

Clark's Organ

Clark Haynam

As a life-long musician and organ repair technician, I always had a dream of fabricating some sort of a machine or music box to fulfill this love.

I had the good fortune to repair a Hammond Organ for John Prtyljaga in Barberton, Ohio, and to my surprise John had built two organs. After hearing his band organs and marveling at his accomplishments, I was hooked into this undertaking. John has become a very good friend and comrade due to our meeting that grateful day.



Figure 2. The row of stopped flutes, complete and installed on the organ chest.

I proceeded to build my first pipe. It took me two days to make one flute pipe, finally got it to sound and proceeded to make an octave of pipes. What a disaster that was. They are on a shelf in my garage as a reminder of what I went through and what I did wrong. I acquired a book for building a Wurlitzer 105 which had pipe charts in it. That was a true blessing. The stopped flute pipes turned out to sound great (**Figure 2**). The workmanship needed a little tweaking but my persistence prevailed.

Once I made 44 flute pipes, then came the making of the so-called violin pipes. These proved harder than the



Figure 1. Clark's Organ as displayed in his display trailer, complete with a display of small and large COAA logos.

flute pipes. Mind you I am not a perfectionist, but had a desire to get things accomplished so the work was there. Making the freins was still another hurdle to get right. Not realizing how many jigs would have to be made, it seemed like there was a jig for everything.

Once the pipes were made, a decision had to be made on how to make everything work. I toyed with the idea of pneumat-

ics but after trying to make a valve that worked right, it was soon decided to go MIDI using Reisner valves (purchased from Organ Supply Company, Erie, PA). The other determining factor was the ability to program my own music rather than only being able to use the standard rolls. I also thought of being able to play this organ myself using a keyboard. The keyboard was built and I soon learned that this would not work the way I would have liked.



Figure 3. The case shell, showing early placement of components. Note the sides of unfinished oak plywood.

The case was built from $\frac{3}{4}$ " oak plywood (**Figure 3**). It was not cheap but it served as frame and housing for just about everything. Again, this was experimentation all along the way. Remember there are no plans.

Laying out the design of this organ was a real trial and error (mostly errors). Things were done which I thought would work but then they didn't. Disgusted, the designs were put away for a couple months. After awhile there was the bug to work on it again, redesigning and sketching what might work. Finally it seemed to come together.



Figure 4. The cut-down bass drum as it sits on the assembled but unfinished drum shelf.

I bought a set of traps for \$100: bass drum, snare drum, a couple beat up cymbals, triangle and a tom-tom (Figures 4 & 7). Nothing matched so I stripped the coverings, cut the bass drum to narrow it, and shellacked the shells. This set then worked out nicely.

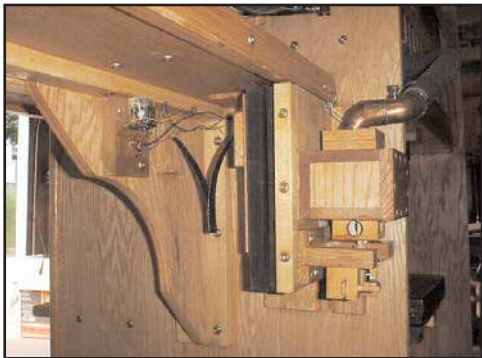


Figure 5. The 24v solenoid/pneumatic combination used to strike the bass drum.

Several attempts to work the drum beaters were unsuccessful as I couldn't get enough "oomph" to beat the snare, bass drum and the cymbal. 12v solenoids just didn't make it. Using a 12v relay to activate a much larger 24v solenoid worked great for the snare and cymbal, but not for the bass drum. What to do? After studying how other organs did it, I experimented with an air bellows and used the 24v solenoid and spring on the bellows to dump the air and hence, provide a big bang to the bass drum (Figure 5). That worked and now I was in business again.

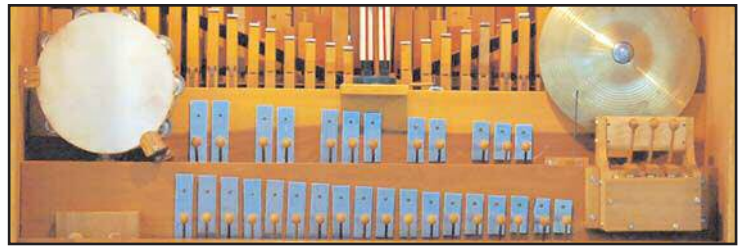


Figure 6. Orchestra bells added to the front add musically to the organ.

I acquired some inexpensive orchestra bells and figured out how to mount them both aesthetically and functionally (Figure 6). The beaters were made out of old piano hammers which were cut down, ball ends were installed, and attached 12v solenoids were placed under to actuate them. WaLa, it worked.



Figure 7. On the left is the three beater wood block and on the right is the Clark Organ's snare drum, again with three beaters.

After acquiring MIDI boards (Figure 8) from J.W.Electronics (Omega Electronics at www.j-omega.co.uk/), two 64 note and two 32 note, I used channel one for the stringed pipes, channel two for the flutes, channel three for the bells and channel 10 for the percussions (drums). I came up with two laptop computers for \$100 each and needed an interface between the laptop and MIDI boards; a Midiman (an interface or driver coupling the laptop to the MIDI boards) was the answer here. Now, one can either use the laptop computer or plug a keyboard into it for tuning.



Figure 8. The interface with the MIDI boards on the left and Midiman couplings on the right. The photo was taken before final installation.



Figure 9 (above) reveals an over-all view of the back of Clark's Organ. The computer is located in front of the large open flute pipes.



Figure 10 (left) shows the flute pipe rank opened (mounted on hinges) to allow access to internal connections.

Later, three octaves of metal string diapason pipes were added which came from a church that John Prtyljaga and I retrieved. Also added were three octaves of open flute pipes. Though not exactly happy with these yet, I may make some new ones to replace them. Next added was another 64-note MIDI board, but this time a programmable J.W. Electronics board. This works quite well for channels four (open flutes); channel five (metal string diapason) pipes.



Figure 11. The tremolo unit located above the reservoir.

My wife bought me a nutcracker Uncle Sam which was used as a conductor (**Figure 12**) It took me two days to cut his arm off and remake it to be workable. The linkage and control turned out ideal. Kids love to watch him keep time with the music.

In time there will be work on the bass notes to try to get a little more volume from them. For now though, it does the trick.

The tremolo unit was built to pulse the pressure reservoir using a camshaft and motor assembly (**Figure 11**). This took some time to get the correct tremolo effect. It works but I don't use it much.

As you can tell, this has been an ongoing project and at this moment I don't know when it will be completed. It is kind of fun to just tinker around with. I sure do enjoy showing and playing it for people.

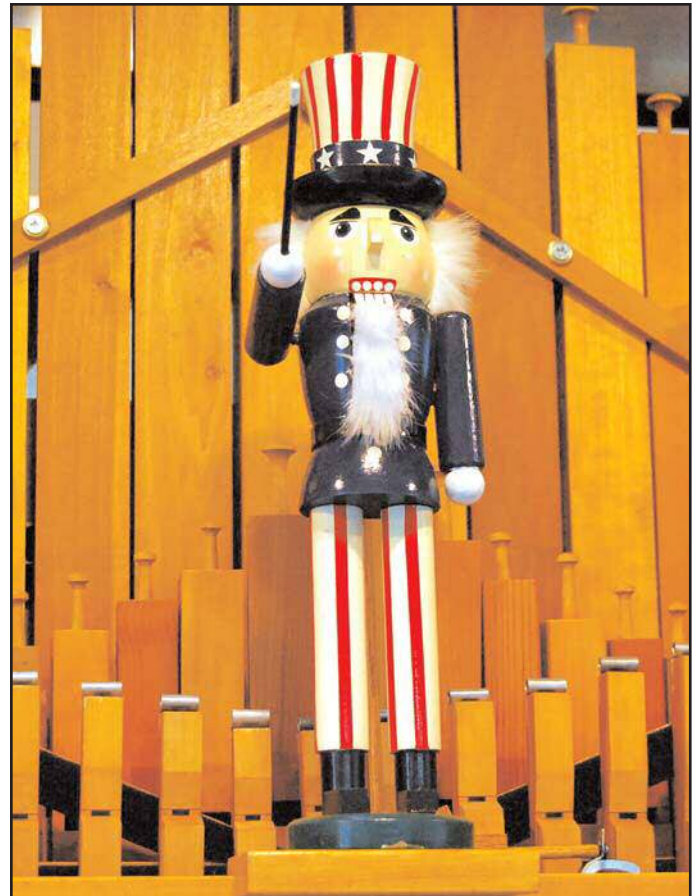


Figure 12. Uncle Sam, a converted nut cracker now conducts Clark's organ.

Programming music has probably been the biggest challenge. Even though as a musician, I never really did any music writing or arranging. Using NoteWorthy Composer (music writing and editing program, www.noteworthysoftware.com/composer/) as my writing program was inexpensive and it was very easy to work with once acclimated to it. It allows me to save the tunes to a MIDI "O" file which is playable on my organ.

I have learned that what you put down in a music file on the computer sounds good, but may not work on the organ. Getting the timing pulses correct, especially with percussion, (drums, bells, etc) is critical. Fast repeat notes must be done exactly right for best playback. Remember, this is a mechanical machine and does not react immediately as does a computer. Learning this made all the difference in the world. I can now program songs that usually do not need a lot of tweaking when played for the first time.

This project, although long and tedious, has been a blessing to me. Most of the things I did on this build are not conventional. I don't care because it works and I love it as well as enjoy showing it to the public. My first rally in 2008 was at Roscoe Village in Coshocton, Ohio put on by the M.B.S.I. The response was just overwhelming by everyone who listened and looked it over. I also went to the COAA rally in Findlay, Ohio. The weather was not that good (a lot of rain and wind) but a marvelous time was still enjoyed.



Figure 13. A complete, over-all view of Clark's Organ, ready to play for the 2009 rally season.

Summing up, I can only say that "I love this hobby" and hope to be able to continue with this for some time. For all of you out there considering building your own organ, patience, perseverance and dedication will benefit you in blessings which will last a lifetime. I only wish I'd started sooner.

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Organ Specifications

- 44 String Pipes (MIDI Channel 1)
- 49 Stopped Flutes (MIDI Channel 2)
- 30 Metal String Diapason (MIDI Channel 5)
- 37 Open Flutes (MIDI Channel 4)
- 30 Orchestra Bells (MIDI Channel 3)
- 1 Siren Whistle (All percussions, MIDI Channel 10)
- 1 Train Whistle
- 1 Bass Drum]
- 1 Snare Drum (three beaters)
- 1 Tambourine (two beaters)
- 1 Cymbal
- 1 Wood Block (three beaters)
- 1 Tremolo Unit
- 1 Nutcracker Uncle Sam

- 1 blower; player piano suction unit which was reversed for pressure instead of suction
- 2 +15v Power Supplies; one for MIDI boards and one for the valves
- 1+24v Power Supply; Operates Percussion Solenoids.
- 1 Midiman Interface
- 1 Laptop which uses Sound Impressions (Audiosim, a multimedia sound studio for computers) which I can load up to eight MIDI files, loop them and they will play all day if so desired.

Clark Haynam and his wife of 42 years, Judith, live in Massillon, Ohio. He studied electronics after serving in the U.S. Navy and then attended Hammond Organ Service School to learn to repair electronic organs. He has also performed as a professional organist in restaurants and lounges for 30 years.

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