No. 635,416. Patented Oct. 24, 1899.

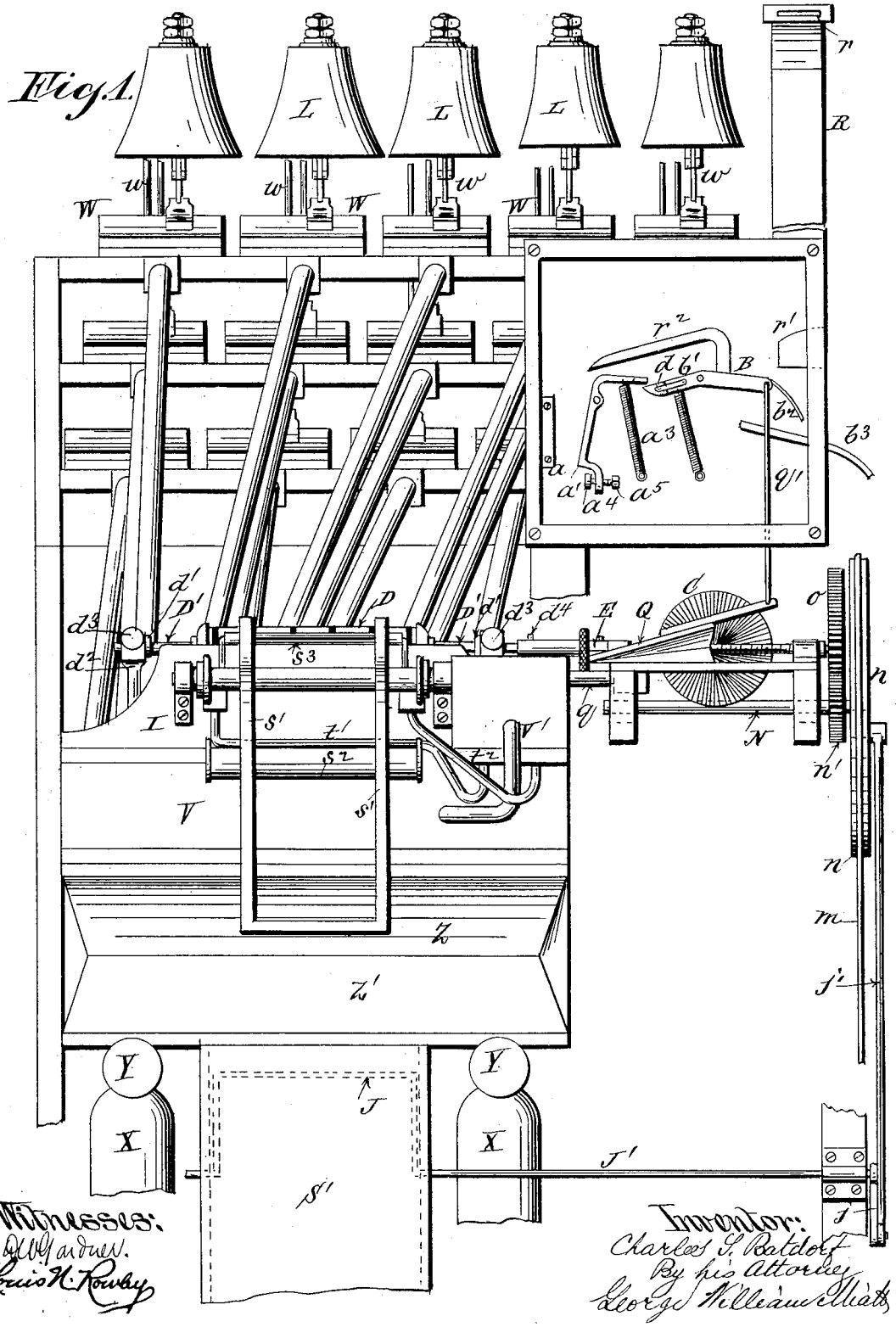
C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

(Application filed Nov. 15, 1898.)

(No Model.) 10 Sheets—Sheet 1.

Fig. 1.



Witnesses:
Louis M. Rowley

Inventor:
Charles S. Batdorf
By his Attorneys
George Williamson Watts

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No. 635,416. Patented Oct. 24, 1899.

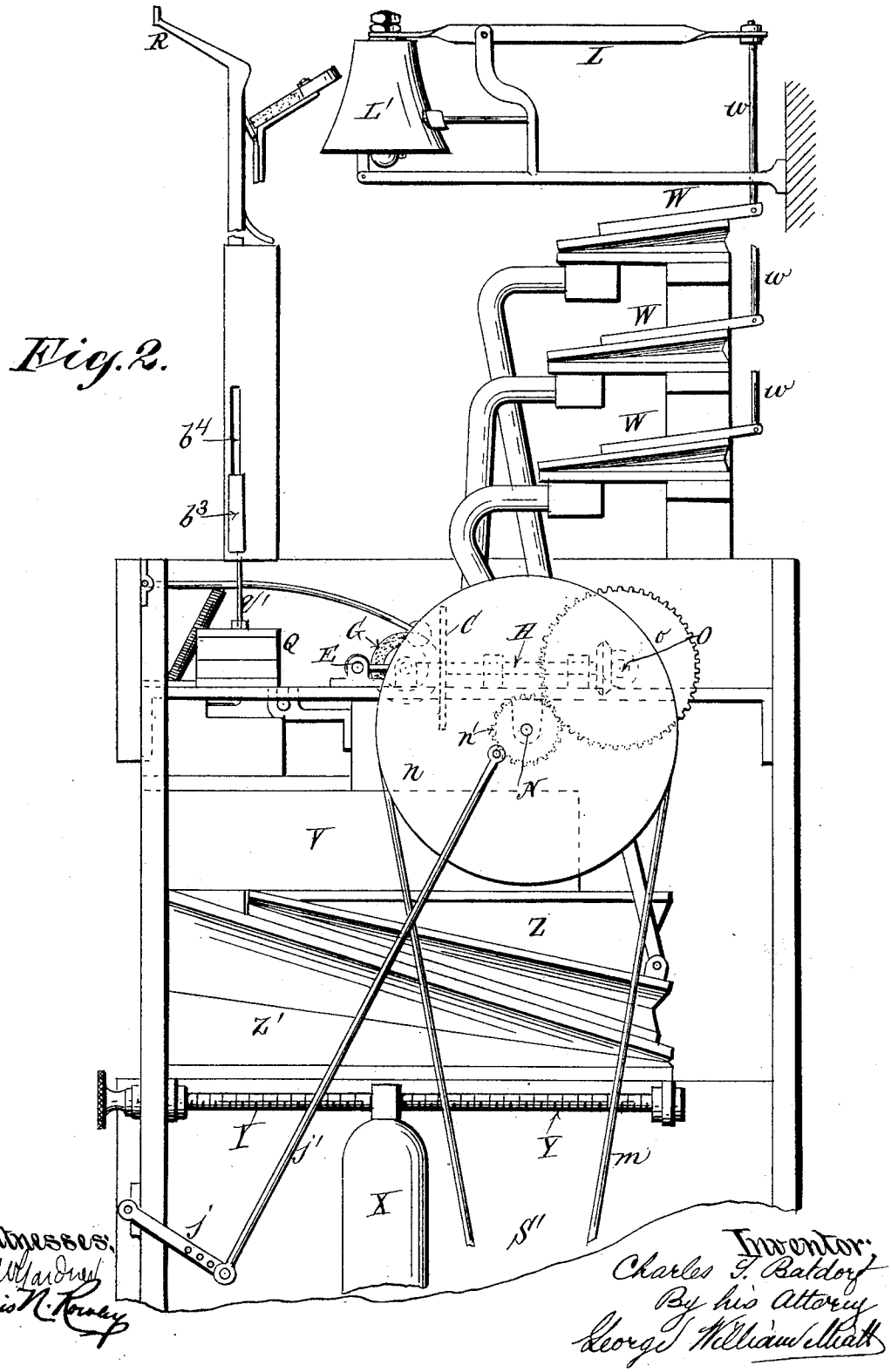
C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

(Application filed Nov. 15, 1898.)

(No Model.) 10 Sheets—Sheet 2.

Fig. 2.



Witnesses:
A. W. Gardner
Louis N. Rooney

Inventor:
Charles S. Batdorf
By his Attorney
George T. Williamson Watt

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No. 635,416. Patented Oct. 24, 1899.

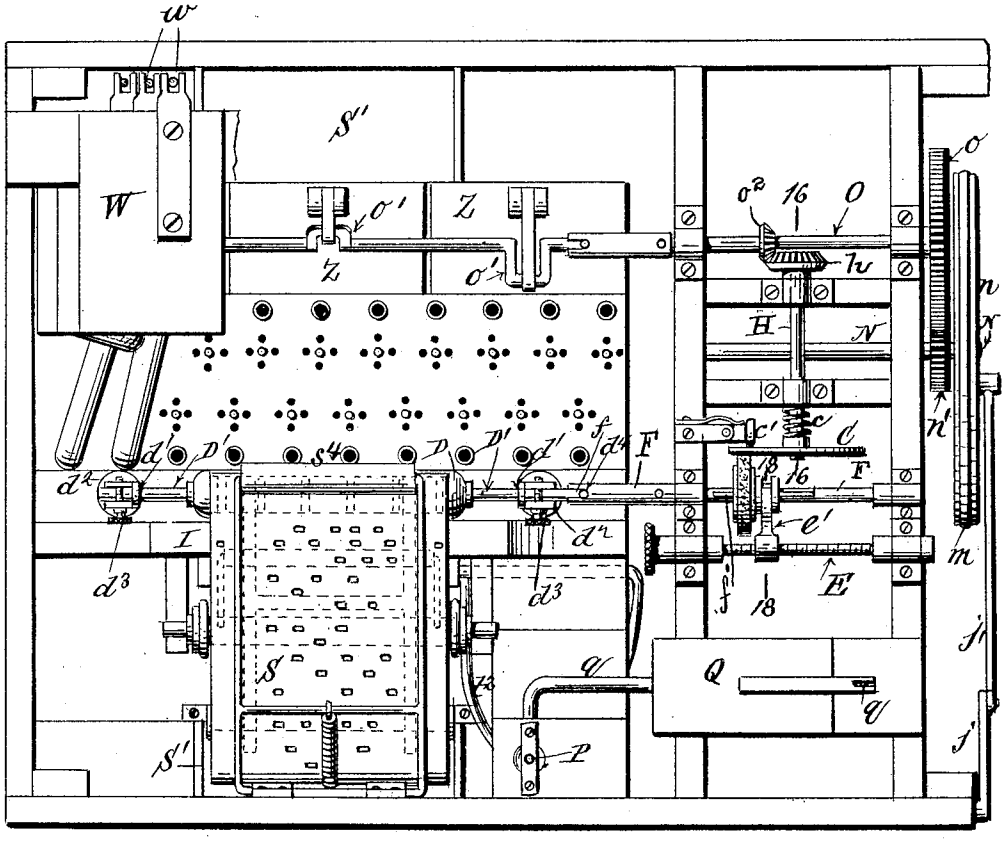
C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

(Application filed Nov. 15, 1898.)

(No Model.) 10 Sheets—Sheet 3.

Fig. 3.



Witnesses:
D. W. Gardner.
Louis K. Fowler

Inventor:
Charles S. Batdorf
By his Attorney
George William Meats

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C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

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Fig. 4.

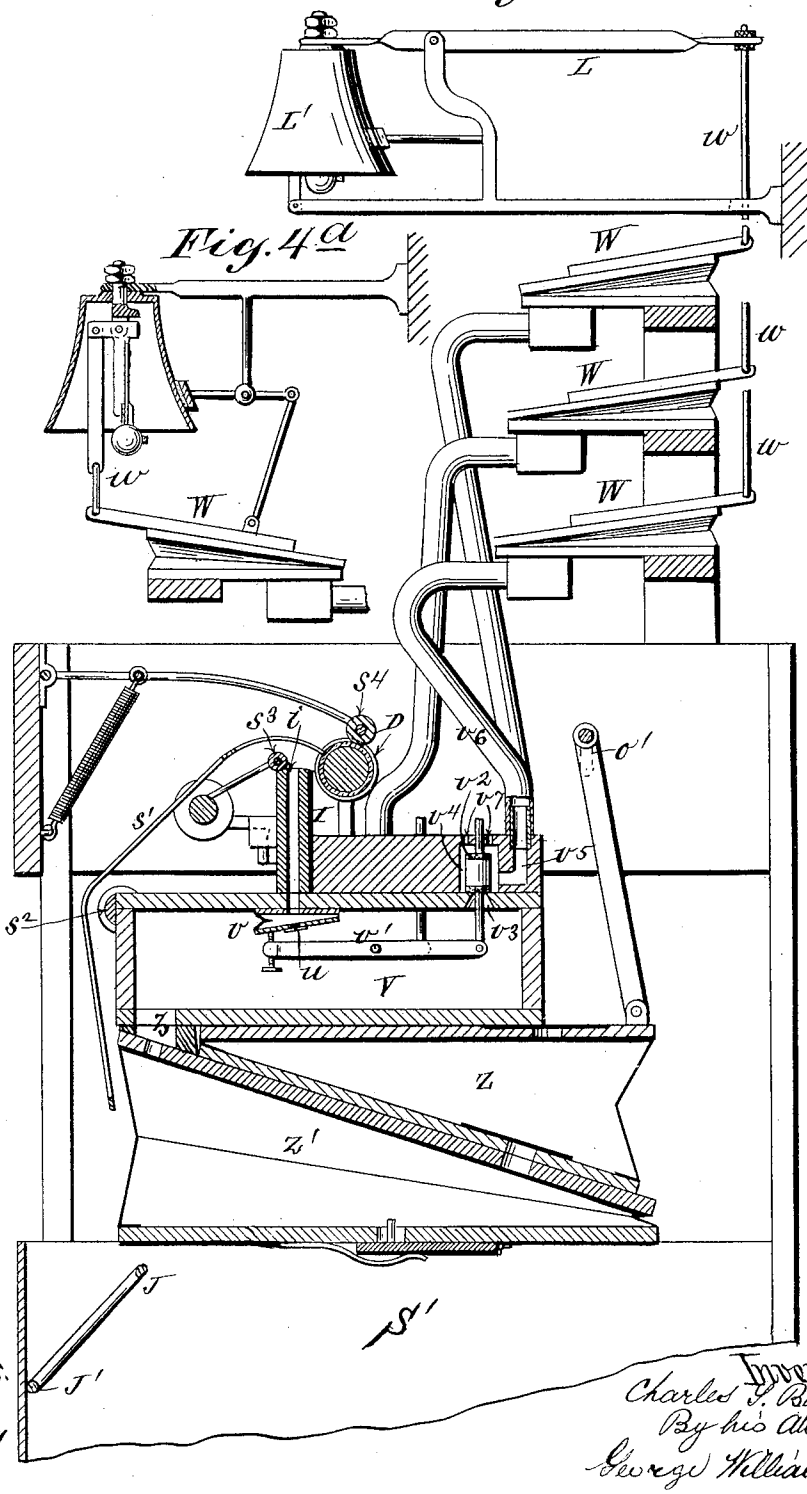


Fig. 4a

Witnesses:
D. W. Gardner.
Louis N. Rowley

Inventor:
Charles S. Batdorf
By his Attorney
George William Mial

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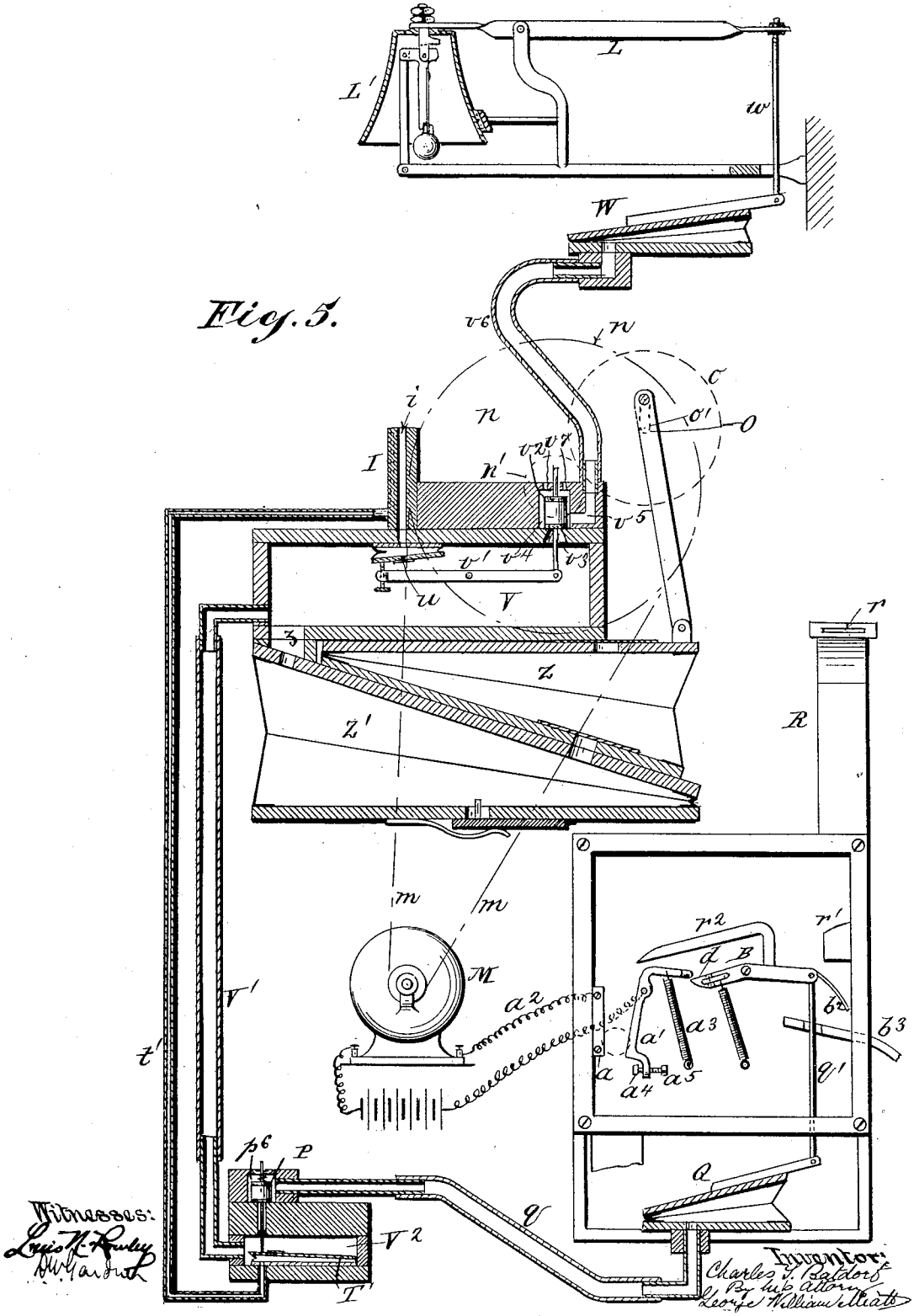
C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

(Application filed Nov. 15, 1898.)

(No Model.) 10 Sheets—Sheet 5.

Fig. 5.



Witnesses:
Louis M. Rowley
W. Gardner

Inventor:
Charles S. Batdorf
By his attorney
George William Elliott

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No. 635,416. Patented Oct. 24, 1899.

C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

(No Model.) (Application filed Nov. 15, 1898.)

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Fig. 7.

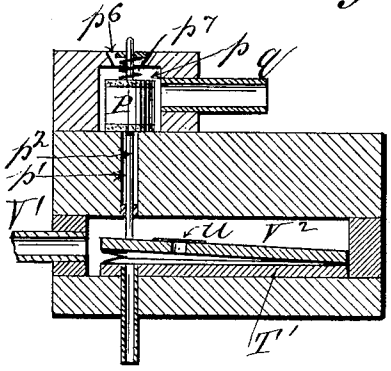


Fig. 8.

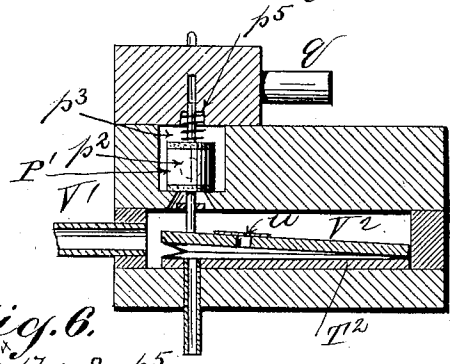


Fig. 6.

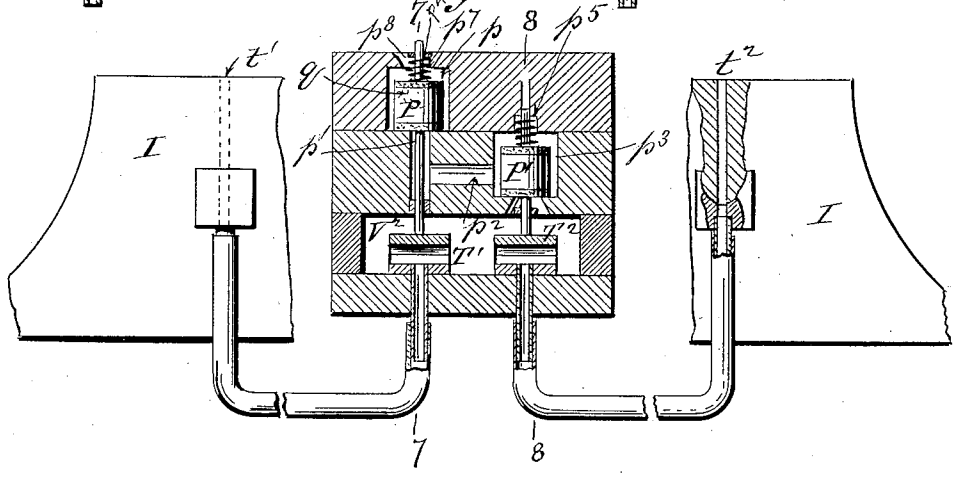


Fig. 9.

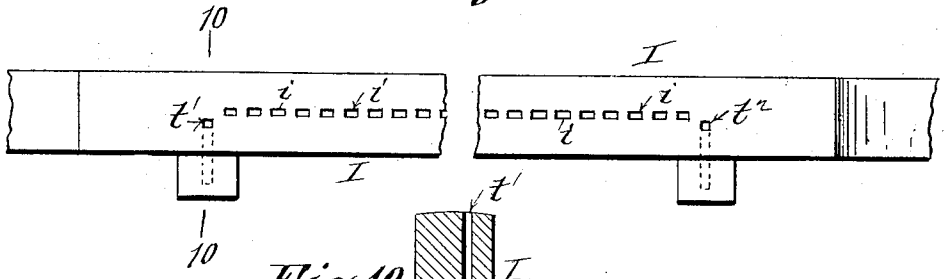
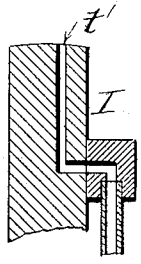


Fig. 10.



Witnesses:
A. W. Gardner.
Louis N. Rowley

Inventor:
Charles S. Batdorf
By his Attorney
George William Meath

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No. 635,416. Patented Oct. 24, 1899.

C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

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Fig. 11.

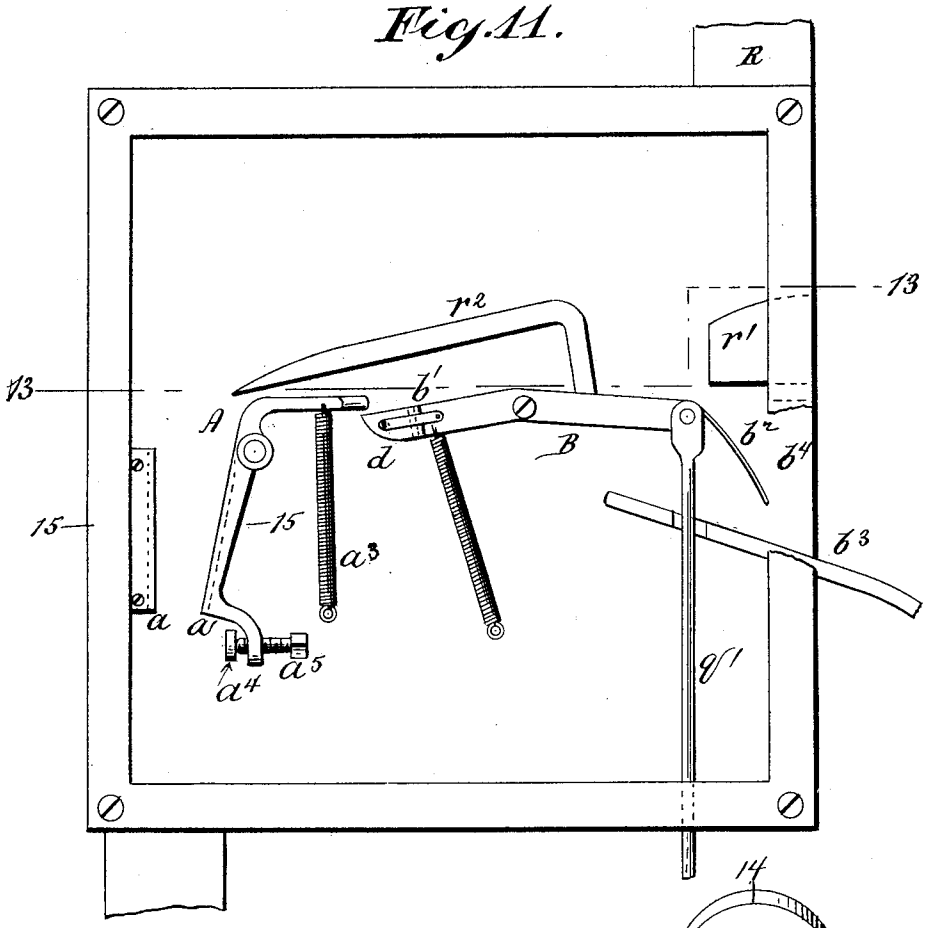
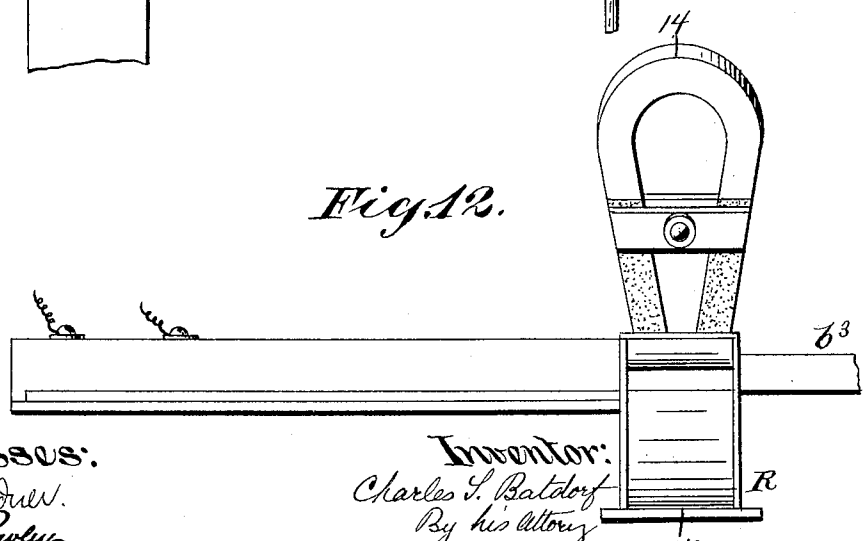


Fig. 12.



Witnesses:
D. W. Gardner.
Louis K. Rowley

Inventor:
Charles S. Batdorf
By his attorney
George William Mial

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 635,416. Patented Oct. 24, 1899.

C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

(Application filed Nov. 15, 1898.)

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Fig. 16.

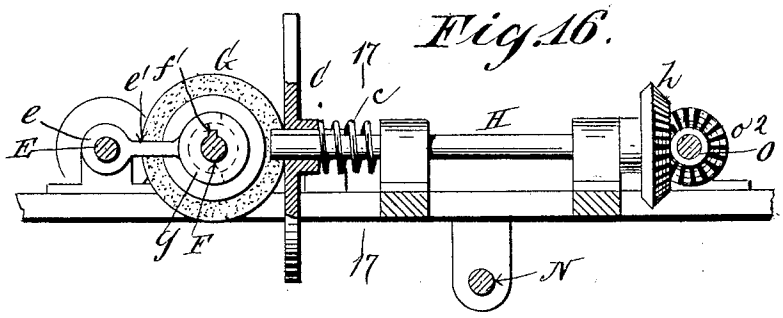


Fig. 17.

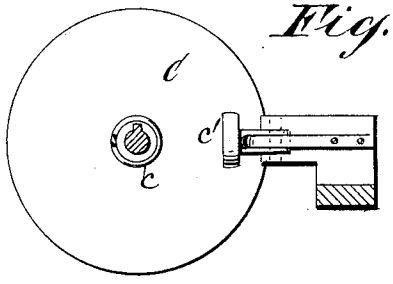


Fig. 18.

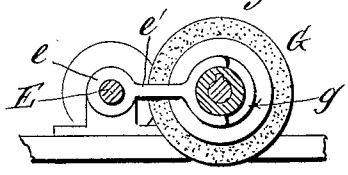


Fig. 15.

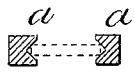


Fig. 14.

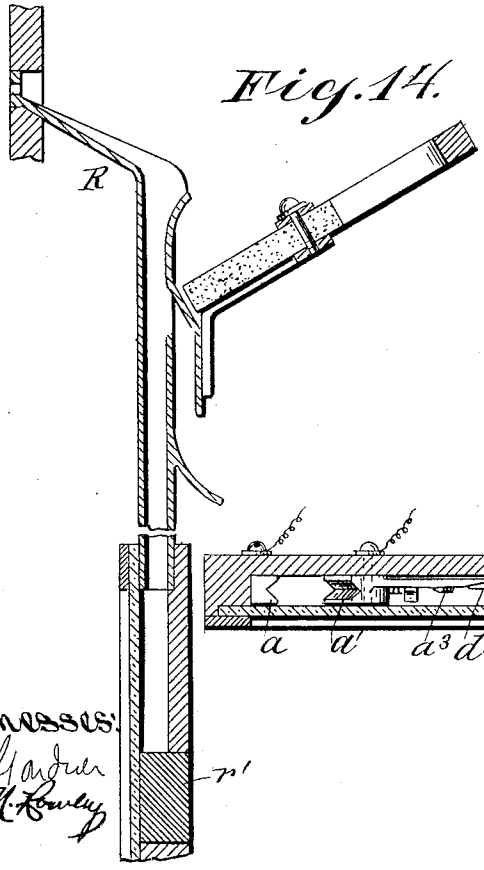


Fig. 19.

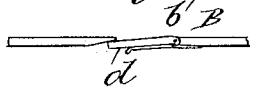
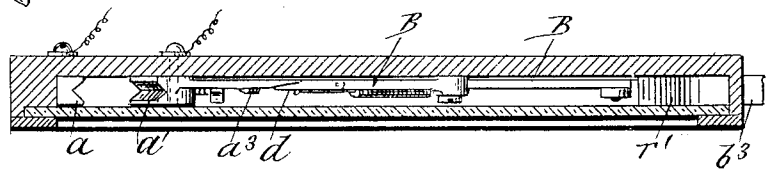


Fig. 13.



Witnesses:
J. W. Gaddis
Louis N. Bowley

Inventor:
Charles S. Batdorf
By his Attorney
George William Meade

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 635,416. Patented Oct. 24, 1899.

C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

(Application filed Nov. 15, 1898.)

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Fig. 20.

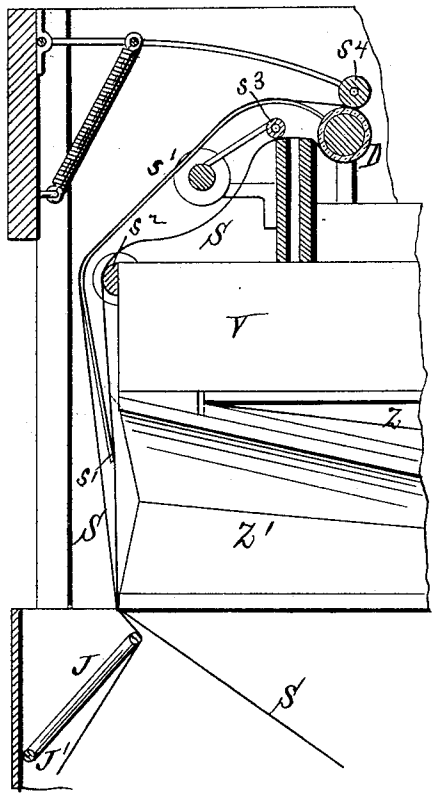


Fig. 21.

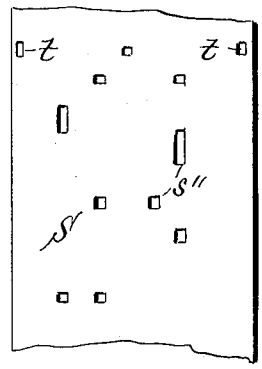
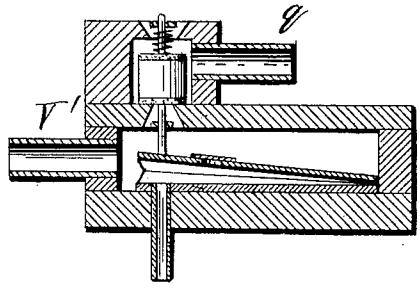


Fig. 22.



Witnesses:
D. W. Gardner.
Louis N. Rowley

Inventor:
Charles S. Batdorf
By his Attorney
George William Mott

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 635,416. Patented Oct. 24, 1899.

C. S. BATDORF.

PNEUMATIC SELF PLAYING INSTRUMENT.

(Application filed Nov. 15, 1898.)

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Fig. 23.

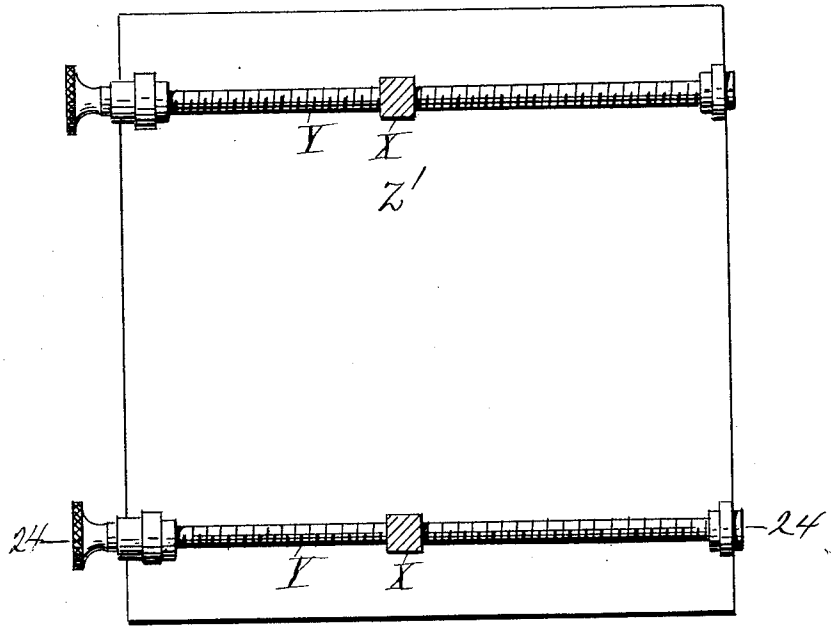
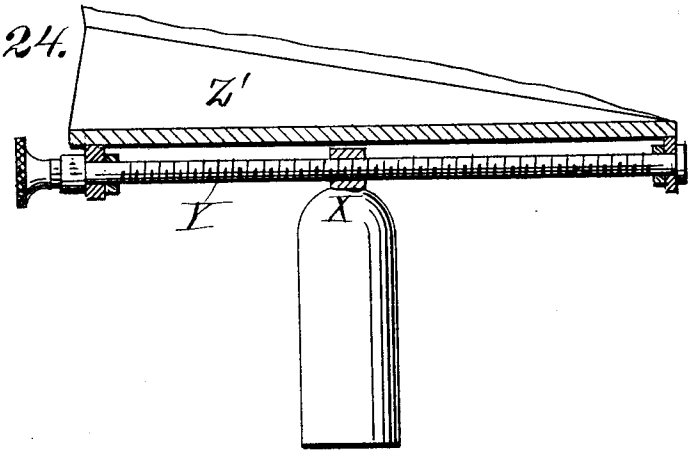


Fig. 24.



Witnesses:
A. W. Gardner.
James Connolly

Inventor:
Charles S. Batdorf
By his Attorney
George William Elliott

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES S. BATDORF, OF NEW YORK, N. Y., ASSIGNOR TO JAMES W. EATON, TRUSTEE, OF WEST ISLIP, NEW YORK.

PNEUMATIC SELF-PLAYING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 635,416, dated October 24, 1899.

Application filed November 15, 1898. Serial No. 696,522. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. BATDORF, a citizen of the United States, residing in the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Pneumatic Self-Playing Instruments, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My invention relates to automatic bell-ringing mechanism actuated primarily by a perforated music-strip; and the invention consists in the special construction, arrangement, and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a front elevation of the essential parts of my improved apparatus. Fig. 2 is a side elevation of the same; Fig. 3, a plan of the same. Fig. 4 is a vertical fore-and-aft section, partly in elevation; Fig. 4^a, a sectional view showing a modification; Fig. 5, a diagrammatic view, in sectional elevation, illustrating the operation of the essential parts of the apparatus. Fig. 6 is a diagrammatic view illustrating the construction and arrangement of parts by which the release of the coin is effected at the termination of a prescribed operation. Figs. 7 and 8 are sections upon plane of lines 7 7 and 8 8, respectively, Fig. 6. Fig. 9 is a view of the induction-board; Fig. 10, a cross-section thereof on plane of line 10 10, Fig. 9. Fig. 11 is a front view, upon an enlarged scale, of the coin-receiver; Fig. 12, a top view of the same. Fig. 13 is a sectional elevation upon plane of line 13 13, Fig. 11. Fig. 14 is a vertical section upon plane of line 14 14, Fig. 12. Fig. 15 is a section upon plane of line 15 15, Fig. 11. Fig. 16 is a sectional elevation upon plane of line 16 16, Fig. 3. Fig. 17 is a sectional elevation taken upon the rear side of the speeding-wheel. Fig. 18 is a section upon plane of line 18 18, Fig. 3. Fig. 19 is a top view of the tripping-latch, adjoining parts being broken away. Fig. 20 is a sectional elevation illustrating the feed of the music-strip; Fig. 21, a portion of the music-strip, showing the perforations for effecting the release of the operating mechanism; Fig. 22, a sectional view showing a modification of the releasing mechanism. Fig. 23 is a view of the under side of the secondary bellows; Fig. 24, a sectional elevation on line 24 24, Fig. 23.

Where the apparatus is to be used as a coin-controlled device, I prefer to employ a coin-receiver of special construction, as hereinafter set forth, although other forms of receivers may be substituted with relation to the other parts or the apparatus may be set in operation by other means without departing from the spirit and intent of my invention. The receiver shown and described herein embodies several of the features claimed specifically in my concurrent application, and I confine myself herein to certain features of construction which are not claimed therein, but which are especially applicable for use in connection with the apparatus herein set forth and designed to be operated through the medium of a coin, which closes an electrical circuit, and thereby brings into action an electric motor interposed in said circuit, which motor in turn transmits power to other operative parts.

R is the receiving-tube for conducting a coin from the receiving-slot r to a step r', from which it rebounds, passing over the guard r^2 into the actuating device A. The actuating device A consists of two opposed jaws or bearings $a\ a'$, respectively connected with opposite poles of an electrical circuit a^2 in such manner that the coin dropping between them forms an electrical bridge or connection closing the circuit, and thereby bringing into play an electrical motor M. One of the jaws, a, is rigid, while the other, a', is pivotally supported and in its normal position is inclined toward the first-named jaw a, being held in such normal position by a retractile spring a^3, which tends constantly to force the lower end of the jaw a' against a stop a^4, said lower end of the pivoted jaw a' being provided with an adjustable bearing-screw a^5 for the purpose of providing for the accurate adjustment of the said pivoted jaw a' with relation to the jaw a. By this means the opposed surfaces of the jaws $a\ a'$ may be regulated with accuracy with relation to the diameter of a prescribed coin, which the jaws are designed to retain between them until the completion of a prescribed operation.

The opposed edges of the jaws $a\ a'$ are pref-

erably formed with V-shaped grooves, as shown in Figs. 13 and 15. The jaws being set at an angle with relation to each other converging toward their lower ends, it necessarily follows that these grooved surfaces act as calipers, gaging in thickness as well as the diameter of the coin introduced between them. The depth and angle of the grooves are so regulated with relation to the inclination and adjustment of the jaws a a' that a coin of a given denomination which has been reduced in thickness by ordinary wear, but not sufficient to render it valueless, will be caught and held between the extreme lower edges of the jaws until released at the end of the prescribed operation, whereas a comparatively new coin of full thickness will be held between the jaws in a position above that of the thinner coin proportionate to the difference in thickness and the relative inclination of the jaws. By this arrangement false disks of metal of less thickness than that of a worn but serviceable coin will obviously drop through the jaws without effecting the prescribed operation of the musical apparatus or other mechanism connected with a receiver. It will thus be seen that my receiving-jaws gage both the diameter and thickness of an operative coin, a result not heretofore attained.

The pivoted jaw a' at the completion of a single operation of the machine is tripped by a rock-lever B, actuated, as hereinafter described, for the purpose of releasing the coin. In order to secure a quick return of the movable jaw a' to its normal position, the engaging end b' of the lever B is formed with a spring-latch d, which, while it trips the jaw a' in its upward movement, yields sufficiently to pass over the end of the said jaw without disturbing it as this end b' of the said rock-lever B is again depressed.

Attached to the rear end of the rock-lever B is a spring-guide b^2, projecting rearward over the inclined chute b^3 at the bottom of the vertical slot b^4. Pieces of lead or other soft non-resilient material falling upon the step r' do not rebound toward the receiving-jaws a a', but instead fall off the step r' and onto the end of the lever B, where they rest until that end of the lever is depressed to trip the jaw a'. When this action takes place, the spring-guide b^2 encounters the upper surface of the chute b^3, yielding thereto and forming a guide for the discharge of the lead or other spurious soft material, insuring its discharge through the opening b^4 and preventing the possibility of its escape into the interior of the apparatus.

The motor M is connected by a belt m with a comparatively large driving-wheel n upon the power-shaft N to effect a proper reduction in speed. Upon the power-shaft N is situated the pinion n', meshing into the gear-wheel o upon the counter-shaft O. This counter-shaft is provided with the cranks o' o', by which the primary and reserve exhaust-bellows Z Z' are operated, the latter of which, Z', communicates through the passage 3 with the main vacuum-chest V. In the vacuum-chamber V is a series of actuating-bellows v, one for each of a series of openings i in a "tracker" or induction-board I, over the upper edge of which the perforated music-strip S passes. Each actuating-bellows v is connected by a rock-lever v' with a puppet-valve v^2, normally covering a valve-opening v^3, communicating with a valve-chamber v^4, into which opens an exhaust-duct v^5, connected by a suitable tube or conduit v^6 to a bell-actuating bellows W. Openings v^7 connect each valve-chamber v^4 with the atmosphere.

Each of the bell-actuating bellows W is connected either directly or indirectly with a device for actuating the bell internally, and in so far as my present invention is concerned the mechanism for causing the vibration of the bell by means of an internal stroke is of secondary importance. Thus in Fig. 4 the rod w connects a bell-actuating bellows W with a lever L, carrying a bell L', which is actuated internally, after the manner set forth in Patent No. 578,253, dated March 2, 1897, while in Fig. 4^a a modification of this arrangement is shown in which the rod w connects directly with the internal bell-actuating device.

It is to be understood that the bell and actuating mechanism herein shown are used by way of illustrating the principle involved and that any other resonant musical instrument may be substituted for the bell and any suitable or equivalent device be employed for actuating the same internally, provided the same be connected and controlled by a pneumatic bellows, in turn controlled automatically by means for regulating the admission or exhaustion of air. Furthermore, it is to be noted in this connection that while the pneumatic devices herein shown and described are arranged to operate by exhaustion of air (the partial-vacuum system) the same result may obviously be effected in substantially the same manner under a system of pneumatic pressure above that of the atmosphere.

The endless music-strip of perforated paper or other material is drawn over the tracker or inlet-board 1 by means of the friction-roller D, preferably provided peripherally with rubber or other elastic material. This driving-roller D is mounted upon the extension-shaft D', having the collars d' d', and resting in the bifurcated bearings d^2 d^2, situated upon a stationary part of the apparatus, the shaft D' being retained in position by locking-screws or equivalent devices d^3 d^3. When in position in the bearings named, this extension-shaft D' is coupled to the speed-shaft F, mounted in suitable bearings upon the frame. The coupling of the shafts D' and F may be effected by any well-known mechanical expedient, as by the stud d^4 upon the shaft D' fitting in the slot f in the end of the speed-shaft F. Adjustable longitudinally upon the speed-

shaft F is the friction-wheel G, secured to said shaft by means which will cause it to rotate with said shaft, as by the feather f' or equivalent. The position of the friction-wheel G upon the shaft F is regulated by the screw E, mounted parallel to the shaft F, through the medium of the leading-nut e, provided with a bifurcated lateral arm e', which engages with the shouldered hub g of the friction-wheel G. Thus by turning the screw in one direction or the other the friction-wheel G may be adjusted toward or away from the axial line of the driving-disk C. This driving-disk C is feathered to the end of the cross-shaft H, having the miter-gear h, which meshes into the miter-pinion o^2 upon the counter-shaft O, thereby receiving motion and power, which it transmits through the friction-wheel G to the speed-shaft F and its extension D'. The disk C is pressed against the friction-wheel G by a spiral spring c, as well as by a tension or steadying roller c', opposed to the said friction-wheel G. The face of the disk C is preferably serrated or roughened to increase the frictional contact with the periphery of the wheel G. It is obvious that as the friction-wheel is made to approach to or recede from the axial line of the transverse shaft H the speed of the shaft F and extension D' will be correspondingly diminished or increased, so that the perforated music-strip S will pass over the induction-board more or less speedily.

The music-strip S passes from the containing-box S' under the tension-frame s', over the guiding-surface s^2, under the tension-roller s^3, over the induction-board I, around the driving-roller D, under the tension-roller s^4, over the tension-frame s', and thence back to the box S', in which it is deposited in even layers by the folder J upon the rock-shaft J'. This rock-shaft J' is provided with a crank j, which is connected by the pitman j' eccentrically to the wheel n upon the shaft N or to a crank on said shaft. It is to be understood that this arrangement for feeding and controlling the music-strip S may be varied and modified to meet the requirements of special use without departing from the spirit and intent of my invention.

Each perforated tune-strip controls and terminates the operation of the device, irrespective of the length of the tune or strip, in a simple, direct, and positive manner. To accomplish this, I provide the strip S with one or more terminal perforations t. These are preferably arranged in the margins of the strip beyond the tune-perforations s'', although they may be arranged in any other portion of the strip not common to any of the musical perforations, provided of course that the corresponding inlets t' t^2 in the induction-board are correspondingly situated.

In the arrangement shown in the accompanying drawings the releasing mechanism is duplex in character for the purpose of guarding against accidental stoppage owing to a possible crease or defect in one edge of the music-strip. For instance, the two marginal perforations t finally reach and coincide with the marginal inlets t' t^2 in the induction-board I. The inlets t' t^2 communicate each with the interior of one of the two bellows T' T^2, situated in the secondary vacuum-chest V^2, which is connected with a primary vacuum-chest V by the conduit V'. Resting upon the bellows T' is the stem of a puppet-valve P, situated in a chamber p, communicating with the atmosphere, the puppet-valve P when seated closing the port p', which communicates by the passage p^2 with the internal valve-chamber p^3, communicating with the interior of the secondary vacuum-chamber V^2 when the valve P' is raised. The stem of this latter puppet-valve P' rests upon the bellows T^2, and both puppet-valves P and P' are raised by the bellows T' T^2 against the resistance of spiral springs p^4 p^5. The chamber p communicates by means of the conduit q with the interior of the releasing-bellows Q, which is connected by means of the rod q' with the releasing-lever B of the receiving device R, hereinbefore described.

Air admitted through the strip S to the inlet t' expands the bellows T', (since there is a partial vacuum in the chamber V^2, owing to its connection with the chamber,) raising the valve P from its seat and closing the opening p^6 to the atmosphere and putting the chamber p in communication with the interior of the releasing-bellows Q. Should air be admitted at the same time through the port t^2 in the induction-board I, the bellows T^2 will also expand, raising the puppet-valve P' from its seat and opening communication through the passage p^2 with the valve-chamber p, thus establishing communication indirectly with the primary vacuum-chamber V and causing the releasing-bellows Q to collapse and release the coin or otherwise effect the stoppage of a prescribed operation. It will thus be seen that in the arrangement of the parts above described air must be admitted to both the inlets t' t^2 before the releasing-bellows Q can be collapsed, since the operation of either of the puppet-valves P P' independently would not open communication between the vacuum-chamber V^2 on the one side and the conduit q to the releasing-bellows Q upon the other. This arrangement is especially desirable where it is required to guard against the accidental release and stoppage of the apparatus by reason of an accidental kink, bend, or other irregularity in one edge of the strip, as it is not to be presumed that the strip would become bent or disordered in like manner at coinciding points.

In the case of the coin-releasing device it is important in that the coin-receiver shall be immediately returned to its normal position after the release of the coin in order to receive succeeding coins, which might otherwise pass without actuating the apparatus.

I accomplish this by forming the valve-chambers v^4 and p in such manner that they communicate with the atmosphere, (as through the vents v^7 and port p^6,) said openings being closed by the valve v^2 and the valve P, respectively, when said valves are raised to communicate with the vacuum, as hereinbefore set forth. Thus when the valve v^3 starts to return to its normal position air immediately enters through the vents v^7, not only expediting the closing of the valve, but also instantaneously relieving the partial vacuum in the bell-actuating bellows W and restoring the bell or other resonant instrument and its actuating parts to their normal positions. In like manner the release of the puppet-valve P′ instantaneously admits air to the releasing-bellows Q, causing it to rock back the lever B and allow the retractile spring a^3 to return the jaw a' to its normal position. In this connection it is to be understood that the bellows v and T′ T² are each provided with vent-valves u, which allow them to collapse *in vacuo* after the air-pressure has been cut off.

It will be readily understood that to increase or diminish the degree of percussion exerted by the internal strike upon the bell or equivalent resonant musical instrument it is desirable to regulate and control the pressure exerted by the atmosphere, whether applied internally, as hereinbefore intimated, or externally, as herein shown and described. I accomplish this by increasing or diminishing the resistance to be overcome in expanding or collapsing the primary or secondary bellows Z or Z′, preferably the latter. A convenient way of accomplishing this result is to suspend upon the under side of the bellows Z′ one or more weights X in such manner that they may be adjusted in position in relation to the fulcrum or hinge end of the bellows. Thus in the drawings the weights X X are shown as suspended upon screws Y, with which they engage, so that by turning the screws in one direction or the other the leverage exerted by the weight may be adjusted with delicacy in effecting a desired result. By this means I am enabled to augment or diminish the volumn of sound produced, accentuating or softening the tone at will.

In incorporating the coin-receiver R in the case of the apparatus it is inclosed in glass or other transparent medium in such manner as to expose the electrical contacts or holding-jaws a a' under all conditions of use. Since the coin is held by the jaws until the completion of a tune or other prescribed operation, there are decided advantages in providing for its exposure while performing its function as a circuit-closer, aside from the attractiveness of the exhibition. For instance, the substitution of a disk equivalent in size and weight to the prescribed coin can be immediately detected, or any other irregularity or obstruction observed and rectified.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In pneumatic musical apparatus, operated automatically by means of a perforated music-strip, two special air-induction passages communicating with operating and controlling valves which must be simultaneously opened in order to release the actuating mechanism, together with said musical strip formed with openings which may be simultaneously brought into coincidence with said air-ducts, for the purpose described.

2. In pneumatic musical apparatus operated automatically by means of a perforated strip, the combination with the strip-feeding mechanism, and with the power mechanism, of the disk C, spring c, on the shaft H, the friction-wheel G, feathered to the feed-shaft F, and provided with the shoulders g, leading-nut e, with the bifurcated arms e', and the adjusting-screw E, the whole arranged and operating substantially in the manner and for the purpose described.

3. In pneumatic musical apparatus, the combination of a music-strip S, formed with coinciding openings t, t, the induction-board I formed with inlets t', t^2, communicating with the pneumatics T′, T², said pneumatics situated in the vacuum-chamber V², the puppet-valve P, operated by the pneumatic T′, the puppet-valve P′, operated by the pneumatic T², the conduit q, and the releasing-bellows Q, arranged and operating substantially in the manner and for the purpose described.

4. In pneumatic musical apparatus the combination of the induction-board I, the perforated music-strip S, the containing-box S′, the tension-frame s', guide s^2, tension-roller s^3, driving-roller D, tension-roller s^4, and the folder J, the whole arranged and operating so as to insure a continuous, even feed of the music-strip to and from the induction-board I, substantially in the manner set forth.

5. In pneumatic musical apparatus the combination of a perforated tune-strip, the induction-board I, and pneumatics connected therewith for actuating bell-ringing mechanism, the vacuum-chamber V, the primary exhaust-bellows Z, and means for operating the same, the secondary bellows Z′, a rotatable screw suspended upon the under side of said secondary bellows Z′, and a traveling nut-weight X, adjustable upon and by means of the screw Y, with relation to the fulcrum end of said secondary bellows Z′, the whole arranged and operatiug substantially as and for the purpose set forth.

CHARLES S. BATDORF.

Witnesses:
D. W. GARDNER,
LOUIS N. ROWLEY.