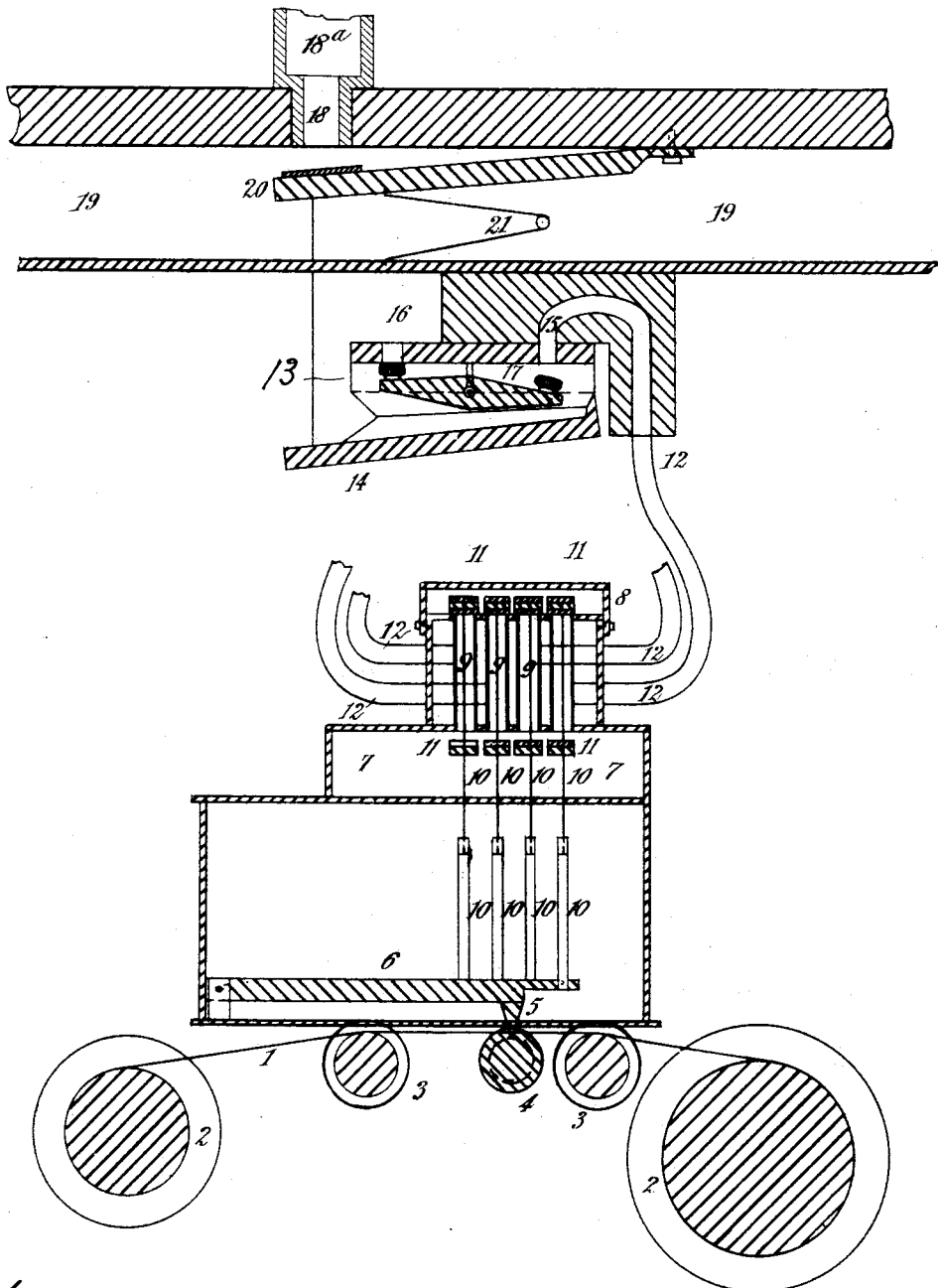


(No Model.)

D. IMHOF.  
AUTOMATIC MUSICAL INSTRUMENT.

No. 540,059.

Patented May 28, 1895.



Witnesses.  
Thos. A. Green  
Robert G. Smith.

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Att'y.

# UNITED STATES PATENT OFFICE.

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## AUTOMATIC MUSICAL INSTRUMENT.

**SPECIFICATION** forming part of Letters Patent No. 540,059, dated May 28, 1895.

Application filed February 19, 1895. Serial No. 538,986. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL IMHOF, a subject of the Emperor of Germany, residing at Vöhrenbach, Baden, in the Empire of Germany, have invented certain new and useful Improvements in and Relating to Automatic Musical Instruments, of which the following is a specification, reference being had to the accompanying drawing.

10 This invention relates to automatic musical instruments.

Whereas the devices heretofore used for operating the clack valves or hammers of musical instruments are sufficient for such instruments as have rollers provided with pins, these devices are inadequate when a perforated music sheet takes the place of the pin rollers. The movement of the keys is not so precise. Consequently the device operates 20 with less precision than in the case of the roller system. Therefore these musical instruments are of inferior value. This inconvenience is remedied by the aforesaid invention which provides for just as precise a sounding of the notes with perforated music sheets as with the roller system.

As shown in the figure of the accompanying drawing the perforated music sheet 1 is wound upon and from the rollers 2. Rollers 3 serve 30 for guiding this music sheet which passes over a roller 4. In this roller are grooves into which the pin 5 of the key 6 can drop when it passes into a hole in the music sheet.

Use is made of a box 7 with compressed air 35 and a box 8 communicating freely with the atmospheric air. Tubes 9 extend from the box 7 to the box 8. Each of these tubes corresponds to a key and is placed directly above the latter. The tubes are not placed directly 40 beside each other, as the keys in this case would occupy too great a width for the music sheet, but they are alternated. Rods or wires 10 coming from the keys extend through these tubes and carry valves 11 above and below. 45 When the point of the key bears upon the music sheet the tubes are closed from below, and when it passes into a hole in the music sheet it drops in consequence of the weight of the valves, opens the tube below and closes 50 it above, this latter case being indicated in the drawing. Each of these tubes communi-

cates through a tube 12 with a bellows 13 the bottom 14 of which is movable. The bellows has two openings 15 and 16. Through the openings 15 the air can enter from the tubes 55 9, while through the openings 16 the bellows can discharge its air to the outside. In the bellows is arranged a rocking lever 17 which alternately closes one or the other of the two openings and is heavier on the side of the 60 opening 16. Above this device is the wind chest 19 with holes 18 for the reeds 18<sup>a</sup>, these holes 18 being adapted to be closed by flaps 20 and springs 21.

For playing the musical instrument the operation is as follows:—When the point 5 of 65 the key bears upon the music sheet, all the parts are at rest and the lower valves close the tubes, so that no compressed air can pass into the bellows 13, while the upper valves 11 70 are open and connect the tubes with the atmospheric air. Accordingly the rocking lever occupies the position wherein the opening 15 and the flap 20 are closed. When however 75 the key drops into a hole in the music sheet the lower valves open the tube 9, whereby the compressed air is caused to pass from the box 7 into these tubes, is conducted through the tubes 12 into the bellows 13, forcing down the end of the rocking lever which has closed the 80 opening 15, and closing at the same time the other opening 16. Thus the compressed air in the bellows 13 forces down the bottom 14 which opens the flap 20 connected with it, whereupon the reed receives air from the wind chest 19. 85 As soon as the key rises again onto the music sheet the tube 9 is at once closed from below and the compressed air can no longer enter it, but at the same time the tubes 9 are opened 90 above toward the open box 8. At this moment the compressed air in the bellows 13 can escape through the tubes 12, while the left-hand part of the rocking lever drops down, the opening 16 is uncovered and the opening 15 is closed, 95 so that the pressure of the spring 21 can instantly close the flap 20. In lieu of the flaps 20, hammers may be operated to set the strings of a stringed instrument, drum sticks or the like in motion.

It will be seen that the essential part of the 100 improved arrangement is constituted by the bellows 13 with the rocking lever 17. As soon

as the compressed air arrives it blows open the valve for the opening 15 and at the same time closes the opening 16, while on the cessation of the air pressure the rocking lever reverses its position and during its movement allows the compressed air to escape from the bellows through the two openings 15 and 16.

What I claim is—

1. In a pneumatic action for musical instruments, the combination with the bellows having two openings communicating respectively with the atmospheric air and with a conduit for supplying compressed air to the bellows, of a rocking lever provided at its opposite ends with valves for alternately controlling said openings, a reservoir for supplying compressed air to said conduit, and means for alternately placing the said conduit in communication with said reservoir and with the atmospheric air, substantially as described and for the purpose specified.

2. In a pneumatic action for musical instruments, the combination with the bellows having two openings communicating respectively with the atmospheric air and with a conduit for supplying compressed air to the bellows, of a rocking lever provided at its opposite ends with valves for alternately controlling said openings, a tube communicating with said conduit and communicating with a compressed air reservoir and with the atmospheric air, valves for alternately placing said tube in communication with said reservoir and with the atmospheric air, and means for simultaneously operating said valves, substantially as described.

3. In a pneumatic action for musical in-

struments, the combination with the bellows having two openings communicating respectively with the atmospheric air and with a conduit for supplying compressed air to the bellows, of a rocking lever weighted at one end and provided at its opposite ends with valves for alternately controlling said openings, a reservoir for supplying compressed air to said conduit, and means for alternately placing the said conduit in communication with said reservoir and with the atmospheric air, substantially as described.

4. In a pneumatic action for musical instruments, the combination with the bellows having two openings communicating respectively with the atmospheric air and with a conduit for supplying compressed air to the bellows, of a rocking lever provided at its opposite ends with valves for alternately controlling said openings, a tube communicating with said conduit and communicating at its opposite ends respectively with a compressed air reservoir and with the atmospheric air, valves connected together and operating to simultaneously open one end and close the other end of said tube, and means for operating said valves for alternately placing said tube in communication with the said reservoir and with the atmospheric air, substantially as described.

In witness whereof I have hereunto set my hand this 21st day of January, 1895.

DANIEL IMHOF.

Witnesses:

EMIL RUEF,  
Z. SCHIACH.