

A. ANDERSON.

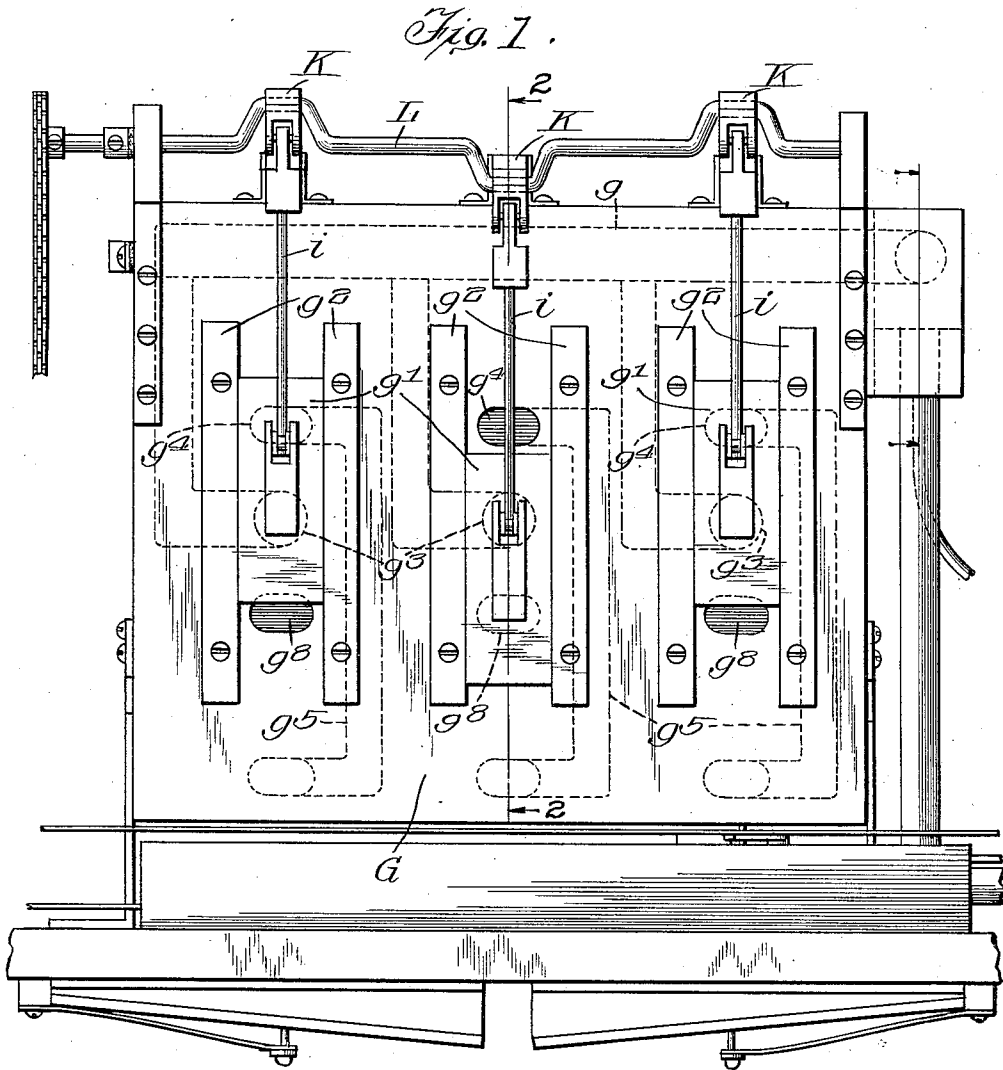
MOTOR.

APPLICATION FILED JUNE 24, 1910.

1,087,627.

Patented Feb. 17, 1914.

2 SHEETS—SHEET 1.



Witnesses:

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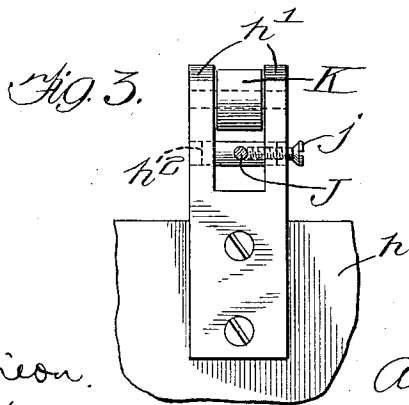
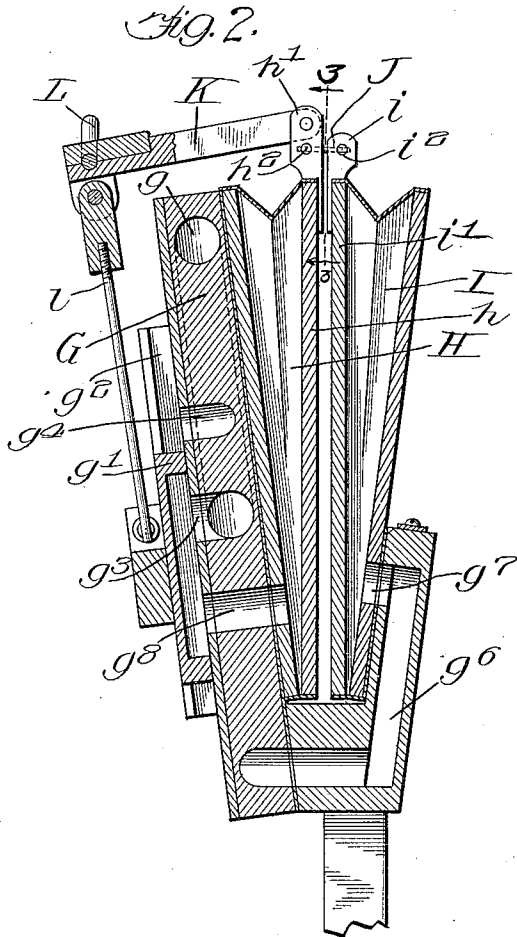
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2 SHEETS—SHEET 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

ALFRED ANDERSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO CONCORD COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MAINE.

MOTOR.

1,087,627.

Specification of Letters Patent.

Patented Feb. 17, 1914.

Application filed June 24, 1910. Serial No. 568,759.

To all whom it may concern:

Be it known that I, ALFRED ANDERSON, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Motors, of which the following is a specification.

My invention relates to pneumatic motors of the kind commonly used in player-pianos or piano-players for operating the perforated music thereof. A motor of this kind, as is well known, ordinarily comprises a plurality of small bellows or pneumatics which are connected to operate a crank shaft, and which are provided with valve devices for controlling the admission and exhaust of the air, whereby each bellows or pneumatic is alternately contracted and expanded to rotate the said shaft. It is desirable, of course, that motors for this purpose be compact and powerful, and that they be adapted to operate smoothly and uniformly, or otherwise the perforated music will not be properly operated. They must be compact because of the fact that it is highly desirable to economize space, especially when the motor is used in a player-piano.

The object of my invention is, therefore, to provide an improved and highly efficient motor of the foregoing general character.

A special object is to provide a motor of this kind in which each valve controls the admission and exhaust of air to and from a plurality of bellows, preferably two, whereby each pitman on the crank shaft is operated positively in both directions, as distinguished from the old style of motor in which each pitman is operated by a single bellows, and is thus actuated positively only in one direction.

Another special object is to provide a motor of this kind which will operate the music of the player smoothly and evenly and in more satisfactory manner than heretofore.

It is also an object to provide, in a motor of this particular character, an effective connection between the adjacent walls of the two bellows, whereby said walls remain parallel.

To the foregoing and other useful ends,

my invention consists in matters herein-after set forth and claimed.

In the accompanying drawings Figure 1 is a front elevation showing of a motor embodying the principles of my invention. Fig. 2 is a vertical section on line 2—2 in Fig. 1. Fig. 3 is an enlarged section on line 3—3 in Fig. 2, showing the construction of the connection between the two bellows, and the connection therefrom to the pitman.

The construction is as follows: The front member G extends for the full height of the two bellows H and I, there being three of these pairs of bellows or pneumatics, as shown in Fig. 1. In this case, also, the description of one pair of bellows or pneumatics, and the valve mechanism therefor, will be sufficient, as the other two are exactly the same. The exhaust passage g extends through the member G at a point near the upper edge thereof. The chambered slide valve g' moves up and down in the guideway g^2 , and travels back and forth on the flat valve seat. The port or opening g^3 in the said valve seat is connected with the exhaust passage g . The upper port g^4 is connected by a passage g^5 , shown in dotted lines in Fig. 1, with the passage or chamber that communicates by an opening g^7 with the interior of the bellows or pneumatics I. The lower port or opening g^8 communicates with the interior of the bellows or pneumatic H. The front bellows H has its movable board h provided at its upper end with a pair of ears h' and a similar pair of ears i are mounted upon the upper end of the movable board i' of the bellows I. A pin h^2 (see Fig. 3), is mounted to turn in the ears h' , and a similar pin i^2 is mounted to turn in the ears i . A connecting rod J has its opposite end inserted in transverse openings in these two pins h^2 and i^2 , and is removably held in place therein by screws j that are inserted longitudinally in the ends of said pins. Thus the distance between the two movable boards h and i' can be regulated or adjusted, as may be found desirable. The ears h' are connected by a pitman K with the crank shaft L, and the outer end of this pitman is connected by a valve rod l with the slide valve g' , whereby the rotation of the crank shaft by the alternate expan-

sion and contraction of two bellows or pneumatics causes the valve to slide up and down. When the valve moves downward it connects the exhaust opening b^3 with the port g^8 and uncovers the port d^4 , whereby the bellows or pneumatic H is connected with the exhaust and caused to collapse, while the bellows or pneumatic I is connected to the atmosphere and allowed to expand. In this way it will be seen that the two bellows or pneumatics constitute a unit, but are structurally separate, each having its flexible hinge at the bottom. As shown, the pitman K exerts both a push and a pull on the crank shaft in rotating the latter.

From the foregoing it will be seen that I provide a motor in which each pitman does double work—that is to say, each stroke communicates power to the crank shaft, so that the crank shaft is always receiving power from each pitman. This is accomplished in a motor which does not necessarily have to be any larger than, and in fact not as large as, the ordinary motor involving three single bellows or pneumatics. I thus provide a motor which is compact and powerful, and which is smooth and even in its operation. Thus the music of the player will be operated smoothly and powerfully, and will always be under good control.

Both in Fig. 2 and Fig. 5 it will be seen that the construction involves a pair of bellows chambers arranged to expand toward each other, and a crank shaft which is connected with the expansible ends of said chambers, which crank shaft is also connected for operating the slide valve. Thus in each case the expansible ends of a pair of bellows chambers are employed for mechanically actuating a single slide valve which controls the admission and exhaust of air to and from the said chambers.

What I claim as my invention is:

1. In a motor, a pair of bellows or pneumatics having outer stationary walls and inner movable walls, said inner walls separate and facing each other, pins movably mounted on the upper ends of the movable walls, a connecting rod extending through said pins, and screws inserted in the ends of the pins to adjustably hold the said rod in place, whereby the two movable walls have relative longitudinal shift and vibrate in unison, and whereby said inner walls are always parallel.

2. In a motor, a pair of collapsible bellows, each bellows provided with an outer wall which is stationary, and a separate inner wall which is movable, a connection between the two movable walls, to cause the same to vibrate in unison, having provisions for permitting relative movement between said inner walls, and to keep said inner walls parallel, a power transmitting connection from said movable walls, and a valve mech-

anism controlling the admission and exhaust of air to and from said bellows, the movable walls of said bellows facing or opposing each other, whereby one bellows contracts when the other expands.

3. In a motor, a pair of bellows or pneumatics having outer stationary walls and inner movable walls, said inner walls being separate and facing each other, pins movably mounted on the upper ends of the movable walls, a connecting rod extending through said pins, and screws inserted in the ends of the pins to adjustably hold the said rod in place, whereby the two movable walls have relative longitudinal shift and vibrate in unison, and whereby said inner walls are always parallel, each said stationary wall having a single opening, and a block for each stationary wall, said blocks having passages communicating with said openings, and said blocks being received together with space between for said bellows.

4. In a motor, a pair of collapsible bellows, each bellows provided with an outer wall which is stationary, and a separate inner wall which is movable, a connection between the two movable walls, to cause the same to vibrate in unison, having provisions for permitting relative movement between said inner walls, and to keep said inner walls parallel, a power transmitting connection from said movable walls, and a valve mechanism controlling the admission and exhaust of air to and from said bellows, the movable walls of said bellows facing or opposing each other, whereby one bellows contracts when the other expands, each said stationary wall having a single opening, and a block for each stationary wall, said blocks having passages communicating with said openings, and said blocks being received together with space between for said bellows.

5. In a motor, a pair of bellows or pneumatics having outer stationary walls and inner movable walls, said inner walls being separate and facing each other, pins movably mounted on the upper ends of the movable walls, a connecting rod extending through said pins, and screws inserted in the ends of the pins to adjustably hold the said rod in place, whereby the two movable walls have relative longitudinal shift and vibrate in unison, and whereby said inner walls are always parallel, supports for said movable walls, and a connection between said supports, provided with a passage for one said bellows.

6. In a motor, a pair of collapsible bellows, each bellows provided with an outer wall which is stationary, and a separate inner wall which is movable, a connection between the two movable walls, to cause the same to vibrate in unison, having provisions for permitting relative movement between said inner walls, and to keep said inner walls

parallel, a power transmitting connection
from said movable walls, and a valve mech-
anism controlling the admission and ex-
haust of air to and from said bellows, the
movable walls of said bellows facing or op-
posing each other, whereby one bellows con-
tracts when the other expands, supports for
said movable walls, and a connection be-

tween said supports, provided with a pas-
sage for one said bellows.

Signed by me at Chicago, Illinois, this
18th day of June, 1910.

ALFRED ANDERSON.

Witnesses:

C. F. REEPS,
BERTHA WEBER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."