Improving Bell Control on the Caliola

by

Robert F. Gellerman

Wurlitzer's version of the calliope, the Caliola, never achieved the popularity of the Tangley -- only 62 of these instruments were built. But because of its simplicity and because of its chromatic scale, hobbyists have made many copies. The Stinson Organ Co. has also built a number of these instruments. The typical original Caliola had 44 wooden pipes and no percussion, but bass and snare drums were available as options, making it a mini-band organ. I built my own version in 1978 with snare and bass drums and a cymbal, and put it into a case decorated to look like a small band organ. Since the rolls have the perforations available, I added a 13 note set of bells. In this version, the wooden flute pipes came from an old church organ and are voiced on 3 « inches of water pressure, resulting in an instrument quiet enough to be played comfortably indoors. This organ has been a favorite over the years with visitors, and has frequently appeared at local festivals.

Fig. 1. "The Old Dominion Marching Society," a small band organ based on the Wurlitzer Caliola roll, built by the author in

The Caliola rolls are a version of the Wurlitzer 65 note automatic player piano rolls with extended notes for the organ. Because the rolls already contained perforations for control of several other instruments, the bell perforations consisted of slots 4 and 5 together for "ON" and 2 and 3 together for "OFF", a technique referred to as multiplexing. Most Caliolas with bells make use of only one slot for ON and one for OFF, which is simple mechanically, but gives less than perfect results musically. On Stinson machines, slot 3 is ON and slot 2 is OFF. After putting up with raggedy bell operation for many years, I decided to add a multiplexer for proper bell control on my instrument. While many collectors frown on modifying old instruments, bells can be added to an original Caliola nondestructively, so that it can easily be returned to its original condition if desired.

The need to respond only when the perforations on two slots appear simultaneously, and not to either one alone, requires what in electronic circuitry is called an "AND gate." In other words, the bells turn on only when slots 2 AND 3 are opened together. The simplest form of a pneumatic AND gate uses cutouts as described in Craig Brougher's *The Orchestrion Builder's Manual*, page 112. Cutouts are unamplified, or passive, devices. AND gates can also be made using pneumatic valves. Both types of multiplexer require three devices for the ON and three for the OFF function, a total of six devices, not including the lock-and-cancel valve. The cutout-based multiplexer uses six cutouts; the valve-based multiplexer uses four conventional valves and two check valves. (The check valves are also passive devices.) On the surface it appears that the valve based multiplexer is a little more complex because it requires a source of suction for the valves. A brief study of the fine print corresponding to the cutouts reveals that they also need suction to bleed the pouches, so the advantage of the cutouts is minimal. After a little experimentation I found the cutouts to be unreliable in operation and used valves, which give reliable, positive control.

A type of pneumatic unit valve popular with professional and amateur builders alike are those made and sold by Doyle Lane. These valves are an injection-molded plastic copy of the Lauter-Humana player piano valves. They can be bought unassembled and made into a variety of valve types. They are easy to mount and replace, should one become defective. Lane provides an Idea Booklet showing how to assemble the different valve types as well as the circuitry for a variety of pneumatic valve devices. The circuit shown in Figure 2 is adapted from the section on multiplexing in the Idea Booklet.

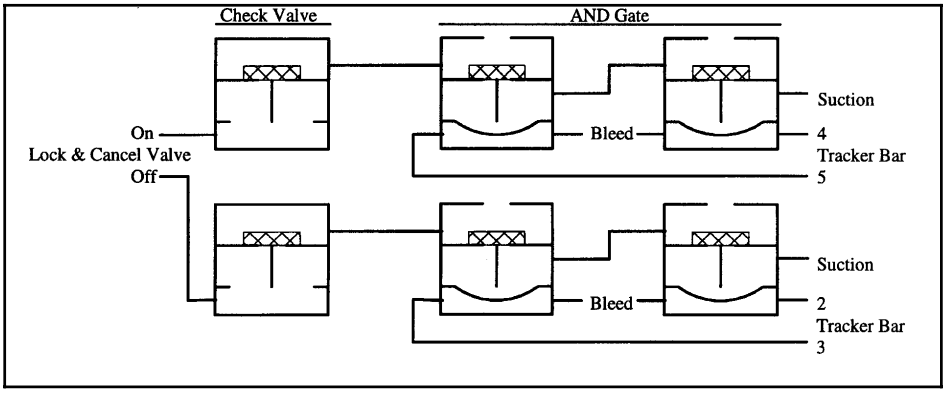

Figure 2. Circuit diagram for the Caliola bell multiplexer. (The location of the valves coincides with the layout of Figure 3.)

The upper and lower sections of the circuit are identical. Each consists of two conventional pneumatic valves connected as an AND gate, followed by a check valve. When tracker slot 4 is uncovered, the first valve operates, putting suction on the second valve. If slot 5 is covered, the second valve doesn't operate, so there is no output. If slot 5 is then uncovered, the second valve in the top section operates and the check valve opens, allowing air to flow through it, and causing the lock and cancel to operate to the on position. If slot 4 remains covered and slot 5 is open, the second valve operates, but since it has atmospheric air coming from the first valve, it doesn't operate and there is no output. Then if the first valve opens, suction is placed on the second valve, causing the check valve to open and air to flow from the lock and cancel, turning it on. If either slot 4 or 5 is uncovered alone, there is no output to the lock and cancel valve. If both are uncovered, air flows from the lock & cancel valve. In the same way, when both slots 2 and 3 are uncovered, all three lower valves operate and the lock and cancel turns off.

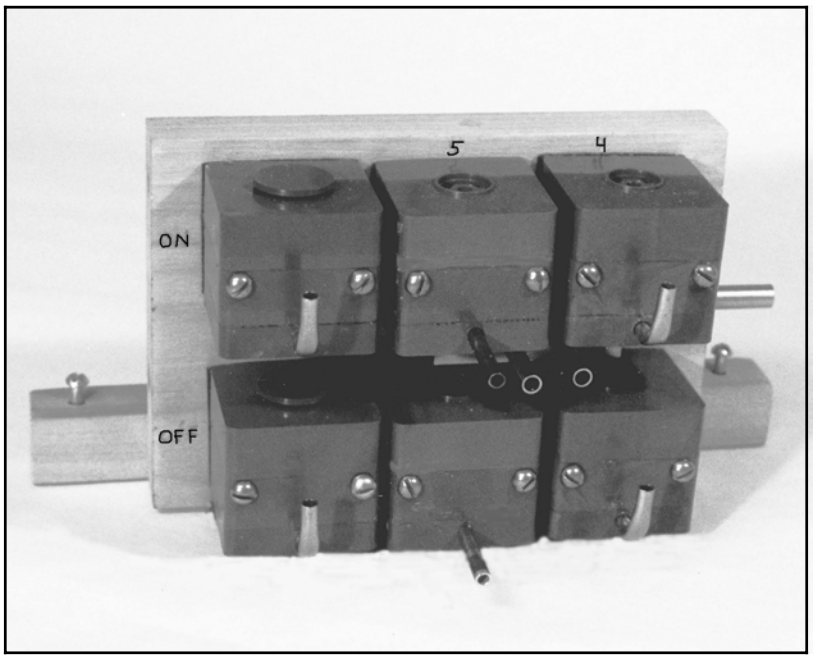

Figure 3. Multiplexer for Caliola bells using Doyle Lane valves.

Two details of the multiplexer are not explained in the Idea Booklet. First, all four conventional valves must have bleed supplied to the pouches. Since the valves on the left in Figure 3 have suction on them at all times, bleed cups can be inserted directly into the holes provided for them in the valves. The middle valves are normally at atmospheric air pressure, so the bleed holes must be plugged with the plastic plugs supplied with the Doyle Lane valves, and the bleed is then teed into the pouch nipple. Second, since the multiplexer output when energized is suction rather than atmospheric pressure, the polarity of the lock and cancel valve is reversed. That is, the normally relaxed side of the lock and cancel is the "OFF" side and the normally energized side is the "ON" side. See Figure 4.

The check valves are made from Doyle Lane valves. The pouch is removed and the upper opening is sealed.

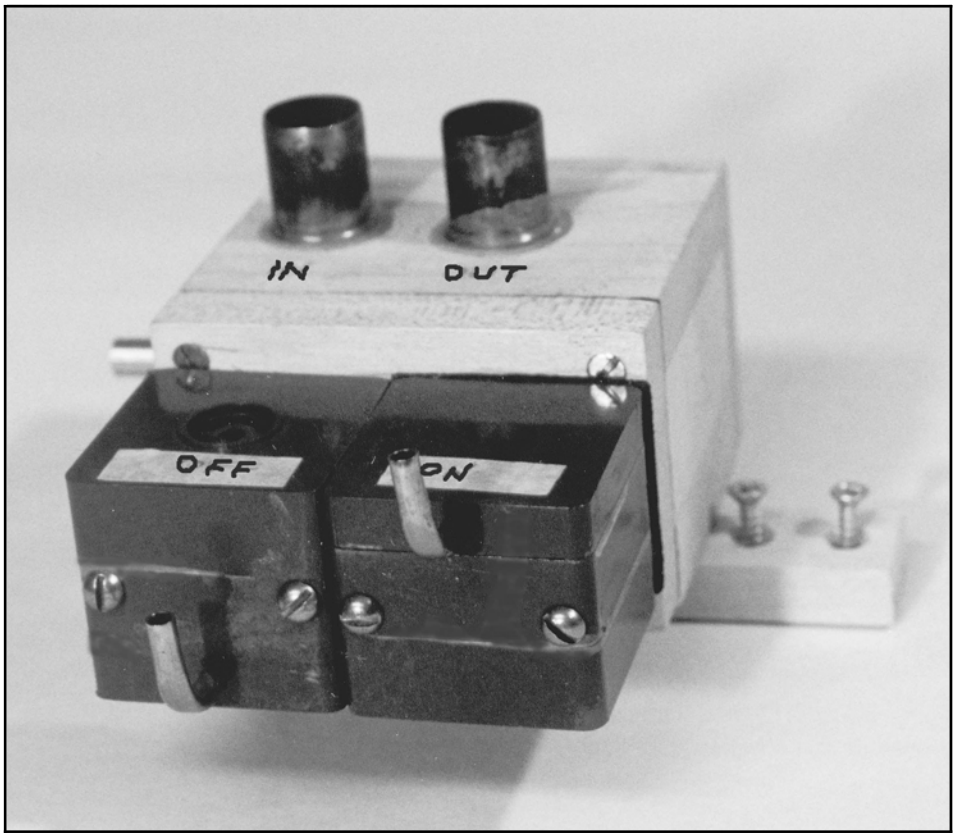

Figure 4. Cutout valve with lock & cancel.

Fritz Gellerman of Deland, FL, is a frequent participant in organ rallies throughout the country.