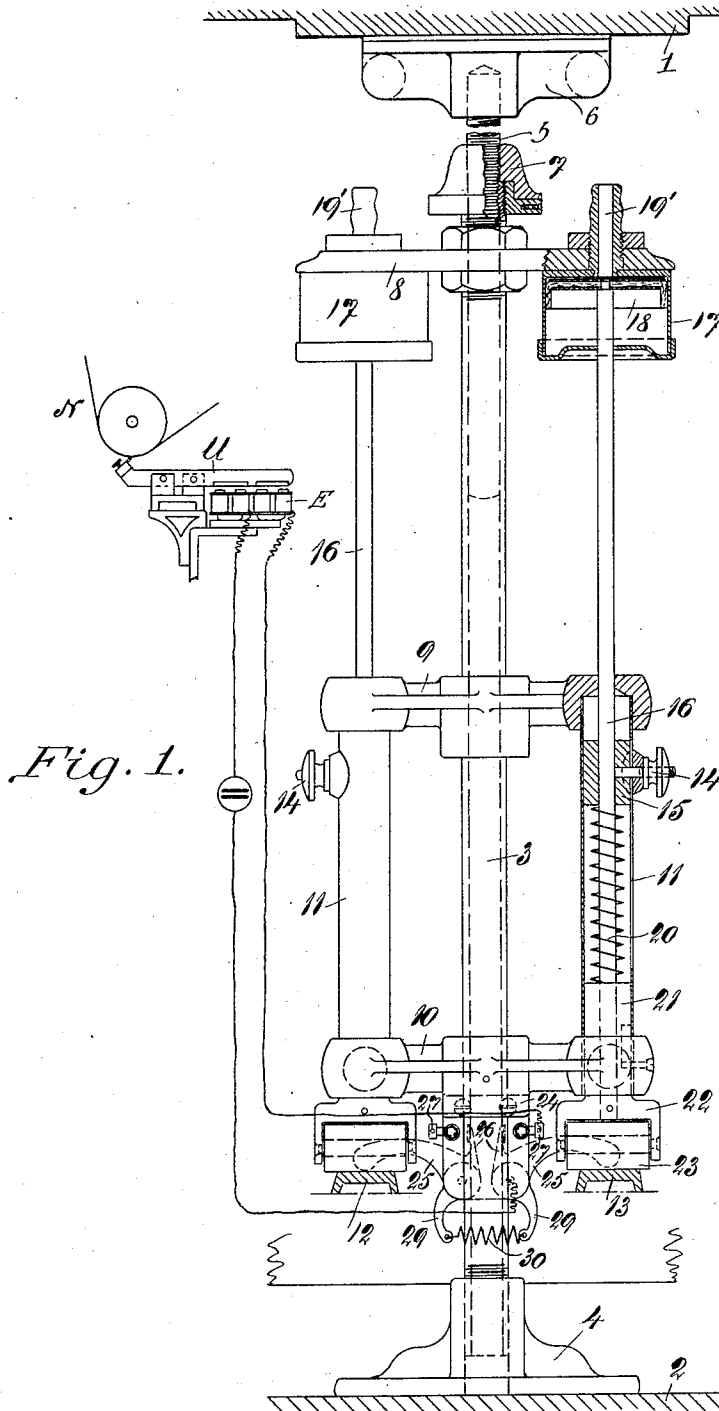


C. W. NYSTRÖM.
 APPARATUS FOR AUTOMATICALLY OPERATING PIANO PEDALS.
 APPLICATION FILED APR. 27, 1910.

1,062,249.

Patented May 20, 1913.

3 SHEETS—SHEET 1.



WITNESSES
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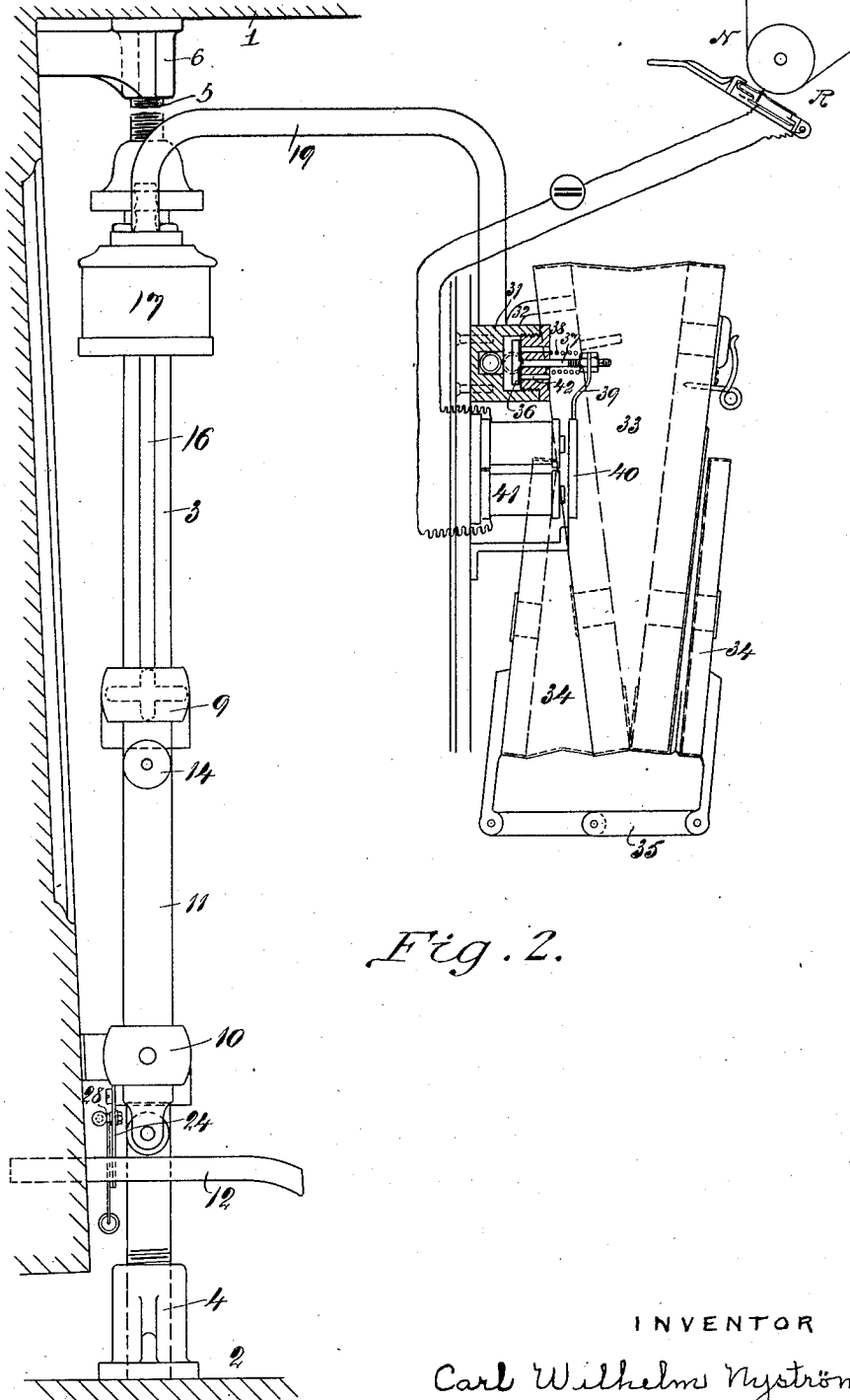


Fig. 2.

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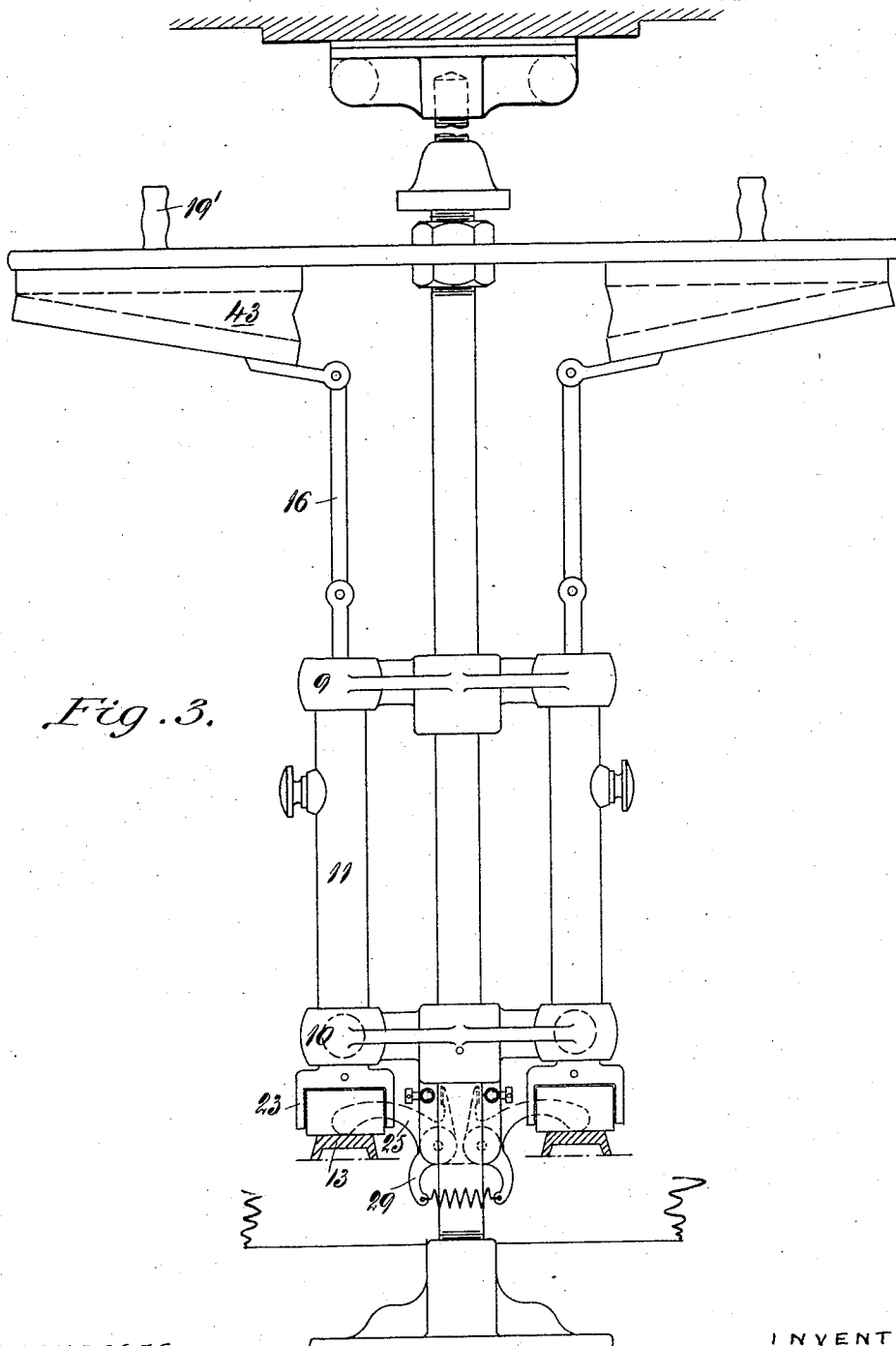


Fig. 3.

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UNITED STATES PATENT OFFICE.

CARL WILHELM NYSTRÖM, OF KARLSTAD, SWEDEN.

APPARATUS FOR AUTOMATICALLY OPERATING PIANO-PEDALS.

1,062,249.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed April 27, 1910. Serial No. 558,026.

To all whom it may concern:

Be it known that I, CARL WILHELM NYSTRÖM, engineer, a subject of Sweden, residing at Karlstad, Sweden, have invented new and useful Improvements in Apparatus for Automatically Operating Piano-Pedals, of which the following is a specification.

The present invention refers to an apparatus for automatically reproducing the pedal movements in keyed musical instruments, by means of which the recording of the pedal movements is effected by means of cutting tools, actuated by electro-magnets and providing impressions of varying lengths on an advancing note strip or on a rotating disk, whereas the said pedal movements are reproduced by means of reproducing tools, which abut against the note strip or the note disk, and when entering the impressions thereon, close electric circuits through electro-magnets, from the armatures of which the movement is transmitted to the pedals.

The invention moreover consists in a device for depressing the pedals with use of relatively little power, also in a device for effecting said depression with aid of air pressure or vacuum.

On the accompanying drawings Figure 1 is a front view, partly in vertical section, of the apparatus, Fig. 2 is a side view of the same with some parts in vertical section and Fig. 3 is a front view of a modified apparatus.

Between the bottom 1 of the key board of a piano and the floor 2 a standard 3 is secured. As shown on the drawing the standard 3 is screwed with its lower end into a shoe 4, whereas its upper end carries a threaded bolt 5, the upper end of which enters a shoe 6, and the lower end of which is screwed into the standard 3 and is turnable by the nut 7, in such a manner, that the distance between the shoes 4 and 6 can be shortened or lengthened by turning the nut 7, whereby the standard can be fixed between the studs 1 and 2. The standard 3 is provided with three cross bars 8, 9 and 10, of which 9 and 10 at their ends support pipes 11, one placed opposite each of the pedals 12, 13.

The device, which will be described below is the same for both pedals. At the upper end of the pipe 11 is inserted a block 15, which is adjustable on a rod 16 by means of a set screw 14, said rod constituting the

piston rod of a piston 18, movable in a cylinder 17. Said cylinder is secured in the manner shown on the drawing at the end of the cross bar 8, and a pipe 19 communicates with the same by means of a nipple 19'. A spring 20 is inserted between the block 15 and a block 21 in the lower end of the pipe 11, which block outside the pipe is formed as a fork 22, carrying a roller 23, which abuts against the pedal 13. The strength of the spring 20 is adjusted so as to counter balance the strength of the usual spring (not shown on the drawing) holding the pedal in its upper position.

On a plate 24, extending from the cross bar 10, are fixed two angle pieces, one of the arms 25 of each piece abutting against the pedals 12 and 13, whereas each of the other arms 26 is provided with an electric contact, placed opposite contact screws 27, traversing a small angle piece 28 on the plate 24. Each of the angle pieces is provided with a downwardly extending arm 29 and a spring 30 is connected to the arms 29 and tends to draw them toward one another thereby holding the arms 25 against the pedals 12 and 13.

When pedal movements are to be recorded on the note strip, the rollers 23 are held lifted from the pedals in any convenient manner, so that the pedals are released from the pressure of the spring 20. When depressing the pedal with the feet during the performance of a piece of music, an electric circuit is closed between the corresponding screw 27 and the angle arm 26, said current in a previously known manner exciting an electric magnet E, actuating a recording tool U, so that an impression is made on the advancing note strip N or on a rotating note disk. When the pedal movements thus recorded are to be reproduced, the spring 20 is adjusted by means of the block 15 so as to overcome the pressure of the usual pedal spring (not shown) by a slight amount of pressure, whereafter the block is fixed in position by means of the screw 14. The pedal tends to occupy its lowermost position and in order to move the pedal to its uppermost position it is necessary to apply thereto a force sufficient to overcome the weight of the pedal and also its frictional resistance as well as the force due to the difference between the pressure of the spring 20 and the pedal spring. In order to do this the following device may be used.

The pipe 19, above referred to, enters as

shown in Fig. 2 a valve casing 31, which by means of a pipe 32 communicates with the reservoir bellows 33, in which vacuum is produced by means of the bellows 34. These bellows are connected with one another through a link 35, which is moved by a motor (not shown in the drawing) in such a manner, that the bellows 34 are alternately opened and closed. On the spindle 37 of the valve 36 is acting an adjustable spring 38, inserted between the valve casing 31 and an arm 39, connected with the armature 40 of an electro magnet 41, inclosed in the same circuit as the reproducing tools R of the apparatus. The spring 38 tends to press the valve against the mouth of one or more holes 42 in the valve casing 31, communicating with the atmosphere.

When the valve 36 is closed, as shown in the drawing, the bellows 33 exhausts the air from valve casing 31, pipe 19 and cylinder 17, thus causing the piston 18 to be drawn or sucked into the cylinder 17 against the action of the spring 20 whereby the piston will occupy its uppermost position as shown in section in Fig. 1. While the piston 18 is in this position the roller 23 will not press against the pedal 13, and the piston will remain in this position as long as the electro magnet 41 is not energized. When the reproducing tool R, which corresponds to the pedal 13, enters an impression on the note strip N, the electric circuit through the magnet 41 will be closed and the armature 40 will be attracted, thereby opening the valve 36. The opening of the valve allows air to flow through the holes 42 into the valve casing 31 and into the pipe 19 and cylinder 17, thereby assuring equal atmospheric pressure on opposite sides of the piston 18. As a consequence of this the spring 20 will overcome the pressure of the pedal spring and force the pedal 13 downward to occupy its lower position. As soon as the electro magnet 41 is deenergized, the valve 36 returns, closing the holes 42, whereby the piston 18 is sucked upward by the vacuum created in the cylinder.

Fig. 3 shows a modified device, the modification essentially consisting therein, that the cylinder 17 and its piston 18 is substituted by the bellows 43, which is connected with the valve casing 31 by a pipe 19 and is held in a collapsed position by the vacuum in the reservoir bellows 33. The rod 16 is provided with a joint as shown. The device is shown only for one of the pedals, viz. 13.

What I claim is:—

1. An apparatus for automatically operating a piano pedal comprising a rod mounted to rest on the pedal, a spring operatively associated with said rod, said spring being strong enough to overcome the pedal spring whereby said first-mentioned spring will tend to depress the rod to hold the pedal in its lower position, means normally holding said rod in its raised position, whereby the pedal will be normally raised and means controlled by a music strip to render said holding means operative or inoperative.

2. An apparatus for automatically operating a piano pedal comprising a rod mounted to rest on the pedal, a spring operatively associated with said rod, said spring being strong enough to overcome the pedal spring whereby said first-mentioned spring will tend to depress the rod to hold the pedal in its lower position, means for adjusting the tension of said spring, means normally holding said rod in its raised position, whereby the pedal will be normally raised and means controlled by a music strip to render said holding means operative or inoperative.

3. An apparatus for automatically operating a piano pedal comprising a rod mounted to rest on the pedal, a piston fixed to said rod, a spring operatively associated with said rod and strong enough to overcome the pedal spring, pneumatic means for actuating said piston against the action of said first-mentioned spring, and a valve, controlled by a music strip, controlling said pneumatic means.

4. An apparatus for automatically operating a piano pedal comprising a rod mounted to rest on the pedal, a piston fixed to said rod, a spring operatively associated with said rod and strong enough to overcome the pedal spring, pneumatic means for actuating said piston against the action of said first-mentioned spring, an electromagnet, a valve, controlling said pneumatic means and controlled by said electromagnet, and means, controlled by a music strip for rendering said electromagnet operative or inoperative.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL WILHELM NYSTRÖM.

Witnesses:

WALDEMAR BOMAN,
T. EKEBOHM.