

P. WUEST, JR.
 EXPRESSION MECHANISM FOR SELF PLAYING PIANOS.
 APPLICATION FILED APR. 20, 1908.

965,354.

Patented July 26, 1910.

2 SHEETS—SHEET 1.

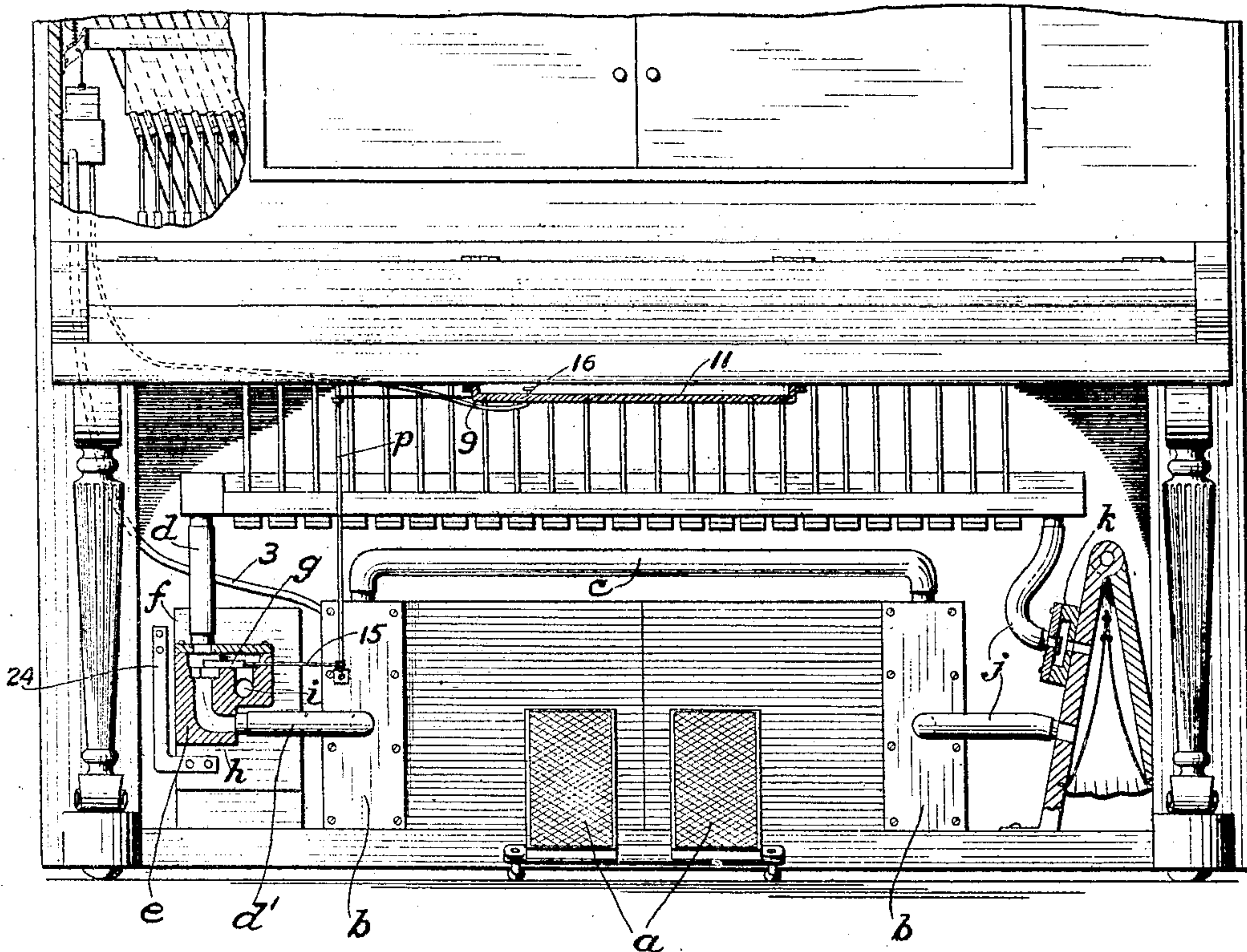


FIG. 1.

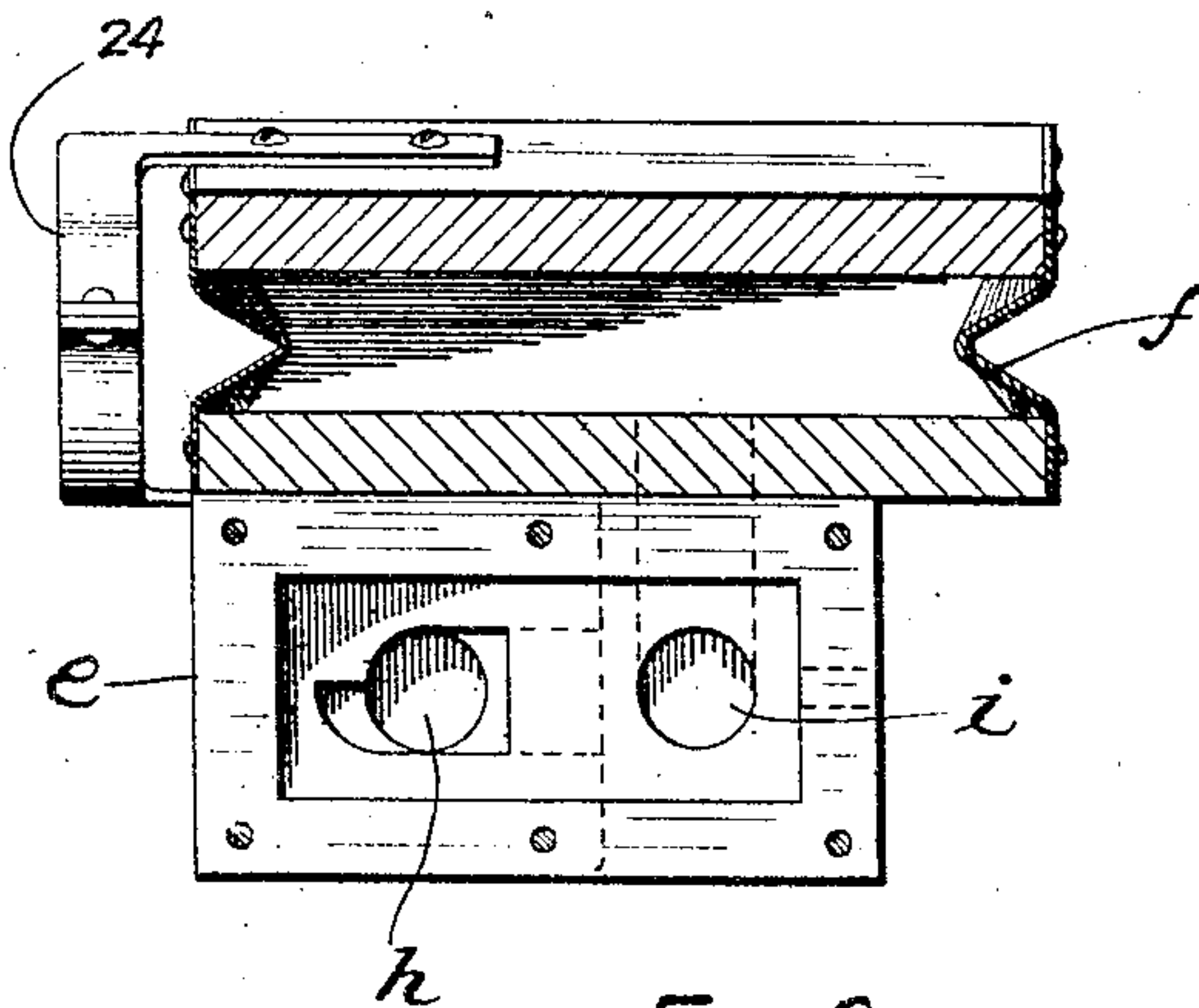


FIG. 2.

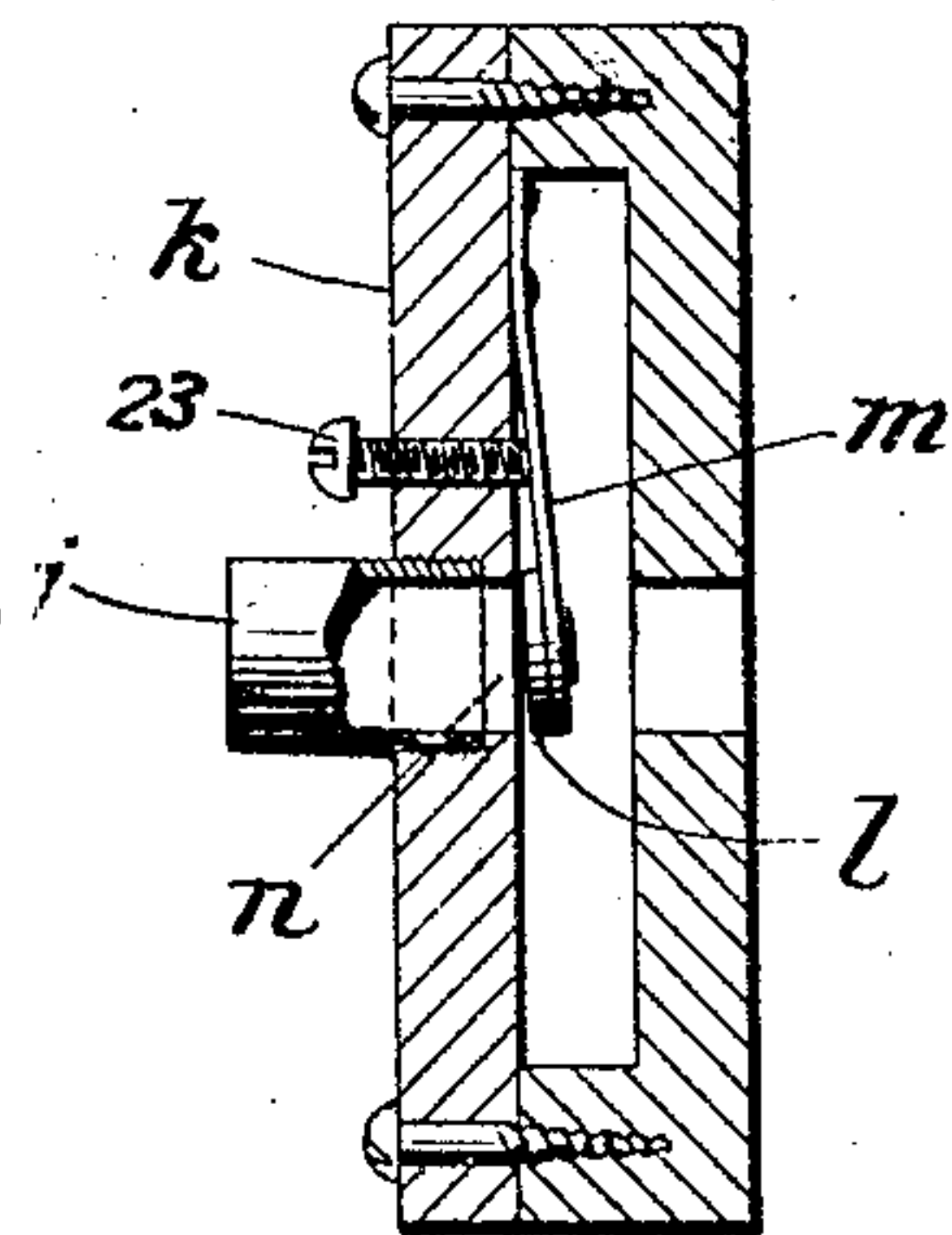


FIG. 3.

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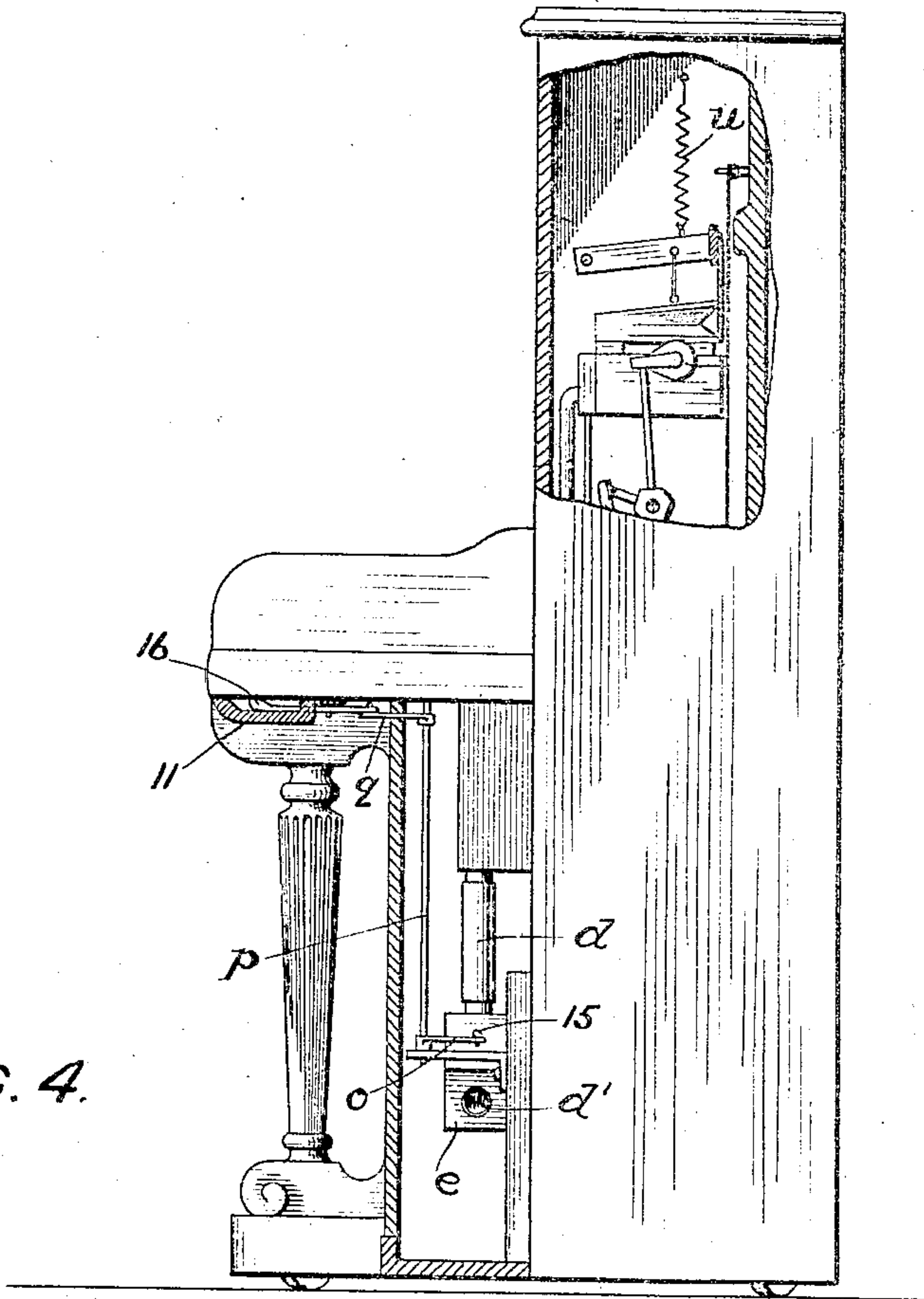
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EXPRESSION MECHANISM FOR SELF-PLAYING PIANOS.

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2 SHEETS—SHEET 2.

FIG. 4.



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EXPRESSION MECHANISM FOR SELF-PLAYING PIANOS.

965,354.

Specification of Letters Patent.

Patented July 26, 1910.

Application filed April 20, 1908. Serial No. 427,965.

To all whom it may concern:

Be it known that I, PHILIP WUEST, JR., a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Expression Mechanism for Self-Playing Pianos, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to self-playing pianos in which the mechanism is controlled by air and in which the air is drawn through the playing mechanism by means of a bellows in connection with an exhaust.

My invention relates to certain improvements, the purpose of which is to vary the quantity of air passing through the playing mechanism for the purpose of producing varying expressions or tone modulations. In general, I accomplish this result by having pipes leading from the playing mechanism to the exhaust. In one of these pipes there is a port which is maintained at a constant size. In the other pipe, is a valve provided with means whereby it may be moved to throttle and vary the throttling of the connection of the last mentioned pipe with the exhaust. While this construction will enable the expressions or tones to be produced over the desired range, there is a possibility at times, where the valve in one pipe is entirely closed, that the fixed port in the other pipe, while set for the desired tone, under these conditions is insufficient to allow sufficient air to pass through to maintain the action where the expression or tone modulation is desired to be produced upon or with a number of notes simultaneously. I use the term "throttling" in its ordinary and well known sense, such as closing or partially closing, as is used with respect to a throttle valve of a locomotive or with respect to the damper in a flue, and I use the term "expression" in its ordinary and accepted meaning of tone modulations; that is, varying the degrees of softness or loudness. This difficulty, just before described, I obviate in the following manner: I provide a bellows reservoir which is connected by a passage with the pipe leading from the playing mechanism. I also provide mechanism whereby, when this valve is operated to close the connection of

the playing mechanism through that pipe with the exhaust, the passage between the reservoir and the pipe is opened. As a consequence, this reservoir can and will enable an additional supply of air to pass through the playing mechanism when the opening or port in the other pipe is insufficient to allow the passage of sufficient air.

I will now describe the embodiment of my invention illustrated in the accompanying drawings.

In the drawings: Figure 1 is a front view of a piano partially broken away. Fig. 2 is a detail plan view, partially sectional, of main valve box and auxiliary reservoir. Fig. 3 is a detail sectional view through auxiliary valve. Fig. 4 is an end view of piano partially broken away.

a are the treadles, which operate the exhaust bellows of the exhaust reservoirs or conduits *b*, which reservoirs or conduits are connected together by the pipe *c*. These reservoirs connect directly with the exhaust.

d is a pipe leading from the playing mechanism and extending to the main valve box *e*.

d' is a pipe leading from the main valve box *e* to the auxiliary reservoir *b*. In this valve box are two ports *h* and *i*, one, *h*, opening to the pipe *d'* leading to the exhaust *b*, the other, *i*, to an auxiliary bellows reservoir *f* acted upon by spring 24.

g is a sliding valve controlling these ports and so arranged that when the port *h* is fully closed, the port *i* is fully opened. It may thus be seen that the auxiliary bellows reservoir has no connection with the main exhaust when the port *h* is closed.

j is a pipe from the playing mechanism leading to the exhaust *b*. Upon this pipe is the port *n* maintained closed or open to a fixed determined amount by the valve *l* in the valve box *k*, acted on by spring *m*. By means of the screw 23 the proper adjustment for the fixed throttle of this port may be obtained. The pipes *d* and *j* are in connection with each other through the playing mechanism.

The valve *g* is operated by means of the rod 15, lever *o*, rod *p* and lever *q* connected with the hand lever 16, the latter being carried upon the sliding shelf 11 carrying the self-playing operating levers. By moving this lever 16, the valve *g* may be gradually moved to close port *h* in order to enable

with the auxiliary valve, varying expressions to be produced. When the port *h* is entirely closed, the expression, except for the air of the auxiliary bellows reservoir *f*, is determined by the permanent throttling produced by valve *l*. The assistance or aid which the auxiliary bellows reservoir *f* gives is as follows: While the port *h* is closed there is a full opening from the pipe *d* through port *i* to the reservoir *f*. If sufficient air to operate the mechanism of the action to carry the expression simultaneously over all the notes required cannot pass through the fixed opening in pipe *j*, the auxiliary bellows reservoir draws, through the playing mechanism, additional air, thus supplying sufficient air to the playing mechanism to temporarily take care of this condition. As soon as the trouble is passed and the port controlled by valve *l* will allow sufficient air to pass, the air in the auxiliary reservoir will pass out through this port, and the auxiliary bellows reservoir will again assume a position to aid in case of a recurrence of such trouble, and come into action if the port controlled by the valve *l* is insufficient.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In a self playing piano, the combination with the pneumatic playing mechanism and exhaust, of pipes leading from the pneumatic playing mechanism to the exhaust, one of said pipes having therein a port maintained at a constant amount of closure, a valve controlling the connection of the other pipe from the playing mechanism with the exhaust, and means to move said last mentioned valve to throttle and vary the throttling of the connection of the playing mechanism with the exhaust through said pipe.

2. In a self playing piano, the combination with the pneumatic playing mechanism and exhaust, of pipes leading from the pneumatic playing mechanism to the exhaust, one of said pipes having therein a port maintained at a constant amount of closure, a valve controlling the connection of the other pipe from the playing mechanism with the exhaust, and means to move said last mentioned valve to close the opening or vary the size of said connection, a bellows reservoir, a passage, normally closed by said last mentioned valve, leading from the last mentioned pipe from the playing mechanism to the bellows reservoir, the movement of the valve, to close the connection between the playing mechanism and exhaust, opening said passage.

3. In a self playing piano, the combination with the pneumatic playing mechanism and exhaust, of pipes leading from the pneumatic playing mechanism to the exhaust, a port, maintained at a constant

amount of closure, in one of said pipes, a bellows reservoir, a passage normally closed connected with the other pipe from the playing mechanism and leading to the bellows reservoir, means to cut off the connection between said pipe leading from the playing mechanism and the exhaust and open the passage to the bellows reservoir.

4. In a self playing piano, the combination with the pneumatic playing mechanism and exhaust, of pipes leading from the pneumatic playing mechanism to the exhaust, a port, maintained at a constant amount of closure, in one of said pipes, a bellows reservoir, a passage normally closed connected with the other pipe from the playing mechanism, means to vary and cut off the connection between the said last mentioned pipe and the exhaust and to open and vary the opening of the passage to the bellows reservoir.

5. In an apparatus of the character described, the combination with the pneumatic playing mechanism and exhaust, of a valve box, a pipe leading, to the valve box, from the pneumatic playing mechanism, a pipe leading from the valve box to the exhaust, an auxiliary bellows reservoir, there being a passage from the valve box to the auxiliary bellows reservoir, and valve mechanism in said valve box adapted in its movement to close the connection between the valve box and the pipe leading to the exhaust and open connection between the auxiliary reservoir and the pipe from the pneumatic playing mechanism.

6. In an apparatus of the character described, the combination with the pneumatic playing mechanism, of pipes leading from the playing mechanism, means to produce suction in said pipes, a reservoir adapted to receive air, there being a passage from one of said pipes to the reservoir, and a port, having a fixed determined throttle in the other pipe.

7. In a self playing piano, the combination with the exhaust and the pneumatic playing mechanism, of a pipe leading from the pneumatic playing mechanism to the exhaust, having therein a port maintained at a constant amount of closure, a valve, a second pipe leading from the playing mechanism, a valve controlling the said last mentioned pipe and the exhaust, and means to move said last mentioned valve to throttle and vary the throttling of said connection, a reservoir adapted to receive air, a normally closed passage to said reservoir, leading from the last mentioned pipe, the movement of the valve to close the connection of the last mentioned pipe and exhaust opening said passage.

8. In a self playing piano, the combination with the exhaust and the pneumatic playing mechanism, of a pipe leading from

the pneumatic playing mechanism to the exhaust, having a port maintained at a constant amount of closure, a second pipe leading from the playing mechanism, a valve
5 controlling the connection of the last mentioned pipe and the exhaust, and means to move said last mentioned valve to throttle said connection, a reservoir adapted to receive air, a normally closed passage, leading
10 from the last mentioned pipe to the reser-

voir, the movement of the valve to close the last mentioned pipe opening said passage.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 17th day of April, 1908.

PHILIP WUEST, JR.

Witnesses:

A. M. URIAN,

M. M. HAMILTON.