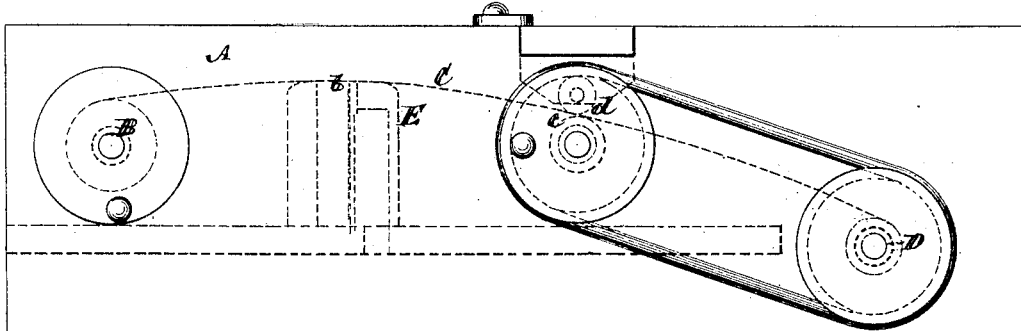


E. P. NEEDHAM.  
Mechanical Musical Instrument.

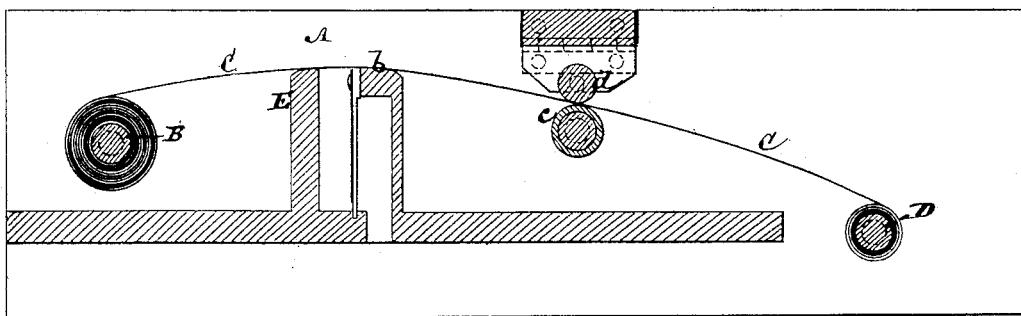
No. 215,831.

Patented May 27, 1879.

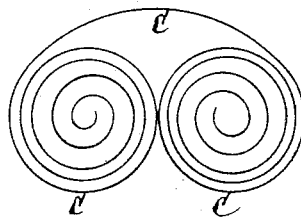
*Fig. 1.*



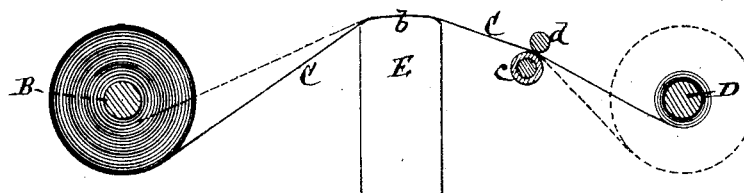
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



Witnesses  
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# UNITED STATES PATENT OFFICE.

ELIAS P. NEEDHAM, OF NEW YORK, N. Y.

## IMPROVEMENT IN MECHANICAL MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. **215,831**, dated May 27, 1879; application filed February 24, 1879.

*To all whom it may concern:*

Be it known that I, ELIAS P. NEEDHAM, of the city and State of New York, have invented a new and useful Improvement in Mechanical Musical Instruments, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to organs and other wind musical instruments which are mechanically played by means of a music strip or sheet perforated to correspond with the different notes or sounds it is desired to produce, and caused, in its transit for playing, to open and close as a valve air-ducts in an action board or device, which may either contain the reeds or connect with the pipes of the instrument, accordingly as the latter is a reed or pipe organ, or which may be a board containing perforations communicating with a system of what are known as "pneumatic keys."

The invention is applicable alike to those instruments of the kind here referred to, which have the air supplied to them either by suction-bellows or by forcing-bellows, or other contrivances.

It is very important in all such mechanical musical instruments that the perforated music strips or sheets should make a close valvular fit with the action-board over or in contact with which they pass. Such music strips or sheets are ordinarily made of paper which is moderately stiff and possesses considerable resiliency, so that when such a music strip or sheet is flexed against the bend given to it by winding or unwinding rollers and devices used to effect its transit in playing, as is the case in arrangements previous to this invention, it is liable to form a more or less imperfect valvular contact with the action-board, and to crack or break, which affects its durability.

The object of this invention is to render the music strip or sheet more durable, to make it more readily adapt itself to the curvature of the surface of the action-board or valve-seat over or in contact with which it passes, and to make it more manageable.

To these and other ends the invention consists in a combination, in a musical instrument, of a perforated action-board and winding and

unwinding and feed rollers, all arranged in such relation to each other that the perforated strip or sheet in its transit for playing has its flexure always in the same direction, thus preserving the resilient tendency of the strip or sheet to retain the curvature it has when on the roller or rollers which carry it, and causing it to closely hug the valve-seat over or against which it moves in its transit when playing, as well as avoiding all liability of it to crack or break by straining it against the bend given to it by said roller or rollers.

In the accompanying drawings, Figure 1 represents a side elevation of a reed-organ, in part, having my invention applied; Fig. 2, a vertical section of the same; Fig. 3, a diagram, showing the flexure which the perforated music strip or sheet assumes by the winding of it on the roller or rollers which carry it, and Fig. 4 a diagram in illustration of the reversed flexures given to the strip or sheet under previous combinations or arrangements.

Similar letters of reference indicate corresponding parts throughout the several figures.

A in Figs. 1 and 2 represents the casing of the instrument. B is a delivery-roller, on which the perforated music strip or sheet C is first wound, and D is a take-up roller, on which it is wound as it is unwound from the delivery-roller. E is the perforated action-board, constructed to present a curved valve seat or face, *b*, over or in contact with which the music strip or sheet passes in its transit for playing.

In the drawings the music strip or sheet C is represented as being driven by means of supplementary feeding devices, consisting of rollers *c* and *d*, the former of which is connected by pulleys and belt or band with the take-up roller D; but this means of driving is not my invention, and I lay no claim to it.

By reference to Figs. 1 and 2 of the drawings, it will be seen that the flexure of the strip or sheet C between the delivery-roller, or, as it may be termed, "music-roller," B, and the take-up roller D is in the same direction as the flexure (exhibited in Fig. 3) produced by the winding of it on said rollers, and that it readily adapts itself to the curvature of the valve-seat *b*, thus obtaining for it the several advantages hereinbefore named, and which the strip, when reversely flexed between the

rollers by the action-board, as compared with the flexure given to it by the rollers, as illustrated by the diagram in Fig. 4, does not possess.

It is possible that in some cases the take-up roller may be dispensed with, and the strip or sheet be delivered at its one end in the form of a loose coil.

I am aware that it is not new in apparatus other than that adapted to the playing of musical instruments to arrange a strip or sheet to travel between a winding and an unwinding roller with its flexure always in the same direction, and therefore I do not broadly claim a strip or sheet so arranged; but

What I do claim as my invention is—

1. The combination, in a musical instrument, of a perforated action-board, a perforated strip or sheet passing in contact with said action-board, and winding and unwind-

ing rollers and feed-rollers, when the whole are arranged in such relation to each other that the perforated strip or sheet in its transit for playing has its flexure always in the same direction, substantially as specified.

2. The combination, with a delivery-roller, a take-up roller, a pair of feed-rollers, and an intermediate perforated action-board, of a perforated music strip or sheet, arranged so that in passing over or in contact with the action-board during its transit for playing, its flexure between said rollers is in the same direction as the flexure produced by the winding of it on said roller or rollers, essentially as and for the purposes herein set forth.

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Witnesses:

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