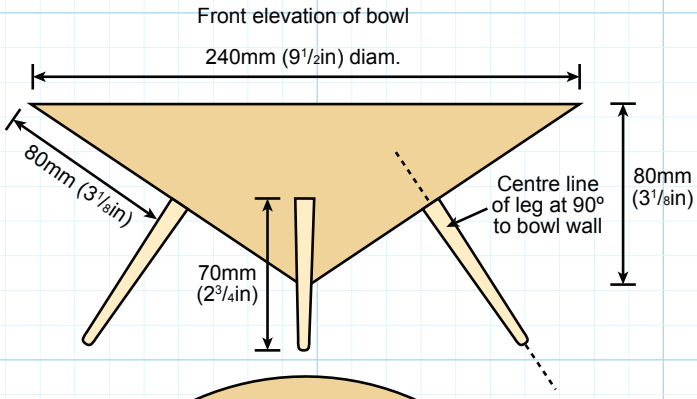
From 3No, 150x15x15mm (6x 19/32 x 19/32in) spindle blanks

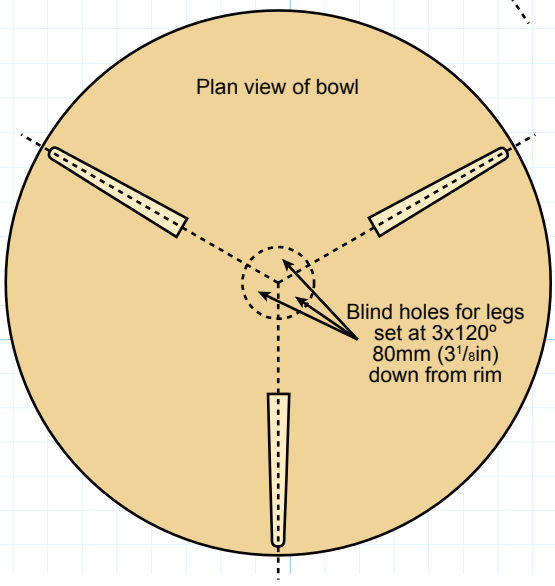


Layout for cutting set of 3 ball feet from a single

120x20x20mm (4 3/4 x 3/4 x 3/4in) spindle blank

Front elevation of bowl



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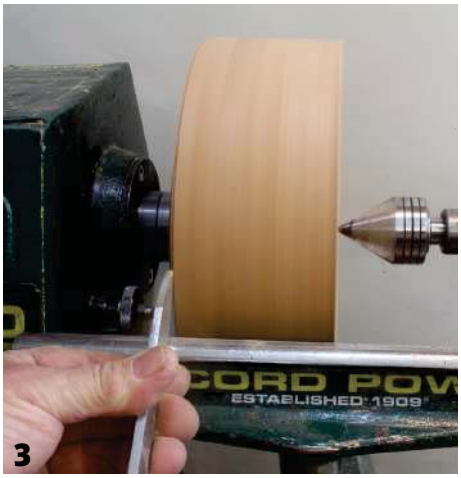

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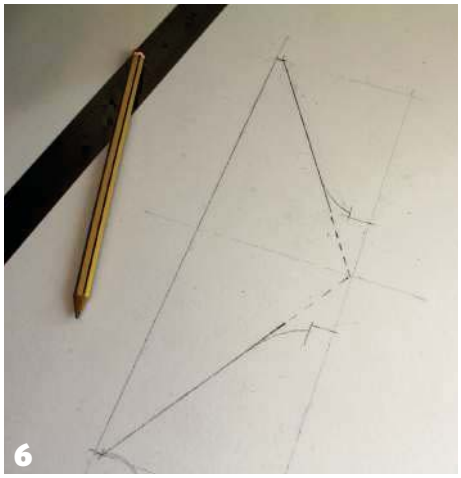
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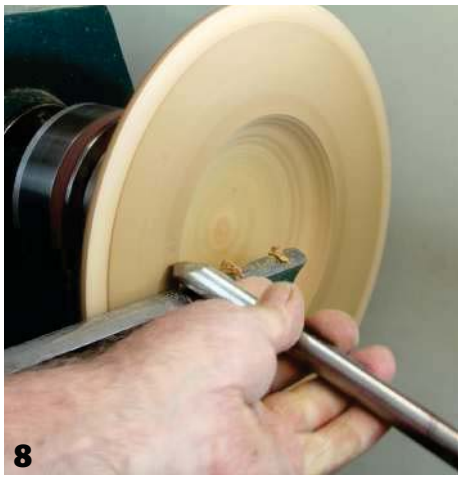
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1 Select a suitable piece of alder, cut to size, decide which is to be the upper surface of the bowl and attach a faceplate to it. Given the soft nature of alder, use at least 10-gauge (5mm) screws, 35mm long, to give good holding power, and pre-drill the screw holes with a 3mm drill. Mount the timber on your lathe and rotate by hand to ensure it clears the toolrest. Advance the tailstock to give extra support.

2 Commence cleaning the outer edge of the blank, using roughing cuts with a 13mm bowl gouge. Take light cuts to minimise tear-out, then use a shearing cut to refine the surface. For this, you will need the tool handle very low, with the tool rolled on to its side to use the wing for cutting.

3 Reduce the blank to 240mm diameter, with a clean surface, then use a parting tool to clearly define the left-hand corner of the blank, thus establishing the rim of the bowl. The parting tool will need to be sharp and used in a cutting, rather than scraping mode.

4 Set the toolrest across the face (underside) of the bowl, reduce the blank to 80mm thickness and clean the surface, making a small indentation at the centre point. Set dividers to half of the diameter of the tenon needed to fit your chuck jaws, place the right-hand leg into the centre point and mark a line with the left-hand leg to define the size of the tenon.

5 Use the bowl gouge to remove sufficient waste from the face of the bowl to create the tenon to the depth that you need, then use the parting tool to refine the shape of the tenon to match your chuck jaws.

6 Set the toolrest across the corner of the bowl blank and use your bowl gouge to remove the corner and to start establishing the shape of the outside of the bowl. Be sure to retain the shape of the tenon and the step that the chuck jaws will be making contact with. It may be helpful to make a full-size drawing of the profile of the bowl at this point.

7 When the outside shape is finished (with the exception of the area around the tenon), abrade the surface to at least 400 grit and seal with cellulose sanding sealer – being quite porous, alder will need two coats abraded lightly between coats. Use a safety cloth or paper towel to buff the surface, raising the temperature of the surface very slightly and thus driving off any solvent trapped beneath the sealer.

8 Remove the bowl from the lathe and set the tenon into your chuck, replace on the lathe and remove the faceplate. Check for alignment/true running and make any adjustments if needed, then commence hollowing the bowl with the bowl gouge.

9 Check the wall thickness frequently. On this type of bowl, the wall thickness needs to be thinner at the rim than it is deeper into the bowl. This is to facilitate the drilling of the blind holes for the legs, so an even taper from rim down into the bowl is needed, with a wall thickness of 10mm where the blind holes will be drilled.

10 When you have finished shaping the inside, abrade to at least 400 grit, then seal the surface.

11 Set the toolrest against the underside of the bowl, at centre height. Rotate the bowl by hand and decide where you want the three legs to be placed. By using the indexing facility on your lathe, set three equally spaced strips of masking tape on the surface, one to mark each of the leg positions, and lightly draw a pencil line along each strip.

12 Mark a position 80mm down from the rim on to each of the three strips of tape to establish the position of the blind holes for the legs, then use your vessel callipers to confirm the thickness of the bowl at these points – in this case it is 10mm.

13 Set the 8mm drill bit into the chuck of your drill, ensuring that it is pushed down into the chuck fully before the chuck is tightened, then measure the length of the bit that extends out of the chuck. In this case, it was 86mm to the tip of the spur.

14 You now require a drilling support to control the drilling of the blind holes and to fix both the orientation and hole depth. To make one, reduce the piece of timber between centres it to a cylinder. The blind holes are going to be drilled to a maximum of 8mm depth (including spur) so the diameter of the drilling support needs to be 86mm minus 8mm, giving 78mm finished size. Reduce the timber to exactly this size, then further reduce the lower half of it to match toolrest stem size.

15 Set the drilling support upright into the toolrest banjo, slide the banjo across the lathe bed and make a pencil mark at the exact position of the live centre. Next, set the drilling support back between centres, place the toolrest up against it and draw a line along the face, passing through the pencil mark just made. Rotate the timber one-half of a turn and draw a second line along the face.

16 Set the drilling support back into the toolrest banjo. Set a Jacobs chuck, fitted with an 8mm drill bit, into your headstock. Slide the toolrest banjo across/along the bed until the two pencil lines on the drilling support coincide, one with the live centre and the other with the spur of the 8mm drill. Lock the tailstock into position and leave the toolrest banjo unlocked. Start the lathe then advance the tailstock using the handwheel. This will drive the piece of timber on to the drill and drill a hole precisely through its centre. When the bit is deeply in the timber, retract the tailstock, remove the live centre, replace the tailstock and carry on drilling. When the drill breaks through, it will safely pass into the morse taper hole in the tailstock quill.

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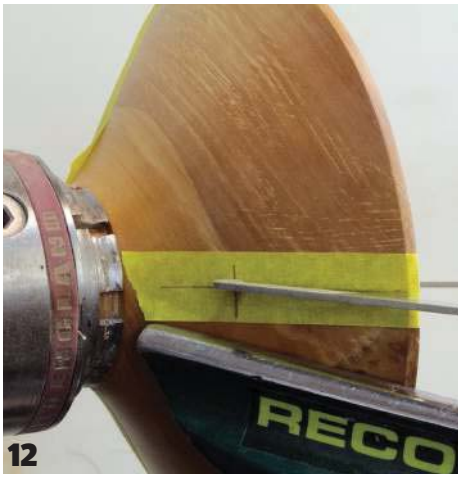

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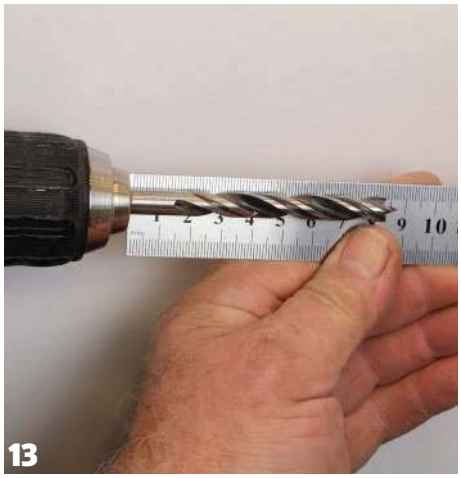
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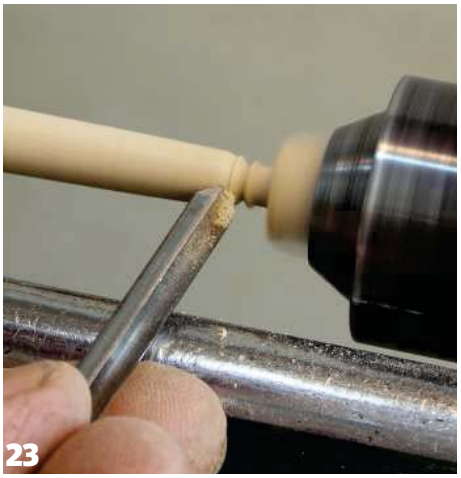
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17 Set a friction/pressure pad into a chuck on your lathe, place the bowl rim against it and advance the tailstock until the live centre engages with the centre-point mark on the tenon. Lock the tailstock and gently advance the quill until sufficient pressure is felt to hold the bowl for the reversing and blind hole-drilling processes.

18 Set the drilling support upright in the toolrest banjo, rotate the bowl and lock the lathe spindle such that one of the leg-hole positions coincides with the hole drilled through the drilling support. It is important that the drilling support holds the drill such that it drills a hole perpendicular to the face of the bowl, so placing a long pencil into the hole in the drilling support will help you orientate it.

19 Set the 8mm drill back into the chuck of the electric drill, slide the drill bit through the hole in the drilling support and drill the first hole. Your calculations and measuring of the bowl wall thickness and of the diameter of the drilling support should ensure that you have drilled a blind hole to precisely the depth needed. Rotate and lock the bowl into position to drill the other two holes, then remove the strips of masking tape.

20 While the bowl is in this position, complete the reverse-turning process, removing the tenon and cleaning up the underside, leaving as small a cone of timber intact as you feel confident to work with. Abrade the surface to 400 grit, remove the bowl and the pressure pad from the lathe.

21 Place the pressure pad on your workbench or lathe bed with the bowl on it. Pare away the remaining cone with a chisel and refine the surface with abrasives, then seal with sanding sealer.

22 Set one of the three spindle blanks for the legs into your chuck, or between centres, and reduce it to a 10mm cylinder. Use a parting tool to establish a short tenon at one end, 8mm diameter – be very precise about the diameter of this tenon. Mark the length of the leg at 70mm along from the shoulder of the tenon and use the parting tool, on the waste side of the mark, to establish the length of the leg.

23 Use a skew chisel to refine the shape of the leg, establishing a taper from 10mm at the tenon to 8mm at the foot, then use a detail gouge to round-over the end of the leg You will have to complete the final step by hand. With the piece removed from the lathe, finally part off at the tenon, leaving sufficient length on the tenon for the blind hole.

24 Set the bowl upside-down on a clean surface, mix up a little two-part epoxy resin and use a fine dental-pick or similar tool to spread a little of the adhesive inside the edges of the blind hole and along the end of the tenon, then press the leg into place, twisting gently as you press to help to distribute the adhesive around the tenon, repeating this for the other two legs.

25 If you wish to experiment further, turn a few more bowls in much the same way and next we will make the set of legs which pierce the bowl's wall and are capped off inside. For this method, use a 6mm drill for the holes for the legs. Mount a 150 x 15 x 15mm piece of walnut (*Juglans regia*) into a chuck and bring a cup-and-pin live centre up to the end of the stock. Reduce the stock to a 12mm cylinder, mark a pencil line 75mm in from the end then taper the leg from 12mm at the pencil mark down to 10mm at the end. Then use a parting tool to cut a tenon to the left of the pencil mark, about 18mm long and 6mm diameter.

26 Start cutting a radius on the end, abrade to 400 grit, retract the live centre and very gently complete the radius on the end. You may need to support the leg by hand for this process, so be cautious.

27 Part the leg off, leaving about 15mm of the tenon in place, then clean off the end of the stock remaining in the chuck and drill a 6mm hole, about 3mm deep into the end.

28 With a sharp parting tool, cut a groove 8mm in from the end, leaving a core of a full 6mm intact, then use a detail gouge to form the end into a hemispherical shape, parting it completely away from the remains of the stock still left in the chuck.

29 Finally, use the end of the stock in the chuck as a jam chuck, pressing the leg cap that you just parted off into place to allow you to abrade the cap to 400 grit. You may need to make slight adjustments to the diameter of the end of the stock to enable the leg-cap to press on to it. Repeat the process for the other two legs and caps, then glue them into place on the bowl.

30 For the ball-shaped legs, mount a piece of 120 x 25 x 25mm African blackwood (*Dalbergia melanoxylon*) in a chuck and reduce to a 22mm-diameter cylinder. Then, 11mm in from the end, radius the end over, forming a hemisphere. With a sharp parting tool cut a groove 21mm in from the end, leaving the bottom of the groove at 9 or 10mm diameter – this will be the tenon for setting the ball on the underside of the bowl. Finally, form a second radius with a detail gouge, thus almost forming a complete sphere.

31 At this stage, abrade the ball shape to 600 grit, seal with sanding sealer, apply your chosen wax and buff to a shine. Don't worry about getting wax on the tenon, as this was deliberately left slightly oversized.

32 Now reduce the tenon to 8mm and part off, leaving enough of the tenon to glue into the bowl. Repeat for the other two balls and then glue all three balls into position in the usual way. ●


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Taking inspiration from ancient cultures

Andy Coates takes inspiration from a Crusader, Ayyubid and Mamluk period grenade

In 2016 the family of the late Marcel Mazliah, a worker at the Hadera power station in Israel, returned a collection of artefacts he had recovered from the Mediterranean sea near the power station. Among the pieces was one in particular that begged to be translated into a woodturned object.

For many years it was believed that these objects were perfume bottles. In fact, some experts still believe this to be the case, but later investigation revealed them to be grenades from the Crusader, Ayyubid and Mamluk period. The vessels are 700 years old and have the patination created by nearly a millennium under water. It is believed that the grenades, and other objects, were made in Syria and were being transported to Israel when the ship sank.

Now these objects not only tell another part in a wider story, but can serve as inspiration for us. With the blessing and consent of Dr Amir Gorzalczany of the Israel Antiquities Authority I decided to use this object as inspiration.

The actual object has a small hole in the cap, presumably to facilitate a fuse or wick, but I decided that this was not a required feature in the pieces I planned to make. In essence, the grenades are simple, capped hollow vessels, and most of the procedures required to make one of these are already within the toolkit of techniques we have at our disposal.

I could see potential for variations based on the original object, and have no doubt more will occur to me over coming weeks. For the purposes of this article I decided to make a close approximation of it and decorate it with pyrography and a faux metallic finish to imitate rusted metal. I also made a verdigris version with a pyrographed design similar to the incised pattern on the original, and a stylised version made as a box.

A 700-year-old Mamluk grenade

PHOTOGRAPHS BY ANDY COATES UNLESS OTHERWISE STATED

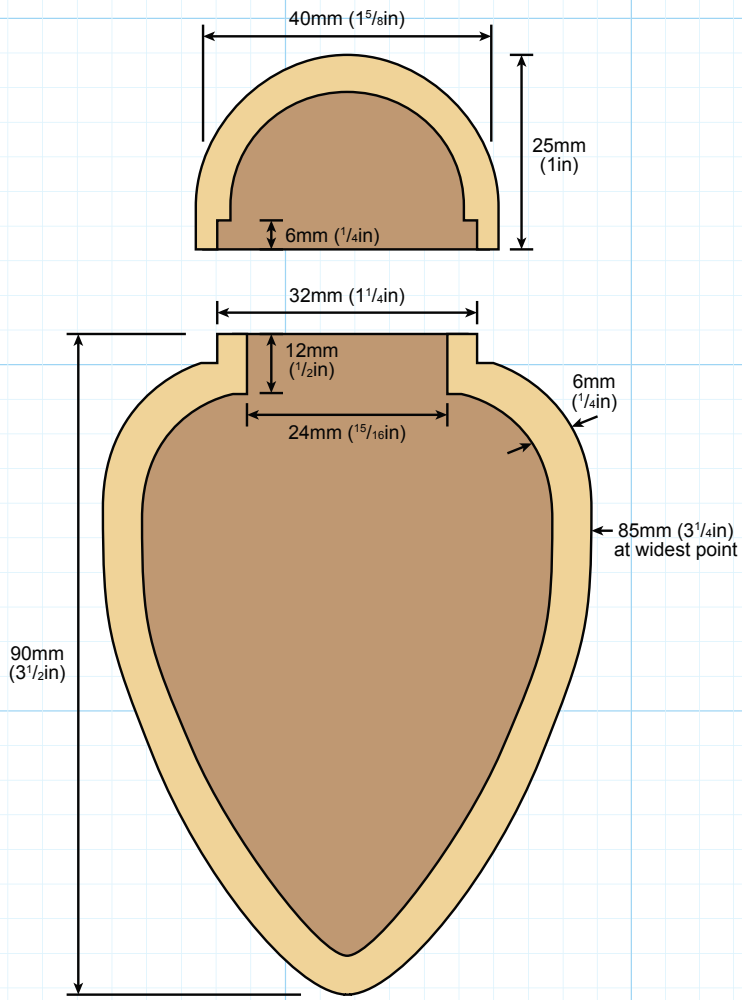
PHOTO COURTESY OF DR AMIR GORZALCZANY, ISRAEL ANTIQUITIES AUTHORITY WWW.ANTIQUITIES.ORG.IL

TOOLS AND MATERIALS

- Personal and respiratory protective equipment (PPE & RPE)
- Bowl gouge
- Spindle gouge
- Parting tool
- Slim parting tool
- Negative rake scraper
- Hollowing tool
- 15mm drill bit
- Drill chuck
- Cabide-toothed burr
- Rotary carving unit
- Pyrography machine
- Chuck
- Drive spur
- Revolving tailstock centre

MATERIALS

- Sycamore (*Acer pseudoplatanus*) blanks:
  100mm by 100mm x 150mm
  65mm x 65mm x 130mm
- Faux metallic paints

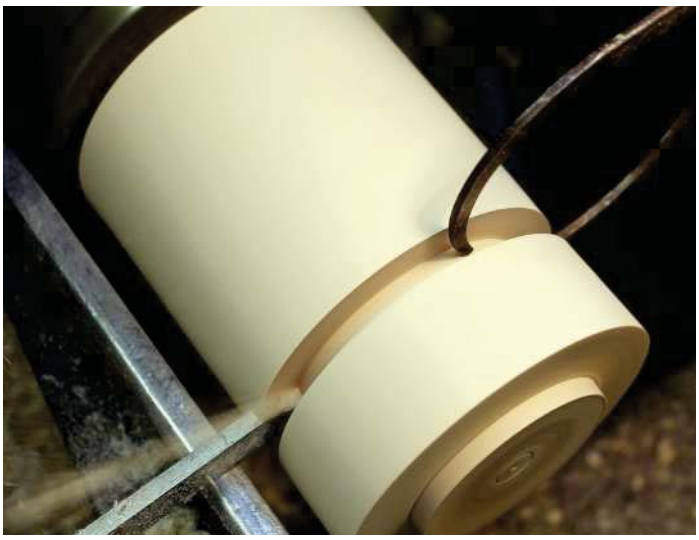


First steps

The blank is mounted between centres and trued to a cylinder 95mm in diameter. A tenon of appropriate dimensions for your four-jaw chuck is turned on both ends of the blank. The blank is remounted and held in the four-jaw chuck. A line is marked 95mm from the headstock end of the blank and a 10mm-wide parting cut made down to a 32mm diameter. This will form the tenon on the base section to take the cap. The top cap section is parted off from the tailstock side of the 32mm tenon.

Initial shaping of the top section can now commence. The widest diameter of the base section, 85mm, is at the top quarter of the section. Using a bowl gouge, 10mm in this case, round over toward the tenon but keep the upper section fairly flat. Once this section is turned a portion of the lower section can be completed. Do not turn the whole of the lower section as some support is required for hollowing. Aim for a gentle but distinct curve.

The completed sections can be shear-scraped and abraded to 240 grit.



Blank mounted, trued and tenon turned

Initial shaping of top section

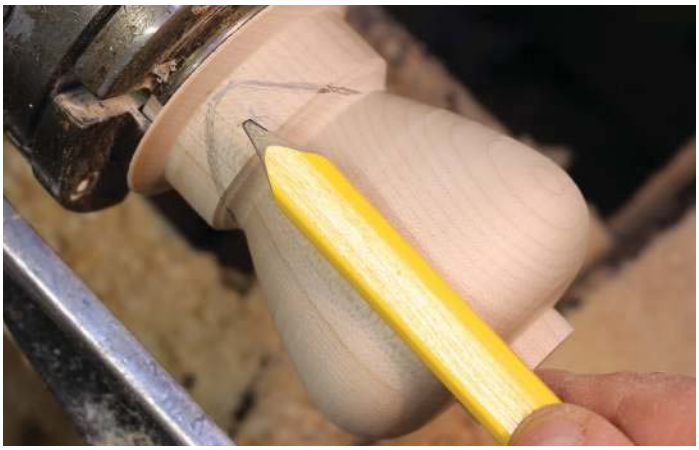
Shaping the part of the bottom section

Negative rake scraping the surface

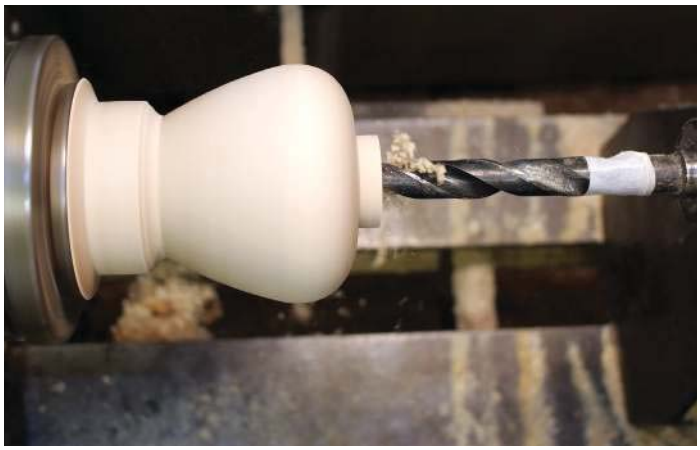
Drilling the central core from the blank

Roughly sketch the final shape on the waste wood at the bottom of the blank. The end will terminate in a rounded shape. This will show you the approximate depth to drill to. Aim for a wall thickness at the tip of 5-7mm. Mark the depth with masking tape on the twist drill.

Ensure the tailstock is locked down, and with lathe speed set to slow, begin drilling out the core. Withdraw the drill frequently and clear the swarf. Take it slowly to prevent the drill bit overheating and expanding to cause it to bind in the blank. Drill to full depth. This will now form the absolute base of the vessel.



Roughly sketched final shape shows depth to drill to



A twist drill bit on a morse taper is used to drill out the central core

Hollowing tools

Hollowing tools come in what can be a bewildering range of designs and sizes to help create the smallest through to the largest and deepest hollow forms possible.

There are three basic types – those that cut, those that essentially scrape, and the 'toothpick' style that are a little of both. Of the cutting variety there are several sub-sets: scraper, ring, carbide disc, and hook tool cutters, each of the last three usually being available shielded or unshielded. The ring or disc-type cutters actually cut the wood and can remove significant amounts of wood quickly, the shielded versions being easy to control. The scraper types rely on a sharp scraper tip which cuts at a shear angle against the wood. These types can also be used for finishing after hollowing. The toothpick-style hollowing tools might be considered as the oldest type of tool, but this should not put you off buying them – they can be an effective tool and are usually the cheapest option. Each of the types comes in a range of shaft, cutter, length and handle sizes. And each will have a maximum hollowing depth at which it can be safely used. Do not exceed this declared depth as it can be dangerous.

For this vessel the smaller of the tools is appropriate, and the style of hollowing tool selected is determined by the size of the access hole, the depth to be hollowed to, and the interior space available to work in. I used a straight carbide cutter tool to open up the access hole, a swan-neck carbide tool and swan-neck scraper type to achieve the undercut, and swan-neck scraper to clean up the interior surfaces after hollowing. I could just as well have chosen a different selection of tools that allowed access through a narrow hole.

A sample range of the many hollowing tools that may help

Hollowing the vessel

Opening up the entry hole can be achieved with a range of hollowing tools and which you use is entirely up to you, but you may be restricted by what you have available. In the last article I detailed the hollowing progression and provided a hollowing process diagram – the process here is the same.

Open up the entry hole working from the edge of the pre-bored hole out towards the rim, and aim for a rim thickness of 5-6mm. The inner face of the recess should be parallel for about 12mm in. This provides you with the starting-off point for your wall thickness. At this stage a curved or articulated tool is needed to achieve the required undercut. The scraper-type tool works well at removing waste but can produce a poor surface. A carbide-type tool may cut more cleanly and produce a better surface. Work carefully, stopping regularly to clear the shavings with a shop vacuum, and keep the wall thickness even. It is particularly important on a piece such as this because the outer surface will be carved later.

A pair of thickness callipers is a great help in ensuring that wall thickness is even throughout, but you may need more than one shape in order to reach every area of your vessels. Continue hollowing by removing waste centrally to provide the room for the tool to work up to the wall. As you progress deeper remember to keep the cutting edge on the centreline as there is a tendency to let the handle rise, leading to the cutting edge being too low, which can result in a catch.

The most difficult part to hollow is the final section where you have not completed the exterior shape. Provided you are keeping the wall thickness even, simply following the wall direction should ensure that the interior shape is correct. Once hollowed you can clean the inner surface of tool marks by using a scraper tip on a swan-neck tool.

Once the interior is finished move back around the workpiece and complete the exterior shape. Work as close to the final shape as possible. Abrade the outer wall.

Starting the undercut

Using a carbide cutter-type tool to take cleaner cuts

Checking wall thickness with callipers

Using a swan-neck scraper tool to finish the interior surface

Completing the exterior shape

Completing the vessel

Check the internal depth and transfer this to the outside wall of the vessel. This is your interior depth. Now add on the wall thickness to the left, and this will be your ultimate end point of the vessel.

Set the toolrest at precisely centre height and bring it in as close to the vessel as possible. I wanted eight panels around the vessel so, using the indexing system, I marked the first two stops and skipped the third, continuing around the vessel.

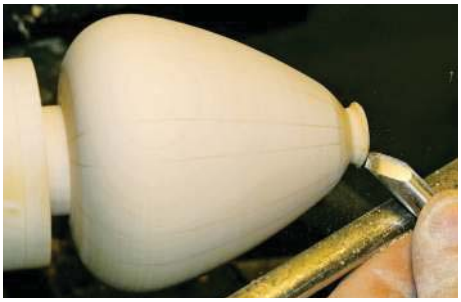
Now you can part off the vessel using a slim parting tool. Part to the headstock side of the mark you made earlier. This should provide enough waste to allow you to finish the vessel with a pleasing curve.

Take a scrap piece of wood and mount in the chuck. Turn a stub tenon to fit the recess on the vessel tightly. NB: not too tight or you risk splitting the vessel. Masking tape can be used to secure the vessel if you are nervous about continuing like this. Using a 10mm spindle gouge complete the last part of the tip and abrade.

Marking interior depth on the outside


Marking the panels for decoration


Parting off the vessel


Reverse turning to complete the last section

Making the cap

Now mount the parted-off cap blank from earlier. Providing you did not remove any more wood from the tenon on the base section there should be a witness mark for the required dimension on the wood. Failing that take the diameter of the tenon and transfer to the face of this blank. Hollow a parallel recess to take the vessel tightly. You can use the slight dovetail technique I have mentioned in previous articles to produce a good fit.

Once the recess is completed you can hollow the interior of the cap. This obviously requires some foresight as you have not yet turned the exterior shape. Abrade and finish the interior but not the recess.

Mark 5-6mm from the outer edge of the recess to provide a wall thickness reference. All the wood between here and the outer rim of the blank is waste. You can simply turn this away down to the mark or, by parting from the outside face and the front face, you can reclaim a ring of wood to be used at some later date on another project. This is my preferred method here but is not for everyone.

Now turn as much of the cap shape as possible. Aim for a domed shape. When you cannot turn any more abrade the surface and then part off with a little excess. Using the scrap block once again turn a tenon to tightly fit the cap. Now you can complete the curve of the cap, abrade and finish the cap.


Check the cap recess dimension


Hollowing the cap


Rough shaping the cap


Completing the cap

Decorating the vessel

I used a rotary-toothed carbide burr to create channels along the paired lines. This creates texture and interest. The carbide burr leaves a very clean surface and cuts incredibly well. I had scribed a pencil line at the widest diameter circumference to enable me to end the cut at the same point for each of the 16 cuts.

In the larger remaining panels I used a specialised pyrography tip, a branding iron, to burn a circular texture covering each of the panels and the smaller, adjacent panels above. Once the pyrography was complete a light brush with a bronze brush removes carbon and the surface is ready to be painted.

I wanted an aged metallic look to the finished piece, and opted for the rust finish from a range of decorative craft paints. The paint is dabbed over the surface and then a second, lighter colour, is dabbed over the top. The paints have an added material to provide texture and when dry the top of the texture can be highlighted using the lighter colour. The results are supposed to resemble rusted metal.


Using a rotary toothed carbide burr


Pyrographing texture on the vessel


Painting choices

Conclusions

This was another enjoyable project, and making it caused me to think of a number of alternative approaches that I will play with at a later date. I think there is a great deal of mileage in using objects from antiquity as the base point for projects, and the contrast between the original object and your interpretation of it is always interesting. Do try to remember my comments on cultural appropriation though – what we perhaps ought not to do is simply copy in the hope that the finished object will be taken as an example of the original. Do try to impose your design ideas on the pieces you create, and tip your hat to the original cultures that created such fascinating objects... with not nearly as many fancy tools.

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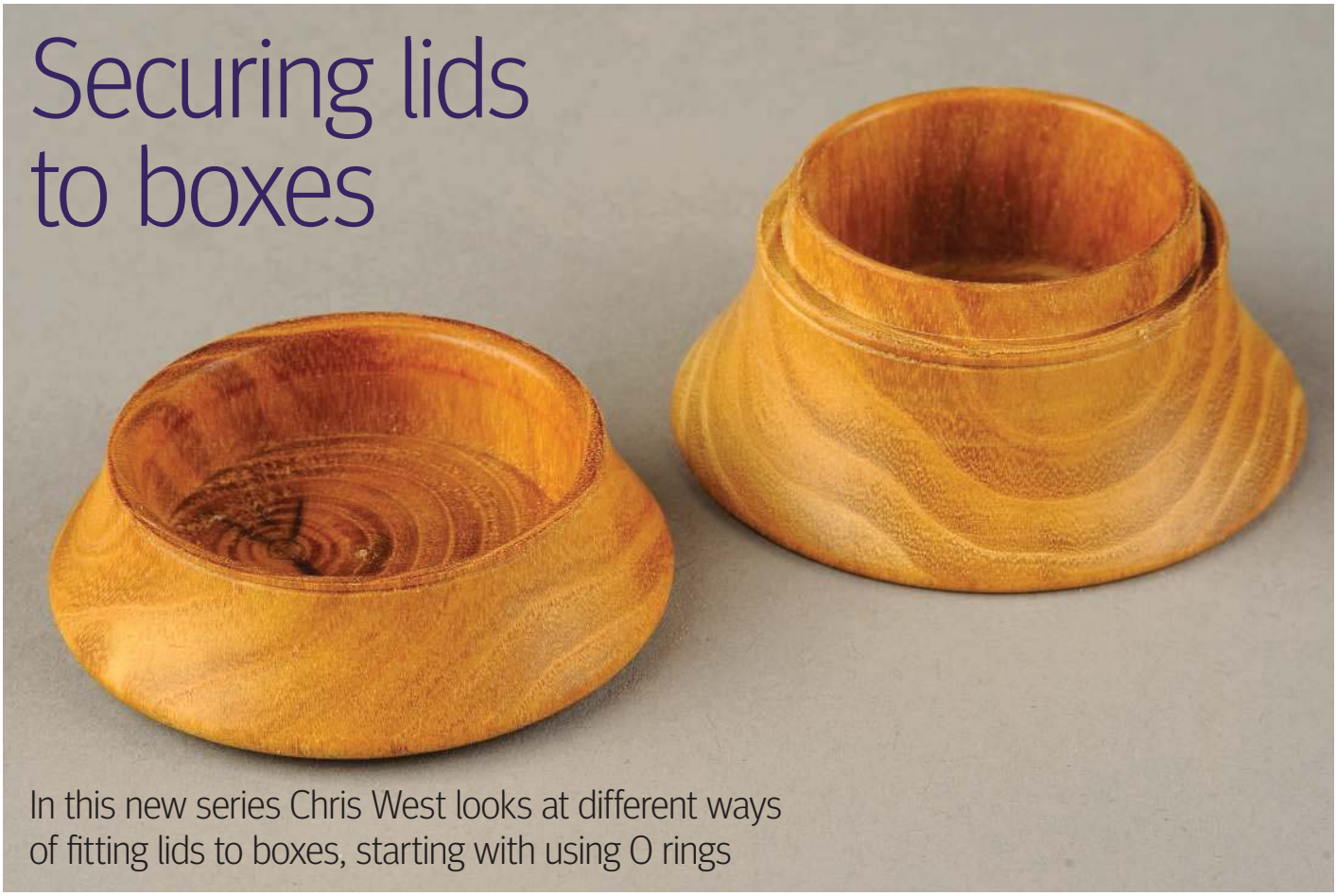
Securing lids to boxes



In this new series Chris West looks at different ways of fitting lids to boxes, starting with using O rings

PHOTOGRAPH AND BOX BY MARK BAKER

In this and subsequent articles you will notice that I am not telling you how to hollow out a box or container. Far better turners have explained that in numerous articles and books. Also, the projects in this series are quite plain in their design. The reason for this is that it gives the reader the opportunity to concentrate on the method of turning for fitting the securing mechanism rather than the project itself. This also leaves the reader to add their own design ideas to the project. That is not a cop-out by the author.

This theme will continue throughout the projects in the series, which assumes a degree of woodturning knowledge, such that the inclusion of detailed holding methods for the project blanks have not been included.

However, when it is considered that tasks are moving outside the boundaries of the turner who has mastered the basic aspects of cutting and holding turned work, instructions will be included. So, there we are, the ground rules for the series have been set.

O rings

The chosen fitting for this issue is the use of rubber O rings. They form an air-tight locking and a bit of cushioning/movement to help when wood moves just a little bit, but not too much out of shape, so creating a seal which is ideal for items storing food or spices.

O rings are typically available in a wide range of thicknesses and diameters

One or two important things to bear in mind in using O rings:

If you are designing a lid and box it is vitally important that a prototype is turned in order to get the diameter dimensions of the lid exactly right. The reasons for a prototype include:

- The depth of the slot must be just right. If it is too deep the amount of the ring available to form the seal in the box will not be enough, so it will be a floppy fit.
- If the slot is not deep enough it will stretch the ring such that it will weaken it.
- When turning any box and lid, the wood needs to be dry, preferably rough-turned and, once dry, finish-turned. If the box becomes too out of shape/oval it will not allow the sealer ring to keep the contents airtight.
- Always have two or three extra rings in stock. They will stretch after repeatedly slipping them on and off.

PHOTOGRAPHS BY RITA MITCHELL UNLESS OTHERWISE STATED

Let's go down Memory Lane... a tooth-fairy box

As the months pass you will notice that the projects being shown may, to say the least, differ in terms of what can be stored in them. This is the first project of many.

This article is targeted at all woodturners. Everyone loses their baby teeth at some time and it's been noted that the price of a visit from the tooth-fairy increases year on year. Every child likes to save their baby teeth, so here is an ideal gift for the collection of teeth.

LIDDED BOX REQUIREMENTS

This project uses an O ring which has an OD of 39mm, an ID of 33mm and a 3mm-diameter wall. The O rings can be bought individually by size or as an assortment kit. Given the need for you to have more than one O ring, the minimal extra cost of a kit might be worth your while looking into. The requirement for more than one is that as you are placing the ring on and removing it, it is liable to get stretched or damaged.

The box shown is made from beli (*Julbernardia pellegriniana*). Another material from which this box can be made is acrylic, especially if you are going to change its use to something containing medicinal items.

TOOLS AND MATERIALS

- Personal and respiratory protective equipment (PPE & RPE)
- Spindle roughing gouge
- Spindle gouge
- Thin parting tool
- Chuck
- Drive spur
- Revolving tailstock centre

MATERIALS

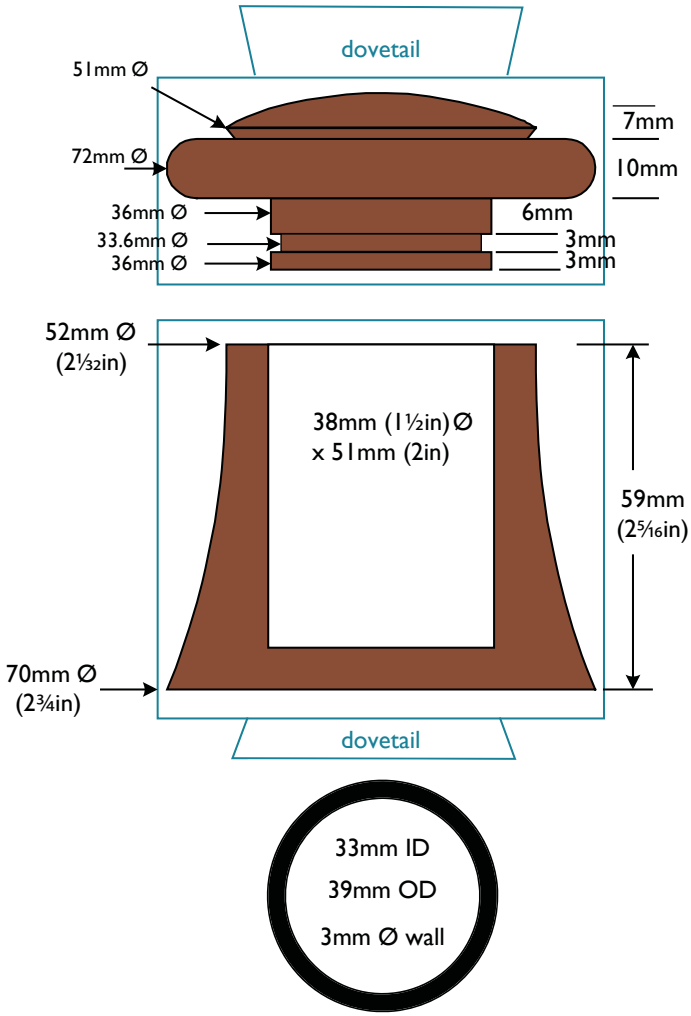
- Abrasives down to 400 grit
- Finish of your choice
- Nitrile O ring
- 39mm (OD) x 33mm (ID) x 3mm Ø

SOURCES OF O RINGS

- UK: simplybearings.co.uk
- US: Ebay.com

SOURCES OF KITS

- UK: altecweb.com Metric Nitrile O Rings kit # 134-3160
- US: Ebay.com



DRILLING AND TURNING THE BOX

Blank size: 3 x 3 x 3in (75 x 75 x 75mm)
Wood: Beli (*Julbernardia pellegriniana*) but any dense, close-grained hardwood will work well

This box and lid is quite straightforward to turn. Please feel free to design your own box and lid using the wood of your choice. An inlay in the top of the lid would enhance it.

THE MAIN BODY

Mount the wood between centres, rough turn and form a dovetail as shown. Remove and hold the dovetail in compression jaws. Face off the other end to the length shown. If you have one, use a 38mm Ø Forstner bit. Drill to a depth of 51mm. If not, remove the inside to these dimensions.

Turn a jam chuck as shown to fit into your chuck jaws and shape a taper so it will fit snugly inside the box and hold it securely, being supported by a revolving tailstock centre.

Measure and mark the overall length. Shape the outside as shown, sand and seal. Now start on the base. Before parting off the dovetail and completing the turning, fine cuts with a gouge should give you a clean bottom. Form a slight concave to the base to ensure it sits level.

Sand, seal and finish as you choose. You may wish to consider gluing a piece of felt in the bottom of the box.

TURNING THE LID

Blank size: 75 x 75 x 51mm
Wood: Beli

Between centres, rough turn and form a dovetail at what will be the top of the lid.

Remove and hold the dovetail in compression jaws. Face off the other end. Mark out the key lengths. Begin forming the smaller diameters at the bottom of the plug.

Next, form the 3mm slot to accept the O ring. Work down towards 33mm bit by bit, placing the O ring on to the plug and pushing the partially turned box onto it.

Keep deepening the slot until you get a good fit. Sand and seal the bottom half of the lid.

Now, with the O ring removed, wrap masking tape round the part that enters the box. This will ensure that the lid is not damaged when held in compression jaws.

When running true, support with the live centre. Measure and mark the position of the bead and complete its turning. Begin turning the top of the lid, removing the dovetail as you go, until the live centre needs to be removed. Carefully complete the final cuts. Finish sanding, sealing and finish the lid to your choice. ●

TOP TIPS:

- Using a sharp pointed tool or a small, fine, slotted screwdriver will cause the least damage to the wood. The O ring's life may be reduced though. Hence the suggestion to buy several at the outset.
- If you have gone too deep and the O ring is loose in the box – it's not the end of the world. Fill in the slot with wood filler, leave overnight to harden and start again the next day.

Another use for an O ring

This mill uses a Crushgrind wood mechanism

The top is inserted into the mill's reservoir to ensure that the salt or pepper remains in the mill's reservoir

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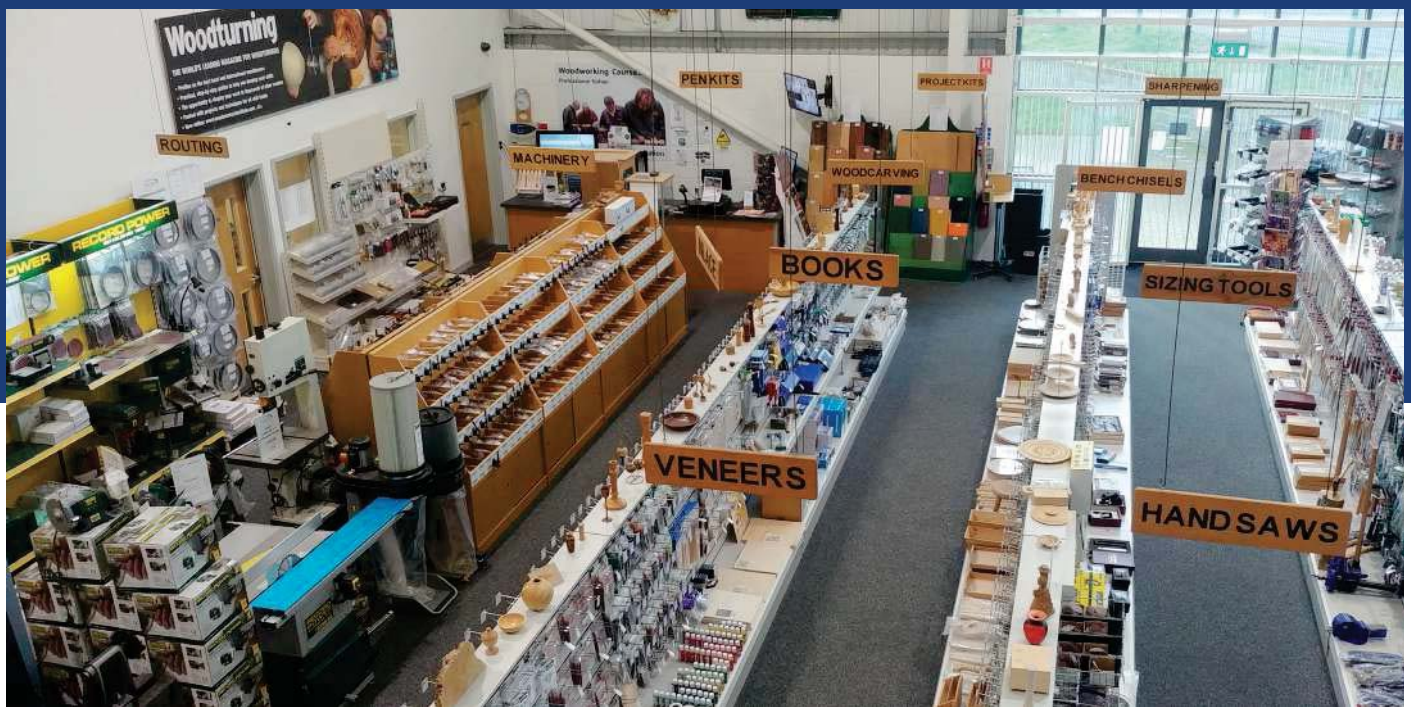

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Designs on life

Mark Baker talks to Ed Oliver and finds out why he chose to take up turning full time

Apollo's aspis, burr oak (*Quercus robur*), burnt, textured and gilded

I left school in 1974 and served an apprenticeship as a furniture maker but as soon as I qualified I left. I was not enjoying it at all. I became effectively a machine operator producing flat-pack, mass-produced items rather than being able to get creative and make designer furniture. I then started my journey into sales, leading to me setting up my own companies selling various things from cable ties to online sales platforms. In August 2014 I set up Olivers Woodturning to supply woodturning tools, accessories and timber to fellow turners.

PHOTOGRAPHS BY ED OLIVER

Ed in his workshop

When and how did you start turning and why?
Every birthday for as long as I can remember my wife Karen has booked me an experience, covering all manner of things. I normally came away saying I was going to take that experience up but never did.

In 2013, when I was given a two-day woodturning course with a woodturner called Tom Pockley, I went along thinking I'd done this at school and then as part of my apprenticeship – it was not for me, but I'd turn an eggcup, as Karen liked a boiled egg for breakfast. I went to Tom's workshop and turned a small sycamore (*Acer pseudoplatanus*) bowl and as the shavings came off the gouge I knew this was what I was going to do for the rest of my life.

I remember coming home and saying to Karen, and Joe my son, I'm going to be a woodturner. The response was: OK, they had heard it all before.

I just fell in love with it after the first shaving coming off the tool. Within eight weeks my first workshop was set up and I started turning in there the first weekend after Christmas 2013. I upgrade to a bigger one two years later after building a custom-built barn which now houses my workshop and my shop, Olivers Woodturning.

Having said all that, I am running out of space. The more space you get the more you fill it. The workshop has a fully-fitted kitchen, sink to clean up in, a microwave, an oven to bake resin blanks in, three large lathes, a sand blaster, compressors and then all the other things needed to turn and process wood and extract dust and chipping etc.

I started offering courses in 2016. I absolutely love it. I love seeing someone for the last time and the joy on a person's face as they make a cut without a catch. I now teach about two days a week and turn my own work and run the shop and mail-order items the rest of the week. It's hectic but I love it.

What was the very first complete piece you made?
The first complete turning was a small bowl on my own in the workshop, which I still have today. It looks like a small dog bowl made from elm and has all the catch marks as well. My latest piece is a big elm bowl about 600mm wide x 275mm high.

What are your influences in your work?
I love the work of impressionism artists. I also love texture and colour, combined with the natural grain of the wood.

I enjoy the work of people such as Joey Richardson, Stuart Mortimer, Mark Sanger, Nick Agar and many other gifted turners.

What are your biggest mistakes workshop woodturning-wise and challenges?
Holding and pushing the woodturning tools too hard and learning how to overcome this. Good old Tom Pockley helped with this and told me to grip the handle of the tool with my little finger stuck out. Everyone could try that.

The challenges that face turners is selling their work. Many will struggle to get the prices from people and work is often devalued by hobby turners. But there aren't many galleries that take wood-turned items and it means direct selling via craft fairs, websites, Instagram or other social media, which most turners will not do.

Lack of understanding of the safety procedures in turning and using bad practices. Sadly many use YouTube and the web, often to learn from, and they do not know whether they are learning best practice from what is seen or shown or receiving good advice. There are more bad videos than good and without some understanding of the processes it will be impossible to tell what is good or bad.

How to get young people to turn – there are too few opportunities for them to try it out near where they live. But insurance, safety checks and so on are often a hurdle. The plus side of social media is

that they are often much younger than the typical age of a club turner and the diverse creativity you can see online is much more than you are likely to encounter in a club environment.

What would you like to see happening regarding your development in turning?
Even today I book to go on courses with other turners – we never stop learning and picking up tips. I would recommend any woodturner to do this.

My next foray will be into spindle turning, most of my work is bowls and hollow forms at the moment. I do create end-grain hollow forms and pepper mills and table legs and so on but will explore creating long, thin trembleurs. I will be going on a course with Jean-François Escoulen soon and hope to learn the finer aspects of ultra-delicate spindle work.

What has been your most memorable experience in turning?
The people I meet. I have met some really interesting people and made some great friends along my woodturning journey and I hope that continues throughout my woodturning career.

Another memorable experience was being accepted on to the Register of Professional Turners (RPT).

What's the best bit of turning advice you've ever received?
When gripping the woodturning tool handle stick your little finger out on the handle hand. It sounds strange but it helps with control.

Have you ever given up on a project?
No.

What is your favourite type of woodturning?
There so many things that I love to turn. If I had to pick one I guess it would be wood with voids in, so when finished the turning comprises part wood and part air.

What are the biggest differences in turning now to when you first started?
Tool control and not rushing to just get something finished.

What is your favourite piece of equipment?
A 10mm bowl gouge with a long grind.

What would you like to happen in the future?
For schools and colleges to start teaching woodturning and other handcrafts to give some enjoyment and another sense of

Wired, sycamore (*Acer pseudoplatanus*) , dyed, hot-melt adhesive and coloured BELOW: Spalted sycamore, burnt, textured and metal-effect paint

Dye horse chestnut (*Aesculus hippocastanum*) burr and ebony (*Diospyrios spp.*)

achievement out of their schooling. Also, if youngsters choose to pursue the trades and crafts for it not to be seen as a lower option than going to university to study the classics or something like that.

I would like to see once again many more trades and craft colleges providing top-quality education fit for the modern day, but still linked with traditional hand skills.

What are your likes and dislikes regarding the world of turning?

I love the creativeness that is involved in woodturning. Sadly I cannot understand why so many woodturners sell their work for the cost of the wood and devalue the work.

It's great that nearly everyone within the turning community is willing to help people. There are a lot of people in clubs and online who are willing to devote a lot of time to help and encourage other people for no personal gain other than sharing. The woodturning community is very caring and sharing. This has a direct outworking in that I think that, in order to grow the community, it is incumbent on those starting out to seek and receive the best advice as soon as they can. It is not just a case of chucking money at the subject by buying new tools when trying to solve a problem.

A new tool may not be the right answer or do what the person thinks it might at that moment in time. It might be that someone needs to receive some help with a technique or explore a different, possibly safer route to do what they wish to do. Money helps, but it is not always the answer.

TOP TIP FOR FELLOW TURNERS?

- You rub the bevel and cut with the edge – you never cut with the bevel.

What helpful advice do you have for other turning?

Never rush to finish a piece of work. Take the time to take a good long look at what you have turned before finishing and taking it off the lathe.

For further information about Ed visit: www.edoliver.co.uk

Cacoon, Yew (*Taxus* Baccata), hot-melt glue and dyed

Pimples & dimples, sycamore, textured and gilt cream

Burr elm (*Ulmus procera*) sculpture

Teesside Woodturners celebrates 21 years

Duncan Hutchinson shares how his local club is evolving and promoting itself

PHOTOGRAPHS BY DAVID MUCKLE

Typical in-house club demonstration

Teesside Woodturners' Association was established in 1998 and has a strong and vibrant membership, including a growing number of younger and female members.

The objectives of the club are to bring together people who are interested in woodturning so they may share their knowledge, pass on their own skills to fellow members and foster a greater awareness and appreciation of woodturning generally.

We meet every Wednesday evening, enjoying a good attendance by members most nights, and there's always a warm welcome for anyone interested in finding out if woodturning is something they would enjoy.

The third Wednesday of each month is our 'main event' night when we have a guest or in-house demonstrator, with the demo being projected on to a large screen and recorded on DVD for members to borrow at a later date.

All other Wednesdays are 'do it yourself' nights, when we have 10 lathes in use, either by experienced turners or learners receiving help or tuition. We often have a small in-house instruction class on these nights. There is also an exhibits table where members can display their latest masterpieces. This is extremely popular with both exhibitors and the rest who are happy to look and learn.

Our club has many very talented members and we are lucky to have among us two Registered Professional Turners (RPTs) and one Approved Tutor with the Association of Woodturners of Great Britain (AWGB).

Members have a limitless repertoire, using native and exotic wood and a variety of decoration techniques to produce a fantastic array of items. Several members make tools and jigs and one member has even made a rose engine which he uses to great effect.

We try to make sure there is something for everyone. We publish a newsletter called *Turning Point*, there is a small workshop providing tool sharpening, a bandsaw and a good selection of occasional-use tools, e.g. bowl saver, texturing, threading and deep hollowing tool, which can be borrowed by members for specific jobs.

We also have a club shop and woodstore which provide a quality selection of timber blanks, abrasives, sealers, finishes, new and second-hand tools and pen kits etc, bought in bulk wherever possible so as to keep costs low for members.

Promoting the club and woodturning

During the summer months members attend numerous events where we set up our gazebo and craft stall with two lathes running from a generator to promote the club and encourage others to visit us and try woodturning.

Regular events include:

- Lacemakers Guild AGM, Eaglescliffe.
- Swainby Classic Car Rally.
- Cleveland Show, Stewart Park, Middlesbrough.
- Picnic in the Priory, Guisborough Priory
- Picton & District Sports, Gymkhana & Horticultural Show.
- Guisborough Forest Walkway, Pinchinthorpe.
- M'Bro Town Meal, Centre Square, Middlesbrough.

CHARITY AND COMMUNITY WORK

The club has a history of charitable and community work including:

- Doorstop mice made from oak donated by Mouseman Robert Thompson and sold in the Kilburn shop in aid of the Help for Heroes www.helpforheroes.org.uk
- The Great North Air Ambulance Service is our nominated charity with external

demonstrations, sale of items made by members, auctions and raffles helping to raise in excess of £6,400 to date: www.greatnorthairambulance.co.uk
- Lacemaking bobbins were turned and donated to the Cleveland Lace Guild.
- Several sets of Indian clubs were turned for Middlesbrough Institute of Modern Art (MIMA) www.mima.art/
- Harry Potter wands and other related items were made for Eaglescliffe Forest School.
- Creation of a 3D timber art display comprising 150 turned mushrooms on a 600mm plaque displayed at Conyers School, Yarm.

We are often asked the question: 'Is woodturning a craft or an art?' Historically it was clearly a craft but with advances in materials, equipment and human imagination it has definitely taken steps into becoming both an art form and a craft that is practised by hobbyists, semi-professionals and professionals alike.

A collaborative turning project

It is probably not uncommon in most clubs, but when talking to members you sometimes hear the words '**I am not turning as much as I used to**'. Having made enough bowls, bud vases etc. to fill their homes and those of family and friends they feel as if they are simply turning for the sake of turning.

For us this raised the question as to whether there were enough members interested in coming together to design and create a piece of artwork using our skills and talents, with each contributing something that would be incorporated into a collaborative piece.

This was open to all members, as working collaboratively would provide a purpose for turning and an opportunity to share knowledge and skills. The project enabled us to incorporate related crafts such as carving and pyrography and others which at first don't seem to fit with woodturning but which, with a bit of lateral thinking, could be used to enhance or complement a turned item.

The finished work has been donated to Butterwick Hospice Care to display on their premises (www.butterwick.org.uk).

We designed a pair of wall plaques based upon the theme of growth and evolution, where various turned elements grew out of a yew goble. These included emerging bowls, spheres, off-centre turning, a threaded box with a mouse inside, a split bowl and much more, as can be seen in the photograph.

It was fun and rewarding to do and has inspired the club to make working collaboratively on a project an annual activity, involving both old and new members, and I hope this article will inspire other clubs to follow suit. Go on – why not give it a go and tell us what you've created.

For further information visit: www.teessidewoodturners.com

Collaborative project

Club night exhibits table

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STRATOS XL

The STRATOS XL combines high weight, stability and power with precision and ease of use. The goal was the development of an extremely solid, stable and quiet machine which, due to its versatility, offers countless possibilities for beginners as well as advanced and professional woodturners.

Motor	3 HP
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Speeds	60-1200 / 100-2200 / 150-3700 U/min
Spindle	M33 x 3.5
Weight	320 kg
Dimensions	1650 x 610 x 1250 mm

Additional Add-ons

Bed-Extension with Stand 1400 mm

Outboard and Bed-Extension 500 mm

Swing-Away

...and many more!

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Motor	2 HP
Centre Height	230 mm
Spindle Length	700 mm
Speeds	80-1350 / 180-3700 U/min
Spindle	M33 x 3.5
Weight	178 kg
Dimensions	1350 x 510 x 1230 mm

Additional Add-ons

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Turning a torus form

Richard Findley is tasked in the Editor's Challenge with turning a torus form

PHOTOGRAPHS BY RICHARD FINDLEY

The challenge that dropped into my inbox this month seems quite straightforward on the face of it but, as with so many of these challenges, there's more to it than meets the eye. The first thing I decide to check is that my understanding of a torus is correct, so I turn to the internet once again.

As I understand it, a torus is basically a ring, like a doughnut. Reading Wikipedia, the actual definition is quite technical – unnecessarily so in my opinion – with mathematical equations to show it clearly. In the interests of speaking in plain English, a torus is a ring, but if you were to cut it in half, the profile of the turned section would be a complete circle. There are a few variations of this but essentially that is my challenge.

Planning the torus

As with all projects, I run through the turning process in my mind and it all seems quite simple up to the point where I will need to finish the internal part of the ring. A few internet searches bring up two options, neither of which seem ideal. Most of the YouTubers who try a torus seem happy to turn as far as possible and part off, choosing to tidy up the seam line with power sanding. While I'm pretty handy with a power sander I doubt I could blend this line with power and hand sanding, at least not to the high standards that I set myself and that you, as a reader, would expect of me.

The second option is what would be known as a 'doughnut chuck' which comprises a backboard which the work sits against, a ring of the same material (usually MDF or ply) which is connected to the backboard by way of long lengths of threaded rod with some sort of nut on the face. The two parts sandwich the workpiece, allowing the turner to work on the centre. This seems like an option but I'm slightly hesitant as one of the few turning accidents I've had involved a homemade chuck with an exposed metal part (a jubilee clip) which almost removed a fingernail, hence my reticence. I am also keenly aware that articles which are published in the magazine should show best practice and I'm not certain the Editor would show such a chuck, so I decide to give him a call to run it by him. At my suggestion of a doughnut chuck he makes a sound which, without actually saying 'no', tells me that he'd rather I found another way to do it. He follows that up with the quite innocent question: 'Have you ever used a glue gun?' and leaves it at that.

GLUE GUN

I haven't used a glue gun since I was at school and have never found the need to use one since. I have heard of them being used to hold awkward projects on the lathe but I've always found a more conventional way of holding odd-shaped work. However, as this series is all about taking me out of my comfort zone and challenging me, I do a little glue gun research online and get one ordered, along with some glue sticks and a hot-air gun, which my research suggests I will need to remove the glue at the end.

TIMBER CHOICE

I figure the torus, being a solid piece of wood with no thin edges or crisp details, can be made from almost anything, so I have a rummage through my timber pile to see what I can find. Most of my stock is prime-grade furniture-quality timber with very few faults, but occasionally a board will have areas which many turners find 'interesting' but are generally useless for the type of spec I am asked to working to. I find one board of black walnut that has a couple of nasty knots which makes it pretty useless for most jobs, but for this, a couple of knots and the resulting curly grain which surrounds them could add some interest, so I decide to use it. The board is 200mm wide and 68mm thick. By the time I have turned it true it should give me enough wood to have around a 65mm-diameter ring section on the torus with a similar-sized central hole, which I think should visually balance quite well.

INITIAL MOUNTING

After bandsawing it into a disc I decide a screw chuck will be the most reliable way to hold it. I will need to reverse the blank to gain access to both sides, and I'll most likely want to repeat this several times to perfect the shape, so I drill right through the blank with an 8mm drill on my pillar drill. As long as I keep a central hub with the 8mm hole untouched when turning the torus, I should be able to remove and remount it as many times as I like without suffering any run-out, which is far more likely with a chucking tenon.

Once the blank is trued up I have a blank of 190mm diameter, 64mm thick. This allows me to plan the diameter of the ring profile.

TEMPLATE

To achieve a perfect circle in the ring profile I need to make a template. I mark out the 32mm radius (half of my 64mm timber) on a piece of 3mm MDF and cut it out on the bandsaw. To make it easier to cut a tight curve I make relief cuts into the arc, which means that as I cut to the line, the waste falls away behind the blade rather than binding and causing a wavy line. I sand the template smooth and can start turning.

Cutting the template on the bandsaw

Marking out the torus BELOW: Beginning to shape the first curve

Turning

I begin by marking the 64mm point on the face of the blank, along with the radius mark at 32mm, which marks the crest or high point of the ring. I start with a 10mm (13mm bar) bowl gouge, using the wing of the tool in a draw cut to take the corner from the blank and develop a smooth curve. I have turned many spheres over the years so I am acutely aware that when forming this pure shape the curve begins right on the line, otherwise it simply looks wrong. There should be no flat spots on the finished torus.

As the first curve begins to take shape I regularly compare it to my template and adjust accordingly. Satisfied with the first quadrant I move to the left side and develop it into a hemisphere, again regularly checking it against the template. Using the screw chuck I have reasonably good access to the back of the torus but, having the ability to reverse it as often as I please, I don't worry about getting this part 100% perfect just yet.

I move to the face of the blank and decide to cut directly into it where the central hole will be to ensure accuracy. I mark 28mm (shy of the 32mm halfway point) on the side of my 4mm parting tool and gently cut into the face of the blank. This cut always ends up far wider than the tool ,but that isn't a problem here. The profile of the parting tool allows a controlled cut which does the job I need perfectly.

With a groove on the face it gives me a target to aim my curve

from the high point round into the centre of the torus. It also allows a little working room. I start with a push cut with the bowl gouge which quickly and cleanly removes a lot of waste wood, but I soon find I don't have much working room between the central hub – which needs to stay there – and the torus. I reduce the diameter of the hub somewhat and switch to a 10mm spindle gouge, using a shearing cut on the wing of the tool to lightly develop the curve, which I find works much better for me. I have no concerns using the spindle gouge as the tool overhang over the toolrest is quite minimal and I have full control at all times. With a larger-diameter torus there would be more space between the hub and the ring so there would be more working room.

As before, I regularly check my progress against the template. I had cut the template into a rectangle of MDF which is now getting in my way as I progress around the torus, so I reshape it on the bandsaw. The template is only a quadrant of the ring profile but it needs to fit at every point around the ring and so it shows me exactly where I need to remove wood. I find it gives the most accurate reading when placed on the centreline of the work. I have learned to trust my templates. It is easy to find yourself doubting what they tell you but, having carefully made it, I know it is correct so must remove waste as it guides me to.

Checking against the template, which shows where more wood needs removing

The parting tool cut into the face

Turning into the torus

Using light shearing cuts with a spindle gouge

Believe what the template tells you

Reversing the torus

Having worked one side, I am ready to flip the blank over on the screw chuck and work on the other side. The first thing I realise is that I need to mark my 32mm and 64mm points from the edge, but having partly turned the curve I have lost a reference point. With a little quick thinking I use a small try square and ruler to enable me to mark these points accurately. By placing the square as shown in the picture, it essentially replaces the corner of the work which I have removed and allows me to measure and mark the important points.

With the points marked I am able to repeat the previous steps and shape the torus, regularly checking against the template, until I am happy with the result. My focus now shifts to the thickness of the material left in the middle. My hour-glass callipers show me I still have around 15mm of wood, which is more than enough.

Marking the reverse side using a square

Checking with callipers

PARTING OFF

Continuing to think through the process, I realise that I will need to completely part off the torus from the hub before moving to my glue-gun-chuck. I need to remove more wood from the centre so continue to work around the curve of the torus until there is around 6mm left, which sounds quite thin, but the torus is still firmly fixed with no hint of a wobble. At this point I sand from 120 grit to 400 grit, reversing the torus on the screw chuck once during each grit to ensure the surface is evenly sanded right round to the centre.

Once fully sanded smooth I reduce the hub to give better access to the centre, and I'm ready to part the torus from the hub. There are several options here to add safety to the process, including the use of tape or cling film, but I have found that there is little need as long as you are paying full attention. Using a sharp parting tool I gradually reduce the thickness of the remaining wood, regularly checking to see if there is light coming through. It is important to take very light cuts as there is a point at which the sound of the cut changes in pitch. At this point I stop and check again. Light is clearly shining through but, because of the structure of the wood, it is still holding on several points around the circle. At this point I rotate the torus by hand with my tool in place to further slice the fibres. A couple of rotations and a slight wiggle of the torus and it comes free. I am pleased to see the curves meet up well with only a small seam line to remove as I blend them together.

Almost through but still holding on

A strong wiggle and the torus is free

The curves meet well with just a slight seam line to remove

Glue-gun-chuck

I must confess to being slightly cynical about using a glue gun in turning. Surely glue guns are for kids and crafters, not serious woodworkers? All of the professional glues I use need good pressure applying to the joint for several hours before it's safe to work on the project, but once it's dry it is a permanent bond. I'm after a strong but temporary hold, which just doesn't entirely sit well with me. Reading the instructions, I need to allow the glue gun to heat up for seven or eight minutes so while I wait, I turn up a blank of scrap softwood, again fixed to the screw chuck. I check the face of the blank is flat and true and sand it with a piece of 180 grit wrapped around a block.

I will need to apply some pressure while the glue dries so fit the large cone centre to my multi-tip live centre. Alternatively a wooden cone could be turned to fit over a standard live centre to do the same job.

With the glue gun up to temperature I liberally coat the face of the softwood blank, bring the torus into place with the tailstock and tighten it. The glue sticks tell me that they reach full strength after cooling for just two minutes but I decide I might add a little more glue around the edge, between the torus and the softwood disc, just for a little piece of mind. I then leave it for a good 10 minutes to dry before even thinking about turning the lathe on.

I remove the tailstock and give the torus a bit of a wiggle, then a more robust shake and it doesn't move at all. With increasing confidence I start the lathe, initially at a slow speed and build it up to a good working speed of around 1000rpm, which is still slower than I might run it at were it more conventionally held. Satisfied that it is going to stay put, I use my 13mm spindle gouge very lightly with a shearing cut to remove the seam line and blend the curves together. All goes remarkably well and to plan.

Applying glue to the backboard

Additional glue to reinforce the joint


Close-up of the glue joint


Blending the curves with a shearing cut with a spindle gouge


Checking the curve flows all the way around with the template

Decoration

The two knots in the walnut had the desired effect of adding interest to it, but I dislike the look of cracks and faults in wood and can't resist the urge to fill them with something. Looking for a quick but effective solution I find some brass powder which I've used in the past but has been collecting dust for several years. I think a hint of shiny metal in with the rich, dark chocolate colour of the walnut could look very eye catching.

I spray some sanding sealer on to the areas I am going to fill to prevent staining on the walnut. I mix up some two-part epoxy, which I regularly use for sticking metal components into wood, and add the brass powder. At this stage it always looks a very unattractive green colour and I hope I haven't made a bad decision. I mix plenty of the powder into the epoxy until it is a thick paste and spread it on to the knot and cracks.

Throughout, the torus has remained in the chuck and now I simply replace the chuck on the lathe and begin to clean off the excess epoxy mix. It is quite thick so initially I use a power sander to remove most of the dried epoxy before powering up the lathe and re-sanding the whole torus until I am happy that the epoxy mix is only showing in the cracks.

Because I had used lots of brass powder in the mix to make it a thick paste, the filled areas have an excellent metallic sparkle to them, rather than just a mucky green, which was my concern.


Applying the brass powder and epoxy mix


At this stage it looks very unpromising


Power sanding away the excess filler


The result of filling the cracks

Removing the torus

Theoretically, I should simply be able to use the hot-air gun on the dry glue, which should soften it enough for the torus to be easily removed from the backboard. I haven't used a hot-air gun before and assume it's basically just an industrial hair drier. My new tool has three heat settings and on level one it is equivalent to a hair drier but on levels two and three it really puts out some heat. I fit one of the optional nozzles, which looks like it will best direct the heat to where I need it. I am aware that too much heat applied to the wood could cause damage, from scorching to heat cracks and, sure enough, the softwood backboard does get lightly scorched in places. Soon the glue begins to melt and the combination of the heat from the gun and the melting glue means I have to put a glove on my spare hand to avoid burning. Even once all the glue is quite soft the torus resists coming away from the backboard until eventually I am able to apply enough force to tear it away from its fixing. This gives me great confidence in glue-gun-chucks as it's clear they hold very securely and it's entirely possible that I didn't need to apply the additional glue, although I'd always prefer a chuck to over hold rather than the other way around.

I remove the chuck and replace it with my usual reversing board of MDF fixed to a faceplate and bring up the live centre again. I try sanding away the remaining glue but it just makes a bit of a gooey mess, so I gently apply a little more heat and scrape it away with my fingernail. With the remaining glue gone, I re-sand the outside, reverse and repeat. There is just one area inside which isn't quite as well sanded as the rest, so I hand sand this up to the same 400 grit level as the rest and finish the whole thing with a thorough rub with an abrasive pad. I finish the walnut torus with three coats of hardwax oil and it is complete.

Applying heat to the glue-gun-chuck

After much persuasion the torus is free of the chuck

Final hand sand before oiling

Applying oil to the torus

Conclusion

I am very pleased with the finished torus. The actual turning was quite simple although needed care and attention to achieve a good result. My timber choice was good, enabling me to use a piece of timber which may otherwise have ended up in the firewood bag. The faults cause some interesting grain and it makes the finished item far more interesting than it might otherwise have been. I'm not entirely certain what to do with my finished torus, perhaps I could mount it on a base of some sort. Perhaps a short length of brass rod, which would tie in the filler I used, could attach it to a base? I think there are many possible options available to make this into a more presentable piece of artwork. It could itself be used as a base or mounting for another project? Either way, I feel the challenge has been met, and I now have a new chucking method in my armoury which I can use with confidence, should the need to hold an odd-shaped piece of work ever arise in the future.

The finished walnut torus showing metal inlay detail

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PHOTOGRAPHS BY MARK SANGER

Ginger jar

Mark Sanger shows how to make a ginger jar and looks at the impact different lids have on the appearance

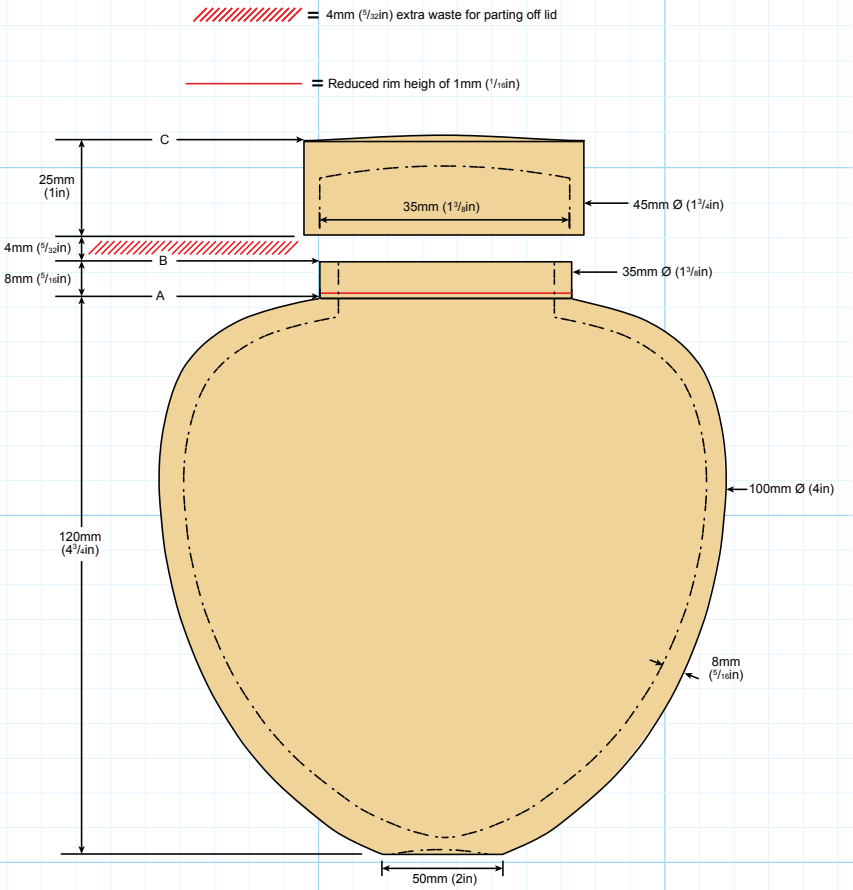
In this article I explore how the appearance of a lidded form can be significantly altered simply by producing different-shaped lids. Here I start with a traditional ginger shaped form which is turned from end-grain seasoned sycamore (*Acer pseudoplatanus*) but any close-grain woods can be used. The first design here is turned from a solid blank similar to the method used for turning a small box. This, however, can be wasteful so also shown is how to produce the lids using offcuts or, alternatively, more expensive exotic timbers can be turned instead. For the making of the lids I have kept the techniques as simple as possible by using jam chucks made from scraps of wood. The emphasis in this article is on the methods to produce the form and lids, giving you a foundation to go away to practice and explore further ideas as to how the visual effect of different lids can impact on a single form. To this end I have chosen plain sycamore devoid of figuring, with the only addition being black wood stain for some of the lids so that the visual effect of each can be viewed void of distraction. The use of finishes has been excluded to allow for room to show the variations and methods to produce them. However, application of your preferred finish can be achieved after the abrasive finishing process as with any project, so remember to include this within the process as you turn the piece. Each lid is shown with illustrations with dimensions but, as with all articles, the design and woods can be altered to you suit your own taste. Experiment, turn safely and have fun.

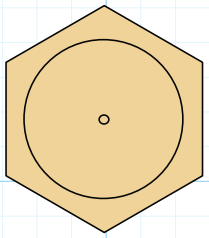
TOOLS AND MATERIALS

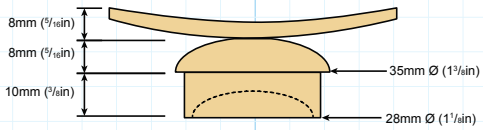
- Personal and respiratory protective equipment (PPR & RPE)
- Spindle roughing gouge
- Bowl gouge with long grind
- Spindle gouge
- Skew chisel
- 6mm parting tool
- 2mm parting tool
- Suitable hollowing tool of your choice for the main body shape created
- Chuck
- Drive spur
- Revolving tailstock centre
- Tailstock drill chuck
- 6mm twist drill
- Disc sander
- Fine blade handsaw
- Internal and external callipers

MATERIALS

- Main form: seasoned sycamore (*Acer pseudoplatanus*) branch wood 100mm dia x 150mm long end-grain blank
- Hexagonal lid: 50mm x 50mm, prepared from offcut
- Lid 1, 2 & 3 beech (*Fagus sylvatica*) 50mm square x 70mm prepared end-grain blank
- Finial/lid: beech 50mm x 50mm square x 50mm long end-grain blank
- Finial: 20mm x 20mm x 100mm end-grain blank
- Abrasive 120 to 400 grit
- Black wood stain
- Finish of your choice for the non-dyed elements




Lid 2 template



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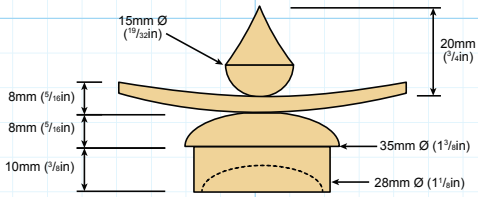

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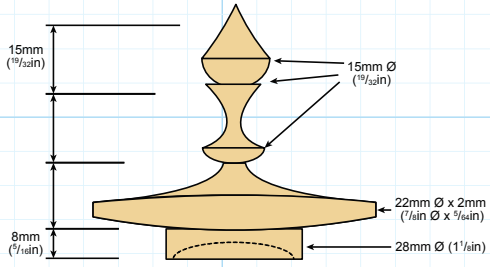
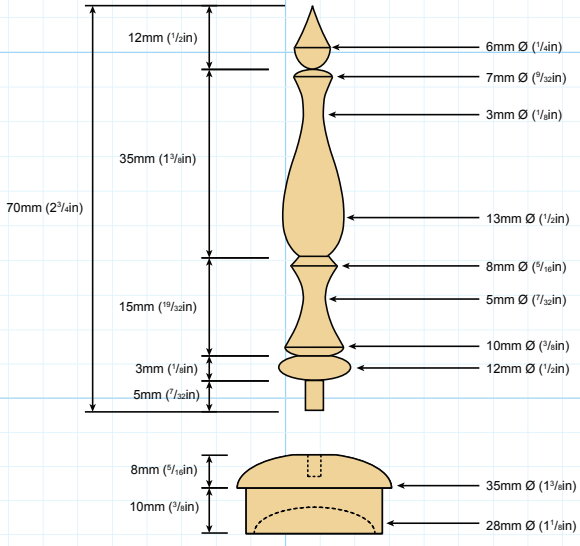
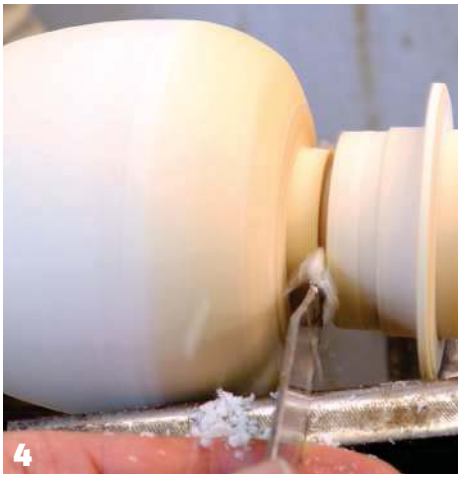
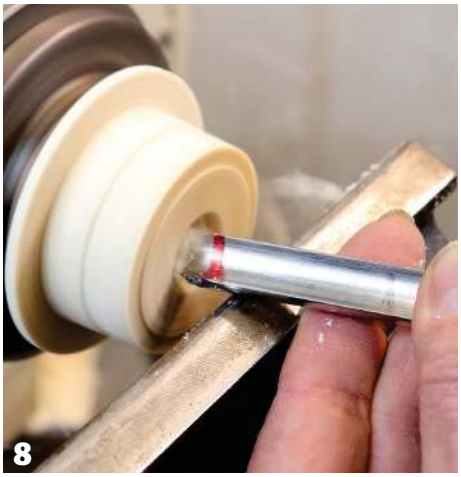


Lid 5







Pot & lid made from single blank

1 Mount the blank between centres. Once secure, turn it to a cylinder and turn a spigot to fit the jaws of the chuck at both ends of the blank using a parting tool. Then turn a waste section at the tailstock end of the blank larger than the chucking spigot and about 15mm wide. Use a pencil and rule to mark from the waste area the height of the pot, neck and height of lid, taking into account extra for parting off of the lid as shown at A, B and C in the main illustration. The darker line at B pictured is where the lid will be parted off, so here it is shown as a thicker line than A & C with 3-4mm extra added to the height of the lid prior to parting off.

2 Using a 6mm parting tool and callipers, set slightly over size for the diameter of the neck, part in left of line A several times until the full width is achieved. Then reset the callipers for the lid diameter and continue parting in left of the neck to produce the lid up to line C previously marked. Ensure you take into account the extra for parting of the lid later in Step 4.

3 Use a bowl or spindle gouge to shape the main form, working from shoulder down towards the tailstock and chuck respectively while turning from large diameter to small, so cutting with the grain, refining from the shoulder down into the neck join.

4 Once done, reverse the form and tighten into the chuck. Ensure it is secure and running true. Now bring up the revolving tailstock centre into the indent created by the drive centre and secure in place. Use a 2mm parting tool to part the lid from the neck, leaving a millimetre of the neck on the lid as a register when hollowing out to later for fitting on to the neck of the form. Now stop the lathe before fully parting off the lid and cut through the remaining waste using a fine-blade saw.

5–7 Mark the internal depth of the form to be hollowed with on to the shaft of a Forstner bit held in the tailstock or in a drill chuck and drill out to depth with the lathe set to around 500rpm. Remove the bit regularly to clear the shavings.

Using your preferred hollowing tool, hollow out the form, stopping regularly to clear the shavings and prevent the tool binding. Hollow from the drilled hole outwards, working from the opening down to the base so as to maintain solidity in the base of the form until the top section has been hollowed.

Finish the inside of the neck and shoulder with abrasive down to-320 grit. Do not stick your fingers inside. I have shaped a metal coat hanger wrapped in duct tape to which abrasive is stuck for this.

8 Remove the form and secure the lid into the chuck. Hollow out the lid to depth using a gouge. The depth needed is marked on the tool. Hollow out to 3-4mm from the registration mark left when parting the lid from the form. The extra thickness from the registration enables the neck of the form to be turned to create a nice fit with the lid and negates the need for further measuring and marking the required diameter for the lid later.

9-11 Turn the inside walls parallel using the toe of a skew chisel with the tool being presented horizontal on the toolrest in scraping mode. Remember not to hollow/parallel all the way out to the registration line. Leave the wall slightly thicker for fitting on to the neck later. As you refine the inside of the lid, stop the lathe regularly and check the internal profile using callipers. Refine until parallel. Finish the inside, front face and bottom third of the outside of the lid with abrasive from 180-400 grit, taking care not to alter the internal profile of the lid.

12 Remove the lid, tighten the body form into the chuck, making sure it is seated fully, and refine the diameter of the neck using a parting tool. Take fine cuts to create a parallel entry opening, checking the fit with the lid as you work until the lid secures tightly on to the neck. If you take off a little too much off just use several layers of kitchen towel sandwiched between the lid and neck to create a jam fit. Using a spindle gouge, turn away the waste and shape the top of the lid, blending carefully down into the outside section previously finished. Once complete finish the top and sides of the lid with abrasive down to 400 grit.

13 Remove the lid and finish the neck, shoulder and main body of the form with abrasive to 400 grit. If you managed a tight jam fit then carefully finish the neck down to 400 grit with the lathe running slow at around 500rpm, checking the fit as you work. Aim for the lid to have a snug fit.

14 Produce a cone-shaped friction drive from scrap wood and mount the form into this, bringing up the tail centre to support into the indent previously left when turning between. Use a spindle gouge to refine and shape the base, removing the waste and spigot to produce and concave the base. Once complete, stop the lathe and cut through the remaining waste with a fine-blade saw, carve away and blend this into the base using a small carving chisel and finish with abrasive on a small sanding arbor held in the chuck with lathe speed set to 2000rpm. The first pot is now finished.

Producing lids using a second blank

The next lid made is turned from an offcut of the same wood that might otherwise be discarded. The form of lid to make here is on the same theme as the previous one but will be shaped to a hexagonal before turning. Shaping the blank before turning opens various possibilities, such as texturing the panels, adding colour through paints or pyrography or simply just leaving the natural wood colour. Create a hexagonal template and stick it on to the face of the end grain of blank you will be using.

HEXAGONAL LID

15–16 Cut out the shape carefully, leaving it slightly oversize for cleaning up. Refine the shape using a disc or belt sander, finally hand sanding it down to 240 grit abrasive.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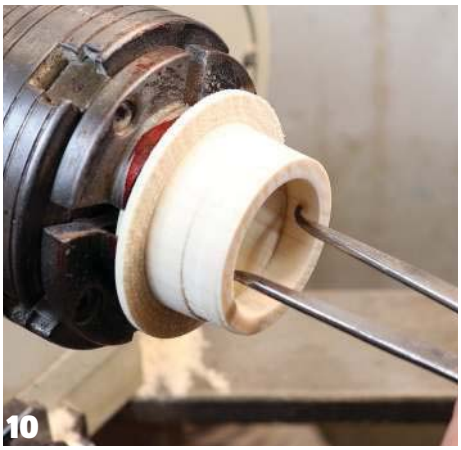
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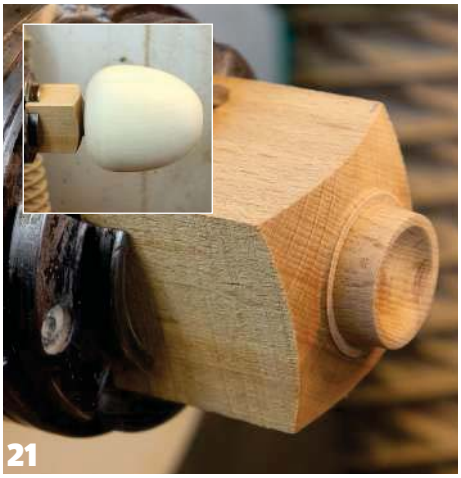
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17 Mouth the blank between centres, turn a spigot to suit your chuck jaws and tighten into the chuck. Clean up the front face with the spindle gouge, mark the diameter of the neck on the front face using a pencil and rule, hollow and refine the internal profile of the lid as previously shown in steps 8,9,10 & 11.

18 Offer the form up regularly as you profile and finish the inside of the lid as you work to achieve a tight jam fit. Remove from chuck once hollowed.

19 Turn a jam chuck from an offcut to fit the internal profile of the lid. Jam the lid on to this, protecting the inside surface by sandwiching kitchen towel between the lid and jam chuck. Using a spindle gouge shape the top of the lid, cutting from outside into centre. Finally finish with abrasive from 120-400. Remove from the chuck. Here I finished the sides by hand, using folded abrasive from 240-400. I prefer to finish the sides by hand after all the turning has been completed in case I mark the sides while working.

SQUARE LID

The previous lids are made to fit over the neck of the form but now the form is turned with a simple opening, so the lid fits down inside of this. The effect is markedly different but shows how a simple alteration of the rim and lid shape can alter the overall effect of the piece. For these lids a blank is prepared accurately to size to a square profile prior to turning and is turned to produce wings leaving the square edges intact. This comes with its challenges due to the intermittent cuts and the need to use a skew to slice into the fibres to preventing the edges breaking out. However, as an alternative the lid can be turned to the round with the sides being cut/shaped off the lathe as shown later. Here due to the fine detail being turned I chose an offcut of beech.

20 Prepare the blank to 50mm square x 75mm long and tightened directly into the jaws of the chuck. Clean up the front face using a spindle gouge, cutting from outside to centre. Mark the diameter of lid spigot to fit into the form on to the front face, as well as the width of the spigot and area of the top to the underside of the wings on the outside. Using the toe of a screw chisel, cut from the outside into the main body of the blank. This allows for the fibres to be supported when cut, producing and maintaining sharp edges on the wings.

21 Cutting from outside in produce the outer rim to size as shown in the diagram. Finally hollow out the underside of the lid using a spindle gouge and finish with abrasive from 180-400, checking the fit as you proceed.

22 Using the toe of the skew shape the top profile of the lid, cutting from outside in and blending the wings into this as you work. Finish with abrasive by hand to 400 grit as before.

23 Produce a jam chuck using a scrap piece of wood to accept the rim of the lid. Note that a hole is drilled through the centre of the jam chuck before fitting the lid into place as once turned it can be difficult to remove the lid from the jam chuck without breaking the wings. Instead a dowel can be placed into the hole to push the lid out.

24 The lid is jammed into the chuck and the revolving tailstock centre brought up for added support. Use a spindle gouge to cut from outside in, profiling the top of the wings and removing the waste as the shape it is developed.

25 With the wings shaped, turn the teardrop, shaping this from the waste wood remaining. Work from outside in, always cutting downhill as you shape. Here I used both the spindle gouge for the main shape and the toe of the skew as before for the fine detail, blending the base of the teardrop into the wings. A simplified version of this lid without the addition of the teardrop is also shown and one that I produced to experiment. I was not happy with the overall shape of this but have included it to show another alternative. After turning and finishing both were stained using a black wood stain applied by brush.

26 Alternatively the lid can be turned to the round with the square being marked on to the wings. The main waste is cut away with a fine handsaw with the piece held in the jam chuck and the edges of the wings carefully finished on a disc sander or with abrasive stuck to a flat offcut of thin plywood.

FINIAL LID

This lid is a classic, often-seen addition in turning and is a fantastic exercise in using the spindle gouge and/or skew chisel. Here it is produced using two small blanks of beech – one for the lid fitting into the form and the second for the finial. Again, after turning both parts black stain was applied with a small brush.

27 Mount the blank into the chuck and produce the lid as shown before in 21 & 22. Produce a jam chuck as shown in 23 and jam the lid into place, refine the top profile with a spindle gouge if required and drill a hole to accept the finial into the face with a 6mm drill held in a Jacobs chuck in the tailstock. Finish with abrasive and stain.

28 Rough the finial blank to the round and tighten into the chuck – bring up the tail centre to support. Mark the finial length and spigot to fit into the lid on the outside using a pencil and rule. Turn the finial using a spindle gouge, working from tail centre towards the chuck with small cuts as you go. Once a third of the detail is complete, remove the tail centre and finish the point carefully before turning the remaining detail. Finish with 240-400 abrasive and apply the stain. Finally, create the spigot to fit into the lid using a parting tool and callipers to measure. Stop the lathe and cut through the spigot to length using a fine-blade saw. ●


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Chinese Well

This extract from *Woodturning Trickery* by David Springett shows how to create a fiendishly hard puzzle

For generations, the Zhang family have been responsible for the care of the village well. Each autumn, as the rains begin, the well is covered for winter. Each spring, as the rains recede, the well is opened and the well cap placed above it for protection. Zhang San is the last of his family; and when he dies one winter, nobody else in the village knows the secret of opening the well and supporting the cover above it. Can you help the villagers to open the well, using only the parts around it to support the cover above it?

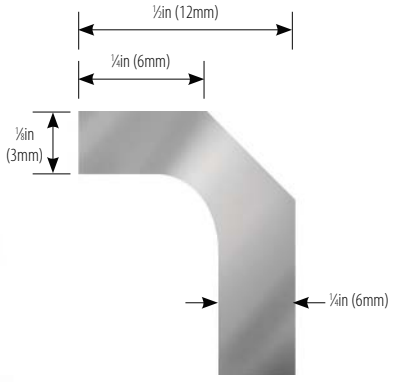
This puzzle is based on a well-known party trick. Three wine glasses are set on a table, equally spaced in a triangle by the length of three table knives. The challenge is to use the three knives to support a fourth wine glass above the other three. The solution is to plait the knife blades, while resting the handles on the glasses, creating a stable platform for the fourth glass. The solution to the Chinese Well puzzle is the same, but instead of a wine glass supported by knives, it is a well cap supported over the well by the spindles that surrounded it.

Preparation

- For the well base, cut a 4in (100mm) square by 1½in (40mm) thick piece of wood, marking its centre with pencil diagonals. Set a compass to 4in (100mm) and, with the point on the marked centre, draw a circle.
- For the well cap, cut a 2⅛in (55mm) diameter piece, 2in (50mm) long. Again, mark its centre.
- For the uprights, cut six pieces 3½in (90mm) long by ½in (12mm) square.
- For the feet, cut a piece 2⁵⁄₁₆in (60mm) long by ½in (12mm) square.

Additional tools and materials

- 1½in (40mm) diameter saw-tooth drill
- Three- or four-jaw, self-centring chuck
- Jacobs drill chuck
- PVA glue and newspaper for the glue chuck, or a hot-melt glue gun
- ½in (12mm) HSS blank to be ground to shape (see left). To make this tool, first paint the end of the blank with typist's correction fluid. On that, mark the shape. Carefully grind away the metal to shape, quenching the tool in water regularly so that it does not overheat. Grind the cutting angle back to about 45 degrees.



Dimensions for the undercutting tool, ground from an HSS blank.

Suggested lathe speeds

- For the base: 1,000rpm
- For the well cap: 1,250rpm
- For the smaller spindles: 1,750 to 2,000rpm

Turning the well base

THE WOOD

I turned this puzzle from padauk. It is never a disappointment turning this wood as it cuts so well. It provides a wonderful, glossy, deep-red finish; but beware, as over time it darkens to a deep brown.

1 Take the 4in (100mm) square by 1½in (40mm) thick piece of padauk. Clamp it firmly to the drill table. At its marked centre, drill a 1½in (40mm) diameter hole (A).

2 Use a bandsaw to cut the piece to the marked 4in (100mm) diameter (B).

3 Fit a three- or four-jaw, self-centring chuck to the lathe.

4 Push the drilled hole of the piece on to the chuck jaws, ensuring that the wood sits flat against the chuck jaws or the chuck face. This will ensure that the drilled hole runs true. Expand the jaws so that the piece is held firmly.

5 Carefully turn the outer edge, until the piece is brought down to 3⅝in (95mm) diameter. It is not necessary to turn close to the chuck jaws at this stage.

6 Turn the face flat and true.

7 Mark a 2¾in (70mm) diameter concentric circle. On the outside of the circle, turn a ⅛in (3mm) deep step, to the outer edge (C).

8 Mark in pencil a circle ¼in (6mm) in from the edge. On that circle, mark four equally spaced points for the feet.

9 Next, take the specially ground undercutting tool and make a mark, using typist's correction fluid, ⅜in (9mm) from the cutting edge (D). Situate the tool, on the shelf tool-rest, so that the mark is in line with the edge of the hole, then turn a ⅛in (3mm) wide, ¼in (6mm) deep groove into the edge of the hole (E).

10 Clean up the face, edge, hole and groove. When satisfied, remove the piece from the chuck jaws.

11 Reset the piece on the expanded jaws, with the turned face and groove against the chuck. Make absolutely certain that the turned face is set flat against the chuck, and that the hole rotates on centre.

12 Turn the exposed face flat and true, and bring the thickness down to 1¼in (32mm).

13 Mark in pencil two light lines on the face: the first 3⁄16in (4.5mm) in from the edge, the second ⅜in (9mm) in from the edge.


A

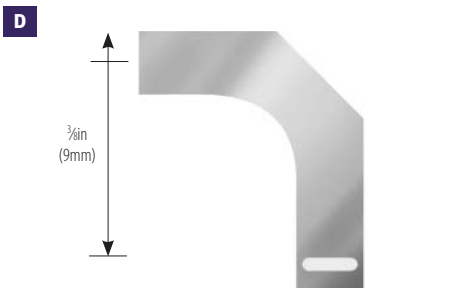
The square blank is clamped in place while the central hole is drilled


B

The drilled square blank is cut round


C

The small step is turned



D

Mark a position ⅜in (9mm) away from the cutting edge


E

Cutting the internal groove with the work held on expanded jaws


F

The work is flipped over and the curve is turned down towards the centre


G

Turning the internal step


H

The finished base

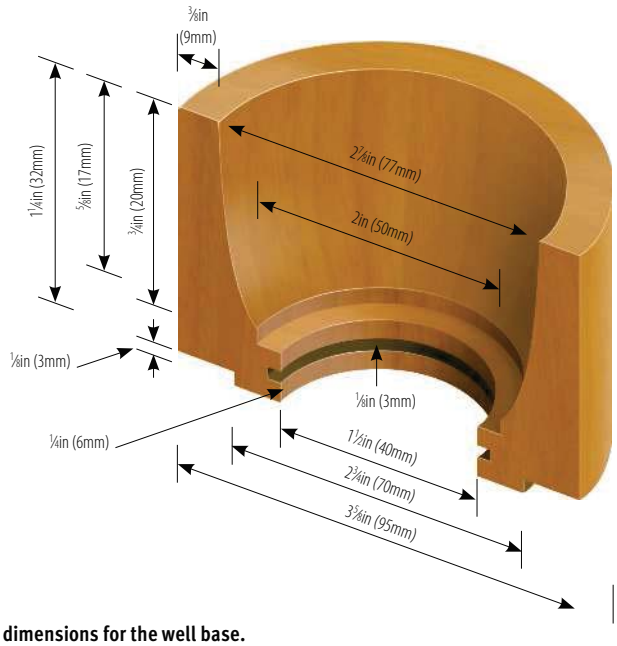
14 Using a ⅜in (9mm) gouge, turn a sweeping curve from the inner circle down into the hole to a depth of ⅝in (17mm) (F).

15 At the base of the beautifully sweeping curve, use a square-end tool to turn a 2in (50mm) diameter step ⅛in (3mm) deep (G). Use the shelf tool-rest to provide good support for the tool.

16 Accurately measure the diameter of the pencil line marked 3⁄16in (4.5mm) in from the edge. It should still be visible. If not, mark it again. Its diameter should be about 3⅜in (86mm). Halve that size to calculate the radius and set a pair of pencil compasses to that distance.

17 Step the compass around the circle, marking six equally spaced points. Ensure that they are marked with the compass point, so that when the work is glass-papered the points remain clear.

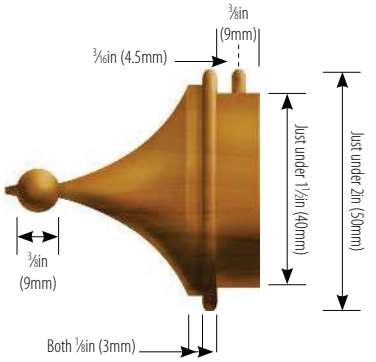
18 Clean and polish the inner and outer surfaces to a deep shine. Remove from the lathe and set aside (H)



The dimensions for the well base.

TOP TIP:

- When cutting the groove in Step 9, place the tool on the shelf tool-rest with the cutting edge facing slightly downwards. Move the tool into the rotating hole until the mark on the shank is in line with the outer edge of the work. Move the tool across and into the work so that it begins to cut. Slowly work the tool in, withdrawing it regularly, until a ¼in (6mm) deep, ⅛in (3mm) wide groove is cut.



Turning the well cap

THE WOOD

I turned this puzzle from padauk. It is never a disappointment turning this wood as it cuts so well. It provides a wonderful, glossy, deep-red finish; but beware, as over time it darkens to a deep brown.

1 Replace the chuck with a wood faceplate. Apply PVA glue to the central area and fix newspaper to that glue. (Glue from a hot-melt glue gun may be used instead if you wish.)

2 Take the 2⅛in (55mm) diameter by 2in (50mm) long piece of padauk and apply glue to its underside. Push the glued surface onto the glued newspaper on the faceplate.

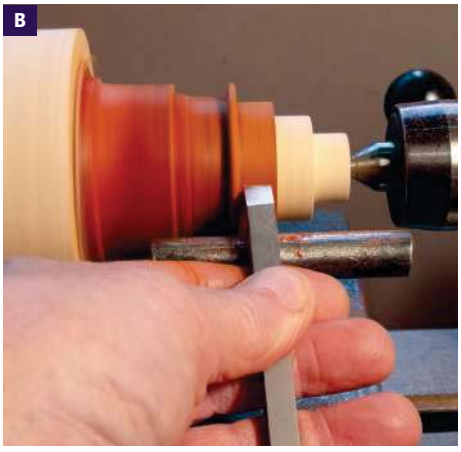
3 Touch the revolving centre lightly against the marked centre on the block to ensure that it is fixed accurately on centre. Place a piece of scrap wood between the padauk and the centre to spread the pressure while the glue sets. This also prevents the centre point marking the end of the piece (A).

4 Turn the first ⅜in (9mm) section down to just under 1½in (40mm) diameter (B). The fit can be tested by pushing the turned well base on to the piece (C). It should be an easy fit.

5 Turn the next ⅛in (3mm) to just under 2in (50mm) diameter. It is important that the step in the base of the well, turned to 2in (50mm) diameter, is measured again and checked against this measurement. The shoulder should be an easy fit into the step in the well base. This can be checked by pushing the turned well base on to the piece once again (D).

6 On the faceplate side of this ⅛in (3mm) long, 2in (50mm) diameter part, turn a slight slope down to about 1^{11}⁄$_{16}$in (42mm) diameter.

The well cap blank glued, with newspaper between, onto a wood faceplate



Turning the end of the well cap

7 Remove the supporting waste wood. Turn the end face flat. Then, turn a gentle hollow at the centre and add a couple of incised lines for decoration (E). Sand and polish.

8 Split the newspaper-and-glue joint. Replace the faceplate with the three- or four-jaw chuck (F).

9 Hold the newly turned end of the well cap in the chuck jaws. Wrap abrasive paper or card around the area held in the chuck jaws for protection. Initially, place a piece of scrap wood between the piece on the revolving centre to support it.

10 Use a small gouge to turn most of the wood from the top of the well cover (G).

11 Use a skew to turn the finer details on the end (H).

12 Use a square-end tool, angled to cut like a mini-skew, to turn the top point. Sand and polish.

13 To complete the well cap, turn a small dowel just under ⅛in (3mm) diameter, ⅜in (9mm) long. This dowel should have a dome end. When turning, the dowel can be held in a Jacobs chuck at the headstock

14 Test the dowel in the groove in the well base. It should move freely in the groove. If it does not, turn another that will.

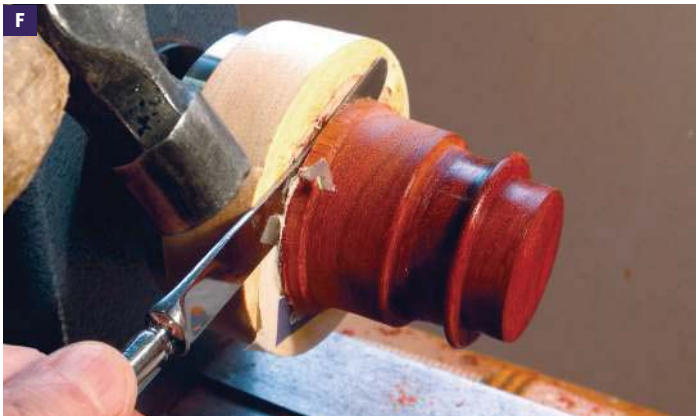
15 In the side of the 1½in (40mm) diameter end of the well cap, drill a 1/8in (3mm) hole, 3⁄16in (4.5mm) deep, 3⁄16in (4.5mm) up from the flat end.

16 Carefully squeeze a dab of glue in the hole and tap the small dowel in, leaving about 3⁄16in (4.5mm) of the dowel end showing (I).

Testing the base on the turned end of the well cap

Check the turned step around the base against the turned collar of the well cap

The hollow turned on the underside of the well cap



Splitting the newspaper-and-glue joint

Turning the top of the cap

Completing the top of the well cap

The dowel glued into the edge of the well cap

Returning to the well base

1 At each of the six equally spaced points around the top of the well base, drill a 3⁄16in (4.5mm) hole, 3⁄8in (9mm) deep (A).

2 On the underside, at each of the four equally spaced points for the feet, drill a 3⁄16in (4.5mm) hole, 3⁄8in (9mm) deep.

3 Move on to the step at the base of the gentle curve, on the inside of the well base. Cut a 3⁄16in (4.5mm) wide, 1⁄4in (6mm) long gap to allow the small dowel (now fixed in the edge of the well cap) to pass through (B). To cut this gap, use a small drill to create an opening, then extend it with a sharp craft knife or chisel. When the well cap is fitted, with the dowel in the groove, the dowel should move along the groove when the cap is twisted. Only when the dowel is in line with the gap should it be possible to remove the well cap.

4 If the dowel does not locate accurately in the groove, replace the well body in the chuck and turn a small amount off the top of the area where the well cap sits. Test for fit and rework until you are satisfied.

5 The small dowel and the gap are hidden from above and below, so the removal of the cap becomes guesswork – adding difficulty to the puzzle.

The holes around the top of the well are drilled

Cutting the gap for the bullet dowel to pass through

Turning the feet and spindles

1 The easiest way to turn these parts is to first round the wood down to a clean ⅜in (9mm) diameter. This can be done by holding the square end in any chuck, then turning the end at the tailstock to size.

2 Take the 2⁵⁄₁₆in (60mm) length of prepared ⅜in (9mm) dowel. Turn it so that a ¼in (6mm) length of ³⁄₁₆in (4.5mm) diameter is followed by an accurate ¼in (6mm) length full diameter. Produce three sections like this (A).

3 Cut the three separate feet.

4 For each foot, hold the smaller diameter in the Jacobs chuck and use a skew to gently round over the end (B). Make sure these ends are turned exactly the same length. Clean up thoroughly and polish.

5 For the spindles, it is important the pieces are turned accurately to the size and shape shown, to ensure that the puzzle works correctly. Turn all six blanks round (C), then on each spindle turn a ¼in (6mm) long, ³⁄₁₆in (4.5mm) spigot on one end (D).

6 For the three cup-end spindles, hold the dowel (spigot end first) as deep in the Jacobs chuck as possible. The piece should measure 2½in (63mm) from the shoulder of the spigot to the end.

7 On the exposed end, use a ⅛in (3mm) round-nose tool to turn a curved hollow about ³⁄₁₆in (4.5mm) deep (E).

8 Pull the piece out from the chuck and refix so that the small spigot is held in the chuck jaws. Support the curved hollow with a revolving centre. The centre mark in the hollow will be of no importance.

9 Following the template for the cup-end spindle, mark in pencil the main points. Use a skew and square-end tool to turn the spindle profile. By now, you should be quite proficient in the use of smaller tools on smaller, turned spindles (F).

10 Clean up the cup-end spindle thoroughly before removing from the lathe. Repeat so that you have three turned cup-end spindles.

Preparing the three feet

Turning the end of the feet

Roughing down the spindle blank

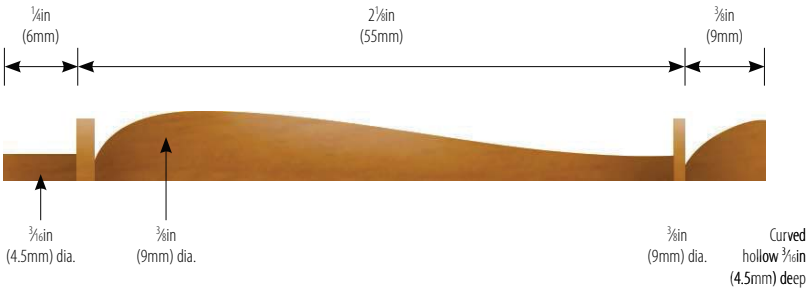
The spigot on the spindle end is turned

Turning the cup hollow in the end of the spindle, using a small round-nose tool

Turning the cup-end spindle

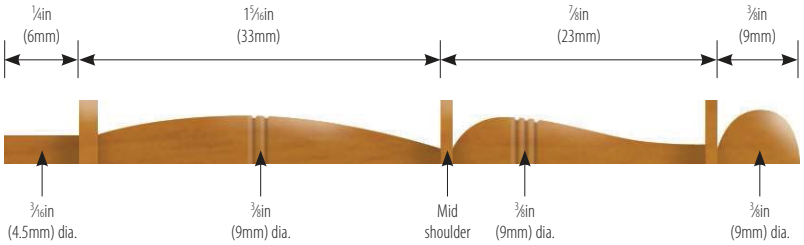
TOP TIP:

- As these are relatively short lengths, there should be no flexing or whipping to cause a problem.



Dimensions for the cup-end spindle

Finishing the ball-end spindles



Dimensions for the ball-end spindle.

Parting off the ball-end spindle

1 Hold the dowel for the ball-end spindle in the Jacobs chuck, this time with the turned spigot at the tailstock end.

2 Following the template, mark with a pencil the main points on the rotating dowel.

3 Turn the profile, finishing off at the ball end (A).

4 Clean up thoroughly, parting off with the skew at the top end of the ball. Repeat, so that you have three ball-end spindles.

Assembling the puzzle

1 Polish all parts before assembly.

2 Use a small amount of glue to glue the feet in their holes on the underside of the base (A).

3 Of the six spindles, only the three cup-end spindles should be glued in place. This is important. So, glue the first cup-end spindle in its hole; miss a hole; glue the second cup-end spindle in its hole; miss a hole; then, glue the third cup-end spindle into the final hole.

4 Fit the ball-end spindles, without glue, into the empty holes between the three glued cup-end spindles. Finally, fit the well lid into the central hole (B).

Fitting the turned feet in the base

The assembled Chinese Well waiting to be solved

Solving the puzzle

Begin with the puzzle assembled. Work the well cap round, by feel, so that the small dowel is in line with the cut gap. Lift the well cap out. Pull out the three ball-end spindles. The next part requires some dexterity, and maybe two people, although it is quite easy to 'juggle' the pieces by yourself when experienced. Place one ball-end into each of the cups in the cup-end spindles. Rest the spigot end of No.1 spindle on the mid-shoulder of No.2 spindle, while resting the spigot end of No.2 on the mid-shoulder of No.3, and the spigot end of No.3 on the mid-shoulder of No.1. Each supports the other. The well cap can now be set on those three interwoven spindles. Problem solved! ●

The cap supported above the well

The cap and the ball-end spindles removed

The 'interwoven' spindles ready for the well cap to be set on top

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Woodturning

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Andy Coates finds inspiration for a hanging bowl

Richard Findley's Editor's Challenge is to create a hollow torus ring box

Mark Sanger explores making an elongated box

Frederick Hill shares an easy-to-follow method for handled bowls

PHOTOGRAPH BY ANDY COATES

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Five steps to better masking of turned work

Mark Palma provides some thoughts on creating a tidier and safer workshop

Attention to detail is what distinguishes extraordinary work from the rest. One detail that may be used to accent timber is colour. Using colour to highlight and create a visual contrast to that of the plain timber on turned detail such as a bead, cove, on outside and/or inside walls and so on can be highly effective. Done correctly with a crisp, delineated line between the coloured element and the timber people will marvel at it. A ragged edge or bleeding colour and you were better off leaving the timber plain. So let's explore five colouring tips that may help you wow the recipient of your work.

PHOTOGRAPHS BY MARK PALMA

1 If possible do not mask the work – instead colour the area before the final cut

The outside and rim were coloured and finished before the inside was turned. Masking tape was applied to the rim while colour was applied to the inside

This isn't always possible, however, with some planning it may be a technique that makes the process easier and results in a very crisp edge. For example, if your plan is to colour the outside of a bowl but not the inside, shape the outside, do your final sanding and finish it before you cut the rim and inside of the piece. If the shape allows you to leave it on the faceplate or chuck during the finishing process you can remount the work with absolute accuracy and cut in the final demarcation line between timber and colour. If not, be as accurate as you can when re-chucking to ensure correct alignment. This also works on the inside of a plate, platter or bowl, but remember to mask off your chuck and make the area to be coloured slightly oversized. You can then define the colour element and finish that area while the remaining area is left untouched. Returning the work to the lathe now with sharp tool in hand, cut the line between the accent and the opening and admire the crisp edge. Remember to only use compatible finishes between areas.

Masking off and the addition of small V-cuts minimises bleeding

2 Give yourself a defining element to separate areas

It is very difficult to create a perfectly straight line on a curved surface, and almost impossible to do so on a compound curve. So use your design and cutting to your advantage. A shadow line, small groove, recess, a V-cut or some other element is an advisable plan. Not only does it act as a guide for the masking tape, it allows some hard edge for one colour to end and another to begin. Make small practice pieces and try different approaches. A sharp tool and steady hand are a must, so if needed rehearse the cut before you commit. If using dyes which are runny and bleed, cut a V-cut into the wood at the boundary of the colour and plain timber and this will sever the fibres to prevent bleeding past the colour line.

Masking off an area ready for the application of colour

3 Do not ask miracles of masking tape

Dyes colour wood on a cellular level, with the dye wicking its way deep into the cells of the wood. Masking tape cannot stop that migration, V-cuts can to an extent. So plan ahead and work out what types of colouring agent you are using. Some are thick and others thin and each creates their own issues.

Some timbers have more closed-grain cell structures and create a clear line between areas. Open-grain timber, particularly many oak and ash species, will pull in the dye with capillary action and it will look ragged. By way of contrast, high-quality acrylics make very clean lines. So use the right species of timber and colouring agent to make your job easier.

Select your masking tape carefully

4 Take a few tips from the automobile body shop industry

Auto body shops can offer us several tips on better work with masking tape. First, not all masking tape is created equal. Purchase high-quality tape and tape compatible with the planned finish. Special tapes are available for going around curves, for use with lacquer, and for application over recently painted work. Most professional masking jobs involve the use of a thin tape adjacent to the area to be coloured. This tape is carefully stretched to conform to the curve and pressed down carefully. Next a filler tape is applied, partially overlapping the thin tape to fill in areas from overspray. Paper and other materials are used if spraying is the method of colour application. Familiarise yourself with professional masking products – you will be amazed at the array of products and difference in quality. One last note – masking tape has a shelf life so if it gets gummy or does not adhere correctly, throw it away and purchase fresh product.

Careful masking will take time

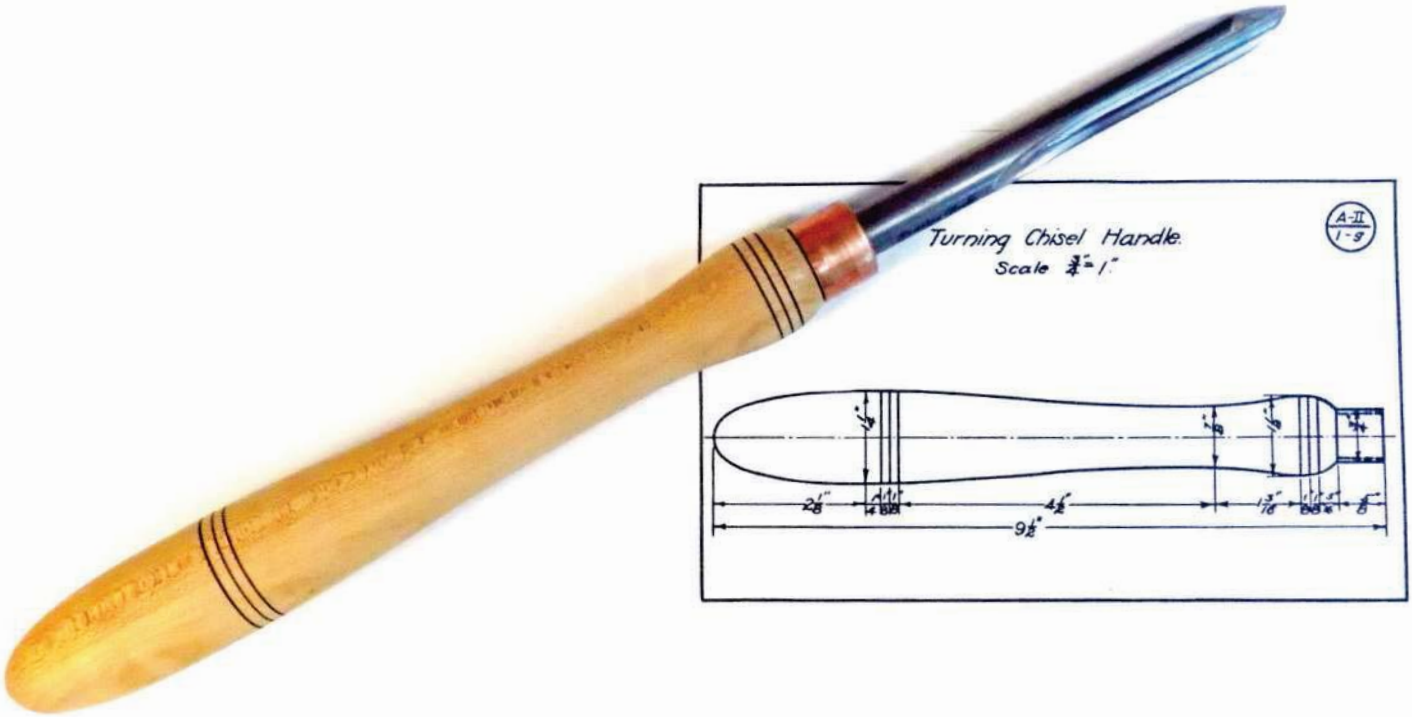
5 Take your time and exercise patience

In many circumstances the time spent on masking will far exceed the time spent on colour application. Take your time on masking, pull the tape to steer it for the correct following of your planned route. If your masking isn't perfect, pull the tape back and fix it. A sharp hobby knife can help with both application and removal of the tape. The back of the blade can press the tape into fine corners. I find that I can pull the roll slightly in one direction or another to steer my line and use my thumb to press down well on the work. Magnifying lenses may help with masking fine detail.

Tape needs to come off as soon as the colour layer is dry. Remove tape by pulling it away from the finished edge at a 45° angle. A sharp hobby knife can help lift the tape, and pick up any specks that stick. ●

Classic handle

Rick Rich replicates a turning tool handle from 1919



With some of the century-old woodturning books, it is obvious that they are training manuals more than books to be read for entertainment. It becomes evident that the instructional methods used by high schools and trade schools in the early 1900s followed a logical sequence and focused on learning basic cuts. This was done through a series of continued exercises, each building upon the previous. One such book I recently browsed through was *A Course in Wood Turning* by Archie Milton and Otto Wohlers. It was printed in 1919 – 100 years ago. Of course finding a copy was out of the question for me, but fortunately Google Books has it in a free downloadable format.

The book contains numerous exercises and projects which are as technical and relevant today as they were then. What is especially nice is that each exercise and project has a drawing with exact proportions and dimensions so that they can be duplicated by the student.

This particular 'turning chisel handle' is on the easier side of the book's projects. It is a classic design and the dimensions are so specific that a direct reproduction is possible. Of course, a modern industrial copy lathe could churn these out by the thousands, but making one by hand is far more rewarding and challenging.

You will need a blank of straight-grained dry hardwood cut to 1¼ x 1¼ x 10in long. I used maple (*Acer* spp.) because I like the strength, weight and look of the wood. One time I made a handle for one of my wife's gardening tools and used very figured and burled wood. It wasn't so long after that it broke along the burled section, so it is best to use straight-grained wood.

You will also need a ferrule. Most hardware stores carry pieces of copper pipe for plumbing and this is what I used. Just make sure that the inner diameter of the pipe is 20mm. Now, here are the steps to make a turning chisel handle:

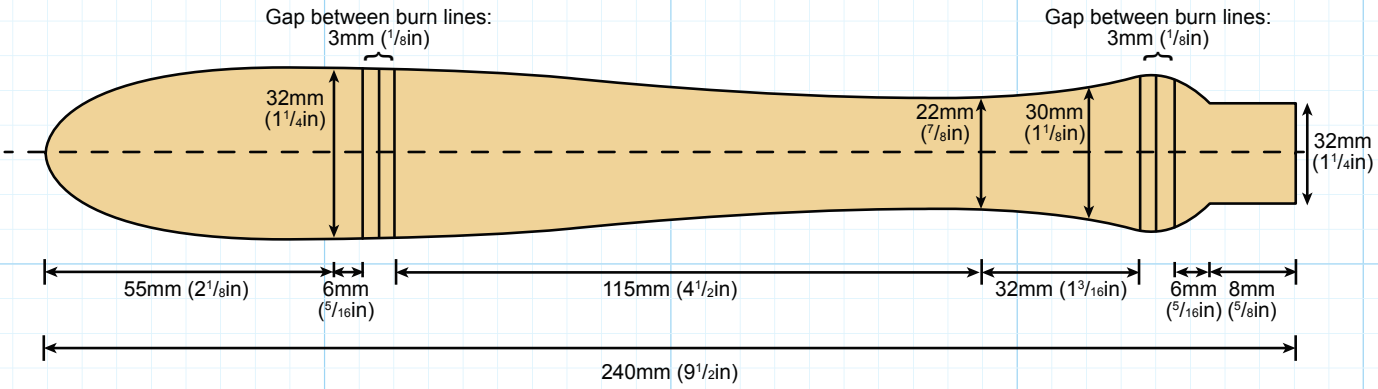
PHOTOGRAPHS BY RICK RICH

TOOLS AND MATERIALS

- Personal & respiratory protective equipment (PPE & RPE)
- Spindle roughing gouge
- Skew chisel
- 3mm parting tool
- Drive centre
- Revolving centre
- 13mm drill bit
- Drill chuck with MT2
- Wire burner
- Pencil & ruler

MATERIALS

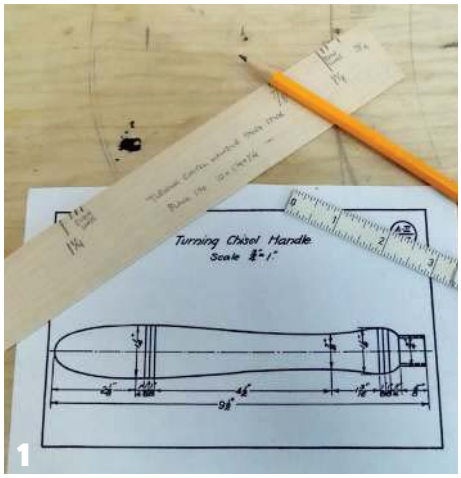
- Timber blank, 32 x 32 x 200mm
- Story stick made from scrap ply
- Copper plumbing pipe with a 20mm internal diameter
- Adhesive



1 Start the project by making a story stick. Use the drawing to measure out where the marks are placed. The story stick will then be used to mark the rounded blank for parting cuts to get proper diameter sizes on the blank.

2 Mark the blank ends for exact centre, and centre-punch the intersection.

3 You have a couple of options for drilling the hole in the blank to accept the tool shank. If you have a drill press, use it. If you don't, drilling it on the lathe will work just fine. Here's how I do it. Install a drill chuck with a proper-size drill bit into the headstock. Use whatever drill bit size for the tool shaft you intend to use in the handle. For this handle, I used a 13mm drill bit for a 13mm spindle gouge shaft. Decide which end will be the ferrule end. Install and use the revolving tailstock centre point to centre the non-ferrule end and put the ferrule end centre mark at the tip of the drill bit. Bring up the toolrest, have it rest against the flat side of the wood and lock the toolrest assembly in place. This will prevent the wood from rotating when drilled and negate the need to hold the wood by hand. At a slow speed begin to drill the handle. By keeping a hand on the blank and turning the tailstock wheel, you will begin advancing the blank on to the drill bit, and it should result in a straight drilled hole. Drill about 50-75mm deep, and use a piece of tape as a depth gauge. When satisfied, stop the lathe and remove the blank and drill chuck.



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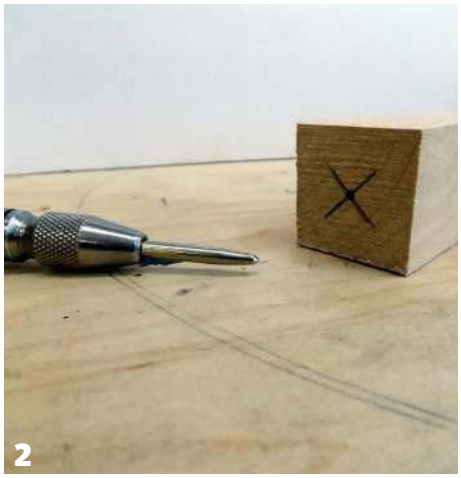
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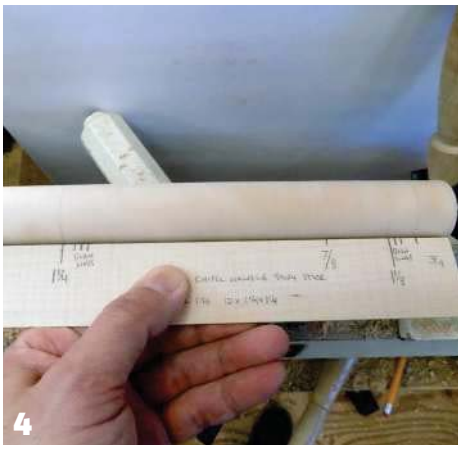
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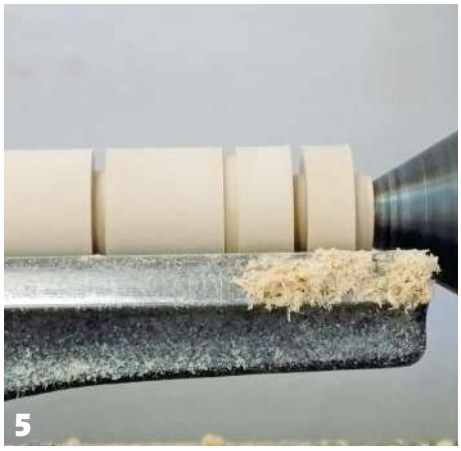
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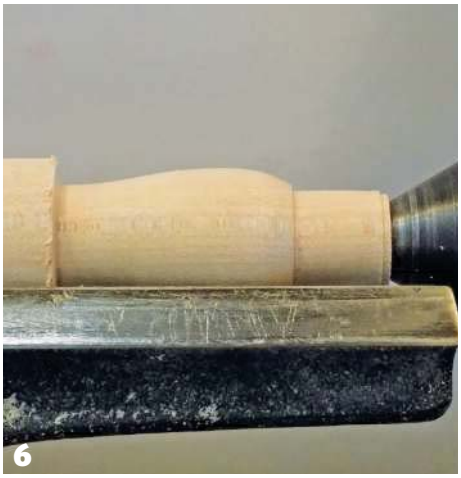
4 Mount on the lathe between centres. Turn it just round, being careful not to take off too much material as there isn't any waste on this blank size. Once the blank is round, use a pencil and mark the diameter lines for parting to size.

5 Use the parting tool and callipers to part the diameters according to the story stick. Use the middle of the lines for the 30mm and 22mm and use the outside, or tailstock side, of the line for the ferrule diameter cut so it doesn't make the ferrule area too long.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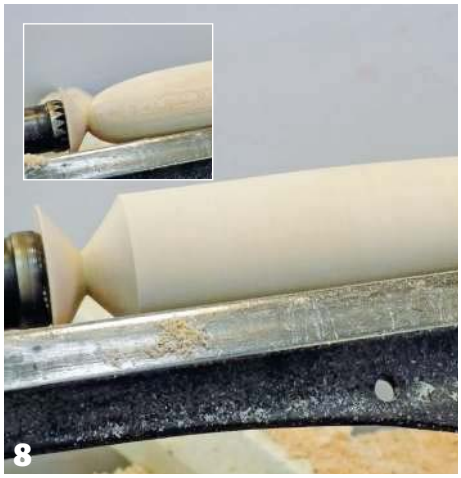
7

6 Cut the ferrule area 6mm and make a sharp 90° transition to the rest of the handle. Start at the top of the 30mm cut and work downhill. It is good practice to dry-fit the ferrule now to ensure a good fit later.

7 From the 30mm mark, cut downhill to connect with the 22mm diameter area.

8 V-cut at the bottom of the handle mark, leaving about 6mm. Cut downhill from the 32mm mark to make a smooth handle bottom. When satisfied, the handle can be sanded.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9

9 Using the story stick, mark the burn lines. Use wires with handles to burn the lines in. After a final light sanding, I applied a very light coat of boiled linseed oil to bring out some of the colour in the wood. But you can use a finish of your choice.

10 Now it is time to affix the ferrule to the tool handle. Use gel-type CA glue, epoxy or other glue that bonds wood and metal. The ferrule should fit neatly and should not require any hammering to make it go on. If you plan on making more than one of these handles, purchasing a short piece of copper pipe and a cutting tool is a cheap investment. The tool shown was purchased from my local hardware store, along with the short section of copper pipe. The total cost was slightly more than a fancy cup of coffee.

Now fit the tool shaft into the handle. Your tool shaft should slide into the drilled hole with little effort. Add a bit of CA or epoxy to help ensure a long-lasting fit. The completed turning chisel handle should look like this.


10

TOP TIPS:

- When using wire line burners, never wrap wire around your fingers. Have the wire attached securely to wooden handles and hold these when burning lines.
- Make sure you do not try to wrap the wire too far around the turning piece – let friction do the work.
- If the tool shaft is a snug fit and doesn't go all the way to the bottom of the drilled hole, try tapping the bottom of the handle against some hardwood. That should help tamp the tool shaft down. ●

OUR CONTRIBUTORS

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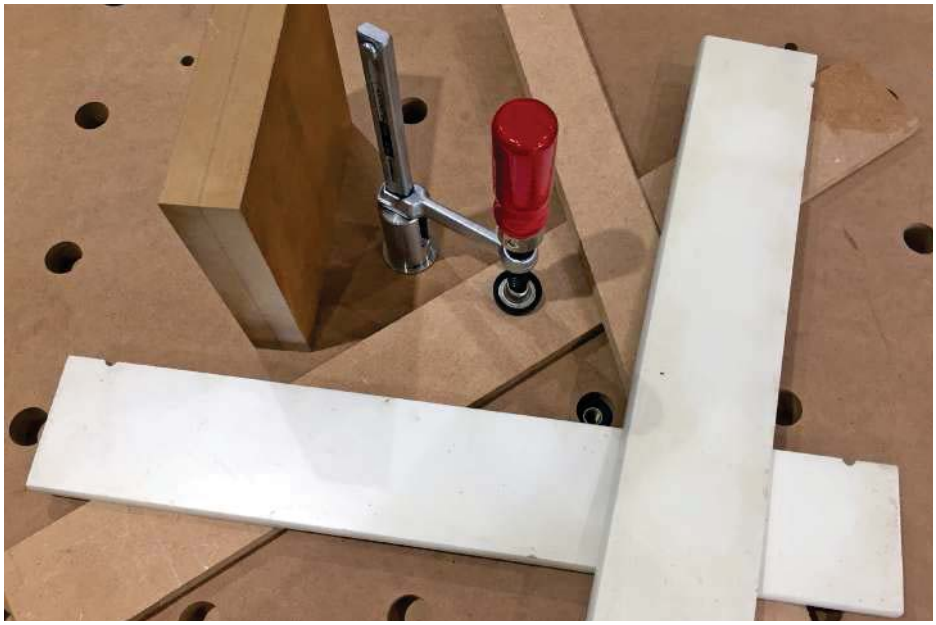
Is all MDF, MDF?

Geoffrey Laycock looks at using a commonly available fibre board

I was putting together various articles about local exhaust ventilation and thinking of illustrating the making of a medium density fibreboard (MDF) component – not something used that much by woodturners, other than perhaps as fixtures for work holding. There are a few wrong facts about MDF often seen in print so maybe we can look at the material in a straightforward way. First myth out of the way: MDF is banned in some countries because of the health risk – not true.

MDF is an engineered board made by bonding small wood fibres together with adhesive, usually synthetic resin. Moisture-resistant and LDF – usually called light medium density fibreboard (don't blame me, I didn't name it) – are available and also a rather different product, HDF, or high density fibreboard, also called hardboard. The HDF product is unlikely to be used by woodturners as typically it is only manufactured in thin sheets, often 3-8mm, and predominantly used in laminate flooring and for backing panels in furniture. Just to confuse all us unwitting buyers further, there is ultra-light MDF, which I have seen described as MDF but 30% lighter. And then not all 'standard' MDF is created equal, as different manufacturers have different products which claim superior performance in some way. One example is Caberwood MDF Pro, described as 'a premium grade ideal for most high-quality paint and surface finishes, superior screw and fastener holding'. And you thought MDF was MDF.



PHOTOGRAPHS BY GEOFFREY LAYCOCK

Health risks

Whichever one we may use, there are potential health risks, but they are not significantly different to those encountered working with solid timbers. The main component is softwood but there can be a percentage of hardwood added, depending on the country of origin and what timber is available. Exposure to both soft and hardwood categories of dust is a health risk and exposure limits are identical at 5mg/m^3 – and MDF is exactly the same as dust from solid timbers. The binder/adhesive used is typically urea-formaldehyde, but in moisture-resistant board may be phenolic resins or polymeric diphenylmethane diisocyanate (PMDI), which does not contain or emit formaldehyde during machining. Machining standard board can release free formaldehyde, dust particles on to which formaldehyde is adsorbed, and the binder itself, all a potential risk as formaldehyde is described as 'suspected of causing cancer'. Free formaldehyde levels should not be of concern where MDF is sourced within the EU due to the standards that apply. Using moisture-resistant MDF can, in my experience, produce better machined finishes and if it is a PMDI board you should only have the wood dust to consider as a risk.

Working with MDF

Working with MDF, of whichever description, can produce very fine dust with the above potential risks. Specifying 'low emissions' or 'no added formaldehyde' board will help reduce that particular risk and using suitable local dust extraction will reduce the wood dust risk. It is very likely if turning or sanding on a lathe that significant levels of dust will result and respiratory protection is highly recommended. This should really be FFP3, which is 20x protection, meaning in theory that whatever the dust level outside the mask, the level inside should be 20x lower – in perfect conditions. Selecting a mask or filter which is also rated as an organic vapour filter would provide protection against any formaldehyde present if you are working with a form of MDF that may release that component.

As the dust that would be released during sanding or scraping would consist of very fine particle sizes, this may test your extraction/vacuum system to its limit and you should not assume all dust would be contained within those systems by their filters. Hence the recommendation to wear RPE. Remember also that cleaning up your lathe, workshop and clothing can easily result in airborne dust, so RPE would be appropriate then. Very small dust particle sizes are also a greater explosion risk when mixed in air, so you should never use compressed air for workpiece, machine or other cleaning – ever.

Essentially, all the above precautions are ones you should aim to use with any timber type as they would protect you against the obvious hazards – dust inhalation etc. – and the not-so obvious additional complications from some of the timbers that have toxic properties – for example yew. So if you do want to use MDF as part of a project, do so, but of course you may have to sharpen tools more frequently as you do.

FURTHER INFORMATION AVAILABLE FREE FROM HSE.GOV.UK

HSG53 – Respiratory Protective Equipment at Work, A Practical Guide
WIS23 – Wood Dust: Controlling the Risks
WIS30 – Toxic Woods

Also search MDF FAQs on the HSE website for simple answers to common questions.

This hollowing tool is not for turning

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Smooth it

John Plater looks at some of the issues involved in sanding natural-edge work

PHOTOGRAPHS BY JOHN PLATER

Having shaped a blank into a bowl, once it is dry enough it is ready for sanding. It is a process which many say they do not enjoy but which is so important to the overall quality of the finished piece. It is the process by which any remaining tool marks, blemishes and torn grain are removed to provide a smooth and reflective surface. It also provides the precursor to the processes of the application of finishes. I enjoy it as it is the stage at which the beauty of the grain is first enhanced.

Technically the abrasive – commonly ground aluminium oxide, but there are other materials – is a set of tiny cutters held on to a backing medium. When a gouge or scraper becomes dull it is sharpened so, similarly, when the abrasive becomes dull it should be discarded and replaced with new.

It is a conflict. We want to get as much use as possible from the material to minimise cost but, realistically, fresh abrasive works more efficiently and quickly without overheating the timber or unduly burnishing the surface. Equally important is to use the whole range of sizes of abrasive. We might begin with a coarse abrasive, say 80 or 120 grit depending on the quality of finish from the woodturning tool. The first grit used may remove any damage. What is critical then is to work down successively through the grit grades of abrasive until the desired surface quality is achieved. So progress through 180, 240, 320 and 400 grits, without missing a grade. Certain dense timbers may need 600, 1200 and finer as well.

Initial sanding provides the required surface but does not reflect much light. By working down through the grades, each one removes the marks left by the preceding one and the surface becomes increasingly more reflective. A 120 grit surface will diffuse a lot of light and appear dull due to coarse scratches, whereas a 400 grit surface will reflect light and gain a sheen due to much smaller scratches in the wood.

THINGS TO KNOW

The process of sanding involves the production of wood dust, some of which is fine enough to be hazardous to health. Always wear appropriate respiratory protection when sanding, as well as other personal protective equipment, such as a faceshield etc. Also, workshop dust-extraction equipment. For instance, I have a cyclone extractor, a vacuum extractor and an air cleaner in the workspace. I also use a powered air full faceshield and/or a FFP3 facemask when sanding. Consider wet sanding using a liquid wax, oil or water as a lubricant. Many use this method and it does prevent a lot of dust from becoming airborne. Like many techniques, it one that is well worth exploring.

Close up the sanded wood sanded down to 400 grit

Methods of sanding natural-edge work

With clean timber, continual clean lines and surfaces with no natural edges, fissures, voids or other anomalies the work can revolve and you can sand using hand or power sanding techniques as appropriate with the lathe rotating. However, since I mainly work with natural-edge and gnarly flawed timbers a lot I would tackle this work differently. I typically work with in such a way as the turning stays relatively still and the rotating abrasive is moved against it or the turning is moved against the rotating abrasive.

I choose to sand mainly with powered hand tools. I feel that this offers me the type of control over the process I want, even if it takes a bit longer than spinning the piece on the lathe and holding the abrasive still against the rotating wood.

I use loop-backed, foam-backed circular pads held in powered hand tools and abrasives on a mesh backing for hand-held sanding. Both are also compatible with the hook and loop systems for attaching to holders/arbors. Arguably these are the more expensive options but at my scale of operation and with my particular skill set, they work for me. Paper or cloth-backed abrasive sheets are less expensive but are not appropriate for my type of woodturning. Between each successive grit size I sweep away the dust and abrasive debris into the extractor with a fine brush. The work of the finer grit is not then compromised by debris from the coarser grit. Some use an airline but I don't like making the dust airborne.

Sweeping the dust into the extractor

TOP TIP

- Some soft timbers may benefit from the application of sanding sealer before and during the sanding process. A sealer will fill the pores if present and harden any patches of soft timber, aiding the production of a smooth and reflective surface.

SANDING NATURAL-EDGE WORK

I sand the outside of the shape first. A circular arbor is held in a Jacobs chuck in the headstock of the lathe and the hand-held bowl is worked against the disc through the grades of abrasive. In this way I am able to retain the crispness of the natural edge by controlling where I sand. It also means my fingers are protected from knocks which could occur if sanding a natural edge with the lathe spinning, and also minimises the risk of creating uneven thick and thin edges/walls that can occur in the natural edge due to deviation of the abrasive as it touches the rotating uneven edges and gaps.

The inside of the bowl is sanded with a circular arbor held in the chuck of a power drill. A normal inline drill works well for some areas, but an angle-head drill will suit some areas better. Sometimes a small bowl might be hand held, at other times held in the lathe chuck jaws with the headstock spindle locked. A right-angled power drill will often aid access to present the sanding disc flat to the surface being sanded, where the regular power drill can be used across the base of the shape. Deeper shapes can be accessed with an extension fitted to a Jacobs chuck or by using a flexible drive system.

Sanding the outside surface

Sanding the bottom

Sanding the inside surface

Advantage of battery powered tools

- There is no lead to trail
- A slower rotation means that the dust is not thrown and is easier to extract

Advantage of corded power tools

- Tools never run out of power
- Tools have greater torque and more speed

Disadvantage of battery powered tools

- Supporting the weight of the battery
- Recharging a battery can be a nuisance
- More expensive

Disadvantage of corded power tools

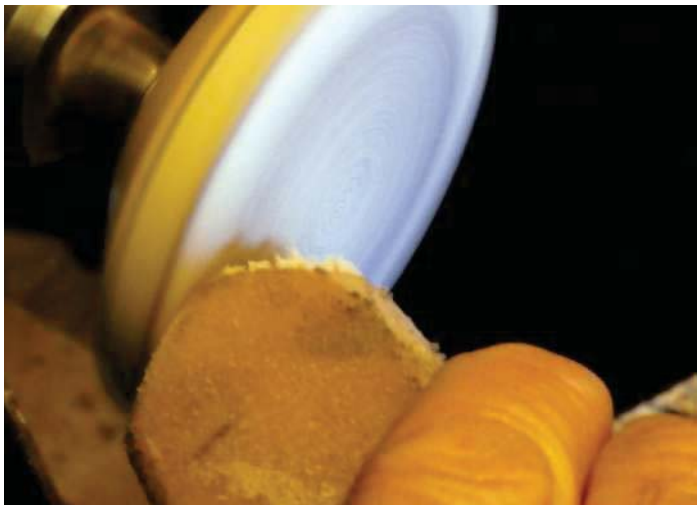
- The greater speed of rotation and the motor's cooling fan make the dust more airborne and less easy to extract
- Dangerous in use if the rotating work catches the trailing lead

Deeper work and small bowls

Particularly small bowls are sanded with an inflatable rounded rubber bowl sander covered with an abrasive sleeve. This tool can also be very useful for sanding deep inside a vase form with an extension fitted to a Jacobs chuck. Other ways of reaching down inside a piece would be a rotating sanding disc arbor attached to a handle. These tools are not powered but rely on the rotation of the lathe to spin the abrasive pad. It is possible to wrap abrasive pieces around the end of a wooden dowel. Some people use a hook and loop system, gluing a piece of hooked tape on to the end of a dowel so that different abrasives with loops can be attached when working down through the grades.

Sanding inside a smaller opening with an inflatable bowl sander

Sanding deep inside with an inflatable bowl sander fitted to an extension arm in a chuck



Cleaning the sanding disc with a rubber block

TOP TIP

- When sanding resinous or oily timber or after using a sanding sealer the abrasive may clog up with dust. Frequent use of a rubber cleaning block will prolong the active life of the abrasive. Take care though if you have an intolerance to latex. Mesh-backed abrasives clog less easily.

SANDING BY HAND

On some occasions there is no substitute for sanding by hand entirely. A cork block or purpose-made grip might be used to back the sheet of abrasive paper. The same rules apply, working down through the grades. The final movement with each grade should be in the direction of the grain to minimise the residue of abrasive scratches caused by sanding across the grain. Powered sanding with power tools or the lathe's rotation tends to be more gentle and less likely to leave signs of abrasion, especially with the finer grades of abrasive. ●

Pulling a strip of mesh-backed abrasive under a finger

Kit & Tools

A collection of press releases and tests showing the latest tools and products on the market

All prices are correct at time of going to press but are subject to change without notice. Products from US & overseas to UK are subject to shipping & taxes

Flexcut carving chisels

Mark Sanger and Andy Coates put Flexcut chisels through their paces

PHOTOGRAPHS BY ANTHONY BAILEY/GMC PUBLICATIONS UNLESS OTHERWISE STATED

Flexcut chisels come in a variety of sizes, cutting-edge profiles and handle options. The company also offers an extensive range of carving knives. Some of the chisels come handled, other can be bought as blades only for use in reciprocating carving handpieces. Small and large cutters are available to suit different reciprocating units, and, if you need a bit more flexibility in how you use this type of blade, various handle types can be bought so you can hand carve with the blades too.

There are more than 28 cutting-edge profiles to choose from in various widths, from 1.5mm to 16mm. There are also more than 15 knife profiles to choose from. The range of products offers the buyer a lot of flexibility as to how to start and develop different carving styles from micro, detailed work to larger items and detail.

There is, as you would expect, the opportunity to buy individual blades, handles and so on, but also various sets of the items mentioned.

Verdict

Andy Coates:

I use various Flexcut products, including a carving jack, small blades to fit into reciprocating carving handpieces and some handled Flexcut chisels too.

I think they are easy to use and can be easily honed on a leather or MDF strop to restore an edge. Once honed, they hold a cutting edge for a long while. I think they are superb.

Mark Sanger:

I have been using Flexcut RG blades for my reciprocating carving handpieces for many years now. They do everything I ask of them and have not let me down. They hold a very keen edge and they are invaluable for the work I do.

Prices from £17.00
Contact: Brimarc Tools & Machinery
Web: www.brimarc.com

LEFT: RG power carving blades for reciprocating carvers and handpieces BOTTOM LEFT: Palm chisels BELOW: Just a few of the many SK carving blades that fit into large reciprocating carvers or, as shown here, into a handle for hand carving

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Responsibility and safety

Pete Moncrieff-Jury has a bee in his bonnet about bad practice and responsibility for what we make and do

At the risk of being shot down in flames, I suspect that if you want to see examples of bad practice in woodturning put a secret camera in a professional's workshop. The fact is that many of us get lazy when we do it for a living or a hobby. Teaching makes me look again at things I do, such as adjusting the toolrest without stopping the lathe, the way I use certain tools, the use of face and breathing protection as well as other suitable safety equipment and measures for what is being done. I am aware when turning a gnarled burr with bark but in everyday simple situations I admit to being guilty as charged. There are, however, certain things that I often see for sale that are not just risky to ourselves but potentially dangerous to others. One which I admit to having a bee in my bonnet about is the use of tealight and candle inserts/heat shields – or rather, lack of them. Again and again I see candles and tealight holders for sale at shows, often by professional turners, without metal, glass or ceramic heat shields fitted and, quite frankly, I get angry at the lack of common sense and thought involved. I, and others, have seen candlesticks and tealight holders charred and burned because of this practice. Perhaps the makers don't realise that if there is a fire, they could be held legally responsible.

TIMBER USED

Another thing that annoys me and which often crops up is the use of woods that are potentially toxic. Something that many turners seem to be either unaware of or ignore is the fact that many woods have a potential toxicity of some sort or other but some, such as laburnum and yew, are well-known as being needed to be used with care. As long ago as 77AD, Pliny the Elder, wrote in his *Naturalis Historia*: 'It is an ascertained fact that travellers' vessels, made in Gaul of this wood (yew), for the purpose of holding wine, have caused the death of those who used them.' Yet I still see goblets and salad bowls made from yew for sale. Laburnum contains the toxin cytisine, which can be fatal in large quantities and cause sickness in small ones yet I have seen babies' rattles made from it

'because it is such a pretty wood'. In this case the maker pooh poohed the idea of it being dangerous, despite the fact that babies suck and bite things.

FINISHES

Another topic to consider is finishes used on work. Are the ones we use appropriate for purpose? The babies' rattles mentioned earlier were lacquered. How long that would the finish last in a baby's mouth? I don't know. Responsible turners do generally use common sense and wouldn't finish a salad bowl with teak oil, I have seen it done though. If we sell or give work to someone we are morally and potentially legally responsible if that object causes damage in any way. It is something that perhaps we need to be seriously aware of. Nowadays it is no defence to say that someone shouldn't have let the candle burn right down. Part of good practice is making sure that anything we make is 'fit for purpose' and that covers many aspects, such as making sure the product is made form a suitable material with an appropriate and suitable finish. It might need labelling as to how to use and care for the item properly as well as saying what it is finished with.

HOMEMADE TOOLS

Another common area of potential danger is with homemade tools. I still see scrapers made of old files and skews made from bench chisels. I originally learned to turn in school using old files and am grateful that none broke on me. If making our own tools we should be sure that the materials are suitable and strong enough for the stresses they will be put under.

Health and safety is undoubtedly important for our own personal wellbeing but we all also need to remember that, if giving or selling on, it affects others as well. We talk about common sense, but do we always apply that to what we do and make?

PHOTOGRAPHS BY PETE MONCRIEFF-JURY

A home-made scraper which can present a real danger to the user

Packed into a strong plastic storage box, these starter kits include a precision chuck, set of dovetail jaws (size C), a matching faceplate ring and a screw chuck. This gives you plenty of scope from mounting blanks for initial turning to final completion of your project. All you need to do is choose the chuck thread to suit your lathe.

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T04M 1" x 8tpi	**101966**
T01 3/4" x 16tpi	**101967**
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