Photograph by **Dave Hutton**

STRIKE A CHORD

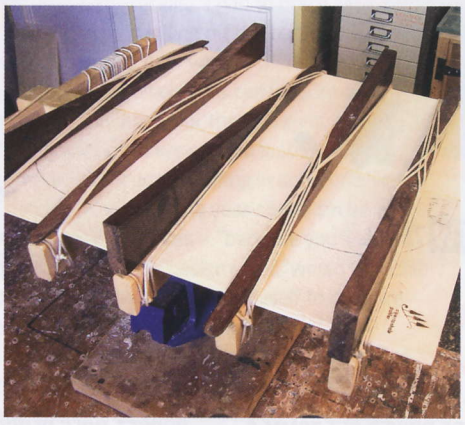
In part 2 of this three-part series, **Shaun Newman** further explains the steps required for making an early Viennese guitar in the style of Johann Georg Staufer

In part 1, I spoke a little about the history of the Staufer guitar before moving on to locate working drawings, sourcing materials and beginning the build. First the neck and headstock are made and then the sides (ribs) of the instrument are attached, ready to receive the soundboard and back.

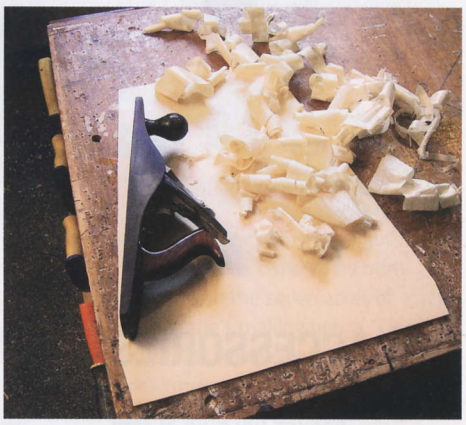
Making the soundboard & rosette

Most guitar makers agree that the soundboard is the most important part of the instrument as far as the quality and characteristics of the sound are concerned. The very best instruments have fine-grained spruce or cedar tops, with a minimum of 40 grains per 25mm of width. The soundboard is supplied as two halves that have been cut from the same log, quartersawn and book-matched. The narrowest grain should go towards the mid join of the two boards, which have to be trued, and when the joining edges are held together, not allow any light to appear through a gap. The two halves are then held in a 'wedge and lace' jig with a glue line along the centre (**photo 33**). Each of the two boards is usually supplied at a thickness of around 5mm or so. Once out of the wedge and lace jig the whole soundboard should be reduced to a thickness of 3mm (**photo 34**). A further reduction will be required later, but the 3mm allows for some extra strength while cutting the channel for the rosette and fitting it.

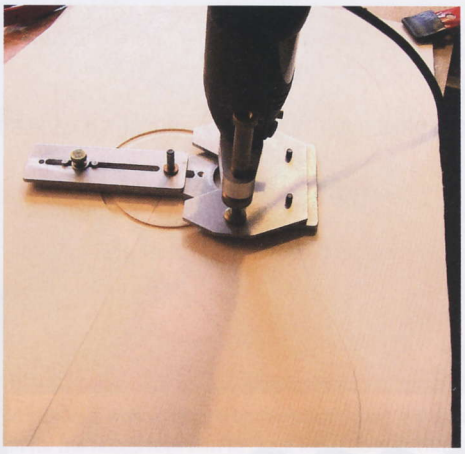
The rosette channel can be cut by hand using a razor-sharp chisel, but most makers use a



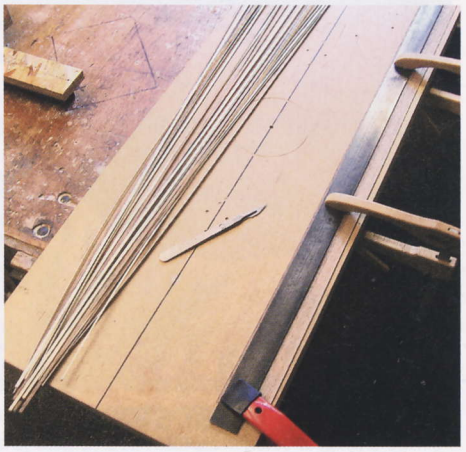
33 The soundboard in the 'wedge and lace' jig



34 The soundboard is thicknessed with a plane



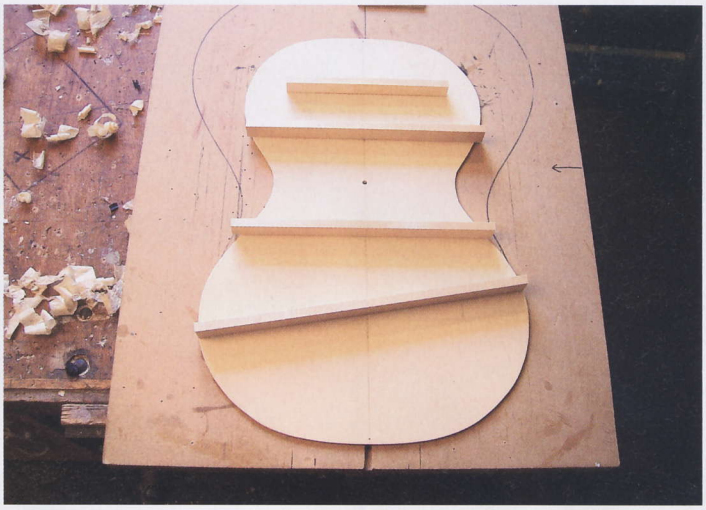
35 Routing the rosette channel



36 Veneer strips cut ready for the rosette

Photograph by Dave Hutton

37 Levelling the rosette with a thumb plane



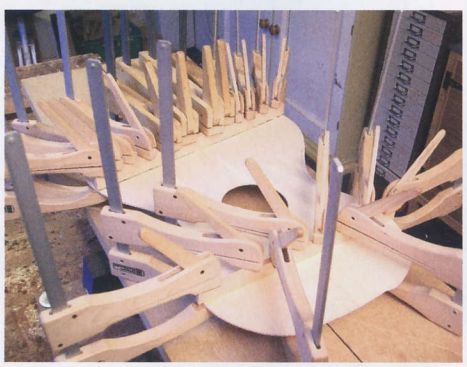
38 Soundboard 'ladder' braces ready for fitting

trammelling router. It is easy to make up a base that will allow the router to cut small curves, but it is also convenient to use a custom-built base such as the one supplied by Stewart-MacDonald and made specifically, in conjunction with Dremel, to receive their small hand-held router (see supplier list). The channel is cut to a depth of around 1.5mm and is 12mm wide (**photo 35**). Fine strips of walnut and sycamore veneers are prepared, each around 600mm long and just 0.5mm thick (**photo 36**). The rosette is simply a series of rings made up by laying one strip of veneer in after the other, starting with the outermost. The last ring should be gently tapped into place with a rubber-faced hammer to ensure the whole rosette is a tight fit. The ends of each veneer strip should arrive at roughly the same spot, which will be hidden by the end of the fingerboard. There are two ways of gluing the rings into place, the first being to line the channel with Titebond and work as quickly as possible. A problem can arise here in that the adhesive is water-based so the veneers begin to expand slightly when they come into contact with it, making the last ring difficult to fit. I prefer to get the rings into place and then steep the whole rosette in thin CA adhesive before skimming everything flush once the glue has cured. A thumb plane and sharp chisel can then be used to level the rosette (**photo 37**).

Preparing the soundboard for fitting

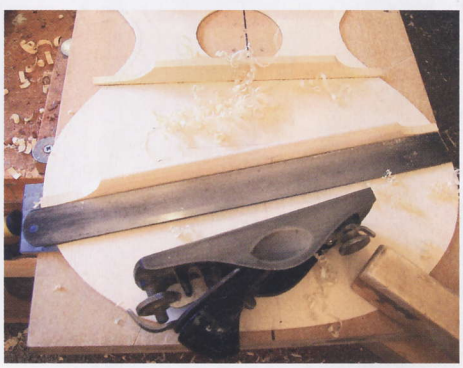
Once the rosette is fitted and the soundboard has been reduced to an even thickness of 2.5mm, it is ready for bracing. Early 19th century guitars were almost exclusively 'ladder' braced – that is a few cross bars running horizontally were used on the underside of the soundboard to give it strength. Later makers, notably Antonio de Torres, discovered that if the braces were attached in the shape of a fan structure, resonance and sound projection were much improved. For the sake of authenticity and to seek to attain the 'Viennese sound' ladder, braces were the better option here.

Just four braces are prepared, from fine-grained quartersawn spruce with the grain running vertical to the soundboard. Each brace is 7mm thick and 15mm high. The diagonal brace runs across the position that will later be taken on the outside of the soundboard by the bridge, then one is placed just above and one just below where the sound hole will be. The fourth sits across the middle of the upper bout (**photo 38**). Once clamped into position (**photo 39**) and ready for further work, each brace has the ends scalloped (**photo 40**) before being gabled (**photo 41**). This helps to reduce weight, aids sound distribution and yet retains considerable strength. Any glue

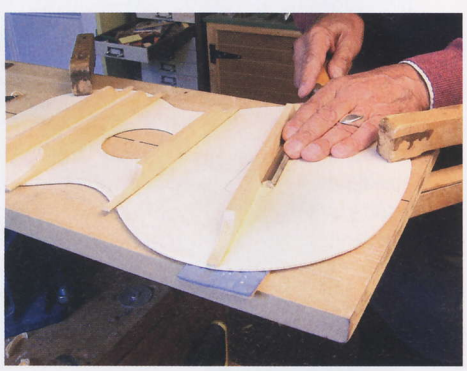


39 Soundboard braces cramped into position

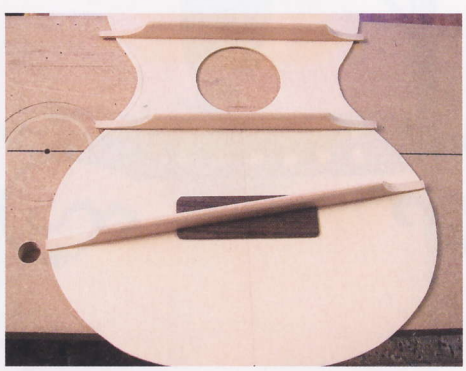
40 The brace ends are scalloped...



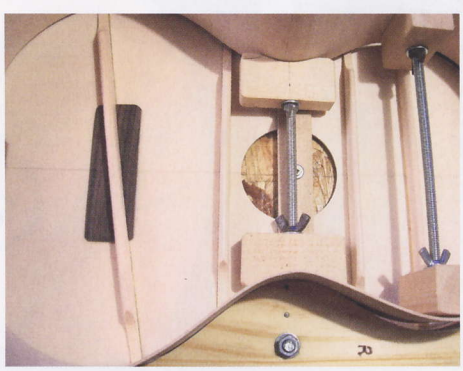
41 ... and then gabled



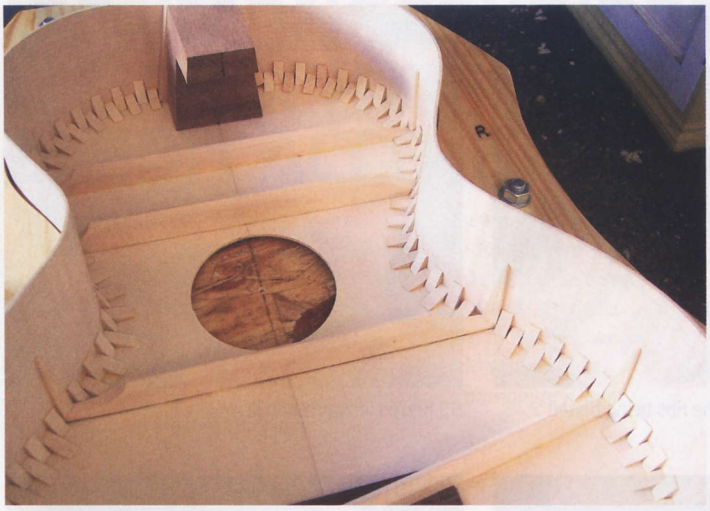
42 Glue squeeze-out is removed with a paring chisel



43 The rosewood bridge plate adds strength



44 The ribs are lowered onto the ends of the braces to mark where they are to be cut off



45 'Tentellones' in place

46 The back in the wedge and lace jig

squeeze-out along the edges of the braces should be removed with a paring chisel, particularly along the edges of the one beneath the bridge (**photo 42**). A 1.5mm thick rosewood plate is then attached in two halves directly below where the bridge will sit; this adds strength and ensures a snug fit (**photo 43**).

Installing the soundboard

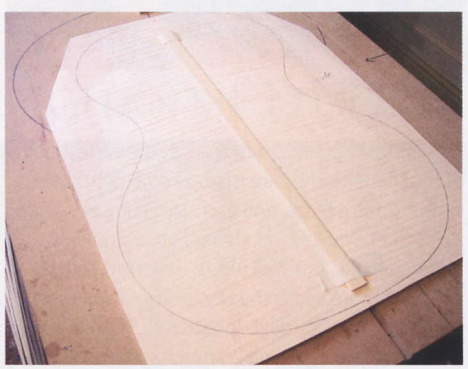
At this point you can see how important it is to have a mould that can be easily disassembled. One side is removed, and the soundboard is placed into the position it will retain while the neck and ribs assembly, and ultimately the back, will all be installed once the mould has been re-assembled. The ribs are lowered onto the soundboard and exactly at the point where they meet the ends of the braces, a pencil mark is made. This will be where the ends of the braces are cut off, allowing the ribs to sit squarely onto the soundboard (**photo 44**). Once everything is judged to be in order after a dry fit, the soundboard can then be attached using the traditional Spanish method of 'tentellones'. These are small triangular pieces of close-grained spruce measuring 15mm high, 5mm at the widest point of the triangle, and 6mm wide. Because the purflings will be quite wide, each tentellone is alternately set upright and then on its back; this ensures there is plenty of support for the soundboard when the purfling channels are cut. The tentellones are put into place with tweezers, and do not require clamping. A spot of Titebond holds them in place (**photo 45**).

The back

As with the soundboard, the back is made from a 'book-matched' set of timber, this time maple, joined along the middle with no decorative inlays. Many early 19th century guitars had backs made from spruce, which were veneered with figured maple, but here the choice was for a solid one. The boards are placed into the 'wedge and lace' jig while the Titebond cures (**photo 46**) and then thicknessed to 2.5mm using a scraper plane (**photo 47**) before being cut to shape slightly oversize. To help prevent the centre join from coming apart, a cross-banded spruce strip, 15mm wide and 1.5mm thick, is attached to the inside of the back (**photo 48**). This can be held with weights or cramped as the glue dries (**photo 49**). Once the centre strip is in place, the back has to be braced both to give it strength and to offer a horizontal curvature of 4mm. This curvature is not simply aesthetic; it helps to project the sound from the back of the instrument through the sound hole.

The braces are made from mahogany and are each 15mm high and 7mm wide, and when dry

47 The maple back is thicknessed with a scraper plane

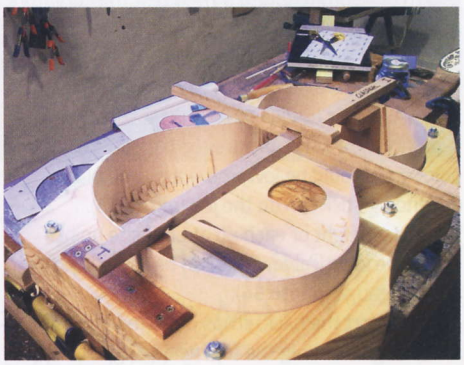


48 A dry fit of the cross-banded back strip

49 The back strip is held in place with weights

50 The label in place

51 A curved sanding stick is used to help create the curve in the back



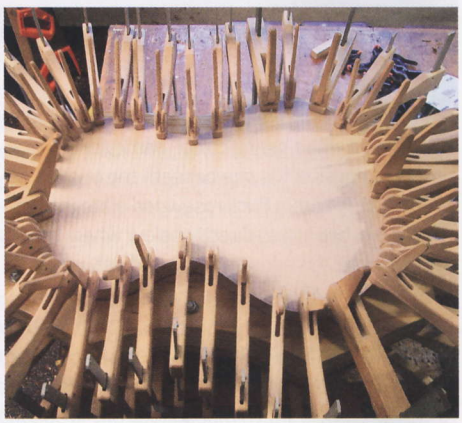
52 The 'curvature tester'

53 A thumb plane can be used to lower the height of the ribs

54 The opposite heights of the ribs being tested

55 Kerfed linings made in mahogany

56 The linings held in place with mini clamps



57 The back held in place with cam clamps

fitted the label can be placed. If this is done when the braces have been curved, it is more difficult to get the label to look good (**photo 50**). Once in place the ends of the braces are scalloped to just 3mm and they are then gabled to offer some weight reduction without compromising strength. The back does not only curve horizontally but also vertically. To help achieve this the ribs, heel and tailblock should be shaped with a curved sanding stick. This has a 4mm lift at the centre over a length of 450mm (**photo 51**). To test the curvature a jig is made from two pieces of hardwood sharing the same curve, cross-halved at the centre and run backwards and forwards along the body of the instrument (**photo 52**). If the cross-halving separates, then the ribs are too high at that point and should be lowered – a thumb plane or sanding stick can do the job (**photo 53**). The exact height of each rib at opposite points should be identical and this can be tested with a depth gauge (**photo 54**).

To support the back, strips of kerfed linings must be glued along the top inside edge of each rib. These linings are made from mahogany and have the same profile as the tentellones, i.e. they are 15mm high and 5mm thick at the widest point of the triangle. They are made on the right-angle slot of a mitre block, and each saw cut goes down to just 1-1.5mm shy of slicing right through. Tricky to make, but well worth the effort as they will bend more easily the closer the saw cuts get to passing right through (**photo 55**). The linings are held in place by small clamps – the ones I used came from 'Poundland' (**photo 56**).

Once the linings are in place the back can be fitted. There are several ways of doing this, the easiest being to use cam clamps. These are rather specialised and can be quite expensive, so some makers use large elastic bands that pass over the back of the instrument and are then held in place by hooks on the underside of the mould. A further method is to use linen tapes pulled tight. Just before this task is undertaken, however, small notches must be cut into the linings to accommodate the scalloped ends of the braces. These notches can pass through the lining and rib, as the brace ends will eventually be hidden behind the rosewood bindings (**photo 57**). Once in place, the back can be trimmed flush all round using a router with a flush cutting bit.

NEXT MONTH

In the October issue, which details the final part of the build, Shaun works on the bindings and purflings, fingerboard, bridge and decorative 'mustachios', the top nut and bridge saddle, before finishing, stringing up, tuning, then making a suitable case

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- **Alpenholz Pahler** – fine quality maple and spruce in keeping with the Staufer tradition – **www.alpentonholz.de**
- **Stewart-MacDonald** – timber, tools and accessories (including drawings). USA based, therefore 20% tax needs to be added to most purchases – **www.stewmac.com**
- **David Dyke** – timber, tools and accessories. UK based – **www.luthierssupplies.co.uk**
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- **Tonewoods4luthiers** – timbers, particularly exotic - **www.guitartonewoods4luthiers.co.uk**
- **Graph Tech** – 'presentation' grade bridge pins – **www.graphtech.com**
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- **The Early Music Shop** – a source of authentic strings for 19th century guitars – **www.earlymusicshop.com**