

J. S. ALLEN.
COMBINATION ORGAN STOP ACTION.
APPLICATION FILED OCT. 9, 1915.

1,311,865.

Patented Aug. 5, 1919.

4 SHEETS—SHEET 1.

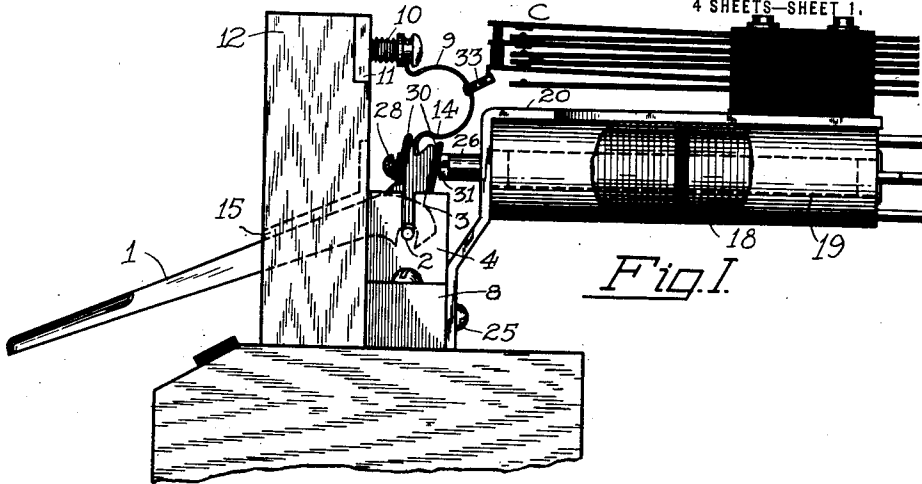


Fig. 1.

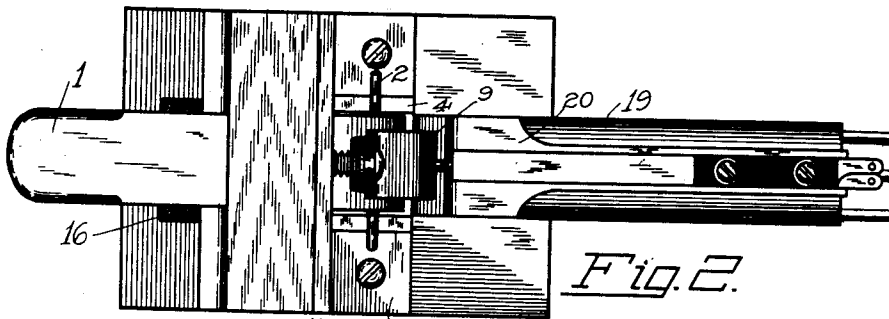


Fig. 2.

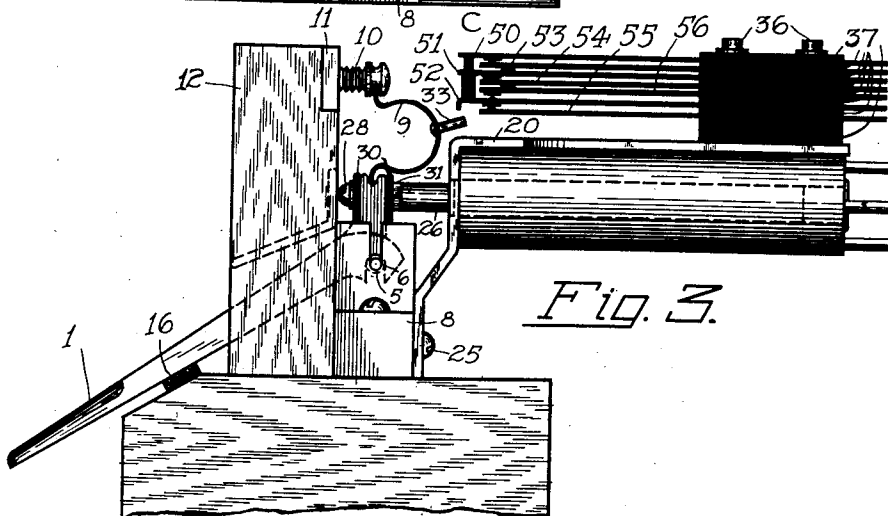


Fig. 3.

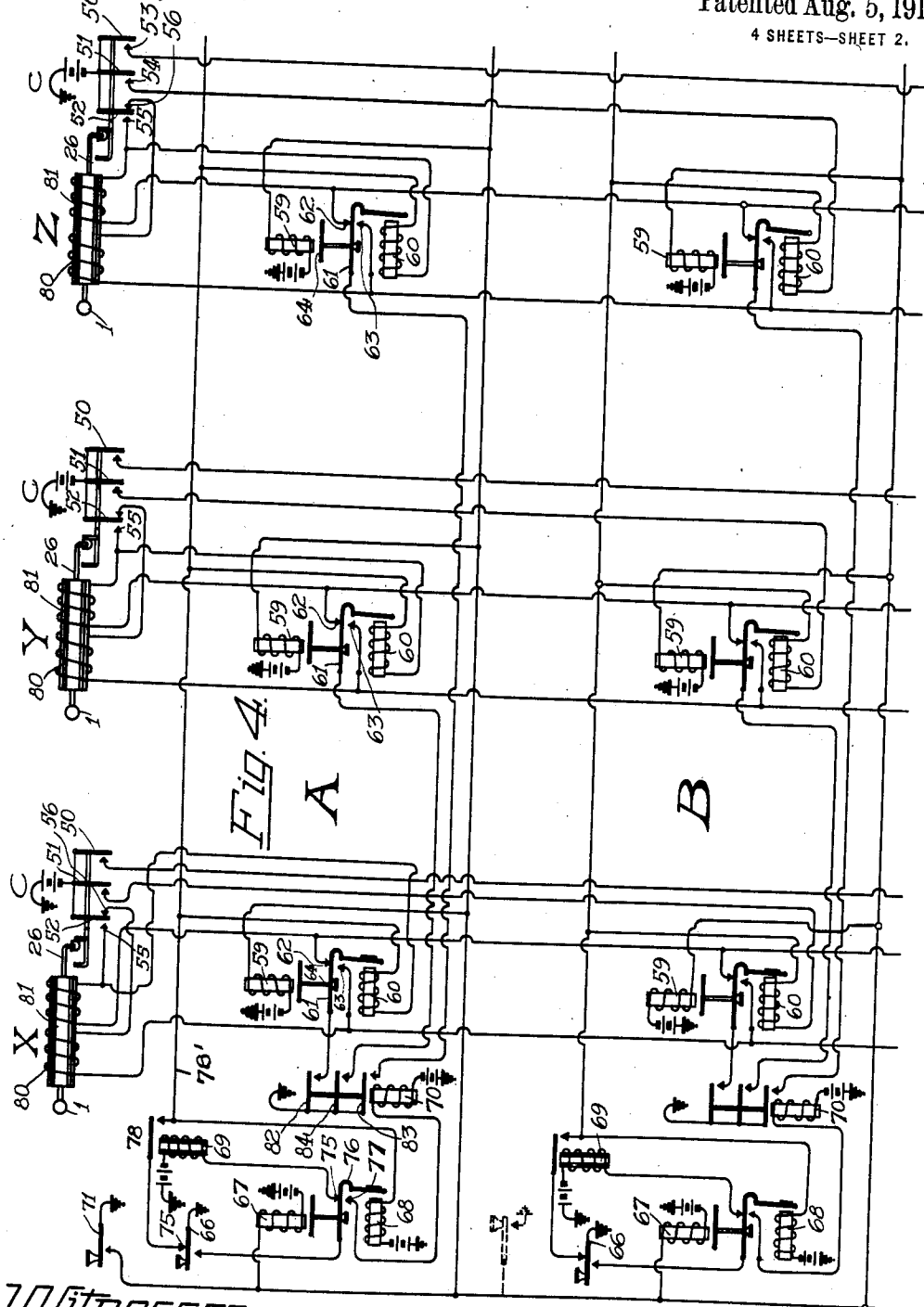
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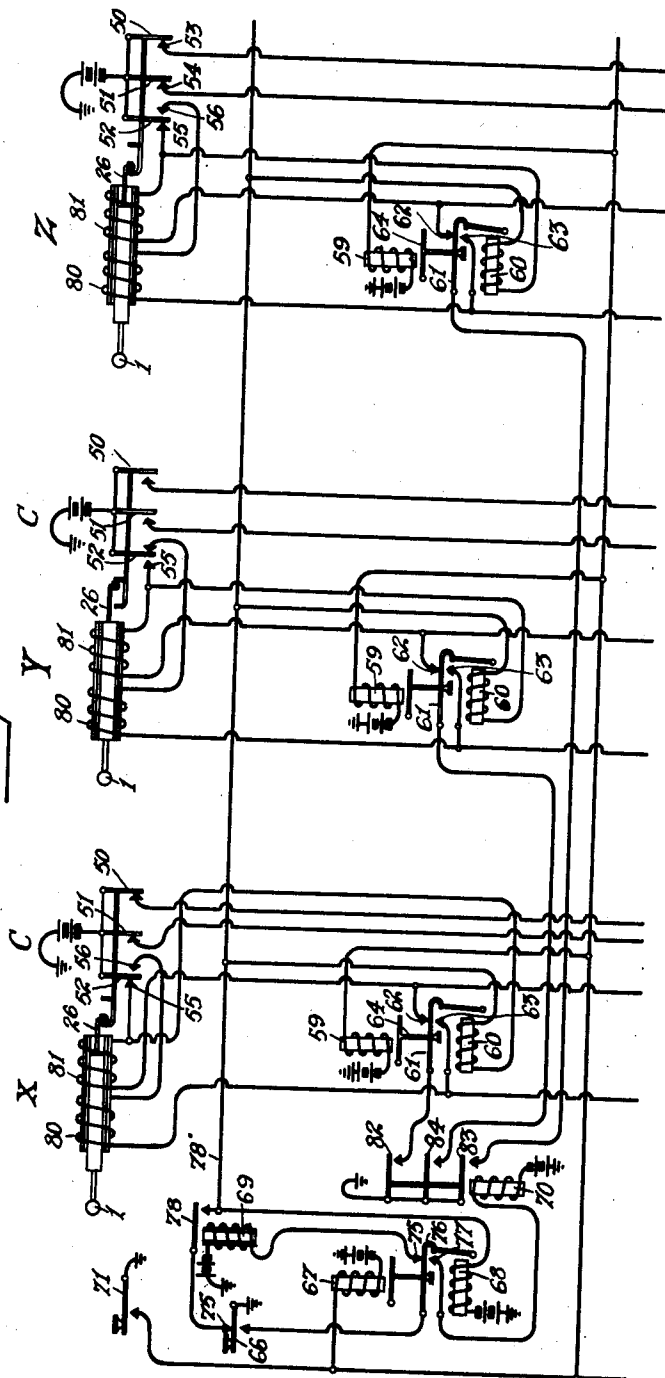
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4 SHEETS—SHEET 3.

Fig. 5.

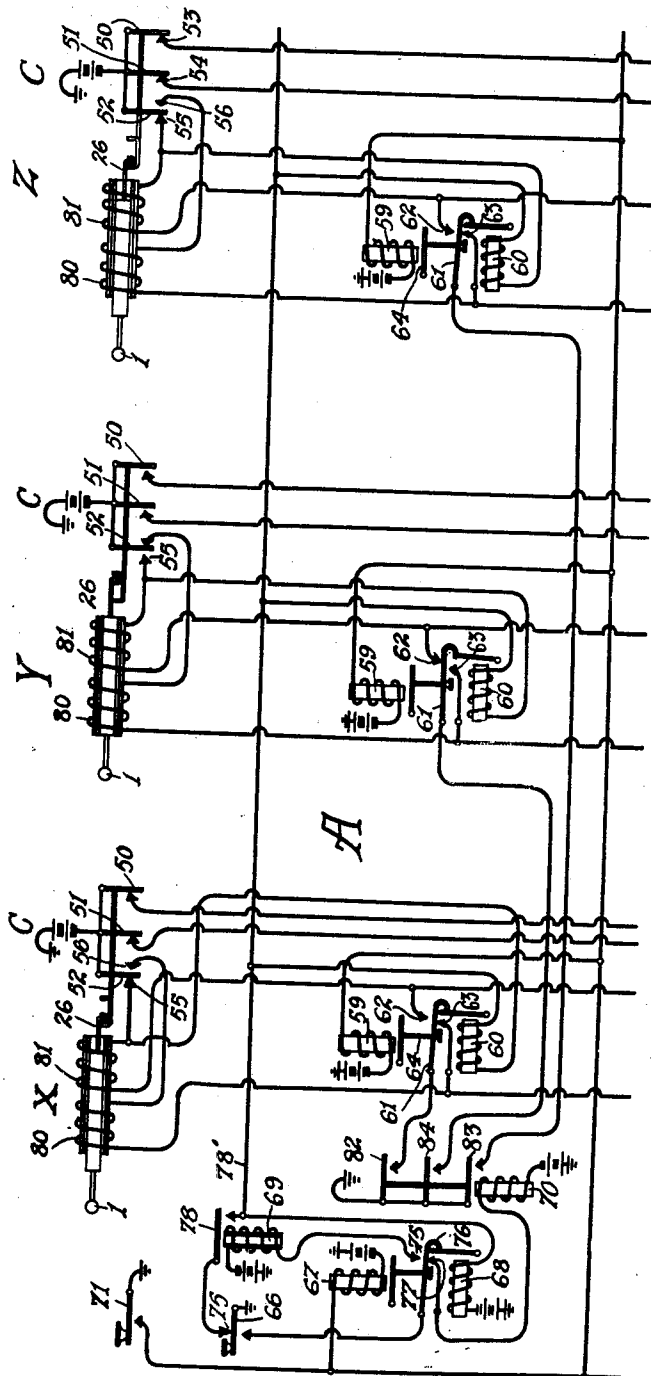


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4 SHEETS—SHEET 4.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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COMBINATION ORGAN-STOP ACTION.

1,311,865.

Specification of Letters Patent.

Patented Aug. 5, 1919.

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To all whom it may concern:

Be it known that I, JOSEPH S. ALLEN, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Combination Organ-Stop Actions, of which the following is a specification.

My invention relates to organ stops and has to do more particularly with a combination organ stop action, the object of my invention being to provide means of the character indicated by which various combinations of stops can be set up by the operator and whereby the combinations can be readily and quickly made to conform to the particular music to be played.

In the drawings accompanying and forming part of the present application, I have represented in detail one of the forms of embodiment of my invention and have fully described the illustrated embodiment of my invention in the ensuing specification to enable those skilled in the art to practise the same. I do not of course restrict myself to this particular disclosure as I may depart therefrom in various respects within the invention as defined in the following specification and in the appended claims.

In systems heretofore proposed, which have been of the pneumatic or mechanical type, a great amount of mechanical apparatus has been necessary, which has been found unreliable in some respects due to its complications. To obviate the above objections, I have produced an electromagnetically operated device of the class described which embodies desirable features and advantages all in a simple, efficient, and economical manner, reference being had to the accompanying drawings, forming a part hereof in which the same reference characters indicate like parts throughout the several views, and in which:

Figure 1 shows a side view of one form of stop key in its off position that is adapted to operate in conjunction with my invention;

Fig. 2 shows a top view of Fig. 1;

Fig. 3 is a similar view to Fig. 1 but showing the stop lever in its actuated position;

Fig. 4 shows the circuit arrangement and

the connecting apparatus necessary to connect a plurality of stops in a plurality of different combinations.

Fig. 5 shows the same circuit arrangement as is shown in combination A in Fig. 4, but with the stop keys X and Z in a position ready to be brought on by depressing key 66, that is, the stop keys X and Z and their associated magnets 59 and 60 are in position to be operated to form one stop combination.

Fig. 6 shows substantially the same circuit arrangement as is shown in Fig. 5, but with the magnets 60 of stop keys X and Z of combination A shown in their operated positions, following the actuation and release of key 66.

In a pipe organ there are what are commonly known as "stop keys" and I provide means whereby these "stop keys" can be electromagnetically operated in different combinations by the operator who may at one time effect the action of but a single stop key, while just using this operation the operator may effect the action of a large number of "stop keys."

Referring more particularly to Figs. 1, 2 and 3, which show a stop or stop lever or briefly stop key adapted to operate in conjunction with the circuit arrangement of my invention; the stop key comprises a pivotally supported shaft 2 resting in grooves 3 of the supports 4. The shaft 2 is provided with a sleeve 5 which is adapted to fit into a recess 6 cut in the lever 1. The supports 4 securely fit in grooves cut in the block 8. A snap spring 9 is provided slotted at its upper end and rests in a groove in screw 10, which screw is threaded into the strip 11 which is secured to the face of the organ frame 12 by means of screws or in any suitable manner. The lower end of the spring 9 rests in a groove 14 cut in lever 1, the said groove being so positioned that when the lever is in a normal position the portion of the spring 9 bearing in groove 14 is to the right of a line drawn from the shaft 2 to the slot in the screw tending to force the lever in a clockwise direction about the pin 2 as an axis. If the lever is pressed downwardly at its forward end as soon as the slot 14 has advanced to a position on the opposite side of the previously referred to line,

by the said spring 9, it will be quickly moved to its on position as shown in Fig. 3. Likewise when the lever is moved upwardly from its on position, the spring 9 tends to snap it into its off position. In this way the lever is moved into its off and on positions by a quick movement and then held therein. I provide a pad of felt 15, or some other suitable material for arresting the lever 1 when it moves from its on to its off position, and a similar pad 16 for arresting the said lever when it moves from its off to its on position. As above mentioned, the lever may be either manually or electro-magnetically operated. For the latter purpose, I provide a double wound electromagnetic solenoid 18 which is inclosed in a shell 19 that is securely fastened to an angularly shaped iron 20. The angularly shaped iron 20 is fastened to the member 8 by means of screws 25 and is so mounted as to hold the plunger 26 of the solenoid 18 in position to actuate the lever 1. A screw 28 is provided mechanically connecting the plunger 26 of the solenoid to the stop lever 1. A pair of felt washers 30 are provided one mounted intermediate the head of the screw 28 and the lever 1, the other mounted between the lever 1 and the lock nut 31, which is provided for securely holding the screw 28 in its adjusted position. The solenoid 18 is so arranged that when one of its windings is energized the plunger 26 is drawn in and operates to move the lever 1 about its pivot point causing it to be restored to its off position while if the other of said windings is energized the plunger 26 is forced forward and operates to move the lever 1 from its off to its on position. The solenoid 18 also controls a set of contact springs C through the medium of the stud 33 which is carried by the snap spring 9. The set of contact springs C are mounted upon the angularly shaped arm 20 by means of screws 36 and are insulated from each other and from the said arm 20 by means of strips or blocks of insulation 37.

Assuming now that the parts are in off position, should the lever 1 be operated as soon as slot 14 of the lever passes its center, that is, a point on the line between the pivot 2 and the slot in screw 10, the lever 1 is snapped downwardly to its on position and the stud 33 carried by the spring 9 operates to allow the springs 50, 51 and 52 to contact with springs 53, 54 and 55 respectively, at the same time spring 52 is disconnected from spring 56. The function of these springs will be hereinafter described when a detailed description of the circuit arrangements of Fig. 4 is given. I have referred to the method of moving the parts from one position to the other by the manual actuation of the lever. These parts may also be operated by the solenoid 18. If the parts

are to be moved from their off to their on position, a circuit is closed through one of the windings of the solenoid, thus causing it to energize and to operate the plunger 26, thereby moving the lever 1 from its off to its on position and at the same time operating the member or stud 33, causing it to move from its off to its on position, and to operate the group of contact springs C. With the parts in their on position, it will be apparent that they may be restored to their off position either manually or by means of the double wound solenoid, this operation being apparent from the foregoing description.

Referring now more particularly to Fig. 4, I here show three stops X, Y and Z each of which is similar in construction to the stop shown in Figs. 1, 2 and 3 and I also show apparatus for connecting these stops in two different so-called "combinations" A and B. I so arrange the apparatus that a set of combinations may be very readily and quickly changed to an entirely different set of combinations. For example one piece of music may require in its execution certain combinations; while another piece may necessitate entirely different combinations. However, it is to be understood that any number of stops and any number of combinations may be provided for. Each stop key is provided with sets of springs such as 52, 51 and 50, and each key is provided with as many sets of springs as there are different combinations that the key may be included in. In the drawing, stop key X is shown provided with three sets of springs, thereby permitting this key to be included in three different combinations. Associated with each stop for each different combination is a pair of coöperating magnets 59 and 60. The armatures of these magnets are mechanically related to each other so that when the armature of magnet 60 is attracted, the hook spring 61 is released from contact with spring 62 into engagement with spring 63, and at the same time the hook spring 61 locks the armature of magnet 60 in its actuated position independent of the energizing current of said relay. To restore the armature of magnet 60 to its normal position a circuit is closed through magnet 59 which operates through the medium of its armature 64 to raise the hook lever 61 from engagement with the armature of magnet 60, thus releasing the said armature and allowing it to return to normal and at the same time the hook lever 61 disengages contact spring 63 and engages contact spring 62. A setting key 66 is provided for initially setting and for operating the stops in any one desired combination. As many setting keys 66 are provided as combinations are desired, two being shown, one for combination A and

the other for combination B. Associated with each setting key 66 is a pair of co-operating magnets 67 and 68 whose armatures coöperate in the same manner as described for magnets 59 and 60. The magnets 67 and 59 are only energized when a restoring key 71 is actuated. A slow acting relay 69 and a relay 70 are also associated with each of the said keys 66, whose functions will hereinafter be described. I also provide a restoring key 71 for energizing the magnets 59 and 67 to destroy the set up combinations and to restore the armatures of relays 60 and 68 to normal. If it is so desired a restoring key 71 may be provided for each combination instead of one restoring key for all the different combinations. While I have shown several different batteries, it is to be understood that in practice these will all be one and the same battery. Referring to Fig. 4, it will be seen that I provide for each stop, such as X, Y or Z, a pair of coöperating magnets 59 and 60 for each desired combination, such as combinations A and B.

Having given a brief description of the apparatus involved in my invention, the detail operation of the same will now be given.

Assuming that the operator desires to set up a combination (using the apparatus of combination A) in which stops X and Z are always to assume their on positions and stop Y its off position, the operator will first arrange these stops so that whenever this combination of stops is desired she may obtain it by actuating the stop setting key 66. To obtain this combination, the levers 1 of the stops X and Z are first manually set in their on positions (as shown in Fig. 3) then the stop setting key 66 is actuated. Upon the operation of key 66 a circuit is closed, traced from battery through the slow acting relay 69, contact 75 and hook lever 76 and through the actuated key 66 to ground. Relay 69 is immediately energized, closing switch 78, and remains energized for a short interval after its circuit is broken due to its being a slow acting relay. The operator now releases key 66 thereby momentarily closing an energizing circuit through the magnet 68 associated with the setting key 66 (of combination A) and through the magnets 60 associated with the actuated stops X and Z. The circuit for the magnet 60 of the un-actuated stop Y is open at its contact 55 and is therefore not operated at this time. The circuits for the magnets 60 associated with stops X and Z may be traced from ground through the setting key 66, its contact 75, contact 78 of slow acting relay 69, over conductor 78', through the multiply-connected windings of magnets 60 associated with the said stops X and Z and through springs 55 and 52 of stops X and Z to battery. The

magnets 60, upon energizing, allow the hook levers 61 to lock their armatures in their actuated positions. The holding of the armatures 60 in this position allows contact levers 61 to engage contact springs 63. The above referred to circuit for relay 68 which is closed when the operator releases the setting key 66, may be traced from battery through the winding of said relay, alternate contact 78 of relay 69 and through contact 75 and setting key 66 to ground. Relay 68, upon energizing, locks its armature in its actuated position thereby allowing the hook lever 76 to engage contact spring 77. The setting of the stops for the second combination B is performed in the same manner as just described for the setting of the stops for the first combination A, that is, the desired stops are manually actuated and then the setting key 66, associated with the combination, is operated. Should the operator now at any time desire to bring on any one of the set-up combinations of stops, no matter in what position the stops may be at the time, she may, by operating the setting key, associated with the desired combination, actuate the stops to cause them to assume their set-up position. That is, assuming that the key of combination A is actuated, the stops X and Z are returned to their on position no matter in what position they may be, and the stop Y is restored to its off position if it should be in its on position. The operation of key 66, of combination A, closes a circuit through its associated contact controlling relay 70, which may be traced from battery through the winding of said relay, contact spring 77, hook lever 76 and the said actuated key 66 to ground, thus causing the said relay to energize. First assuming that the stops X and Z are in off position and the stop Y is in on position, the energization of relay 70 closes a circuit through windings 80 of the solenoids of stops X and Z and through winding 81 of the solenoid of stop Y. The circuits for the windings 80 of stops X and Z may be traced from battery through contact springs 52 and 56, through the said windings 80 through springs 63, and hook levers 61 of magnets 60 and through alternate contacts 82 and 83 to ground, thus causing the solenoids of the stops X and Z to be energized and to restore the stops to off position. The circuit for the winding 80 of the solenoid of the stop Y may be traced from battery through springs 52 and 55, said winding 81, springs 62, hook lever 61 of relay 60 and through alternate contact 84 to ground. The solenoid for the stop Y is actuated to restore the said stop to off position. If the stop Y had been in its off position when the setting button 66, of combination A, was operated, the winding 81 would not have

received operating current, as its circuit would have been open at its spring 55. Should either of the stops X and Z have been in its on position when the setting button 66 was operated, its winding 80 would not have been energized as its circuit would have been opened at its contact 56. If the operator should now desire to use the combination of stops in the B combination, she would operate the setting button 66 associated with the B combination and thereby cause the stops to return to the position selected at the time that the B combination was set up.

If it is desired to change the combinations A and B, the restoring button 71 is operated thereby closing circuits through the resetting magnet 67 of each of the different combinations and through the magnets 59 of all the different combinations. The magnets 67, upon energizing, allow the armatures of the magnets 68 to return to normal thereby breaking contact between the hook levers 76, and the spring contacts 77, and at the same time closing contact between the said hook levers 76 and springs 75, while the operations of magnets 59 restore the armatures of the magnets 60 to normal and thereby close connections between their contact springs 62 and the hook levers 61, thus returning the associated apparatus to normal.

Although I have shown only three stops and the necessary apparatus for connecting these stops in two different combinations, it is apparent that any number of stops may be connected in any number of different combinations simply by providing duplicate apparatus of the type above described.

While I have illustrated the apparatus of my invention in one specific manner, I do not wish to be limited to the exact structure as shown, as many changes and modifications readily suggest themselves to one skilled in the art; as for example, instead of providing a resetting magnet 59 for each magnet 60 of a combination, one magnet may be used to accomplish this result, therefore I wish to cover all such changes and modifications as come within the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by United States Letters Patent, is:

1. A combination organ stop action including a plurality of electromagnetically movable organ stops having off and on positions, mechanism associated with said stops and adapted to be actuated by a combination stop setting member to set up a combination of said organ stops, and electromagnetic means for coöperation with said mechanism for actuating the said electromagnetically movable organ stops to cause the said stops to assume their set up combination.

2. A combination organ stop action including a plurality of electromagnetically movable organ stops having off and on positions, electromagnetic means including self-locking relays adapted to be actuated by a stop combination setting member to set up different stop combinations, and means including electromagnets common to said stops and said electromagnetic means for controlling circuits for said stops to cause them to assume their different stop combinations.

3. A combination organ stop action including a plurality of stops having off and on positions, an electromagnet individual to each of said stops for moving it from one of its positions to the other, a second electromagnet for each of said stops for controlling the circuits of said first electromagnets, setting means for operating certain of said second electromagnets to form a stop combination, and circuit controlling members for actuating said first electromagnets to group said stops in their set up combination.

4. A combination organ stop action including a plurality of stops having off and on positions, an electromagnet individual to each of said stops for moving it from one of its positions to the other, a second electromagnet for each of said stops for controlling the circuits of said first electromagnets, setting means for operating certain of said second electromagnets to form a stop combination, circuit controlling members for actuating said first electromagnets to group said stops in their set up combination, and a third electromagnet individual to each of said stops for returning said second electromagnets to their normal positions.

5. A combination organ stop action including a plurality of stops having off and on positions, an electromagnet for each of said stops for moving said stops from their on to their off positions and vice versa, and electromagnetic means adapted to be actuated to form a stop combination when a stop setting member is operated, and circuits controlled by said electromagnetic means and by a circuit controlling member for grouping said stops in their stop combination.

6. A combination organ stop action including a plurality of organ stops having off and on positions, electromagnetic means for each of said stops for moving said stops to their off positions or to their on positions, electromagnetic means for said stops for controlling the circuits of said first electromagnetic means, means including a part of said last electromagnetic means for forming stop combinations, and a circuit controlling member adapted to be thereafter operated to group said stops in their stop combinations.

7. A combination organ stop action in-

cluding a plurality of organ stops having off and on positions, electromagnetic means for each of said stops for moving said stops to their off position or to their on positions, electromagnetic means for said stops for controlling the circuits of said first electromagnetic means, means including a part of said last electromagnetic means for forming stop combinations, a circuit controlling member adapted to be thereafter operated to group said stops in their stop combinations, and other electromagnetic means for returning said second electromagnetic means to normal.

8. A combination organ stop action including a plurality of organ stops adapted to be actuated either manually or electromagnetically to their off and on positions, a pair of electromagnets for each of said stops for controlling the circuits of said stops, a circuit controlling member for actuating one of each of said pairs of electromagnets of the stops moved to their on positions to form a stop combination, and circuit controlling means for thereafter causing said stops to assume their stop combination.

9. A combination organ stop action including a plurality of organ stops adapted to be actuated either manually or electromagnetically to their off and on positions, a pair of electromagnets for each of said stops for controlling the circuits of said stops, a circuit controlling member for actuating one of each of said pairs of electromagnets of the stops moved to their on positions to form a stop combination, circuit controlling means for thereafter causing said stops to assume their stop combination, and circuits for energizing the second of each of said pairs of electromagnets to restore the first of said electromagnets to their normal positions if they have been moved therefrom.

10. A combination organ stop action including a plurality of electromagnetically movable organ stops, an electromagnet for each of said stops for controlling the circuits thereof, a stop setting member adapted when actuated to close a circuit for each of said electromagnets associated with a stop in its on position to form a stop combination, and circuit controlling means adapted to close circuits through contacts of said electromagnets to cause said stops to assume their stop combination positions.

11. A combination organ stop action including a plurality of electromagnetically and manually controlled organ stops, electromagnets controlling contacts in the circuits of said stops and adapted to be actuated to form different stop combinations, and circuit controlling members adapted to close circuits through the contacts controlled by different ones of said electromagnets to cause said stops to assume their stop combination positions.

12. A combination organ stop action including a plurality of electromagnetically and manually controlled organ stops, electromagnets controlling contacts in the circuits of said stops and adapted to be actuated to form different stop combinations, circuit controlling members adapted to close circuits through the contacts controlled by different ones of said electromagnets to cause said stops to assume their stop combination positions, and electromagnetic means for restoring said electromagnets.

13. A combination organ stop action including a plurality of electromagnetically and manually movable organ stops having off and on positions, an electromagnet for each of said stops, a circuit controlling member for closing circuits for each of said magnets associated with a stop in its on position to form a stop combination, a second electromagnet for each of said stops, a second circuit controlling member for closing circuits for each of said second electromagnets associated with stops in their on positions, and other electromagnetical means for restoring all of the operated ones of said electromagnets to normal.

14. A system of the character described including a plurality of electromagnetically operated devices having on and off positions, an electromagnet for each of said devices for controlling circuits thereof, a second electromagnet for each of said devices for controlling circuits thereof, combination setting means for operating said electromagnets to form combinations of said devices, manually controlled means for operating said devices, and circuit controlling members for actuating said devices to cause them to assume their different combinations.

15. A system of the character described including a plurality of electromagnetically operated devices having on and off positions, an electromagnet for each of said devices for controlling circuits thereof, a second electromagnet for each of said devices for controlling circuits thereof, combination setting means for operating said electromagnets to form combinations of said devices, manually controlled means for operating said devices, circuit controlling members for actuating said devices to cause them to assume their different combinations, and means for restoring said electromagnets.

16. A system of the character described including a plurality of electromagnetically operated devices having on and off positions, a pair of electromagnets associated with each of said devices, circuits controlling means for actuating one of the electromagnets of each of said devices, that are in their on positions, to form a combination, means for thereafter moving said stops to their on and off positions, circuit control-

ling means for thereafter automatically operating said devices to cause them to assume their combination positions, and circuit controlling means for energizing the second of
5 each of said pairs of electromagnets to restore the operated ones of said first electromagnets.

Signed by me at Chicago, in the county of Cook and State of Illinois, in the presence of two witnesses.

JOSEPH S. ALLEN.

Witnesses:

G. A. YANOWSKI,
B. O'BRIEN.