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# Herringbone hollow form

Dennis Keeling takes the lamination concept to an open segment hollow form and goes off-piste with the design of the top of the vessel

The design for this hollow form was developed in 3D Design Pro; the laminations were designed in Lamination Pro and transferred to Woodturning PRO. The design is a 16-level open segmented hollow form with a herringbone zig zag feature ring made from ebony (*Diospyros spp*) and sycamore (*Acer pseudoplatanus*). Ebony is also used for the solid separators above and below the feature ring and the top rim.

Normally the top would be constructed with the horizontal layers, but with such a shallow angle to the top they would have looked odd, so I went 'off-piste' by making my top with vertical joints – using concentric open-segment circles – which are far more pleasing on the eye. I am pushing the envelope here; I am not aware of anyone who has done this

before. This project is designed for the more experienced segmented turner.

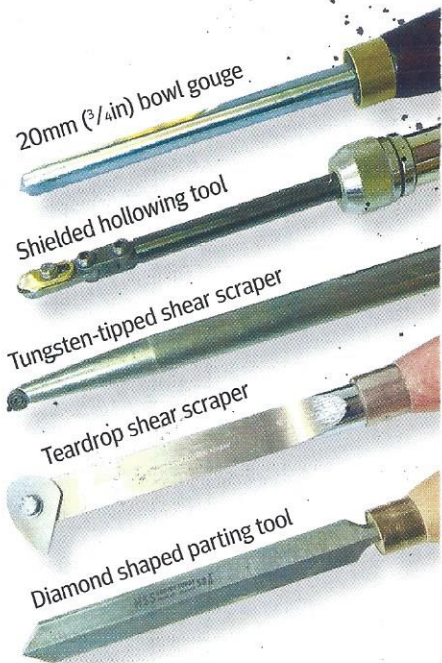
## DENNIS KEELING



**About the author:** UK turner Dennis Keeling has been turning for nearly 15 years, first as an amateur, and now as a professional turner. He is one of the leading exponents of segmented turning and is a Freeman of the Worshipful Company of Turners, producing a DVD on segmented turning, undertaking one-to-one tuition in his well equipped workshop and demonstrating segmented turning both in the UK and USA.  
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## ADDITIONAL TOOLS

1. Circular saw
2. Planer thicknesser
3. Bandsaw
4. Mitre saw
5. Drum sander



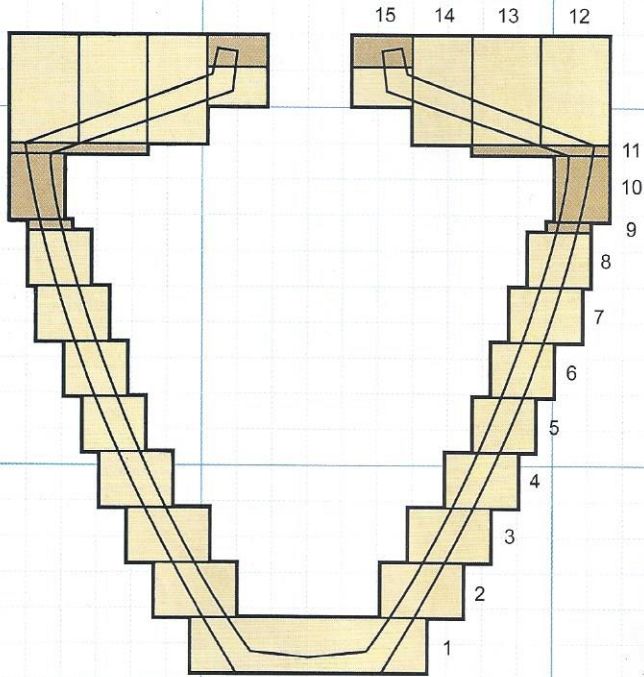


### HERRINGBONE HOLLOW FORM DIMENSIONS

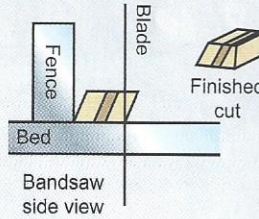
#### TIME TAKEN & COST

**Time taken:** 8 hours to make (spread over 5 days for gluing and finishing)

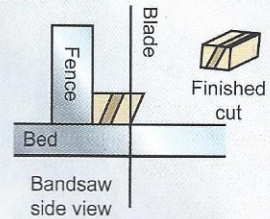
**Cost:** £35 (approximately)



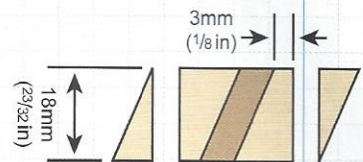
Second segment cut



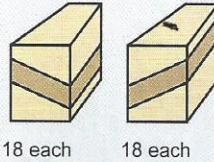
Third segment cut



Segment guide



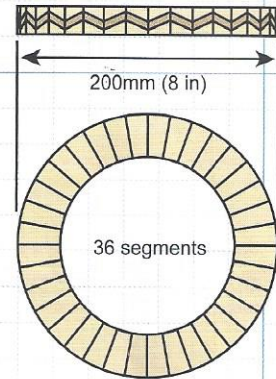
Finished segments



Gluing up the segment ring



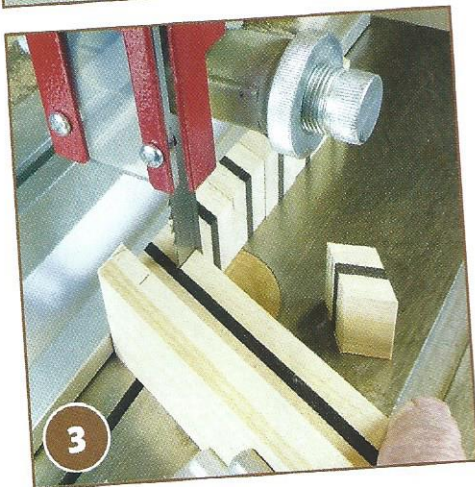
Make sure the joints line up as evenly as possible



Row	Type	Segments	Board thickness	Diameter	Diameter	Segment edge length	Vertical spacer width	Board width	Economy board length	Miter angle
15	Flat ebony	18	15mm (9/16 in)	56.8mm (2 1/4 in) od	25mm (1 in) id	10mm (3/8 in)	0mm	16.1mm (5/8 in)	1503.6mm (59 in)	10°
14	Open segment sycamore	18	25mm (1 in)	90mm (3 1/2 in) od	45mm (1 3/4 in) id	12.6mm (1/2 in)	3.1mm (1/8 in)	22mm (7/8 in)	1521.3mm (60 in)	8°
13	Open segment sycamore	18	30mm (1 1/8 in)	125mm (5 in) od	70mm (2 3/4 in) id	17.6mm (23/32 in)	3.8mm (9/32 in)	25mm (1 in)	1554mm (61 1/2 in)	8°
12	Open segment sycamore	18	35mm (1 3/8 in)	165mm (6 1/2 in) od	105mm (4 1/8 in) id	22mm (7/8 in)	5.8mm (1/4 in)	25mm (1 in)	1680.6mm (66 in)	8°
11	Flat ebony	18	3mm (1/8 in)	165mm (6 1/2 in) od	105mm (4 1/8 in) id	39.1mm (1 1/8 in)	0mm	30.8mm (1 1/8 in)	1803mm (71 in)	10°
10	Flat Zigzag	36	18mm (23/32 in)	165mm (6 1/2 in) od	135mm (5 1/4 in) id	14.4mm (9/16 in)	0mm	15.3mm (9/16 in)	3216.2mm (126 in)	5°
9	Flat ebony	18	3mm (1/8 in)	155mm (6 1/8 in) od	130mm (5 1/8 in) id	27.3mm (1 1/16 in)	0mm	13.5mm (9/16 in)	1823.1mm (72 in)	10°
8	Open segment sycamore	18	15mm (9/16 in)	155mm (6 1/8 in) od	120mm (4 3/4 in) id	21.8mm (7/8 in)	5.4mm (1/4 in)	18.1mm (23/32 in)	1720.5mm (68 in)	8°
7	Open segment sycamore	18	15mm (9/16 in)	150mm (6 in) od	110mm (4 1/4 in) id	21.1mm (13/16 in)	5.2mm (3/16 in)	20.5mm (3/4 in)	1702mm (67 in)	8°
6	Open segment sycamore	18	15mm (9/16 in)	135mm (5 1/4 in) od	100mm (4 in) id	19mm (3/4 in)	4.7mm (3/16 in)	18mm (23/32 in)	1702mm (66 in)	8°
5	Open segment sycamore	18	15mm (9/16 in)	125mm (5 in) od	90mm (3 1/2 in) id	17.6mm (23/32 in)	4.4mm (3/16 in)	17.9mm (23/32 in)	1645mm (65 in)	8°
4	Open segment sycamore	18	15mm (9/16 in)	115mm (4 1/2 in) od	75mm (3 in) id	16.2mm (5/8 in)	4mm (5/32 in)	20.4mm (3/4 in)	1613.9mm (63 1/2 in)	8°
3	Open segment sycamore	18	15mm (9/16 in)	100mm (4 in) od	55mm (2 1/8 in) id	14.1mm (9/16 in)	3.5mm (5/32 in)	22.8mm (29/32 in)	1570.2mm (62 in)	8°
2	Open segment sycamore	18	15mm (9/16 in)	85mm (3 1/4 in) od	40mm (1 1/2 in) id	11.9mm (1/2 in)	3mm (1/8 in)	22.7mm (29/32 in)	1532.4mm (60 1/2 in)	8°
1	Disc sycamore		15mm (9/16 in)	65mm (2 5/8 in) od						



DEVELOPING THE ZIG ZAG  
FEATURE RING



**1** The basic laminated strip is constructed from 32mm (1 1/4in) x 10mm (3/8in) sycamore strips and 5mm (3/16in) x 32mm (1 1/4in) ebony strips. You will need four lengths of 50mm (2in) of the sycamore and two lengths of the ebony

**2** Glue the strips together with a quick drying PVA, using a glue applicator to get an even thickness. Clamp them with G clamps using waste timber each side to protect the sycamore from marking. Leave to dry for about four hours

**3** The basis of the zig zag is a two-stage laminate. The first stage is to cut the glued composite length into segments on the bandsaw with the mitre angle set to 22.5°. The segment width is 18mm (11/16in). Plane the glued edges flat beforehand

**4** The second stage is to cut the rhomboid segments into square segments. First cut away one side on the bandsaw and then reposition the fence to cut the other side. The segment should now be 19mm (3/4in) wide

**5** The next stage is to sand the sawn sides to a 5° mitre angle using the disc sander. The push stick needs to be at right angles for the first face and at 5° for the second face

**6** Be careful to not cut away any of the front face – all the segments should be the same size. It is important that you have 18 left-hand and 18 right-hand segments (see diagram)

**7** Dry fit the segments together into semi-circles. If they do not line up with a straight edge, then slight adjustments will be needed before gluing

**8** It's easier to glue the segments up in pairs initially to ensure the points accurately line up. Ensure they make up a zig zag pattern. Don't forget to leave two single segments

*Handy hints*

1. Care should be taken when gluing up the herringbone zig zag to ensure the tips line up
2. The herringbone feature ring was wide enough to cut into two concentric rings with a small parting tool – enough to make two bowls, as I did



## SKILLS & PROJECTS

### Herringbone vessel

**9** Then glue the pairs into fours and finally into semi-circles of nine segments

**10** Clean up the semi-circles on the disc sander and glue the two halves together. When the glue is dry, clean up the feature ring on the drum sander, but make sure the gap at the top and bottom is even

#### CUTTING THE EBONY RINGS

**11** Plane the ebony on one face and then cut into 5mm ( $\frac{9}{16}$ in) strips on the bandsaw. Leave it oversize at the moment as it will be brought down to 3mm ( $\frac{1}{8}$ in) on the lathe later

**12** Then cut the ebony strip into 18 segments, per ring, on the bandsaw, with the mitre angle set to 10°. Clean the edges up on the disc sander afterwards

**13** Glue up the ebony rings into semi-circles with the planed side down and leave to dry. After they are dry, clean the faces of the semi-circles up on the disc sander and glue them together as a ring. Repeat this for the other ebony ring and the ebony collar

#### BUILDING UP THE COMPOSITE STRUCTURE

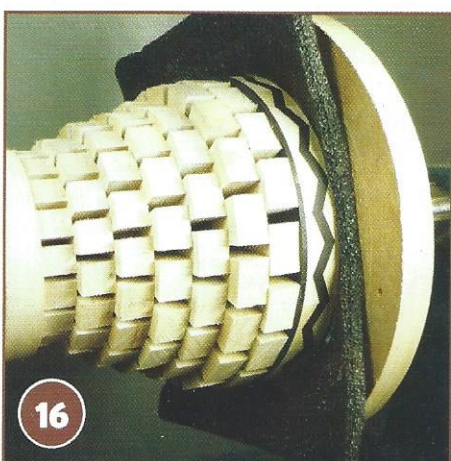
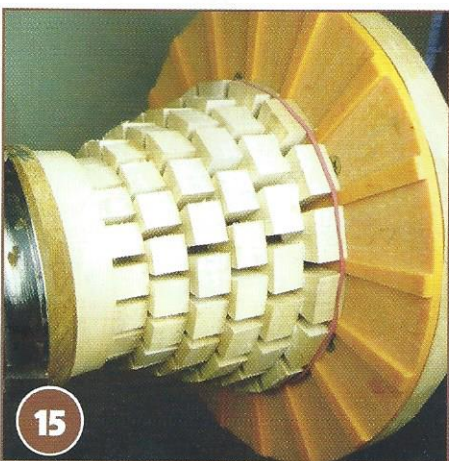
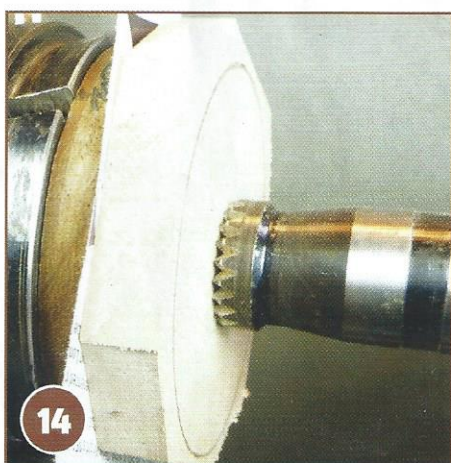
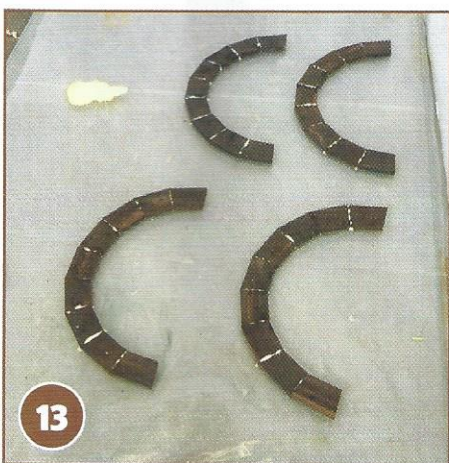
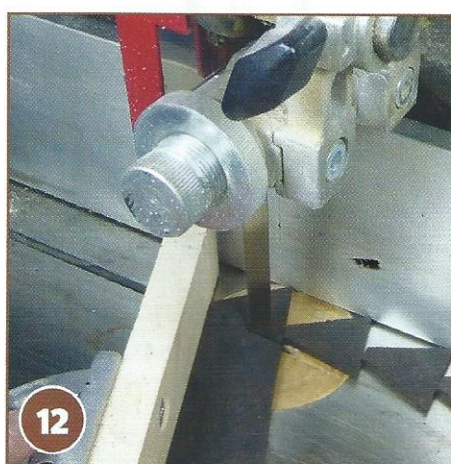
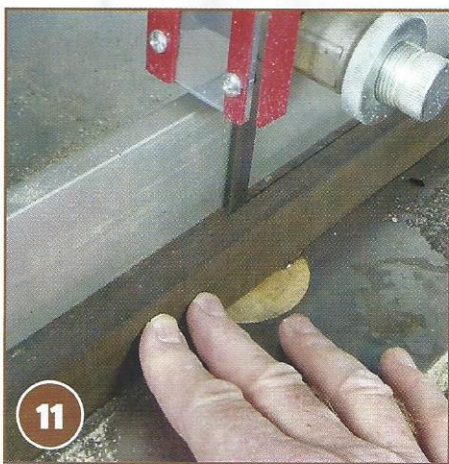
**14** The composite is constructed with a 15mm ( $\frac{9}{16}$ in) solid sycamore base that is glued to the wooden faceplate with a paper glue joint. Cut the segments from a 15mm ( $\frac{9}{16}$ in) sycamore strip on the mitre saw with a mitre angle of 8°

**15** Build the levels up using the 18-segment SegEasy template. The levels overlap brick-work fashion. Use a super fast drying white PVA glue for this project. The glue I used cured so fast that I was able to glue up six levels in one day

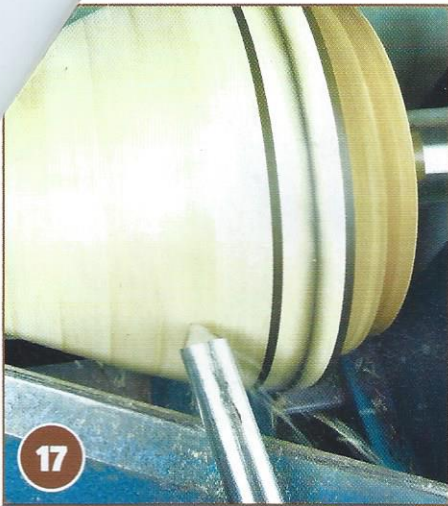
**16** Glue the 18-segment ebony ring into place and, when dry, face the top and bring the thickness down to 3mm ( $\frac{1}{8}$ in). Glue the feature ring into place followed by the ebony ring when this is dry. Use a foam mouse mat between the MDF backplate and the rings to ensure even pressure all over

3. The Herringbone feature ring was wide enough to cut two concentric rings, so I vertically parted off an inner section 14mm ( $\frac{1}{2}$ in) and made two bowls from the one ring

Handy hints







17

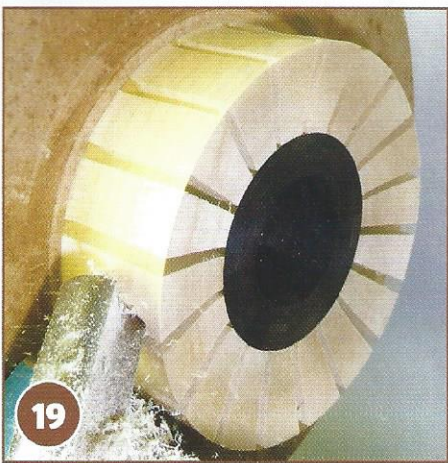


18

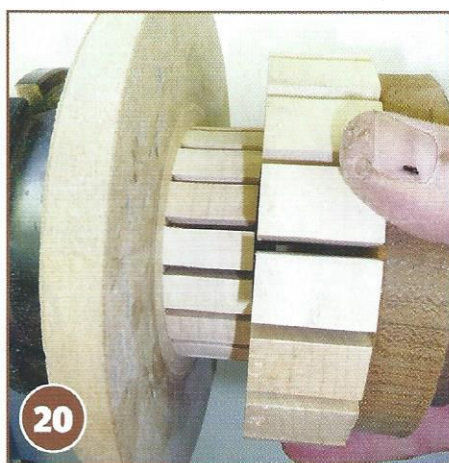
**17** Carefully true up the inside of the top ebony ring and feature ring using the bowl gouge in shear scraping mode. Fit a cone made from MDF to the tailstock to enable the vessel to be supported at both ends. Clean the outside of the vessel up but do not take it down to finished size

**18** Support the vessel on the three-point lathe steady and hollow out the inside. Use a hollowing tool to remove the bulk and then tidy the shape up with a tungsten-tipped shear scraper followed by a teardrop scraper. The edge of the top ebony ring should be almost vertical to accept the top section later

### BUILDING UP THE TOP



19



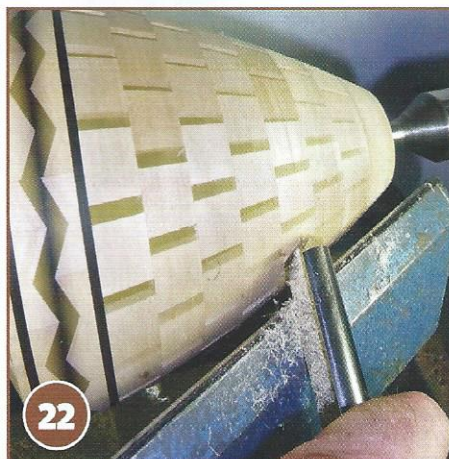
20

**19** Glue the ebony top ring to a 200mm (8in) diameter MDF disc mounted as a faceplate. Clean the outer edge of the ebony ring up to accept the next ring. The second, open segment ring can also be glued to a MDF faceplate, using a paper glue joint, and after the glue has dried the inside can be cleaned up to fit on the ebony top ring. Glue the two together concentrically and then clean the next pair of rings up

**20** Repeat the process for each segment ring. They all need to be turned to fit inside each other as concentric rings and can then all be glued to the original MDF backplate for support. Remove the intermediate MDF backplates by breaking the paper glue joints



21



22

**21** Bring the inside to the top down to size and clean up using the bowl gouge in shear scraping mode. Cut a step on the outer edge, with a parting tool, to allow the top section to fit on the top of the lower half and inside of the ebony ring

**22** Marry the two halves up and glue together between centres. Bring the top down to finished size using the bowl gouge. Remove the two faceplates by cracking open the paper joints and reverse the vessel on the lathe using an MDF cone on the headstock and a small step centre on the tailstock



23



24

**23** Finish the shape and undercut the base. Sand using a rotary sander, starting at 120 and working up to 400 grit. Remove any whiskers using a needle file and apply an initial coat of sanding sealer spray lacquer. After the sealer has dried, return the vessel to the lathe and sand again with 400 grit. Remove the pip under the step centre on the base with a carving chisel and then you can start to sand the base

**24** After three coats of lacquer, the finished herringbone vessel should look something like this ●