

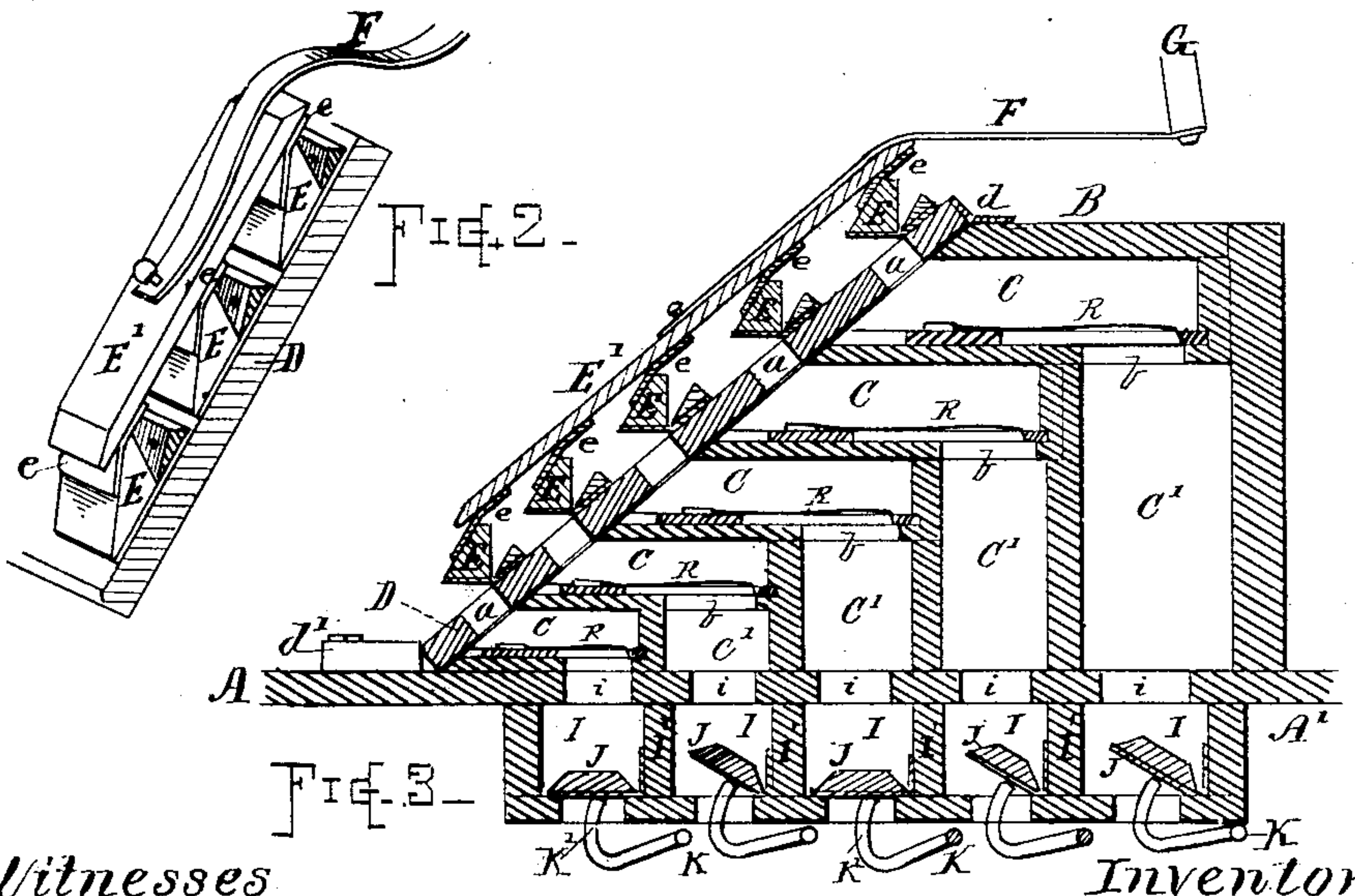
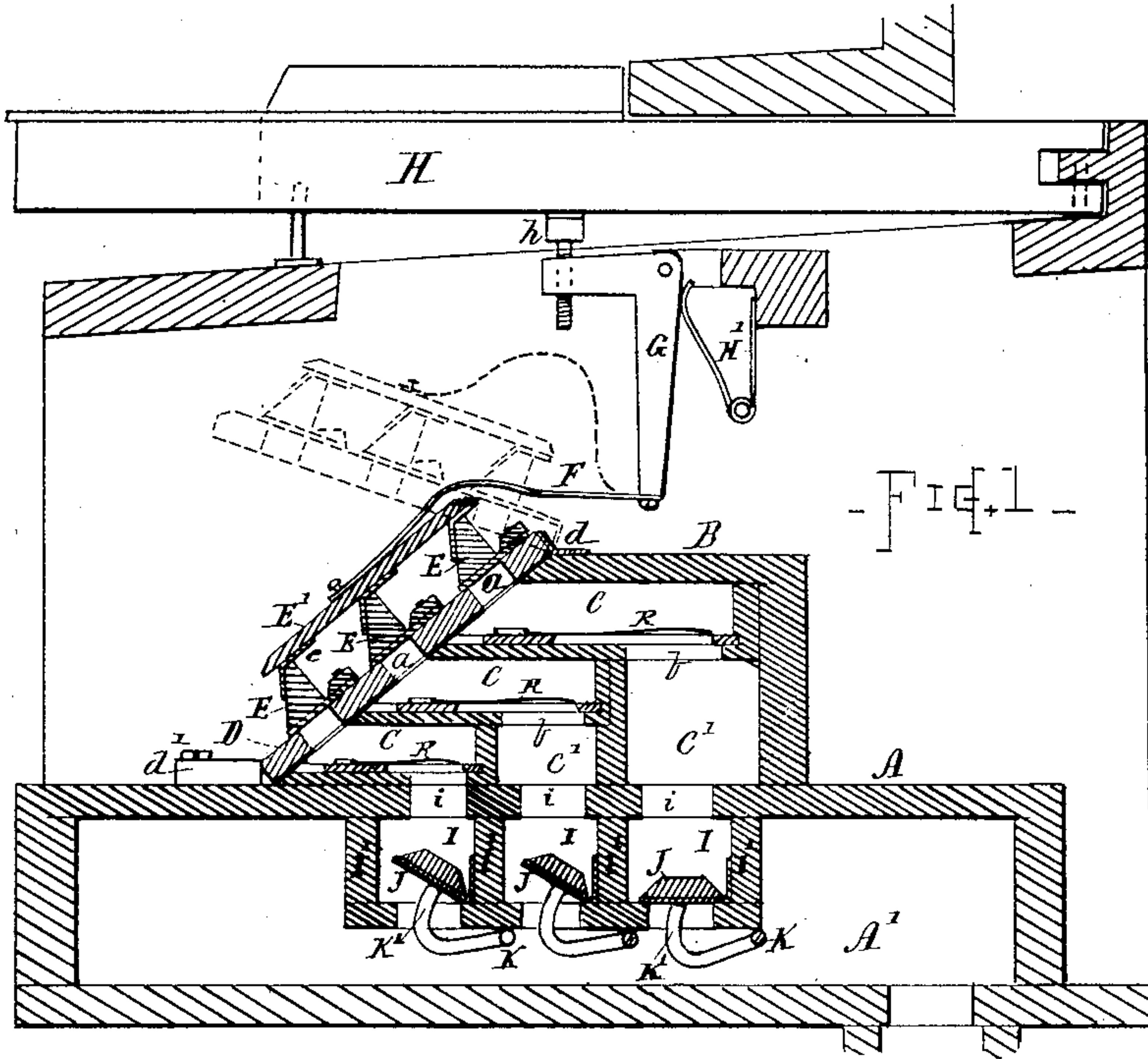
(No Model.)

2 Sheets—Sheet 1.

F. STONE.  
ORGAN ACTION.

No. 326,171.

Patented Sept. 15, 1885.



Witnesses

Geo. M. Rice 2d

Walter B. Allen.

Inventor

Frank Stone

By Chas. H. Burleigh  
Att'y.

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2 Sheets—Sheet 2.

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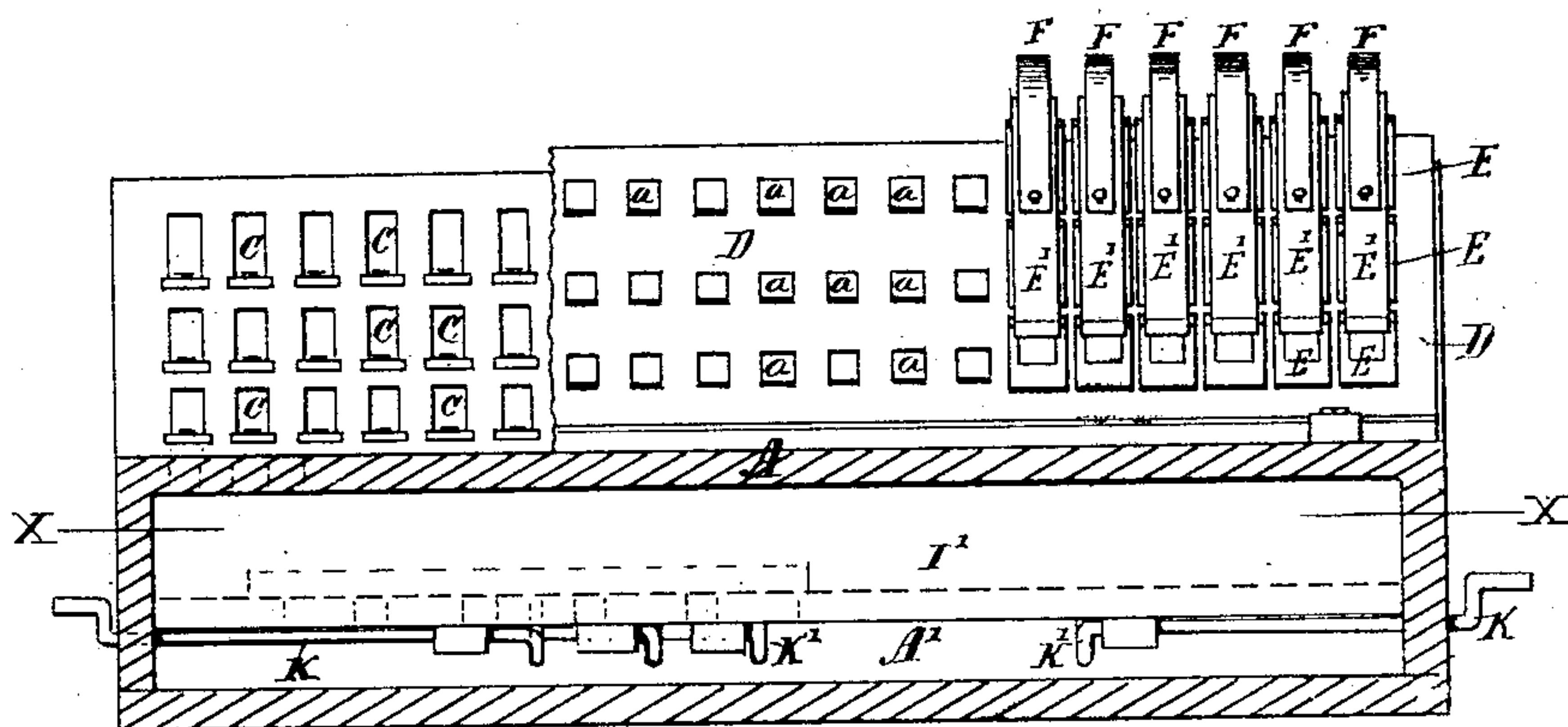


Fig. 4.

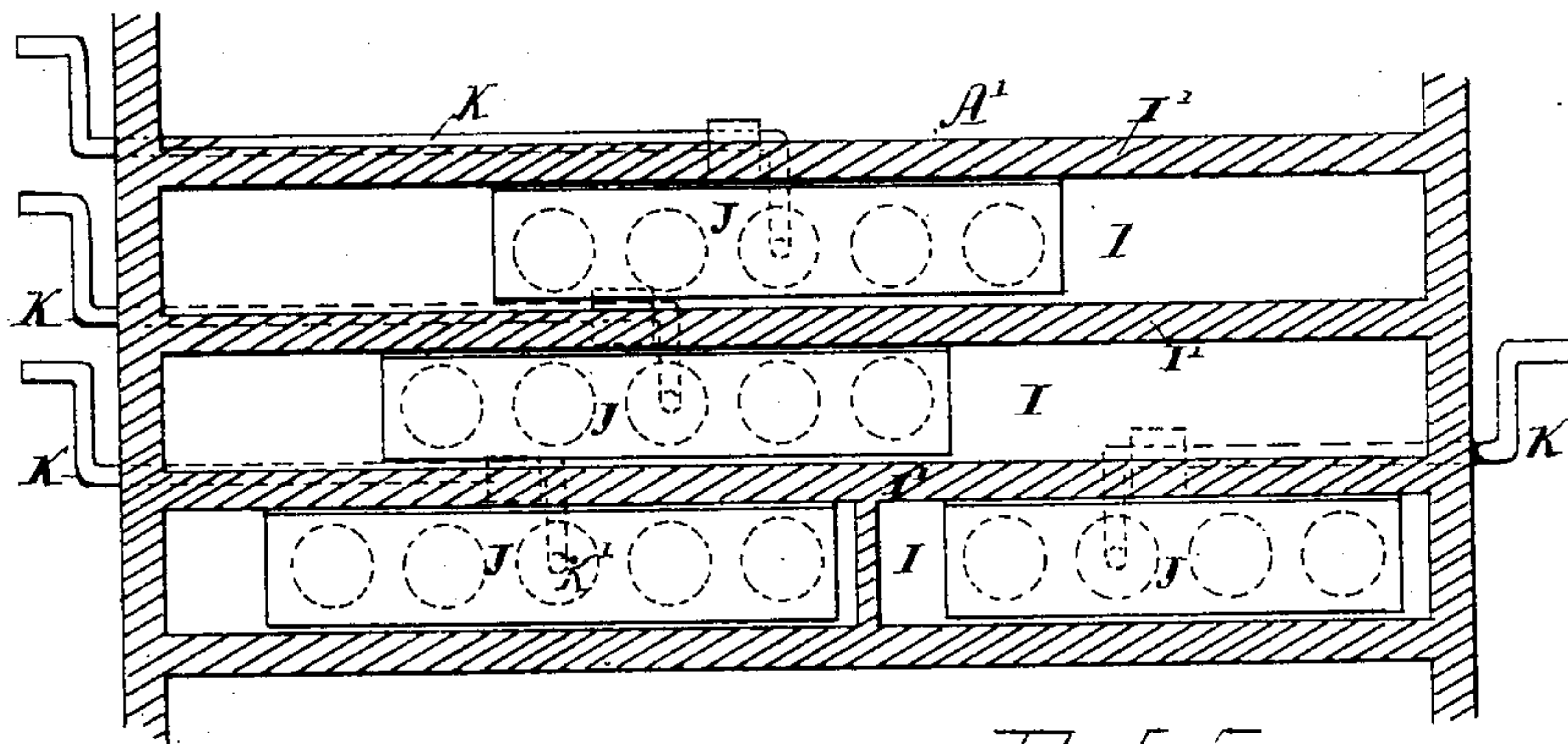


Fig. 5.

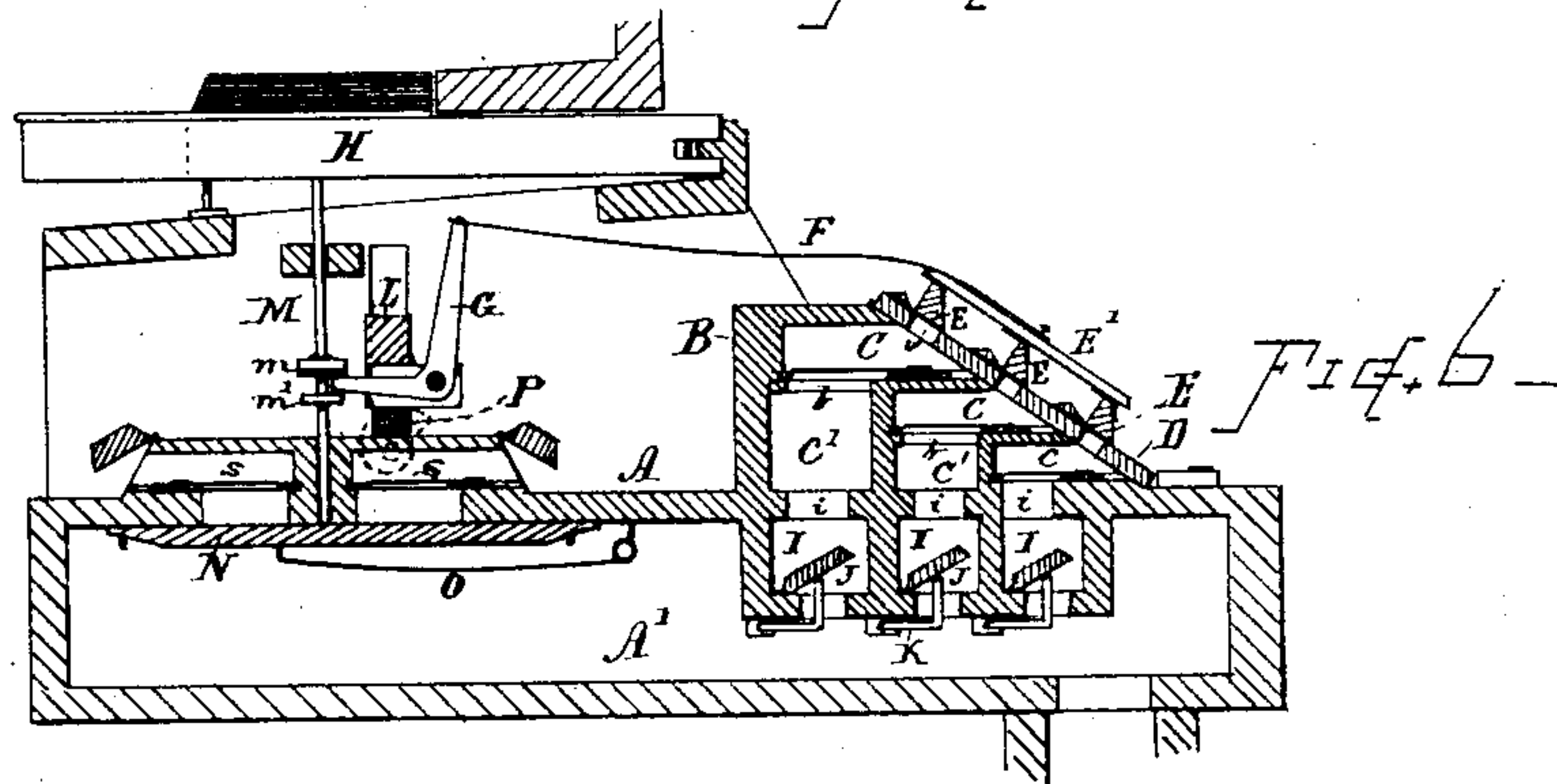


Fig. 6.

Witnesses

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# UNITED STATES PATENT OFFICE.

FRANK STONE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE  
MUNROE ORGAN REED COMPANY, OF SAME PLACE.

## ORGAN-ACTION.

SPECIFICATION forming part of Letters Patent No. 326,171, dated September 15, 1885.

Application filed April 1, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK STONE, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Actions for Musical Instruments; and I declare the following to be a description of my said invention sufficiently full, clear, and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My present invention relates more especially to organ-actions or to instruments having reeds or other sounding devices actuated by air-currents the flow of which is regulated by valves controlled by manual keys or mechanically-actuated valve-operators.

The objects of my present invention are, first, to provide a construction whereby a larger number of reeds or sounding devices can be assembled within comparatively small space, and be operated by a single set of keys without materially increasing "touch" or force required for depressing the several keys; second, to provide a style of action wherein the number of reeds or sounding devices can be indefinitely increased and their government and operation effected with ease and facility; third, to afford a valve mechanism in which the valves are adapted for perfect action without the necessity of springs for retaining them to their seats; fourth, to afford facilities for ready access to the reeds without derangement of the valve mechanism; fifth, to provide a convenient and efficient system of mutes or shutters for isolating the various sets of reeds or sounding devices from the wind apparatus; sixth, to conveniently combine additional sets of reeds with the ordinary organ-action and to provide facilities for connecting and disconnecting the valves of such additional sets of reeds with the manual keys or operating mechanism. These objects I attain by mechanism constructed and organized for operation substantially as illustrated in the accompanying drawings, the principles and features of my invention being more fully set forth and explained in the following description, and the particular subject-matter claimed being hereinafter definitely specified.

Figure 1 is a vertical section of such parts of a musical-instrument action as are necessary to illustrate the nature of my invention, the valves being shown closed. Fig. 2 is a perspective view of one series of the valves and a section of the valve-seat piece. Fig. 3 is a vertical section showing an increased number of reeds or sound devices and with the valve shown in open position. Fig. 4 is a front view showing at respective portions thereof the valves, the valve-seat piece, the face of the tube-board, and a vertical section of the wind-chamber. Fig. 5 is a horizontal section at the position of line *xx* on Fig. 4, illustrating the arrangement of the mute valves; and Fig. 6 is a vertical sectional view showing a method of combining my invention with the ordinary form of reed-organ actions.

In reference to drawings, A denotes the sounding board or piece that forms the top of the wind-chamber A', from which chamber the air is exhausted by a suitable bellows apparatus operated in the ordinary or any suitable manner.

B indicates the tube-board, which is composed of several series of tubes or cells, C, containing reeds or sounding devices R, arranged in receding order, one above another, with each course or tier of cells offsetting that below it, so that the air-passages *b* from the higher courses of cells open into chambers C' formed at the back of the course below and beneath the respective sets or courses in a manner to serve as a common exhaust-receiver for the several reed-cells in the respective sets or courses. The size or capacity of the several chambers C' proportionally increases as the number of courses of cells is extended. The front of the several sets of tubes is formed on an inclined plane at an angle common to all the sets or continuous from the bottom to the top of the tube-board, which may embrace from three to eight or more sets of tubes, as desired. The tubes or cells in the several sets preferably stand directly over each other in transverse alignment, the smallest set of reeds being located in the bottom course, and the larger sets in regular order, one above the other, in proportion to their relative sizes, the largest set being in the upper course of cells. The cells C are made to



receive the entire length of the reed-plates, which are respectively sunk therein to a depth sufficient to give the best vibratory action or tone of the tongues according to their relative pitch.

D indicates a valve-seat piece arranged over the mouths of the cells or air-inlet openings to the reeds. Said seat-piece is provided with air-ducts *a*, corresponding to each of the cells C, and its under face, which is provided with a suitable packing, is fitted to the face of the tube-board B, so as to exclude all air, except such as passes through the ducts *a*. The valve seat-piece D is connected with the tube-board by a hinge, *d*, or in other suitable manner, so that it can be readily raised or removed from the mouths of the cells, (see dotted lines, Fig. 1.) for permitting access to and the withdrawal of any of the reeds which may require attention. The lower edge is secured by a button, *d'*, or other suitable fastenings.

The ducts *a* are each stopped or governed by a rolling or tip-up valve, E, and said valves are arranged to operate in series corresponding to the number of courses or sets of reeds in the tube-board, the several valves of each series being uniformly hinged at their heel-portion to the seat-plate D, and connected at their tops by hinges or flexible connections *e* to bars E' in the manner indicated, whereby all of the valves in the series are caused to move in unison. The bars E' are in turn connected by straps or flexible connections F to the key-fingers or operating-levers G, by means of which the valves are actuated. The straps or connections F have sufficient length to stand slack or buckle to a slight degree when the valves are closed, so that when opening the valves the operators G get under movement before the valves E start, thus utilizing the momentum of the parts for overcoming the suction action on the valves when closed. In the present instance the operator G consists of an angle-lever arranged beneath the manual-key H, and provided with a spring, H', for retaining its upper arm, which may be furnished with a suitable bearing-button, *h*, against the under side of the key H. If preferred, however, any other suitable mechanism may be employed for connecting the key with the operating-strip which moves the series of valves without departing from the nature of my invention. The valves E, being connected and arranged in the manner illustrated, require no springs for closing them to their seats, since they naturally close by their own gravity, and are held sufficiently tight by the atmospheric pressure or slight suction of air when the exhaust-bellows are in operation.

Beneath the tube-board B on the under side of the sound-board A, and dependent therefrom, I arrange a series of auxiliary chambers, I, in number corresponding with the number of sets of reeds in the tube-board. Said chambers are separated from each other by suitable partitions, I', and respectively communicate

with the reed cells C or their chambers C' by openings *i*, formed through the sounding-board A.

Within the auxiliary chambers I, I arrange the mutes or shutters J for isolating the separate sets of reeds or sounding devices from the air-exhaust chamber A', to give the various stops and changes of expression. Said shutters J, which cover openings in the bottom board of the chambers, are arranged to open upward or against the action of the air substantially as illustrated, so that the shutters fall by their own gravity and the air-suction, while for opening they are operated by means of rocking wires or bars K, arranged beneath the chambers, having cranked or upward-turned ends K', that pass up through the openings and press against the under side or faces of the shutters J. The rocker-wires K extend to either end of the instrument and pass to the outside through properly-packed openings, and they may be connected with any desired form of operating mechanism and stop-pulls, whereby they can be conveniently actuated, and the mutes or shutters J raised thereby at the pleasure of the operator.

In Fig. 6 is shown a method of combining my invention with the ordinary organ-action. In this case the angle levers G, which operate the valves E, are supported on a fulcrum-bar, L, (movable or stationary,) in position where the forward arm of said levers G will be engaged by suitable flanges, *m m'*, fixed on the pitmen M, by which the ordinary organ-valves N are operated, so that when said pitmen are depressed the levers G are actuated for straightening the straps F and raising the valves E.

By using flanges *m* and *m'* above and below the end of the lever-arm G the mechanism is caused to operate for closing the valves E simply by the force of the springs O required for the ordinary valves N; hence the touch of the key or pressure required for operating the valves E and N together is but very slightly in excess of that required for operating the valves N alone.

The bar L may be arranged to elevate and depress the fulcrum-bearings of the levers G by the action of a cam, P, or other suitable device, in connection with a pull knob or handle at some convenient location outside the case, so that the operator can, by the depression of the fulcrums of the levers G, slacken the straps F to such an extent that the valves E will not be operated by the movement of the pitmen M. The movable bar thus serves as a coupler for the two orders of action, thus controlling a large number of reeds by a single set of keys, with the additional benefits of a very simple, effective, and easily-operated mechanism.

By the arrangement of the tube-board and valve mechanism in the manner illustrated and described an indefinite number of reeds can be included in a single action, as it is sim-



ply necessary to add set after set in the order specified until the required number of sets are included in the organ.

The valve-seat plate D, containing the air-ducts, and also the tipping-valves connected in series to the bar E', can, if desired, be employed together or separately, and with other styles of tube-boards or with sounding devices of different construction with beneficial results, and said valves may be actuated by manual keys or by automatically-operating devices without departure from the spirit and nature of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A tube-board for musical instruments, provided with three or more sets of reed-tubes arranged upon each other in overlying rearwardly-offsetting courses, with the air-passages of the overlying sets respectively opening directly into chambers, as C', situated beneath the respective offsets and in rear of the lower courses in the order illustrated, and substantially as set forth.

2. The tube-board B, constructed with several sets of reed-tubes arranged in courses above and offsetting each other, with air passages b and chambers c', disposed in the order shown, in combination with a series of mutes or shutters, as J, arranged in auxiliary chambers, as I, beneath the respective courses, for isolating or independently stopping off the several sets of reeds, substantially in the manner shown and described.

3. The combination, as described, of the tube-board B, having three or more courses of reed-cells arranged in overlying offsetting order, with inclined front, the removable seat-plate J, having air-passages a leading into the several cells, the valves E for closing said passages, and means for detachably confining said plate firmly upon the face of the tube-board, as shown, for the purposes set forth.

4. The combination, with the reed-board and sounding devices, of the auxiliary chambers I, depending from the sound-board beneath the air-ducts from the respective sets of reeds,

the upwardly-opening mutes or shutters J, arranged within said chambers, and means for operating said shutters, substantially as shown and described.

5. The combination, with the mutes or shutters arranged within the close chambers I for opening upward, in the manner set forth, of the cranked rocking wires K, arranged along the exterior of said chambers within the wind-chest, and having their ends turned at an angle and bent upward, as at K', for action against said shutter, in the manner shown and described.

6. In combination, substantially as described, the tube-board B, having the inclined face and provided with three or more courses of reed-cells and reeds disposed in the relative order indicated, the valve-seat piece D, with series of air-ducts a formed therein, detachably secured to the face of said tube-board, the valves E, hinged to said seat-piece and connected in series of three or more to the bars E', the flexible attachment F, and actuating-lever G, substantially as and for the purposes set forth.

7. The combination, with an organ-action having keys H, reeds S, and valves N, of the tube-board B, having overlying series of reed-cells C, with reeds R and air-chambers C', externally-arranged valves E, and inside mutes or shutters, J, substantially as shown, the pitmen M, having flanges m m', the levers G, and the flexible connecting-straps F, as and for the purposes set forth.

8. The combination, with the valves E, flexible connections F, and operating-levers G, of the movable fulcrum-bar L, for changing said levers in relation to the operators or pitmen and throwing the valves into and out of action, substantially as set forth.

Witness my hand this 25th day of March, A. D. 1882.

FRANK STONE.

Witnesses:

CHAS. H. BURLEIGH,  
GEO. M. RICE.