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M. CLARK.

REED ORGAN.

No. 473,383. Patented Apr. 19, 1892.

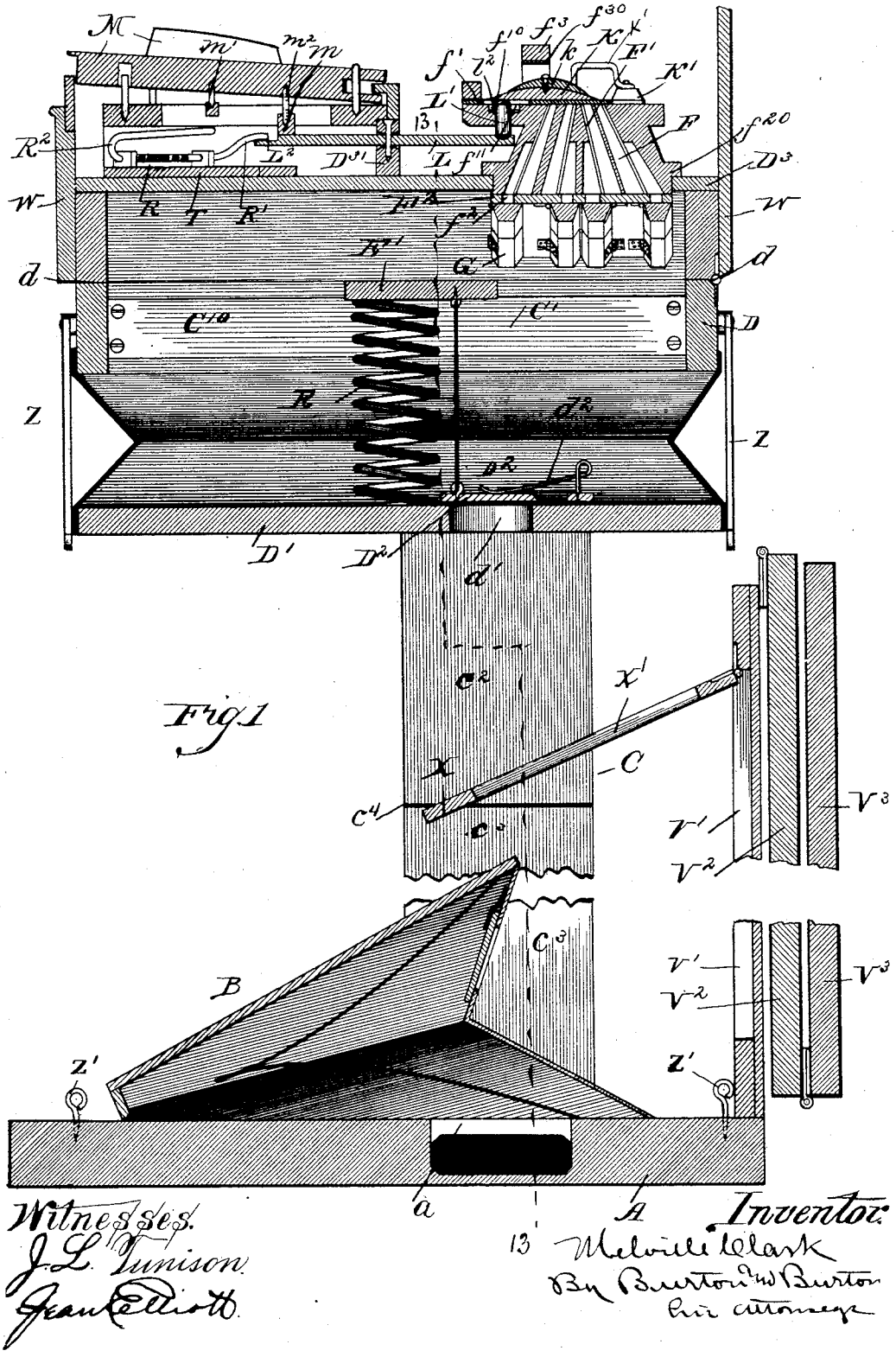

Fig 1

Witnesses.
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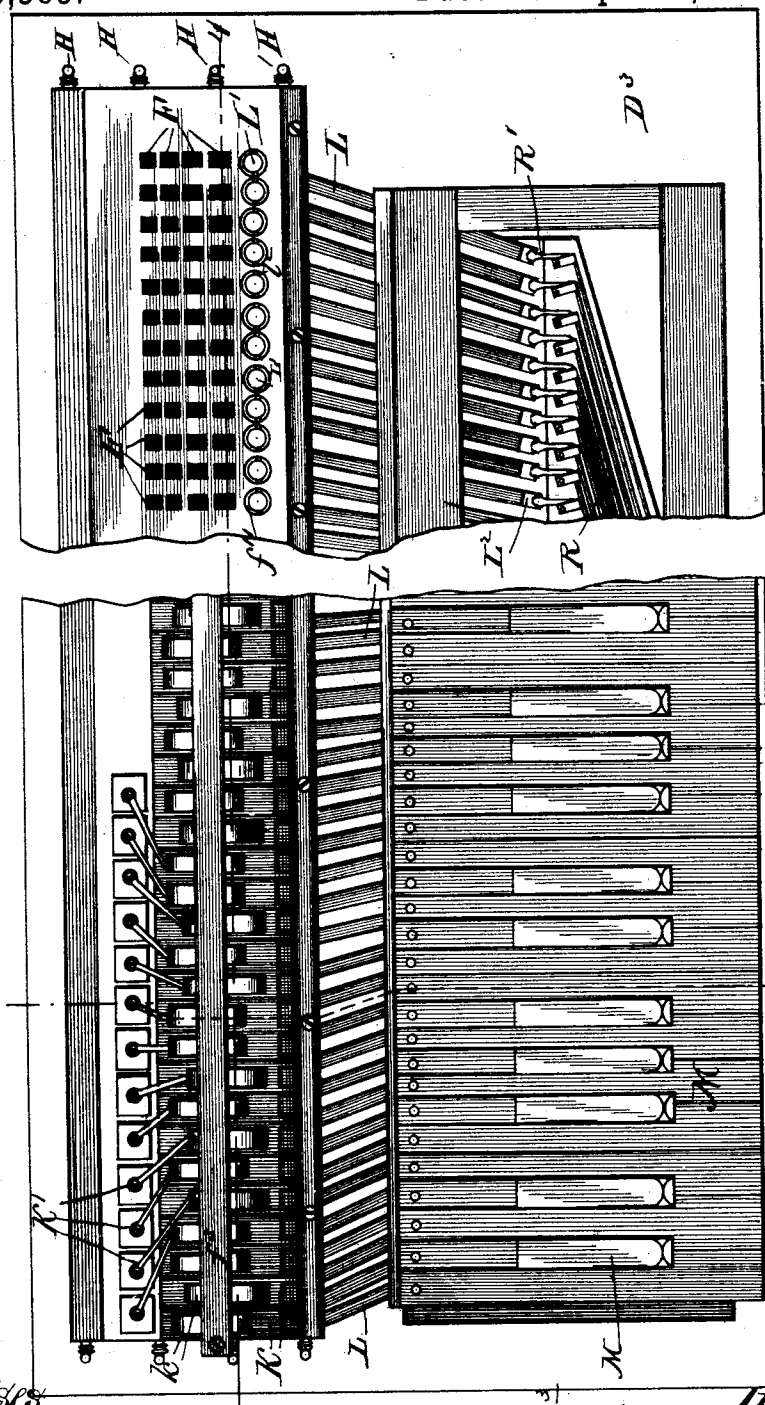

Fig 2

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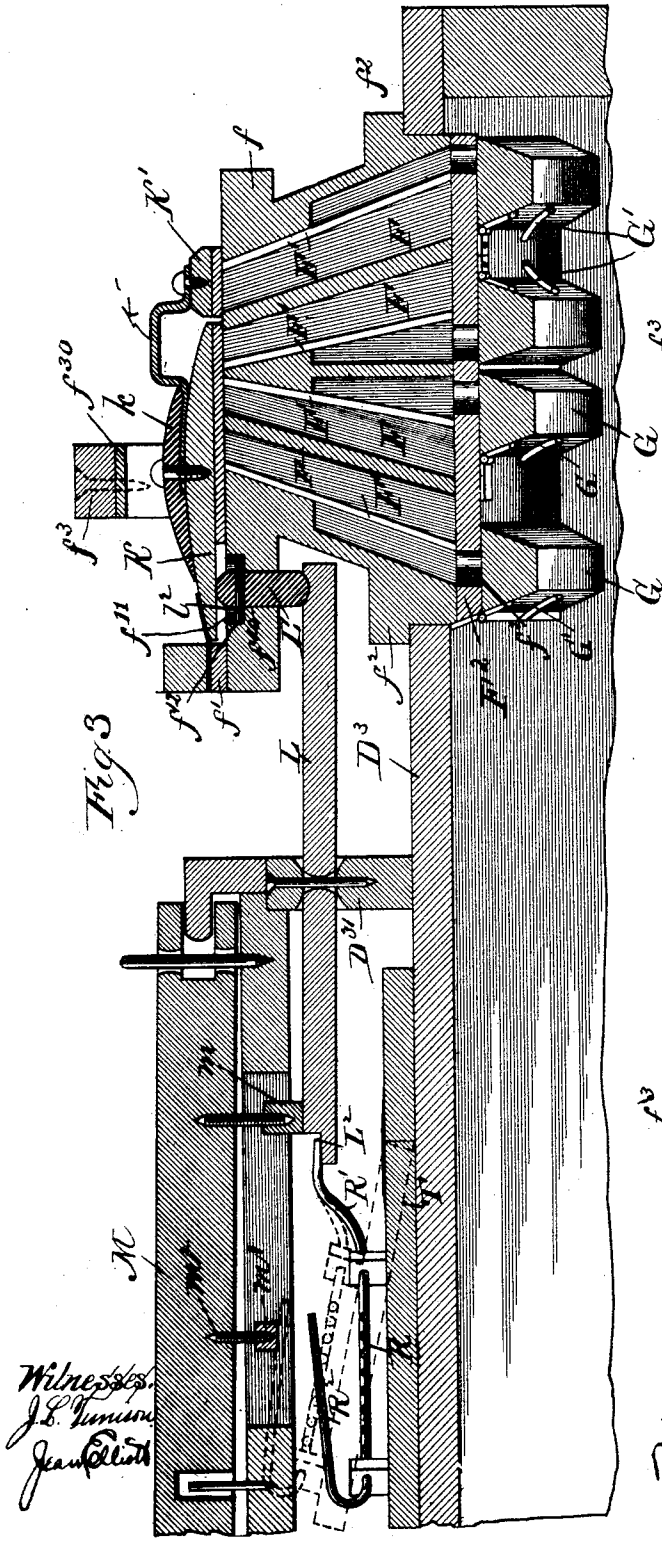

Fig. 3

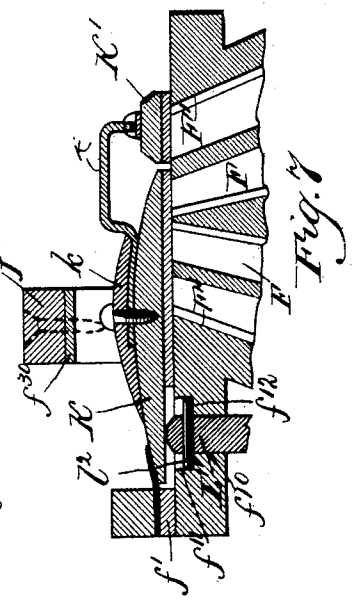

Fig. 7

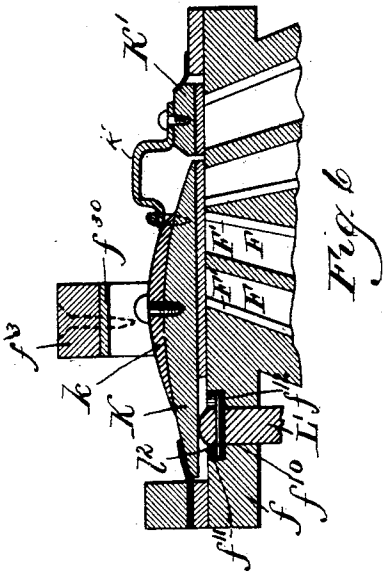

Fig. 6

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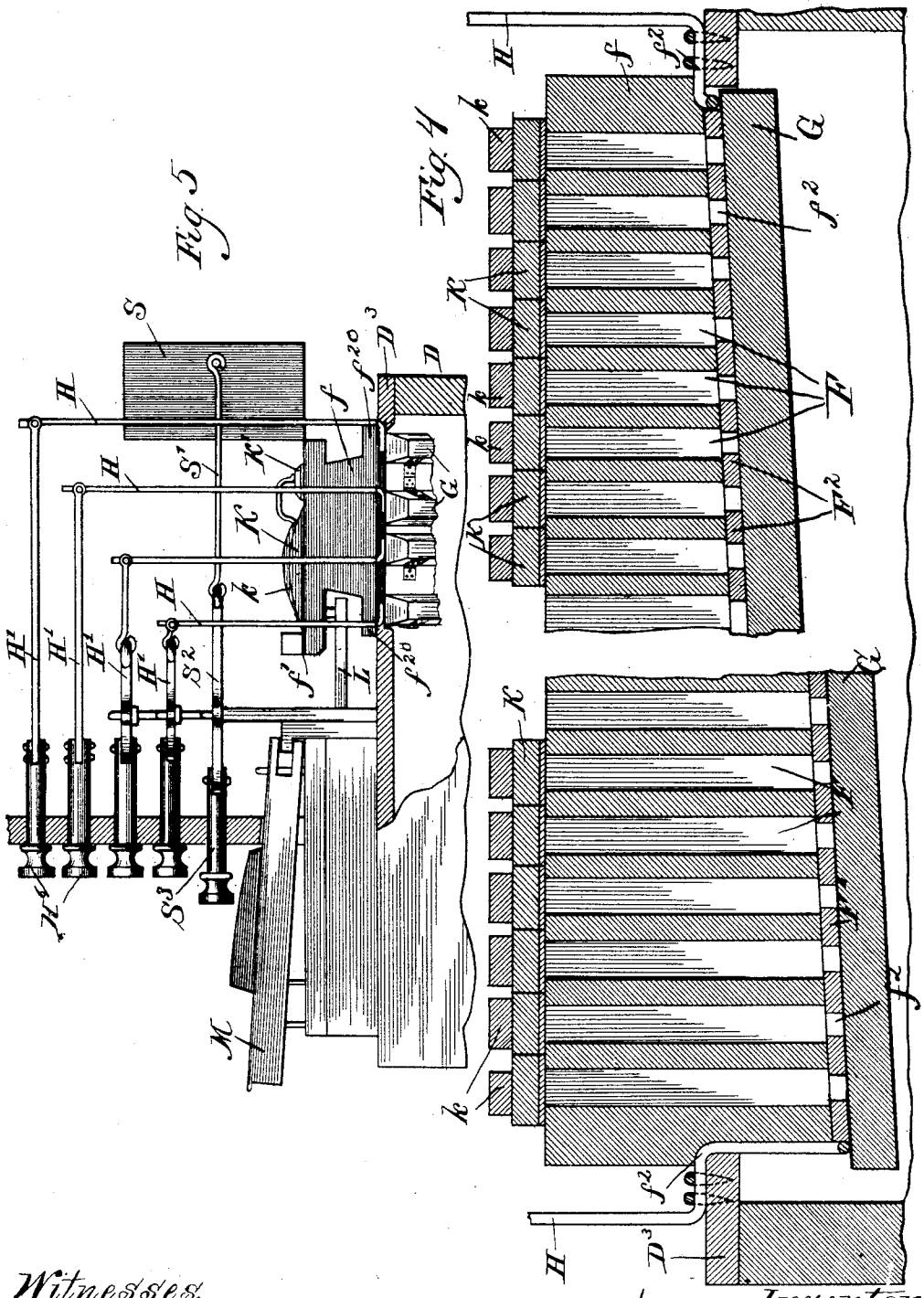

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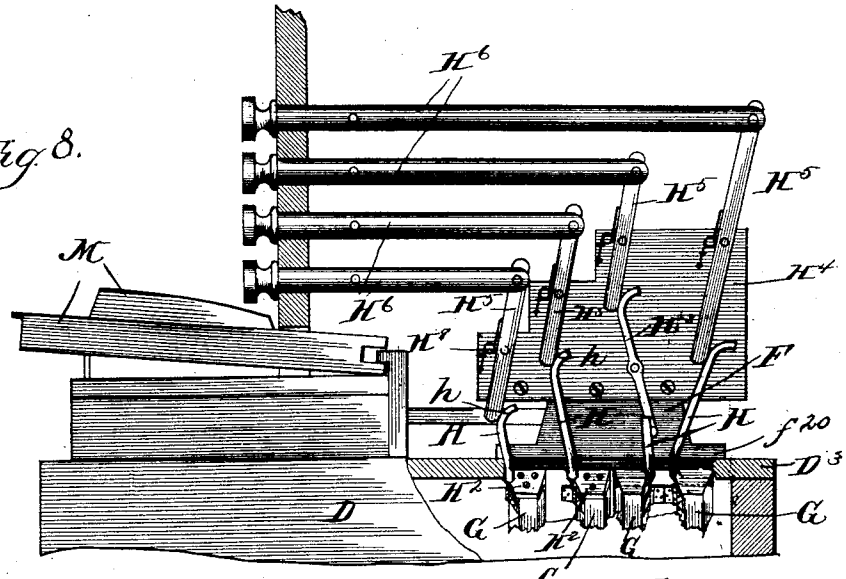
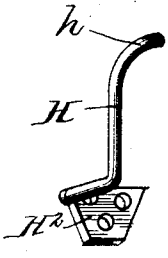
Fig. 8.





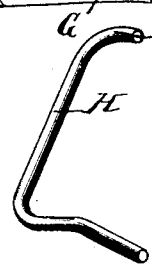


Fig. 11.

Fig. 10.

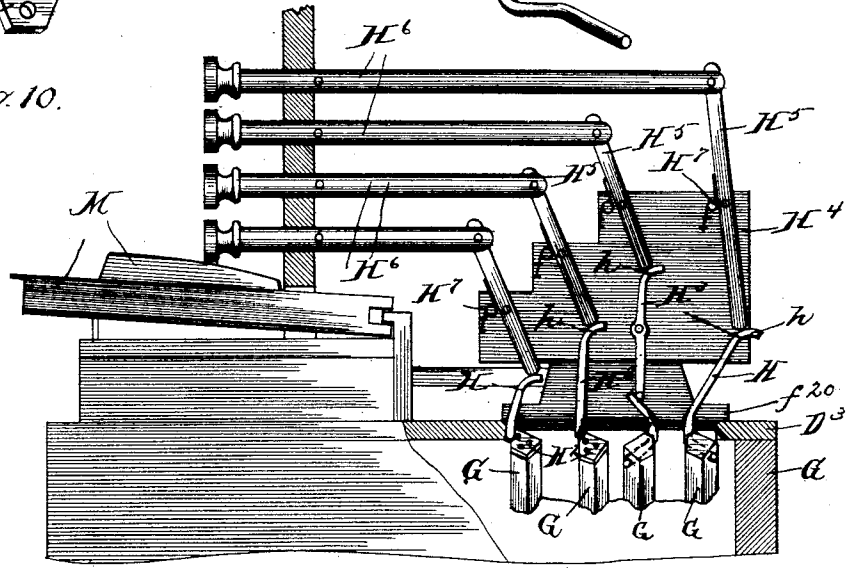


Fig. 9.

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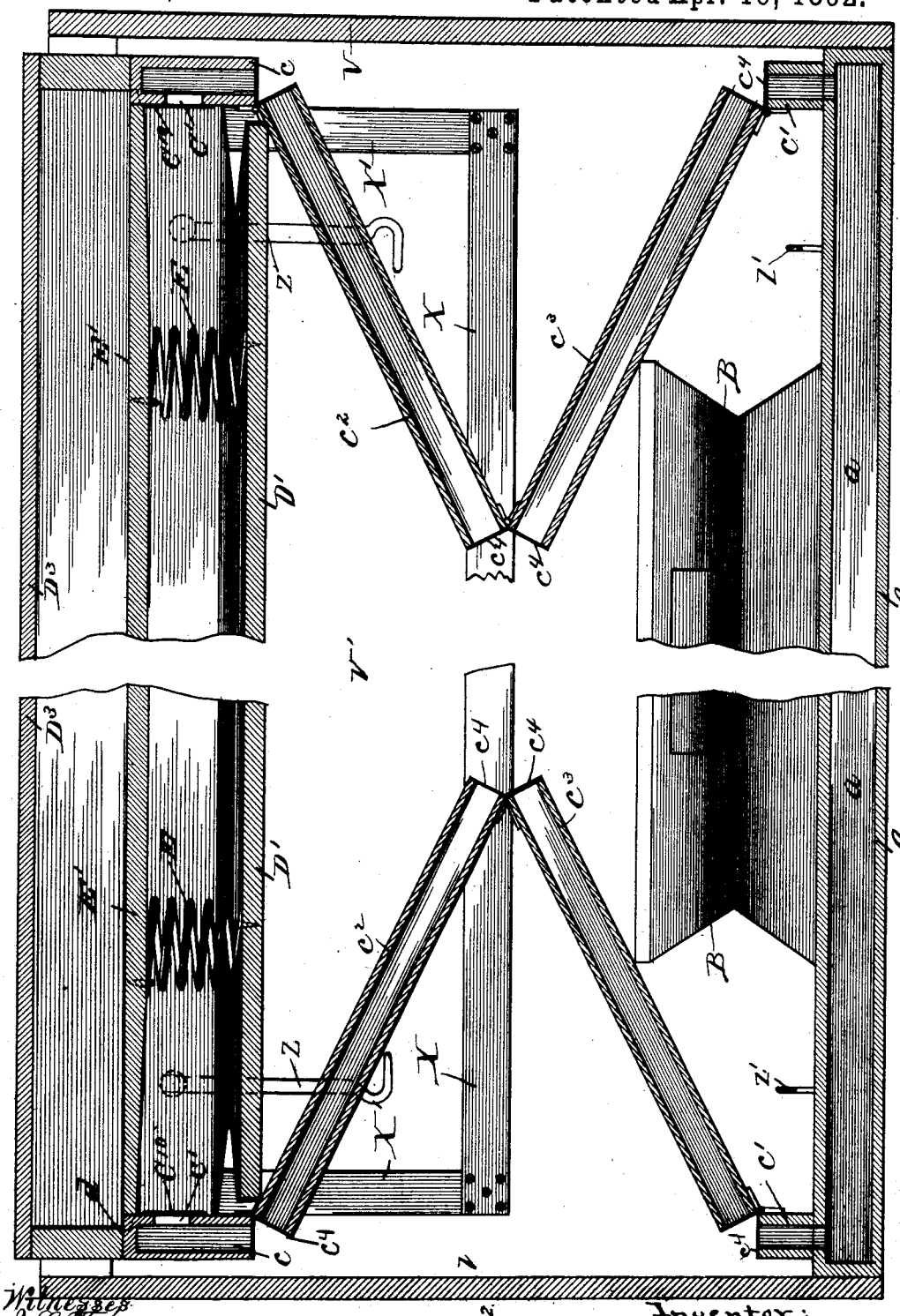

Fig. 2.

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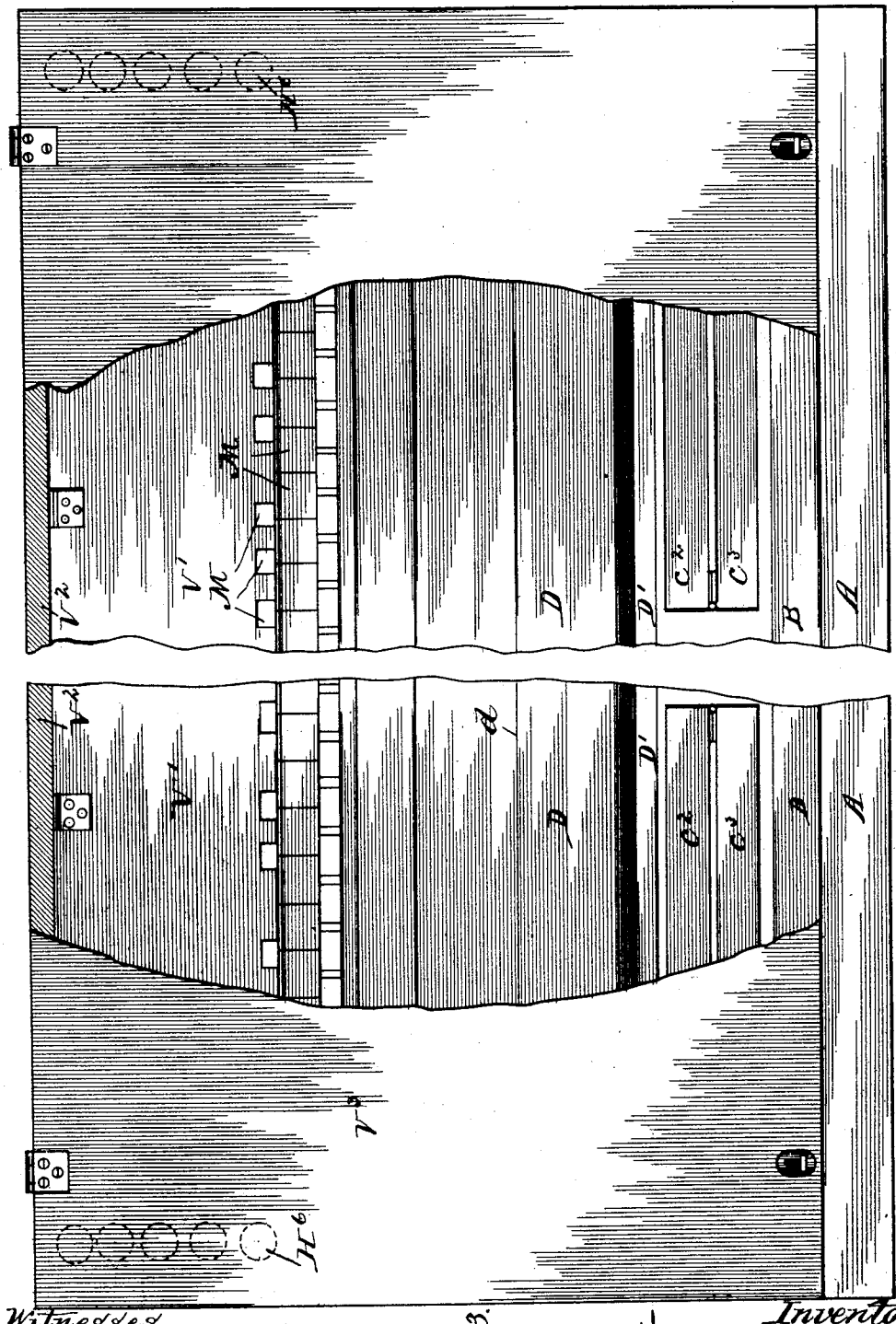

Fig 13.

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Jean Elliott.

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UNITED STATES PATENT OFFICE.

MELVILLE CLARK, OF CHICAGO, ILLINOIS.

REED-ORGAN.

SPECIFICATION forming part of Letters Patent No. 473,383, dated April 19, 1892.

Application filed October 30, 1891. Serial No. 410,683. (No model.)

To all whom it may concern:

Be it known that I, MELVILLE CLARK, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Reed-Organs, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

The improvements which constitute this invention relate chiefly to blast-organs, but some of them are equally applicable to exhaust-organs.

In the drawings, Figure 1 is a vertical fore-and-aft section midway in the length of the blast-organ embodying my invention, the stop-action being omitted. Fig. 2 is a plan of the same, part of the manual and part of the valves being removed to show the action and reed chambers more fully. Fig. 3 is an enlarged detail section at the line 3 3 on Fig. 2. Fig. 4 is a longitudinal section at the line 4 4 on Fig. 2. Fig. 5 is an end elevation showing one form of stop-action, the end of the storage-bellows being partly broken away. Fig. 6 is a detail vertical section showing a modification of the connection of the principal and sub-bass valves. Fig. 7 is a similar detail showing another modification of the same. Figs. 8 and 9 are elevations of a preferred form of stop-action, the former showing the stops in and the mutes all closed and the latter showing the stops out and the mutes all open. Figs. 10 and 11 are perspectives of two alternative forms of crank or lever arms by which the mutes are operated in this preferred action. Fig. 12 is a longitudinal section at the plane of the line 13 13 on Fig. 1, showing the organ-frame partly collapsed. Fig. 13 is a partly sectional front elevation showing the organ entirely collapsed, the case being broken away for a portion of the length and the collapsed frame being shown in longitudinal section at the same plane as the section in Fig. 12.

The general arrangement of the blast-producing devices with respect to the case of this organ is the same as that shown in my application, Serial No. 330,744, filed February 9, 1891, and is not the subject-matter to be claimed herein; but those features will be incidentally described for the purpose of completeness.

A is the base-plank of the organ, upon which the pedal-bellows B are supported and into the cavity *a* of which said pedal-bellows discharge.

C C are the standards at the end of the base A, which support the storage or blast bellows D and the action, said standards being hollow and serving to conduct the blast from said pedal-bellows to said storage-bellows, the blast entering the latter at the support C′, as seen in Fig. 1, said support being provided with the customary flap or check-valve C^{10} to retain the air in the storage-bellows under tension.

E E are helical springs, which are located within the storage-bellows, being secured at both ends, the upper end being fastened to a bar E′, which extends from end to end of the part of the storage-bellows below the division plane *d d* and the lower end being fastened to the bottom D′ of the bellows. In the inflation of the storage-bellows by the operation of the pedal-bellows the springs E are extended, as seen in Fig. 1, and their reaction tends to force the air out through the reeds as the manual is operated. These springs E are shown at their normal tension in Fig. 12, and they are capable of compression from that position, with a tendency to react to expand instead of to contract the bellows. These springs thus serve two purposes—first, to resist the expansion of the bellows and give tension to the air therein, and, second, to render the collapse of the bellows toward the latter part of that action gradual instead of abrupt, as it would be if the collapsing-springs were resisted by a positive stop. The springs E constitute their own stop and cushion the bellows in the collapse, which the springs themselves cause, and thereby the unpleasant effect which is due to the abrupt termination of the collapsing action, which causes the air to be expelled with a puff at the last, is prevented.

d′ is a relief-port in the bottom D′ of the bellows, which is closed by the valve D^2, which seats downward and is primarily seated by a light spring d^2, but principally seated by interior pressure in the storage-bellows. This

valve is connected with the fixed upper portion of the bellows by a check-cord E′, the length of the cord being such that it is drawn taut only when the bellows is expanded to the maximum desired limit, and thereafter any further operation of the pedal-bellows tending to force the air into the storage-bellows, and tending thereby to further expand the latter, causes the bottom D′ to move away from the valve D^2, and the valve being thereby opened and allowing the bellows to collapse slightly will cause the bottom of the bellows to immediately withdraw upward and permit the valve again to seat, whereby in case of continuous operation of the pedal-bellows in excess of the requirements of the organ the storage-bellows will be kept expanded only to the point where the relief-valve will be opened by the check-cord.

The storage-bellows is divided horizontally at *d d*, and the two parts are hinged together at the rear side of the organ at said divisional plane, so that the upper part of the storage-bellows, carrying on its upper side all the action, may be tilted back to give access to the said action at the under side. As above stated, the action is mounted on the upper side of the top board D^3 of the storage-bellows.

F F F, &c., are reed-chambers, and F′ F′ the reeds therein. These reed-chambers protrude into the storage-bellows chamber. The corresponding reed-chambers of the several octaves, which are designed to be controlled, respectively, by different stops and operated in conjunction, are located side by side in fore-and-aft lines, the chambers of each octave being of course side by side successively in right and left lines—that is, lines substantially parallel with the manual. All the reed-chambers terminate at their upper ends or discharge-throats in the same horizontal plane, and I prefer to make them vary in length, according to the length of their respective reeds, from which it results that they terminate at their lower ends along lines oblique to the plane of their upper ends, as seen in Fig. 4, and I provide to bound them at their lower ends the strips F^2, which I term the "mute-seats," said seats having the apertures f^2, which lead into the reed-chambers, respectively, said apertures being situated in straight lines from right to left, so that each of the mutes G may cover all of the apertures pertaining to the reeds designed to be operated by a single stop, the reeds in each right and left row being controlled by two mutes and corresponding stops—one for the upper portion and the other for the lower portion of the manual, as usual. The mutes G are hinged to the mute seats F^2 and provided with the springs G′, tending to seat them, and are operated by the levers H H H H in a manner which will be obvious from the illustrations, the stop-rods H′ H′ H′ connecting to said stop-levers, as seen in Fig. 5. By varying the length of the reed-chambers as the length of their respective reeds vary I bring the air-induction apertures f^2 all substantially equally near to the reeds to which they respectively admit the air, and thereby I insure uniform promptness and intensity of action of all the reeds, whereby the quality of tone is rendered more uniform than would be the case if the said apertures were located in lines parallel to the plane of the discharge-throats of the reed-chambers, which would bring them at varying distances from the reeds.

The block *f*, in which the reed-chambers are formed, is provided with a flange f^{20} in a plane parallel to the plane of the reed-valves, and the top board D^3 is cut out to allow the said reed-chamber block to be protruded down into the bellows, the flange f^{20} serving as a stop and means for securing the reed-chamber block to the board D^3. The reed-chambers thus protrude into the bellows more or less, according to their length—that is, according to the length of their respective reeds—so that the air under tension in said bellows has direct access to each of the reed-chambers through the ports f^2 directly to the reeds without being obliged to pass in any instance through an intermediate duct or passage to reach the reed.

The upper ends or discharge-throats of the reed-chambers being, as stated, all in the same horizontal plane and the chambers for the reeds which are designed to be operated as coupled, being in fore-and-aft lines, it becomes possible to control all of the reeds pertaining to any key of the manual—that is, which are designed to be operated as coupled—by means of a single valve, such valve seating simultaneously over the several throats in fore-and-aft line. K K, &c., are the valves. They are hinged in a familiar manner at their forward ends to the slightly-upraised rib *f′* of the block *f*, in which the upper parts of the reed-chambers F are formed. These valves are seated by gravity only, all springs or other devices of that sort for holding them on their seats being dispensed with. I secure upon the upper side of each of the valves K a small metal weight *k*, sufficient to hold the valves on their seats against the pressure of air which can enter through the induction-port f^2, or which, entering through said ports, can pass the reeds. The valves are operated by the levers L, which are fulcrumed upon the upper edge of the rib D^{31}, mounted on the upper side of the board D^3, said levers being at their forward ends operated by the keys M of the manual in a familiar manner and having upon them at their rear ends the weights L′, which are sufficient to counterbalance the keys M and hold the latter at their proper horizontal position. These weights L′ are cylindrical in form and long enough to operate as the plungers by which the levers L may operate the valves K. They are slightly rounded at their lower ends, and the levers L have slight concavities, which receive the said rounded ends to give the weights definiteness of lodgment on the levers. They are each provided with

a short cross-pin l^2, and the holes f^{10} in the block f, through which they respectively extend from the ends of the levers below to the valves above, are countersunk or rabbeted by forming the enlarged part f^{11} at the upper end, whose diameter is just barely more than the length of said cross-pin, so that the shoulder f^{12} is formed, on which the cross-pin lodges, and thereby suspends the plunger. The said plungers are thus without direct connection either to the valves or to the levers, but are interposed between them, and may each independently be lifted out by tipping the valve back, and they all remain with the reed-chamber block f when the latter, with the valves, is withdrawn for any purpose. By their freedom in their relation to the valves and the levers they are prevented from rubbing on either in their action, and at the same time they communicate motion from the lever to the valve as exactly as if positively connected to each.

By counterbalancing the keys M with the plunger-weights L′, I reduce the amount of force necessary to operate the keys to the minimum, which is sufficient to lift the weighted valves, and I thereby also diminish the weight necessary to hold the valves on their seats, because it is not necessary to include in that weight any counter-balance for the keys M, as would otherwise be required.

It is obviously a much more easy matter to make the weights k perfectly uniform than it would be to make an equal number of springs perfectly uniform in tension. I therefore gain greatly in uniformity of touch of the manual by using weighted valves instead of spring-pressed valves, and in order that this uniformity may exist not only between keys of the same length, but between long and short (white and black) keys as well, I place the weights k on the valves which pertain to the short (black) keys enough nearer the pivots of the valves to compensate for the difference in leverage afforded by the keys on account of the difference in length of the latter. For perfect accuracy the distance of the weights from the hinges of the valves, respectively, should of course be exactly proportionate to the leverage of the keys. Since seating the weights back toward the hinge of the valves diminishes the effectiveness of the weights as a means of holding the valves on their seats, the weight must be heavy enough to accomplish the purpose, even in case of the valves upon which the weight is placed nearest the hinge, and it will therefore be somewhat heavier than necessary on the valves on which it is placed farther from the hinge; but the touch will still be much lighter than it can be made and be even tolerably uniform when springs are employed, and almost exact uniformity is easily obtainable. To prevent the valves being thrown farther up than necessary by a violent stroke on the keys, I provide the check-bar f^3, detachably secured at the ends of the block f and overhanging the valves and having non-sonorous cushion f^{30} on the under side.

By dispensing with a spring, which, if employed, would have to be located over each valve and press upon it, I render the space above the valves, respectively, when the check-bar is removed, entirely clear of any obstruction, so that the valves can be tipped back freely off their seats to remove the reeds or for any other purpose requiring access either to the reed-chambers or to the plungers, whereas springs, if present, would be in the way of such manipulation and would be themselves damaged by even such movement of the valves as they might not absolutely prevent.

For the purpose of sub-bass or pedal-bass, which requries broader reeds than are employed for the remainder of the tones, I provide series of reed-chambers, which are made vertical, as in the case of the other reed-chambers, the middle one of the number necessary for sub-bass, which is usually thirteen, being placed in fore-and-aft line with the corresponding chamber of the octave with which the sub-bass is to be coupled. On account of the greater width of the sub-bass reed-chambers each successive chamber to the right and left of this middle one will be a little more out of fore-and-aft line with the corresponding chamber of the principal octave than the last preceding, as is seen in Fig. 2. To control these sub-bass reeds, I provide extensions k' k', either from the principal valves pertaining to the reed-chambers of the octave with which the sub-bass is to be coupled to the sub-bass valves or from the sub-bass valves to the principal valves, the extension of the middle valve of the series being in direct fore-and-aft plane with the principal valve and the extensions of each of the other valves in the series to right and left being successively a little more oblique to the right or left, as the case may be, and to said extensions the valves K′ K′ for the several sub-bass reed-chambers are connected. The connection of the sub-bass valves to the principal valves by means of said extensions may be rigid, making the sub-bass valve virtually a mere prolongation of the principal valve, or it may be flexible, the sub-bass valve being either suspended at its middle point from the rigid extension of the principal valve or being hinged at the rear end and operated by said extension, as by a lever-arm. These several forms of connection are illustrated, respectively, in Figs. 2, 6, and 7, and in all of them it should be observed that the principal valve directly actuates the sub-bass valve. In case the sub-bass valve is hinged, as in Fig. 6, it is immaterial which valve has the extension, and in case they are rigidly connected by the extension it may be considered as pertaining to either of them. Only, therefore, in case of the form shown in Fig. 7 is it essential which valve is described as having the extension, and in that form the extension must pertain to the principal valve.

S is the swell, which is hinged to the block

f, in which the reed-chambers are formed and adapted to shut down over the valves and to be operated by the stop-rod s^3, through the medium of the levers S^2 S′, in a manner which will be obvious from inspection of Fig. 5.

I have shown a coupling mechanism for this organ, which I will now describe.

The forward ends of the levers L are rabbeted at L^2, and the coupling-levers R, mounted as usual on the hinged board T, have one arm R′ lodged above the said rabbeted end of the levers L. The other arm R^2 extends under the buttons *m*′, which are provided on the under side of the keys M of the manual. The ends of the lever-arms R^2 are brought up to the buttons by the operation of the coupler-stop, which rocks the board T to the position shown in dotted lines in Fig. 3. The buttons *m* on the keys M by which the latter make contact with the lever L are secured to the keys, respectively, by threaded stems m^2, which permit their adjustment to level the keys and compensate for any inequality in the plunger-weights.

Cranks or lever-arms H extend in a plane substantially at right angles to the axes of the hinges of the mutes, respectively, and are journaled in the end of the chamber in which the mutes operate, and within said chamber engage the mutes, respectively, so that as the levers are rocked in their said journals they rock the mutes over their hinges. They are constructed and operated outside said chamber, as shown in Figs. 8 and 9.

Before describing that exterior construction and mode of operation I will describe specifically two modes of forming said cranks or lever-arms and causing them to rock the mutes, both of which are illustrated in said Figs. 8 and 9. One of these methods consists in providing a plate H^2, which is secured to the end of the mute and has the crank-arm H rigid with it at one corner in line with the axis of the mute-hinge. This construction is shown in detail in Fig. 10. The other method consists in giving to said crank, in addition to the short portion which constitutes its journal-bearing in the end of the chamber, an arm at right angles therewith within the chamber and which is lodged upon the face of the mute and may be conveniently let into a groove on that face, as seen in two of the mutes in Figs. 8 and 9. This second method is substantially the same as that which is shown at the right-hand end of Fig. 4, because it is not very material whether the journaled portion is exactly in line with the hinge-axis or not so far as the ultimate action of the device is concerned, and the crank-arm H in Fig. 4 at the right-hand end may be considered as representing either crank shown in Fig. 5 or that shown in Figs. 8 and 9. The reaction of the mute-spring being in the opposite direction from that in which the interior arm of the crank in the form shown in Fig. 13 can operate against the mute as the crank is rocked, these two constructions shown in Figs. 10 and 13 are substantially identical in their mode of action and may be used interchangeably in combination with the remainder of the mechanism, which will now be described. The crank-arms H outside of the chamber extend up at the end of the block *f*, in which are the reed-chambers. In case of each of the mutes which is hinged at the forward edge the upper end of the lever or crank-arm H is curved convexly upward and forward, as seen at *h* in the drawings, and in case of any mute which is hinged at the rear edge there is provided an intermediate lever H^3, which has a similar convexly-curved upper end *h* and its lower end engaging the lever H^3 in question and has its fulcrum on a suitable bracket H^4, which is rigid with the block *f*, and on said bracket there are also fulcrumed the levers H^5, which at the upper end are connected, respectively, to the stop-rods H^6 and at their lower ends engage, respectively, the deflected ends *h* of the lever-arms, respectively. Said levers H^5 and the lever-arms upon which they respectively operate are so located relatively that when the stops are pushed in, as in Fig. 8, and the mutes are closed the lower ends of the levers H^5 rest against the deflected ends *h* near the commencement of the deflection; but when the stops are pulled out the levers H^5 rock the lever-arms having said deflected ends over to the position shown in Fig 9, setting the mutes open, as shown in that figure, and when the stops are thus pulled out to their limit the lower ends of the levers H^5 rest against said deflected ends *h*, respectively, in such position as to lock the levers, respectively, against return, as seen in Fig. 9—that is, pressure of the curved end of the lever-arm is directed against the lever H^5, either directly endwise toward the fulcrum of the lever or a little past the center, so that such pressure cannot rock the lever in such direction as to draw in the stops. When the stops are pushed in a little distance, the ends of the levers H^5 reach a point on the deflected ends *h*, such that the pressure of the mute-springs, tending to close the mutes, is no longer restrained by the levers H^5; but, on the contrary, each lever is itself rocked by the force of its mute-spring and draws in the stop. Light springs H^7 may be provided to operate upon the levers H^5, tending to draw the stops inward, merely to insure promptness of action when the stops are partly pushed in; but they should be so light as to be incapable in any event of starting the stops in from the position shown in Fig. 9.

I have illustrated a construction of the organ-case which is adapted to be collapsed, so as to occupy the smallest possible space in transportation, and this feature I will now describe.

The standards C C, for the purpose of adapting the organ to be collapsed, are formed each in four sections—the upper section *c*, which is rigid with the storage-bellows, the lower section *c*′, which is rigid with the base A, and

two equal intermediate sections c^2 and c^3, which are hinged, respectively, to the upper and lower sections c and c', so as to fold inward therefrom, and are hinged together at their abutting ends to permit the same folding movement. The abutting ends of all these sections of the standard C are furnished with suitable packing of leather or rubber or felt c^4, so that when the standards are straightened up air-tight joints are made at said abutting ends. The height of the lower section c' is as great as the vertical dimension of the pedal-bellows when collapsed to the utmost, and the upper section c extends down to the plane to which the bottom of the storage-bellows can be moved upward in the collapse of said bellows, so that when the standards are collapsed, as in Fig. 13, to the extent that the equal sections c^2 and c^3 lie prone one above the other, the pedal-bellows is collapsed below them and the storage-bellows collapsed above them, and the entire case and bellows occupy the least possible vertical extent.

An inclosing case, which may be finished cabinet-work or merely a rough packing-case, according to the mode of use of the organ, may be secured to the base A and extend high enough to inclose the entire organ when collapsed. Such a case is represented in the drawings. V V are the ends, V′ the back, V^2 the top, and V^3 the front of such case. The ends and back are secured rigidly to the base outside the folding standards. The top is hinged to the upper edge of the back V′, and the front V^3 is hinged to that edge of the top which is the forward edge when the case is closed and the rear and lower edge when the case is open, and the top and back, as is necessary, are folded back, as seen in Fig. 1. When the organ is collapsed, the top is folded over above the action and the manual and the front folded down forward of the manual and bellows and suitably fastened at the forward edge of the base. Suitable cabinet-work W may inclose the upper part of the organ comprising the action, such cabinet-work being of such dimensions as to pass within the rigid case, which is secured to the base A when the organ is collapsed. In order to lock the standards fixedly in any position, I provide the brace or locking-bar X, which is of such length as to extend from end to end between the standards at their middle joint between the parts c^2 and c^3 when they are erect, and preventing the buckling of those joints inward. This locking-bar is connected by a lever arm or frame X′ to the back V′ of the case, such frame or arm being hinged to said back, so that when the organ is collapsed it may hang down close to the back, not protruding at any point forward of the forward surface of the marginal cleats, which are secured upon the inner surface of said back V′ to stiffen and strengthen the same. The said locking-bar and its connections to the frame are therefore entirely out of the way of the portion of the organ which is telescoped within the case when the organ is collapsed; but when it is erect the locking-bar is thrown up to the position shown in Fig. 1. The bar is long enough so that it binds tightly between the two standards in this position for two purposes—first, to insure the tight closing of the standard at the hinge-joints to prevent any leakage of air thereat, and, second, to prevent the locking-bar from dropping down.

Both for the sake of preventing the weight of the action and the upward pressure of the bellows-springs from a tendency which they would otherwise have to strain the cover in the handling and shipment of the organ in its collapsed condition, as well as for the purpose of making it possible to dispense with the cover and adapt the organ to be collapsed and secured in collapsed condition regardless of the inclosing case, hooks Z Z may be provided, and eyes Z′ Z′, adapted for the engagement of such hooks, secured, respectively, to the base and to the action-frame, so that they may be engaged when the standards are collapsed and the action base and frame are nearest together, thereby locking them in such relation. Many obvious equivalents of the hooks and eyes may be devised and substituted without departing from the essential feature—to wit, locking the base and action-frame together at collapsed position.

I claim—

1. In a reed-organ, the valves which control the reeds seating against the air-pressure by which the reeds are operated and weighted to adapt them to be seated by gravity only, substantially as set forth.

2. In a reed-organ, the valves which control the reeds seating against the air-pressure by which the reeds are operated and weighted to adapt them to be seated by gravity only, the manual keys, and the levers by which they operate the valves, the distance of the weights on said valves from the hinges of the valves being proportional to the leverage of their respective keys, whereby the touch of long and short keys is equalized, substantially as set forth.

3. In an organ, in combination with the manual keys, the valve-operating levers actuated by said keys, provided with counterweights on their ends remote from the keys to counterbalance the weight of the latter and uphold the keys independently of the pressure which seats the valve, substantially as set forth.

4. In an organ, in combination with the manual, the valve-operating levers and the valve operated thereby, the levers having on their arms remote from the keys plungers to operate said valve, said plungers being in the form of weights to counterbalance the keys, substantially as set forth.

5. In combination with the valves adapted to seat by gravity only and weighted for that purpose, the levers which actuate them and the keys of the manual which actuate the levers, said levers being weighted on their arms

remote from the keys to counterbalance the latter, substantially as set forth.

6. In a reed-organ comprising a plurality of series of reed-chambers corresponding to the same series of operating-keys, the reed-chambers of the several series all opening endwise at the same horizontal plane, corresponding individuals of the several series being in line fore and aft, in combination with valves extending fore and aft over the ends of corresponding individuals of the several series and weighted to cause them to seat by gravity thereover, substantially as set forth.

7. In a reed-organ comprising a plurality of reeds and reed-chambers corresponding to the same series of operating-keys, the corresponding individuals of the several series terminating endwise at the same plane and converging from their ends remote from said plane, and the valves which control them seating at said plane, whereby the valved throats or mouths of said chambers are brought into a limited compass, while their opposite ends may be expanded to accommodate the vibration of the reeds, substantially as set forth.

8. In a reed-organ, the reed-chambers of each series which corresponds to a series of operating-keys located side by side and terminating endwise at the same plane and individually valved at said plane, said chambers varying in length according to the length of their respective reeds, and the mutes pertaining to such series at the opposite ends of said chambers extending in a direction inclined to the plane of the individually-valved ends, substantially as set forth.

9. In a reed-organ, in combination with a principal set of reed-chambers, a set of sub-bass chambers parallel with the principal set, valves of the principal set, and valves of the sub-bass set, the valves of one of said sets having, respectively, rigid extensions which directly engage the corresponding valves of the other set, whereby the principal set operate the sub-bass set, substantially as set forth.

10. In a reed-organ, in combination with a series of reed-chambers pertaining to a given series of keys of the manual, a further series of reed-chambers located parallel with the first series, the individuals of the second series being wider than the individuals of the first series, whereby said second series occupies greater extent parallel with the manual than the first series, and corresponding individuals are successively from a selected point more and more out of fore-and-aft line, the valves which pertain to one of said series of chambers having, respectively, rigid oblique extensions which directly engage the corresponding valves of the other series, substantially as set forth.

11. In a reed-organ, in combination with a principal set of reed-chambers, a set of sub-bass chambers parallel with the principal set, the valves of the sub-bass set being hinged at their rear ends and having rigid extensions which overhang, respectively, the valves of the principal set, whereby the latter operate the former, substantially as set forth.

12. In a reed-organ, the manual keys and the levers which they actuate to operate their respective reeds, the octave-coupling levers mounted on a coupling-board and having one arm lodged above the forward ends of the manual levers of the keys to be coupled, respectively, and the other arm projecting freely under the keys, respectively, with which the coupling is to be effected, the coupling-board being hinged at its edge proximate to the vertical plane of lodgment of the coupling-levers on the manual levers, and the stop-action pertaining to said coupling-board, substantially as set forth.

13. In an organ, in combination with the mutes, lever-arms by which they are operated, located outside of the chamber in which the mutes are situated, said lever-arms having deflected ends *h*, the stop-rods and the levers H^5, operated thereby and engaging the deflected ends of the mute-operating lever-arms, substantially as and for the purpose set forth.

14. In an organ, in combination with the pedal-bellows and the storage-bellows, the standards which support the action, constituting, also, the air-conduits from the pedal-bellows to the storage-bellows, said conduits consisting of sections hinged together and adapted to collapse inwardly, the abutting ends of such sections having yielding packing to adapt them to make air-tight junctions when erect, substantially as set forth.

15. In an organ, the base and the action-supporting standards adapted to collapse to lower the action toward the base, combined with a case having ends and back rigid with the base and extending high enough to inclose the action when the standards are collapsed, and a removable cover, substantially as set forth.

16. In an organ, the base and the action-supporting standards adapted to collapse to lower the action toward the base, combined with a case having ends and back rigid with the base, and the cover hinged to the upper edge of the back, substantially as set forth.

17. In a blast-organ, in combination with the storage-bellows, springs which are both collapsible and extensible, connected to the bellows, and adapted normally to hold the bellows partly collapsed, whereby they both resist the expansion of the bellows and cushion its collapse, substantially as set forth.

18. In a blast-organ, in combination with the storage-bellows, helical springs connected fixedly at one end and connected at the other end to the fluctuating side of the bellows, said springs adapted to be compressed and extended and at their normal condition of no tension holding the bellows partly collapsed, substantially as set forth.

19. In a blast-organ, the storage-bellows divided horizontally between its top and bottom sides, the helical springs E E, located

within the lower section of the bellows, connected at their upper ends to the bar E′, which is rigid with the fixed portion of the lower section and at the lower ends to the fluctuating side of the bellows, substantially as set forth.

20. In an organ, in combination with the action-frame, the pedal-bellows, the storage-bellows, the base which supports the pedal-bellows, the standards which support the action-frame and connect it to the base, said base and standards constituting the air-conduit from the pedal-bellows to the storage-bellows and being composed of sections hinged together and adapted to collapse inwardly, and suitable means for locking the action-frame to the base when the standards are collapsed, substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 28th day of October, 1891.

MELVILLE CLARK.

Witnesses:
CHAS. S. BURTON,
JEAN ELLIOTT.