

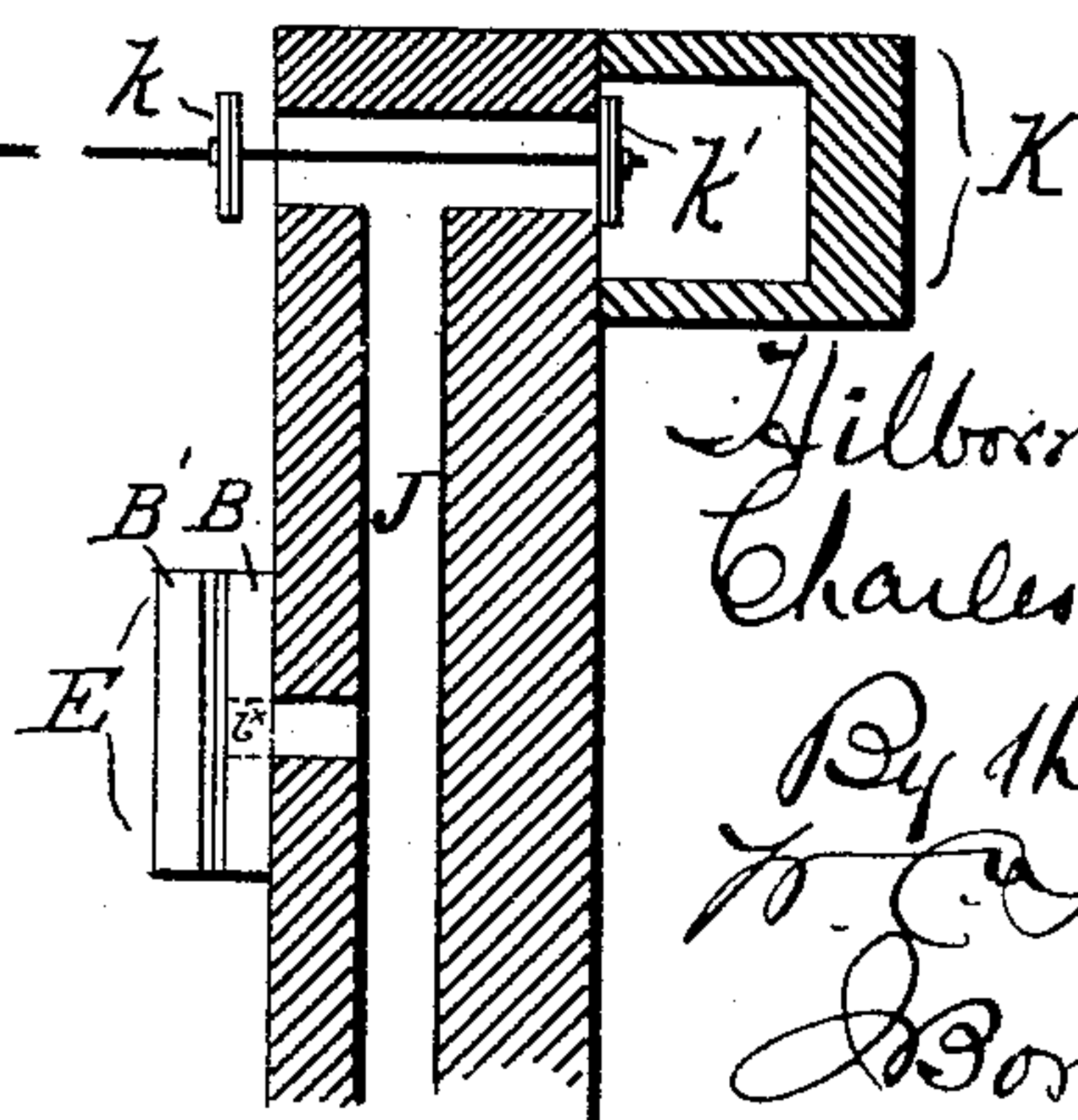
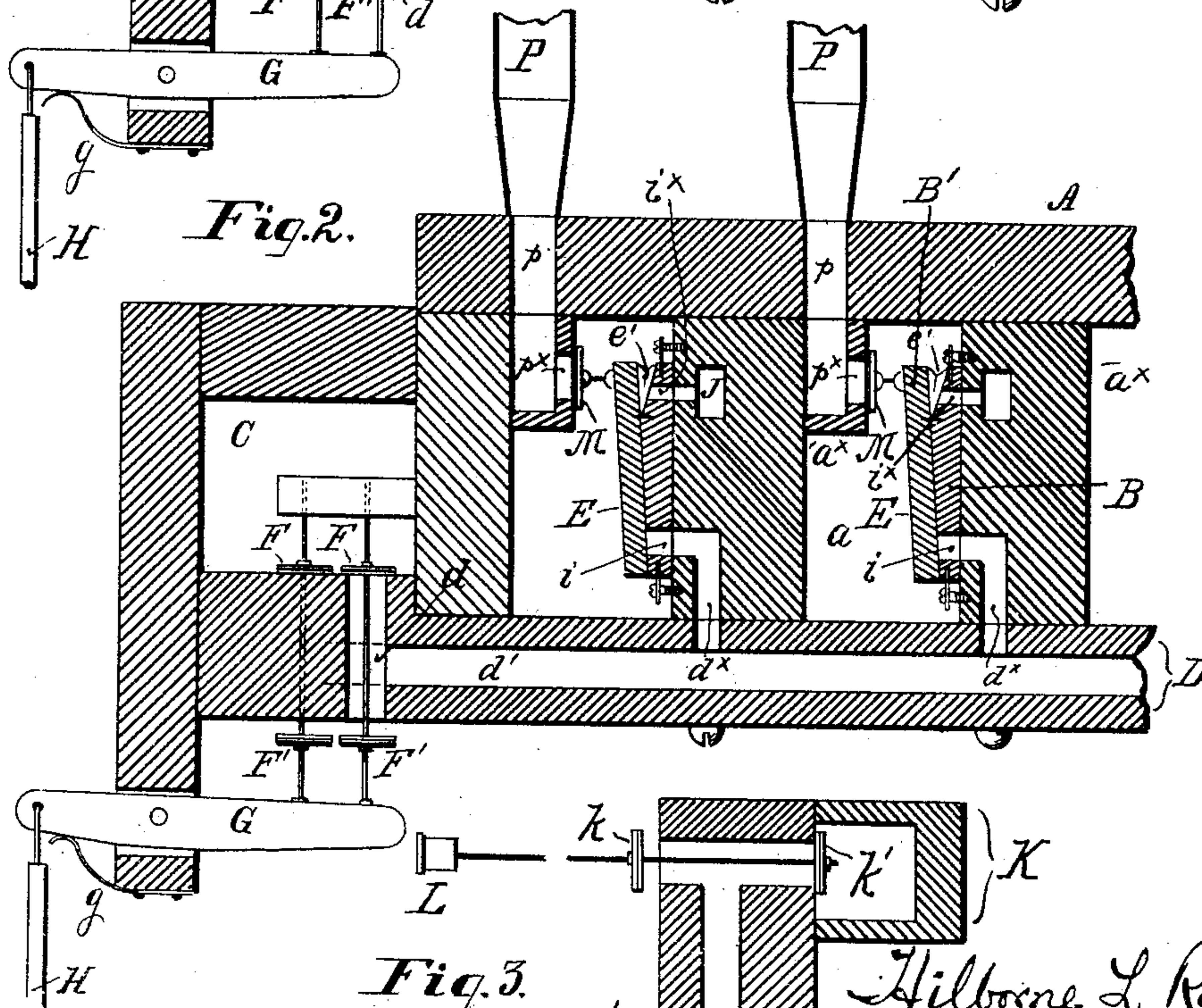
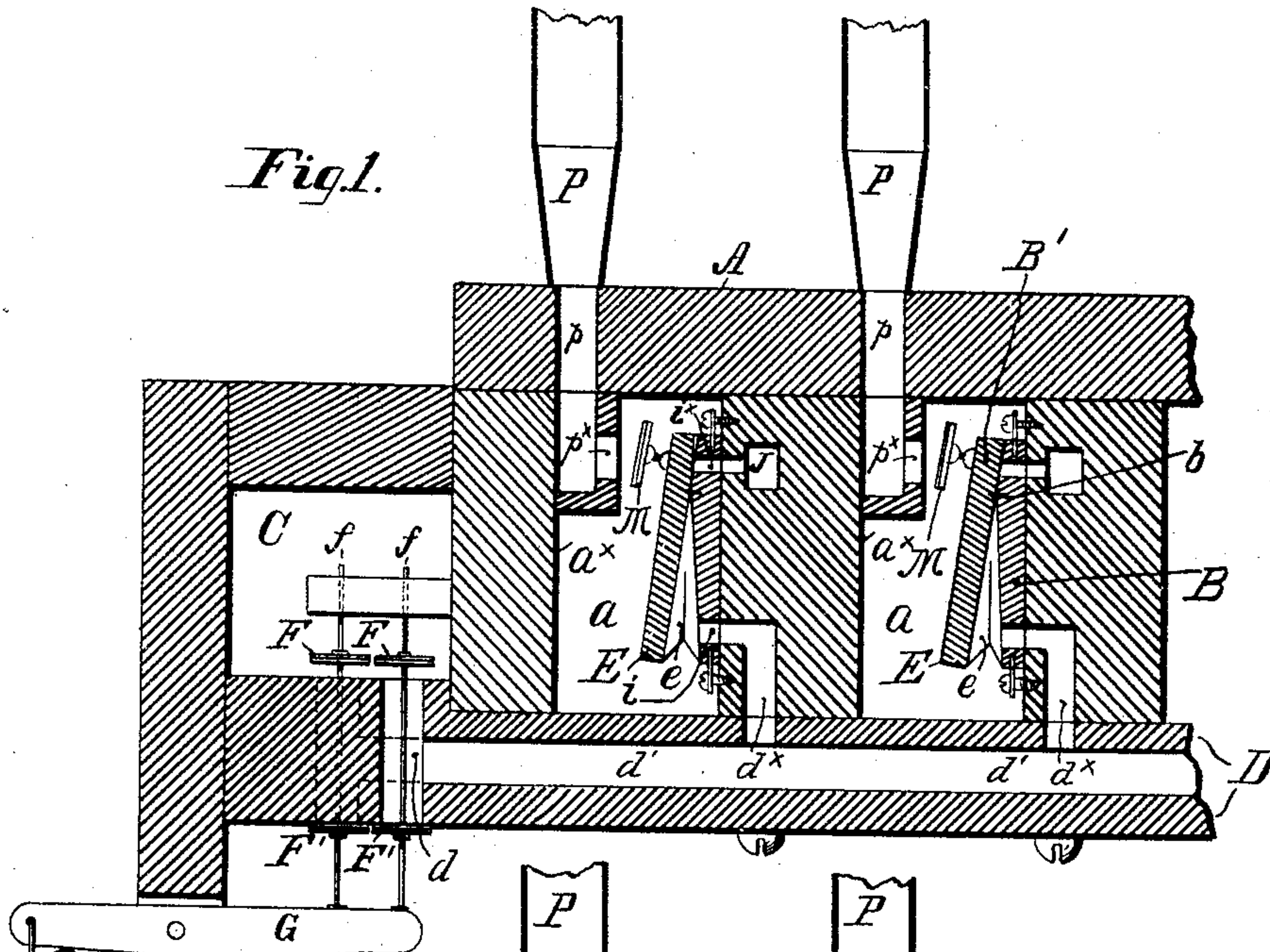
(No Model.)

H. L. ROOSEVELT & C. S. HASKELL.

PNEUMATIC ACTION FOR ORGANS.

No. 336,351.

Patented Feb. 16, 1886.



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UNITED STATES PATENT OFFICE.

HILBORNE L. ROOSEVELT, OF NEW YORK, N. Y., AND CHARLES S. HASKELL,
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PNEUMATIC ACTION FOR ORGANS.

SPECIFICATION forming part of Letters Patent No. 336,351, dated February 16, 1886.

Application filed July 24, 1884. Serial No. 138,608. (No model.)

To all whom it may concern:

Be it known that we, HILBORNE L. ROOSEVELT, of the city, county, and State of New York, and CHARLES S. HASKELL, of the city and county of Philadelphia, and State of Pennsylvania, and citizens of the United States, have invented certain Improvements in Pneumatic Actions for Organs, of which the following is a specification.

Our invention relates in general to the wind-chests of pipe-organs, and relates specifically to the pneumatic bellows, or "pneumatics," as they are popularly termed, employed in connection with wind-chests, and constructed on what is known as the "exhaust system." Pneumatic bellows, as such, are contrivances for lessening the amount of force required to play an organ of even moderate power against the pressure of the wind on the wind-chest when any number of the stops are down.

The objects of our improvements, which relate, as stated, to the pneumatic bellows of the wind-chest, and utilize compressed air in lieu of the usually complicated pneumatic levers, touch-lighteners, and kindred mechanical contrivances, are to simplify construction, obviate the necessity of dependent mechanism, render the expansion and contraction of the material used in the manufacture of the wind-chest a matter of no consequence, overcome such objections as have heretofore been inseparable from inflation, render the action more rapid and attended with less noise, and relieve weight of touch.

The foregoing objects we attain by mechanism a preferred form of a convenient embodiment of which is illustrated in the accompanying drawings, and explained in the following description, the particular subject-matter claimed being hereinafter definitely specified.

Heretofore in pipe-organs pneumatic bellows placed in the wind-chest have been, in various modes of application, employed to control the throats or orifices of the wind-ducts leading from out the chambers of the wind-chest to the pipes or to the atmosphere. Thus, for instance, the movable board of the pneumatic bellows itself has been so relatively disposed with respect to the pipe wind-duct as to itself constitute a valve to the throat of

said duct when the bellows has been expanded, the said movable board having been retained in its expanded position by the assistance of a spring interposed between the fixed and movable boards. Thus, also, a spring-controlled pallet over the pipe-throat has been linked to the movable board of a pneumatic bellows so as to be controlled by the movement of said board. Thus, again, in mechanical musical instruments of the character operating through the medium of a perforated strip of sheet-music, the movable side of a device of somewhat the character of a pneumatic bellows has been prolonged and linked to a pivotal valve controlling an air-duct. At the outstart, therefore, of this specification we desire to disclaim either the invention of a pneumatic bellows, as such, its application within a wind-chest, or its utilization within said wind-chest as a device, broadly as such, for controlling the throat of the wind-duct leading to the pipe; that which, in fact, constitutes our invention being such a specific improvement in the construction and application of the pneumatic bellows as is hereinafter at length set forth.

In the drawings, Figure 1 represents in side sectional elevation a wind-chest embodying our improvements, and to which our improved pneumatic bellows are shown applied, the position of parts being that represented when the pipes are speaking. Fig. 2 is a similar view of the same parts in the positions which they occupy when the pipes are silent, or when the key is at rest. Fig. 3 is a top sectional elevational detail representing the pallets controlled by one of the stops governing one of the windways of the partitions, hereinafter termed a "partition-way."

Similar letters of reference indicate corresponding parts.

For a more clear understanding of our improvements, it is proper to describe so much of a wind-chest and its connected appliances as are shown in the drawings.

A is the wind-chest of a pipe-organ, and *a* the wind-chambers, which extend longitudinally therethrough, and are formed between the partition-bars *a'*.

P are the pipes, and *p* the pipe-ducts, which

are formed in the wind-chambers and cover-board of the chest, and which lead from out the wind-chambers to the pipes.

C is the pallet-box, which is in communication with a wind-trunk, (not shown,) and through the bottom of which extend to the outer atmosphere the valve-throats d , which, midway of their depth, are respectively in communication with the valveways d' , formed in the bottom board, D, of the wind-chest, from which valveways lead the windways d^x , which vent within the large compartments e of the pneumatic bellows E, secured within the wind-chambers.

F F' are respectively the upper and lower puppet-valves, or "disk-pallets," as they are sometimes termed, which control the respective orifices of the valve-throats, the valve-stems or pallet-wires f of which connect below with the secondary lever G, controlled by the spring g , and operated through the tracker H in the usual manner. Each of the wind-chambers of the chest is in communication with a wind-trunk and organ-bellows, and constantly filled with compressed air. It is of course understood that there are any desired number of pipes, wind-chambers, and pneumatics, while the latter are supplied by a suitable number of valveways and controlled by a suitable number of valves and keys. The depression of any particular key in the action, through the operation of the tracker and secondary lever raising that valve-stem and pair of puppet-valves with which said key communicates, permits of the influx of wind from the pallet-box to a given valveway, d' thence through the windways d^x of said valveway to within the large compartments of the pneumatic bellows, which compartments are in communication with said valveway. The relief of pressure upon the same key, occasioning the reversal of its puppet-valves and the closing of its upper and opening of its lower valve-throat, shuts off the wind from the valveway under consideration and gives the lead to the exhaust from out said valveway, thus permitting the collapse of the large compartments of the pneumatics under pressure of the air at the time existing in the wind-chambers.

The foregoing features of construction, save only that which provides two compartments in the pneumatic bellows, are well known in the art.

The features of construction which constitute the novelty of our invention all relate to the construction, operation, and mode of application of the pneumatic bellows, and are the following:

B is the fixed and B' the movable board of the pneumatic bellows. The fixed board is conveniently provided with two oppositely or reversely inclined planes or surfaces, as will be understood by a reference to the drawings, one of these surfaces, or that forming an inner side of the large compartment e , being, for instance, of twice the length of that surface which forms one of the inner sides of the small

compartment e' . The movable board is hinged to the fixed board at b , or upon the line of junction of the two inclined planes, being in the nature of an elevated ridge or crest between them. Bellows, flaps of suitable proportions, arranged upon each side of the hinges of the boards, form two compartments, already designated as "large" and "small," and complete the construction of what constitutes a double or compound bellows having two compartments of different area. Two apertures, $i i^x$, in the fixed board of the bellows, leading, respectively, in the completed instrument into the large and small compartments of the bellows, place the latter, when applied within the wind-chests, in communication, as to its large compartment, with the windway d^x on the one hand, and with the partition-way J, which leads to a wind-trunk, K, and is controlled by the pallets $k k'$, operated from the stop L, as shown in Fig. 3. It is obvious therefore that air admitted from the pallet-box will distend the large compartment of the bellows, while air admitted from the wind-trunk K will distend the small compartment of said bellows.

Securely connected with the upper portion of the outside face of the movable board of the bellows, or that portion outside of the small compartment, is a disk-pallet, M, adapted to close the throat p^x of the pipe-duct p when the small compartment of the bellows is filled, and the movable board thereby deflected from the position which it is represented as occupying in Fig. 1 to that shown in Fig. 2. There is of course no communication between the two compartments of the bellows. It is to be understood that the requisite number of these pneumatics is employed, and that the description relates to but one alone, for the purpose of clearness.

The pneumatic bellows are removably retained in place by forked cleats, after a manner invented by us, and described and claimed in an application for patent executed by us contemporaneously with this application.

The operation of our improved contrivances will be understood from the foregoing description. It is to be understood that whenever it is desired to play a given stop of pipes the draw-stop L, which controls the partition-way J, communicating with the pneumatics of the said stop of pipes, is to be drawn so as to place the pallets $k k'$ of the said partition-way in the position represented in Fig. 3, and thus to put the said partition-way, and consequently the small compartments e' of the pneumatics which operate in connection with said partition-way, in communication with the atmosphere. The wind-chambers a , it being remembered, being in the position of rest constantly full of air, the bellows will assume the position represented in Fig. 2—that is to say, with their disk-pallets closed upon the throats of the pipes, and this for the reason that that portion of the movable board which forms the outer side of the large compartment, presenting a greater area for the wind to act upon

than that portion of the same board which forms the outside of the small compartment, will be naturally acted upon by the air and forced down against the fixed board. So soon as a key is struck and wind admitted from the pallet-box C to the interior of one of the large compartments of a pneumatic in connection with which said key operates, the pressure within the said large compartment will equalize the pressure within the wind-chamber *a*, within which the pneumatic under consideration is placed, and, by virtue of the fact that there is no resistance or air-cushion within the small compartment *e'* of the said pneumatic, because the corresponding partition-way, *J*, is vented to the atmosphere, as already explained, the said small compartment will collapse, and said large compartment will become distended, and the disk-pallet of the said pneumatic bellows will be lifted from its pipe-throat *p*^x, so as to permit of the escape of wind from out the chamber *a*, under consideration, to the pipe *P* controlled by the key struck, so as to cause said pipe to speak. When, on the other hand, it is desired to close the pipe-duct and silence the pipe, relief of pressure on the key will cause the puppet-valves to assume the position represented in Fig. 2, and so give the lead to the exhaust from out the large compartment of the bellows, and the pressure of air on the outside of the large compartment of the bellows will then cause the distention of the small and closing of the large compartments of the bellows, and the consequent closing of the disk-pallet upon the pipe-throat. It is obvious, of course, that the construction of the fixed board with two inclines is simply one of convenience, and that the gist of the construction, so far as it relates to bellows proper, resides in forming a bellows of two compartments of different area, and that this result may be accomplished either by forming inclines upon the movable board, or by retaining the surfaces of both boards level and erecting a ridge or kindred raised contrivance for a fulcrum of the movable board. It is also obvious that the position of the bellows may be inverted, suitable modifications in the air ducts and passages being in such instance made.

Having thus described our invention, we claim—

1. As a new article of manufacture, a pneumatic bellows for the wind-chest of an organ, having two opposite compartments, one of greater area than the other, and the movable board of which is equipped with a pallet, substantially as set forth.

2. The combination of the wind-chest of an organ, the chambers of which are equipped with pipes and supplied with compressed air, pneumatic bellows placed within said chamber, and having two opposite compartments,

one of greater area than the other, and the movable boards of which are equipped with pallets respectively adapted, in the movement of said boards, to control the throats of the pipes, a pallet-box the pallets of which are controlled by the action, and which is supplied with wind, channels of communication between said pallet-box and the large compartments of the bellows, and channels of communication between a source of wind-supply and the small compartments of the bellows, substantially as set forth.

3. The combination, with the wind-chest of an organ, the chambers of which are equipped with pipes and supplied with compressed air, pneumatic bellows placed within said chambers, having two compartments, one of greater area than the other, and having that portion of their movable boards which incloses their small compartments equipped with pallets respectively adapted, in the movement of said boards, to control the throats of the pipes, a pallet-box the pallets of which are controlled by the action, and which is supplied with wind, channels of communication between said pallet-box and the large compartments of the bellows, and channels of communication between a source of wind-supply and the small compartments of the bellows, whereby, in the absence of wind within the large compartments of said bellows the air in the air-chambers acts against the greater areas of the movable boards covering the large compartments, collapses said compartments, and causes the seating of the pallets upon the throats of the pipes, substantially as set forth.

4. As a new article of manufacture, a pneumatic bellows for the wind-chest of an organ, having two opposite compartments inclosed by the same movable board, and one of greater area than the other, such portion of the movable board as incloses the small compartment being supplied with a pallet, substantially as described.

5. As a new article of manufacture, a pneumatic bellows for the wind-chest of an organ, one of the boards of which is provided with two inclines, one of greater area than the other, and the movable board of which is hinged upon the crest between said inclines and equipped with a pallet, the boards being united by two bellows-flaps applied with respect to the two inclined surfaces so as to form a bellows having a large and a small compartment, substantially as described.

In testimony whereof we have hereunto signed our names this 9th day of July, A. D. 1884.

HILBORNE L. ROOSEVELT.
CHARLES S. HASKELL.

In presence of—

JOHN W. HEINS,
JOHN ADATTE.

Correction in Letters Patent No. 336,351.

It is hereby certified that in Letters Patent No. 336,351, granted February 16, 1886, upon the application of Hilborne L. Roosevelt, of New York, New York, and Charles S. Haskell, of Philadelphia, Pennsylvania, for an improvement in "Pneumatic Actions for Organs," an error appears in the printed specification requiring correction as follows: In line 72, page 2, the comma after the word "Bellows" should be stricken out; and that the Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 23d day of February, A. D. 1886.

[SEAL.]

H. L. MULDROW,
Acting Secretary of the Interior.

Countersigned:

M. V. MONTGOMERY,
Commissioner of Patents.