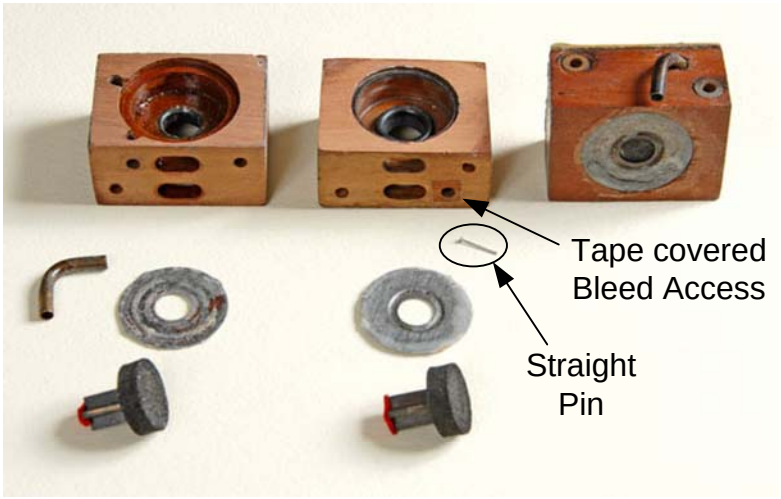
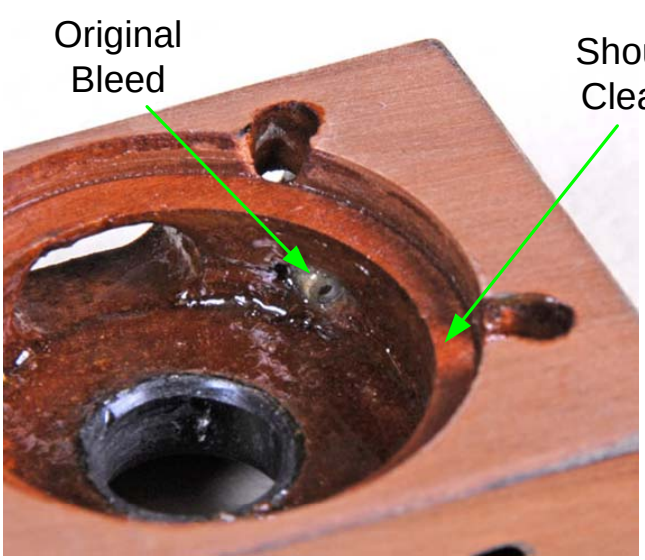
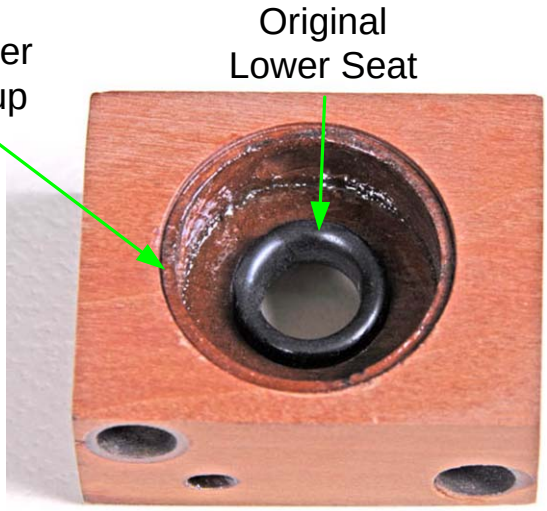
Notes on Rebuilding the Wurlitzer Unit Valve

Ron Yost recently became the proud owner of an original Wurlitzer 105 and is now in the process of rebuilding it. Along the way, Ron loaned me three of his original unit valves so that I could add to my collection of pictures and measurements of all things Wurlitzer 105, and maybe do some documentation on the process of rebuilding the Wurlitzer Valve. On the left above is one of the original valves and next to it is the same valve after rebuilding. For some reason the original springs holding in the valves were removed and the recess for the spring was filled with a wood plug. Ron and I speculate that the recess was filled to allow the same screws to be used without driving the screws all the way into the air passages of the Stack. These plugs were drilled out with a 5/16" Forestner drill.

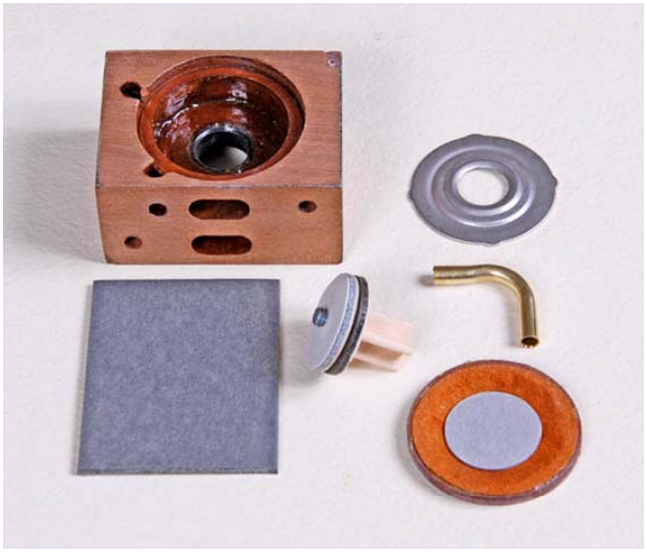


The picture to the left shows two of the three valves after they were taking apart. The front and back have been sanded lightly to level the surface by sanding on a piece of sand paper that has been glued to a flat surface. The valves obviously had been rebuilt before using closed cell foam rubber for the upper and lower valve surfaces. The material has become very hard making most of the valves inoperable. The Fluted Stems do not look original and were too small in diameter for the lower seat. The Bleeds were original and in good shape but in a few cases a piece of straight pin was taped in the Bleed access hole to partially close off the bleed, no doubt after the pouch began to leak. Some of the upper seats were original and some were PPCo. All of the lower seats appear to be the original Wurlitzer Bakelite seats.

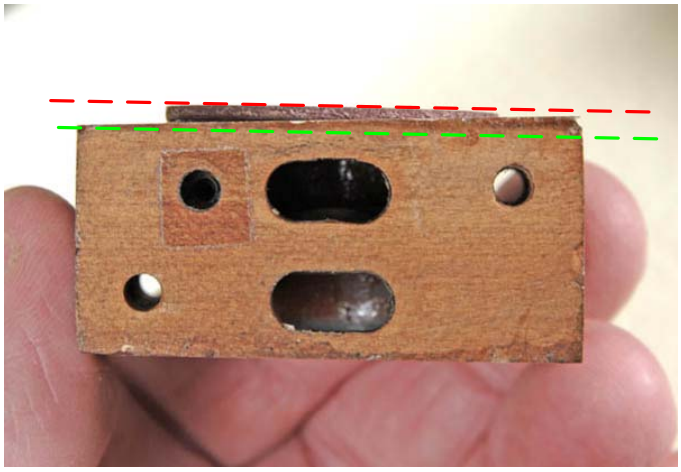




Forestner drill bits were used to clean up the shoulders of both the upper seat and the pouch well. The previous pouches had been glued in with white glue and care had to be taken to remove all the glue without drilling too deeply into the block.



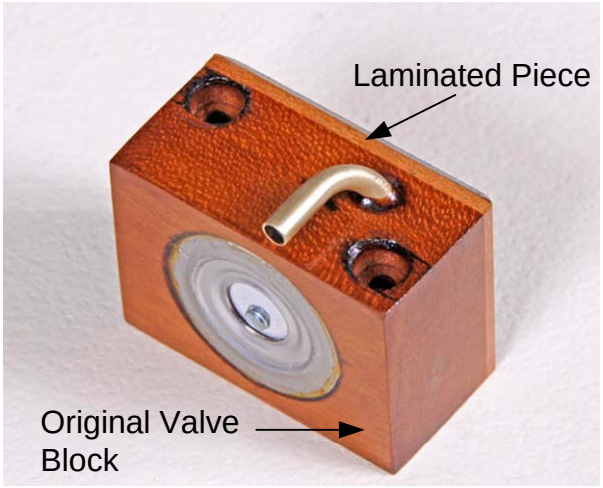
Here are the new parts ready for installation. The shoulder where the Pouch Assembly will be glued has been coated with thin hide glue as a sizing, and the inner surfaces and channels of the block have been coated with shellac to reactivate the old shellac seal. The hide glue sizing provides a good bond for the gluing in the Pouch Assembly as well as keeping shellac from interfering with the glue bond.



In one of the valves, the Pouch side of the valve had been sanded so much when it was last rebuilt, that there was not enough room for dishing the pouch. To fix this, the valve was band sawed and sanded to the green line to clean up the surface and a thin piece of wood laminated on the surface to restore the missing wood.

In addition to being made from maple, Matthew Caulfield tells me that the original Wurlitzer valves were made from Gumwood, sometimes called Red Gum, which was a popular local construction wood in New York during that period when Wurlitzers were made. These valves all are made from Gum. Gumwood gave the valve its characteristic brown color. It is a close, straight grained wood. It is medium hard and reminds you of mahogany and is some respects cherry. Since I did not have any Gumwood in the shop, I used mahogany to make the thin piece to laminate on the valve.

Several pieces of 1/8" thick mahogany were drilled using a 1-3/8" diameter Forestner bit, the same as the Pouch Well, just in case Ron comes across more valves that have to be laminated.



The upper valve seats had to be replaced in most cases. Because the adjustment capability was removed when the valves were last rebuilt, it appears that valve travel was adjusted in some cases by flattening the “dish” in the upper seat to increase travel. In cases where this was done, it damaged the seat beyond repair . With few exceptions, once the block was cleaned up and sealed, the rebuild followed the process used for building a new valve that is covered in the *Notes for Making the Wurlitzer Unit Valve* PDF. The one exception is the size and length of the fluted stem.

The hole in the original lower seat measures .425" so the diameter of the fluted stem was made about 95% of that or .400". Because of small changes that might have been made in previous rebuilds or in cases where the pouch well had to be drilled slightly deeper, the length of the fluted stem had to be checked in every case to make sure that the stem provided for the required 1/16" lost motion to account for any future pouch shrinkage that might otherwise pull the valve off the lower seat.

After valve travel was adjusted and the upper seat was sealed with burnt shellac, the Upper Seat hole was covered with a round punching of masking tape and the valves were sprayed with two coats of clear shellac. The cleaned-up original elbows were reinstalled and sealed with burnt shellac.

The valves improved in performance noticeably after the final step of spraying them with shellac. Sealing, inside and out is always very important, but since the original wood seems to be very porous, and quickly soaked up the first coat of shellac, the sealing of these original valve blocks, is particularly important.