

# Paul Unger's Bass: The Fourth Hundred Hours

(in true chronological order)

[July 15, 2010]

## Mode Matching



The major hogging is now long done, and I have since spent way too much time tuning the plates and matching the modes. A lot of folks are going to hear this puppy, and I want it to be the best it can. What you're seeing in the photo is mode 2 in the top plate. I call this the "quality" mode, because most of the time I get it right, the instrument has good tonal quality. In bygone days, the bass maker had to tap the plate with his finger to get an idea of how it rang. Easy enough on a violin or viola, but the great size of a bass makes it difficult. Following the Hutchins method, I use a speaker instead of my finger. You can see the circular magnet assembly and the downward-facing speaker basket just behind the center of the plate. By feeding a sine wave into the speaker and holding the cone close to the plate, I can use the pulses of air to "tap" the plate as many times per second as I like. Depending on where I hold the speaker over the plate, and how often it vibrates each second, different mode patterns will form. The mode 2 pattern on the lower bout (to the right) is excellent. The mirror pattern on the top (left) is also quite good, but the photo doesn't show it. The speaker moves so much air that it pushes around the aluminum glitter (the black stuff) and distorts the pattern. The tuning of both the top and back plates is now essentially done, and shortly I will clean them up to make them ready for the next step. Time to date: 303.5 hours.

[August 7, 2010]

## Assembly



Interior work on the back is largely completed, although there will be a bit more cleanup once the mold is removed. In this picture, the back of the bass has been glued to the ribs, and you can now begin to get a sense of the size and volume of the corpus. The modern clamps I use around most of the body are a great improvement over the old ones with wooden clamp faces. I especially like the way they stand off the ribs, which allows me to get behind them and clean out most of the excess glue while it is still liquid. Paul says that strings are on the way. Not quite ready for them just yet! Hours in: 312 or so.

[August 12, 2010]

## "Opening Night"

A treat just for those in the know. A special video only available here (for now)!

<http://www.youtube.com/v/gWe4fxb0X7Y&hl=en&fs=1>

[September 8, 2010]

## The Eyes Have It



Interior grads are finally done, and once that is the case, a number of pending steps can happen in quick succession; f-hole cutting, bass bar installation and tuning, gluing upper liners in the body, chamfering the underside of the edges, and, finally, "closing the box." All I have to do is remember to make the f-hole stem wide enough to slip the sound post through before gluing the top on the ribs (I did). It's very difficult to correct this omission later (don't ask me how I found this out). In an experimental bass like this, placing the ff-holes can be the result of some judicious compromises. The reworked geometry and the relative high placement of the ff-holes are the result of Paul's request for a 38" vibrating string length. The actual linear measurement of the string is 37 1/2", by the way, but the string angle above the fingerboard will increase that dimension slightly. Cutting through those heavy grains was an interesting experience, but the wood is very resonant. Some recent research has shown that the wings of the ff-holes are acoustically very active, especially at higher frequencies. Hours to date: 328.

[September 9, 2010]

## Lined Out



Here's another of those pictures with Bob's technicolor lining clamps on parade, this time on the upper liners. You can see the liners clearly in this picture, and the blocks as well, since they are all made of willow that has a darker color than the maple of the ribs and back. Once the liners are planed to the same level as the ribs and their lower edges beveled and smoothed off, the work on the interior of the body is pretty well done. There'll be some cleanup, I'll put my label in, and then

the corpus is ready for the top.

[September 11, 2010]

### Belly Up to the (bass) Bar!



O.K., despite my penchant for truly horrible puns, here's the belly of the bass with the bass bar fitted and glued in. I use simple clothespin-style oak clamps I made myself years ago, which makes the assembly easy to move and which is a great improvement over the heavy steel clamps most of us were taught to use. I find that a lot of string players don't know that this bar is inside the instrument, and those who

know it's there often don't know what it does. The bass bar gets its name from being located under the bass foot of the bridge. It serves both a structural and acoustical function. Structurally, it carries the load from the bridge foot out of the weak area between the f-holes. Acoustically, it acts like a spring, restoring the arc of the top when it is depressed by the rocking motion of the bridge at low frequencies. The luthier's task is to shape this bar for the optimum relationship of strength and spring. It makes a huge difference in the how the instrument will sound. Hours now about 335.

[September 15, 2010]

### Zu Poppen



For those who don't speak German, zu poppen is a slang expression meaning to pop something together, as though it were a quick and simple task. This utterance is usually followed by a grim laugh because everyone knows the task ahead isn't going to be quick or simple. Today, I started to glue the top to the ribs, which is where a solo craftsman can find himself needing a third and fourth hand. Fortunately, my wife is an experienced luthier, too, so we ganged up on the project, each of us standing on opposite sides of the bench to position parts and tension the clamps. On a big instrument like a

bass, there is a lot of movement in the wood over time while the pieces are apart, and when it comes time to glue everything together one usually finds a host of small misalignments. It can be a challenge. I had the bass in clamps without glue for several days to start the process, and today I made the pragmatic decision to glue down only half the top. The bass burdened with clamps is just too heavy and cumbersome to flip over safely, so I'll glue the other side down in the morning.

[September 19, 2010]

### Back in the Saddle Again . . .



For those of you who are too young to remember Gene Autry, the famous "singing cowboy" of yore, we're not talking about the same kind of saddle. Rather, it's the saddle (ebony piece in the lower right of the picture) that will one day carry the tailpiece hanger. Because this is a five-string bass and I want to ease the tension that will be caused by the extra string, this saddle will be a bit taller than normal. It has rounded corners (hard to see here) to minimize pressure points on the belly. You can see that the body is now completely glued together and will shortly be hanging from the hook protruding from the lower bout ribs. That's

because after the saddle is carved to shape, work on the body is essentially done until after the neck is set. On the top of the bass is the nearly finished scroll template. It's a piece of clear polycarbonate sheet with a drawing on paper glued down. This bass required a redesigned scroll since the peg box must be longer to accommodate the extra tuning machine, so that's what I did most of yesterday. Hours in project: about 350.

[September 14, 2010]

### Scroll Work



With the bass body now hanging from a ceiling hook, I've been able to start roughing out the scroll. In the photo, you can see the scroll beginning to emerge from the wood, and if you look closely, you can see the the dots in the peg box wall where the tuning shafts will be located as well as the dots outlining the scroll. A lot of the layout for the neck and scroll requires the fingerboard to be on hand, which it isn't. A few I bought because they were said to be for five-string basses turned out to be too narrow at the nut. It took me a week, but I found one that has the right length and width. When I heard the price,

I was not surprised that no one had bought it. Well, it has a home now! Getting scroll blocks wide enough for bigger basses has also become more difficult in recent years, and again I was lucky to find an old piece that works beautifully. 365 hours in the log so far.

[October 6, 2010]

## Scroll Work Update



The outline of the scroll and peg box have been established, and the turns of the scroll have been carved but not finished. It is easier to drill the pilot holes for the tuning gears at this point and to lay out the peg box while the scroll block is roughly squared off. The assembly gets increasingly harder to handle and the ears of the scroll create some vulnerability as the work progresses. The fingerboard has arrived, and it is actually long and rather nice. It is wide enough, too, but just barely. However, the final fingerboard length will be

shorter due to the shorter string scale, which worked out to my advantage in positioning the fingerboard. It's going pretty well now, although slowly. No blood on the scroll, either! Hours in: 383.

[October 17, 2010]

## Dry Run



The peg box has been hollowed out, and let me tell you that getting in behind the fifth gear hole isn't an easy task! It was also close on the string hole in the rearmost shaft where the peg box is narrowest, but the string hole is there with just enough room to spare. It is better to fit the tuning machines at this point than it is to attempt it after the pegbox has been

varnished. The wood under the gear plates has to be absolutely flat, which is something different than

normal on the peg box cheeks of a violin or a cello. Installing the machines now allows additional wood to be removed, if needed. The drawback to this operation is that after the machines are in place, they have to be taken apart again and put away until later. We're using Sloane gears, which in many ways are very nice. They have a 50:1 ratio, so the tuning is slow but precise. The action of the machines is extraordinarily smooth.

The tail wags the dog in modern times

because the peg box contours must fit to the machines; in bygone days, a skilled craftsman would have fit the machines to the contours. Standardization makes things easier in some ways, but some of the individual craftsmanship we see in older basses is lost. We're just about at 400 hours on this project.

