the "inside" story

Wurlitzer Chest Action

by E. S. "Tote" Pratt
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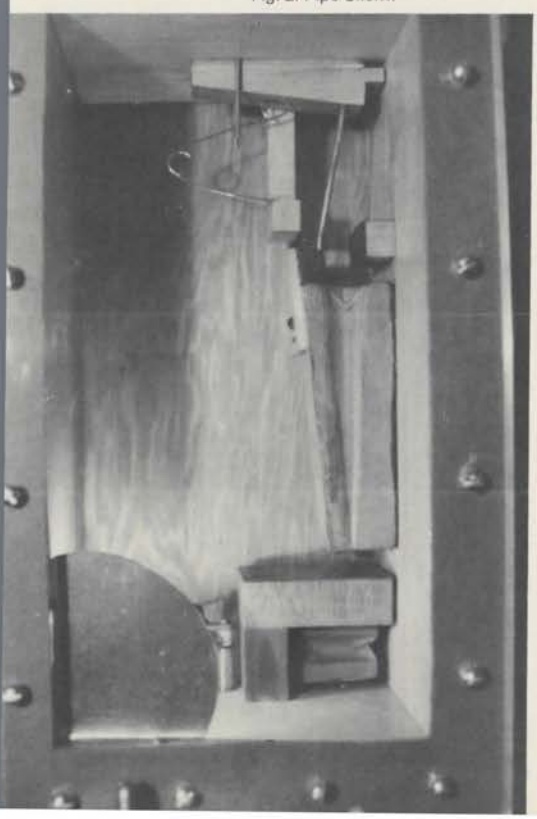
When I suggested to one of our dedicated organ crew members, Art Havlovic, retired principal of Cincinnati's Western Hills High School, that it would be interesting if we could show our many visitors to the floor-level chambers in the OVC-ATOS Emery Theatre 3/23 Wurlitzer 260 Special just how a pipe "plays," he accepted the challenge and produced the unit seen in these photos.

Photo #1 shows the unit as mounted at the access door to the solo chamber winded by a 1" bung in the five-rank wind box of the solo brass chest. A miniature white key is seen at the bottom of the unit which, when depressed, simulates the key action at the console. A 12V light behind the shield in the lower-left corner is controlled by the toggle switch. The plexiglass front plate is framed with a red felt seal.

Fig. 2. Pipe Silent.



For those uninitiated in the operation of a Wurlitzer chest, the following photos and description of this action might be of interest. (Refer to the drawing for interior details.)

Photo #2 shows the unit when the pipe is silent. Note the secondary pneumatic is inflated with chest pressure, always present in the chest when the blower is running. The pallet spring (top) keeps the pallet closed so the pipe does not "speak." The magnet (seen behind the light shield) is not energized so chest wind flows around the armature to the primary (small pneumatic — bottom right) through an air channel bored in the bottom board and then through the L-shaped primary pneumatic board, keeping the primary inflated.

A double valve is connected to the primary (stem can be seen in Photo #3) which allows chest air to move through another bore through the bottom board and up the side rail (right) to the secondary pneumatic allowing spring and chest pressure to keep pallet closed. A flute pipe is racked above a hole in the top board covered by the pallet (seen in Photo #3.)

Photo #3 shows the position of the primary, secondary and pallet when the magnet is activated by playing the note. The armature is attracted to the magnet shutting off wind from the chest, allowing the high pressure air in the primary to escape through the magnet cap exhaust hole. (*Note:* Primary is further away from the bottom board, exposing the valve intake hole and valve stem.) The valve is now pulled up shutting off high pressure air to the secondary, allowing air from secondary to exhaust to the atmosphere causing it to collapse under chest pressure and the pallet to open via the spoon (metal rod) attached. The high pressure air now

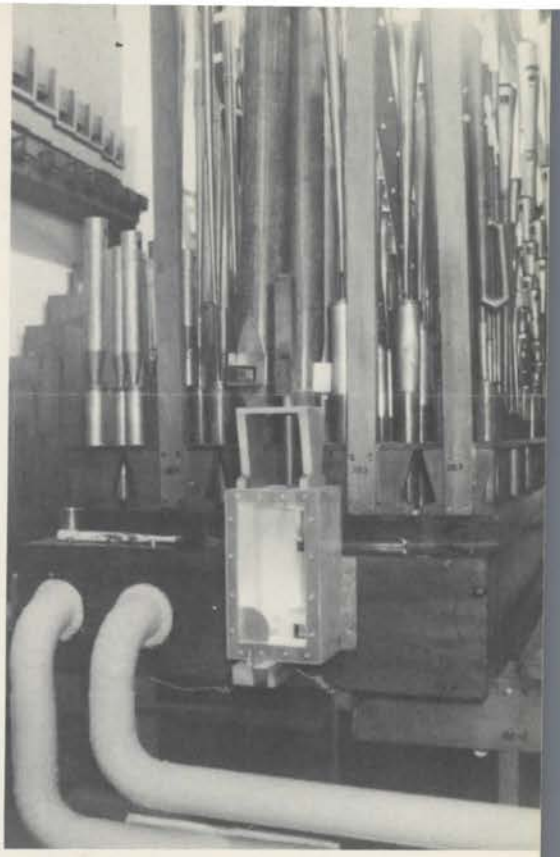
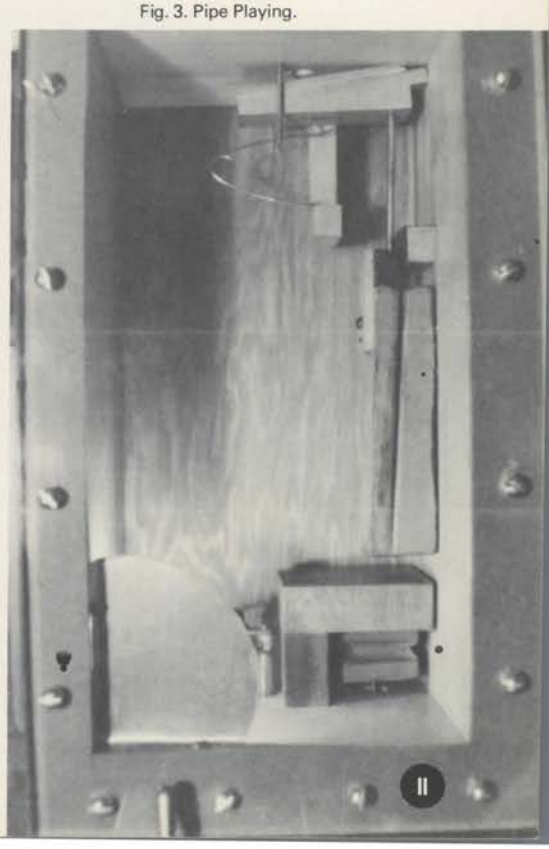


Fig. 1. Display unit is located on the brass chest in the solo chamber. L to R: Vox Humana, Brass Trumpet, Quintadena, Brass Sax and Oboe Horn.

causes the pipe to speak.

The Wurlitzer action is extremely fast in attack and repetition due to the primary system employed in every note in the organ which permits a large amount of air in the secondary motor pneumatic to inflate and exhaust than if the smaller magnet port itself bleeds the pneumatic. Many other builders' action do not

Fig. 3. Pipe Playing.



employ primaries, which is most essential, particularly for bass pipes with larger pallets and secondaries.

A similar system is employed in Wurlitzer relays, switch stacks, trems and offset chests. The shades, percussion and combination action use the same basic concept except that the valves are mounted on the stem, external to the bottom board, "inflating" the secondary to activate instead of "deflating" as in the chest action.

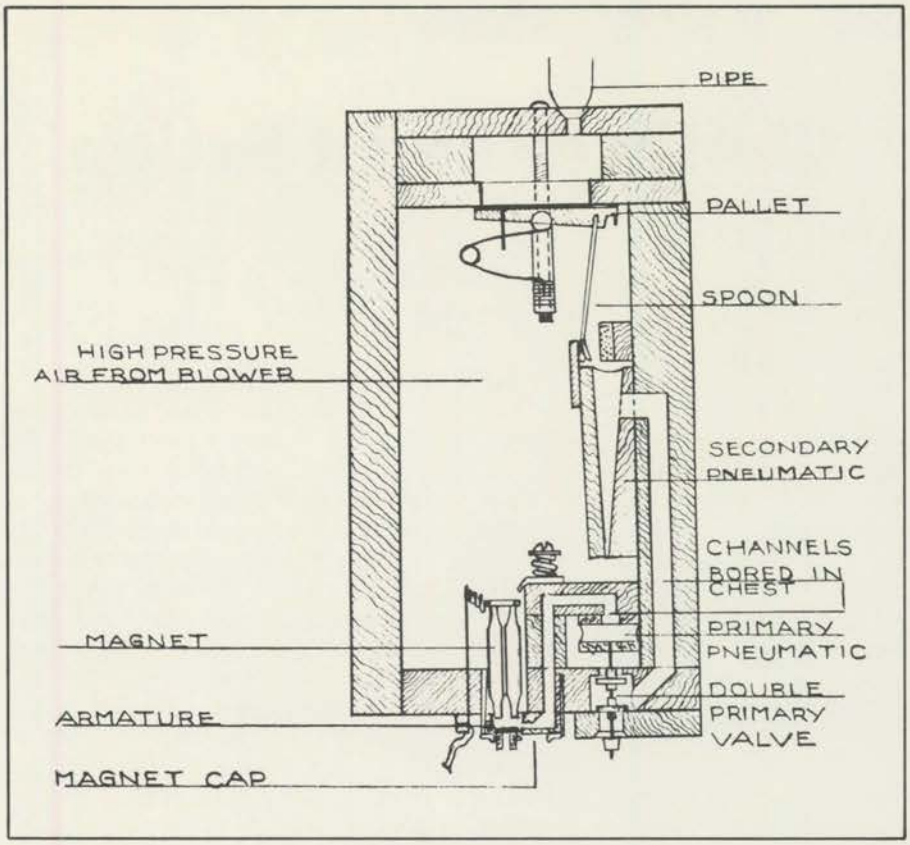
The amount of movement in both the armature and the primary valve is of considerable importance as to speed of action and reliability.

The armature position in relation to the magnet core is governed by the brass tube screw in the magnet cap in lead base magnets through which the exhaust air passes when the note is played. By running the screw in, the armature is positioned closer to the core (and should be as close as possible for faster action). In lower pressures (6"-8" wind) it is not so critical, but in 15" wind chests, relays, etc. it should be as close as possible, since the higher pressure air passing from the chest to the primary offers high resistance to the magnetic field, and if the armature is too far away will not be 100% reliable, on repeat or when a large number of magnets are energized as in full organ, with a D.C. line voltage drop.

In our ATOS Emery Theatre Wurlitzer installation, 11.5 to 12V D.C. is available at all points, the rectifier being in the relay room. The A.C. input is activated by a pneumatic and microswitch when the blower is turned on. We have two rectifiers with a switchover system in case of failure.

Equally important to fast, reliable action is the relative position of the double primary valve. The drawing shows the valve in the "silent" position with the top valve allowing pressurized air to flow to the secondary, while the bottom valve shuts off the exhaust port. When a note is played, the valves move up, reversing the flow, shutting off pressurized air and opening the exhaust port.

If these valves are too far apart, there will not be sufficient movement to permit enough air to pass around valves, so the note will be slow to play and/or release, or be silent altogether, or cipher. If they are too close, the valve will not shut off pressurized air and air will flow around the valve to the exhaust port, thus the secondary will collapse because of pressure differential, and the note will cipher.



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A study of the drawing will show the two valves, with a leather nut on each side of both valves. The nuts are rounded on one side, which should always be the one facing the valve, so that when moved, the valve can "float" (i.e., align flat with the chest surface to seat properly). The nuts should not be turned too tightly against the valves. As in the case of the armature discussed above, the less movement of the valve, the better, as the speed of action and repeatability is vastly improved.

By adjusting these nuts, the proper distance between valves can be established and maintained. A further adjustment is made by turning the whole valve assembly (valve stem) with a pin vise, threading the assembly into or out of the primary, to adjust the relative movement in relation to the primary, which should be set about one-half the distance that the primary can open as a norm. It is important to assure that the primary pneumatic moves freely up and down without bottoming or stretching before the valves seat. The optimum movement is between 3/32" and 1/8".

Photo #4 is a picture of Art Havlovic with another of his "made from scratch" contributions, patterned after the Wurlitzer crash cymbal action. This was made to provide for a Chinese gong donated by Phil and Blanche Underwood (two of our most valuable crew members). The gong was originally used on WLW's *Chandu, the Magician* radio show in the 1930s when Phil was an engineer there. □

Arthur Havlovic.

It is time to place names in nomination for the National ATOS Board of Directors for the two-year period from July, 1980 through June, 1982.

All those who wish to run in this election are asked to send a photo and short resume.

Written consent of the nominee is mandatory and must be received before the nominee's name can be placed on the ballot.

Mail to . . . **Office of the President**
Thomas O. (Tommy) Landrum
4815 Leonard Parkway
Richmond, Virginia 23226

MUST BE POSTMARKED BY APRIL 16, 1980

Konsole Kapers

by Shirley Hannum

Families of Tone

Since the organ is usually considered an orchestra-at-the-fingertips instrument (Wurlitzer called it the "Unit Orchestra"), it follows that, just as there are sections of instruments in an orchestra, there are sections of instruments in a theatre organ. On the organ, this is called "families of tone." There are four — string, diapason, flute and reed.

The string section is usually noted by yellow stops (Ed. Note: The color of tablets as given here can be considered as a general rule. Color of stops, particularly strings, differed amongst organ builders.) but look for them also in the white ones. These are the stops with such names as viol, cello, violina, viola, gamba and salicional. On a pipe organ with multiple string ranks, one is tuned on pitch, the other ranks are tuned either sharp or flat (celeste). When they are played together, they produce a warm, shimmering effect.

The diapason family (pronounced dye-ah-PAY-sun), also called principal, is the foundation of the church organ tone. If you've visited a church where there is a vertical pipe facade, these are diapason pipes, and not usually playable. The tonality of a diapason is mellow and round, but with character. Some make super solo stops, and usually are good combining stops for the accompaniment instead of the breathy tibia. The 4' diapason is often called the octave.

The flute family consists of just that — flutes. You may also find gedeckt, clarabella, bourdon and melodia, each one with a different voicing. The orchestral flute and the organ flute have a very similar tonality, although the organ flute lends itself more to accompanying. Check out the piccolo stop — that may be a tibia or a flute; it's handy to know which it is.

Included in this family is the tibia, the "foundation stop" of theatre organ, although some folks put the tibia in a fifth family. However, quoting from Lloyd del Castillo's *Alphabetical Primer of Organ Stops* which quotes here from Webster's dictionary, the tibia is defined as "an ancient type of flute, originally made from an animal's tibia" (which is a leg bone). The tibia, with lots of tremulant, produces the throbbing, lush, meltingly sensual tone we've grown to love. It's common to include a tibia in a theatre organ combination. But, please remember, dear readers, that, although the rich lustrous tibia may be unified from 32' to 1', it isn't the only stop on the organ.

The reed section includes all the red stops. Yes, *all* of them. In this, the orchestra and organ differ. Where the orchestra adds a fifth family — brass — organ lumps brass and reeds into one category. This is because the pipes used to produce these tones employ reeds. Trumpet, French horn, trombone, tuba, English horn, oboe, clarinet — all these are reeds on the organ. Also included are vox humana, posthorn and kinura. Unlike stops of other families, each reed has a personality all its own, ranging from the mellow French horn to the nasal kinura and the biting posthorn.

As you've read this, you may have wondered how to apply this new knowledge to your organ playing and how it will make you sound better. In combining stops from each of the four families, remember that you are conducting an orchestra. Listen to a good easy-listening FM station and orchestral records (as well as organ records of theatre organ masters) and get a feel for the orchestral tonality. The score registers the orchestra just as you will the organ.

Within the ATOS membership, we are blessed with many professional touring musicians as well as those who play as a hobby and those who don't play but just love to tinker. Among the organists are the hobbyists who play theatre pipe organs or their own theatre-sounding electronics. Some take lessons and some play by ear. It's these folks we're attempting to aid. The professional, we trust, has reached the stage where the ideas in this column are second nature. For the amateur just having fun, however, the ideas expressed here will hopefully be of some help in advancing from one plateau to the next.

Enjoy your Units Orchestrae, all!□