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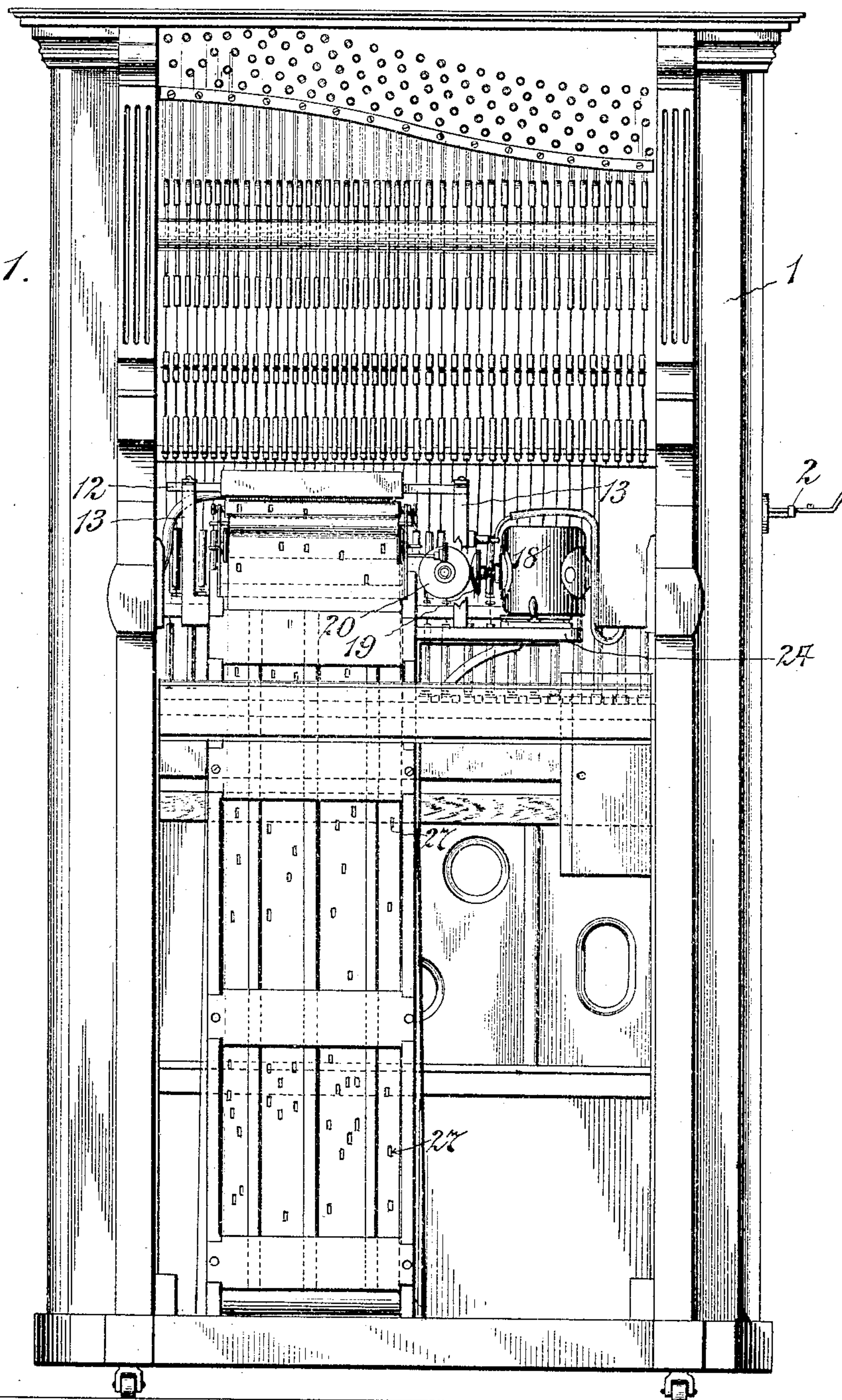
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AUTOMATIC MEANS FOR PLAYING MUSICAL INSTRUMENTS.

APPLICATION FILED DEC. 10, 1902.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

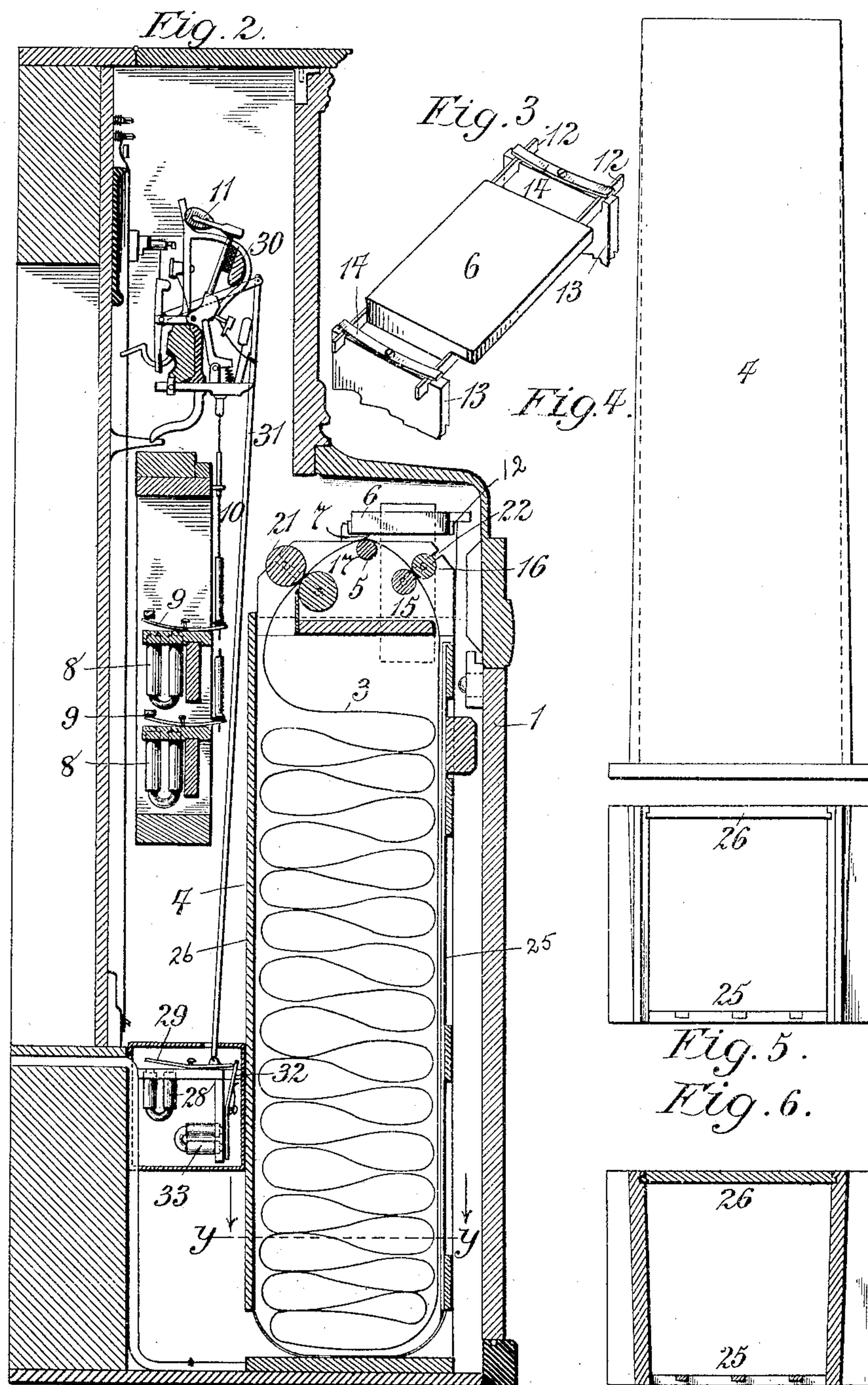
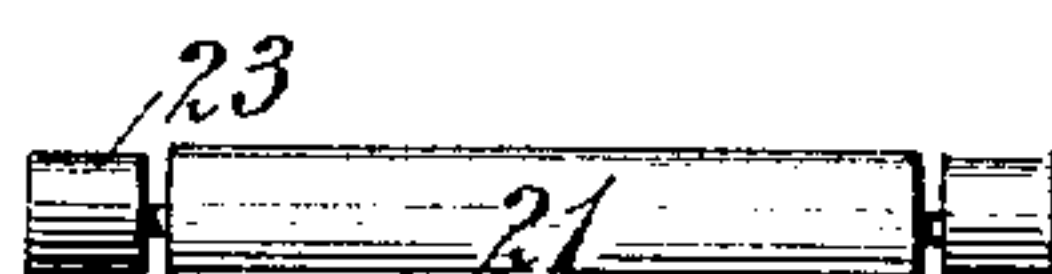


Fig. 7.



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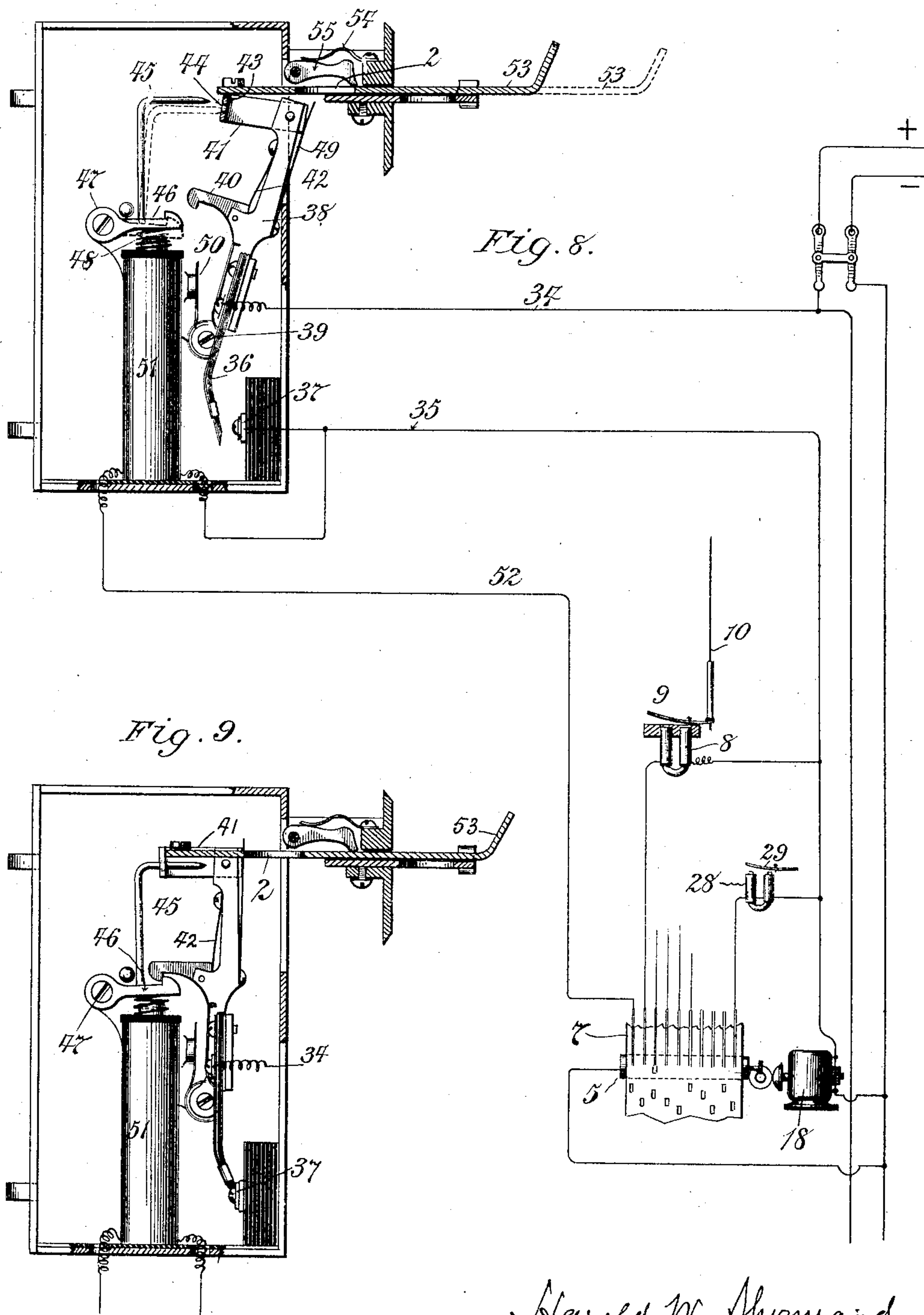
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC MEANS FOR PLAYING MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 780,687, dated January 24, 1905.

Application filed December 10, 1902. Serial No. 134,651.

To all whom it may concern:

Be it known that I, HAROLD W. SHONNARD, a citizen of the United States, residing in the city, county, and State of New York, have invented a certain new and useful Improvement in Automatic Means for Playing Musical Instruments, of which the following is a specification.

My present invention has particular relation to an instrument of the above-named class wherein an improved removable music-box is employed.

One branch of this invention comprises means whereby this class of instrument may be operated by coin-controlled devices.

My invention is shown in a preferred form as applied to a coin-and-slot mechanism in the accompanying drawings, wherein—

Figure 1 is a front view of a small piano-like instrument employing my invention, the front of the instrument being removed. Fig. 2 is a vertical section of the same as seen from one side. Fig. 3 is a perspective detail view. Fig. 4 is a side view of the sheet-box. Fig. 5 is a top view thereof. Fig. 6 is a horizontal section of the same on the line *y y* of Fig. 2. Fig. 7 is a detail view of my preferred sheet-gripping roller, and Figs. 8 and 9 are side views of the coin-controlled circuit-closer in two different positions.

In the drawings, 1 represents the casing of a reduced piano intended for operation when a coin is inserted at the slot 2. Whether used with a slot or otherwise the front of the casing should be made capable of accommodating the removable music-box, as shown in Fig. 2. An endless perforated music-sheet 3 is employed and is folded back and forth within the sheet-box 4, which stands upright within the casing 1 when in use.

At 5 is shown the common return-conductor in the form of a metallic roller over which the sheet 3 passes, as shown. Within an appropriate casing 6 are placed the contact-fingers, whose tips bear, as at 7, upon the music-sheet over the roller. These operate in a well-known manner, as by circuits shown in Fig. 8, to energize the proper magnets 8, and these acting through the rocker-armatures 9

and key-rods 10 impel the hammers 11 through any appropriate intermediate action.

The finger-case 6 is mounted directly upon the music-box and is fastened thereto. The preferred fastening is shown in Fig. 3. Two parallel rails 12 extend beyond the ends of the case 6 and rest in notches on the tops of the sides 13, projecting above the top of the sheet-box on each side. Springs 14 are screwed in the middle on top of each extension or side 13, and their ends are thus pressed down upon the rails 12, so as to hold them in place in their notches. The finger-case is thus made adjustable lengthwise to make possible a slight shifting to accommodate the fingers to the sheet-perforations. By thus mounting the fingers and their casing directly upon the music-box the latter needs no special adjustment in placing the same in relation to the instrument. This box can thus be placed anywhere with relation to a piano properly equipped with magnets 8 and associated mechanism.

The means preferably employed for moving the music-sheet and for leading it to the roller 5 in proper alinement are simple and effective. In moving toward the roller 5 the sheet first passes over the idle roller 15, between which and the tension-roller 16 it is smoothed out and finally brought into line. The driving-roller 17 is driven in any well-known way by the electric motor 18 and friction-gears 19 and 20. The sheet is held down to the driving-roller 17 by means of the weighted roller 21, the journals of which turn in inclined slots (shown in dotted lines) in the sides of the music-holder. The roller 16 has the same free bearing in the slots 22.

The desired weight for the roller 21 is best secured by metal—such as cast-iron, for instance; but I find a wooden surface preferable for bearing upon the paper sheet 3. Consequently I prefer to make this roller as shown in Fig. 7, wherein the wooden roller 21 is provided with cylindrical end weights 23, the journals which slip into the inclined slots being located like small necks between 21 and 23 on each end. By mounting the rollers as shown they can be easily removed at any time.

The driving-motor 18 is placed upon a platform 24 supported by the sheet-box 4.

In order to insure smooth and regular movement of the perforated sheet 3 down behind 5 and up in front of this box and to preserve perfect alinement at all times, I shape the box as indicated in Figs. 4, 5, and 6. Fig. 4 is a rear view showing how the width of the box slowly increases downward. This is also made 10 clear in Fig. 5, which is a top view of the open box. Since the paper must be guided into alinement on both sides of the music-roller 5, it is clear that the aperture at the top should have the same width as said sheet, or very 15 nearly so, both in front at 25 and at the back 26, (see Fig. 5;) but the widening downward taper is given the box to prevent catching and possible tearing of the paper as it passes downward. As shown in Fig. 6, the 20 bottom part of the box 4 narrows again from the rear 26 to the front 25, so that as the paper reaches the forward part of the bottom of the box it is guided into proper alinement, which it then preserves all the way up. The 25 degree of taper shown in the drawings is merely for clear illustration and is not intended as a guide or a limitation. A very small taper will be found sufficient.

One element of my invention is the pedal 30 applier and release, which may be used in connection with either pedal of the instrument, or with both. This device may be operated by any circuit-closer, but is controlled for the purposes of any given piece of music by 35 special perforations in the sheet, as at 27, for instance. (See Fig. 1.) It is also to be understood that although I have shown and described this device as used in connection with electromagnetic applying devices in certain 40 broad aspects it is capable of use with motive means of a different character.

As any given hole in the series 27 reaches its appropriate finger the magnet 28 is energized, and acting on armature 29 it raises 45 the well-known hammer-rail 30 by means of the pedal-bar 31. The spring-pressed armature 32 falls in behind armature 29 and keeps the pedal in action without further expense of current until another hole in the sheet permits energization of the magnet 33, which releases 29 and ends the pedal effect. This may 50 be applied to two or more pedals by using a corresponding number of perforations.

This device as a whole lends itself particularly well to use in connection with devices 55 whereby deposit of a coin in payment enables any one to start the self-playing machine in operation. For this purpose I preferably employ the means shown in Figs. 8 and 9. Here 60 current from the feed-wire 34 is brought to the trunk-wire 35 of the machine by means of a switch comprising an insulated spring 36, adapted to swing against the fixed terminal 37 of said switch. The spring 36 is fixed to 65 a main arm 38, pivoted at 39 and carrying

two pivoted levers 40 and 41. The lever 40 is a hooked latch, and the spring 42 tends always to hold it down in the position shown in both figures. The lever 41 carries an offset 43 at right angles to its extremity. This off- 70 set serves as an operating-abutment for movement by the coin-slide and is perforated, as shown at 44, to receive the point of the hook 45. (See Fig. 9.) This hook is carried upon an armature-latch 46, which is pivoted at 47, 75 and normally engages with the latch 40 when the latter is drawn forward, as in Fig. 9. The spring 48 tends to lift the armature 46 and the spring 49 bears upon the flat rear end of the lever 41, tending to hold it in the position 80 shown in Fig. 9, so that its perforation 44 will register with the hook 45. At 50 is shown a spring tending to open circuit at 36 and 37, as shown in Fig. 8. The magnet 51 is connected on one side to the common wire 35 and 85 on the other by wire 52 to one of the contact-fingers 7.

The coin-slide 53 and its immediate adjuncts are well-known devices. The slide has an opening or slot 2 to receive the coin, and a catch 90 54, pressed down by a spring 55, prevents full operative travel of the slide when the slot 2 is empty by dropping into said slot.

The operation of the coin-controlled means is as follows: The coin being placed within 2, 95 the slide is pushed in, its inner extremity catching the abutment 43 and carrying the arm 38, with its associated parts, into the position shown in Fig. 9. Here the hook 45 projects into the perforation 44 and the latches 100 40 and 46 are in engagement. These last prevent return movement of 38 when the slide 53 is withdrawn. They are not absolutely essential, as will be seen further on. With 38 in the position shown in Fig. 9 circuit is 105 closed through the motor 18, and the music-sheet moving the piano is played. At the end of each tune an appropriate aperture travels under the finger 7, connected to the wire 52, and the magnet 51 is energized. If 110 the slide has been withdrawn, downward movement of the armature 46, under the influence of 51, will release 38 and open the circuit at 36 37, thus stopping the motor 18. If, however, either by dishonest intention or oth- 115 erwise, the slide 53 is left in the position shown in Fig. 9, downward movement of the hook 45 with the armature 46 causes the lever 41 to tip on its pivot until the abutment- 120 offset 43 clears the end of the slide, when 38 will be free and with 41 will assume the position shown in Fig. 8.

In Fig. 8 the slide is shown drawn back as far as possible without allowing the catch 55 to fall into the opening 2 and shows in dotted lines the position of the hook 45 when 51 is energized. This figure shows that however 125 far the slide may be drawn back before it is caught by the catch 55 the releasing position of the hook 45 will always be such that it will 130

throw 43 under the slide, and so prevent operative return of the slide for closing circuit until said slide has been first pulled out far enough to prevent being thrust back again without a coin. The spring 49 acts when the slide is in the coin-receiving position to bring the abutment 43 up again into position to register with the hook 45. This part of my invention is not confined to the use of a magnet, as 51. Any desired operating means for moving the latch 46 and the hook 45 is within the scope of my present invention.

Various details of the above-described invention may be varied by one skilled in the art without departing from my invention, and I am not to be understood as limiting myself to the details herein shown and described.

What I claim is—

1. In an electric self-playing musical instrument, a music-sheet box, a common roller-terminal, contact-fingers and a case for said fingers; in combination with said pieces above and on opposite sides of said box, rails attached to said case and set into notches in the sides of said side pieces, and springs bearing upon said rails to hold them in place, substantially as described.

2. In an electric self-playing musical instrument, a music-sheet box, a common roller-terminal, side pieces over and on opposite sides of said box, rails set into notches in said side pieces, contact-fingers and a casing therefor adapted to slide upon said rails over said roller, substantially as described.

3. In an electric self-playing musical instrument, a music-sheet, a music-sheet box, side pieces over and on opposite sides of said box, a multiple-contact maker thereon and means on said box for feeding said sheet to said contact-maker, said means consisting of a lower and upper roller one of which is loosely journaled in slots in the sides of said sheet-box, substantially as described.

4. In a means for feeding the perforated sheet of a self-playing musical instrument, two slotted uprights and a gravity feed-roller composed of a middle or bearing section between said uprights and two weights outside of said uprights joined to the middle section by journals loosely fitted in the slots in said uprights, substantially as described.

5. A music-sheet box having sheet-feeding means at one end, the rear of said box gradually widening away from the end next said means while the front of said box has substantially the same width from end to end, substantially as described.

6. In starting means of the class described, a starting-arm, motive means therefor, a catch

or lock for said means engaging therewith in one position, a pivoted part on said arm normally in the path of said means and a releasing device for moving said pivoted part out of the line of movement of said motive means, said releasing device being adapted to move sufficiently far parallel to the path of the motive device to be operative until after said catch or lock has caught said motive means, substantially as described.

7. In combination with starting means for automatic musical instruments comprising a pivoted starting-arm; a reciprocating motive device, a pivoted latch on said arm, a pivoted lever on said arm having an abutment normally in the path of said reciprocating device, a spring acting to tilt said lever into said normal position, a second latch adapted to engage with said first latch, means for drawing said second latch out of engagement and means carried by said second latch for tilting said pivoted lever out of its normal position, substantially as described.

8. In a starting device of the class described, a motive slide, a catch adapted to arrest the same when partly moved through its operative path, a starting-arm adapted to be acted on by said slide and releasing means for said arm adapted to be operative at any position of said slide between that where the catch operates and that which corresponds to starting position of said arm.

9. In a starting means of the class described, a starting-arm, motive means therefor, a movable abutment for said means mounted on said arm, a releasing device for moving said abutment away from said motive means and operating means for said releasing device; in combination with a perforated music-sheet and means controlled thereby for supplying energy to said last-named operating means.

10. In a starting means of the class described, a starting-arm, motive means therefor, a switch operated by said arm, a movable abutment for said motive means mounted on said arm, a releasing device for moving said abutment away from said motive device and an electromagnet for operating said releasing means; in combination with an electric circuit comprising a common terminal and a contact-finger, said finger being connected electrically to said magnet and a music-sheet having a perforation adapted to be brought between said common terminal and said finger to energize said magnet.

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Witnesses:

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