J. P. HULDER.

CONTROLLER BELLOWS FOR PNEUMATIC MUSICAL INSTRUMENTS.

APPLICATION FILED MAY 15, 1909.

991,851. **Patented May 9, 1911.**

Fig. 1

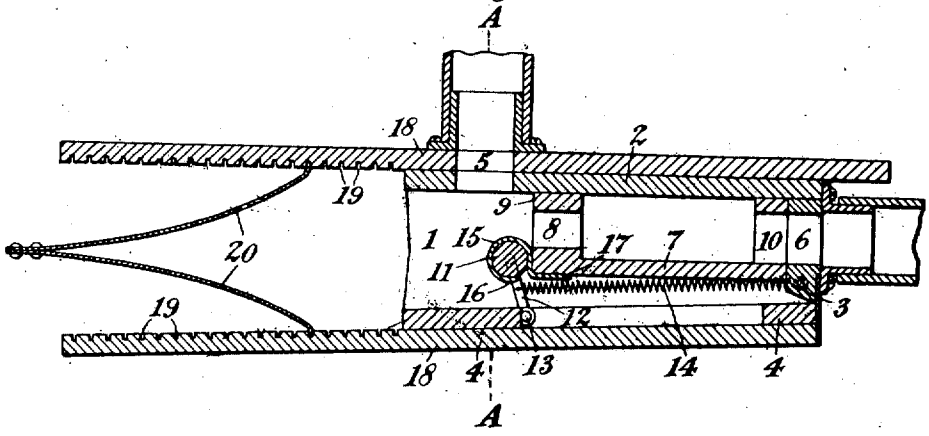
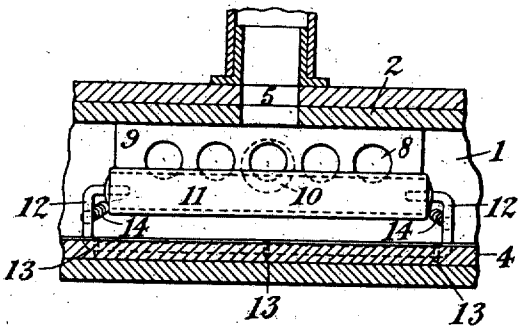


Fig. 2



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UNITED STATES PATENT OFFICE.

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CONTROLLER-BELLOWS FOR PNEUMATIC MUSICAL INSTRUMENTS.

991,851. Specification of Letters Patent. Patented May 9, 1911.

Application filed May 15, 1909. Serial No. 496,105.

To all whom it may concern:

Be it known that I, JOSEPH P. HULDER, a citizen of the United States, and a resident of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Controller-Bellows for Pneumatic Musical Instruments, of which the following is a full, clear, and exact specification.

This invention relates to improvements in controller bellows for piano players, player pianos, and other pneumatically operated musical instruments.

In the class of instruments to which my invention applies the motor actuating the perforated music sheet is operated under air tension. The speed of the motor is primarily regulated by means of a throttle or gate valve acting upon the air suction. In order, however, that the speed of the motor shall remain constant for any given position of the throttle or gate valve, it is necessary that the air tension on the motor be kept constant. Means must therefore be introduced to compensate or govern the variations in the state of air exhaustion created in the suction bellows by the irregular pumping of the treadles. To obtain this result I provide a controller bellows having simple and efficient means for automatically governing the air tension.

I attain the object of my invention by means of the construction and arrangement of parts hereinafter described and shown in the accompanying drawings in which—

Figure 1 is an elevation in section through the center line of the bellows; and Fig. 2 in an elevation in section through the line A A in Fig. 1, showing an end view of the channel box and the roller.

(1) refers to the controller bellows, made in any suitable size or shape and having a stationary leaf or wall (2), a hinge block (3), a suitably hinged movable leaf (4) and the usual collapsible side and end walls. An opening (5) is provided for the admission of air from the motor to the controller bellows, and another opening (6) leading to the suction bellows (not shown) forms a passage through which the air may be exhausted from the controller bellows.

In the interior of the controller bellows, and fastened to the stationary wall, I place a channel box (7) having a plurality of relatively small ports or channels (8) formed at one end (9) thereof, and a large port or channel (10) at its opposite end arranged in alinement with the opening (6) of the controller bellows.

A roller valve coöperating with the movable leaf of the controller bellows, is provided to act as a governor by automatically restricting the area of the ports (8) as the air tension in the suction bellows is increased. This valve comprises a roller (11) arranged to roll over its seat (9) at the end of the channel box, and supported on arms (12) which are suitably hinged to the movable leaf (as at 13). A spring (14) is fastened at its ends to the supporting arm and hinge block respectively, and is adapted to hold the roller valve in contact with its seat. A flexible flap (15), made of leather or other suitable material, is wrapped around the surface of the roller, substantially throughout its length, and is fastened at one edge (16) to the roller and at its opposite edge (17) to a part of the channel box below the air passages (8).

Extension boards (18) projecting beyond the opening end of the controller bellows, are fastened to the movable and immovable walls. These boards are provided with oppositely disposed notches (19) in which the ends of a leaf spring (20) may be placed to permit of the tension on the controller bellows being readily adjusted. As the boards (18) are at an angle to each other, it will be understood that by simply moving the spring (20) toward or away from the opening end of the bellows the tension thereon will be respectively increased or decreased.

The manner in which my invention operates is as follows: When the treadles of the suction bellows are pumped slowly the air tension will be low, that is there will be a limited exhaustion of the air, but when this action is increased in power or rapidity the air tension will be raised. As the controller bellows is in connection with the suction bellows, any variation in the state of air exhaustion in the latter will influence the action of the former. By means, however, of the extension boards (18) and the spring (20), the controller bellows may be adjusted so that it will remain distended under any desired degree of air tension. When the air tension in the controller bellows is increased beyond this point the roller valve actuated by its movable leaf will be raised from its

normal position causing the flexible flap to unroll against the ports (8) thereby restricting their area for the passage of air, and thus maintaining the air tension on the motor practically constant under varying degrees of air exhaustion in the suction bellows.

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

1. A controller bellows for pneumatic musical instruments comprising a collapsible bellows provided with an elongated exhaust port; a roller valve actuated by the movable wall of the bellows, disposed in the interior thereof and arranged to roll over the exhaust port to cause the gradual opening or closing of said port upon the variation of air tension in said bellows.

2. A controller bellows for pneumatic musical instruments comprising a collapsible bellows; a hollow block disposed within said bellows and fastened to its fixed wall, said block having a plurality of exhaust ports in its inner end; a roller carried by the movable wall of the bellows and arranged to roll over the inner end of said block; a flap secured at its ends to the roller and to the block below the exhaust ports, adapted to be wound or unwound by the roller so as to gradually cover or uncover the exhaust ports; and resilient means for holding the roller in contact with the block.

3. In a pneumatic action for musical instruments the combination with a pneumatic controller bellows, of valve means disposed within said bellows actuated by its movable part to govern the air tension therein; an expanding spring; and means for adjusting the expansive force of said spring, comprising extension members secured to the walls of the controller bellows and provided with a plurality of oppositely disposed notches adapted to receive the ends of said spring, substantially as described.

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

JOSEPH P. HULDER.

Witnesses:
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