

Make a bottle in a cube from cherry

Ger Vervoort shows us how to make this David Springett-inspired bottle in a cube out of cherry

“The problem I faced was how to get the sphere completely free inside the box, in the eight outer-most corners”



David Springett's bottle in a sphere, shown in his *Woodturning Wizardry* book, led to me experimenting with the design, and ultimately creating this project out of a solid piece of wood. I had to experiment with a variety of woods and approaches before I was able to perfect it, and I eventually came to the conclusion that cherry (*Prunus spp*) was the best material to use.

My first trial and error approach used a piece of ash (*Fraxinus spp*) which I planed, sawed and sanded to the exact measurements of 85mm (3 1/4 in). The problem I faced was how to get the sphere completely free inside the box in the eight outer-most corners. The sphere was still held by the little triangles, which my standard tools were not able to reach. Eventually, I was able to cut these triangles with a small reciprocating saw blade held in a Stanley knife holder.

My second attempt, using yew and grenadillo developed this idea further and I made another cube, but this time giving more attention to the sequence of workflow and preparing some tools. I also wanted to develop this to hollow the sphere to create a little bottle in a cube.

TOOLS USED

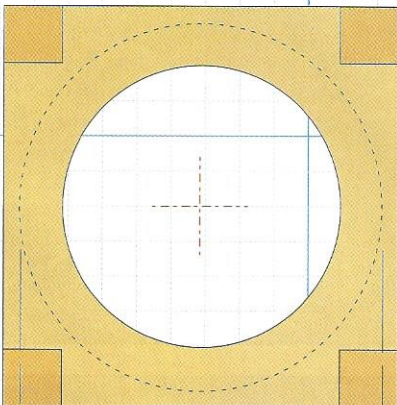
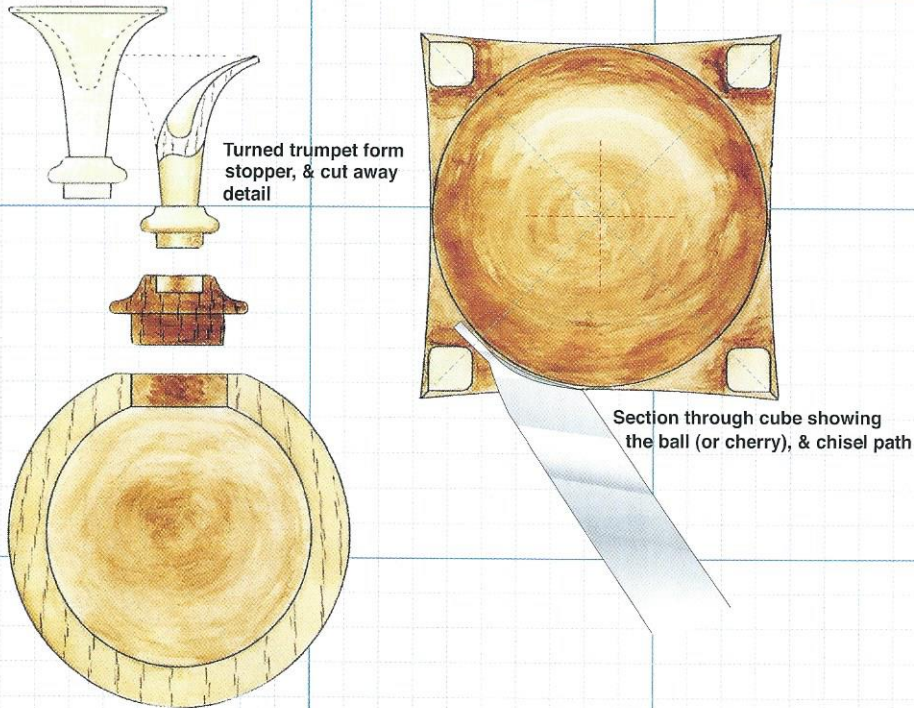


LEFT TO RIGHT: 3mm (1/8 in) & 10mm (3/8 in) parting tool, 6mm (1/4 in) & 12mm (1/2 in) spindle gouge, a very pointed scraper, a special undercutting tool, bent and straight hollowing tools

ALL PHOTOGRAPHS BY GER VERVOORT

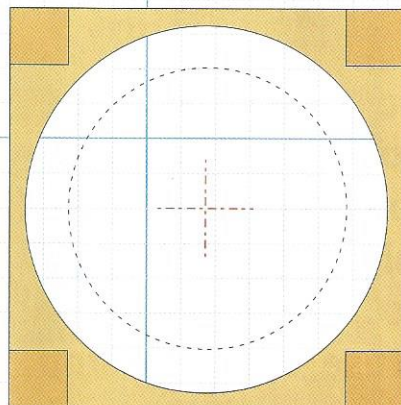
ILLUSTRATIONS BY JOHN LOVAIT

BOTTLE IN A CUBE DIMENSIONS

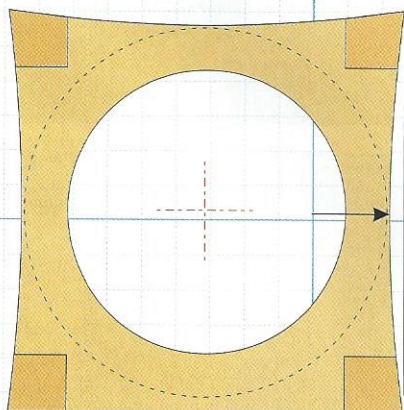


60mm (2³/₈ in)
 79mm (3¹/₈ in)
 85mm (3¹/₃₂ in)

Front View



Cut through section showing sphere diameter and wall thickness



Front view from incurved sides

“Use the template to show the depth and the width. Measure regularly to avoid error”

1 Select a dry, medium to fine-grained piece of wood, then saw, plane and sand it to the exact dimensions of the cube, 85mm (3¹/₄in). You will need a special undercutting tool for cutting the corners between cube and sphere. Take an old scraper and make a full-size drawing of the cube and draw in a circle of 79mm (3³/₈in). The outer circumference of the sphere and the internal diameter of the sphere will be 6mm (1/4in) smaller. The external circumference will be the arc required for the cutting tool – see opposite drawing as to how this is to be shaped. The arced area is not sharp as it needs to ride the surface of the sphere without cutting it. Only the tip is sharp to sever the corner section to free the ball. You will also need a template to measure the width of the window and the curvature of the sphere, which can be made out of stiff cardboard. Practise with this technique as it takes a couple of attempts to get used to freeing the ball

2 You will need a set of jaws that will hold the cube securely – these are made from 40mm (1¹/₂in) ply held in template jaws on a scroll chuck which have been marked and cut to allow the perfect holding of the cube. The depth is about 20mm (3/4in)

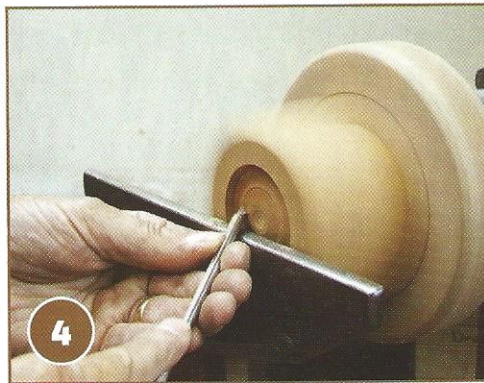
3 Once the cube is cut and securely held measure and mark the initial opening required



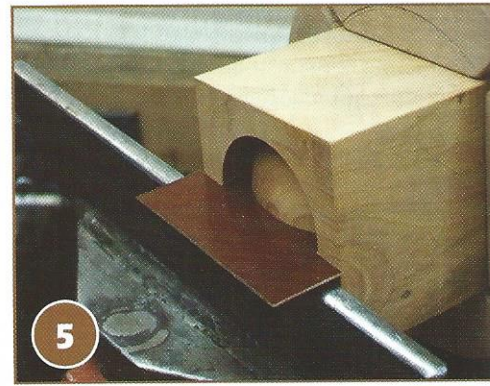
SKILLS & PROJECTS

Bottle in a cube

4 Once the opening is marked out, double-check the jaws have securely locked the cube in place before starting the lathe. Then, cut the opening with a spindle gouge taking care not to go too far in terms of depth and width as these openings are a critical size



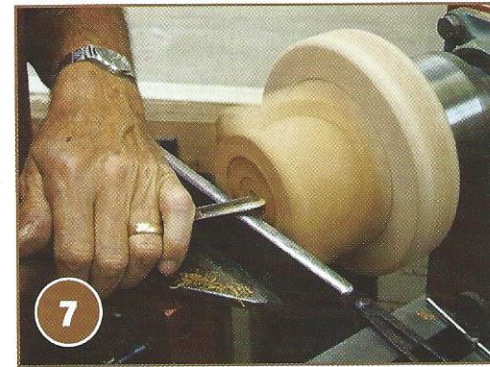
5 Use the template to show the depth and the width. Measure regularly to avoid error



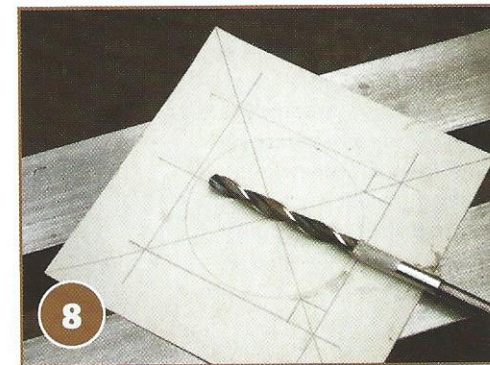
6 Once the critical width and depth is achieved, use the shaped scraper to cut the corner areas. Slow gentle cuts are necessary with a very sharp tool. The arc will ride the form of the sphere and as you ride the scraper around it, it will cut the corner section cleanly



7 Once the opening is cut, sand the face with the sphere exposed, then relocate the cube and repeat the process on the four other sides. You will see the sphere being formed in the cube more clearly as more windows are created



8 Once the fifth window is formed and the corner sections are cut to blend the sphere, you now need to take a drill and on a cardboard template grid, mark the depth required and then drill a hole into the centre of the sphere to that depth...



9 ...then start to hollow the sphere to the correct shape and thickness. This is only possible because the sphere is still held in place by the single remaining face that is yet to be cut – this will be worked on to release the sphere later. You can do a lot of the hollowing with a spindle gouge followed by a straight scraper of your choice, but whatever tool you use, ensure to stop and clean out the dust regularly. Failure to do so will result in a catch with the tool or the tool failing to cut

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10 It will be necessary to use a tool that has either an off-set tip or a swan-neck of some sort, to finish off the sphere. The cranked section of the tool must never be in contact with the toolrest. Instead, a straight section of the shank should be used to ensure control of the tool at all times – the last thing you need at this stage is a catch



11 Check regularly to ensure you are at the correct thickness as this is your last chance to adjust, correct and finish this part of the project. Callipers are ideal to use for this project as the opening is too small for your finger to be used. Keep adjusting and refining the internal shape until you are happy



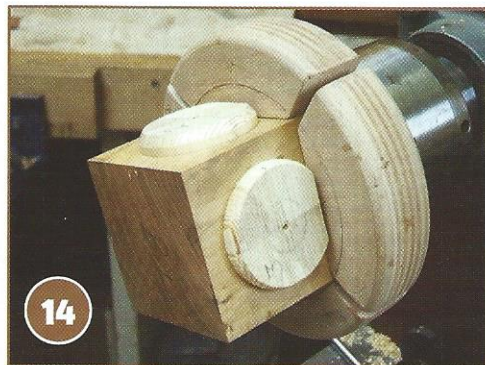
12 The four windows and top window have been cut and the sphere hollowed to the correct thickness. The sphere is still held by the last remaining bottom face. Remove the cube from the chuck and create five wooden plugs to mimic the shape of the cardboard template. These will need to protrude a little from the windows once fitted to enable you to remove them easily later...



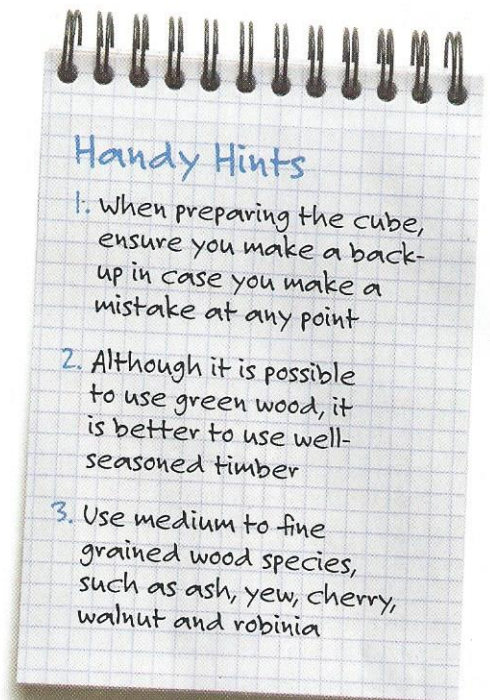
13 ...one plug is required for each window you have cut. These are going to support the sphere in a fixed position while you cut the last window and release the sphere in the cube. This process and the plug forms are critical. One incorrectly fitting plug can allow the sphere to move during the final cutting stage and ruin the whole project. They do not have to be smooth, just the correct shape to support the inner sphere



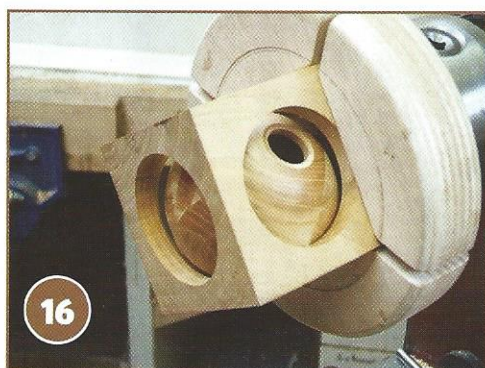
14 Fit the plug in the window opposite the un-cut face and then with the plugs in place, secure the cube in the chuck...



15 ... then wrap gaffer tape or the equivalent, around the cube to securely hold the plugs in place. If you do not they will fly loose and cause the sphere to be unsupported



16 Now mark the window size on the last un-cut face and cut the window to the correct diameter and depth. Cut as before and use the shaped scraper to release from the cube



17 Now remove the cube from the chuck and remove the plugs – the sphere is now ready to be sanded. Create a dowel just a little under the diameter size of the opening hole in the sphere, which is long enough to touch the bottom of the sphere depth. This is going to be a friction drive to enable you to sand the bottom face of the sphere



18 Slide the sphere over the dowel, bring up the tailstock and clamp the sphere onto the dowel



19 With the sphere clamped in place with light pressure, switch on the lathe and set the speed to approximately 300rpm. The sphere should rotate but the cube is held securely. This may look odd, but by having the arms clearly out of the way of the chuck, it will allow you to sand the bottom section of the sphere. Do not worry about the slight indent from the revolving centre as this can be power sanded out a little later



SKILLS & PROJECTS

Bottle in a cube

20 Now you need to reChuck the cube (note the off cuts of foam-backed abrasive to gently hold the sphere in place). Once nicely snug...



21 ... take a spindle gouge and cut a gentle incurve into the face of the cube, but ensure not to be too aggressive. The gently curved face looks a lot better than a flat one. Once the gentle in-sweeping face is cut, sand to the finish required



22 Once happy with the curvature and finish, reChuck and cut all the other faces, except the bottom which remains flat. As before, ensure that the sphere is supported with the foam-backed abrasive

23 This is what the cube looks like with all the five faces curved and sanded with the base flat

24 With the cube complete it is now time to make the neck for the internal sphere. Take a piece of timber, sycamore (*Acer pseudoplatanus*) in this case...

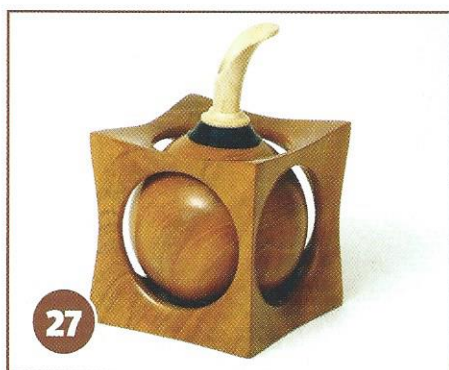
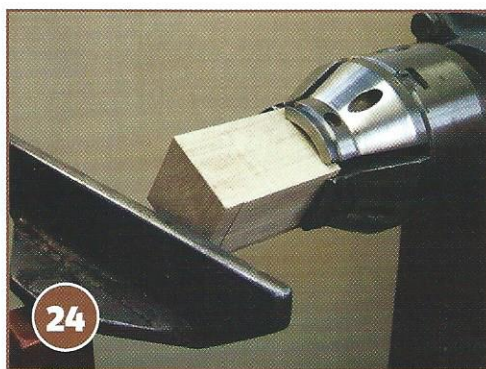


25 ...and shape the neck and top section of the sphere to turn it into a bottle – this is a trumpet form. Then, hollow out the inside of the form to a fine thickness

26 Reverse mount and turn the rest of the trumpet form, cutting a small parallel tenon at the very end – note the the form is now totally hollow. Fit a contrasting piece of timber to the bottom and finish shaping it to the finished opening size in the sphere and sand. Sand to shape, glue in place and then apply two coats of a finish of your choice and buff to a fine finish

27 The final bottle in a cube will amaze anyone who sees it

28 This shows an alternative item in yew with a different neck form •



Handy Hints

4. Experiment with making a solid sphere in a cube before you approach this project
5. Don't use a buffing wheel on the lathe to finish the hollow sphere as this is very fragile and will not survive the process, use a softer method instead
6. For accuracy, ensure you use the template as much as possible whilst making the piece
7. Pay special attention to turning the bottom part of the cube as this is the moment the sphere comes loose