

\

Giuseppe Cazzaniga, Liutaio

Bernareggio, July 2009 - June 2012

Restoration of a Brescian style double bass

The instrument is property of Maestro Ezio Pederzani.

Index

Premise.....	3
Observations.....	4
Initial works.....	15
Ribs.....	26
Front.....	71
Back.....	141
Neck.....	226
Varnish.....	242
Set up.....	252

Premise

Ezio give me the instrument in the summer of 2009 for a full restoration.

The work will have to be done with respect for the original parts and for its history, maintaining its current musical function

All broken or deformed parts will be repaired in order to give solidity and equilibrium to the instrument, while the badly executed additions and repairs will be removed, but there will be no alterations that would make it more modern or playable at the expense of modifying its form.

In the same way, alterations that have been made in the past will not be undone, as there will be no attempt to restore the instrument to some presumed "original" state.

Ezio does not possess any certificate, experts' evaluation or document on this double bass, since it was left to him by his father, Gino Pederzani, who was also a bass player with the R.A.I. Orchestra in Torino.

The only information given is that the father bought the instrument on an unknown date from his teacher, Antonio Betella, who taught at the Parma Conservatory.

The previous owner is unknown.

On the inside of the back, in addition to the label, it is possible to see a pencil notation, indicating a restoration by Giulio Degani, Cincinnati, Ohio, 1927.

Giulio Degani was born in Montagnana, near Venezia, in 1875. He was his father Eugenio's apprentice, until he took over the business in Venezia in 1915; in 1922 he moved to America, establishing himself in Cincinnati, where he worked for Wurlitzer.

I do not know how the instrument got to America, or how it came back to Italy.

I never worked on a confirmed Brescian bass, so my knowledge of this workmanship is based on studies rather than personal experience.

I am consequentially not in the position to provide any attribution for this instrument.

I hope that this document will be helpful to any expert who will examine the bass in the future.

Observations

The instrument is of a form typical of the Brescian design.

The current measurements in millimetres are:

Body length	1073	(with ebony columns at the heel 1088)
Lower bouts width	665	
C bouts width	347	
Upper bouts width	520	
Distance between upper ff holes eyes	168	
Body stop	557	(with ebony columns at the heel 572)

Ribs heights

At lower block	227	
At lower corners	230	E side 233 G side
At upper corners	221	E side 234 G side
At the back's bend	223	E side 228 G side
At the heel	145	E side 147 G side
Back length from lower edge to the bend	896	

String length (Eb neck) 1053

The top is made of three pieces of spruce, with regular fiber and quarter sawn.

The back and ribs are in cherry wood.

The back is in two pieces, quarter sawn, but with the grain deviating to slab cut at the edges.

The upper ribs are quarter sawn, while the C and the lower ribs are slab cut.

The neck graft is in maple, and the scroll is in walnut.

The varnish that covers most of the instrument is not original and red-brown

Large areas are touched with a darker material.

There are many cracks on every surface, most of them already repaired, often with filler













The lower curves of the back have been modified, next to and on the sides of the lower block, for a length of about 45 centimetres, with a replacement of the edge and purflé, of a maximum width of 20 millimetres



The glueing surface of the ribs to the back in this area has been lowered by 5 millimetres

The endpin hole is not in the middle point of the ribs' height but more towards the top.



It is possible that the ribs and lower block have been planed down, and the lower part of the back rebuilt, to repair the damages caused by resting the back edge of the instrument on the floor while playing, or because of the removal of a "clog" used for the same reason, and that in the beginning there was an end button instead of an endpin.

The width of the back has been decreased, as proved by the old purfling beside more recent ones, from the back button to the maximum width of the upper bouts.

The width of this reduction is of about 5 millimetres per side. The back button has been cut transversely and rebuilt.



In the same area the top has been widened with two additions of the edge and purfling.

On the G side, the addition has a maximum width of 17 millimetres and a length of about 180 millimetres.

On the E side the addition is much longer, of about 300 millimetres, and the maximum width is of about 22 millimetres.

The two additions, and some fillings as well, cover the highest point of the top.

On the neck's sides, to complete the body's outline, there are two ebony columns.





It seems that the upper part of the body has been modified to bend the shoulders ribs, by widening the top plate and tightening the back.

The neck graft was fitted the last time in order to have an Eb neck.

The back of the scroll and pegbox has a single scoop.

From the inside of the pegbox it is impossible to see how many pegs were mounted in the past, because of the graft.

On the outside there are German single-plate tuning machines.

Of the strings mounted, the E string is gut core with a copper round wounding, the middle two are gut core flat wounded, the G string is metal.

This stringing suggests that the instrument was last played in the 60's.



Initial works

The instrument shows a limited number of woodworm holes, closed with either filler or wax.

I do not see recent or open holes, so I deduce that the problem has been solved in the past.

To make sure I inject a woodworm treatment product (Xilamon), which is diclofluanide and permethrine based. I will use the same product in the inside as well.

I take down the strings, the bridge and tuning machines.

The bridge is deformed and has been repaired on the E side with an ebony plate, where it was fractured and eaten by woodworms.



The tuning machines are German made.



Under the plates there are two ebony and filler replacements, where a previous set of tuning machines for four strings were inlaid in the pegbox.







On the back of the pegbox it is possible to see three filled holes, that might be left from a previous set of three machines with retaining pins.





I will be able to get better informations on the previous stringing when I will repair the pegbox by removing the ebony and filler from the walls in order to make new additions.

I remove the neck to avoid deformations or cracks that may be caused by its weight on the ribs during the restoration

Under the non original back button there is a metal screw inserted diagonally between neck and upper block



On the G side a wedge has been inserted to block the dovetailed neck fitting.



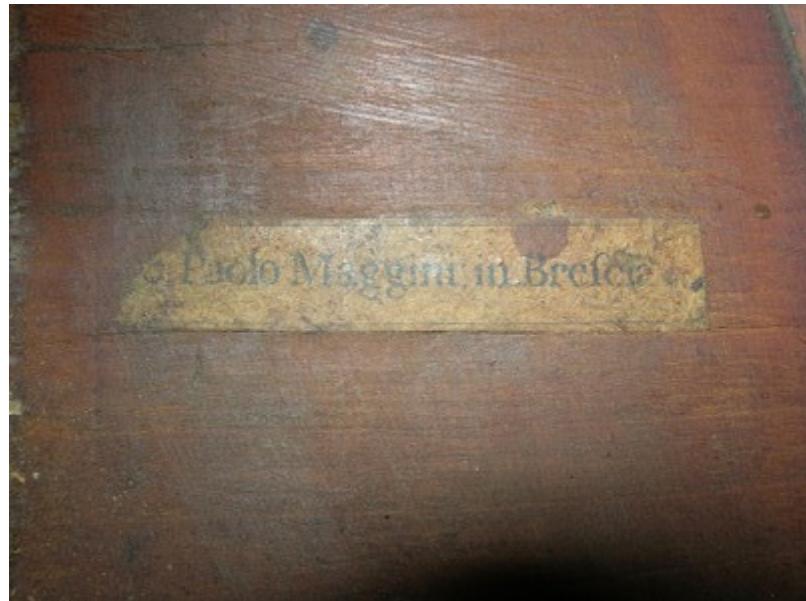
Various replacements are glued to the upper block both on the sides and back of the dovetail, with different woods (walnut, maple, spruce). There are three screws as well.



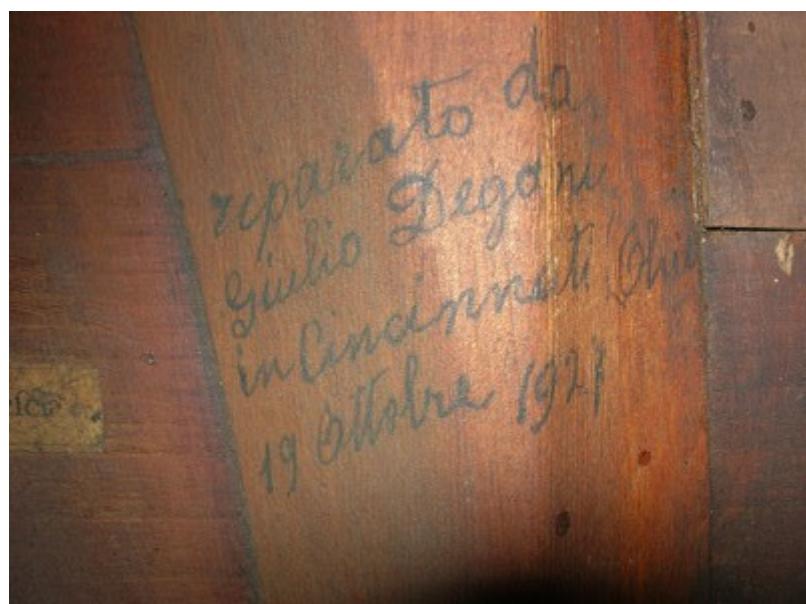
I unglue the top from the body.



By having access to the inside of the instrument, I can see a label:
"o. Paolo Maggini in Brescia"



There is a pencil notation as well:
“ Riparato da Giulio Degani in Cincinnati Ohio 19 Ottobre 1927 “.



I decide to start working on the ribs.

To do so, before unglueing the back from the ribs to have better access, I build a wooden cross to hold the form by glueing it to the upper and lower blocks, and blocking it to the C bouts.



I then separate the back from the ribs.



I build a wooden cross to hold the ribs on the back side as well.



Ribs

The ribs are made in cherry wood, and have an average thickness of 2 millimetres; cracks are present all over.

Old restorations, which are very heavy, are made in spruce, linden, and ash.

Some old linings are thin and have continuous fiber; they have been overlaid, or in some cases substituted by other pieces that are cut and bent in the way that is used for guitars. Other linings are added on the back side, in linden which is cut to shape.

Reinforcements of the same kind can be found on the side of the upper and lower blocks.







The upper rib on the E side has been repaired with three large ash doublings with transversal fiber, and some splints.



The rib shows a large number of cracks on the entire surface, and worm damages on the back side between the corner and the middle, which have been filled.



I clean the rib of all the restorations and take the linings off. I then glue a set of 1,7 millimetres thick poplar splints.

The average thickness of the rib is 2 millimetres, but drops to 1,2 near the maximum upper width of the body



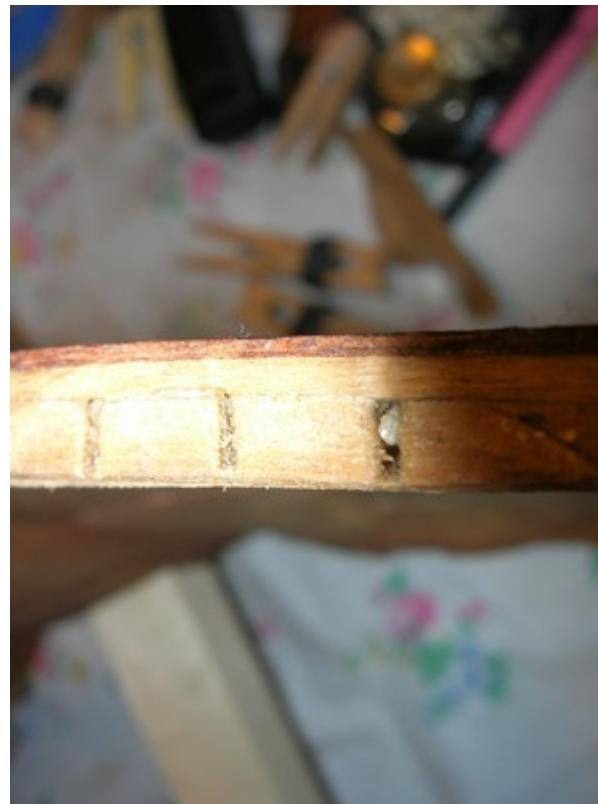
I use white maple to rebuild the missing parts and fill the shrunk cracks.



I glue poplar doublings between the splints, on the edges of the rib.



The upper rib of the G side shows many cracks as well, repaired with a large ash doubling and other small ones, with transversal fiber.



The lining on the belly side, in linden wood, is cut and bent. This overlaps a second one, maybe in poplar.

I remove all repairs and linings from the rib.



The rib is between 1,8 and 2,3 millimetres thick.

I glue a set of 1,7 millimetres thick poplar splints, with fiber running perpendicularly to the rib.



I glue doublings between the splints, at the lining areas



I rebuild the missing parts.



The lower rib on the E side shows cracks on the entire surface, repaired with ash doublings, that cover the whole rib towards the lower block.

There are three spruce splints as well, two of them covering the ash doubling.



The linden wood lining on the belly side is cut and bent, and covers a second one with continuous fiber.

The one on the back side shows reinforcements cut to shape.



The lower corner on the back side has been replaced.



There is a small replacement in the center of the rib as well.



I clean the rib from all repairs and linings.



The average thickness is 2 millimetres (1,8 - 2,1 millimetres)

During the cleaning process two missing parts can be seen along the glueing surface on the back side, at the lower block and towards the corner.

The missing parts were filled with wood and filler.



The glueing surface between ribs and back has been lowered, probably during the replacement of the lower edge of the back.

In order to rebuild the missing section, I glue a set of poplar splints longer than the current height of the rib.

I then glue the doublings between the splints.



I rebuild the missing parts, except the one on the back side next to the lower block.





The lower rib on the G side shows many cracks, repaired with ash doublings and with three large splints of linden wood.



Here too, the linings on both the back and front side are cut and bent, and are covering another set of linings with continuous fiber; on the back side the lining is partially cut to shape.



A part of the rib on the back side is missing and filled with putty.



The glueing surface of the back to the ribs next to the lower block has been lowered.

Once the rib is cleaned, I make the poplar splints higher than the rib, to rebuild the missing part.



I then glue the poplar doublings between the splints.



I make the missing parts, up to the edge of the rib as it was before this restoration.



The upper block might be partially original. It is currently made of four different layers of wood, two side grafts, wedges and fillings.



The external layer is screwed to the inner ones, and is not original. It is made of walnut, and forms the cheeks of the dovetail neck fitting.



In the middle, two layers of spruce are glued together, with transversal fiber.

The last layer is in slab cut spruce, and the fiber is perpendicular to the ribs.

On the sides of this are two grafts, both in two pieces, that were probably made to widen the shoulders on the belly side, while tightening the back, as can be seen from the back's purfling and the front additions.



An hypothesis is that the original form had the front of the same width of the back, and that the neck was glued to the block without the dovetail joint, and the last part of the ribs glued to the neck's sides.

I decide to replace the block because of the bad condition it's in, having different woods, wedges, worm holes and side grafts, and for the necessity of remaking the neck's fitting.

To do so, I build a counterform external to the ribs.



I finish it so it can be clamped to the upper part of the ribs.





In order to remove the block, I will have to remove the wooden crosses as well.

To be able to glue them in the same place in a second moment, I measure the lengths on both top and back side, which are of 1062 millimetres at the top, and 1054 at the back.

The surfaces of the counterform copy the ones on the ribs, with an irregular convexity caused by the modifications made in the past.

I remove the crosses and the upper block.

I use the counterform the way it is to sustain the ribs while I remove the block. I will eliminate the irregularities , while maintaining the same profiles on both top and back side for the making and glueing of the new block.



During the cleaning of the ribs, two replacements on the bass side get unglued, and some splinters break off.

The two middle layers of the block, with the fiber running perpendicularly to how it is commonly used, are glued to the ribs by the endgrain, and have three holes.



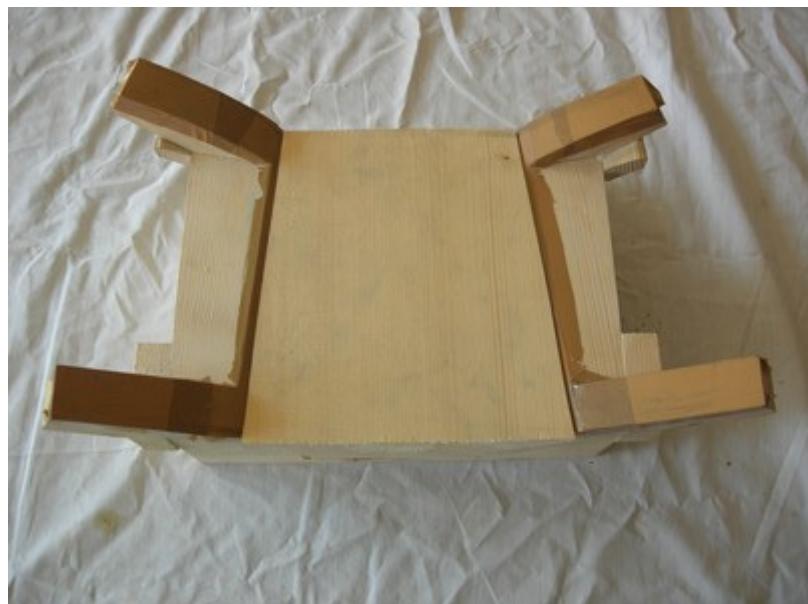
I figured that the inner layer was newer than the middle ones. It is possible that at some time a neck was nailed or screwed to the middle layers.

I modify the counterform.





I prepare the new block.





I reposition the ribs in the counterform, finish the block and glue.



I replace the two reconstructions on the E side and the missing material on the G side.



I finish the ribs from the inside with two reinforcing splints and doublings between them.



The lower block might be original as well.

It is made of four pieces of spruce, with the grain running in different directions, but all perpendicularly to the ribs



The endpin hole is off center in respect to the height of the ribs



If the hypothesis is that the instrument was played with the back edge resting on the floor, maybe with a protective "clog", it would make sense to think that an end button was used rather than an endpin, and would have been placed more towards the top, so it would not touch the floor.

As said before, the back presents a replacement of edge and purfling that would be compatible with this hypothesis.

In the same area the ribs and block have been lowered and the glueing surface altered.

The top also shows an edge replacement on the lower bout on the G side, and here as well the rib has been lowered and the glueing surface altered.

The block's glueing surface to the back is splintered and shows fillings.

An ebony inlay at the lower ribs' joint suggest that the block has been detached and reglued , maybe to shorten the ribs

The block has been cut on the sides in order to put two lateral reinforcements in linden wood.



I decide to make a new block, for solidity, and to have one of the right height.

Since the lower surface is completely flat, the replacement does not need a counterform.

I remove the block.



I glue the new one. The ribs are missing a part next to the top, where the saddle was partially fitted into the block.





Before repositioning the crosses to keep the ribs, I start repairing the C bouts.

The G side C bout has been repaired with some ash doublings and a large spruce splint in the middle.



Covering two straight fiber linings, there are others in linden wood; the top one is cut and bent, the back one cut to shape.



I remove the linings and reinforcements and clean the rib.



I glue a set of poplar splints and doublings between them in the lining's areas.



I rebuild the missing parts.



On the back side, the corner blocks are lower than the ribs.

I rebuild the missing parts and two replacements on the lower corner.





The very cracked E side C bout has been repaired with ash doublings and two linden splints.



On the top side a straight fiber lining is covered by a second one, cut and bent.



On the back side the covering one is in three pieces, cut to shape.



The back corners have been replaced. Here too, it is possible that the blocks were lower than the ribs.



In proximity to the glueing surface on the back side, there is a rectangular replacement, and part of the edge is missing and filled.

At about 35 millimetres from the edge there is a reconstruction meant to fill a crack.



I clean the rib from linings and doublings.



I glue a set of poplar splints, and doublings between them.



I then finish the rib by remaking the missing parts.



After finishing the surfaces on which the linings will be glued, I cut and bend them while verifying the shape on the top and back, and then glue them.



The thickness of the ribs, together with the splints and doublings, after the finishing of the glueing surfaces, is of about 3,5 millimetres.

The thickness of the linings is of 2,5 millimetres, and consequentially the glueing surface of the ribs to the top and back will be of 6 millimetres, or 5,8 considering the finish from inside.

I finish the splints and linings by thinning out the edges and softening the corners.





I finish the inside of the lower block.



I reposition the crosses.



After finishing the glueing surface, I cut and glue the top linings.



I let part of the lining on the G side lower bout jutting, where the ribs have been lowered, next to an edge replacement and where I make and glue the missing part of the rib.



The ribs have been lowered next to the lower block on the back side as well.

In this area I kept the lower block, splints and doublings higher.



After I finish the glueing surface, I replace the missing parts of the lower ribs



I finish the glueing surface, make and glue the linings of the back.





I finish the inside of the ribs, by thinning and smoothing the linings, doublings and reinforcing splints.

Front

The design of the front is very pleasant, archaic, typical of the Brescian school.

The upper bouts are relatively wide, the C bouts small and round, the f holes very far apart and slanted, with the upper and lower eyes of similar size, the corners long, there is a double purfling, the bridge line is close to the middle point of the top's length. The arching of the upper part of the top is finished with a central crest.



The whole surface on the front is heavily cracked,

It is also very deformed, presenting an extensive weakening of the bass side, a swelling of the lower treble side, cuppings under the bridge's feet, in particular under the G foot





Edge works and purfling replacements are evident both on the lower and upper block's sides.







I have doubts on the lower part of the C bouts as well. I will have a clearer view after I clean the varnish and remove the edge doubling from the inside.





The varnish is dirty, with red brown retouchings and fillings, specially near the bass bar, where there are evident woodworm damages.

There are no open worm holes though.



From an inside view, there are repairs by at least three different hands



The entire edge has a spruce doubling, which has been glued with the fiber running perpendicularly to it.

At the lower edge, this doubling is glued over another (previous?) one.



In some areas, upper and lower bouts on the treble side, lower bout on the bass side, at the lower block, the doubling extends inside the top.



The bass bar, which is very long, conical, well shaped, is glued to a large doubling in the middle part of the top, and to reinforcements with perpendicular fiber at the edges. (the grain of the central doubling which is made of multiple pieces, goes in various directions).





The thickness of the non doubled parts, without considering irregularities, shows a thick area near the edge, ranging from 4,5 to 6 millimetres, up to 7,5 in the C bouts area, and a relatively thick area at the edges of the bass bar, between 6 and 7 millimetres, while thin areas can be found between the bass bar and the edges, till a minimum of 2,8 millimetres.

The edge of the f holes has been bevelled from the inside, so that from the outside it shows a thickness more or less regular and of an average of about 4 millimetres.

In order to have proper sustaining during the removal of the doublings, and to correct the deformations, I need to make a mould of the front.

To do so, I plane down the bass bar, which I will replace, to lay the top on a flat surface.



I notice, with no surprise considering the ribs, that the edge of the top is not flat but curves lengthwise, with the C bouts being the highest point.

Doublings, replacements and deformations might have been a cause for it, but is more likely that the curve was given to the ribs by planing them to follow an original curve of the top's carving.

In fact, the asimmetrical deformations of the top, even if pronounced, are quite common.

If the top had been made flat, and then bent on the ribs lengthwise, now we would notice a lowering of the whole area between the f holes, not only of the bass side.

I make the mould









The sides of the mould are in plywood and polyester to give it strength, while the inside is in plaster for the ease to work it

I place the front on the mould, with a cotton cloth to protect the varnish, and remove the bass bar.
Then I plane the doublings and cleats down till I can see the glueing surfaces.





While doing this, I notice that the edge doublings and their extensions toward the inside are older than the ones in the middle of the front, where the wood used seems less oxidized.

There is a second doubling in the lower center of the top, older than the one covering it.



I put new small temporary cleats on the cracks that have been repaired from the outside, and on the ones that could open when the top is pressed against the modified mould to correct the deformations.





I modify the mould.





I apply a good amount of shellac to the mould and sand it



Then I press the top against the modified mould, moisturizing it and using sand bags as weights, while clamping the edges down when they rise up.





The top takes an acceptable shape in about two months. The area under the bridge's treble foot remains slightly cupped, and it will need more time to get in shape before the making of the central doubling.







I start the repair work in the lower part on the treble side, by removing the edge doubling up to the first crack.



By doing so, I can see that the edge had been replaced in the lower part, at the widest part of the bout and at the corner, where I see a wooden pin.





The outer purfling has been partially replaced or reglued with white glue.



The doubling's extension towards the inside, in the lower part, has been inserted in the plate with a straight joint.



I replace a first part of the doubling in spruce with fiber running slightly sloped.



I remove the cleats, clean and repair the first two cracks, and put new cleats.



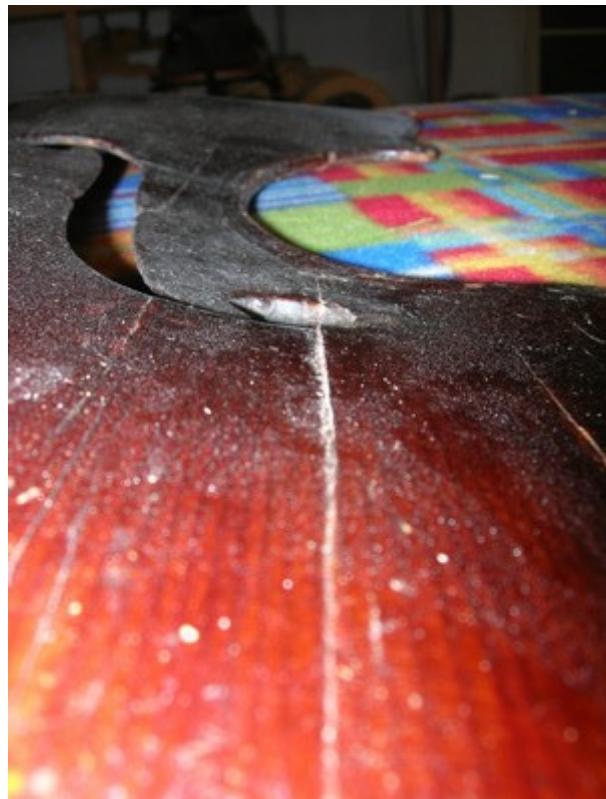
Then I replace the extension of the edge doubling, smoothing the edges thus obtaining a curve glueing surface.



I make and insert a shim from the outside to close the first crack, which was damaged and filled.



The following crack was glued with non aligned sides.

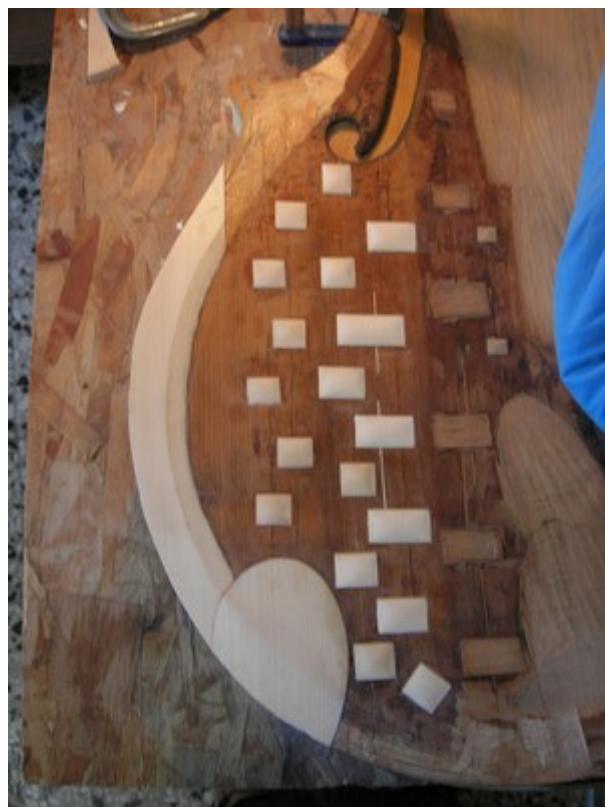


I open it, clean, glue, and reinforce with new cleats.

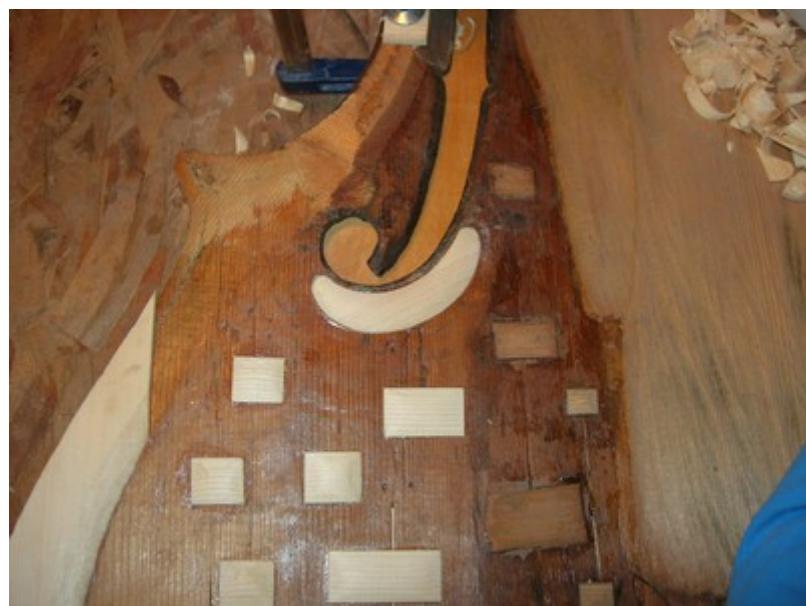


I proceed in the same manner with the following two cracks
The inner one has been repaired with stiches, of which holes still remain.
The outer one has two well made shims.

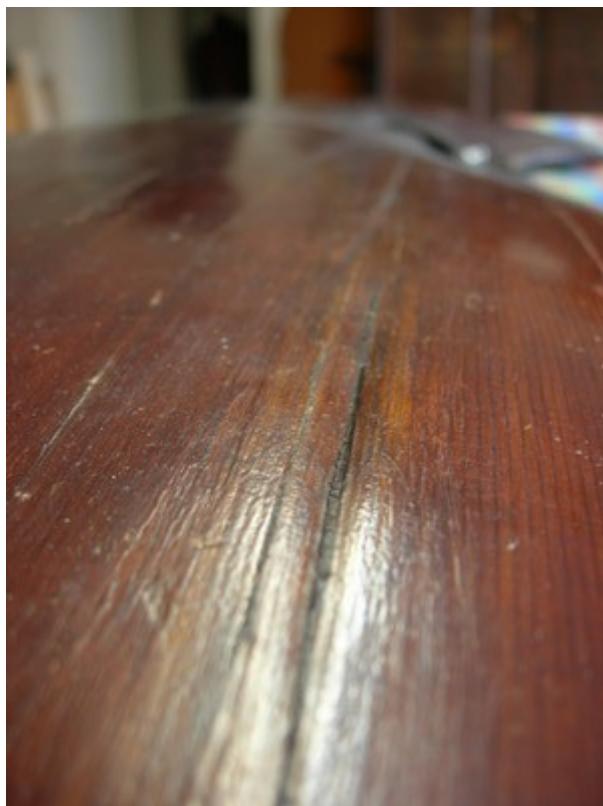




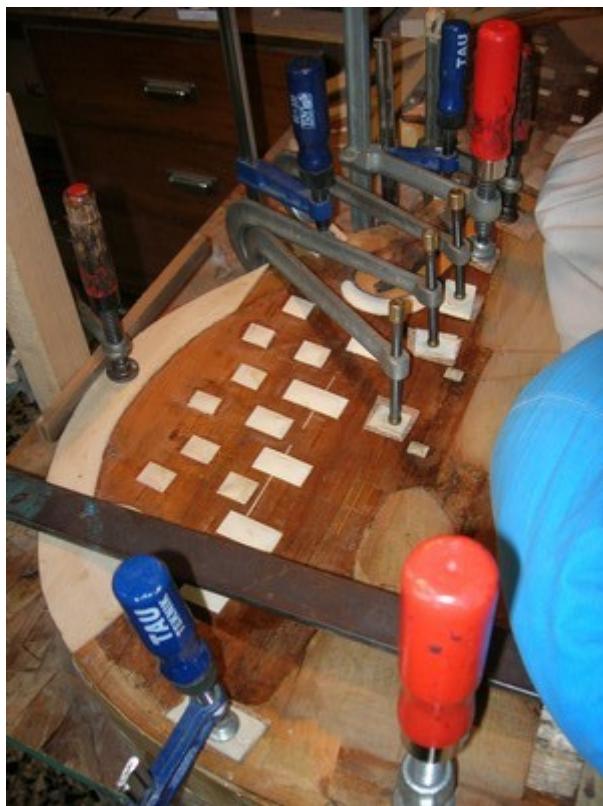
I remove a temporary cleat from the third crack and put a reinforcement under the f hole.



The next two cracks, close to each other, were repaired offset, with shims and filler. The front has been leveled from the outside, removing the varnish, which has been later retouched.



I unglue, remove shims and filler, repair the upper part, were there are no missing parts.



I reinforce the joint with new cleats.



The lower part presents a thickness decreasing, where the cracks have been poorly closed and the top leveled from the outside.



I make a doubling that will fill the unleveled inside surface, and glue it by pressing down on the mould; I reinforce with cleats and make the filling shims.



I remove the doubling from the lower block's glueing surface, and part of the surrounding reinforcements placed on a large reconstruction of the lower center part of the top, which is also cracked.





I notice that an old doubling covers the large reconstruction, made before the edge doubling and the lateral reinforcements.

Both doubling and reconstruction show a crack repaired with a walnut shim.







The thickness of the external reconstruction is of about 2 millimetres. The old doubling covering it brings this area to 4,2 millimetres.

The glueing area under the bass bar has been lowered to 4,5 millimetres, and then reinforced with doublings with perpendicular fiber.

The extension of the edge doubling between the bass bar and the lower bout was partially inserted in the top, where it drops to 3,2 millimetres.

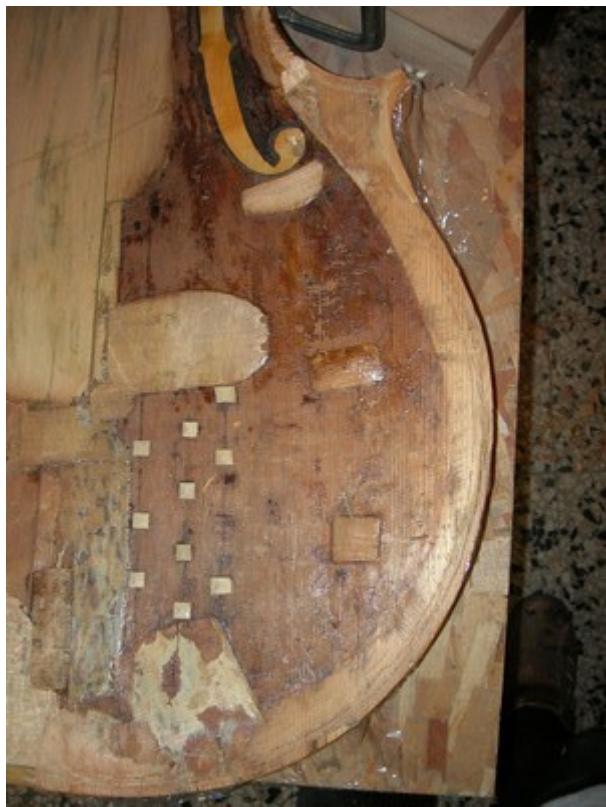


This requires a large doubling at the lower part of the top.

Since this doubling will cover cracks on the bass side as well, I decide to repair this side of the top too, before I start the doubling.

I remove the edge doubling on the bass side.





By doing so, edge reconstructions come to light along the whole bout, together with a corner reconstruction.

I make the edge doubling with the fiber running slightly tilted, for the part with no cracks.



I remove the cleats, open, clean and reglue the first crack, then reinforce with new cleats.



I clean and repair the other cracks, always reinforcing with new cleats.



I clean the area under the edge's doubling extension towards the bass bar, to repair the inner cracks.



I clean the lower center part of the front.



So I can see that the top is in three pieces.

the central reconstruction is connected to the central piece with a slanted joint, while on the sides there is a walnut shim and a larger spruce reconstruction.

I make the lower central doubling, with slightly sloped fiber.





I make a partial doubling at the joint of the external reconstruction, to avoid excessive thinning.







I finish by thinning and remaking the missing edge doubling, and insert a patch to get rid of a small knot.



I apply a reinforcement to the lower eye of the f hole.



I remove the old edge doubling from the C bouts and upper corners.



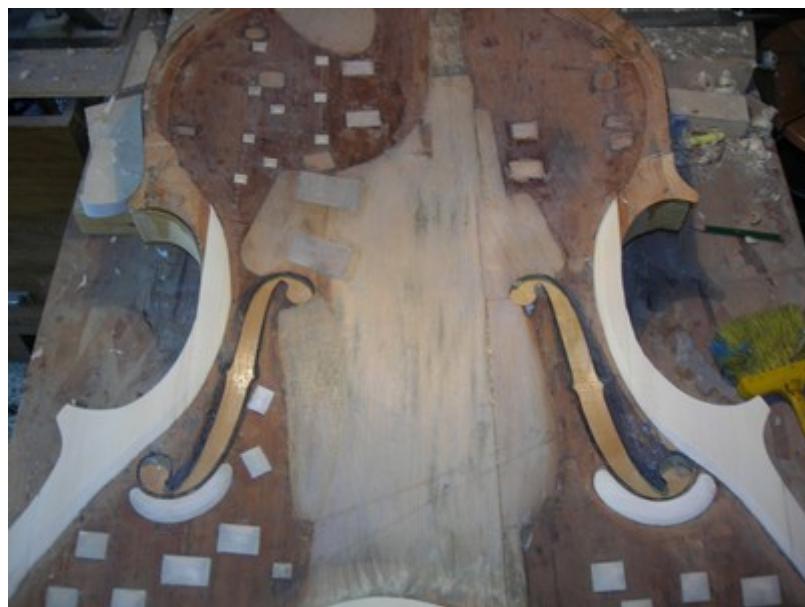
It is possible to see an edge replacement of the treble C bout, maybe made because of the bowing action. The corners have centering pins.



The bass C bout has both corners reconstructed.

Here as well are centering pins.

I remake part of the edge doubling, with slightly sloped fiber.



I remove the remaining central doubling.

This clearly shows the top in three pieces. The joint on the treble side is parallel to the center line, and internal to where the sound post might be.

On the bass side, next to the joint, there are worm holes.

Under the old doubling, the front was roughly made thin, and worm holes and tool marks were filled with white chalk.



The remaining thickness of original wood varies between 3,4 and 1,7 millimetres, and is particularly thin on the bass side in proximity to the upper part of the bass bar and on the treble side on the upper part of the f hole.

In order to avoid thinning the plate too much, I make partial doublings to level irregularities.





The joint on the bass side has been partially filled with a shim and filler.
I clean, and remake the shim.



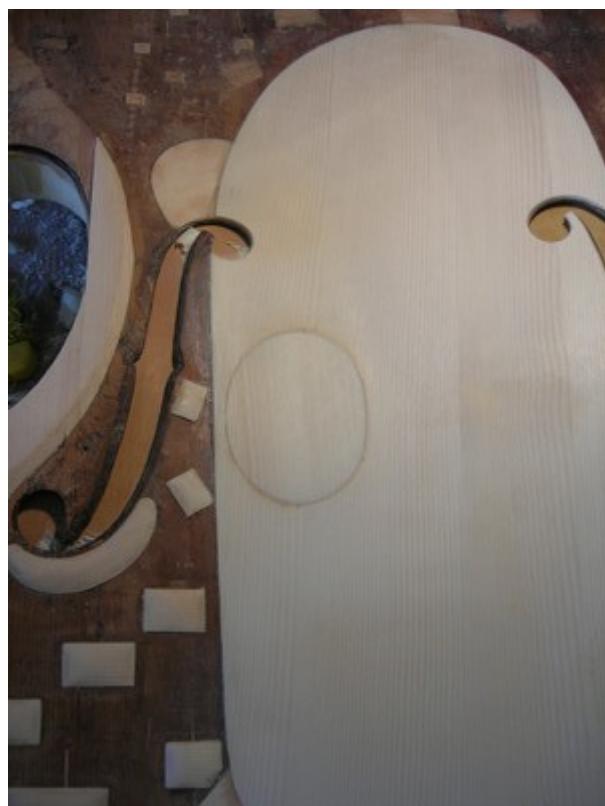
I make the central doubling, with the grain leaning the opposit way of the lower one.





In order to avoid stiffening this part too much, considering the inclined fiber and the large glueing surface, I use softer spruce than the one used in the lower part.

So I make a soundpost patch with harder spruce.



I continue by removing the section of the edge doubling covering the first crack on the top's shoulders, on the bass side.

By doing so the edge reconstruction ment to widen the top is clearer. I clean and repair the crack. I apply three new cleats.



I place a temporary cleat to block the two cracks, properly closed, next to the center doubling, in an area that has been thinned to 2,5 millimetres, that will need a doubling.



I repair the first partial crack on the treble side.





I remove the sections of the edge doubling interfering with the other cracks that need to be repaired





This way the replacement of the top edge made to widen it can be clearly seen.

The extension of the edge doubling towards the inner part of the top was inserted in the wood, and the top is here thinned to 2,7 millimetres.

There are two well done shims as well.

I remove the cleats, open, clean and repair the next crack, reinforcing it with new cleats.



I repair the other cracks in the area that will not be covered by the upper doubling.



I remove the edge doubling in the upper block area.



Now it is possible to see the edge reconstruction and four centering pins in the upper part of the top.

I make the upper doubling, that will repair:
the thinned area on the treble side, where the edge doubling would extend towards the inside;
the thinned area on the bass side, flanking the bass bar, where two cracks are temporarily hold together with a cleat;
the thinned area on which the tip of the bass bar was glued, reinforced with a transverse fiber doubling.

The glueing surface of the upper block, which had a doubling, reconstructions and worm holes.

Between the tip of the bass bar and the edge doubling there is an area, 7 millimetres thick, that is maybe original. Unfortunately I will have to thin it to glue the upper new doubling. This area is cracked anyway.



The thickening of this area is interesting, maybe revealing the maker's intention to reinforce a part of the top subject to sollicitation.

Another thickening of the upper part of the top, up to 11,5 millimetres, can be found in proximity to the central "crest" carved on the outside.

I prepare the surface for the upper doubling.



I model, glue and thin the doubling.



As said before, the areas next to the edge with no doubling are relatively thick, of about 5 millimetres at the upper and lower bouts, and between 7 and 8 millimetres at the C bouts.

The more central areas drop down to 3 millimetres.

I have no reference on the doubled areas, since they were all thinned.

However, there was a thickening, to 7 millimetres, in the area under the upper block, on the bass side.

For the graduation, I left a thickness of 7 millimetres on the areas of the tips of the bass bar, and between the f holes, rising up to 7,6 at the soundpost.

The areas under the bass bar, between the tips and the central area, go down to 5,8 - 6 millimetres.

The remaining surfaces gradually drop from the thick areas next to the edges to the 3 millimetres of the not doubled parts.

The "crest" carved on the outside, about 19 centimetres long, thickens the top up to 11,5 millimetres.

I remove the remaining edge doublings.

This way, the edge and upper corner reconstruction on the bass side come to light, together with a superficial addition.



On the treble side, the shorter upper edge reconstruction is almost entirely covered by the doubling.



Then there is an edge reconstruction in the widest part of the bout, and the corner rebuilt in multiple pieces.



I prepare the new edge doubling, with slightly tilted grain, and glue it.



I remove the "crosses" ment to keep the ribs in shape, position the ribs on the top, trace the inside line.





I finish the edge doubling, leaving a small margin between the ribs and the beginning of the scoop.

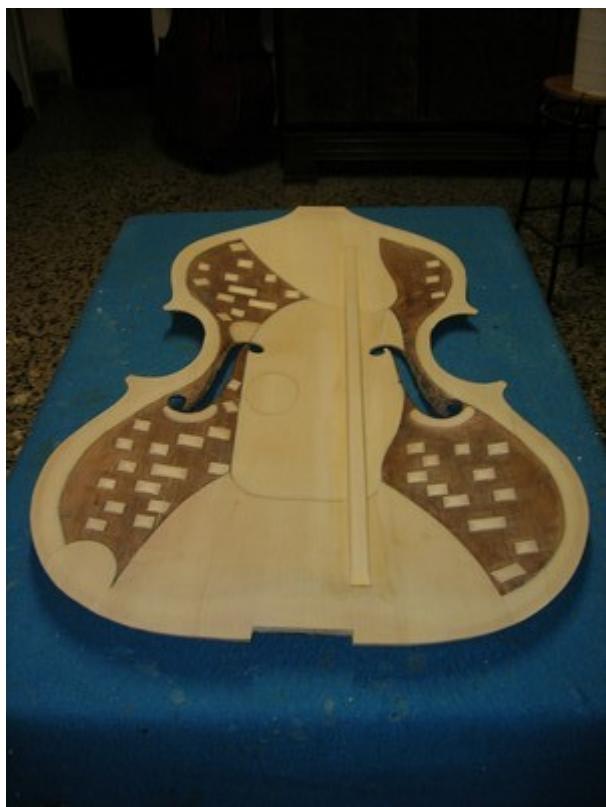


I make and glue the bass bar.



The bass bar is 21 millimetres thick and 840 millimetres long, while the height in the center is 42 millimetres. I consider that the bridge line is not far from the center of the top's length, and position the center of the bass bar on this line. So the upper tip is farther away from the edge than the lower one. However, the shape itself of the top makes it more rigid on the upper part than on the lower one. The inclination is set keeping in mind the different inclinations of the doubling's grain.





I glue the top to the ribs



I set a splint between the C bouts on the back side to hold the correct width.



Back

The back is made from cherry wood, in two pieces, cracks are present over the entire surface, the button is missing.



The thickness decrease from 4,5 - 5,2 millimetres in the lower bouts to 3,7 - 4,3 millimetres in the upper part.

The joint was reinforced, I believe at the time of construction, with butterfly maple inserts.



The corners on the bass side were remade, and there are large sections at the maximum upper and lower width which have been replaced.









A remade section is also present at the treble C bout.



The lower edge, adjacent to and under the block has been remade, maybe to repair the damage caused by playing the instrument without an endpin.

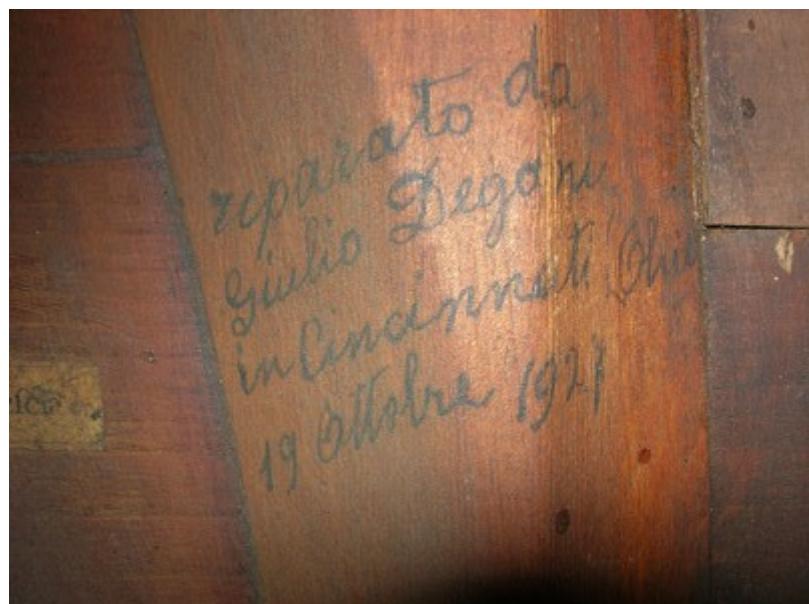
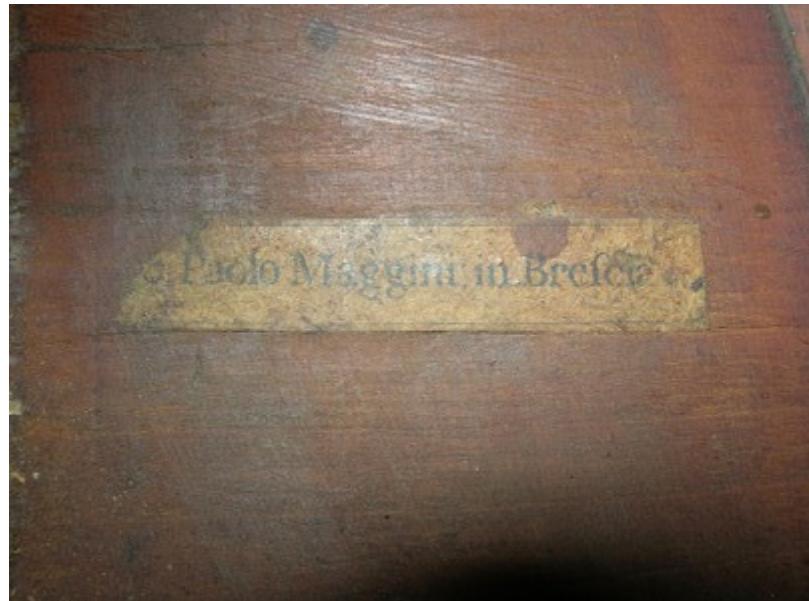




In the upper section, near the upper block, the presence of wider purfling may show that the profile has been reduced in width



There is a label reading "...o. Paolo Maggini in Brescia", as well as a pencil writing reading " riparato da Giulio Degani in Cincinnati Ohio 19 ottobre 1927 ".



The soundpost crossbar, of strange form, as well as the upper and lower bars, are made of the same wood and seem to have been replaced by the same person, whose work resembles the shaping of the linings and of the reinforcements at the upper and lower blocks, which I found while repairing the ribs.





The small bar is from a different maker and seem to have been replaced more recently.



In the lower part there are several rectangular reinforcements, placed along repaired cracks. those above the lower bar are in walnut, and those below in spruce.



The bend, placed fairly high, has been broken, and there is some filler from the outside. Inside it has been reinforced with a strip of walnut, with grain parallel to that of the back.







There are additional reinforcements, maybe in ash, along two cracks on the bass side, as well as two others smaller in size on the treble side.



The reinforcement along the bend has also cracked.

I remove the reinforcements along the cracks in the lower section, and clean the area.



It is now possible to see the profile of the ribs, traced with a scribe roughly 4 millimetres from the border.



Some of the cracks have been filled with strips of walnut, and one was filled with white putty.



There are marks from a scraper or a small plane present on the entire surface.

Under the reinforcements there are scribe marks.



I clean the middle section.



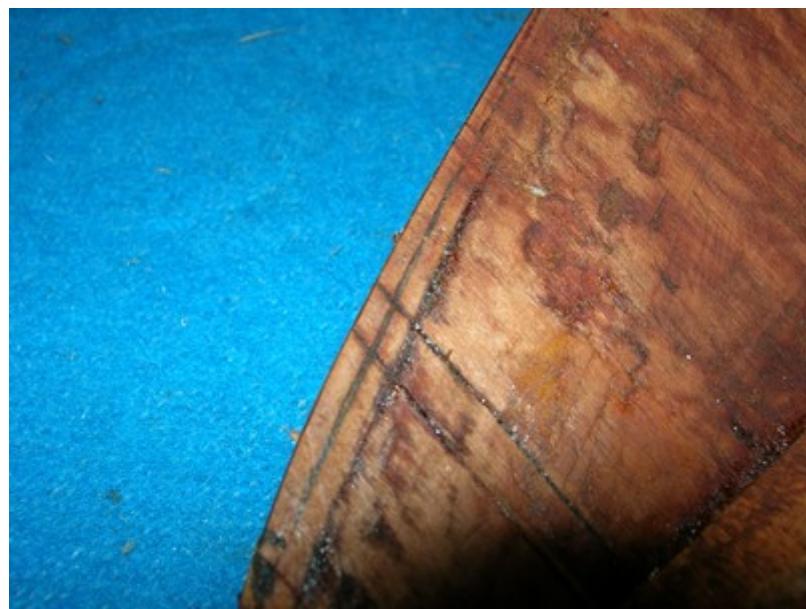
The area around the label has been varnished, maybe to protect the label.



The profile of the ribs is present here as well.



I clean the upper part.



Given that the upper part of the back has been modified, it is probable that the profile of the ribs was rescribed during a previous repair.

I apply temporary cleats along all cracks.



I choose to remove the bars with a plane and gouge, and then cleaning the glueing surfaces with hot water; this way avoid the possibility of causing further damage to the back while unsticking the bars.

None of the bars is original, their excessive weight and rigidity could have caused some of the damage the back has suffered, the removal is necessary to repair the cracks under the bars.

Unfortunately during the process I will have to remove the writing of Giulio Degani on the soundpost bar.

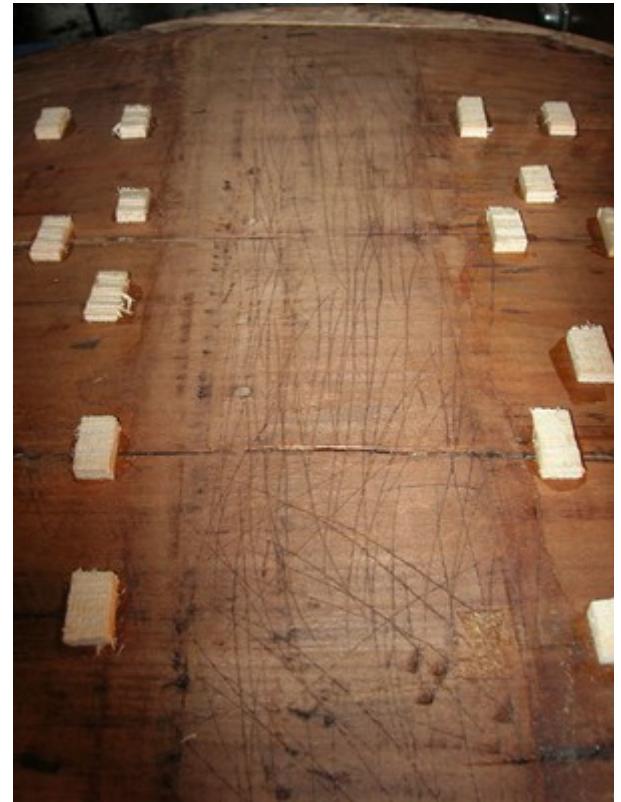
The spruce with which the lower bar was made is fairly hard and rigid.



The glueing surface of the back to the lower bar was scratched with a scribe. Similar to the surface under the walnut and spruce reinforcements along the cracks.

One of the butterfly inserts was covered by the bar.

There are also several round pins, maybe placed from the outside during a bad repair to a previous smaller bar, whose position is still visible on the surface of the back



The previous bar would have had a width of 20 - 22 millimetres, and was placed along the upper edge of the bar I removed, corresponding with the widest point of the back.



The soundpost bar was made with the same wood of the lower one.



The scratch marks on the glueing surface are present here as well, and under the bar there is another butterfly insert.



The butterfly and the surrounding area are rich with tool marks. Maybe a previous bar was narrower, but similar to the one I removed.

The small central bar was made from a softer spruce, with a wider grain than that used for the other bars. This material seems less oxidized as well.



The glueing surface under the small bar has been scribed as well.



The upper bar was made from the same wood of the soundpost and the lower bars.

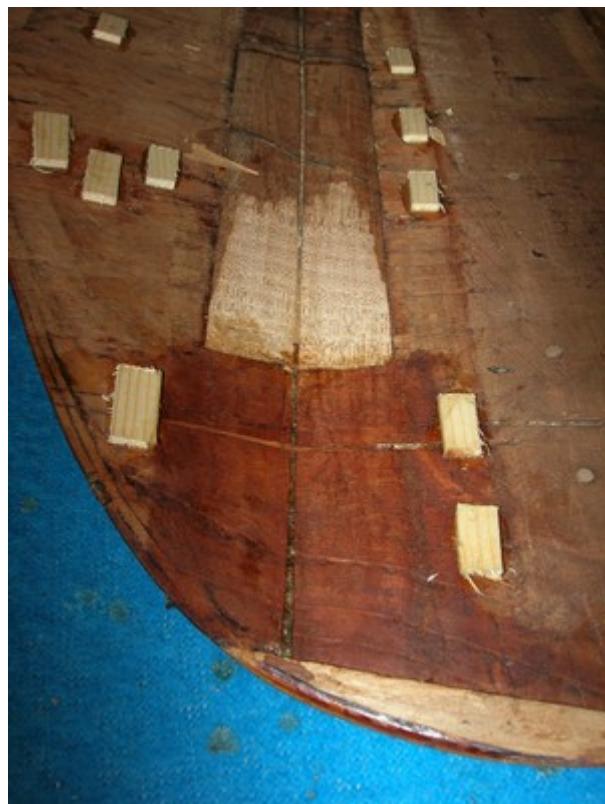


The glueing surface has been scribed here as well, and there are several pins similar to those under the lower bar.

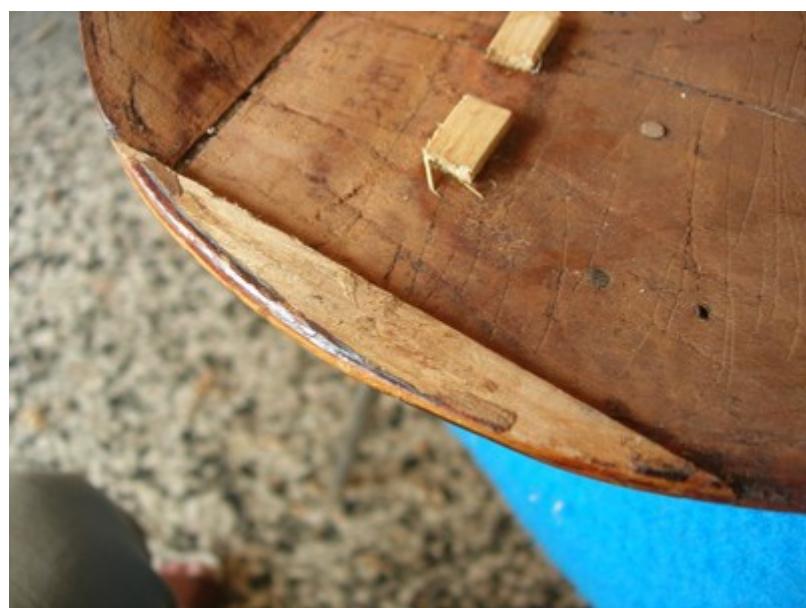
The position of a previous bar is visible, at the widest point of the upper bouts, and 20 -22 millimetres wide.



I remove part of the reinforcement along the bend, on the bass side.



The edge between the widest point of the upper bouts and the bend has been remade with maple which is thicker than the rest of the back.



I bring it to the same thickness



There are double lines of non original purfling inlaid into the remade edge, which are present along the entire profile of the back, placed over or near another wider purfling with very thin black sides, maybe the original.

The older purfling would outline a wider profile in this area of the instrument.



I remove a temporary cleat near the upper corner on the bass side where there is a crack as well as splintered wood, and clean the surface.



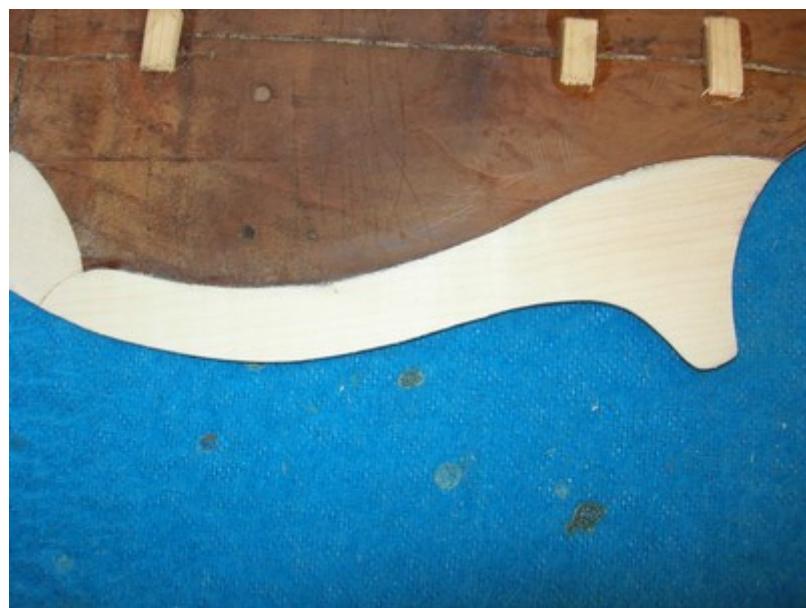
I then remove a temporary cleat from a crack closer to the bend, and repair the two cracks and the splintered area.



I make a patch along the border near the bend, using maple with the grain slightly inclined.



I then make a doubling along the edge from the upper corner to the patch near the bend.



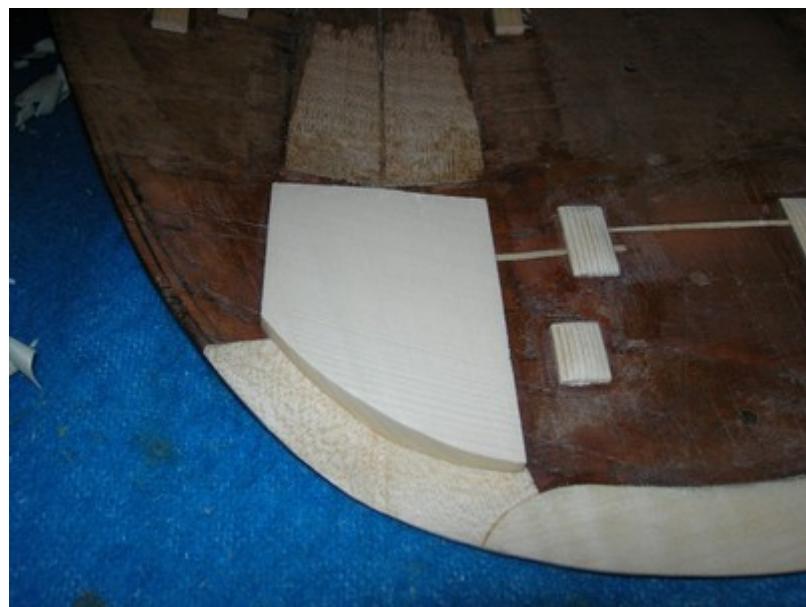
I place two cleats on the repaired cracks near the corner and bend.



I remove the temporary cleats and filler from the next two cracks and I repair them using slivers of wood.



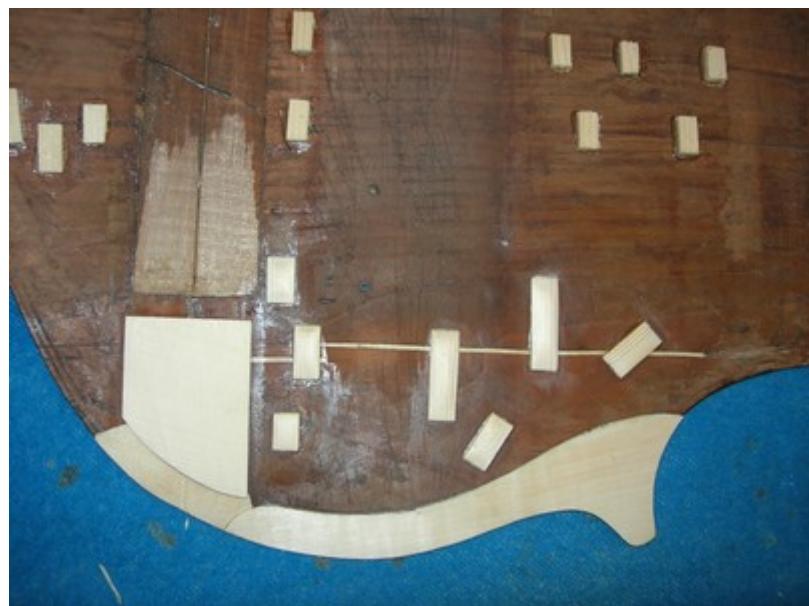
I remake a section of the reinforcement along the bend using spruce, with the grain slightly offset to that of the back.



The next crack, near the bend, was caused by one of the walnut pins under the upper bar.



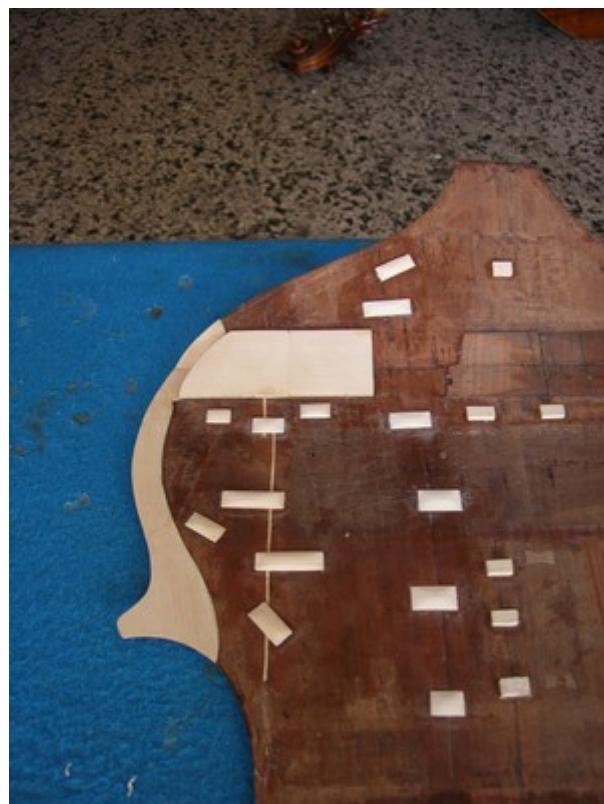
I remove the pin and repair the crack.



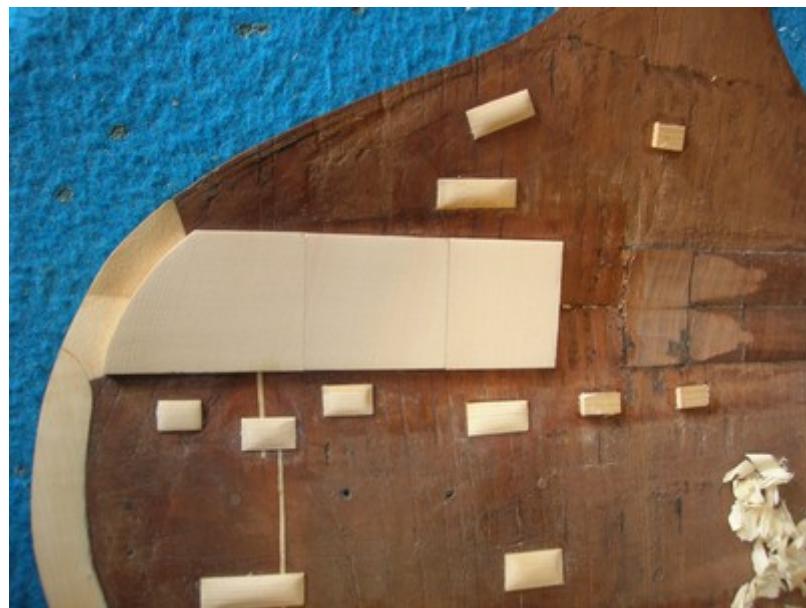
I remove a second section of the reinforcement along the bend and I remake it.



I then remove a third section, and repair the next two cracks, without removing the slivers of walnut already inserted to fill the cracks, which are well done.



I remove another section of the reinforcement along the bend and remake a part of it.



I make an edge doubling near the bend on the bass side out of maple, with the grain slightly inclined.



I remove the temporary cleat from the first crack in the lower part of the bass side, and repair the crack.



I make an edge doubling in maple along the widest portion of the lower curve on the bass side.



The next crack, in the lower section on the bass side, was repaired with several slivers of walnut and with putty. It reopened.

I remove the temporary cleats, open the crack, remove the slivers and repair the crack, rebuilding the missing part in white maple.



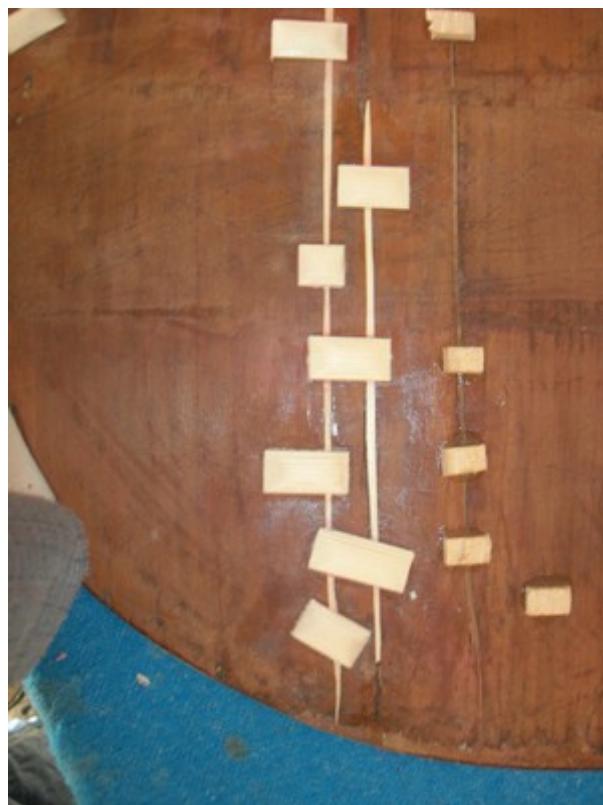


I reinforce the crack with cleats, one of which, in the soundpost bar area, I will later remove.



The next two cracks, above and below the lower bar, have been repaired with slivers of walnut and putty, and are partially open.

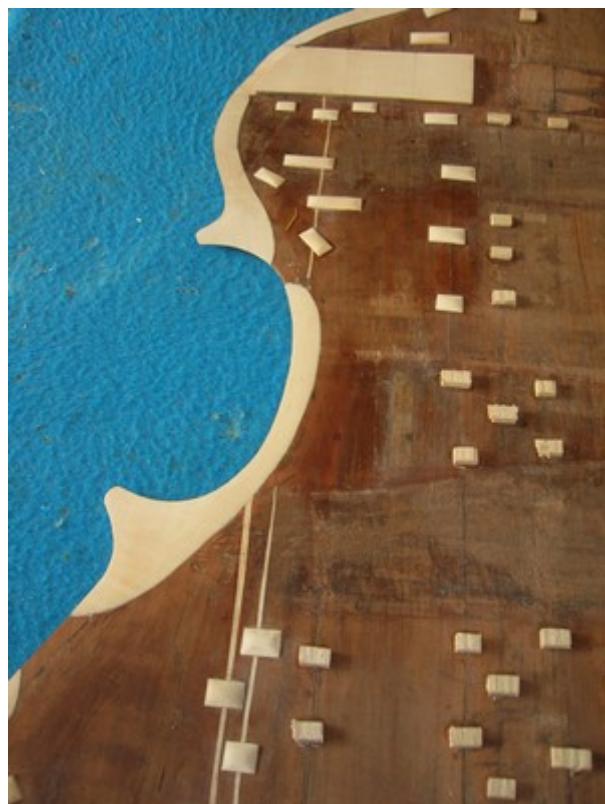
I first repair the lower crack.



I then repair the upper crack.



I make an edge doubling at the C bout and the lower corner on the bass side.



The next crack, on the lower bass side, has been repaired with a sliver of walnut.

From the outside the sliver is well glued and the crack is level, inside the sides of the crack are slightly offset, and the sliver shows gaps.

I work from the inside, without touching the outer surface, inserting a new sliver into the back, which enters halfway into the thickness.

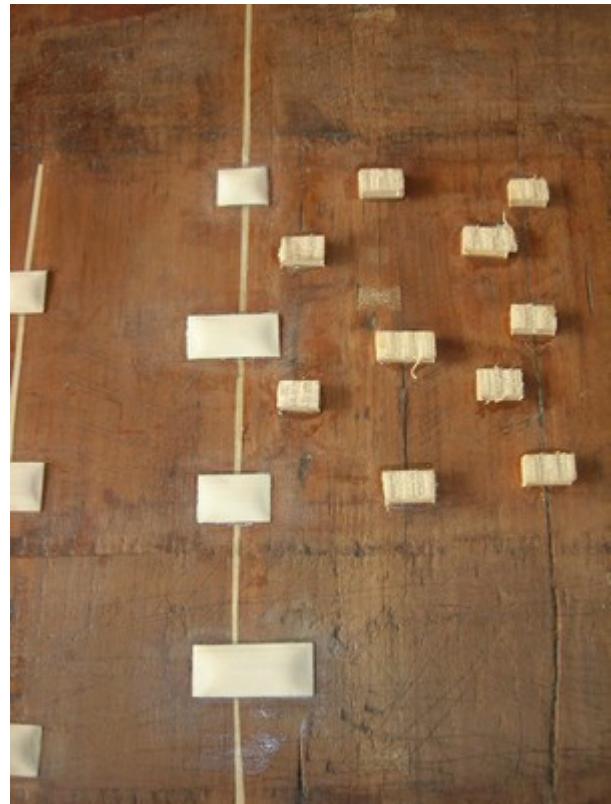
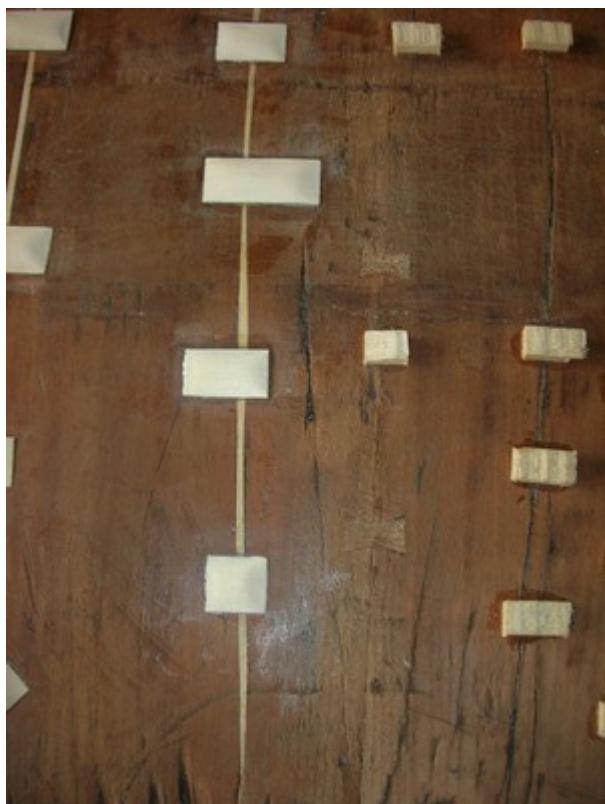
The offset sides of the crack inside do not merit a doubling, and the crack can be reinforced with the adjustment of the cleats.



The next crack runs from the glueing surface of the lower block to the center of the instrument. The sides are partially offset, and it has been filled with strips of walnut and putty. I reopen the crack, remove the fillers and close the crack with a new sliver.



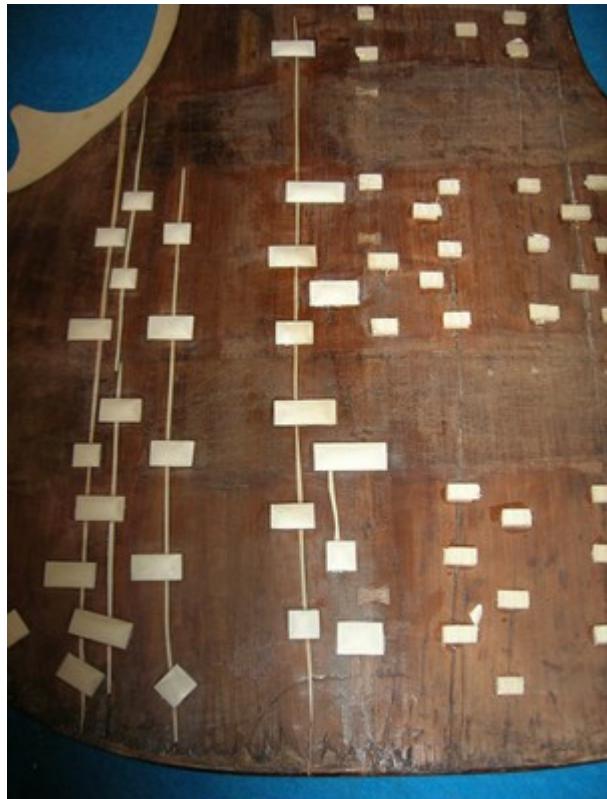
Continuing towards the central joint, in the lower section there are three small cracks, the first between the lower block and the lower bar, the second under the bar, and the third above it.



The first is well glued and level, but has a gap filled with glue on the inside; the second and third are partially open and offset, with brownish retouches to the varnish.

I remove the temporary cleats and repair the cracks, inserting maple into the gaps.

The central joint in this area is solid, maybe due to the butterfly inserts, and I can reinforce it with cleats without reopening.



In the center there is a crack next to the label, which I repair inserting glue from the outside and placing cleats on the sides. This way I do not risk damaging the label, while a large part of the crack will be reinforced by the soundpost bar.





At the same time I repair a small crack on the bass side of the lower block.





In the upper section, between the bend and the soundpost bar, along the side of the central joint on the bass side, there is a long crack, repaired without filler, partially open and dirty.



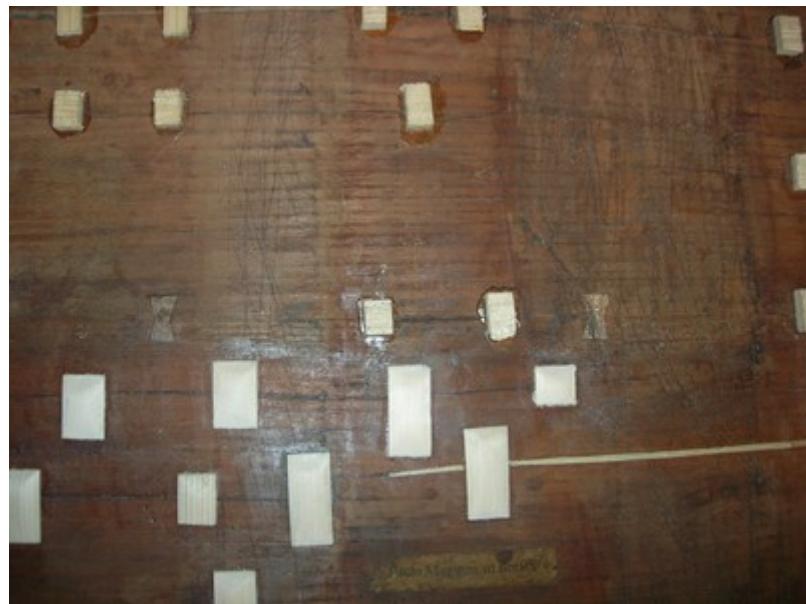
I remove the temporary cleats, reopen, clean and glue the crack, reinforcing with cleats.



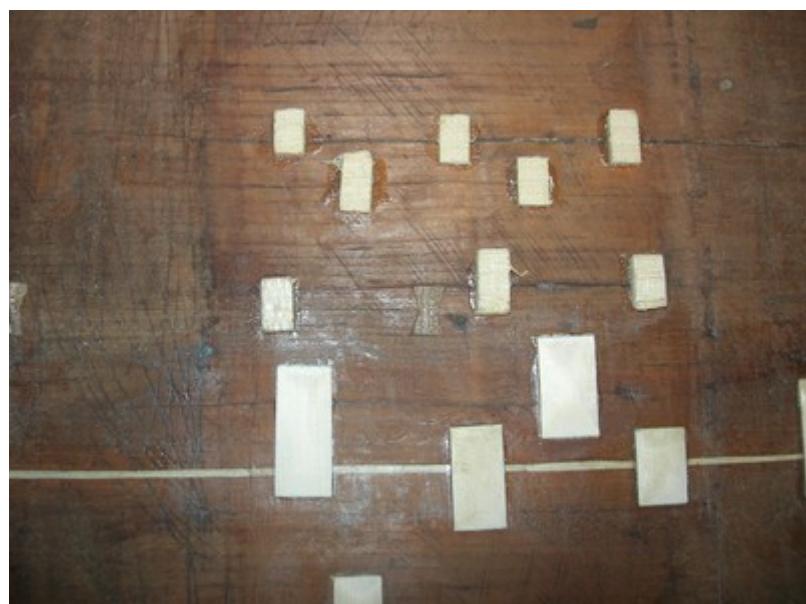
In spite of, or maybe thanks to the butterfly inserts, the central joint is for the most part closed.



The exception is a short area on top of the soundpost bar, which has been repaired with a walnut shim.



Also, under the soundpost bar, next to one of the butterfly inserts and by this probably caused, there is a crack, repaired with a walnut shim as well.



I reopen and repair the two openings, and reinforce the central joint with cleats



I remove part of the bend reinforcement, uncovering the joint and a butterfly insert.

In this way it can be noticed that the section of the back on the upper side of the bend was shifted of about 2 millimetres towards the treble side, probably during a previous bend repair.



I replace part of the reinforcement at the bend.



I remove the next section, uncovering a crack that starts at the upper block's glueing surface and continues down to the upper bar, through the bend, where it is open.



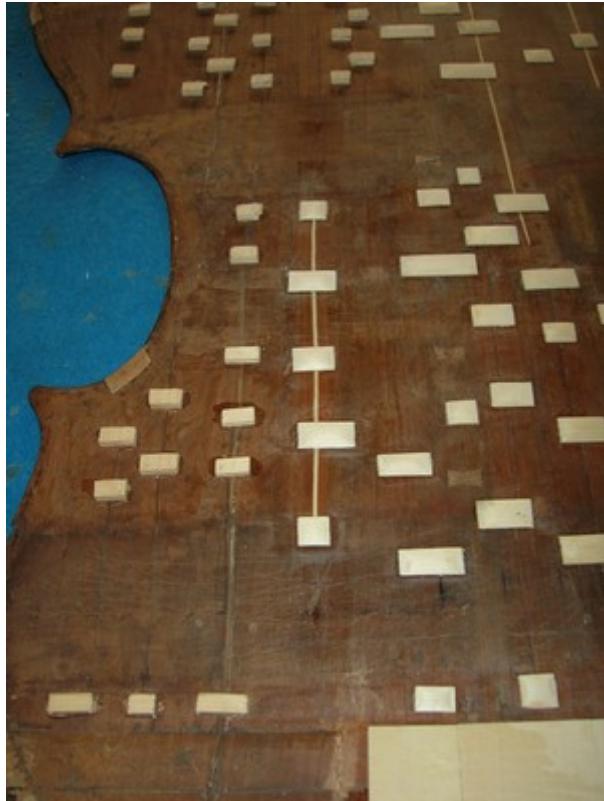
I repair the crack and replace another part of the reinforcement.



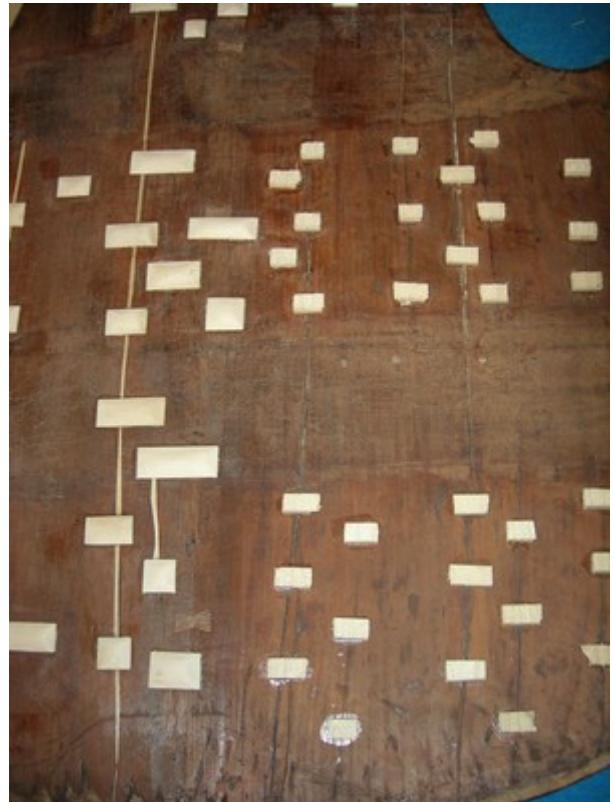
In the area between the upper bar and the soundpost bar, there is a crack repaired with a walnut shim, well glued from the inside, but open and putty filled on the outside.



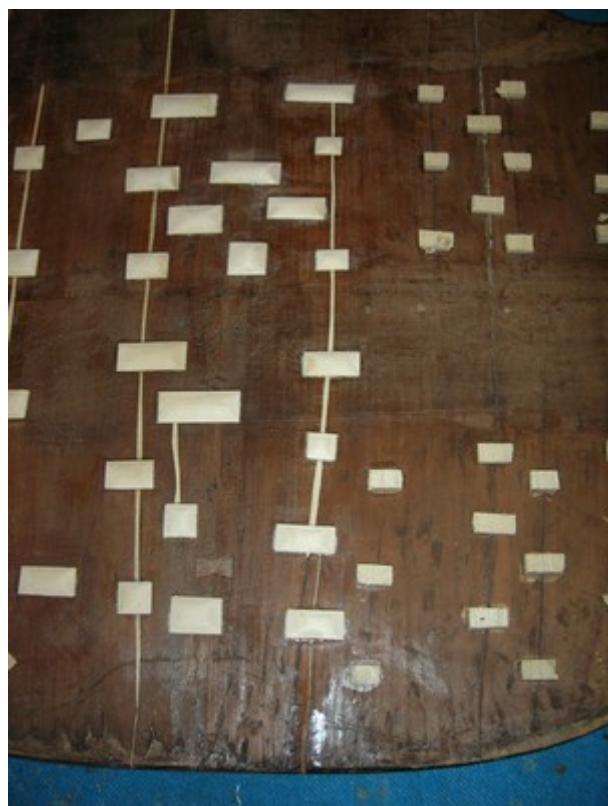
I remove the temporary cleats, clean and repair.



There is another open crack between the soundpost area and the lower edge, repaired with a walnut shim and putty, and two shorter cracks alongside, one right under the soundpost bar, the other at the lower edge.



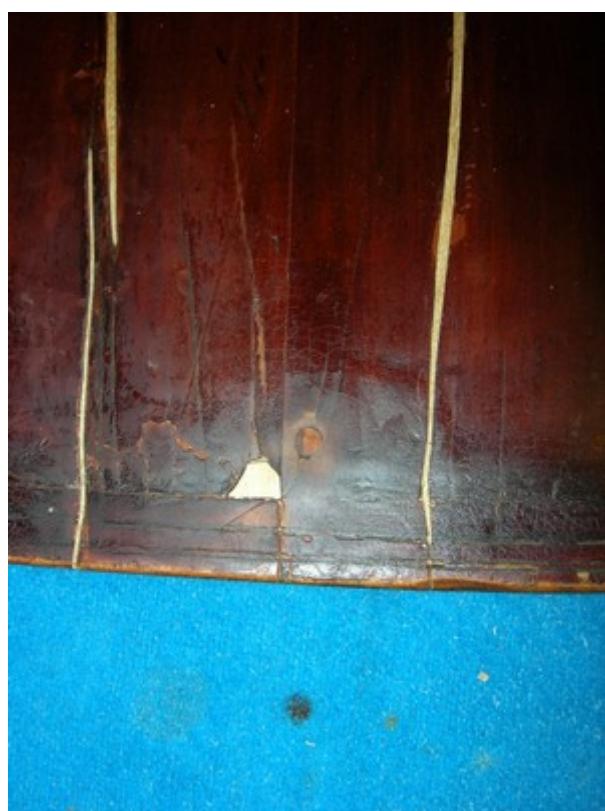
I remove the temporary cleats, clean and repair.



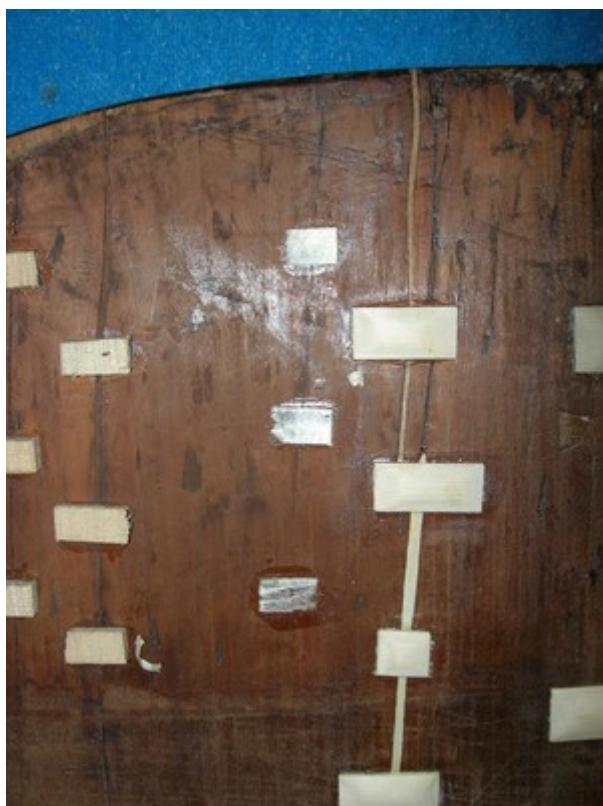
At the glueing surface of the lower block, a broken part has been reglued and a missing part filled. There is an hole flared on the outside as well.



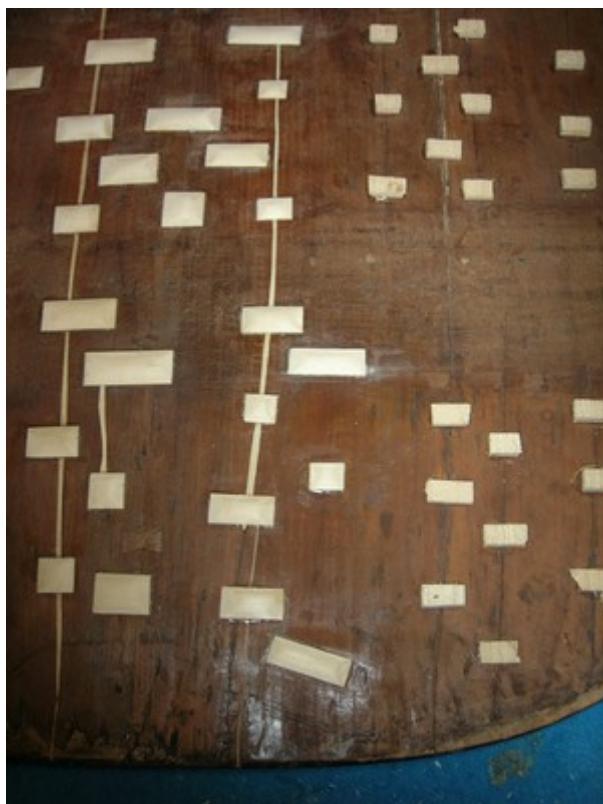
I remake the missing parts.



On the side of the block area there is an open crack about 16 centimetres long.



I reopen, clean and repair.



I remove another section of the bend reinforcement and remake part of it.

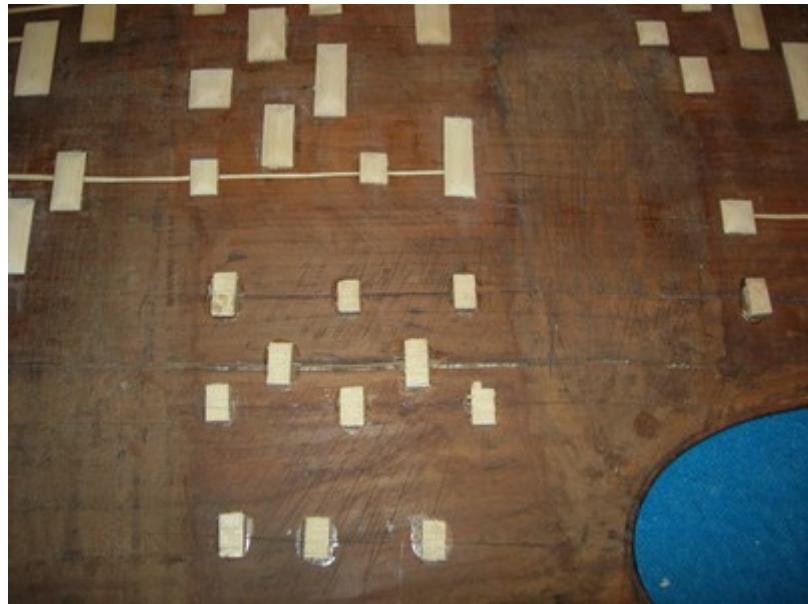


Then I uncover a crack by removing another section of the reinforcement.



This runs from the upper edge to the lower bar.

The section between the lower bar and the soundpost bar is open but has no filling shims.



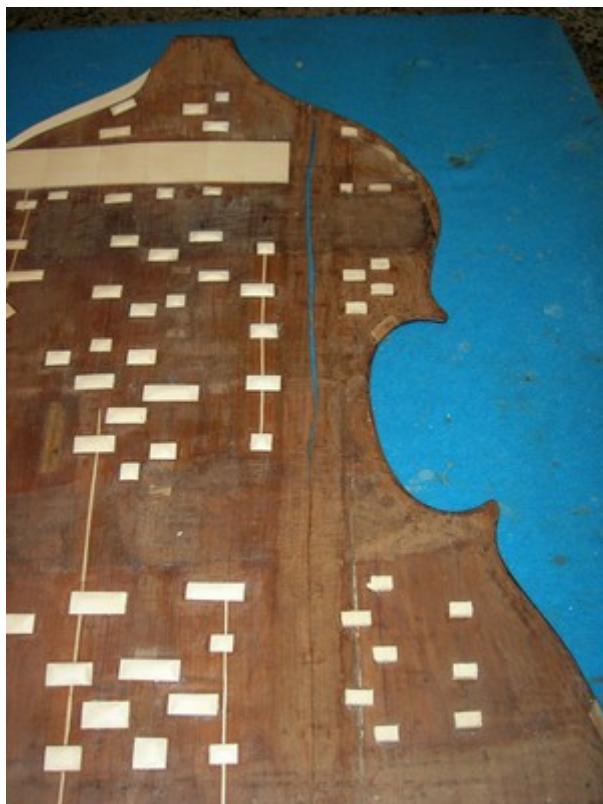
From the soundpost bar to the upper edge there are many shims, some side by side, and putty.

Also, the sides of the crack are offset on the inside, while they were smoothed and retouched from the outside, making the joint sunken.

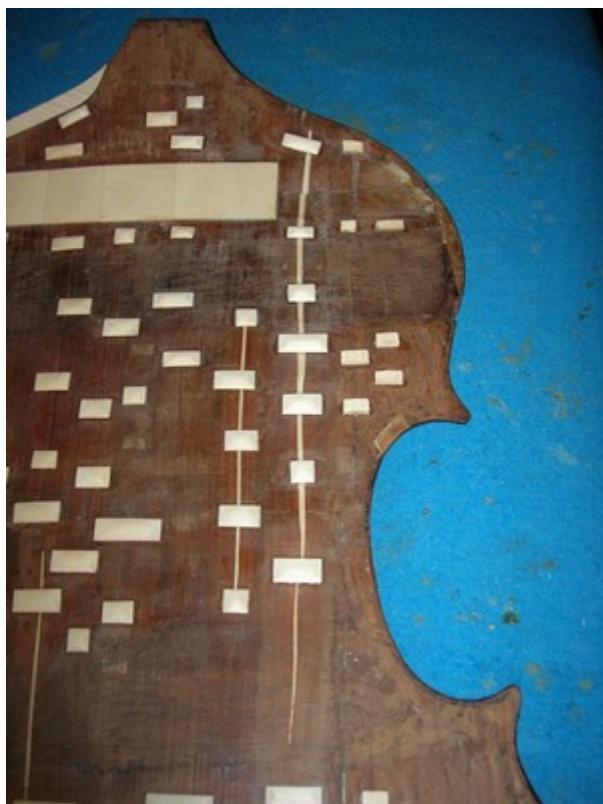




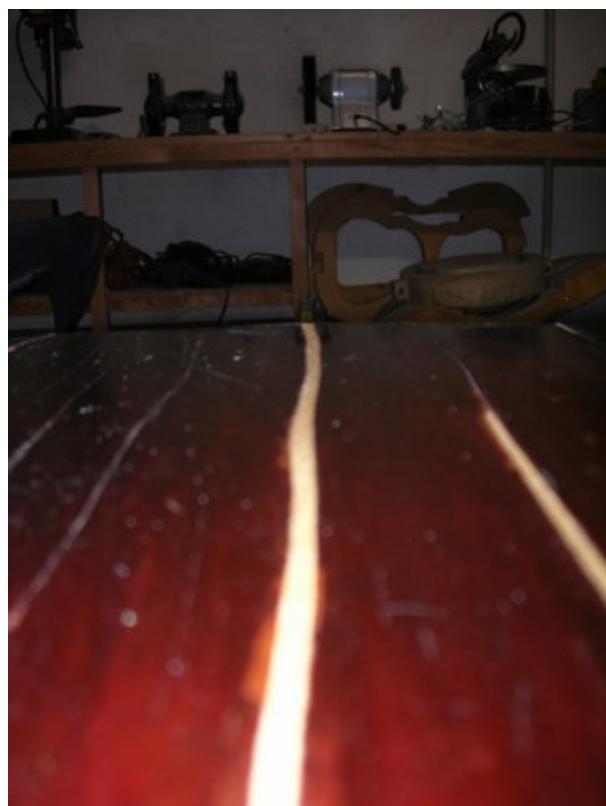
I remove the temporary cleats and clean the crack.



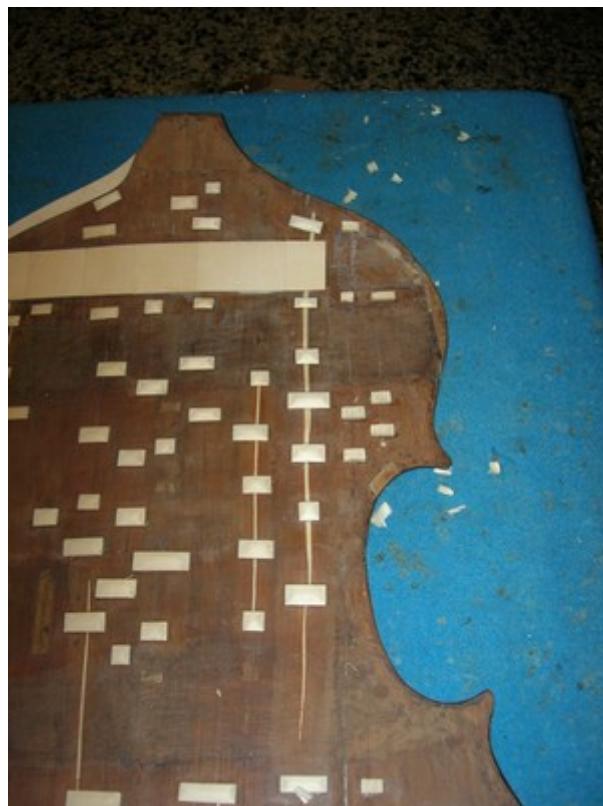
Then repair the lower part with no filling shims, replace the two upper shims and put new cleats.



I pushed both sides of the crack on a flat surface on the outside to eliminate the sinking, while the unlevelling on the inside will remain as it is, with the cleats shaped to follow it.

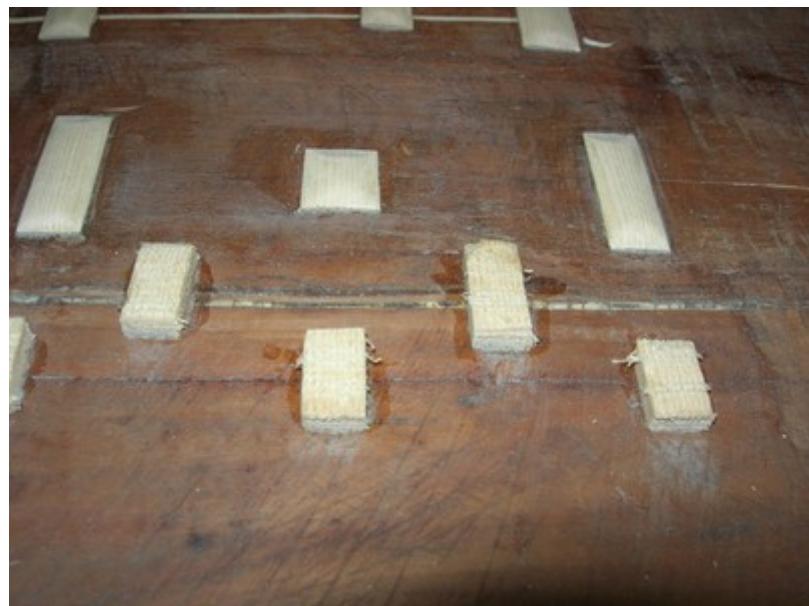


I replace another section of the reinforcement.



There is a crack in the lower part between the lower edge and the treble C bout, repaired with shims and filler.





I remove the temporary cleats, open, clean, replace the shim and put new cleats.



Two more cracks run parallel to the last, one between the lower edge and the glueing surface of the lower bar, the second one between the bar and the treble C bout.

In the lower crack a walnut shim was inserted from the outside, properly glued but missing a part on the inside



I open, clean and repair, with a shim to fill the crack inside.



In the upper part, I remove a section of the reinforcement, at the edge.





I make an edge doubling at the bend.



Then remove the last section of the old reinforcement at the bend.



In the lower treble part there is a last crack, between the lower edge and lower corner, properly repaired with a shim, well glued.



I remove the temporary cleats, clean and reinforce with new cleats.



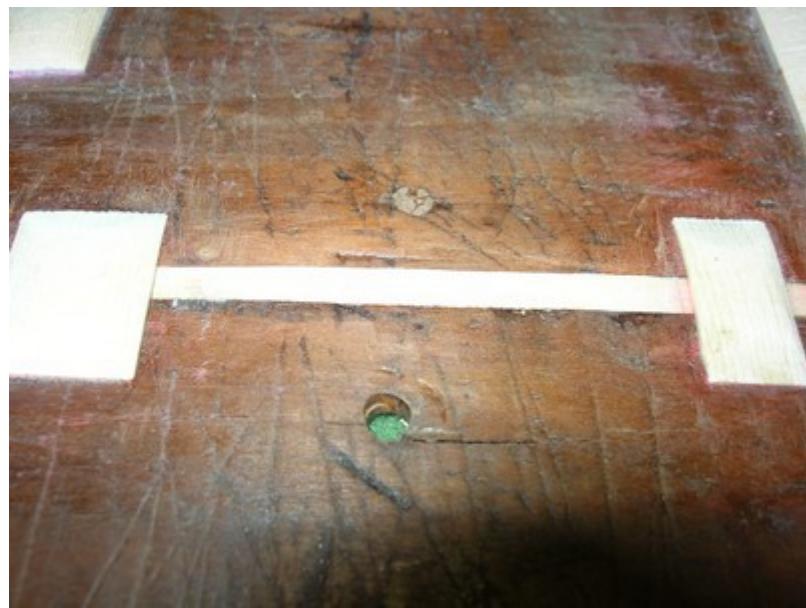
The widest part of the treble lower bout was reconstructed in various parts.



I make a reinforcing edge doubling on the inside.



In the upper part I remove a pin in the upper bar glueing surface, which caused a small crack.



I repair a crack that runs between the upper edge and the C bout, and replace a shim that was inserted from the outside with some filling.





I make a doubling of the lower edge, which had been replaced, in order to give structure and a better glueing surface.



In the upper part, a crack is open from the bend to a reconstruction at the treble C bout. The reconstruction has the grain parallel to the C bout's edge.



It has been repaired from the outside with a walnut shim and filler.



Next to this one, between the bend and the upper bar, a second small crack is open.
I clean and repair the two cracks, replacing the shim with a longer one.



I remove the last temporary cleat and make a doubling of the upper treble edge, from the bend to the upper block glueing surface, to have better glueing surface between the back and ribs.



I then make an edge doubling from the bend to the lower corner, to have a better glueing surface, to secure the upper reconstruction, to thin out and make less dangerous the reconstruction at the C bout, and to fill some missing spots.





I make the last part of the reinforcement at the bend, and finish it by thinning it out.



I make a doubling of the upper block's glueing surface.



I replace the back button, leaving margin to finish.



I decide to place three bars on the back.

The bar structure that I found initially had four bars, none of which original.

Of all the glueing surfaces of the back to the bars, the one for the smaller bar is less damaged than the others, which probably have been replaced more than once.

The small bar seemed more recent than the others, and even though I have no certainty about the original bar placement, I may think that at some point a three bar system was used on this instrument.

Considering the damages at the back's surface, the upper and lower bars might have been around 20 millimetres wide, with an inclination converging towards the treble side, having the upper bar parallel to the bend and the lower one inclined.

The glueing surfaces of the ribs to the back are flat enough to think of the back being flat, not arched on curved bars.

I make the upper and lower bar flat, and adjust them to fit the irregularities of the back surface.

The width is 20 millimetres and the placement is as indicated by the damages.





The glueing surface of the soundpost bar shows signs of at least two previous bars.

The more recent one, possibly made by Degani, was wider on the treble side, narrowing down towards the bass side.

A previous one, narrower, had similar shape but sharper curves.

Both covered a butterfly insert at the center joint.





I decide to make a bar parallel to the upper one and to the bend, of constant width, narrow enough to not cover the butterfly insert.

After making sure that the soundpost position would not be compromised, I make it.



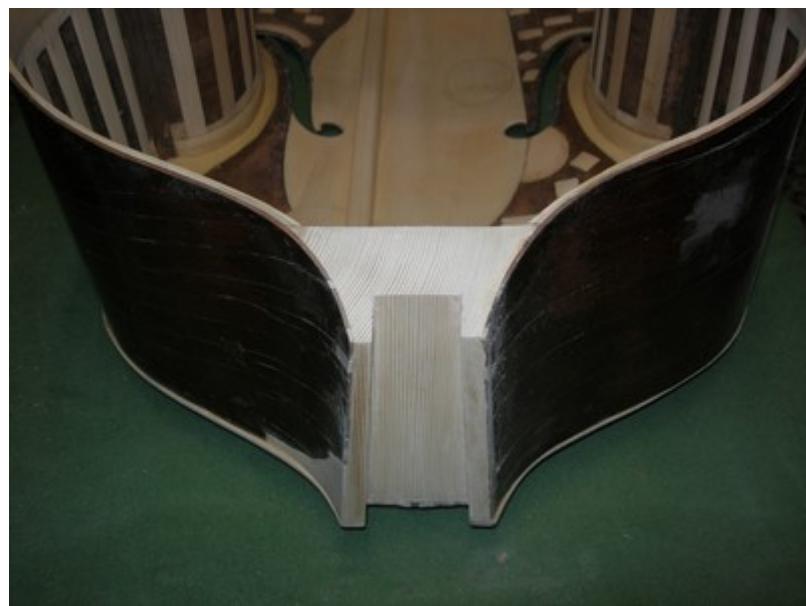


It is fascinating, without requiring this to be the autor's intention, or that it would have any definite acoustic influence, that the distance between the soundpost bar and the upper bar, misured along the center line, is about double the distance between the soundpost bar and the lower bar. The distance between the upper bar and the upper edge, without including the button, and the distance between the lower bar and the lower edge, are the same, and are one and a half the distance between the soundpost bar and the lower bar.

I work on the already assembled ribs-top, to prepare the endpin hole.



Then prepare the mortise, leaving margin for the last adjustment.



I glue cotton strips in the inside to reinforce weak points.



I close the body.





Neck







I remove the reconstructions in ebony and filler from the pegbox cheeks.



It is possible to see that at least two different stringings were used before the current.

One used three strings.

The hole closer to the scroll used for this stringing had been closed, of the central one a trace remains on the part of the cheek left from the carvings made to fit the external reconstructions and the graft, while the hole closer to the nut has been reused.

The three holes are aligned with pins on the back of the pegbox, which probably replace metal ones meant to keep in place an old kind of tuning gears.



The fact that the three holes on the cheeks are more or less perpendicular to the pegbox's centerline suggests that maybe pegs were used before.

Another type of stringing of which remains a trace is the one with four strings using full-plate mechanics inserted in the pegbox cheeks.

Then, these gears were removed, ebony plates set on the cheeks, peg holes repositioned, neck grafted.

I cannot determine whether the head is or is not coeval to the body of the instrument

The scroll and pegbox are in walnut, while back and ribs are in cherrywood, and is better preserved.

The back of the pegbox and scroll is single fluted, the cheeks have no corners, the scroll has half a turn more than what is common today.

The position of the plugged hole, the last one of the three string set up, suggests that the peg box excavation has been extended to leave space for the four strings set up.

The nut's glueing surface, clearly finished together with the graft and cheeks, and the fact that the upper edge of the cheeks is lower than the nut, are clues that the cheeks were modified during the finishing of the neck graft.



The cheeks are tilted towards the back of the peg box, which is 8 millimetres narrower than the upper part.

This contour continues in the first turn of the scroll, which is convex in the first part.



I smooth the glueing surfaces and make the cheeks reconstructions; I drill holes corresponding the existing ones for the entering of the tuning gears, in order to not compromise the solidity with new holes.

The exiting holes were not centered, so I had to close and redrill them, under the cheeks reconstructions.



I decide to graft the neck, to get a strong mortise at the heel - upper block joint.

Also, I want more overstand on the top, and I need an heel that fit the habits of today's musicians.

The existing heel is "milanese" style, commonly used in the first half of the '900, up to the '70s, having the thumb at the heel opposite to the second finger and the first finger playing Eb on the first string.

As I remove the fingerboard, it is possible to see marks made with a pointed tool on the glueing surfaces, very similar to the ones found on the back.



I make the cuts to graft the neck.

The previous graft had squared upper edges.

I do not remove the upper parts of the cheeks of the old graft, which are solid, to avoid weakening, and on these I make the new graft.



I though completely remove the remainings of the old graft from the back of the peg box.
The spine in the center of the button is flared towards the inside.



It is possible that before the last graft a screw was used for a bad repair of the base of the peg box.

The glueing surface of the peg box to the graft shows pointed tool marks as well.

I make the new graft.



I glue and finish it.



I fit the tuning gears.

I decided to use four parts gears, mounted on single plates, for a minimum impact on the peg box wood.



I prepare the mortise.



I rough out the neck.



I prepare the internal part of the back button, which will be finished with an ebony crown.



I cut a fingerboard, temporarily glue it on the neck, and smooth the whole.



I glue the neck to the body.



I make and glue two ebony columns at the sides of the heel. Since the ribs and block in this area are asymmetrical, as the treble side is shorter than the bass side, I make the columns to compensate this.



I finish the back button with an ebony crown.

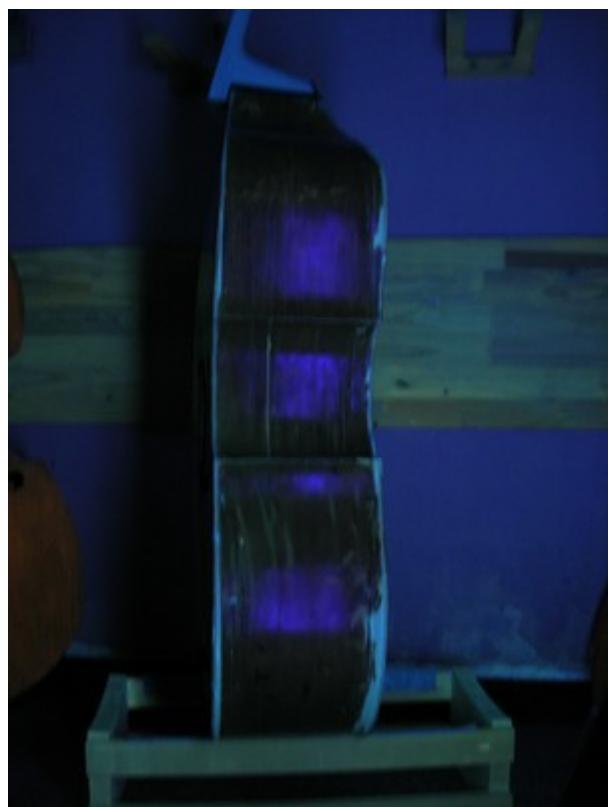


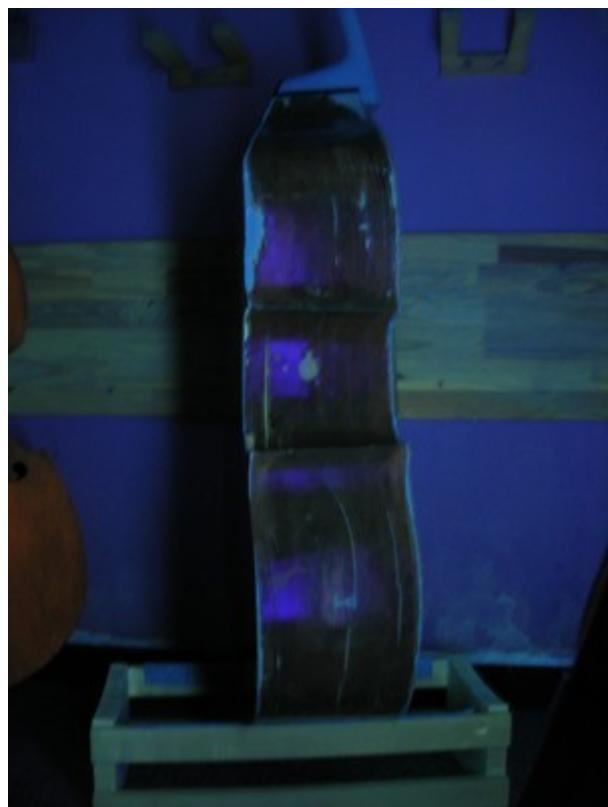
Varnish

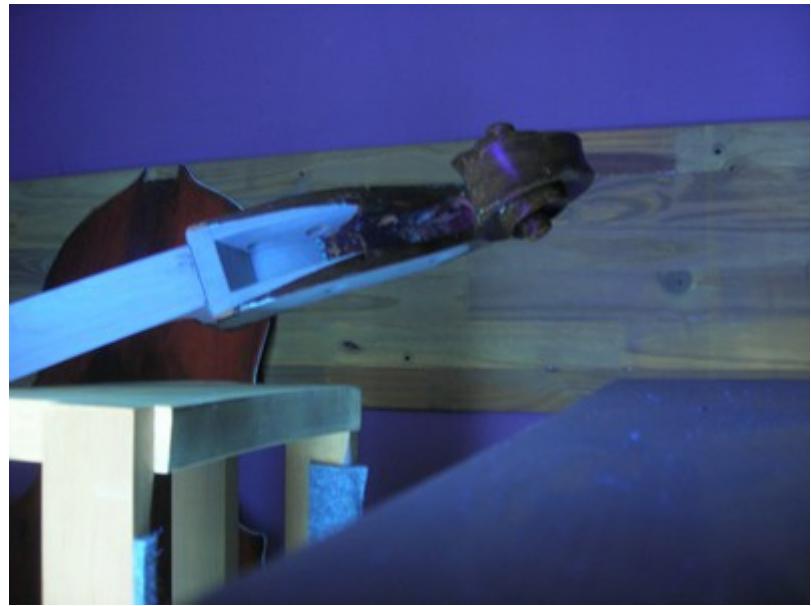
I unglue the fingerboard to have better access to the top's varnish.

I illuminate the surfaces with Wood's light.











By doing so, many touches of various materials can be seen, over an homogeneous layer of varnish with gray-brownish tones.

The most frequent touches consist of a light gray, semitransparent varnish, rising over scratches and superficial fillings.

Superficial fillings are more extended on the top, covering many cracks, reconstruction joints, and woodworm holes in the bass bar area.

A very evident touch with orange fluorescence covers the long crack under the treble f hole, where the varnish was in the past scraped away down to the wood to eliminate a gap, and then replaced. This was definitely done after the application of the homogeneous layer.

Other recent touches have either dark orange or black fluorescence.

The homogeneous layer is probably a covering varnish, present on the whole surface and maybe applied during a restoration (Degani 1927 ?)

Under this layer, with natural light, it is possible to see a second kind of coloured varnish, spread thorough the whole surface as well, reconstructions included, (for example shims and edges of the

back, reconstructions on the lower center and at the top's shoulders, reconstruction on the treble side of the volute), and for this the authenticity is at least unsure.

It is possible that the original varnish had been removed and replaced, or at least heavily retouched and covered with a darker and less transparent one, to mask repairs and damages.

There is no evidence of a varnish layer under the coloured one. On the other hand, if there is one, it would be very damaged and missing considering the conditions of the instrument.

For this reason I decide not to remove any of the layers, but only to clean the existing, retouching scratches, missing spots and reconstructions.

I start by cleaning the surfaces with a damp cloth, than with a mixture of tripoli powder and linseed oil.



I seal the new reconstructions with shellac.

Then retouch with raw sienna in shellac, then with aniline dyes in shellac.



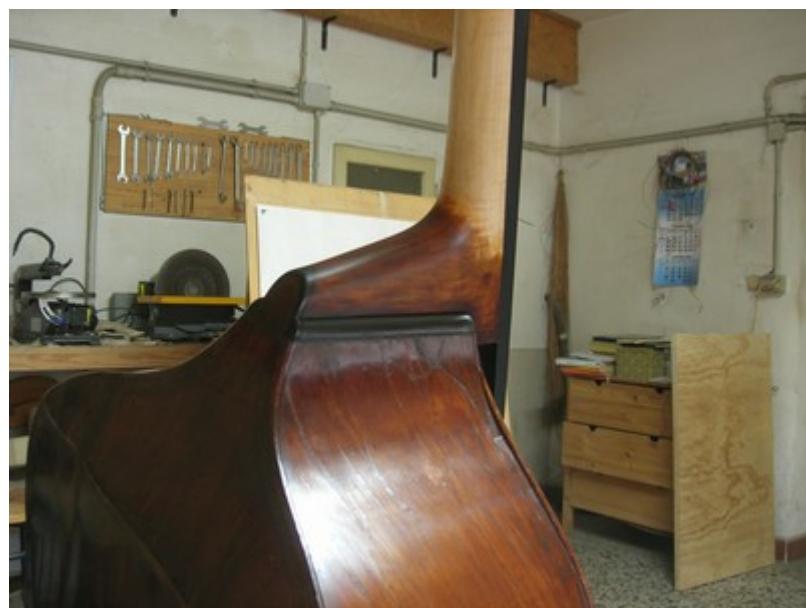




I glue the fingerboard and finish the neck by sanding with fine paper wet with linseed oil.
I make the nut and glue it to the fingerboard with two drops of cyanoacrylate glue.



I varnish the neck and heel, first with just shellac, then with aniline coloured shellac.



I finish the varnish on the whole instrument by French polishing, with a thin alcohol varnish, made of shellac, rosin and propolis.

Set up

After a last finish of the fingerboard, I mount the tuning gears and the nut, make an ebony tailpiece of simple design, a soundpost and a french style bridge.

I use Pirastro Flexocore Orchestra strings.



Some measurements of this first set up, in millimetres, are:

String length 1038

Nut to upper edge of the front 435

(the ebony columns at the sides of the neck are considered part of the body)

Upper edge of the front to bridge line 572

Resting at the heel in D

(thumb at the heel opposite to the second finger, the first finger plays D on the first string)

Neck thickness including fingerboard 43 - 48
Fingerboard lenght 872
Fingerboard width at nut 42
Fingerboard widht at lower edge 91
Approximate curvature radius at fingerboard lower edge 69
Scoop under the G string 2,5
Scoop under the E string 3
Neck overstand on the top 36
A string angle at the bridge 139°
Height of the bridge 165
Height of the E string from the front at the bridge 158
Height of the G string from the front at the bridge 151
String heights at the fingerboard lower edge 6 7,5 9,5 10,5
String spacing at bridge (center to center) 27
String spacing at nut 11
Tailpiece lenght 356.



















