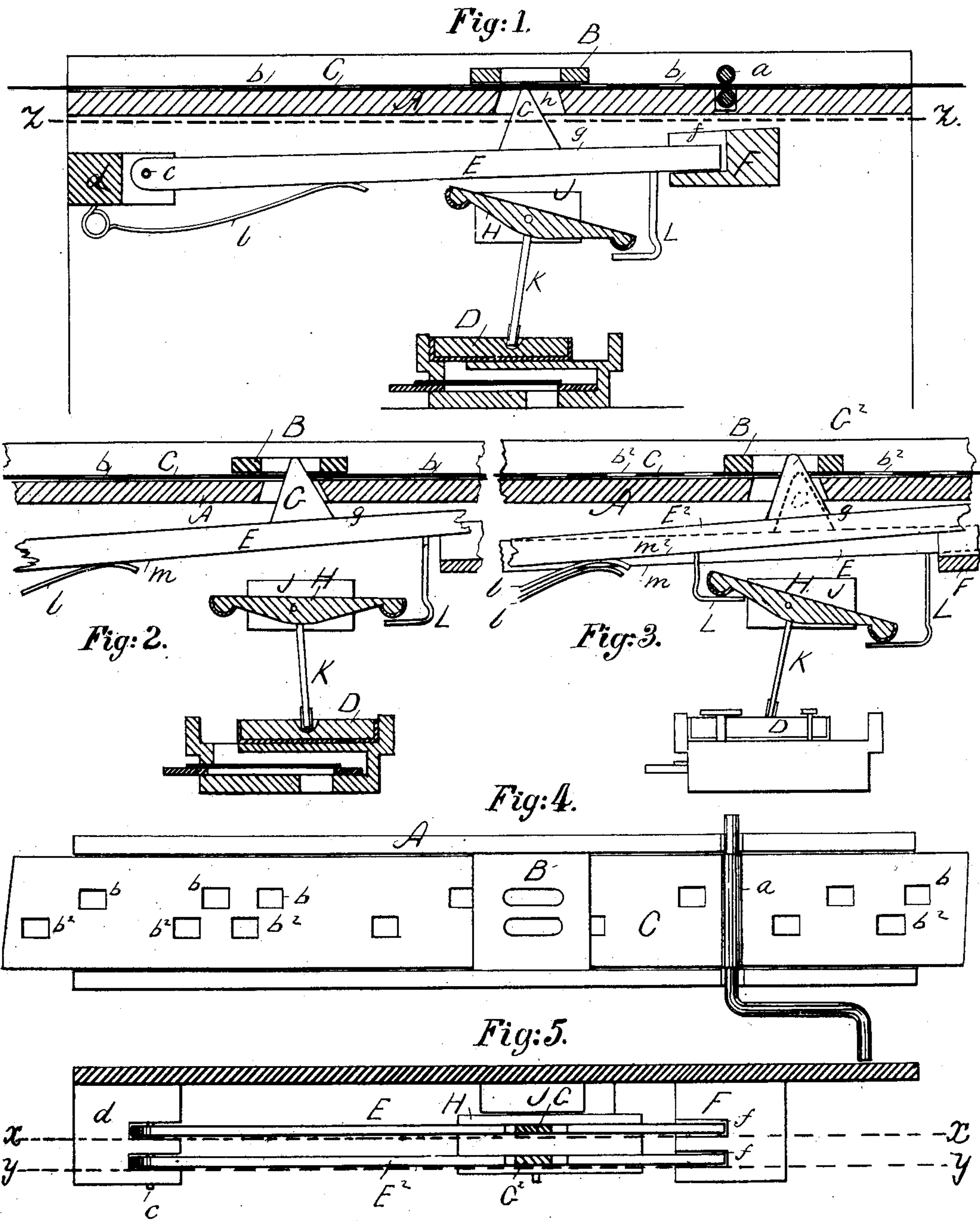


O. H. ARNO.
Mechanical Musical Instrument.

No. 227,714.

Patented May 18, 1880.



Witnesses:

H. M. Keever.

N. S. Bellows.

Inventor.

O. H. Arno.

*Per Brown Bros.
Attorneys.*

UNITED STATES PATENT OFFICE.

OLIVER H. ARNO, OF WILMINGTON, MASSACHUSETTS.

MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 227,714, dated May 18, 1880.

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To all whom it may concern:

Be it known that I, OLIVER H. ARNO, of Wilmington, in the county of Middlesex and State of Massachusetts, have invented a certain new and useful Improvement in Mechanical Musical Instruments, of which the following is a specification.

Among the varied kinds of musical instruments adapted for an automatic operation are those having mechanism by and through which, under the movement of a perforated strip of paper, &c., in relation thereto, the tune corresponding to the arrangement of such perforations is automatically performed or played. In this class of such instruments the length of the perforations of the strip determines the length of time which the notes represented by such perforations are sounded, and thus with varying lengths of such perforations correspondingly varying lengths of tones are produced. Under this invention, however, the reverse is the case—that is, the length of time which a note is sounded is determined by the closed parts or portions of the paper strip, and the opening and closing of the valve are secured in each instance by and through a separate perforation in the paper strip, which several separate perforations of the paper for each note are the perforations for opening the note in the one line and the perforations for closing the note in another line, which two lines are parallel.

The invention consists, first, of a strip of paper or of other suitable material having perforations arranged in parallel rows or lines, substantially as and for the purpose above stated; second, of the combination, with a valve of an organ-reed, of two levers, which are arranged in such relation to said valve and connected therewith, and also arranged in such relation to two rows of perforations in a perforated strip disposed in the relation above described that under the travel of such perforated strip to secure through the one lever and one row of such perforations an opening of the valve and through the other lever and the other row of such perforations a closing of the valve, all substantially as hereinafter described, and for the purpose specified.

In the accompanying plate of drawings this invention is illustrated.

Figure 1 is a longitudinal vertical section between the two levers for one set of rows of perforations of the perforated strip, which section extends through the said strip, its bed or raceway, valve, reed, &c.; Fig. 2, a similar section to that of Fig. 1, except that the valve is opened; Fig. 3, a longitudinal vertical section along and through the perforated strip and its bed or raceway, but on a line in front of the two levers for one set of rows of perforations of the perforated strip; Fig. 4, a plan view; and Fig. 5, a horizontal section on line $z z$, Fig. 1.

In the drawings, A represents a horizontal bed or raceway, along and through which, under a perforated block, B, travels a perforated strip, C, of paper, moved through feed-rolls a , or in any other suitable manner. This strip of paper C has two parallel rows of perforations, b b^2 , all of which perforations are of a uniform length. One, b , of these rows of perforations is for the opening of the valve D to an organ-reed, and the other, b^2 , is for the closing of the same valve D.

E E² are two similar levers arranged horizontally alongside of each other and below the line of travel of the perforated strip. These levers, at one end, are hung on a fulcrum, c , of a common rail, d , to swing in a vertical plane, and at their other ends they rest upon a common rail, F, which is suitably slotted, as at f , to guide such ends of the levers in their said swing. Each lever, on its upper edge, g , has a wedge-shaped projection, and both projections G G² are in line with a hole, h , in the bed or raceway A for the perforated paper strip, and the one projection, G, as also its lever, is in line with one row of the perforations of the paper strip, and the other projection, G², as also its lever, is in line with the other row of such perforations. Each lever has a bent spring, l , pressing at one end against its under edge, $m m^2$, intermediate of its length, and at the other end fixed to the common rail d , before referred to. Below these two levers E E², and between them and the valve D, is a common lever, H, which is hung between its two ends upon a fulcrum of a horizontal rail, J, so as to tilt and swing in a vertical plane. This lever, by a vertical rod, K, connects with the valve, and according as it is tilted in the one or the other direc-

tion slides the said valve in a direction either to open or close the same, as the case may be. This intermediate and tilting lever H is tilted in the one direction by the lever E and in the other direction by the lever E² of the pair of levers provided for the two rows of perforations described, and in each instance this is secured by means of a hook-shaped arm, L L², fixed to the under edge of each lever, and each and both arranged in relation thereto and to the said tilting lever to tilt the same, as aforesaid, and without interference otherwise between them and the tilting lever.

From the above description it is plain that under the travel of the perforated strip each and every perforation, as it passes over the location of the wedge-projections of the levers, necessarily frees such levers, as the case may be, to the action of its bent spring l, and that therefore such lever swinging upwardly moves its hook-arm, and through it tilts the tilting lever correspondingly, and thereby moves or slides the valve. Thus the valve is opened or closed, as the case may be.

Then, again, it is obvious the length of time in which the valve is opened or closed depends upon the arrangement of blank parts or portions of the perforated paper strip in relation to the perforations.

From the above it therefore is plain that the tone or note represented by the reed to the valve under the travel of the perforated strip along the bed or raceway A can be sounded from time to time, and such soundings thereof be made of shorter or longer duration, the sounding and non-sounding of the reed being determined from the movements of the levers E E² and the duration of sounding or of non-sounding from the blank parts or portions and their relation to the perforations of the paper strip.

Obviously mechanism other than the tilting lever and its attachment and the hook attachments of the levers E E² may be used to secure, from the depression of the levers, an opening and closing of the valve; and the valve may be arranged for being opened and closed in various ways other than that herein particularly described, and therefore it is not intended to limit this invention to any manner in that regard, as so far as the invention consists in a strip of paper having two parallel rows of perforations for a single note, and also in so far as it consists in the combination of two levers, E E², arranged substantially as described, to be operated through a perforated strip of the character specified.

The tilting lever, arranged and operated substantially as described, is, however, found efficient and practicable, and makes one part of this invention, in its combination with the valve and the pair of levers E E², provided to be opened through a perforated strip having perforations such as specified.

The arrangement of perforations in perforated strip C, levers in pairs E E², and tilting lever H, &c., to each pair obviously, is to be repeated for each note in the scale of the musical instrument.

When either one of the levers E E², through the perforation in the paper, operates to open or close the valve D, such lever is by the closed portion of the paper immediately returned to its normal position, so that its hook L or L² will not interfere with the movements of the tilting lever, the perforations being short enough for such purpose.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a mechanical musical instrument, a music-sheet or a strip of paper or similar material provided with two parallel rows or lines of perforations successively alternating with each other, as and for the purposes herein set forth.

2. A pair of levers arranged in relation to a valve or its equivalent, and the strip of paper having a row of perforations for each lever, which rows of perforations are in parallel lines and otherwise disposed substantially as set forth, whereby one of said levers will operate to open the said valve D and the other to close the same, all substantially as and for the purpose described.

3. The combination, with the pair of levers E E², of the tilting lever H, and of the valve D, arranged to operate substantially as described, and for the purpose specified.

4. The combination, with a pair of levers, E E², of a sliding valve, arranged and connected for operation all substantially as described, and for the purpose specified.

5. In a mechanical musical instrument, the combination, with a perforated strip of paper, of a sliding valve to a reed, said valve being arranged to be operated by mechanism through the perforation of said paper.

OLIVER H. ARNO.

Witnesses:

EDWIN W. BROWN,
W. S. BELLOWS.