



Using a 'double-cross' violin mould

An aid to both shaping the ribs and positioning the blocks

BY CARSTEN HOFFMANN

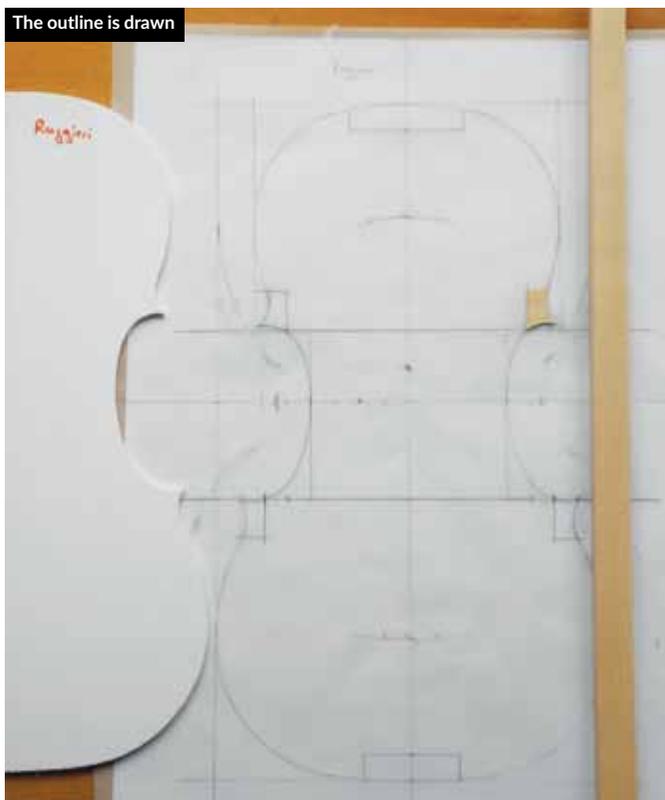
Luthier and restorer based in Bamberg, Germany

When Andrea Amati introduced the internal mould into violin making in the 16th century, one of his key aims may have been to ensure consistency in his instrument outlines. Nevertheless, probably every violin maker today will praise the deviations from perfect symmetry in the lines of old Cremonese instruments, which resulted from the ancient construction methods.

While I was working for the Allgäu-based maker Fridolin Rusch, I learnt his method for making a rib structure with the help of a 'double-cross' mould. Here, a lot of variation can be introduced into the outline

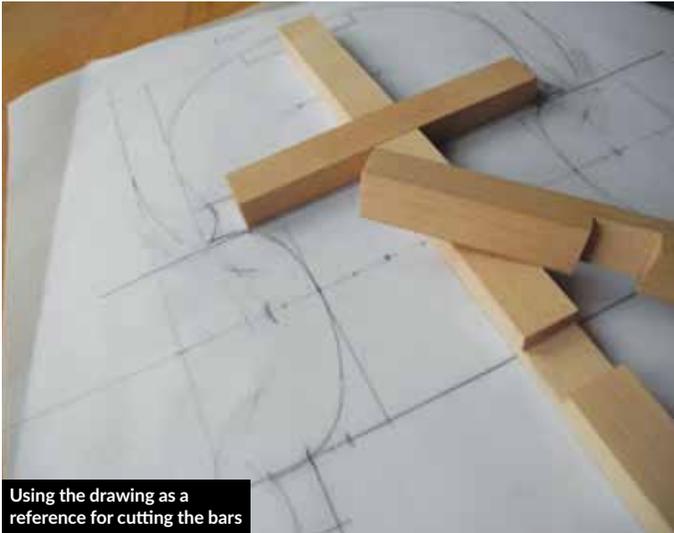
even with the modern neck construction, depending on how precisely the blocks are shaped and the ribs are bent and glued. The cross is very light, which is helpful when planing a cello rib structure: you have full access when gluing and shaping the linings, and the inside line of the rib structure can be traced directly on to the plates.

I have now adapted Rusch's system to my own requirements. It can help me to bring a certain degree of deviation into a constructed outline, or I combine it with elements of the classical internal mould to make exact copies. The method described below demonstrates how I use a constructed outline as a reference.



The wood I use for the double-cross is wide and high enough to support the blocks and the holes drilled for the clamps, but I am careful to leave enough space for the linings. For a violin it is about 18mm wide and 12mm high.

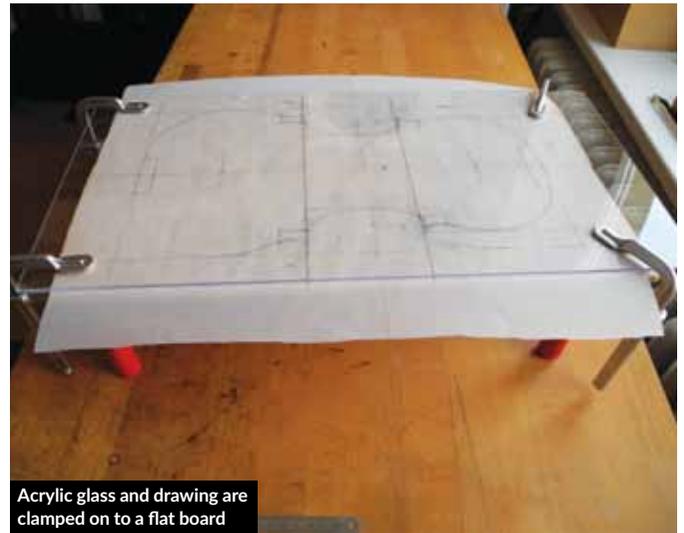
Usually I draw the outline on a piece of paper. I then mark the sizes and positions of the blocks on the drawing. From there I can make a half-template or just little templates for the blocks. I can even use no templates at all, and just cut the curves more or less freestyle. This makes the whole process from an outline to a rib structure very fast and simple.



Using the drawing as a reference for cutting the bars

2 I cut the bars for the cross using my drawing as a reference. The ends are squared and glue-sized. Then I use a bandsaw and chisel to cut the mortises halfway into the bars. It is important to set the horizontal bars about 2mm away from the C-bout curves, to leave space for some variation in the outline here and for inserting the linings. Next, the bars are fixed together with white glue.

I let the double-cross set for at least two or three days to release any tension brought in by the gluing. Then I drill holes for the clamps.



Acrylic glass and drawing are clamped on to a flat board

3 Using four clamps, I fix a 2mm-thick piece of acrylic glass, together with my drawing, on to a flat board, which is usually my jointed and flattened back plate. That way I have a stable construction for clamping the cross.



The cross and blocks fixed in place

4 I plane the blocks to the dimensions (length and width) shown on the drawing. Then I draw a centre line on the top- and bottom-blocks and the cross to mark their positions.

Since the cross is thinner than the blocks, it needs to be supported. (I generally place a CD case under the cross for this.) Then I fix the blocks in place with white glue. I begin with the upper and lower bout, then I set the cross on the drawing to have the references for the corner-blocks.



The point where the curve enters the block area is transferred to the block

5 When shaping the blocks, the important areas are the curves at their ends, as they determine the direction of the ribs when leaving the blocks. To control them I transfer their position from the drawing on to the blocks with a ruler. This also gives me the reference points to lay out the corner templates. (For a looser approach I can skip this step or deliberately displace or rotate the template a little.) ▶



Cut-offs can be used as counterparts

6 If I want to be really fast (when making a fractional-sized instrument, for instance), I simply cut out the block curves with a bandsaw and smooth them with a rasp. The cut-offs can be used as counterparts for the gluing.



The cross is clamped on to the plate for placing of the C-bouts

7 I clamp the cross on to my plate at the top- and bottom-block. Now I can bend the C-bouts with the drawing as reference. I mark their exact position in relation to the blocks, and glue them in with the clamps directly on the blocks' back edges. After setting these four clamps, I release the cross from the plate so that I can wash away any excess glue on the ribs and blocks, and the acrylic glass.



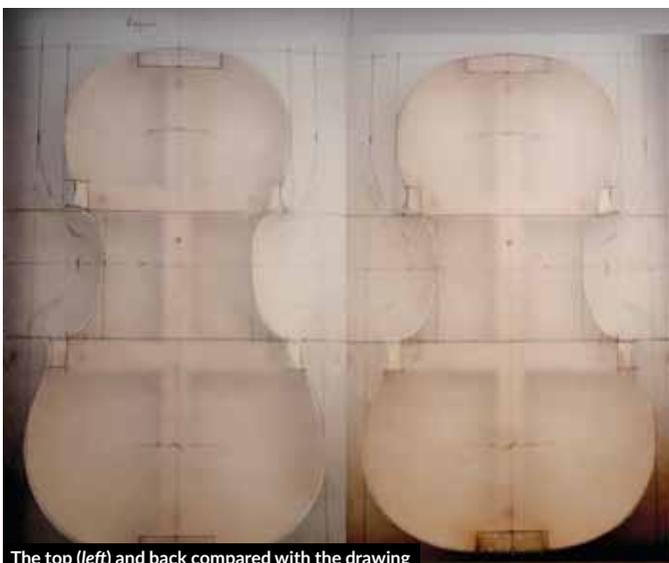
The set-up for work on the upper and lower bouts

8 When I want to work on the upper and lower bouts, I insert a block of wood in the middle area. This allows me to set the clamps where they are not in the way.



A combination of the double-cross and moulds for the two plates

9 This cross can be used for many other outlines. If I want to have more support for the outline (as when I'm making a cello, or using different outlines for the top and back) I cut out two moulds for the two plates and screw them on to the cross. Before gluing in the linings I unscrew them.



The top (left) and back compared with the drawing

10 This photo shows the drawing compared with the outlines of the top and back, showing the deviation. When bending and gluing in the linings, I can still make slight corrections. ●