

## *Book It!* *A Summary of Mechanical Musical Instruments* *Operated by Book Music—Part I*

**Ron Bopp**

**B**ook-operated mechanical musical instruments are most fascinating to observe as the music media weaves its way into the key frame and the result, the anticipated music (**Figure 1**). The viewing public as well as the collector seems to enjoy watching this mechanical unfolding and the subsequent folding of the music used to produce the music.

Owning my 52-key Gebruder Bruder fair organ gave me a chance also to produce this same media, and that was an additional thrill for me, as well as others owning and enjoying a book-operated machine (**Figure 2**).

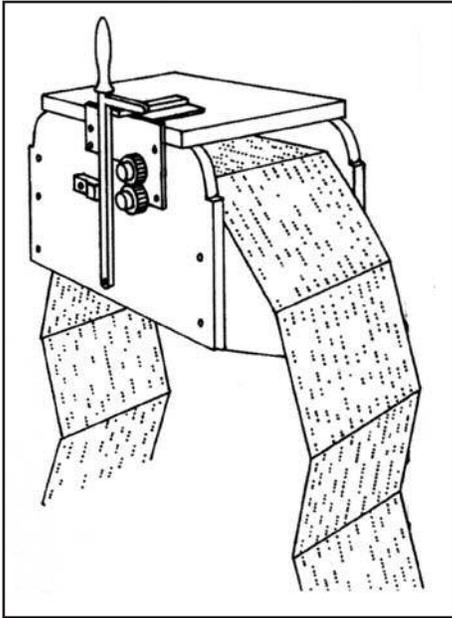


Figure 1. A line drawing of a cardboard book in an organ keyframe. Photo: Herbert Jutteman

Having owned several book-operated organs since 1983 I was initially under the incorrect assumption that only fair organs were book-operated. After studying other forms of instruments I found out how wrong I was. I have taken on the task to find out just how



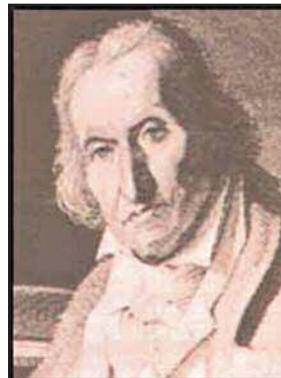
Figure 2. COAA member Bob Conant punching our cardboard books.

many instruments used the book method for their medium for music and this article is a review of a multitude of various categories of those that I have found. The following categories contain over 30 different mechanical musical instruments in which book music is incorporated: musical boxes, organettes, zithers, pianos, orchestrions and organs.

This article is not to be interpreted as a mechanical review of book-playing mechanism but rather as an overall look at the range of mechanical musical instruments that played folding cardboard (usually) books.

### **History**

Historical sources point to Joseph Jacquard's (**Figure 3 & 4**) mechanical loom as the beginning of the book-operated system, which the principal method of operation leads to the similar ones in the field of mechanical music. Joseph Marie Jacquard was born in 1752 in Lyon, France. In 1801 he invented the mechanical loom which incorporated a punched-card system which faithfully repeated the required operation without mistake. In his invention, it was the loom, which was operated by the punched cards. **Figure 5** details an interesting drawing of a worker making a set of punched cards.



Figures 3 & 4. Joseph Jacquard (above) and his book-operated loom (right).

Photo: Phil Ament, *Ideafinder*, Internet



As time progressed others followed suit, building on Jacquard's punch card idea. In 1830 Charles Babbage used the punch card to control an "Analytical Engine," and even later, Herman Hollerith developed the punched cards to help count the 1890 census. Thomas Watson, a manager of Hollerith's Tabulating Machine Corporation, formed his own company, International Business Machines (IBM), and this set the stage for wide-spread usage of this form of controlling and storing data until the late 1980's when computers replaced the once-dependable system.



Figure 5. Workers making Jacquard punched cards.  
Kopplin: “An Illustrated History of Computers,” Internet

What is this book-operated system that is being discussed in this article? A description by Eric Cockayne in his popular book, *The Fairground Organ*, is worthwhile repeating:

A cardboard music book consists of a long strip of folding cardboard on which music is scored either by punched-out rectangular slots of varying lengths, or by circular holes. The strip is made from two layers of cardboard, each layer consisting of a row of card board rectangles which have been creased down their centers. The two layers are glued together so that two adjacent edges of rectangles in the top layer lie over the central creases of the rectangles in the bottom layer. As the rectangles are creased, the strip can be folded quite easily, first one way and then the other in a zigzag fashion, to form a compact block, or book as it is called. The folds are sometimes reinforced with linen tape and the edges of the book are planed or smoothed to make sure it runs smoothly and accurately.

Common thinking among fair organ operators is that the cardboard system was invented for the mechanical organ in 1892 by Anselme Gavioli but in fact, it was introduced quite earlier by other mechanical music inventors. Another French inventor was Claude Relax Seytre who made perforated cardboard sheets to play the “Autopanphone” in 1842—this eventually failed. And a third Frenchman, Joseph Antoine Teste, patented the carton (book) system on July 16, 1861, to play the “Kartonium.”

Other early inventors of book-operated mechanical instruments include Thibouville-Lamy (the *Pianista Thibouville*) in 1884; Friedrich Ehrlich of Leipzig (piano) in 1885; and Jules Carpentier (the *Melotrope*) in 1887. Gavioli utilized the book-playing piano, the *Piano*

*Executant* in 1888. More discussion on these inventions will be found later in this article.

Why were so many interested in the book-operated system? Herbert Juttemann in his book “Waldkirch Street and Fairground Organs” noted the advantage of books over pinned barrels:

1. The tunes no longer were limited to the duration of a barrel revolution
2. There was no warp factor as there was with barrels [and later, books even proved superior to paper rolls on organs for the same reason]
3. Changing music was much easier than with barrels
4. New music was easier to obtain than with barrel music
5. Repinning a barrel required the entire organ had to go to the factory.

The introduction of book music also brought along the standardization of scales.

## Musical Boxes

Cylinder musical boxes, much like barrel organs, were limited to musical compositions that would fit on a cylinder, or later, the metal disc. Some attempts were made to have capacity for longer selections such as the Plerodienique cylinder box (it can play over six minutes at a time if needed) or the Sirion and Tannhauser disc musical boxes which incorporate a disc-shifting mechanism to accommodate somewhat lengthy tunes. These options must have had little success, however, as there are few surviving examples today. The folding book method, however, offered a chance for playing as long a tune as one would want and the following are examples of attempts at book-operated musical boxes.

### *Ariophon*

The *Ariophon* is a rare musical box that utilizes either a cardboard book or a continuous zinc sheet for its directional medium. **Figure 6** shows an illustration from the 1893 *Zeitschrift fur Instrumentenbau (Zeitschrift)* detailing a book-operated musical box. The box is of typical



Figure 6. The *Ariophon* as advertised in a 1893 issue of *Zeitschrift*.

shape for a disc-operated unit and of note is the absence of a middle guiding/propelling metal rail which is present in those books used in the *Libellion* music box described later in this article.

The *Ariophon* was more than likely invented by Wilhelm Alfred Seifert of Leipzig-Plagwitz in 1893. The box was manufactured by the Plagwitz Music Works, R.M.Polter, in Leipzig-Plagwitz. Four sizes were available; 42, 56, 72 and 104 teeth. Coulson Conn, in his excellent treatise on the *Ariophon*, “Bastard Disc Musical Boxes” (*Journal of Mechanical Music*, Autumn, 2004) noted that a report (from Hans Schmitz) the *Leipzig Fall Fair* of 1894 stated “The factory plans to replace the previously used cardboard books with metal books with light paper covering, as has already been done by the firm of Pietschmann.” Thus, earlier machines used the cardboard books and later ones used a zinc sheet.



Figure 7. An existing *Ariophon*, this one using a coiled zinc sheet. The folded books would have sat in the depression on the left side of the case.

Figure 7 shows an existing 56-note *Ariophon* photographed in the Mark Yaffe collection. Close examination reveals a coiled zinc sheet. The depression in which

the sheet is resting was used in earlier models to house the unplayed book as it was fed across the star wheels. A relief was incorporated into the lid of the case to allow playing while with the lid closed. Earlier boxes also had a slot on the edge of the case to allow playing with the book resting on a table. The boxes also contained guide rails to keep the music in correct position.

Conn’s article also noted that instead of the music sheet actually actuating the star wheel (and therefore causing wear and tear on the cardboard) it primarily kept the otherwise constantly rotating star wheel from turning until a slot presented itself, at which it was allowed to turn. The lengthy zinc music strip, however, presented problems for the box as it was prone to physical damage. This change from the folded cardboard book to the zinc strip may have been a reason why no more advertising or sales were noted after 1897.

### *Libellion*

By far, the *Libellion* music box was the most popular of the group of book-operated musical boxes. Patented by Dr. Friedrich Adolf Richter of Schwarzburger Strasse 56, Rudolstadt in Thuringia, Germany (Figure 8) these musical boxes were offered in sizes ranging from 42, 54, 84 and 100 notes. In his patent Dr. Richter notes:

My invention consists, first, in the arrangement of two toothed music-sheet-controlling wheels, one behind the other, in the same line, for the purpose of insuring a proper rectilinear motion of long and endless music-sheets, the latter being driven by the said wheels from the center of the line of notes.

Dr. Richter was perhaps more well-known more for his system of building blocks for children (making it possible to build detailed models of buildings) known and

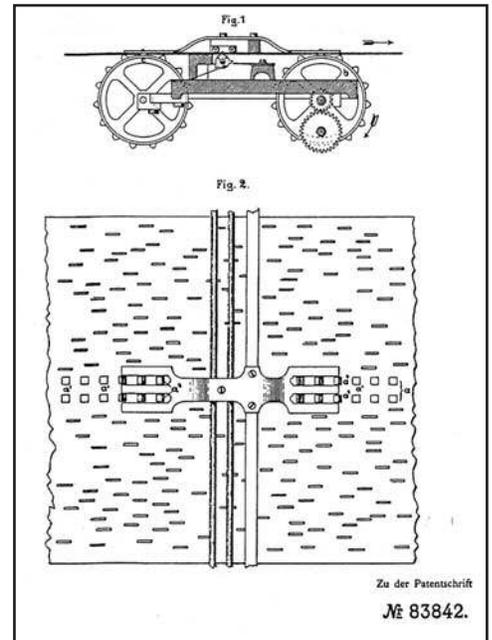


Figure 8. Richter tune sheet as seen in his patent. Photo: German Patent Office



Figure 9. A drawing from a 1903 catalog detailing the scope of the Libellion products.

sold as “Anchor Blocks.” Nevertheless the *Libellion* was awarded many medals from 1893 to 1900. A 1903 catalog (Figure 9) illustrates both a book-operated musical box (left) as well as a tall or grandfather clock (center). The grandfather clock was interesting in that it could play every hour a different piece of music. In addition the *Libellion* book system was incorporated into writing desks and tables.

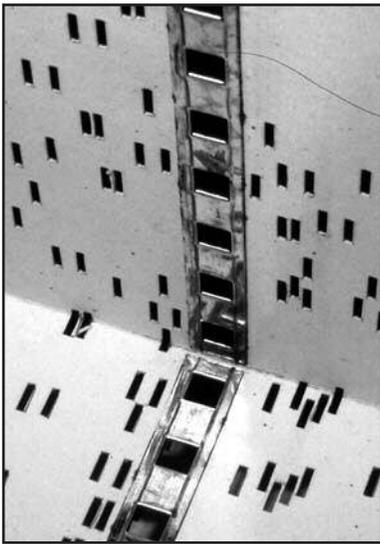


Figure 10. A close-up of a *Libellion* center drive strip on the cardboard book music.

Close inspection of what is currently available today (Figure 10) details what appears to be an advancement on Richter’s initial patent as the book. While still containing a center drive arrangement, it is now a continuous metal-reinforced strip for each page of the book rather than a series of holes as described in the patent. Figure 11 is a close-up of the reading mechanism to accept the book in Figure 10.



Figure 11. The *Libellion* tracker bar.

Patentirt in allen Staaten! **Libellion!** Grösste Neuheit!

Das Libellion ist das Neueste und Vollkommenste aller selbstspielenden mechanischen Musikwerke mit Stahlzungen und auswechselbaren Notenblättern. Letztere bestehen aus extra präparirtem unverwundlich zähem cartönlähnlichen Stoffe und legen sich beim Abspielen von selbst wieder in gefälliger Buchform zusammen.

Während auf die Stahlscheiben der Symphonien und Polyphons bekanntlich nur eine beschränkte Anzahl Takte, demnach nur ein kurzer Auszug der betz. Musikstücke gesetzt werden kann, ist es beim Libellion möglich, **beliebig lange Stücke** z. B. vollständige Walzer, Märsche, sogar ganze Opern in tadelloser Weise zu bringen.

Außerdem zeichnet sich das Libellion durch **Reinheit und Klangfülle der Töne**, sowie angenehme melodische Musik, vor allen anderen bis jetzt auf dem Markt erschienenen Musikwerken in hohem Grade aus.

Die Bauart und Ausstattung ist bei **großer Billigkeit** eine in jeder Beziehung durchaus solide und elegante. 1021

Figure 12. A Libellion advertisement appearing in the 1892 *Zeitschrift*.

The *Libellion* was advertised extensively in the *Zeitschrift* with Figure 12 appearing in an 1892 issue. Another cut advertising the *Libellion* is illustrated in Figure 13. This was No. 6 and depicted to play 64 notes. A close examination of the photo reveals a slight cut-out on the right and left side of the case—just enough room to allow the book to travel across with the lid closed.

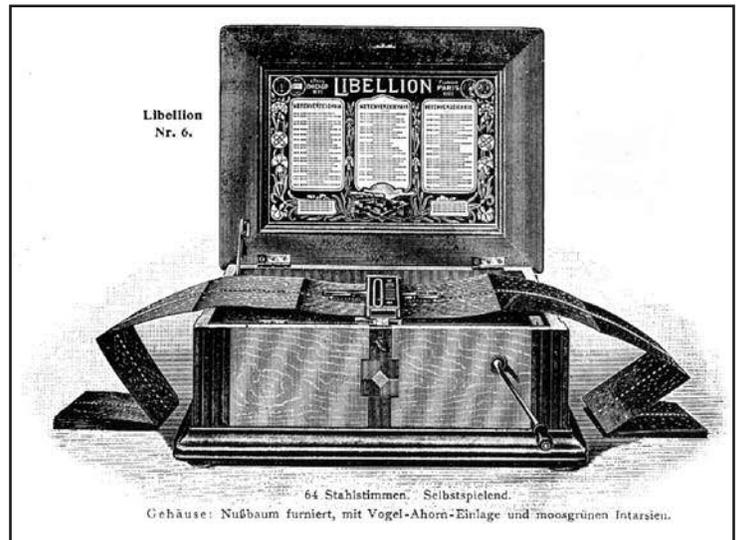


Figure 13. An artist’s drawing of a *Libellion*, No. 6.

Several collectors in this country proudly own *Libellion* musical boxes, Figure 14 is one such box in the Morris Museum, in Morristown, New Jersey (formerly of the collection of Murtogh Guinness). *Libellion* instruments are very quiet and have a delicate sound when played.



Figure 14. A *Libellion* musical box in the Morris Museum.

... continued from page 19

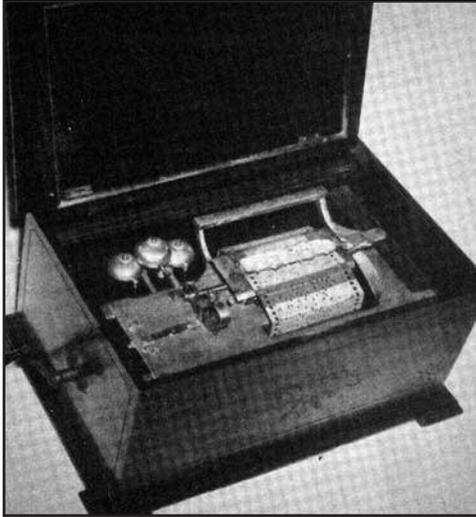


Figure 15  
The Roepke musical box as pictured in Bowers' *Encyclopedia*

### Roepke

Few examples exist of the Roepke music box. **Figure 15** illustrates a book-operated Roepke (from Bowers' *Encyclopedia of Automatic Musical instruments [Encyclopedia]*). Close inspection will show, that unlike the *Libellion*, it has two sets of drive holes, one on each side of the book. **Figure 16** is a patent drawing illustrating the two sets of drive holes. This feature not only would provide for the driving motion but also to keep the book correctly positioned while traveling.

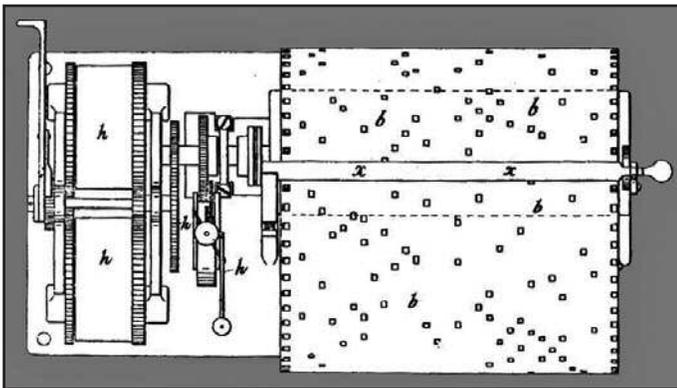


Figure 16. Roepke's musical box patent of 1890.

Photo: USPTO #443,114

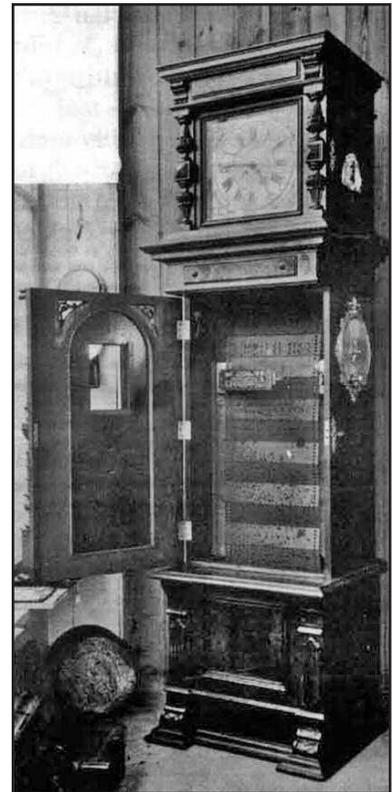
The Roepke musical box was made by Carl Albert Roepke of Salford, Manchester, England of parts manufactured in Germany. He had a patent of 1890 that promoted the plucking of a musical comb by means of moving cardboard. Roepke's patent as it relates to the book music reads as:

Instead, however, of operating this comb or the like, by means of a barrel format with spikes or projections, I operate such comb by means of a traveling band or sheet of perforated cardboard . . .

Bowers noted that several models were produced with at least two sizes (# of notes) of books. This mechanism has been installed in hall clocks as well (**Figure 17**). The books for these tall clocks are a large 14 inches wide and contain a 'catch' on the ends so they may be converted to a continuous piece of music.

Figure 17  
The Roepke Grandfather Clock.

Photo: Bowers' *Encyclopedia*



### Unikon

The Unikon book-operated musical box is quite small in relation to the *Ariophon* and *Libellion* (**Figure 18**). Utilizing 41 notes the book, again like the Roepke, has a hole on each side of the book which allows for the forward movement. The lid decal (**Figure 19**) proudly boasts (in three languages) that "Tunes of any



Figure 18. The Unikon book-operated musical box.

length and number can be played," obviously an attempt to promote this instrument over others that simply would play just a disc. Close inspection of a couple of original musical numbers (**Figure 20**) reveals that the Unikon offered their music in two lengths books, the lower one being over twice as wide as the upper. The reason for this is unclear.

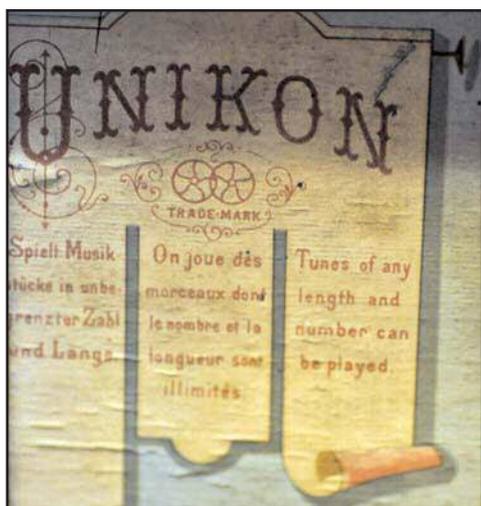


Figure 19  
Notation on the lid  
“Tunes of any  
length and number  
can be played.”

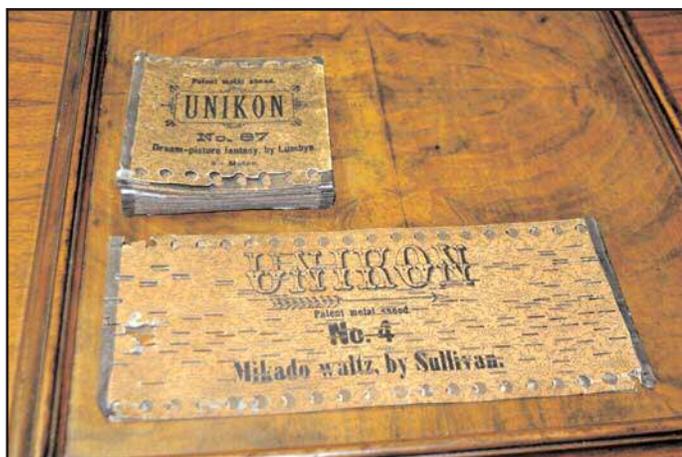


Figure 20. Two sizes (width-wise) of *Unikon* books.

## Organettes

Much like the music boxes, some manufacturers of organettes tried vainly to produce music longer than the normal machine would produce, one example being the fan-shaped cardboard disc used by the Ariston. The book-operation method would be an obvious answer for the small hand-cranked organette and as one would expect, there were a number of companies that provided such an item. I have listed in **Figure 21** a table of those organettes that utilized some form of book-operation.

Organettes using Book Music	
Arion	Arno
Ariston	Carillon
Gloria	Harmonietta
Manopan	Seraphine/ Ullmaniphone
Thibouville-Lamy	Victoria

Figure 21. A listing of those organettes using book music.

## Arion

The *Arion* organette (maker unknown) utilizes “18 harmonic tones.” It is seen only in a 1892 Holzweissig catalog (**Figure 22**).



Figure 22  
The *Arion Dreihorgel* as advertised in a 1892 Holzweissig catalog.

Photo: McElhone’s *The Organette Book*.

## Arno

The Massachusetts Organ Company produced many organettes, one of which was the *Organina*. **Figure 23** is a drawing of the interior of such an organ with what appears to be book-type music. The advertisement accompanying the photo stated that the instrument uses “paper as a valve” indicating the need for a sturdy material to activate the playing notes.

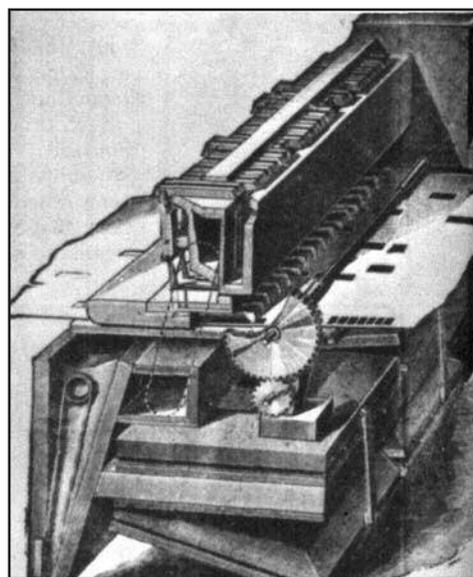


Figure 23. A drawing of an organ produced by the Massachusetts Organ Company.

Photo: Bowers’ *Encyclopedia*

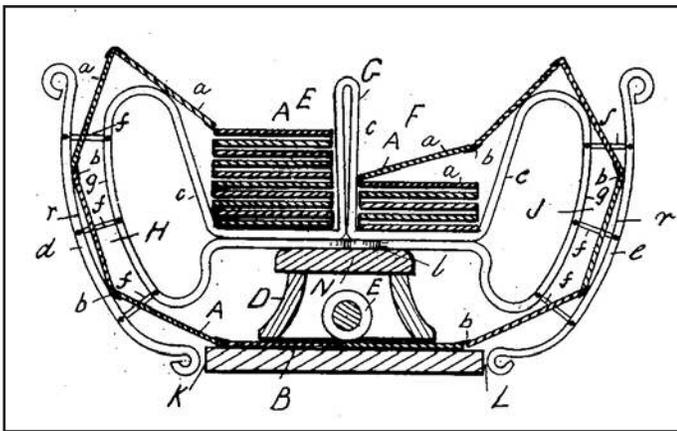


Figure 24. Arno's patent #266,411.

Photo: USPTO

In United States Patent and Trademark Office (USPTO) patent #266,411, granted 10/24/82 (Figure 24), Oliver H. Arno of Wilmington, MA stated:

This invention relates to key-board attachments for musical instruments—such as pianofortes, reed and pipe organs, and to mechanical musical instruments—such as the “organette” and “organina,” so called in the trade—and others which are arranged for the travel of a perforated music sheet through them, and thus to secure, as such sheet so travels, an operation of the mechanism and sounding devices composing them in a manner to play or produce mechanically from the musical instruments, the tune, air, chord, or other combination of sounds represented by the arrangement of the perforations in the music sheet. These perforated music sheets in some instances are adapted to fold forward and backward in layers or folds of equal length, and it is to the use of such perforated music sheets in said attachments and musical instruments that this invention pertains.

In the drawings, “A” represents a perforated music sheet adapted in any suitable manner to be folded forward and backward in folds or layers, one upon the other—as, for instance, by making it in sectional pieces “a” of equal length, connected together by flexible hinging pieces “b”, attached alternately at the dividing lines of the separate sections to opposite sides of the sheet.

### Ariston

*Aristons* were manufactured by Paul Ehrlich of Leipzig, Germany. They were made in three configurations, the typical round cardboard disc; the fan-shaped disc which would expand as needed (mentioned previously) and the cardboard book. The latter two are seen in Figure 25. They came in 24 and 36-note configurations. Most *Aristons* played the circular discs but some models were configured to play both discs as well as the book music.

The 24-note *Excelsior* used a fan disc which would obtain more music of a round disc—seen at the bottom of Figure 25.

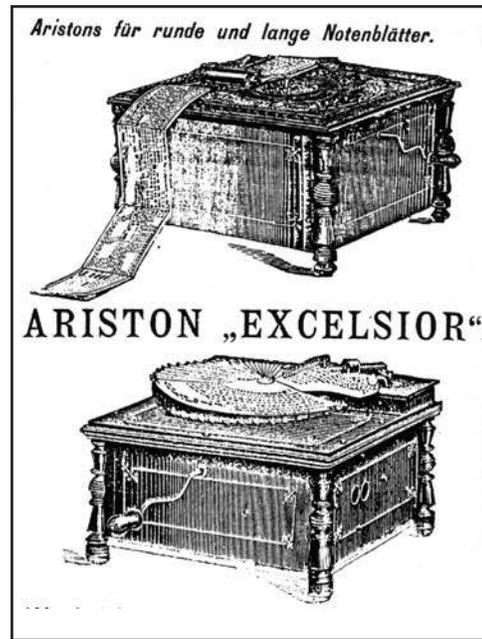


Figure 25. The *Ariston's* book-operated and fan disk organettes.

Photo: McElhone's *The Organette Book*

### Carillon

The Carillon's *Drehorgel mit Glockenspiel* organette came in two sizes: 30-note and 60-note. One of the differences was the number of bells in each unit; the 30-note had 13 bells and the 60-note had 18 bells. It was sold by the Holzweissig firm (Figure 26).



Figure 26. The *Carillon* organette.

Photo: McElhone's *The Organette Book*



Figure 27. The *Gloria* organette.

Photo: McElhone's *The Organette Book*

**Gloria**

The *Gloria* was thought to be a small and inexpensive version of the *Victoria* (see below). It was a 16-note machine and was advertised in the 1892 Holzweissig catalog (Figure 27).



Figure 28. The Harmonietta organette.  
Photo: McElhone's *The Organette Book*

**Harmonietta**

The *Harmonietta* organette was another small unit, utilizing a 28-note book. (Figure 28). This musical machine was marketed by the Ernst Holzweissig Nachf Company which began in 1872. The organette was described as a “mechanical barrel instrument” which played card music sheets via endless loops or band as well as in a folded book form. It looked like a miniature player piano.



Figure 29. The *Manopan* with cardboard book in place.  
Photo: Walter Moore

**Manopan**

The *Manopan* organette was extremely popular in Europe from the 1880s until the 1920s. It was manufactured by the Euphonika Musikwerke of Leipzig Germany. Many used endless cardboard strips but some were operated by the cardboard book. The organette in Figure 29 illustrates a typical book-operated *Manopan*. It was recently restored by Walter Moore and operates with 39 notes. Each note is double-reeded for a full sound.

*Manopan's* initially were produced by Charles F. Pietschmann & Son before being taken over by the Euphonika Musikwerke (1895-1910). In Figure 30 Pietschmann's patent (USPTO #363,480) details the use of cardboard books (granted 5/24/87) and notes that:

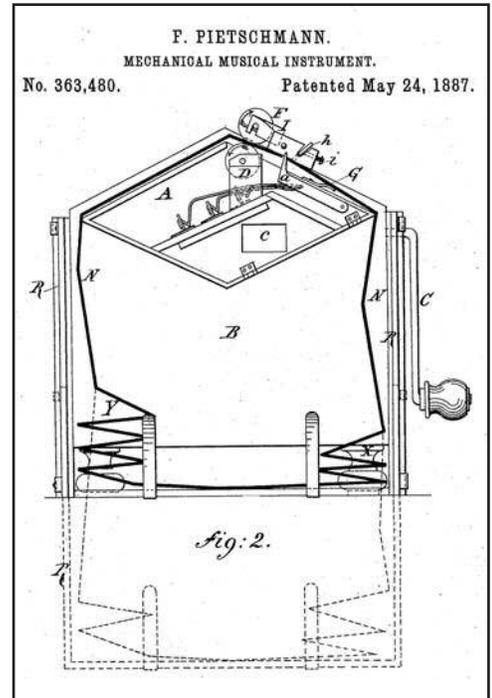


Figure 30. Pietschmann's patent #363,480.  
Photo: USPTO

In this instrument, the perforated sheet producing the notes, in lieu of being circular, which limits the number of bars that can be played, is folded together like the leaves of a book and hence the length is unlimited and pieces of music of any length can be played.

In order to easily manufacture music sheets of great length, the said sheets are formed, as before mentioned, of several parts or members, which are connected together end to end by means of strips of parchment, pig's leather, or any other thin material of the same nature.



25 Figure 31. A *Manopan* advertisement of 1894.  
Photo: Zeitschrift



Figure 32. The *Motor-Manopan* advertised in 1894.  
Photo: Zeitschrift

Figure 31 shows the lineup of *Manopan* machines in 1894 (advertised in the *Zeitschrift*). Concomitant with this ad was another of the same year (Figure 32) detailing a larger, upright version of the book-operated *Manopan* called the *Motor-Manopan*. This operated off a hot-air motor and must have been the pinnacle of the firm's accomplishments. *Manopans* are very desirable today and always found in the organette specialist's collection.

### Seraphine and Ullmaniphone

The *Seraphine* (and *Ullmaniphone*) organettes (also patented by Charles Pietschmann) were offered around the turn-of-the-century. The units were of the 18-note range and played either endless bands or book music (Figure 33). The *Seraphine* was sold in Germany and the *Ullmaniphone* was sold in France. Advertisement noted "Hand-organ with crank with 18 accordion tones."



Figure 33. Pietschmann's *Ullmaniphone*.  
Photo: McElhone's *The Organette Book*

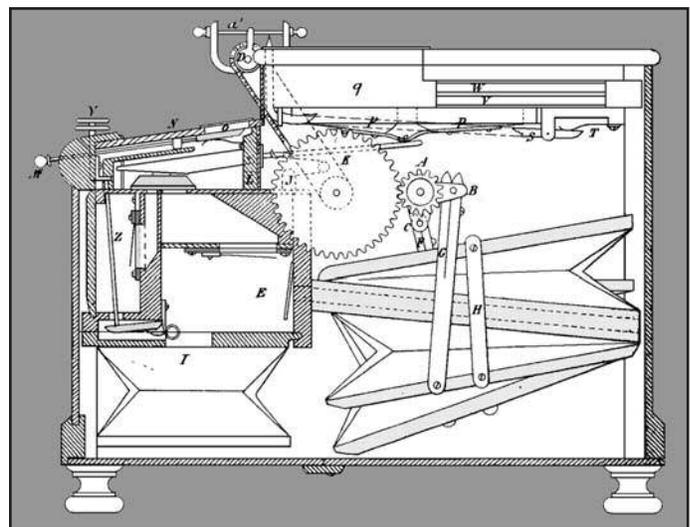


Figure 34. Thibouville's *Coelophone* drawing.  
Photo: USPTO

### Thibouville

Thibouville organettes were the creations of Jerome Thibouville, Paris, France. Several models were made including the 16-note *Serinette Parisienne*, the 24-note *Organina* and 33 to 40-note *Coelophone*. The latter was supposedly the largest organette made in France and was invented by Claude Gavioli. It was also quite loud and allowed for use outdoors. Figure 34 shows a patent drawing for the 40-note *Coelophone*.

Of importance to this article in this patent is the following comment by Gavioli:

I prefer to make the perforated paper band of short lengths or divisions of card-board, which are folded back and forth one upon another, instead of being rolled upon a roller. In order to insure the proper folding up of the paper band as it emerges from the organ, I provide a folder. This consists simply of a wire frame pivoted to the end of the case above the opening and arranged to fall upon and be lifted by the issuing paper band. The slight weight of this frame is sufficient to force the perforated paper band to bend at the folds or creases.



Figure 35. The Thibouville *Organina 1*.  
Photo: Todd Augsberger

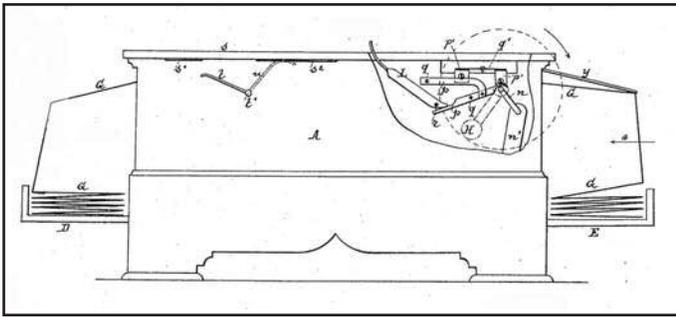


Figure 36. The patent drawing for the *Organina Thibouville*.

Photo: USPTO

Advertisement for the *Organina Thibouville* (Figures 35 & 36) noted that it “possesses the tone of the harmonium and is played mechanically by means of perforated cardboard.” It measured 22 inches by 11 inches in height by 13 inches in depth. The advertising also noted the instrument “bearing the name of its inventor Jerome Thibouville is, as you may well say so, the most perfect of all instruments with a crank, turned up to this day.”

Figure 38 is an interesting trade card comparing the Thibouville instruments. The prices (in Francs) show the relationship of each organette. As noted, each came with 18 meters of music.

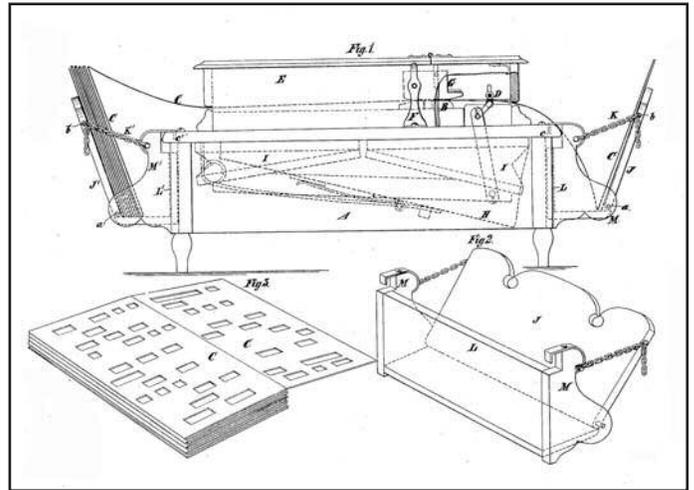


Figure 39. Morgan's patent line drawing of his proposed organette.

Photo: USPTO

### Tournaphone

In addition to its own marketing efforts the *Tournaphone* was also sold by the Massachusetts Organ Company. Relating to this is the fact that James Morgan of Brooklyn, NY was the assignor to the Tournaphone Music Company of Worchester, MA. According to Kevin McElhone there are no existing examples of a book-operated *Tournaphone* but . . . in USPTO patent #263,295, dated August, 1882 (Figure 39) Mr. Morgan stated:

I intend generally to employ a music sheet which is so constructed that it can be folded lengthwise, and to so dispose the receiving pocket that the music sheet, after leaving the feed rollers, will, on striking it, be automatically fold up. I may employ a suitably inclined board alone to accomplish the desired result.

The music sheet shown consist of paper creased so that it can readily folded lengthwise into compact form; but it may be composed of a number of cards or tablets united by flexible joints.

### Victoria

The *Victoria* organette was made by H. Peters and Co. of Leipzig, Germany (Figure 40). It was marketed in the early 1890s. An 1892 German advertisement (*Zeitschrift*) refers to them as “Victoria-Drehorgel” playing

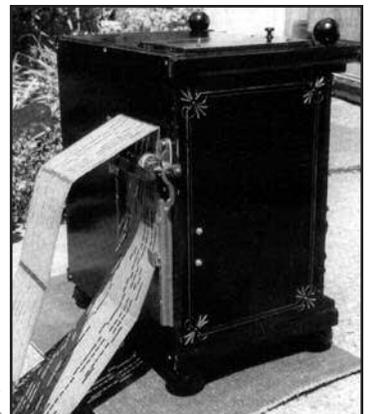


Figure 40. The *Victoria* organette.

Photo: McElhone's *The Organette Book*

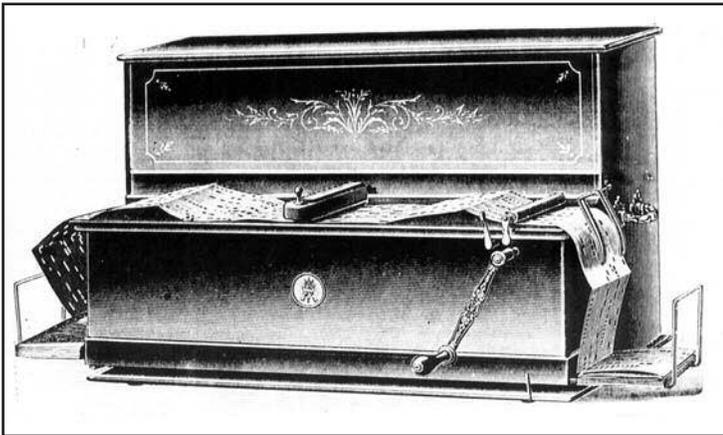


Figure 37. An artist's rendering of the 37-note *Coelophone Orchestre*.

Photo: Dausien catalog reproduction

The patent for the *Coelophone Orchestre* was captured by Claude Gavioli. Figure 37 is an artist drawing of the *Coelophone Orchestre*. Again the 1901 Thibouville catalog was quite generous in its flowery description by stating: “The volume of sound is powerful enough for 60 to 80 people to dance to.”

<p><b>J. THIBOUVILLE-LAMY &amp; C<sup>ie</sup></b>                  Manufacture d'instruments de Musique                  Cartes Harmoniques - Rhéographes                  58, 68<sup>bis</sup>, Rue Réaumur - PARIS</p>	
<p><b>INSTRUMENTS A MANIVELLE</b></p>	
Organina Thibouville, avec 18 mètres de musique avec caisse d'emballage. . . . .	83 »
Musique d'organina. . . . . Le mètre	0 60
Organina Céleste, grand modèle faisani, avec 18 mètres de musique, avec caisse d'emballage. . . . .	224 »
Musique d'organina Céleste. Le mètre	1 35
Coelophone Orchestre, très sonore avec 18 mètres de musique, avec emballage. . . . .	260 »
Musique de Coelophone. . . . . Le mètre	1 15
Organophone, très harmonieux, avec 18 mètres de musique. . . . .	250 »
Musique organophone. . . . . Le mètre	1 50
Pianista nouveau modèle. . . . .	660 »
Musique de pianista. . . . . Le mètre.	1 50
<p>Envoi franco du Catalogue général</p>	

Figure 35. A Thibouville-Lamy trade card.

Photo: Ralph Heintz archives



Figure 41. The *Victoria* organette in a 1892 edition of the *Zeitschrift*. Photo: *Zeitschrift*

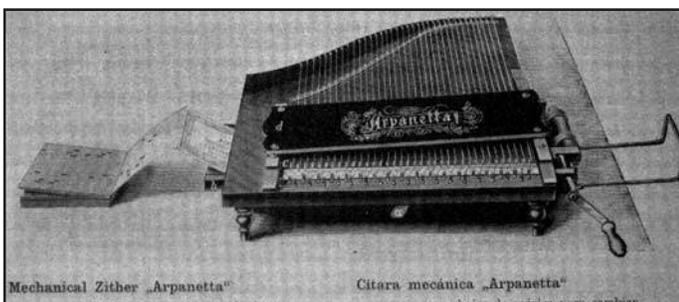
cardboard music of 24 or 36 notes (Figure 41). There were five different models, all in an upright rectangular box-like construction. Bowers in his *Encyclopedia* noted that they were made in Germany for the British market.

### Zithers

The Arpanetta *Mechanical Zither* was marketed around the turn of the 20th century, using folded cardboard books (Figure 42). According to Dave Bowers only a few were sold and the instrument is somewhat related to the *Volks Klaver*, a similar unit that uses a heavy paper strip instead of books. Figure 43 is an 1895 advertisement in *Zeitschrift* detailing the points of the zither.

Figure 43 (left): An 1895 advertisement. Photo: *Zeitschrift*

Figure 42 (below): The Arpanetta *Mechanical Zither*. Photo: Bowers' *Encyclopedia*



### Pianos

The use of book-playing pianos was somewhat prevalent in the late 1880s as the barrel-operated pianos were clumsy and suffered from the same problems as did other mechanical instruments with a fixed medium for controlling the musical notes; also the widely-used piano roll had yet to be developed. Correspondence with Hans van Oost (Holland) has revealed that probably the first book-operated piano was the *Piano Mecanique*, invented by a Jean Louis Nestor Fourneaux, France. It had 52 piano notes and used cardboard book music. His patent was bought by Anselme Gavioli in 1885 and used to produce the *Pianista Gavioli*. More on that below.

### Ehrlich

The Paul Ehrlich Company's *Mechanisches Clavier* (Ehrlich's Musikwerke – Leipzig, Germany) used a book system where the book would transverse the reading mechanism midway on the front of the piano (Figure 44). Interesting is that this mechanical piano is very similar to the following unit by the Leipsig company. No examples are known to exist. This advertisement appeared in an 1892 *Zeitschrift* issue.



Figure 44. The Ehrlich book-operated piano as advertised in 1892. Photo: *Zeitschrift*

### Leipzig

Leipzig's *Excelsior Piano*, (Leipzig Musikwerke, Leipzig, Germany) as noted in the preceding paragraph, is very similar to the *Mechanisches Clavier* noted previously (Figure 45). Again, the traveling book moves down the front of the piano. An ad of the day noted "Playable like an ordinary piano and besides mechanically, with handle, by means of interchangeable cardboard tunes."



Figure 45. Leipzig's *Excelsior Piano*.

Photo: Zeitschrift

### Gavioli

Besides the reputation of providing the outdoor entertainment arena with fine fair organs Gavioli was known also for its pianos and piano players (Figure 46). Eluded to above in the introduction to book-operated pianos Anselme Gavioli had bought the patent for his mechanical piano with expression, the *Piano Exécuteur* (Figure 47) from A.M. Fourneaux (French patent #155,051, 1883). Comments in the patent specifically relating to the use of cardboard books sound like a “poster child” for the use of book material:

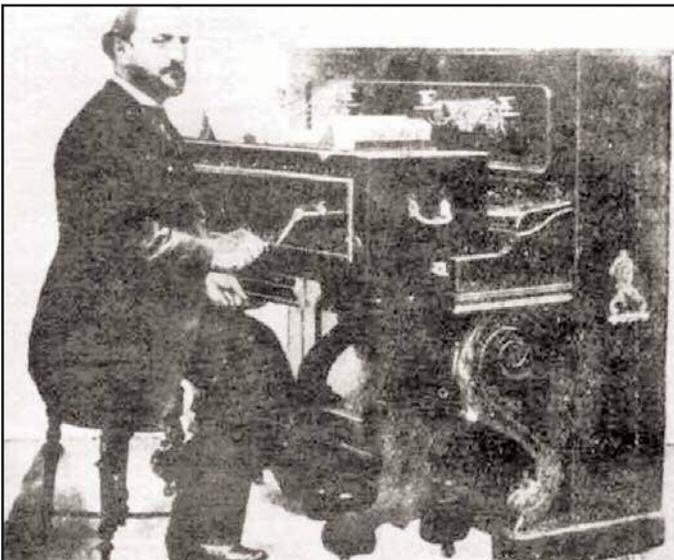


Figure 46. Anselme Gavioli cranking a *Pianista Gaviola*.

Photo: 1973 *Bulletin*, Musical Box Society International

Finally, the use of perforated cardboard—as a means for musical reproduction—is infinitely better than the planchettes and barrels generally used in mechanical pianos until now, since both means can only be used with the piano by using a fixed length for music, or their use results in a bad striking of the hammers; moreover, they are expensive, hard to handle, and especially the barrels take up too much space, which makes it difficult to have a repertoire more or less complete of music to be performed.

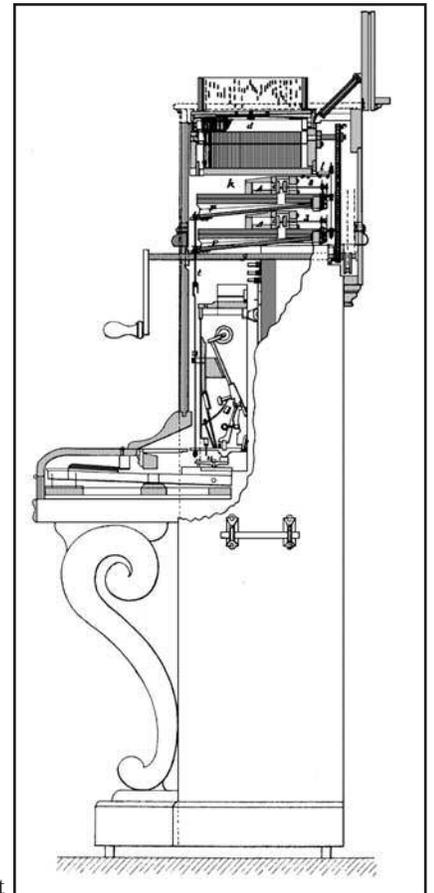


Figure 47. A French patent drawing (#155,051) of the *Piano Exécuteur*.

Photo: Hans van Oost

Figure 48 depicts the *Piano Exécuteur* as seen in a vintage advertising piece. The book and playing mechanism sit on top of the actual piano. The handle for passing the music through the key frame is below the keyboard.

Figure 49 shows another *Piano Exécuteur* but without the keyboard and with the mechanism sitting in the midline of the piano. A similar such machine was offered by G.W. MacKinnon in his 1971 catalog.



Figure 48. The *Piano Exécuteur* with its book-playing mechanism located at the top of the piano.

Photo: Fred Dahlinger



Figure 49. The keyboardless *Piano Exécutant*.  
Photo: Fred Dahlinger

The *Piano Exécutant* later became the basis for Gavioli's *Piano Quartet*. "Quartet" was to mean the four voices of the piano, violin, alto-violin and cello. Fred Dahlinger has extensively researched and covered the *Piano Quartet* in his article "Gavioli's Piano-Quartet and Related Carousel Organs" which appeared in issue #39 of the *Carousel Organ*. The *Piano-Quartet* appeared after 1906 and played 80 keys (Figure 50 ).



Figure 50. The *Piano-Quartet* orchestrion in the Sanfilippo collection.

## Hupfeld

The Hupfeld book-playing piano (Figure 51) was a unique style being tall instead of in the typical piano shape. The music book would weave its way through the key frame (seen at the middle of the case) up to the top and then back down to pile up for the next playing. Inspection of the photograph reveals no pneumatic chest in which to power the striking force for the pianos meaning this was solely a mechanical piano, and probably a quiet one at that. It wouldn't have had competition from the motor, however as it was a hot-air engine/alcohol burner arrangement.

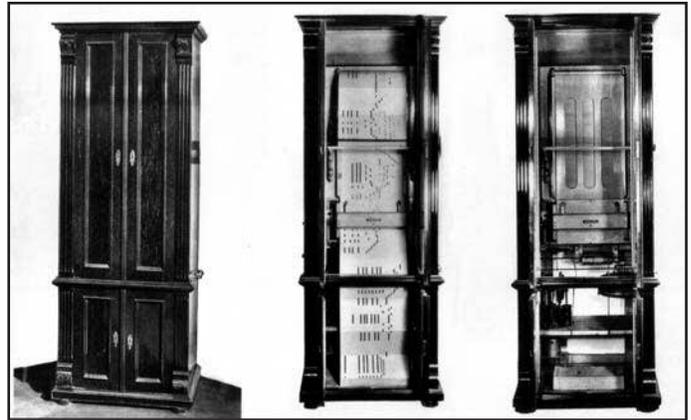


Figure 51. The Hupfeld book-playing piano.  
Photo: Ord-Hume's *Automatic Pianos*

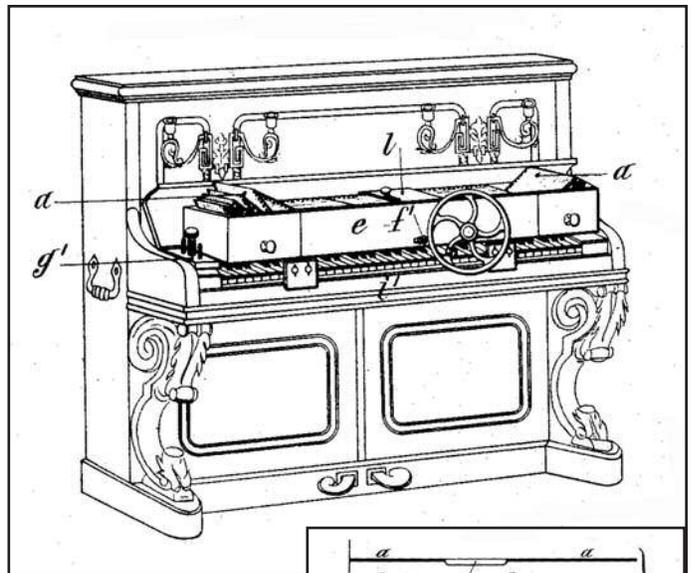


Figure 52 (above).  
Le Dan's key-top piano player with hinged metal books.  
Photo: USPTO

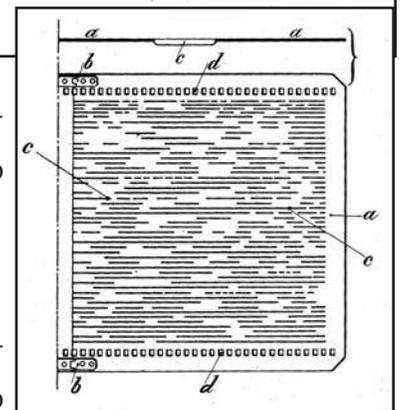


Figure 53 (right).  
A patent drawing of the actual plate (or musical cards).  
Photo: USPTO

## Le Dan

In 1887 Gustave Paul Le Dan (Paris, France) patented (USPTO 419,690; granted 1890) his key-top piano player (**Figure 52**). It worked by way of a series of metal plates with projections which engaged levers connected to the keys. Le Dan's folding book is somewhat different in that it is made of steel and has projections impressed on it instead of perforations (**Figure 53**). This combination sort of represents a marriage of the book-operation and musical box discs. His patent notes:

My invention relates to an apparatus for playing mechanically upon the piano or other key-board musical instrument; and it consists, essentially, in mechanism whereby the keys are depressed in proper order by tracker pins carried by levers actuated directly by the passage of the cards representing the piece to be played.

The music cards, which are connected together by hinges are made of steel plates stamped up or embossed in such manner as to form projections of a length depending on the value of the notes they represent. The cards are also provided at either side with a roll of perforations forming a rack in which gear the teeth of the wheels by which the cards are moved along.

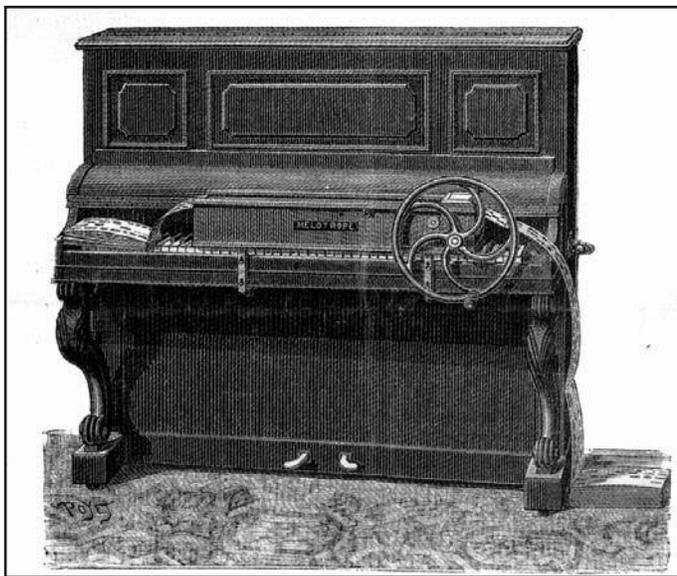


Figure 54. A drawing of the *Melotrope* keyboard top player unit.  
Photo: Ord-Hume, *Automatic Pianos*

## Melotrope

Jules Carpentier (France) invented the *Melotrope* in 1887 (**Figure 54**). This was a hand-cranked mechanism placed on the keyboard of the piano. It had 37 notes. The book was held down by a pressure roller—when the slot passed through a finger lifted up into a grooved pressure roller—each lever was attached to a mechanism via a spring-loaded plunger which pushed down on the piano key. **Figure 55** is of an existent *Melotrope* attached to a sophisticated German café piano, the *Weber Unika*. The

position of the books and the hand-crank relay a sense of proportion to the unit being used.

The *Melotrope* was also available in a standard 65-note push-up player but was fitted with a roll instead of being book-operated.



Figure 55. A *melotrope* playing a *Weber Unika*.

## Piano Melodico

Giovanni Racca of Bologna, Italy manufactured and sold many *Piano Melodico*'s. A complete discussion of the *Piano Melodico* system and all the instruments may be found in a previous issue of the *Carousel Organ* ("Piano Melodico—A Family of Mechanical Musical Instruments," Christian Greinacher, Issue No. 14, January, 2003). He, along with a German, Wilhelm Späthe (USPTO patent # 457,445; dated August 1891), designed and produced many models (**Figure 56**).

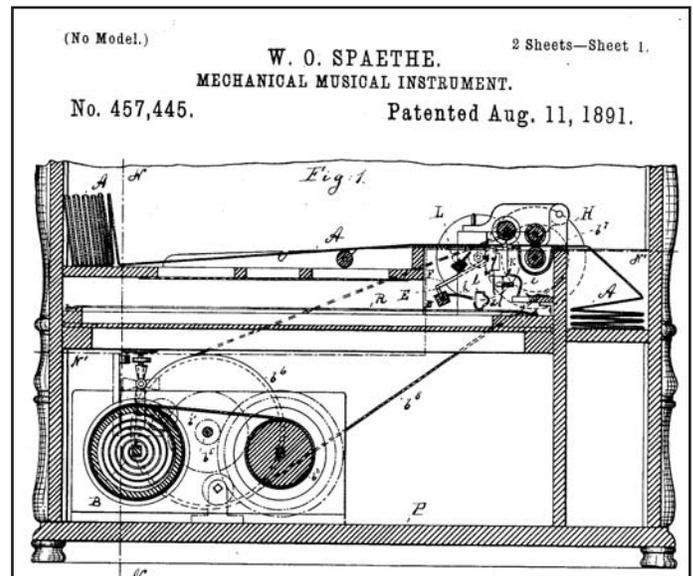


Figure 56. Wilhelm Späthe's patent patent which lead to the *Piano Melodico*.  
Photo: USPTO

Because of the design it can sound like a piano (short notes) or a mandolin (sustained notes) as the hammers are constantly moving. **Figure 57** shows a smaller model with 30 notes. The books came in 30, 48 and 73-note configurations.



Figure 57. An illustration of the *Piano Melodico*.  
Photo: Wurlitzer, *Music Boxes of 1898*

Figure 58 (right). An advertisement for the piano-shaped 73-note *Piano Melodico*.

Figure 59 (below). Jens Carlson playing a 73-note instrument in his private collection (1989).



Figure 61 (above). An English printed ad for the *Piano Orchestra*.  
 Photo: Wurlitzer: *Music Boxes of 1898*

Figure 62 (below). A tabletop *Piano-Orchestra-Automat* in the Museum Mechanischer Musikinstrumente, Bruchsal, Germany.

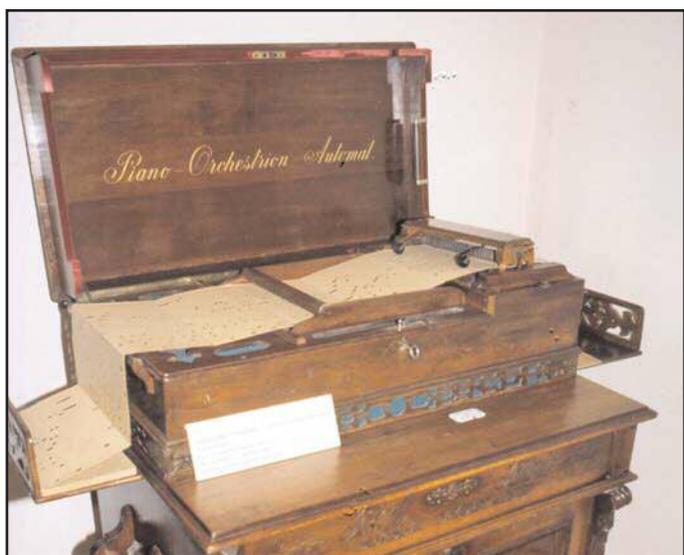


Figure 58 is an advertisement for the larger, 73-note *Piano Melodico*. It is this model that seems to be most encountered today. Figure 59 details an existing 73-note model being hand cranked by Jens Carlson in his former museum in Braunschweig, Germany.

A rare advertising piece for early book-operated machines is this *Piano Melodico* promotional card, reprinted by *The Music Box*, Volume 6, #4 (Figure 60).



Figure 60. An advertisement for the 73-note *Piano Melodico*.  
 Photo: Musical Box Society of Great Britain's *The Music Box*

**Piano Orchestra**

The Piano Orchestras were variants of the *Piano Melodico*, designed for home use (Figure 61). They were made by Wilhelm Späthe, Gera, Germany. Späthe had obtained a license from Giovanni Racca to build instruments based on the Melodico but differing in mechanics and operated by various methods (hand, spring, air, electric motor).

They were of the 30-note variety (usually, however some were 48 and 73 notes) and all used cardboard books. These consisted of a enclosed table (usually with a hot air motor in the base) and the instrument on top. Several examples are in collections in Europe (Figure 62). The cases are quite elegant and detailed. The music is produced by continually vibrating hammers. Of note is that the book music was made of linen and covered with leatherette. Figure 61 shows an English-written advertisement—note the hot air motor in the base of the cabinet.



Figure 63. The *Polyphon-Rossini* as advertised in 1903.

Photo: *Zeitschrift*

### Polyphon

An interesting addition to book-operated pianos is the *Polyphon-Rossini* which was advertised in the 1903 *Zeitschrift*. (Figure 63) It was a mechanical self-playing piano. From the size of the book in the illustration it would have to have been a clumsy mechanism and probably not reliable. Likewise, the amount of volume would have had to been minimal since this was mechanical, not pneumatic. No examples are known to exist and none may have ever been produced.



Figure 64. The *Pianista Thibouville*.

Photo: Ord-Hume, *Automatic Pianos*

### Thibouville

Known for their book-operated organettes the Thibouville-Lamy firm also produced a push-up piano player titled *Pianista Thibouville*. Figure 64 documents

such an instrument in the 1903 Jerome Thibouville-Lamy and Company catalog. Description of use includes the following:

Perforated cardboard is used with the pianist, the perforations represent exactly the notes of the piece of music which is to be performed. This cardboard is placed on the left side of the apparatus, each tune being bound as in a book, and drawn along by turning of the handle and refolded into a book again, after having met the mechanism destined to put into motion the keys which are to play the tune.

Figure 65 depicts an intact *Pianista Thibouville* in the mechanical musical museum at Bruchshal, Germany. This is a 54 note piano player and uses a double valve system.



Figure 65. A cabinet style *Pianista Thibouville*.

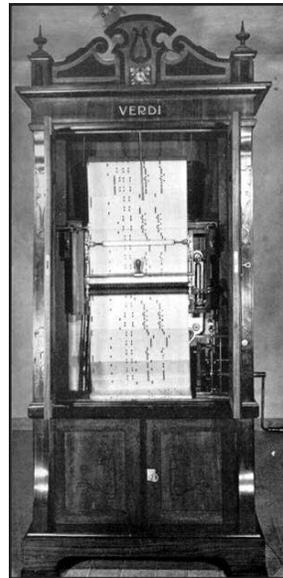


Figure 66. The *Cabinet melodic Piano*.

Photo: Marino Marini Catalog.

### Verdi

The *Verdi Cabinet Melodic Piano* is similar in size and shape to the Hupfeld piano discussed previously (Figure 66). A description from the catalog of Marino Marini states:

The melodic piano is a unique instrument of its kind, and has a sweet, delicate sound which resembles a mandolin. Its mechanism consists of a set of spring levers that, when lowering, check the continuous movement of the hammer. The program is on folded cardboard.

This is the end of Part I. Part II will continue in issue #47 of the *Carousel Organ* with the discussion of orchestrions and organs.

## ***Book It!*** ***A Summary of Mechanical Musical Instruments*** ***Operated by Book Music***

### **Part II**

**Ron Bopp**

#### **Orchestrions**

Increasing in size of instruments that utilized book music I will now discuss the orchestrions, instruments which usually had several instruments incorporated within and usually of quite large size. Larger instruments meant larger books and that is the case with the following machines.



Figure 67. The *Concert Orchestrion* built by Gavioli.

Photo: Ron Schmuck

#### **Gavioli**

While known primarily for its organs, the Gavioli firm made other instruments that featured the widely-known and much-appreciated book-operated system that

Anselme Gavioli invented. More on that patent and application later in this article. Two Gavioli-produced orchestrions existing today are the *Piano-Quartet* and the one-of-a-kind Gavioli *Concert Orchestrion* which Gavioli and Cie had produced in 1898 (**Figure 67**). The *Piano-Quartet* was discussed above with its predecessor, the *Piano-Executant*.

The *Concert Orchestrion* was the first of 13 such instruments to be built (imitating and competing with large Welte orchestrions) but after it was completed the Gavioli firm turned its production to the more profitable fair organs and the smaller, compact *Piano-Executant/Piano-Quartet* line of instruments.

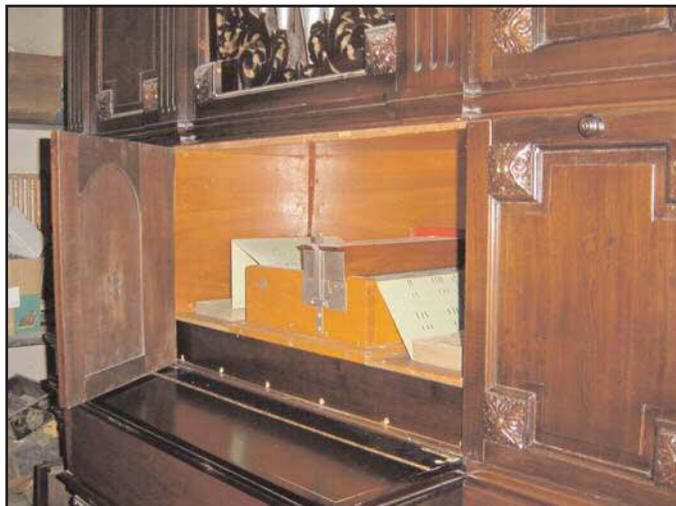


Figure 68. Upon opening the doors above the keyboard the keyframe and book can be seen.

Photo: Ron Schmuck

This book-operated orchestrion utilizes 90-keys and has 252 pipes. It has a keyboard with 11 stops, much like a harmonium but has a fairground organ pipe layout. The key frame (**Figure 68**) is typical of a Gavioli organ and sits above the keyboard of the harmonium.

The provenance of this one-of-a-kind machine starts with the possibility that it was a demonstrator orchestrion. It was shipped to Italy but returned to France before WW II. It came into the collection of the late Rick Cooley after 1999 where it is today.



Figure 69. An 84-key Mortier café organ (a.k.a. orchestration), previously in the collection of the late Vince Aveni.

### Mortier

Theofil Mortier, besides making his well-known dance organs, also produced a café organ which was more refined in appearance (**Figure 69**). Known as orchestri- ons (they did not contain a piano, however) they were not as suitable for dance hall use. These large organs (organ and traps only) were found in more ‘refined’ places such as hotel lobbies and even the homes of the wealthy.

Early models were often produced with natural wood facades with art glass figures as seen in this example. Most were 68, 84 or 92 keys—this example is of the 84- key configuration.



Figure 70. The keyframe of the Mortier café organ.

**Figure 70** shows a book in operation in this Mortier café organ owned by the late Vince Aveni. Often the key frame was located on the side of the chassis such as seen here. This would allow for the instrument to be pushed against the wall, something necessary for the location in which they operated.

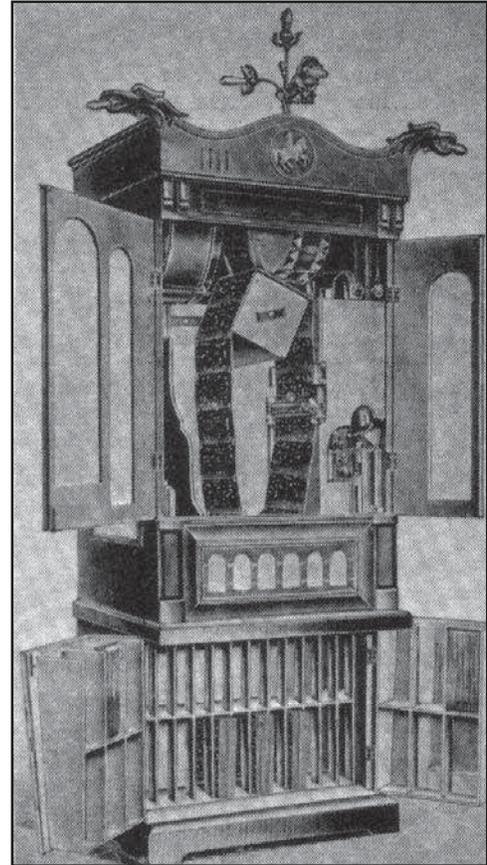


Figure 71. The SOM's *Trio, Model B* orchestration using a 76-key cardboard book.

Photo: Bowers' *Encyclopedia*

### Sächsische Orchester-Musikwerke

The Sächsische Orchester-Musikwerke (SOM) of Leipzig-Wurzen, Germany produced a series of orchestri- ons that used aluminum folding books. The *Trio, Model B* (**Figure 71**) is one of several produced by the firm. According to Bowers in his *Encyclopedia* the instruments “provided string music for concert and dancing purposes.” No piano is present but there is a “piano effect” (ham- mers hitting strings?) as well as several ranks of pipes and traps. The *Trio* instrument used a 76-key music book. The cases were tall at nearly nine feet.

### Weber

Gebrüder Weber of Waldkirch made *Die Automatische Capelle*, an animated (five figures) orchestration that operated with book music. It was one of the first orchestri- ons to use cardboard books. While clas-



Figure 72. The Gebr. Weber *Die Automatische Capelle* as seen in the Elztalmuseum in Waldkirch, Germany.

sified as an orchestrion it is a pure organ, containing 182 pipes. Utilizing 75 keys the organ actually played 54 notes—seven of the remaining keys were for actuating the movements of the five figures. The orchestrion also had one key for a revolver (one of five percussion effects) which operated at the end of a book (this effect was used most often in *Schlachtenpotpourri*, a musical selection that ended with a composition imitating a battle).

Figure 72 pictures this one-of-a-kind Weber orchestrion in place at the Elztalmuseum, Waldkirch, Germany. Restored in 1996 it plays as intended when manufactured at the turn-of-the-century.

## Organs

The use of the cardboard book on fair and street organs is well-known and well-documented by most of the readers of this article—therefore every make of organ that utilizes this method will not be listed.

Anselme Gavioli's (Paris, France) invention of 1892 and his patent (French # 250,689) define, however, the moment and the soon-to-occur change in the way that fair organs would operate. It would make the pinned barrel, with its limitations in repertoire (because of length), obsolete. Figure 73 is of that patent. Mr. Gavioli begins by stating how he manufactures the book [abridged for easier reading]:

We take a strip of cardboard . . . we cut off a strip at a distance equal to the width of the page—and then we obtain a double page . . . now we fold the single pages onto one another . . . we follow the same procedure to create an indefinite number of double pages . . . we stack the pages while alternating the hinges . . . we glue together the successive sides of the pages touching each other . . . having glued together and stacked the desired number of double pages—there remain two single pages of a single layer of cardboard: one at the top and one at the bottom of the pile—these are cut off and we now obtain the final book . . . the pages of this book all have a double layer of cardboard and are stacked like the bellows of an accordion. This clearly shows that—when the cardboard is completely stretched on a level surface, either to perforate it or when in use on an organ . . . the surface of the cardboard is completely flat on both sides, without excess thickness or hollows at the hinges.

Gavioli goes on to state that:

One can easily understand the industrial advantages of this process, which—being very easy and involving only some light handiwork—provides perforated cardboard meeting every condition of endurance, neat and easy packaging, rapid folding and unfolding (which can be done over and over again without damaging the cardboard), and—finally—neatness of the surface at the folds when the cardboard is being used.

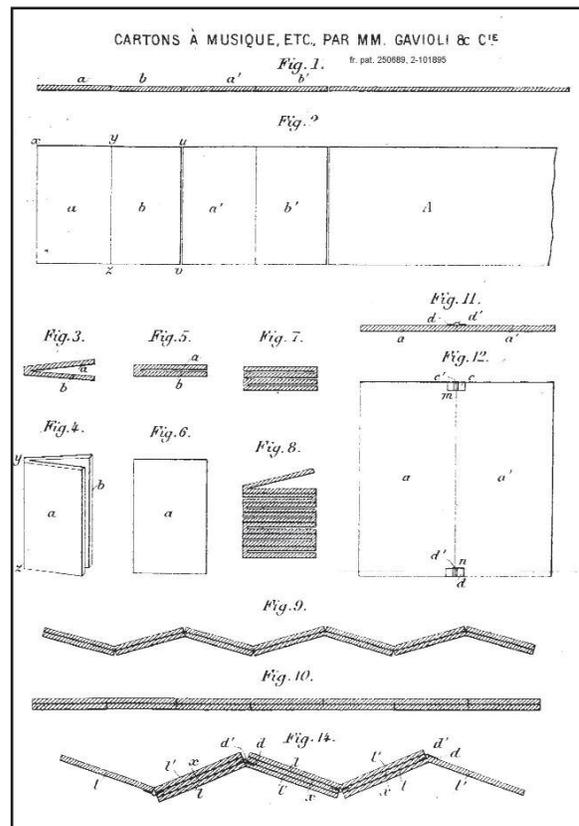
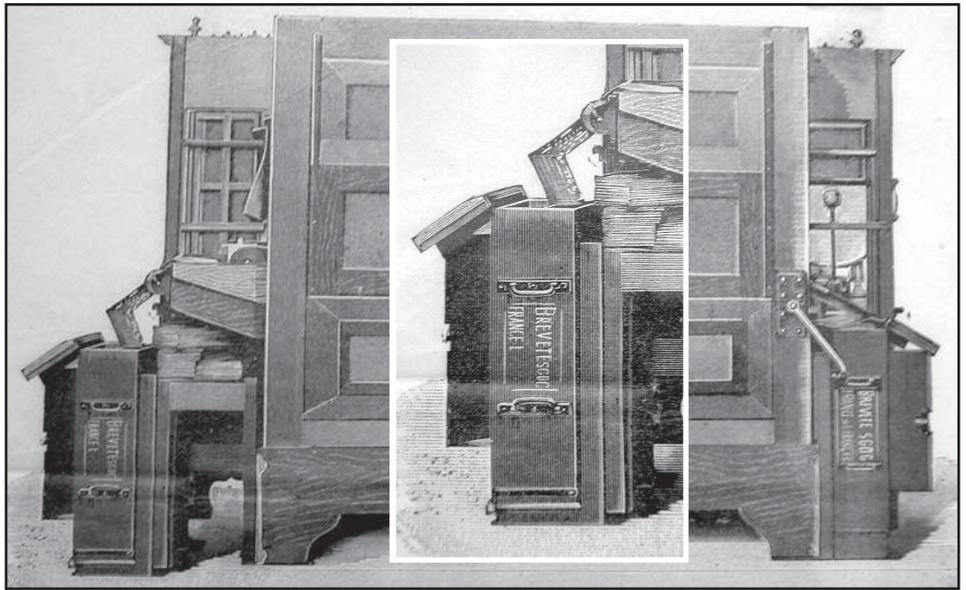


Figure 73. Anselme Gavioli's patent of 1892.

Photo: Hans van Oost

What followed was a development in how various organs would utilize the card-board book. Those organs that used “keys” had mechanical projections that would be held down by the cardboard until a rectangular slot passed over the key, allowing it to project upwards and allow a note to be played via a valve. Those organs became known as “keyed organs.” An opposing way of operating were organs that used a tracker bar which had tubes connected from valves in the organ to a metal or wooden bar which the cardboard passed over. Once a round hole went over a hole connected to the tube (the book would be pushed on the bar by way of a spring-loaded roller) pressurized air would pass out, opening up a valve which in turn would cause a pipe to sound.

Two photographs of very early Gavioliphone organs (advertising piece courtesy of Fred Dahlinger, Jr.) show some details of the book system in use. **Figures 74 & 75** (inset) depict the rear side of a large Gavioliphone organ. Note how the book crate is placed so the book enters the organ without stress on the book itself. Interesting also is that, as an early book-operated organ, the book passes through most of the width of the organ. Later organs, however, have a small key-frame arrangement where both the key-frame and the two organ crates can be spaced much closer together. The inset photo shows more detail to this arrangement.



Figures 74 & 75 (inset). An illustration of a 87-key Gavioli fair organ and it's book apparatus.

Photo: Fred Dahlinger

This latter option of placing the key frame attached to the organ (as opposed to having it inside the organ) allowed for continuous music from a long book (usually multiple tunes) in which the front and the ends of the book were attached and the music was stored and rotated in a hopper as it played (**Figure 76**).



Figure 76. A hopper arrangement available with an attached key frame (this photo: a Decap organ).

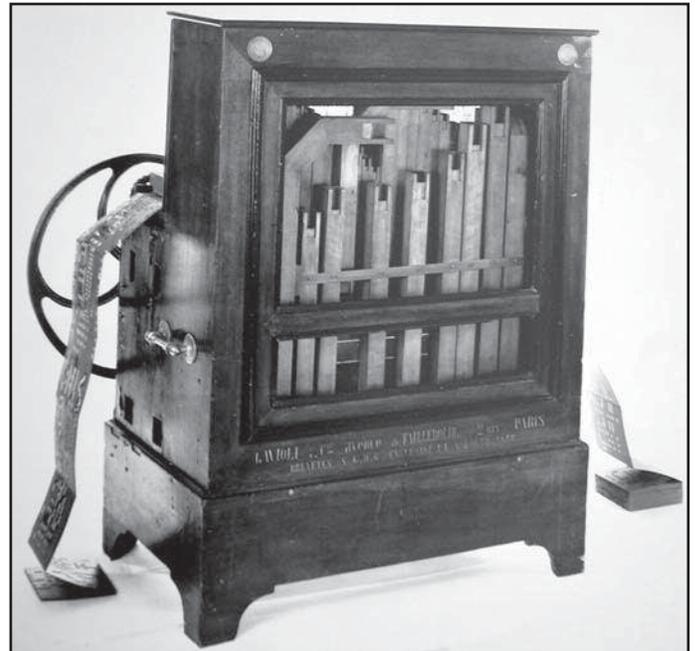


Figure 77. An early hand-cranked Gavioli book organ.

Photo: Fred Dahlinger

**Figures 77 & 78** are of early hand-cranked Gavioliphone organs. Interesting to note in Figure 78 is that this is an endless book and the book actually rotates around the back top of the organ on what appear to be spindles with rollers.

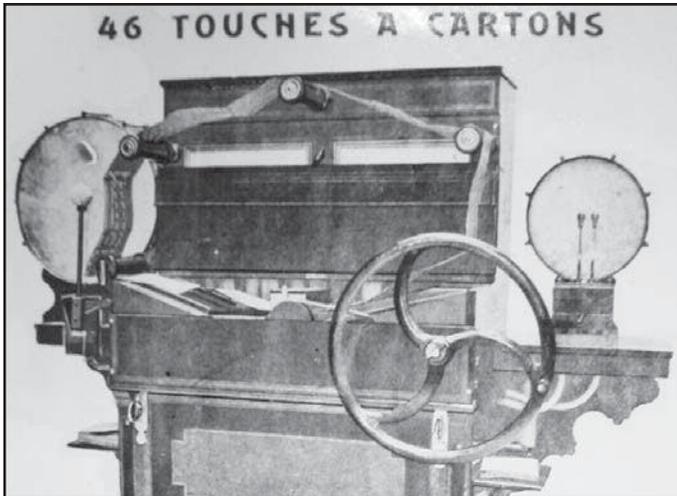


Figure 78. An illustration of a 46-key book-operated Gavioli organ. The book is an endless book which circulates around the top of the rear of the organ. The book appears to be held up by a set of spindles.

Photo: Fred Dahlinger

## Conclusion

In reviewing the myriad of mechanical musical instruments utilizing the book-operated system it becomes apparent that all were an attempt to escape the limitations of a previous operating system, whether it was a pinned barrel (cob or cylinder) or a circular disc, used by that particular manufacturer (inventor) or of a competitor.

Over 30 such attempts have been examined. Most have succumbed to more modern methods although book-operated fair and street organs are still in existence and being used, and some current manufacturers continue to produce organs that play with the cardboard book system.

To reiterate, the rhythmic and mechanical motion of the traveling/weaving book adds another dimension to the realm of enjoying a truly mechanical musical instrument.

... continued from page 35

now a music room with things that play A-Rolls and O-Rolls. Much of my free time is spent in restoration projects like the just finished Steinway Upright Duo Art or Wurlitzer 125 in process.

I am amazed at the ingenuity and craftsmanship of the people who have developed mechanical music and those that keep it alive today. Like many of you we have been blessed with the friendship of COAA and MBSI members willing to share their time, knowledge and skill.

Any regrets? Only one, that we did not find these organizations earlier.

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### In memory of . . .

Walter P. Bellm, long time collector, museum owner, and Past President of the Music Box Society, passed on November 28, 2010. In 1965 Walt acquired Horn's Cars of Yesterday museum in Sarasota, Florida and changed it to Bellm's Cars & Music of Yesterday. The collection was sold in 1997 but the museum building still stands, again housing a collection of vintage cars.

