J. LEISCH.

POWER PNEUMATIC FOR PLAYER PIANOS.

APPLICATION FILED OCT. 23, 1911.

1,066,927. Patented July 8, 1913.

Fig. 1

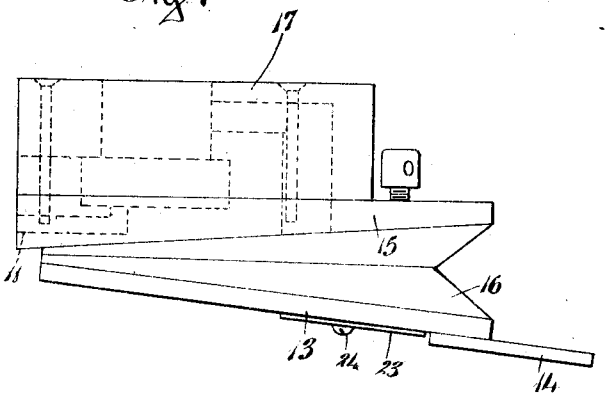


Fig. 2

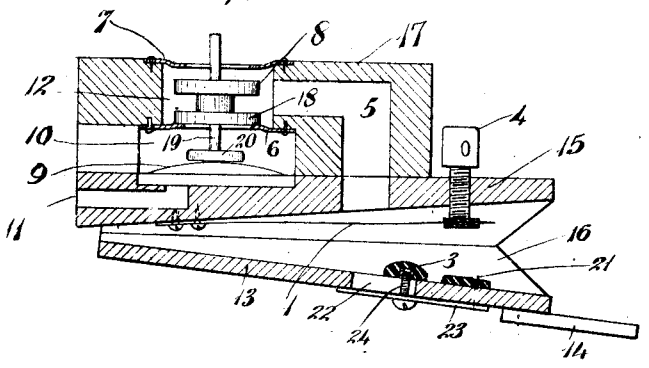


Fig. 3

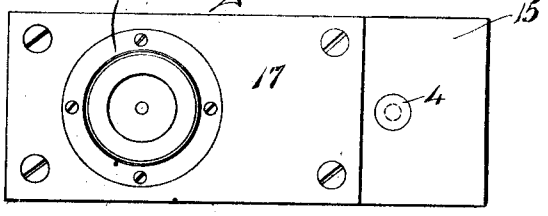
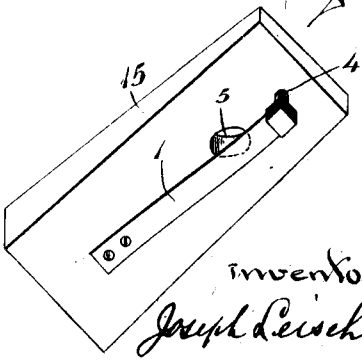


Fig. 4



Witnesses

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UNITED STATES PATENT OFFICE.

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POWER-PNEUMATIC FOR PLAYER-PIANOS.

1,066,927. Specification of Letters Patent. Patented July 8, 1913.

Application filed October 23, 1911. Serial No. 656,249.

To all whom it may concern:

Be it known that I, JOSEPH LEISCH, a citizen of the United States, and a resident of Tryon, in the county of Polk and State of North Carolina, have invented certain new and useful Improvements in Power-Pneumatics for Player-Pianos, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

The object of my invention is to provide a construction for regulating the action of the pneumatic whereby the mechanical movement of the pneumatic may be made to simulate the human touch of the musician in playing the keys of a piano in the ordinary way.

In ordinary piano action constructions, when the sticker of the piano action has been raised high enough to bring the hammer up to the string a release takes place, which is governed by a regulating screw on the jack. When this happens, the hammer bounds back and is checked until the jack can fly back underneath the hammer-butt, preparatory for another stroke of the key. During this action, the key has reached the bottom of its stroke, but there is usually a slight space between the point where the key is released and the cushion underneath the key. Many musicians have different ideas as to how much of a space this should be, and the vivacity of touch is determined by this space. The musician in playing unconsciously tends to release the key before it reaches the bottom of its stroke, and thus the pressure on the key is subject to a check not entirely mechanical and the actuation of the piano keys is different from a mere mechanical stroke.

My invention consists in providing, instead of a fixed stop, an adjustable resilient stop for the pneumatic which can be regulated to suit the desires and requirements of the individual operator as hereinafter particularly pointed out and claimed, whereby an effect may be produced, that shall simulate more nearly the human touch.

In the drawing, Figure 1 is a side elevation of my improved construction. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a top plan view. Fig. 4 is an inside perspective view of the pneumatic.

The pneumatic of the usual bellows type is made of a movable member 13, with an extension 14, to contact with and actuate the sticker of the piano action, the fixed member 15 and the bellows fold 16. Mounted on the fixed member 15 is the valve box 17 containing the secondary pneumatic pouch and valve for actuating the pneumatic.

12 is the valve chamber, with valve seat plates 6 and 7, and in which is mounted the double valve comprising the valve disks 8 and 18, with the stem 19 carrying the button head 20 projecting downwardly into the vacuum chamber 10 and resting on the pouch 9, covering the passageway 11, which extends to the primary valve or tracker board. The valve chamber 12 is connected by the passageway 5 with the interior of the pneumatic. When the air is released through passage 11, through the tracker board in the usual way, the pouch 9 is inflated, which raises the valve, closing disk 8 against the seat plate 7 and thus cutting off the outer air and raising the valve disk 18 to open the vacuum chamber to the passage 5 into the pneumatic, and actuates the pneumatic in the usual way to cause the extension 14 to raise the sticker of the piano action.

Mounted inside the bellows pneumatic is a strip of spring metal 1, which is secured by screws or otherwise near the inner end of the fixed member of the pneumatic and the free end of which bears upon the inner end of a screw capstan 4. The spring is adjusted toward and away from the movable member 13 by the capstan 4, mounted in and extending through the fixed member of the pneumatic, while underneath this spring plate on the movable member is located the cushion 3, so that instead of the cushion coming in contact with a fixed abutment, it comes in contact with the spring. A cushion or strip of felt 21 is also provided to prevent any metallic contact with the end of the regulating capstan, and the spring 1 is likewise provided with a felt washer for the same purpose. By adjusting the capstan, the spring is regulated for distance of stroke, resiliency of touch and to absorb any shock in the mechanical movement. In adjusting the stroke by the capstan 4, the lift of the extension 14 should be just sufficient to lift the hammer of the piano action and operate the release. In making this adjustment, it might sometimes happen that the maximum benefit of the spring 1 could not

be obtained with the cushion 3 in fixed position. The cushion 3 is therefore preferably mounted on a screw 24 which projects through a slot 22 in the member 13 of the pneumatic while a plate 23 is attached to the screw either inside or outside the pneumatic, to cover the slotted opening for all positions of adjustment. In this way, the cushion can also be adjusted for its contact with the spring. When very slight resilient effect is desired, the capstan will be withdrawn so as to provide for a full stroke of the pneumatic and the cushion 3 will be advanced to strike the spring close to the capstan. To obtain the full advantage of the resilient cushion, the capstan screw will be advanced and the cushion will be moved to strike the spring farther from the capstan.

It will be evident from the foregoing description that the resilient check given the movable member of the pneumatic by contact with the spring 1 is of the same nature as the unconscious check given by the human finger in striking the keys in the ordinary playing of the instrument, and this checking of the stroke of the pneumatic may be regulated with great delicacy, thus tending to simulate the human touch. More than this, and of special importance is the effect of the spring in returning the movable member of the pneumatic to its normal position under the resilient impulse.

It is evident in playing the keys of a piano, that rapidity of stroke depends for one thing on the rapidity of withdrawal of the finger after the key has been struck. It is also evident that rapid action of the pneumatic is dependent on the quick return of the movable member. With my construction, the resiliency of the spring instantly returns the movable member so that extreme rapidity of stroke is attainable.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a player piano, a power pneumatic having a movable member, a yielding spring to form a check stop and return for the movable member, and an adjustable unyielding stop for said member, a contact cushion on said movable member for the fixed stop, and an adjustably mounted cushion on said member for the spring stop.

2. In a player piano, a power pneumatic having a movable member and a fixed member, a yielding spring mounted inside of the pneumatic to form a check stop and return for the movable member, and an adjustable unyielding stop for said member, a contact cushion on said movable member for the fixed stop and an adjustably mounted cushion on said member for the spring stop.

3. In a player piano, a power pneumatic having a movable member, a yielding spring with means for adjusting the position of the spring to form an adjustable check, stop and return for the movable member, said adjusting means also adapted to form a fixed stop for said member, and separate contact cushions on said member for each stop.

4. In a player piano, a power pneumatic having a movable member, a stop for the movable member normally out of contact therewith comprising a strip of resilient metal, with an adjusting screw to regulate the position of the free end to vary the position of the stop, said screw arranged so as to form a fixed stop for said member and separate contact cushions on said member for each stop.

5. In a player piano, a power pneumatic having a movable member and a fixed member, a stop for the movable member thereof comprising a strip of resilient metal, secured at one end to the fixed member and normally out of contact with the movable member, with a capstan adjustable from outside the pneumatic against which the free end of the spring abuts to adjust the position of the free end of the strip, and separate contact cushions on said member for each stop.

6. In a player piano, a power pneumatic having a movable member, a fixed stop for the movable member, a stop for the movable member comprising a strip of resilient metal abutting against the fixed stop and normally out of contact with the movable member, mounted within the pneumatic to serve as an adjustable stop therefor, with an adjustable cushion on the movable member to vary the point of contact therewith, means for adjusting the fixed stop for said movable member and a contact cushion therefor on said member.

7. In a player piano, a power pneumatic having a movable member and a fixed member, a stop for the movable member thereof, comprising a strip of resilient metal, secured at one end to the fixed member and normally out of contact with the movable member, with an adjusting screw to regulate the position of the free end to vary the position of the stop and the amount of movement of the movable member of the pneumatic, with an adjustable cushion on the movable member to vary the point of contact therewith to conform to the adjustment of the spring, and an additional cushion on the movable member shorter in height than the said adjustable cushion for contact with the adjusting screw.

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