

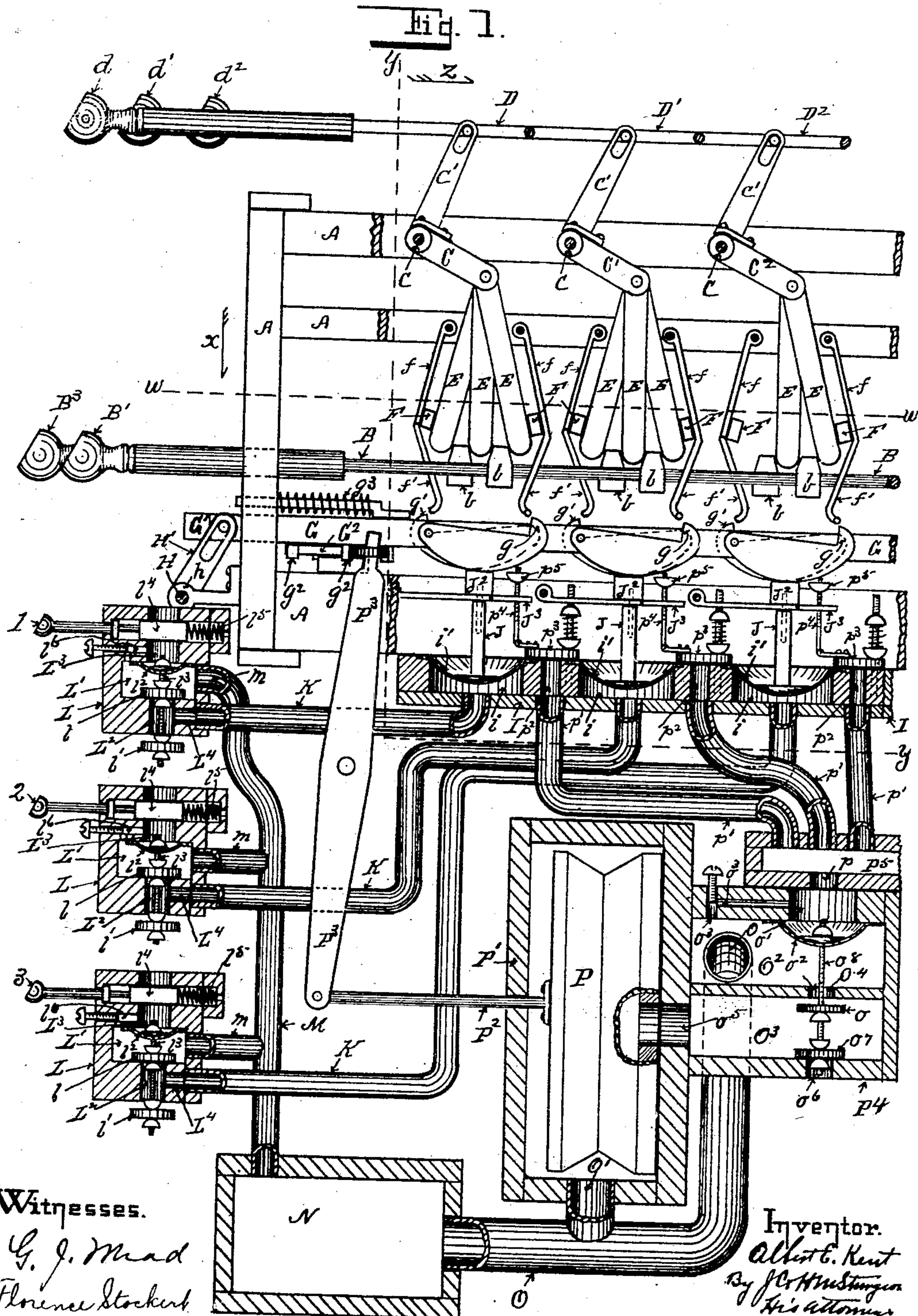
No. 879,776.

PATENTED FEB. 18, 1908.

A. E. KENT.
COMBINATION ORGAN STOP ACTION.

APPLICATION FILED SEPT. 28, 1907.

3 SHEETS—SHEET 1.



Witnesses.

G. J. Mead
Florence Stockert

Inventor.

Albert E. Kent
By J. C. H. H. H. H.
His attorney

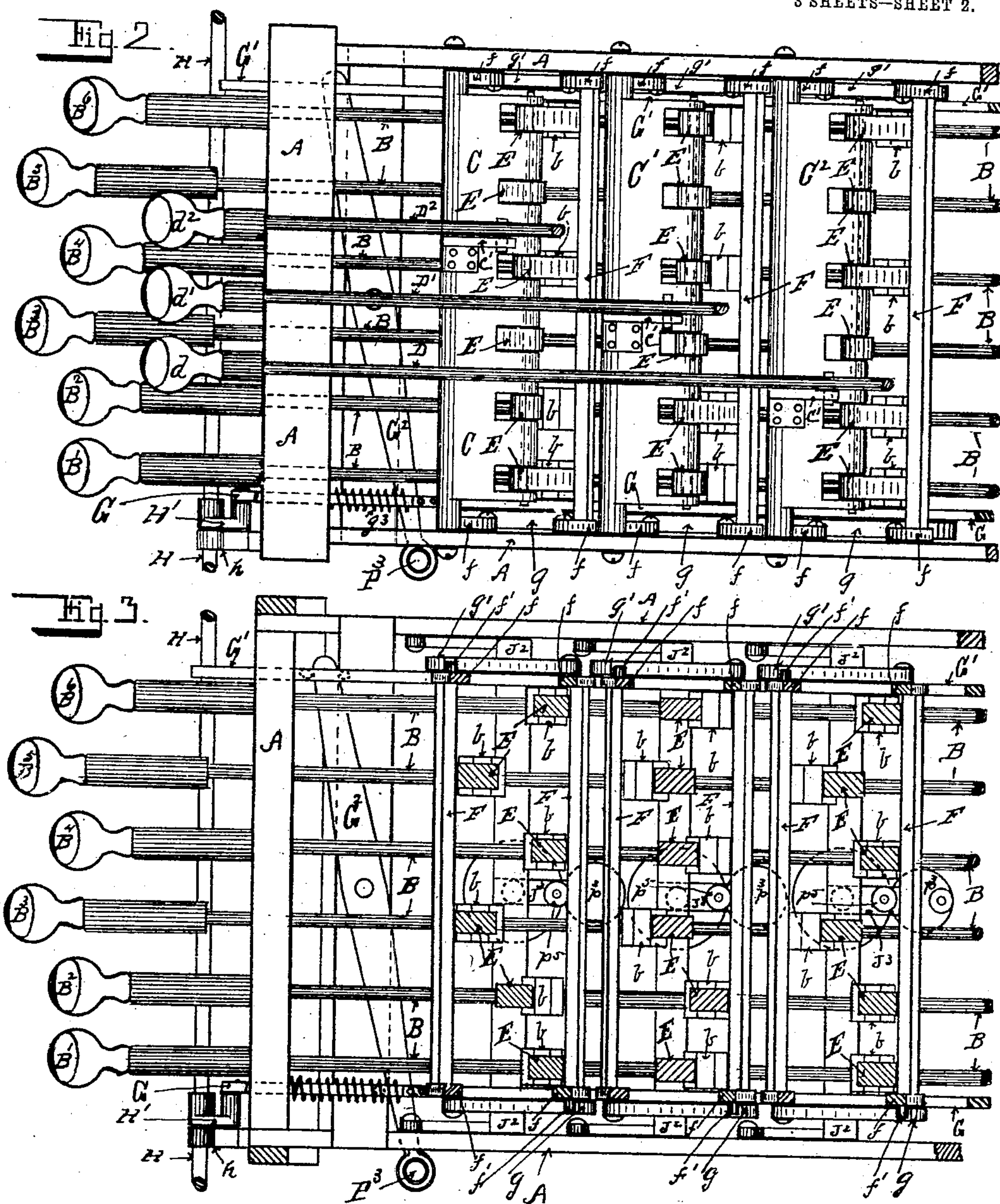
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3 SHEETS—SHEET 2.



Witnesses.

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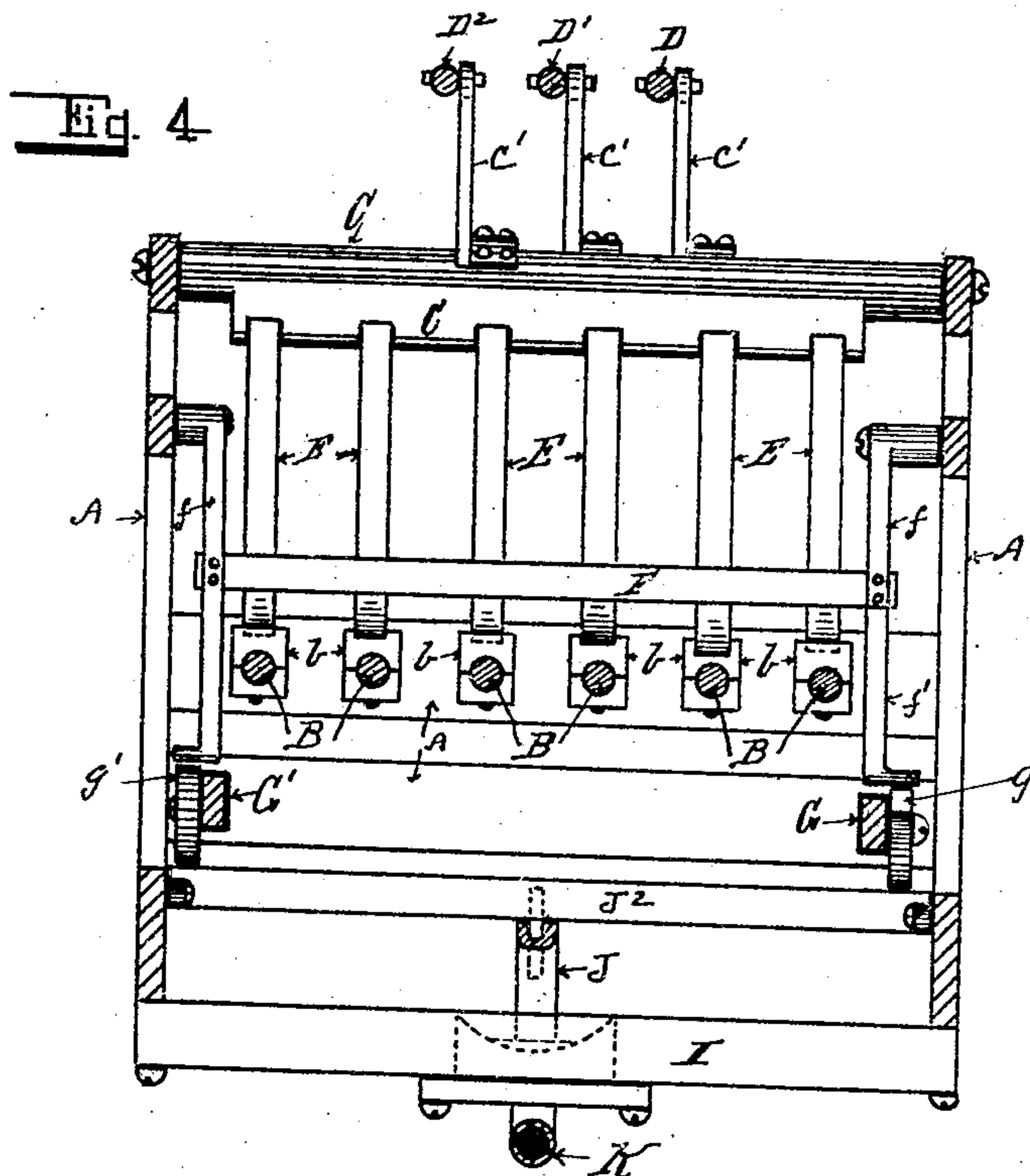
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3 SHEETS—SHEET 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

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COMBINATION ORGAN STOP-ACTION.

No. 879,776.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed September 28, 1907. Serial No. 394,983.

To all whom it may concern:

Be it known that I, ALBERT E. KENT, a citizen of Great Britain, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Combination Organ Stop-Actions; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention relates to the construction of church organs, and has for its object the construction of an adjustable automatic combination-stop-action for such organs whereby the organist can arrange the required consecutive combinations of stops before the music is commenced, and, as it proceeds, can, by a single movement, bring simultaneously into speaking position all the stops of each combination at such points in the selection being rendered, as it is required, and at the same time leave each individual stop free to be singly operated by hand when desired without disturbing the prearrangement of said combinations.

Another object of my invention is the construction of said organ combination stop action in such a manner that each and every combination of stops for which the organ is adapted may be thrown into speaking position by a single pull, or motor, common to all said combinations.

These and other features of my invention appear hereinafter in the specification and claims, and are illustrated in the accompanying drawings in which:

Figure 1 is a side view in elevation of my improved stop-action for organs, with portions thereof broken away, and a diagrammatic view of the operating mechanism therefor. Fig. 2 is a top or plan view of my improved stop-action for organs. Fig. 3 is a view of the same on the line $w-w$ looking in the direction of the arrow x in Fig. 1. Fig. 4 is a view of the same on the line $y-y$ looking in the direction of the arrow z in Fig. 1.

In these drawings A indicates the supporting frame work of my improved stop-action. Passing longitudinally through said frame

are the usual stop-draw-rods B, the front ends of which terminate in the stop-knobs $B^1 B^2 B^3 B^4 B^5 B^6$ (see Fig. 2 & 3) in the usual manner. In practice it is usual to so bend the front ends of the stop-rods B that the stop-knobs thereon may be placed in banks at different levels, at each end of the keyboard of the organ, the said stop-rods B being all arranged on the same plane in the frame A, and extending back therein to the stop-valve operating mechanism (not shown). Upon each stop-rod B I secure shoulder-blocks b , which blocks, when the stops are in their normal closed position, are on straight lines across said series of rods, there being as many sets of these shoulder-blocks as there are combination-setters in the organ.

In the upper part of the frame A, I pivot rocker-boards $C C' C^2$ by means of the pivots $c c c$, said rocker-boards being provided with upwardly extending arms $c' c' c'$ the upper ends of said levers being pivoted to the inward extensions $D D' D^2$ of the combination-setters $d d' d^2$. To the free edges of the rocker-boards $C C' C^2$ are pivoted depending fingers E, one over each stop-rod B and in front of each shoulder-block b thereon when the rods B are in their normal closed or mute position, and behind said blocks when the stop-rods are in their open or speaking position. Upon each side of each set of fingers E, I place a bar F, which extends transversely past the opposite sides of said fingers E; said bars F being suspended by arms f at each end thereof to the sides of the framework, so that they may swing toward each other. The arms f are provided with extensions f' adapted to reach down to and be engaged by hooks on the opposite sides of the stop-action, and the bars F drawn toward each other thereby.

At each side of the stop-action I place slide-bars G and G' , and upon the slide-bar G there are pivoted hooks g and upon the slide-bar G' there are pivoted hooks g' , which latter are reversed to the hooks g . These slide-bars G and G' are operated by means of a lever G^2 pivoted in the action-frame A under said slides, and engaging studs g^2 on the under edges thereof, so that with each oscillation of the lever G^2 the slide-bars G and G' and the hooks g and g' thereon are

moved in opposite directions. For returning the slide-bars G and G' to the normal position shown in the drawings, being that of inaction, I provide a spring g^3 .

5 In the drawings I have shown extensions f' on the arms f , and the slide-bars G and G' located below the level of the stop-rods B , but in practice these slide-bars G and G' may be placed high enough in the action frame A to permit the hooks g and g' pivoted on said
10 slide-bars to directly engage the transverse bars F , thus eliminating the necessity for the extensions f' on the arms f .

I have thus described the mechanism provided at each end of the organ key-board for carrying out my invention. In order to connect the combination action at one end of a key-board with the like action at the other end thereof, I provide a rock-shaft H
20 mounted in suitable brackets or bearings h on the frame A . This rock-shaft H is provided with an arm H' at each end thereof adjacent to the slide-bar G in the stop-action at each side of the key-board, which arm H'
25 is pivoted to said slide-bars G , so that as the slide-bars G and G' at one end of the key-board are operated the corresponding slides at the other end thereof are operated in unison therewith.

30 In order to operate the mechanism hereinbefore described the hooks g and g' have to be raised up to contact with and engage the extensions f' of the arms f hereinbefore described or with the transverse-bars F , before
35 the slide-bars G and G' are operated to draw the hooks g forward and the hooks g' backward in the action frame.

One form of mechanism which I have provided to carry out this part of my invention
40 is as follows: In the bottom of the action frame A , I secure a plate I , having air-chambers i therein corresponding in number and longitudinal location to the rocker-boards C C' C^2 . The tops of these air-chambers
45 are covered by flexible diaphragms i' , upon which rest the posts J , which support the transverse bars J^2 upon which the hooks g and g' rest in a horizontal position.

For supplying compressed air to the air-chambers i when desired, I provide air-supply pipes K leading thereto from valve-chests L , to which the air is supplied by a pipe M and branches m , leading from an ordinary air-trunk N ; said valve-chests containing mechanism (hereinafter described)
55 adapted to operate at the will of the organist to transmit air therethrough into the desired pipe K , and thence into the desired air-chamber i , which will cause the diaphragm i' to raise the post J and transverse bar J^2 , thereby raising up the hooks g and g' which rest thereon so that they will engage the extensions f' . The hooks g and g' are now in position to operate the bars F , and it is therefore
65 necessary to cause the slide-bars G and

G' to reciprocate. To accomplish this, I provide a collapsible bellows P , inclosed within an air-chest P' , and having a draw-rod P^2 attached thereto and extending out through an opening in said air-chest P' , the
70 outer end of which rod P^2 is pivoted to one end of a lever P^3 which is pivoted in the organ frame, the opposite end of said lever being connected with and adapted to impart motion to the transverse lever G^2 hereinbefore
75 described.

The interior of the chest P' receives air from the air-trunk N through the pipe connections O and O' , and the interior of the bellows P also receives air from the trunk N
80 through the pipe O , chamber O^2 passage O^4 and chamber O^3 , so that the action of the air upon said bellows is normally neutral and the same is retained in a distended position by the action of the spring g^3 . Upon the
85 back of the chest P' I secure a double chambered air-chest P^4 containing an upper air-chamber O^2 and a lower air-chamber O^3 which chambers are connected by an opening o^4 . In the top of the upper chamber O^2 there is
90 a chamber o' having on its under side a diaphragm o^2 of flexible material. There is also a leak o^3 leading from the chamber O^2 to the chamber o' above the diaphragm o^2 through which the air will slowly pass until
95 the pressure above and below the diaphragm becomes equalized and allows the valve o connected therewith to drop to the position shown in Fig. 1. This chamber O^2 is connected to the air-trunk N by means of the
100 pipe O . The chamber O^3 below the chamber O^2 , which communicates therewith by means of the opening o^4 , and with the interior of the bellows P by means of the opening o^5 , also communicates with the atmosphere by means
105 of the opening o^6 . These openings o^4 , and o^6 are provided with valves o and o^7 , the valve o being on the under side of the opening o^4 and the valve o^7 being on the upper side of the opening o^6 , and being so spaced apart on
110 their valve-stem o^8 , which connects with the diaphragm o^2 , that when the valve o^7 closes down upon the opening o^6 , the valve o drops away from the opening o^4 .

In order to operate all of the combinations
115 of which the organ is possible, from the mechanism last hereinbefore described, I secure upon the top of the double chambered chest P^4 , a pressure chest P^5 which is provided with an opening p communicating with
120 the chamber o' in the top of the double chambered chest P^4 . I have shown this pressure chest with the end thereof broken away, indicating thereby that the same may be made of such length as may be desired, and
125 more pipes p' connected therewith, when more than three combinations are provided for in the organ. From this pressure chest P^5 , pipes p' lead to openings p^2 in the plate I secured in the bottom of the action frame A .
130

These openings p^2 are normally closed by valves p^3 , which are held down by springs against such air in the pipe p' as may pass through the contracted passage o^3 in the chest P^4 .

I have hereinbefore described the raising up of the transverse bar J^2 and the hooks g and g' resting thereon. The bars J^2 are provided with arms J^3 through which pass the valve lifting stems p^4 of the valves p^3 , said stems being provided with a stop-nut p^5 above said arms J^3 . When, therefore, the bar J^2 and arms J^3 rises until it engages the stop p^5 , it raises the valve p^3 which allows the air in the pipe p' , pressure box P^5 , and chamber o' above the diaphragm o^2 to escape, thus leaving the pressure in the chamber O^2 under the diaphragm o^2 strong enough to raise up the valve-stem o^8 and thereby, by means of the valves o and o^7 thereon, to close the opening o^4 against the air, and open o^6 to the atmosphere to allow the air in the chamber O^3 and interior of the bellows P to escape; this will permit the air in the chest P' to collapse the bellows P , and through the rod P^2 and lever P^3 to move the slide-bars G and G' and thereby draw the hooks g and g' against the extensions f' , while said hooks are yet in a raised position, thereby pressing the bars F against the fingers E and pushing the stop-rods B , whose shoulder-blocks b are in front of the fingers E , forward into speaking position, and those stop-rods whose shoulder-blocks b are behind the fingers E backward into the mute position.

The valve-chest L is preferably constructed as follows: In the lower portion of the air-chamber L' therein, there is an opening L^2 and a larger opening L^3 in the top thereof, which last mentioned opening is covered on its under side, with a diaphragm l^2 . From this diaphragm a valve-stem l^3 passes down through a valve l on the upper side of the opening L^2 , and through said opening to and through another valve l' below said opening, said valves being so spaced apart that when the upper valve l is closed the lower valve l' leaves the opening L^2 open to the atmosphere. On the upper side of the upper opening L^3 , I provide a slide-valve l^4 adapted to be pushed inward to open said valve, and to be returned to a closed position, as shown, by means of a spring l^5 . The opening or chamber L^3 between the slide-valve l^4 and diaphragm l^2 is provided with a contracted passage or leak l^6 through which, when the slide-valve l^4 is closed the air in the chamber L' communicates therinto to neutralize the pressure in the chamber L' and permit the valve l to close the passage L^2 and the valve l' to open the same. The passage L^2 is provided with an opening L^4 communicating with the pipe K leading to the chamber i , and the chamber L' receives air from the pipe m .

In operation, when the organist desires to

set a combination, he draws out the setter d thereby lifting the rocker-board C , and its depending fingers E so that they will hang perpendicularly therefrom. The several stops, as B' , B^2 , B^4 and B^6 (see Figs. 2 & 3) desired for the combination, are pulled out carrying their shoulder-blocks b to their forwardmost position, the setter d is then pushed in, allowing the fingers E to drop behind the several shoulder-blocks b that have been moved to a forward position, and in front of those shoulder-blocks b that have remained in a rearward position, so that when the stops selected for the combination are again pushed in the fingers E which were dropped behind the shoulder-blocks b thereon will be swung backward therewith, and will remain behind the same. Should the organist desire to pre-arrange more than one combination he can repeat this operation, taking care not to disturb the setter d , which controls the first combination, using only the setters d' and d^2 consecutively therefor, which operate the rocker-boards C' and C^2 and their dependent fingers. When, after setting the combinations needed, the organist desires to throw into speaking position the first combination of stops set by the setter d , he merely pushes in the valve-stem knob 1 of the chest L , which allows the air above the diaphragm l^2 to escape, thereby allowing the air communicated to the chamber L' through the pipes M and m , to raise said diaphragm and the valves l and l' connected therewith, so as to open the upper end of the passage L^2 and close the lower end of the same, which will permit the air in the chamber L' to enter the pipe K through the opening L^2 and branch L^4 , through which pipe K the pressure travels to the air-chamber i where it raises the diaphragm i^2 , post J , cross-bar J^2 , hooks g and g' , arm J^3 , and valve p^3 , which in turn controls the operating of the mechanism P , P^2 and P^3 as hereinbefore described. When the valve l^4 is allowed to return to its normal closed position, the air passes through the contracted opening l^6 into the chamber L^3 and neutralizes the pressure in the chamber L' and permits the valves l and l' to fall and thus cut off the air from the pipe K and chamber i and permit the air therein to escape through the opening L^2 and thus allow the cross-bar J^2 to drop, and the valve p^3 to close, and the valves in the chest P^4 to return to their normal position. When the organist desires to change to another combination of stops, he has simply to press in the valve-stem knob 2 which will cause the withdrawal of the stops used in the first combination, and push out the stops pre-arranged for the second combination, in the same manner as when the first combination was put into speaking position. It is obvious that each combination after having been used does not become lost, but remains capable of being

called out again by operating its relative valve-stem knobs (1, 2 & 3) until the setters d d' and d^2 are again drawn out.

Having thus described my invention so as to enable others skilled in the art to construct and utilize the same, what I claim as new is:—

1. In an organ stop-action, the combination of a stop-rod, a shoulder-block thereon, a vertically movable finger pivoted above said stop-rod, mechanism adapted to raise said finger, and then lower the same in front of or behind the shoulder-block on said stop-rod, a transverse bar on each side of said finger, oppositely moving slide-bars on each side of said stop-rod, hooks pivoted to each slide-bar adapted to engage and move said transverse-bars toward each other when said slide-bars are reciprocated, means adapted to raise said hooks up to engage said transverse-bars, and means adapted to cause said slide-bars to reciprocate, substantially as set forth.

2. In an organ stop-action, the combination of a stop-rod, a stop-combination setting mechanism, transverse bars adapted to engage said setting mechanism, slide-bars on each side of said stop-rod, a hook on each slide-bar adapted to be raised up to engage and operate said transverse bars, an air chamber in the lower portion of said stop-action frame, a diaphragm in the top of said chamber, a post resting upon said diaphragm, a transverse bar resting on the top of said post and supporting the hooks on said sliding-bars, means to supply air to said air-chamber and to allow the same to exhaust therefrom when desired, an operating motor, connections therefrom to said sliding bars and means adapted to cause the motor to operate to slide said bars when air is supplied to said air-chamber and diaphragm, and to release said bars when the air is exhausted therefrom, substantially as set forth.

3. In an organ stop-action the combination of, a stop-rod, stop-setting mechanism, transverse bars adapted to contact with and actuate said stop-setting mechanism, sliding bars mounted on opposite sides of said stop-rod, hooks pivoted on said slide-bars adapted when raised to engage said transverse bars and draw the same toward each other when said slide-bars are reciprocated in opposite directions, a rocking lever pivoted in said action frame and connecting said slide-bars, a spring adapted to actuate said slide-bars in one direction, a motor and connections adapted to operate said slide-bars in the opposite direction against said spring, means adapted to raise said hooks to engage said cross-bars, and means operated thereby to cause said motor to actuate said slide-bars, substantially as set forth.

4. In an organ action, the combination of a plurality of stop-rods, a plurality of stop-

combination setting mechanisms, selective mechanism adapted to select the desired previously set stop-combination, and a common actuating mechanism adapted to throw into speaking position any combination selected, substantially as set forth.

5. In an organ stop-action, the combination of a plurality of stop-rods, one or more shoulder-blocks secured on each stop-rod, one or more combination-setting mechanisms adapted to engage said shoulder-blocks on said stop-rods, transverse operating bars on each side of said setting mechanism, oppositely reciprocating slide-bars adjacent to each side of said stop-rods, one or more hooks pivoted on each of said slide-bars, those on one bar hooking in one direction, those on the other bar hooking in the opposite direction, means to raise a hook on one bar in unison with a hook on the other bar directly opposite thereto so that said hooks will engage the transverse bars on each side of said combination-setting mechanism, an operating motor, connections therefrom to the slide bars, and means whereby the motor is thrown into operation to actuate each of said slide bars, and a spring to actuate said slide bars in the opposite direction, substantially as set forth.

6. In an organ stop-action, the combination of a plurality of stops, one or more combination stop-selective mechanisms, actuating mechanism to operate said stop-selective mechanism, a motor adapted to operate said actuating mechanism in one direction, and a spring adapted to return the same to its normal position, selective mechanism adapted to operate the desired stop-selective mechanism, and at the same time to cause the motor to operate said actuating mechanism, substantially as set forth.

7. In an organ stop-action combination-setting mechanism, stop-rods, shoulder-blocks secured thereon, depending fingers suspended over each stop-rod upon vertically movable pivots adjacent to said shoulder-blocks so that each of said fingers will contact with the front of one of said shoulder-blocks when lowered and the stop-rods are in their mute-position, means to raise and lower the said vertically movable pivots and the fingers thereon, mechanism to swing the lower ends of said fingers to a perpendicular or central position when the same have been pushed therefrom by said shoulder-blocks, mechanism adapted to engage said finger swinging mechanism, motor mechanism adapted to operate the same in one direction, a spring to return the operating mechanism to its normal position, and means for operating said mechanisms, substantially as set forth.

8. In an organ stop-combination-setting mechanism, a plurality of stop-rods, a plurality of shoulder-blocks secured on each rod

in transverse rows across the series of said stop-rods, a combination-setting mechanism for each row of shoulder-blocks consisting of vertically movable swinging fingers suspended in front of and slightly above the shoulder-blocks on each of said stop-rods, transverse-bars adapted to move each of said fingers to a perpendicular position, combination-throwing mechanism, motor mechanism adapted to operate said throwing mechanism, and selective mechanism adapted to select the combination desired and cause said motor to operate the throwing mechanism to throw the same into speaking position, substantially as set forth.

9. In an organ the combination of a keyboard a stop-action at each end thereof,

stop-combination setting mechanism in each stop-action, mechanism adapted to operate the stop-action setting mechanism in each stop-action in unison with the other, combination throwing mechanism, an actuating motor and connections to operate the combination-throwing mechanism, and selective mechanism adapted to select the required prearranged combination of stops, and cause the actuating motor to operate the same, substantially as set forth.

In testimony whereof I affix my signature, in presence of two witnesses.

ALBERT E. KENT.

Witnesses:

H. M. STURGEON,
THOS. C. MILLER.