Wanting More Organ

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Did you ever get the feeling you wanted more organ? Then an idea sets in your mind! That's what happened to me. I would like to share this experience with you of what I wanted, and how I went about it to upgrade my Stinson Model 47 band organ.

My organ played at Martha's Vineyard for three years on the carousel. The servicing of it was in order, and a 105 Wurlitzer was substituted while the Stinson was out. I guess the Wurlitzer was an exact type of what was originally on the carousel and a deal was struck to keep the match of the Wurlitzer and the carousel. I found out about the Stinson; inquired if it was for sale; and bought it.

Figure 1 details my organ as it is now complete. In the center you can see an opening where there is a wood block; originally the glockenspiel was placed there. I know that you would think that there wasn't enough room for more bars. That isn't the case: when the organ was built it had a tracker bar with an 89-key capacity and only part of it was used. The organ was designed around 43-key Bruder music and that's all that was used. Problems occurred, however, with the roll being too wide (did not track very well); so the tracker bar was removed and a Style 165 Wurlitzer bar was installed and the usage of the 43-key music took place. This same tracker bar was also used on the larger organs making it feasible for all the organs to use the Style 165 Wurlitzer music.

Figure 1. The completed organ with added glockenspiel and wood block.

The organ played fine but as we organ enthusiasts know, we are never satisfied—there is always room for refinements. The tracker bar was still operating with the Bruder scale but could be changed—the organ was sent to Don Stinson where an additional bass pipe was installed to make it play the Wurlitzer Style 165 scale which allowed for more music to play.The organ does not have a counter-melody. It is tied in with the main melody (as the trumpet section is on the Wurlitzer scale). Therefore an extra section could be added to it.

The thought occurred to me that if I were to make 22 glockenspiel bars, it would add a little extra to the counter-melody by accompanying the violins. Then the idea was to build an extra chamber below and make a sound box to help amplify the bars (**Figure 2**). That left me with a big opening for something else and that something would become a wood block (The Wurlitzer scale has a perforation for castanets but we won't tell the wood block that).

The first step in this process was to see about making a good sounding bar. I decided that I would make the longest (lowest) note first and if that worked I could cut a length off a duplicate bar to achieve the next highest note and proceed in the same fashion all the way to the shortest or highest note. Aluminum was the choice—I don't have to plate the bars and they are easier to work with. The material is 6061 aluminum: 1/4" thick x 1" wide for all bars. The originals were 5/16" thick and 1 ¼" wide but they would be too wide for the area I wanted to place them in. I also found out that the thinner bars are louder and have a better ring.

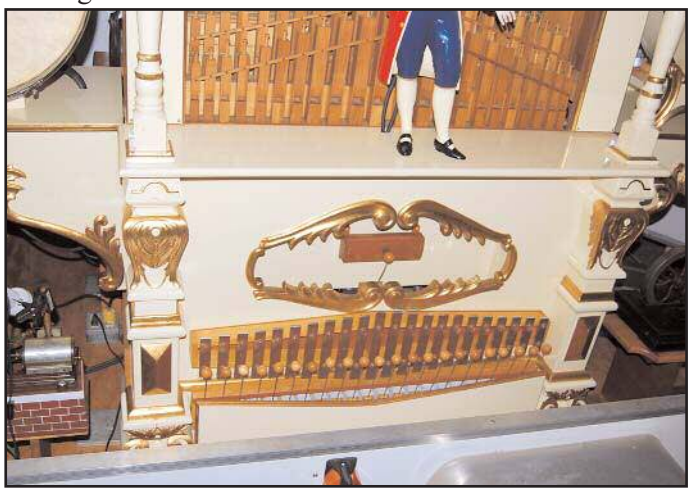
Figure 2. A detailed photograph of the glockenspiel and wood block.

Now I needed to drill nodal holes somewhere in the bar, but where? The formula was found and it is .2242" x the length of the bar (the answer is the distance from the end of the bar to the center line of the hole to be drilled). With that in mind I drilled the holes slightly larger: .316 Dia. The reason is that I use silicone rubber tubing over a #5 wood screw 1-¼" long and it may expand a little.

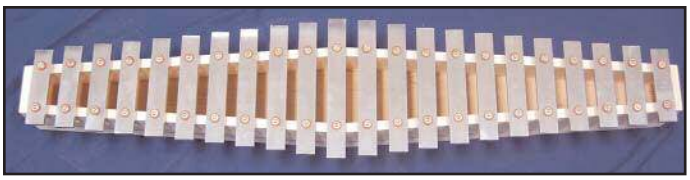

Figure 3. Sized bars in position for mounting.

When mounting the bars you want them hang loose. In **Figure 3** you will notice the bar and some washers—the washer that is under the head of the screw has a hole of .125" and the Dia. that is ½". This gives good cover over the silicone washers that I made: the first washer is silicone rubber 1/16" thick and the one on the underside of the bar is 3/16" thick silicone rubber which means that the silicone tubing length must be around .525" long to get through the washers and the bar and still be loose on the tubing when it hangs.

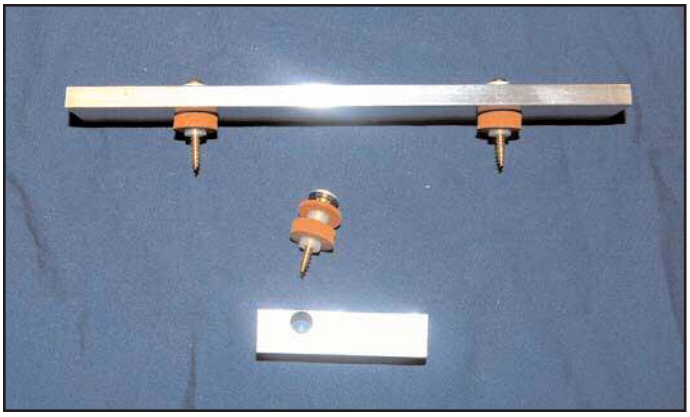

Figure 4. One of the bars showing the silicon washers. Below is the bar that was used as a tube cutting jig.

In **Figure 4** you will see an extra bar shown at the bottom and that bar has a hole drilled though it. The bar is .525" thick so you can put the tubing through the ¼" hole and with a razor blade cut it to the exact length each time. The silicone tubing can be purchased from Small Parts Inc. Why silicone? In the past I had a problem with bars not ringing and tried many different materials. I have worked with silicone before and I thought of giving it a try. It works! This stuff will outlast most of us and the bars will ring better than anything I have ever heard before. You can lay a bar down flat on the silicone and it will ring but only where the nodal hole should be.

Back to the nodal hole: when I drill my holes I made the bar long and then machined each end until in tune. That's where the aluminum comes in handy: it's easy to machine and there is no heat build-up (like when grinding steel). I machined a little off of each end; laid the bar across the nodal hole; struck see if it was in tune; and repeated that process until its true. I did not grind any bar in the middle to lower a note. That silicone rubber was R104 2 medium durameter (a degree of hardness).

For the sound chamber I realized that laying out the largest bar to the smallest one with every other note placed on alternating sides of the initial bar it would make a perfect slant to each side. This resulted in the proper layout with the largest bar (lowest note) in the middle.

After the entire sounding board was mounted to the façade I began to build all the pneumatics. I won't explain this process as it has been discussed before. Striking balls of hard maple were used; the rods were of 1/8" 303 stainless steel and their mounts were made out of brass.

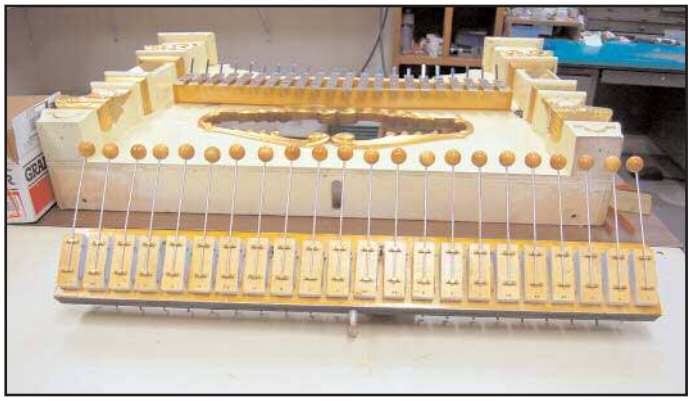

Figure 5. The striker pneumatics mounted to the chest.

Figure 5 shows the pneumatics mounted to the chest with all the valves on the back side and the bottom of the chest machined out with a tube coming out for the vacuum.

Figure 6 has the pneumatics and the chest mounted to the façade which I had previously cut out allowing the valves to be exposed on the back side.

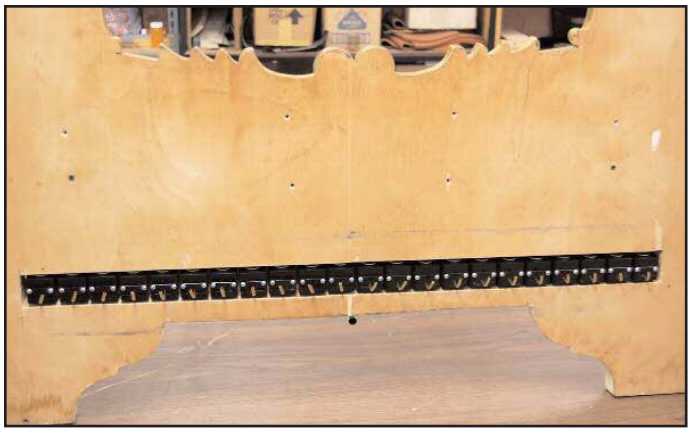

Figure 6. The backside of the façade revealing the exposed valves.

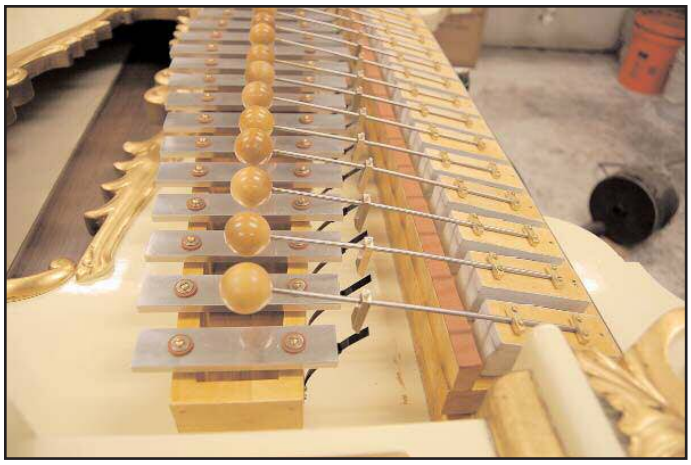

Figure 7 The glockenspiel is now mounted to the façade.

Figure 7 shows all the bars, sounding chamber and pneumatics mounted to the façade. You will also see something new added to the striker just below the balls. I was under the impression that a sustained note may not sound good and also felt that these bars were going to be too loud, so I incorporated dampers. They worked great but I liked the sustained sound, and the bars were not too loud. The dampers were made out of normal rubber tubing which most restorers use for their insulation over screws in the bars. That is a dampening material and which was proved here—when the damper touched the bar they stopped ringing almost immediately. I find felt isn't that great for washers.

I think I have covered the construction of the glockenspiel so now for the wood block. I made it out of oak wood with a slot milled over half way down from the top towards the bottom and closer to the back of the block. Then if you turn it upside down and do the same only towards the front of the block, the two slots will bypass each other and create a hollow sound effect. This was mounted as well with silicone rubber.

Figure 8. The completed tympani assembly.

We are not quite done yet. Since we have the 165 Wurlitzer layout on the tracker bar I decided to add yet another instrument (**Figure 8**): a tympani. This was carefully designed to fit into the organ and mount along side of the bass drum beater (half way between the bass beater and the edge of the drum). Now the fun begins. I was told that you need sort of a whipping action for the tympani. To achieve that, I made three different pneumatics (of different sizes) as well as an extra valve for size and speed (to get rapid action from good air flow). Two valves and extra-large porting did the trick but we are not done yet. Different weights of balls were used and also several rods (to get a whipping action). The length of that rod gives it a completely different response (note: this was all trial and error); the material for the rod is 303 stainless steel—it has somewhat of spring action. The final part to the tympani was using a 3" distance to get a good whipping action out of this beater.

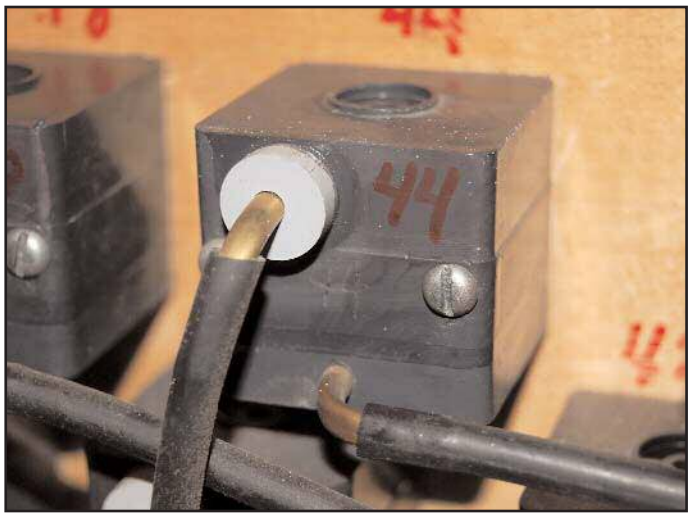

Figure 9. Valve assembly details for the tympani effect.

Finally to operate the valves I tapped into the main valve blocks for the violins (**Figure 9**). These are Doyle Lane valves. To strengthen up the body of the valve in the area I tapped into, I purchased PVC type II rods; cut them to approx. 5/32" thick; applied acetone to both surfaces and pressed the two parts together. Finishing up I drilled for the appropriate size; installed an elbow; and connected with tubing to the valves of the strikers for the bars.

The way I went about getting what was wanted may be crazy but, it works and I like it. This was a job that was rewarding and satisfying to my listening.

Ralph's interest began from playing the trombone in high school. He graduated from technical college with an expertise in tool and die making. This has led to a fascination with mechanical music which for 20 years he has applied to the restoration of music boxes, organs and tower clocks.