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# CAROUSEL ORGAN

The Official Journal of the
**Carousel Organ Association of America (COAA)**
*Devoted to the enjoyment, preservation and education of all outdoor mechanical musical instruments, including band, fair and street organs, circus calliopes, and hand-cranked organs of all sizes.*

## Inside this issue:



**Editor/Publisher — Ron Bopp**
**Assist. Editor — Angelo Rulli**

## Frati 49-Key Barrel Organ

by
Ron Schmuck

We were commissioned to restore a very interesting barrel organ by our customer, Mr. Domenic DiBernardo. The instrument was sold as an old "Bode" organ. This name didn't mean very much to me except for the short listing on page 806 of the "Encyclopedia of Automated Musical Instruments" by Q David Bowers which reads "Magdeburg; Hermanne Bode, Grossesteinerne Tischstrasse 1; Raap & Sohn, Rote Krebsstrasse 37 (founded 1889)."

**General**

The organ measures 52 inches high by 40 ½ inches wide and 21 ½ inches deep (Fig. 2, page 20). The first step was to completely dismantle the instrument in preparation for restoration. It was very obvious that this organ had earned its keep and absolutely everything that could be done by the previous owners to keep it working had been done. Even the cloth panels of the facade were made up of small scraps of cloth all sewn or glued carefully together to make a piece large enough to fill in the front and rear panels. Then crude paintings of flowers were drawn on the cloth to make it a little fancier. The organ's barrel measures 34 inches long and 7 inches in diameter. This organ has 49 Keys which play the organ from the barrel. A total of 8 songs are pinned on the barrel, which is also marked by what looks like a rubber stamp "H. Bode" as is every large pipe, pumps, chests, etc

The scale of the instrument is as follows:

Trumpet, 14 Notes - D, E, F, F#, G, A, B, C, C#, D, E., F, F#, G.
Melody, 17 Notes - D, E, F, F#, G, A, B, C, C#, D, E, F, F#, G, A, B, C.
Accompaniment, 12 Notes - G, A, B, C, D, E, F, F#, G, A, B, C.
Bass bourdon, 3 notes - G, C, D
Bass Trombone, 3 notes - G, C, D

*. . . continued on page 16*


Figure 1 The restored barrel organ presents the original Frati logo and medals on the bottom of the case.

**. . .** continued from page 1 (*Frati 49-Key Barrel Organ)*

**Casework**

We began the cabinet restoration by carefully stripping off the old paint, which was obviously, a home-done job. As each coat of paint came off it was recorded for color and type of paint with the intention of restoring the case to its original painted color. As we went deeper and deeper it became evident that the wood on the sides and back was actually a beautiful rosewood matched veneer. The entire front was ebony. As the stripping process continued, images of the name Frati & Co. Buchholzer, Strass 1, Berlin came into view (Fig. 1). Below the name appeared a large floral panel of marquetry. You cannot believe the excitement that went through the shop at that moment. Our customer decided that the now designated Frati barrel organ should receive a full 100 point restoration.

Work was started on the case, which needed a great deal of repairs. The name and large flower panel were made up of wood marquetry—the art of making pictures from small pieces of different colored woods. We had to replace many missing pieces that had fallen out and some sections that were gouged out and completely missing. The old legs of the cabinet were worn down more then an inch from what looks like simply being dragged over a rough floor! We removed the original veneer from the lower section and replaced the old legs with new ones. The old veneer was then replaced over the new legs, complete with a section of new veneer to fill in the missing section at the bottom that had been worn away. New brass corners of the correct height were also made using the originals as our pattern. These original corners will be saved and will be kept with the instrument, as will all the other interesting items we found yet to be discussed.

Figure 2 The "Bode" barrel organ as it was brought into the shop. At this point there was no clue that it was orignally a Frati organ.

The entire case was re-glued, along with repairs to the rosewood veneer, which was stained to bring out the full grain of the wood. It was decided that the new finish should be a "French Polish" finish—the application of special brewed shellac onto the surface of the cabinet. By rubbing the finish and using varying degrees of abrasive powders and oil this will create a perfectly smooth, clear finish, exactly the way it was done hundreds of years ago. Domenic DiBernardo is an expert at French polishing and did the entire case over a six month period. The main ingredient in this process is plenty of talent, time, patience and lots of good old elbow grease.

**Pipework**

The ground pipe work (these pipes are located underneath the organs) was, as one might expect, quite rough! After many years of working on the streets, in all types of weather, all were found to be split at the joints and many had been blocked off with a piece of leather so they would not speak. As each pipe split it would produce an awful sound so rather then repair the pipe it was simply plugged. Every pipe had to be taken apart and re-glued, then sealed. Some pipes have a stopper in their tops. These "stoppers" are used to tune the pipe and must move freely, so all of these stoppers had to be re-leathered, and then, fitted back into the pipe for a snug, air tight fit (but yet able to be movable for tuning the pipe). The pipes were then re-voiced and rough tuned—the final tuning to be done later (after installed into the organ and using the organs own bellows pressure). Next these pipes were glued to the bottom of the organ's floor onto strips of leather (Fig. 3). Then the floor could be reinstalled into the instrument, and the bottom skirt section slid into place and fastened to the main cabinet. We also made a special dolly of angle iron and rubber wheels to make it easy to move the instrument — this also gives strength to the entire instrument, which probably weighs in excess of 200 lbs.


Figure 3 The ground pipe work have just been glued to the bottom of the case . These are protected by a wooden skirt.

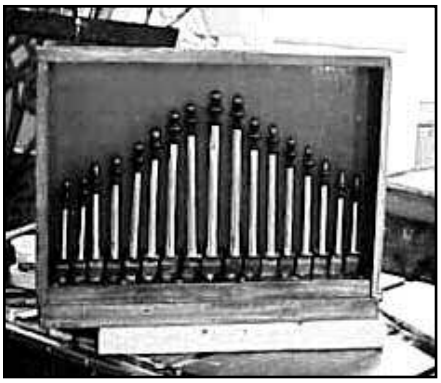

Figure 4 The brass piccolo pipes have been restored and now back in position.

The main ingredient in French Polishing is plenty of talent, time and patience — and lots of good old elbow grease!

The Piccolos were stripped of their painted finish — underneath the paint was the traditional black egg corn tops. These tops have a threaded wire that holds the tuning plug in place. These we replaced with new cork plugs, which are turned on the lathe for a tight, yet movable fit in the pipes. Several new bases for the piccolo brass tubes had to be made because of worm damage and to replace some home-made ones that simply didn't work. The pipes were then buffed back to a high polish, finished and mounted on their pipe rack (Fig. 4). The original red cloth back was cleaned and reinstalled behind the piccolo pipes.

**Pumps**

The Main pumps also held a wonderful surprise in the form of an autograph of Bacigalupo inside the reservoir — however, no dates or initial. In all there were three signatures but just the one could be read. Another mystery! These pumps have had many repairs over the years and I assume Bacigalupo made one of these repairs. The pumps in this Frati were of the standard type used for street organs of this era. This comprises of four pumps and a reservoir. The reservoir has four large springs which push down on it as it tries to inflate from the wind which the four pumps are pushing into it as the organ is being cranked. The pressure of these springs is what creates the wind pressure needed to make the pipes play loudly for outdoor use. The pressure in a street organ is usually about 8 (water column) inches and sometimes higher. A typical church organ works on about 3 (water column) inches of pressure.

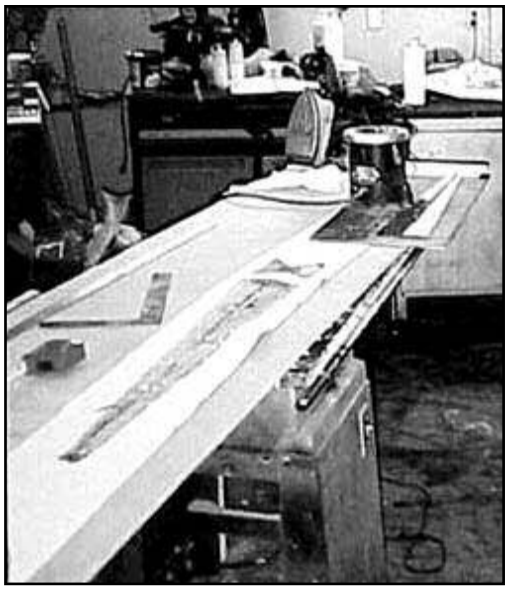

Figure 5 The rigid gussets being glued to the one piece leather bellows.

A lot of the leather had split at the edges and the rigid gussets had come away from the leather and jammed against each other inside the bellows. We had to make several new bellows boards because of worm damage and large cracks which could not be glued properly to insure a strong enough bellows. Also, the usual wood spreaders between the pump sections had to be replaced with new wood pieces. We sent samples of the original leather to The Leather Supply house of South Bend IN. They carefully matched all the required leather for the pumps and reservoir with leather of the same weight and thickness. They were also able to supply us with long pieces so the bellows could be formed in one piece rather then having to splice pieces together as original. We found this instrument to be using fairly light-weight leather for the bellows so extra care was spent to ensure it was correctly stretched before installing to ensure a long life.

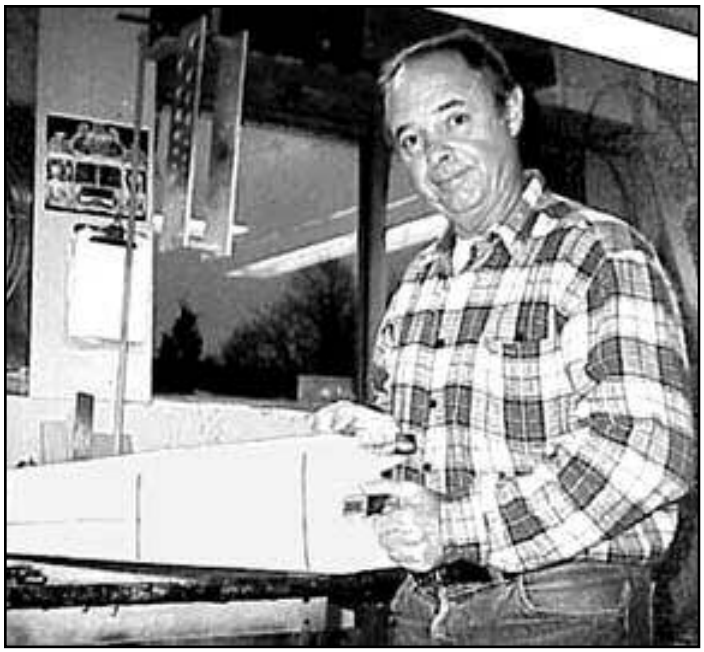

Figure 6 The author testing the newly covered bellows. Each will move easily because of the new, light-weight leather.

The alignment devices . . . can actually be the difference between success or failure of a good instrument.

We installed new rigid gussets onto all the leather pieces and increased the distance between the gussets' bottom and where the bellows boards fit on to the panel by about ¼ of an inch (Fig. 5). This ¼ inch will actually be glued to the inside edge of the pump boards on all three movable sides. This makes a sort of shelf or edge and will stop the leather from simply tearing off the side wall of the thin bellows boards for many years. All of the pump boards were resealed and re-hinged. New valve flaps were made using the same three-piece build-up as original. This build-up is comprised of three sections of leather — the top piece was a rigid cowhide while the next 2 pieces were of thick suede goatskin. Two strips of thin leather straps hold down these flaps. Once assembled we found the pumps to crank very easily (because of the thin leather panels) and the pressure to be 8" of wind (Fig. 6).

**Metal Parts:**

Surprisingly there are quite a number of special metal parts used in a barrel organ. Included are the main crankshaft, bearings and various sliding plates to adjust the barrel for song selection. In addition there are the adjusters for aligning the barrel to the keyframe and keyframe to the pallet sticks, bellows springs, and screws of all types and sizes. All need just as much attention as the rest of the instrument. In fact, the alignment devices (used to remove lost motion between the barrel, keyframe and pallets as well as square up the keyframe to the barrel) can actually be the difference between success or failure of a good instrument. Simple regulation! For these parts to work properly they must also be restored.

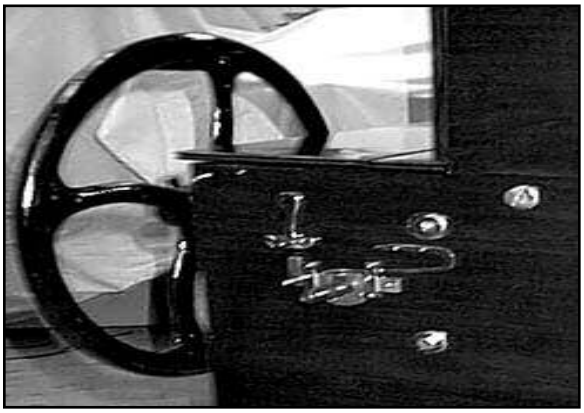

Figure 7 Some of the metal parts, cleaned and polished or plated, and installed back on the organ.

We operate our own plating shops, which can handle nickel, copper, brass and gold. But most important is Electro-cleaning. This is a process where the parts are put into a special heated bath and an electrical current is passed through them. The current causes hydrogen bubbles to form on the part and literally scrub the part clean of all dirt, rust and grease. Once cleaned the part can then be either polished or replated to its original color. Often parts have become very pitted and rusty with their original plating literally falling off. When this happens we simply strip off the old metal plating electrically. We place the part to be stripped in another special bath along with a metal plate, and then pass an electrical current through the part. This causes the old plate to leave the part and form on the metal part, actually saving the old nickel or brass for later to reapply it back onto the cleaned part. The part must then be polished to a perfect surface. To repair scratches or bad spots caused by rust we then apply a thick coat plate of copper. Copper is very soft and builds up quickly on the part; this allows us to easily buff out the damaged section and then re-plate the part in nickel. It often takes three or four of these sandwiches of plating of brass, nickel, and then re-polishing before the part is ready to go back onto the organ. We can also plate brass parts with 24-caret gold. This will keep the part bright and shiny as new and never need polishing.

**Pipe Chest**

Over the years water got into the instrument and soaked the pipe chest as well as all the other various parts. The pipe chest, with all it's many channels that supply air to each of the pipes, was badly warped and most of the boards had separated or split, including a large number of the thin boards that divide each of the 49 notes from the next (Fig. 8). We were able to completely dismantle the chest and re-glue all of the original boards back into the two large boards that make up the top and bottom panels of the chest. All of the thin boards that make up the 49 separate channels were then cleaned and re-glued into their respective slots. The fun really starts when you have to fit all of these boards into the slots cut in the top board. This operation certainly does take a lot of pushing and gentle nudging until all of the parts slip into place. This job should be only undertaken when you are all alone and no one is able to hear you yelling and cursing at the stubborn pipe chest. We then re-clamp the entire chest in a special jig I made up especially for straightening pipe chests. After four or five days of drying, it is taken from the rack. We then fill the chest with a special sealant, which runs into every nook and cranny, leaving a clear, airtight seal. The chest is then allowed to dry and the entire resealing process done again. I like to do this flooding at least three times to ensure a good job. One leak and the result is several pipes of different notes playing together, not very nice to hear! If that happens then the entire organ must be dismantled so the pipe chest can be removed and the offending leaks found and sealed. So it is a good idea to take your time here and test every channel as best you can before continuing with the pipe chest restoration.

Figure 8 The pipe chest prior to restoration. Many boards were warped or split.

Next the pallets were cleaned and recovered with soft leather of the same type as used originally. The pallets were re-glued in place in the pipe chest with special attention to the hinge end. This hinge must be a very good bond, as must the bond between the leather and pallet board. The pressure of the opening and closing of the pallets as the organ plays can cause the hinge to separate allowing the leather to “gather up” allowing wind to enter the windway and cause a pipe to play continuously. The pallet boards were also lubricated with graphite in the little slot cut into their top. When the pallet box lid is replaced a small wire leaf spring is slid into each of these slots and secured in the top board. As the pallet opens and closes this spring must slide freely in the pallet slot. The back of the chest was simply covered with a thick brown paper. I could see that this paper had been cut many times to allow for repairs to be made on pallets that had become unglued or stuck. The repaired sections then simply had another piece of paper glued over the hole made for the quick repair. I decided to replace this paper seal with a thin wood panel which can be more easily opened allowing for any adjustments that may be needed in the future just like on the larger band organs.

So it is a good idea to take your time here and test every channel as best as you can before continuing with the pipe chest restoration

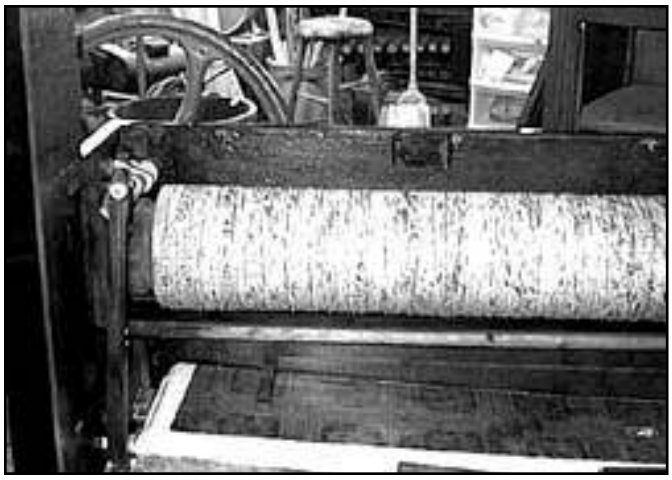

Figure 9 The pinned barrel, restored pump and crank and crank arms now have been put back into the case and ready for testing.

**Partial Assembly**

Following the pipe chest work we installed the main crank assembly and begin to realign the crank and crank arms for a smooth travel (Fig. 9). The barrel tray and its brackets were installed and the barrel slid into place for alignment with the worm gear on the main crank. When the casework was being done, we re-veneered right over all the many holes that had been made in the case sides over the years. Holes to compensate for wear as well as the holes to readjust the various levers for selecting the songs and lifting the fingers off the barrel. Now we have to carefully cut through the new veneer and position all the controls where they were when the organ was new. Once this is completed we are able to tighten down the pipe chest and install the big pressure springs. Now is the moment of truth, when for the first time in many years the heavy iron wheel is slowly turned allowing wind from the restored pumps to enter the pipe chest. Nothing is more satisfying then watching the reservoir come up to the top and become rock hard as the pressure regulator valve balances off the wind at an even nine inches of pressure. Each of 49 the pallets is then checked for tightness by shoving a wire down its key frame hole and simply listen for the snap as it reseats.

**Trumpets and top melody pipes**

As restoration of the pipe work continued, we are always looking for pipes which will help confirm the original pitch the organ was tuned to. Often the trumpet reeds will have a mark left on the tongue where the tuning wire held the reed in place for many years. In fact you can see how the trumpet was tuned over the years by simply studying the different marks. Often the pipe would come loose from its rack and for some reason the screw hole in the resonator never seemed to line up with the screw in the rack. Often the problem was solved by simply making a new screw hole. Rarely is the old unused hole ever found to have been properly filled. Usually a crack starts from the new screw that was forced into the soft wood of the resonator. This hole in the resonator causes the note to go sharp and of course the organ grinder had to retune the trumpets by pulling back on the tuning wire making the trumpet slightly lower in pitch. Next the piccolo would also have to be made lower to be in tune with the trumpets. This goes on through the entire instrument - each pipe has been "adjusted" or tuned over the years to be as close to original pitch as possible until finally it can no longer be tuned and usually makes such a screech that it is blocked off. The more pipes we can find that haven't been altered completely out of whack the better. We record every pipe and its condition and where the tuning device was last positioned. (Fig. 10) Then as each pipe was restored and taken apart we can see where it was originally tuned. Care must also be taken as occasionally the scale was altered and your new discovery as to where the pipe was originally tuned may not be correct for the instrument's scale as it is now. Occasionally you will find that pipes have been switched with one another for one that would tune better or even pipes that have been sawn shorter so they would come into tune (sort of) even though it is now an octave higher! (pipes that have had sections glued on to make them lower in pitch).

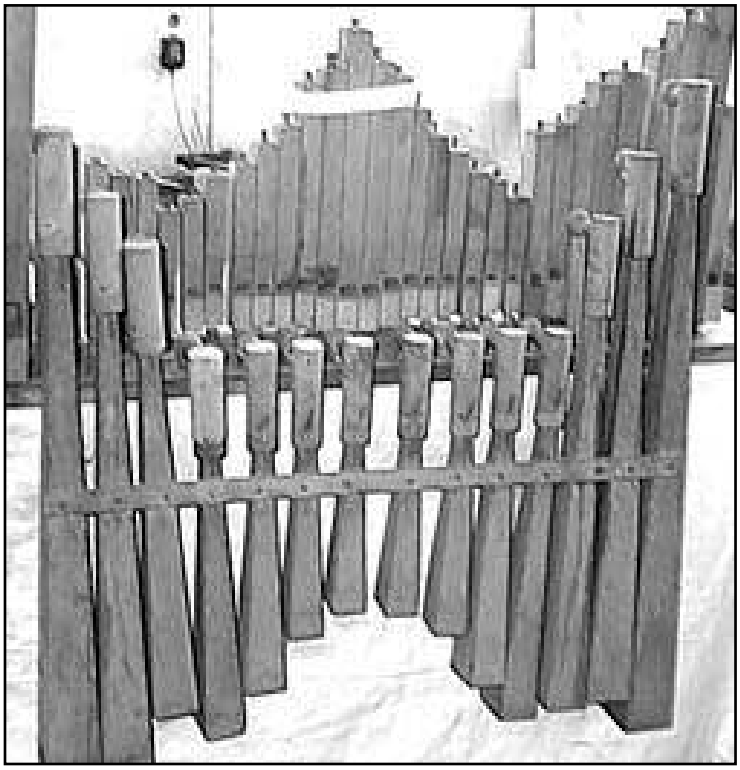

Figure 10 The trumpet pipes (foreground) and melody and accompaniment pipes (background) sit on the workbench before restoration.

Once all the pipes are restored I like to rough tune the pipe on the work bench to its original pitch as the various marks inside it show where it was tuned. After all the pipes are rough-tuned and their pitch noted you can begin to see where the instrument was originally tuned. Often the note shown on the key frame is not the actual note the pipe is tuned to. I make up two scale sticks, each stick has all the notes marked on them starting at C and running up at least three or four octaves. Next I set my first note of my melody section which is D (on this Frati Organ) and then sound the first melody pipe (as we feel it was originally tuned) and it plays F. I then simply align the two scale sticks so that D on stick #1 is beside F on stick #2. We have now found one of the ways to the way the instrument was originally tuned. All notes are transposed up three notes automatically by referring to the scale sticks, and after com-

paring the original locations of the pipes tuning marks, I find this to work 9 out of 10 times. Always keep in mind that the organ may not have been tuned right on the note as is a piano is. Many times you will find the note to be sharp or flat of the actual true note — sort of in-between — and again this is where people try to get the organ into tune with their "modern electronic tuning scope" damage a lot of instruments.

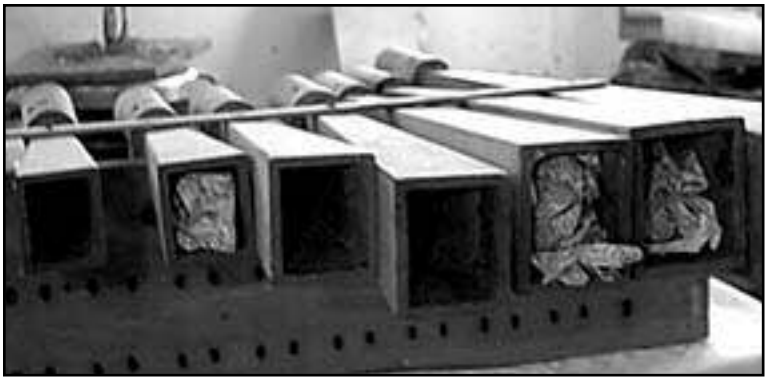

Figure 11 This view reveals the paper "stoppers" in some of the organ's trumpet pipes.

We now begin fine-tuning the pipes. All are installed in the organ and the wind is supplied by the organs own pumps. As you tune each section of the scale you will notice how each pipe speaks with good volume while main-taining its unique sound or voice (and is able to speak quickly at the correct pitch). Just like magic! The actual tuning procedure would take several pages to cover. In fact, many entire books have been written on this subject, so for now we will skip this, and save it for a future article in the Carousel Organ.

Sometimes even the things people jammed into the pipes to stop them from playing can become a very important clue for further investigation (Fig. 11). The paper that we found jammed into the trumpets is dated 6 January 1949 and is the German newspaper "Braunschweiger." This tells us that the instrument was still working in Germany in 1949. Who knows with luck and help from other collectors in Europe, it is actually possible that some day we will know who the original owners of this wonderful instrument were and perhaps even learn to what extent this Frati influenced their day to day life.

**Final Casework**

There are many details involved in the restoration of a barrel organ. From the very beginning the cost of the restoration must balance the end product. Instruments like this Frati deserve a full restoration. And the hundreds of hours involved in such a project simply cannot be rushed. On this Frati we found two marks in the veneer right beside the Frati name, on further investigation we realized that this is where the Frati Company displayed two of their distinguished awards (Fig. 1). These medals had long ago disappeared. We are very fortunate to have another Frati of similar size in for restoration from the collection of Rick and Betty Cooley of Hockessin, DE. On the Cooley's Frati we found very similar, if not identical, awards medals. Rick unselfishly allowed us to make exact copies of his Frati's medals in order for us to complete this Frati to the last final detail. This is the sort of comradeship that exists in this collecting group. People who love these amazing machines want to see every instrument restored as complete as possible.

Figure 12 The restored 49-key Frati barrel organ.

**Final Assembly**

Now is the time to assemble all of the various parts that have been collected over the past months (Fig. 12). Parts such as new custom-made hinges, eye and hook fasteners, locks and keys, moldings, corner brackets and handles to name just a few. All machined from solid brass and polished to perfection just waiting for this day. Each section is carefully aligned and fitted into place. This is not the time to slip with the screwdriver! Red cloth is secured into the front facade for the time being. These cloth panels will also soon have hand painted floral decorations as the instrument did originally.

This ends my brief description of a typical restoration of a Frati barrel organ. There are many items we did not discuss in detail in this article such as the barrel restoration, key frame finger re-tipping, regulation or any of the various adjustments required to get a barrel organ to perform as it once did 100 years ago. These we will save for a later date. I do hope you enjoyed this Frati story and would certainly like to hear from you and hope you will share with me your favorite restoration ideas and how you solved some of the many problems encountered in all restoration of automated musical instruments.

Ron Schmuck is a mechanical music restorer who resides in Ontario, Canada. He frequently attends organ rally functions and recently, took time from his restoration work to document this interesting organ.