

N<sup>o</sup> 12,795



A.D. 1900

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Complete Specification Left, 13th Apr., 1901—Accepted, 16th July, 1901

**PROVISIONAL SPECIFICATION.**

**Improvements in or appertaining to Automatic Key Board Music Instruments Actuated by Pneumatic Devices.**

I PAUL EHRLICH of No 6 Breitenfelderstrasse at Gohlis near Leipsick in the Kingdom of Saxony, German Empire, Managing Director do hereby declare the nature of this invention to be as follows:—

5 This invention relates to automatic key board music instruments actuated pneumatically, and its object is to facilitate the insertion of the perforated note sheets and to produce automatically the rolling movement thereof.

10 In music instruments automatically played by means of pneumatic devices it has been found troublesome to insert perforated sheets or bands, as the pneumatic mechanism has been usually arranged below the key board. According to the present invention the perforated band will be arranged above the key board; and the pneumatic device below it said band being adapted to be rolled automatically, up and off from one roller to the other.

15 A removable plate is provided with passages communicating at one end with the channels closed or opened by the passing perforated band, and at the other end with the pneumatic device. The effect of this arrangement is that if a perforation of the perforated band opens the passage air will be sucked by the pneumatic apparatus, whereby the lever gearing will be raised and consequently the correspondent key connected with the lever will be struck,

20 By insertion of an adapted sector the air pressure required may be diminished. In order to regulate the stroke or blow of the key the connecting rod may be provided with an aperture in order to guide the said sector producing more or less intensity of the tone according to the position of the connecting rod.

25 The automatic movement for the rolling up and off of the perforated sheet is effected by means of suitable rollers, one of the rollers being rotated by tooth gearing and the other turning loosely.

A coupling device is arranged and actuated by the pneumatic mechanism in such a manner that one of the rollers is connected with the driving shaft, the other turning loosely and *vice versa*.

Dated the 16th day of July 1900

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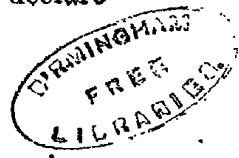
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**COMPLETE SPECIFICATION.**

35 **“Improvements in or appertaining to Automatic Key-board Music Instruments Actuated by Pneumatic Devices.”**

I, PAUL EHRLICH, of No. 6 Breitenfelderstrasse at Gohlis near Leipzick in the Kingdom of Saxony, German Empire, Managing Director, do hereby declare

[Price 8d.]



*Ehrlich's Improvements in Automatic Key Board Music Instruments, &c.*

the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention relates to automatic key-board music instruments and its object is to facilitate the insertion of the perforated note-sheets and to produce automatically the rolling movement thereof. 5

In music instruments automatically played by means of pneumatic device it has been found troublesome to insert perforated sheets or bands, as the pneumatic mechanism has been usually arranged below the key-board. According to the present invention the perforated band will be arranged above it, said band being adapted to be rolled automatically up and off from one roller to the other. 10

One special object of my invention is to afford means by which the air pressure required may be diminished.

Another feature consists in a contrivance for regulating the impact of the key and thus to vary the intensity of the tone.

In describing the particulars of my said invention, I shall refer to the accompanying drawings in which similar letters indicate similar parts. 15

A removable plate *b* (Fig. 1) is provided with passages *a* communicating at *a*<sup>1</sup> with the channels *m* (Fig. 2) closed or opened by the perforated band being fed by the rollers 1 and 2 past the aperture *n*. At *e* said passages *a* communicate with the tubes *b* secured in the bottom of the key-board *d* and projecting through open spaces between the keys *c*, as shown in vertical section in Fig. 1 and in a top view in Fig. 2, while the ends *o* of the tubes *b* are connected with the mechanism located below the key board. 20

If, now, the aperture *n* of the channel *m* is set free by a perforation of the perforated band, air will be sucked into the said channel (Fig. 4), distending the membrane *f*, whereby valve *g* will be opened and *h* closed. Owing to the evacuation taking place in the meanwhile through an opening *j* in the known manner the bellows *i* will be contracted thereby causing the key *c* by means of the rods *p* and *q* and the segment *l* to strike the cord or string. 25

It is obvious that the segment *l* inserted between said rods *p* and *q* imparts greater sensitiveness to the mechanism so that a slighter air pressure is required to cause the striking of the keys than if the rod *q* were directly connected with the bellows. 30

But as stated above means are also provided to regulate the impact of the key and thus to vary the intensity of the tone. 35

I obtain this object by arranging a slot *s* in the rod *q* (Fig. 5) in which slot the segment *l* is guided and by arranging the rod *q* to allow of being either automatically or otherwise approached to or removed away from the fulcrum *r* of the segment *l*. It will be easily understood that the nearer the rod *q* is to the fulcrum *r* the slighter the impact of the key and hence so much softer the tone. 40

The diagram represented in Fig. 6 illustrates the automatic movement of the rolling up and off of the perforated sheet.

1 and 2 are two rollers of which the one is rigidly secured to its shaft, while the other one 2 turns loosely upon the shaft 3. Mounted upon the said shaft 3 and connected therewith by means of a feather engaging a groove in the shaft is the toothed wheel 5 meshing with a corresponding toothed wheel 6 and provided with a stud 7 serving to catch the disc 8 in view of turning the roller 2 in the same direction as the wheel 5. The latter which is arranged to slide sideways so as to be either coupled with the disc 8 or with the wheel 6 is controlled by a rod 9 actuated on one side by the bellows 10 and on the other one by the spring 11 tending to couple the wheel 5 with the disc 8. This latter action can only take place when the bellows 10 are distended and 12 contracted as air is driven into the one and drawn off the other by their respective air holes 13 whereby the bellows 10 are set free from the catch 14. 45 50

Instead of the toothed wheels 5 and 6 friction gear may be employed as shown in Fig. 7. 55

*Ehrlich's Improvements in Automatic Key Board Music Instruments, &c.*

The operation of this automatic device for rolling the perforated sheet up and off is as follows.—

- While a music piece is being performed by the instrument the perforated sheet is wound off from the roller 1 to the roller 2. In this case bellows 12 are contracted which may be effected in the known manner by a perforation of the sheet, bellows 10 expanded and the rod 9 pushed into the position represented by dotted lines through the action of spring 11. Consequently the wheel 5 is out of gear with wheel 6 and coupled with the disc 8 which will therefore cause the roller 2 to rotate and wind the sheet up.
- At the end of the music piece another perforation of the sheet will cause the expansion of the bellows 12 and the contraction of bellows 10 passing over the catch 14 and being held in position thereby. Wheel 5 is brought into gear with wheel 6 and the sheet wound up again on roller 1.
- At the same time the bellows 12 are emptied the driving power, for instance the electromotor, is stopped.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Pneumatic device for automatic key board music instruments, distinguished by the perforated sheet being arranged above the key board and fed past the aperture of channels communicating with the playing mechanism located below the key-board, essentially as and for the purpose described.
2. In a device according to the first claiming clause the insertion of segments between the pneumatic levers and the rods actuating the keys, essentially as and for the purpose described.
3. A constructional form of the device set forth in the claiming clauses 1 and 2 distinguished by the provision of a slot in the rods actuating the keys in which the segment is guided and by an arrangement of said rods actuating the keys whereby they may be approached to and moved away from the fulcrum of the segment, essentially as and for the purpose described.
4. In a device according to the preceding claiming clauses the arrangement for automatically rolling the perforated sheet up and off distinguished by two rollers of which one is rigidly secured to its shaft while the other one is mounted loosely on another shaft and by pneumatic levers controlled by perforations of the perforated sheet and so acting upon a coupling device that one of said rollers is connected with the driving power while the other one turns loosely and *vice versa*, essentially as and for the purpose described.

Dated the 13th day of April 1901.

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[This Drawing is a reproduction of the Original on a reduced scale]

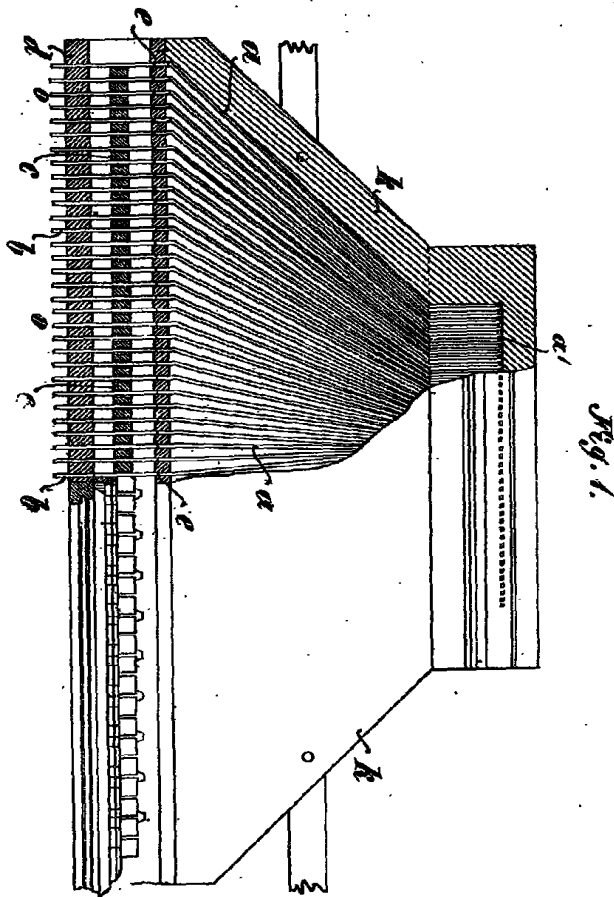


Fig. 1.

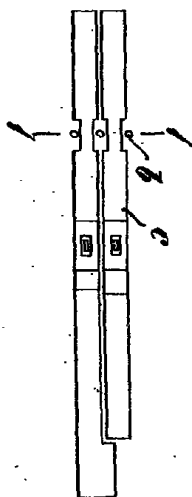


Fig. 2.

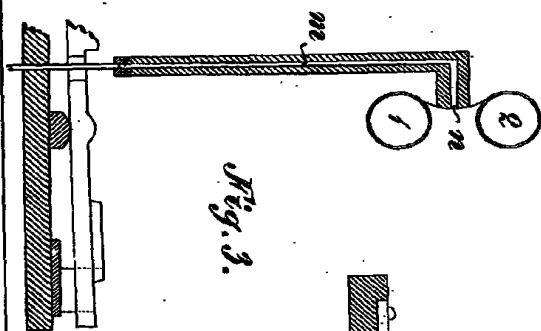


Fig. 3.

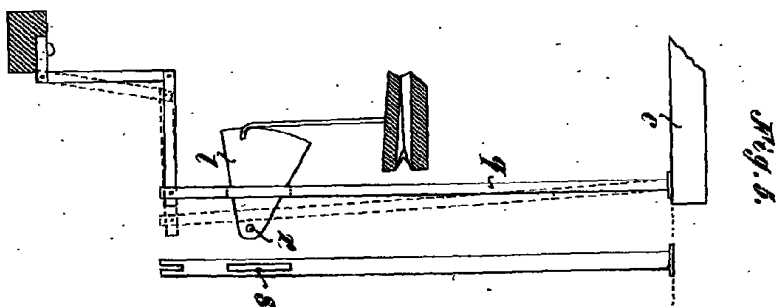


Fig. 4.

Fig. 6.

Fig. 7

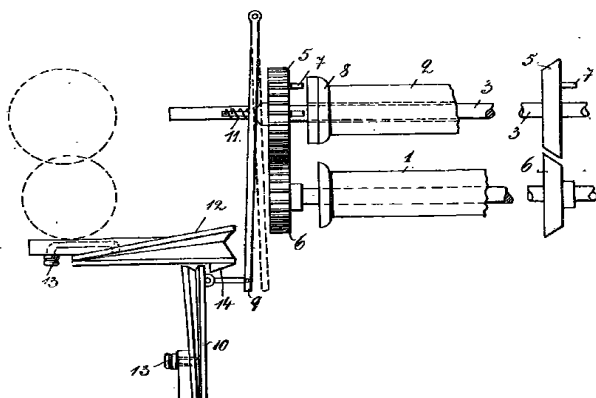
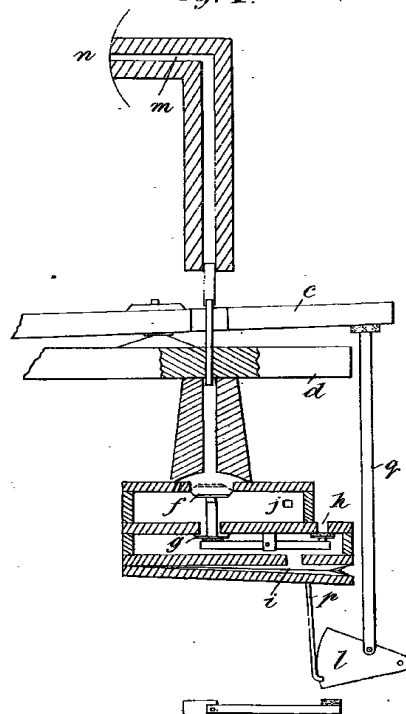


Fig. 4.



[This Drawing is a reproduction of the Original on a reduced scale]

*Fig. 6.*

*Fig. 7*

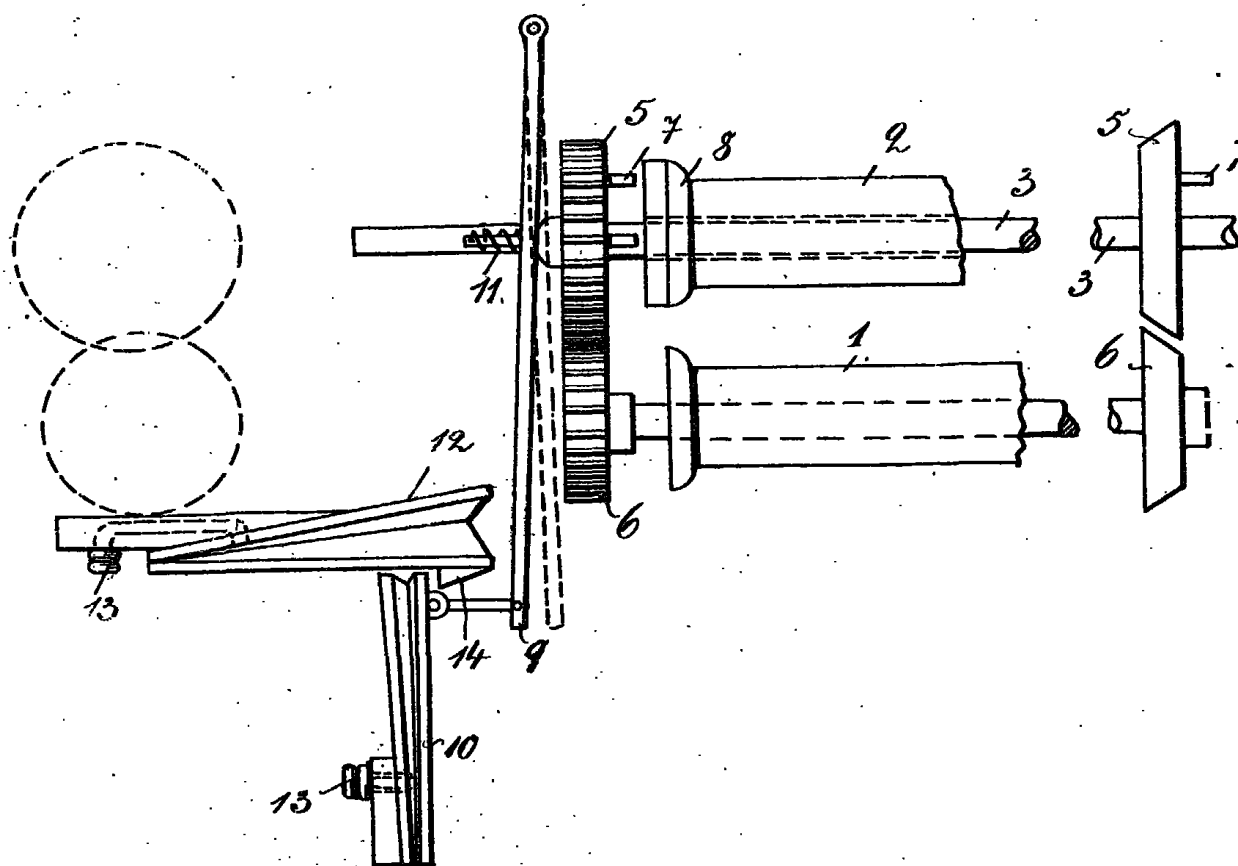
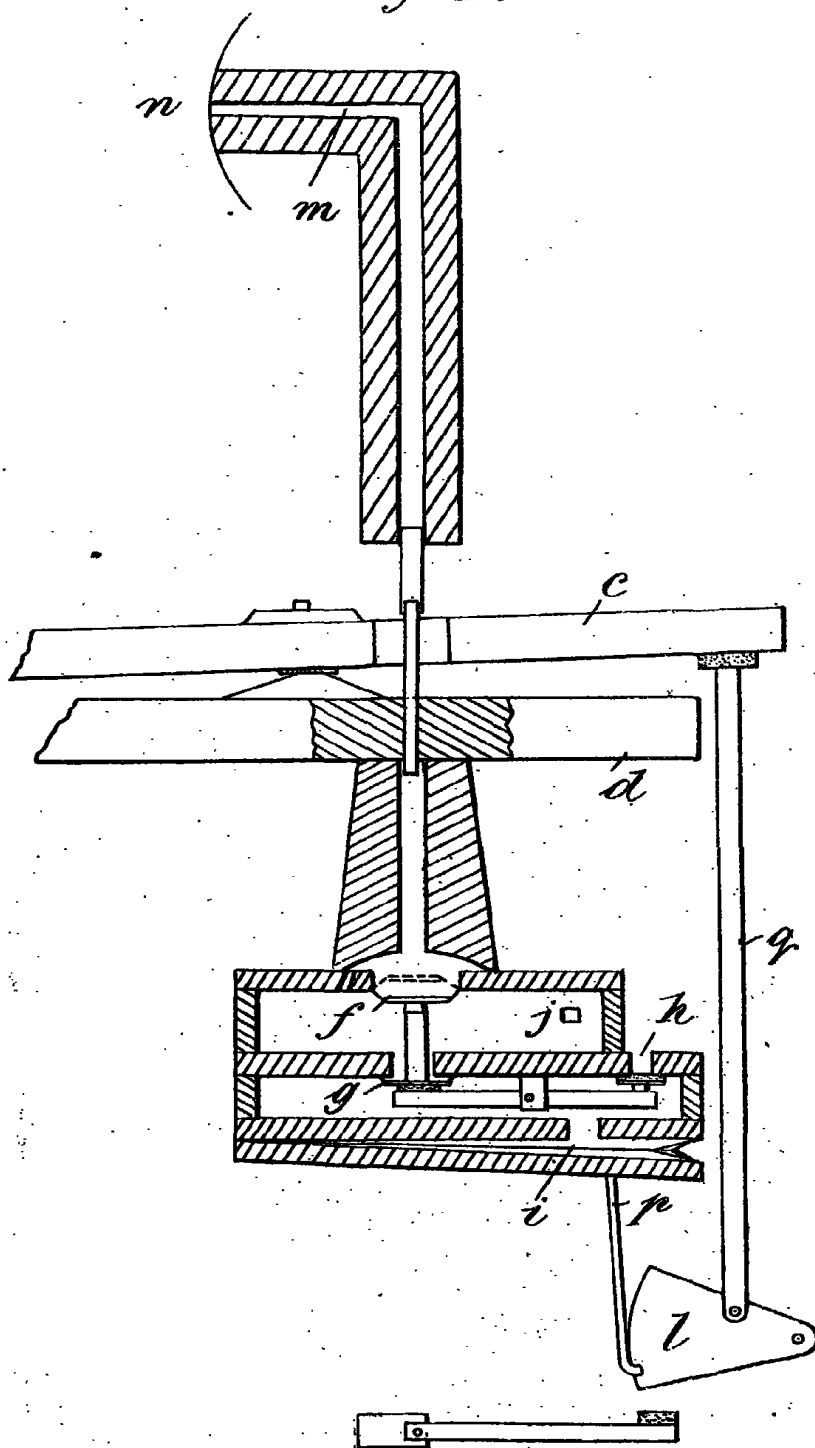


Fig. 4.



[This Drawing is a reproduction of the Original on a reduced scale.]