(No Model.) 2 Sheets—Sheet 1.

H. L. ROOSEVELT, Dec'd.

A. ROOSEVELT, Executor.

PNEUMATIC APPARATUS FOR RINGING BELLS.

No. 414,998. Patented Nov. 12, 1889.

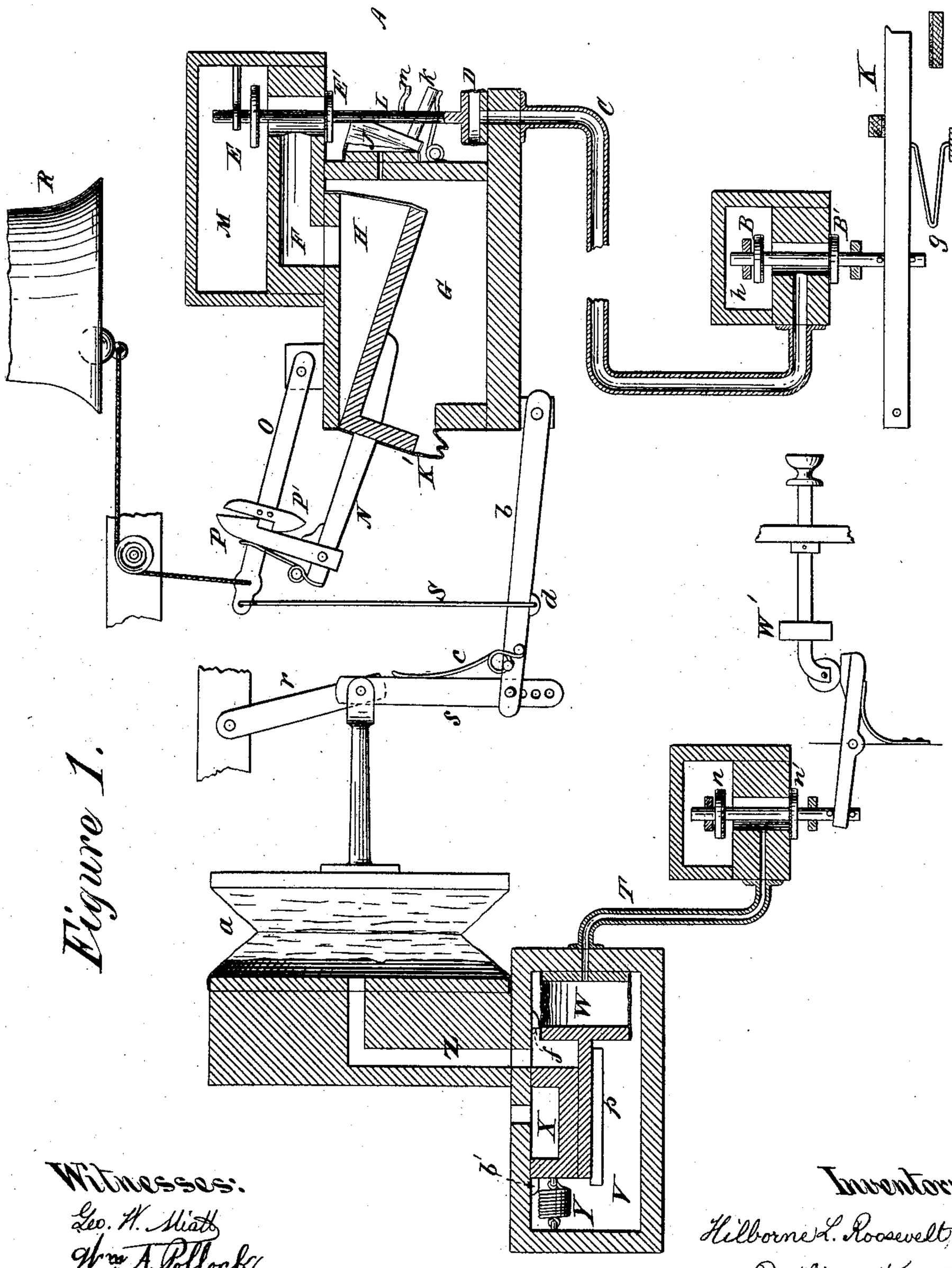

Figure 1.

Witnesses:
Geo. H. Miatt
Wm. A. Pollock

Inventor:
Hilborne L. Roosevelt
By his attorney
E N Dickerson Jr

(No Model.) 2 Sheets—Sheet 2.

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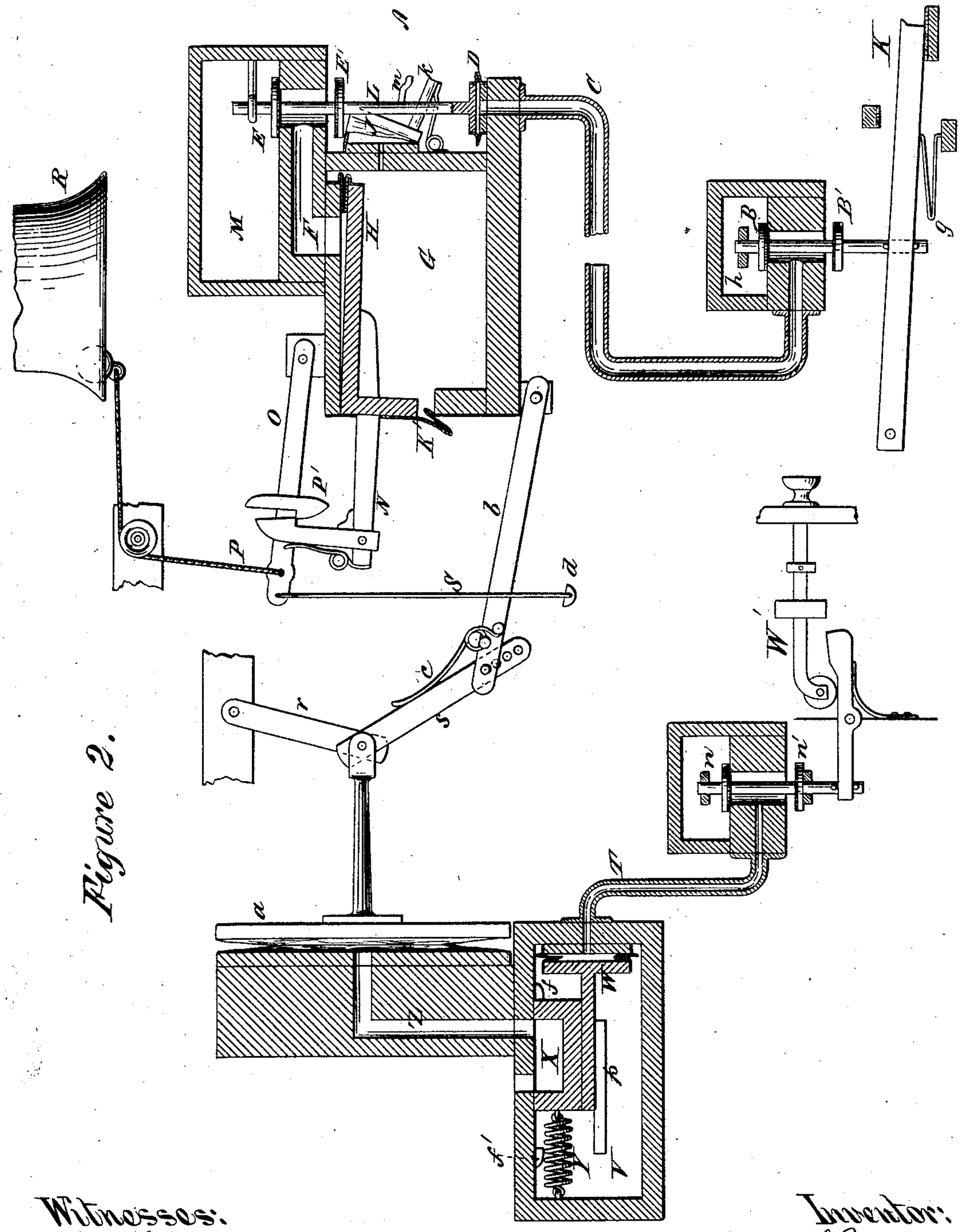

Figure 2.

Witnesses:
Geo. H. Miatt
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UNITED STATES PATENT OFFICE.

HILBORNE L. ROOSEVELT, OF NEW YORK, N. Y.; ALFRED ROOSEVELT EXECUTOR OF SAID HILBORNE L. ROOSEVELT, DECEASED.

PNEUMATIC APPARATUS FOR RINGING BELLS.

SPECIFICATION forming part of Letters Patent No. 414,998, dated November 12, 1889.

Application filed April 25, 1881. Serial No. 31,770. (No model.)

To all whom it may concern:

Be it known that I, HILBORNE L. ROOSEVELT, of the city, county, and State of New York, have invented a new and useful Pneumatic Apparatus for the Ringing of Bells or Performing other Mechanical Work at a Distance from the Controlling Operator, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

My invention consists, generally, in the combination of tubes, valves, bellows, and levers so contrived as that mechanical motion can be transmitted instantaneously by the operator to a distant point, and that which I conceive to be new in my invention is claimed in the claims annexed to this specification.

My invention will be readily understood from the accompanying drawings, which represent, generally, mechanism for striking a bell at a distance and mechanism for controlling the loudness of stroke of said bell.

Similar letters refer to similar parts in the two figures.

Figure 1 represents a view of the apparatus with the controlling-bellows open; Fig. 2, a view of the same apparatus with the bellows closed.

The right of the drawings represents mechanism for striking the bell. The left of the drawings represents the apparatus for controlling the length of stroke of the bell-striking mechanism.

My apparatus is intended to be operated by compressed air generated by an apparatus capable of maintaining a constant supply during the operation of the apparatus, and it is shown combined with mechanism by which it can be applied to an organ.

K represents a finger-key elevated by spring *g*. This finger-key controls the double valve B B′. The upper valve B is situated in a box *h*, in which a pressure of air is constantly maintained. The pipe C connects between the valves B B′, as partially shown in the drawings. When the valve is depressed, the pipe C is connected with the atmosphere. When elevated, the pipe C is connected with the box *h*.

At the distant end of this apparatus is located a bellows D, connected to pipe C. This bellows is capable of vertical movement, as is clearly shown, and controls the double valve E E′, the lower end opening into the atmosphere and the upper end opening into the box M. The pipe F enters the valve intermediate between the two disks E E′. This pipe F connects with the bellows H, located in the air-chamber G and controlling the bell-striking mechanism. It should be remembered that the chambers *h* and G are connected with the air-supply and are constantly filled with compressed air.

The bellows H, flexibly supported in the chamber G and connected thereto by the flexible connection K′, operates the bell-controlling lever N, to which is connected the hook P, which engages with the hook P′ on the lever O, connected to which is the mechanism for striking the bell R. Whenever the bellows H is closed, the arm N is depressed, also depressing the arm O until the hook P slips past the hook P′ and the bell-striking lever O returns to its upper position. The length of stroke of this lever O is determined by the arm S, provided with stop *d*, in a manner to be explained.

The hooks P P′ are so arranged as to engage automatically when the bellows H is open, but to be freed from each other at about the termination of the stroke of the arm N. Connected with the air-box G is the supplemental bellows J, connected to which is the arm *k*, which arm is elevated by a spring, and is arranged to engage with the arm *m* on the valve-stem L, so as to elevate said valve-stem and close the valve E′ when the bellows J is collapsed.

When the apparatus is in the position shown in Fig. 1, the pipe C is in communication with the air-box *h*, and the bellows D is consequently elevated, thereby opening the valve E and closing the valve E′ The bellows H is expanded by the pressure in the air-box M acting against the pressure in the air-box G, the apparatus being contrived so as to remain open in its normal condition when unaffected by any air-pressure. Consequently the arm N and hook P are elevated and are engaged with or ready to engage with

the hook P′ on the arm O and to make a stroke of the bell R. Now, suppose the key K be depressed, as shown in Fig. 2, the pipe C is opened to the atmosphere, and the bellows D is collapsed, opening the valve E′ to the atmosphere. The bellows H is consequently collapsed by the pressure in air-box G, the arms N and O are depressed, a stroke of the bell is made, and the arm O flies back. On releasing the key K it is apparent that the apparatus will once more assume the position shown in Fig. 1.

In order to avoid a false stroke when air is first pumped into the apparatus, I have devised the supplemental bellows J.

Before the apparatus for supplying air to my apparatus has been put in operation the bellows H would be depressed, as shown in Fig. 1, and the valve E′ would be open. Consequently as soon as the pressure enters the box G there would be a tendency to close the bellows H and make a false stroke of the bell.

The supplemental bellows J is arranged to be closed by a spring, and when closed its arm *k*, engaging with the stop *m*, holds the valve E′ closed. Consequently when pressure first enters the apparatus it strikes both sides of the bellows H simultaneously, passing into the air-box G and the air-box M and pipe F at the same moment. As soon, however, as the pressure is established in the air-box G the bellows J is expanded, thereby removing the arm *k* from the stop *m*, but meanwhile the pressure has been established through the pipe C in the bellows D, and this latter bellows holds the valve E′ closed. This operation prevents a false stroke when the air-pressure is first introduced into the apparatus.

The apparatus shown on the left of the figures for determining the length of stroke of the apparatus on the right of the figures is operated in substantially the same way, though varying somewhat in detail. As shown, the valve *n n′* corresponds with the valve B B′ on the right of the apparatus. The valve *n n′* is controlled by means of a stop W′. The bellows W corresponds with the bellows D and is operated in a similar manner. The bellows *a* corresponds with the bellows H and is operated by the valve X, which corresponds with the valve E E′. This valve is, however, made in the form of an ordinary D slide-valve and is located in the air-box V. It is drawn to the position shown in Fig. 1 by the coiled spring Y. In this position the bellows *a* is connected with the air-box V by pipe Z, and there being an equal pressure within and without the bellows W it remains in the position shown in that figure. When, however, the stop W′, is pushed in, as shown at Fig. 2, the pressure on the inside of the bellows W is released, and the pressure on the outside of said bellows in the air-box V collapses the said bellows, as shown in said figure. The valve X is suitably supported upon slideways *p* and its motion is limited by stops *f f′*. The bellows *a* controls the toggle-joint-lever system *r s b*. The spring *c* tends to straighten out the levers *b s* into the position shown in Fig. 2. It is very plain that the arm O can have a longer stroke when the apparatus is in the position shown in Fig. 2 than when the bellows *a* is expanded, as shown in Fig. 1. In Fig. 1 the stop *d*, engaging with the lever *b*, prevents the arm O from moving upward to as great a distance as it otherwise would.

It will be observed that the operating-bellows, both those controlling the valves and those doing the work, are normally extended or filled with air, and that they operate by the release of the air-pressure. A much quicker and more certain action is obtained in this way than when the bellows have to be extended by the introduced air before they operate upon the succeeding bellows or mechanical action.

I have shown one form of mechanism for carrying out the purposes of my invention; but it is obvious that many different forms could be devised which would operate upon the same principles and be in effect the same apparatus as that which I have here shown, and I do not, therefore, limit myself to the specific apparatus described.

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

1. In a pneumatic apparatus for performing mechanical operations at intervals, an operating-bellows controlled by a valve, which valve is controlled by a bellows under the control of the operator, combined with a regulating apparatus operated by an independent bellows automatically operated to regulate the movements of the operating-bellows, substantially as described.

2. The combination, in a pneumatic apparatus for doing work at a distance, of one bellows performing the mechanical operation, and a second bellows which interposes a stop into the path of movement of the mechanism operated by the first bellows when the said regulating-bellows is operated, substantially as described.

3. The combination of the bellows *a*, toggle-joint lever *r s*, and arm S, controlling the motion of arm operated through hook P by bellows H, substantially as described.

4. The combination of the bellows H in the chamber G, and bellows J, communicating with said chamber and having a projection operating stem L to close valve E′ when the box G is exhausted of air, substantially as described.

HILBORNE L. ROOSEVELT.

Witnesses:
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