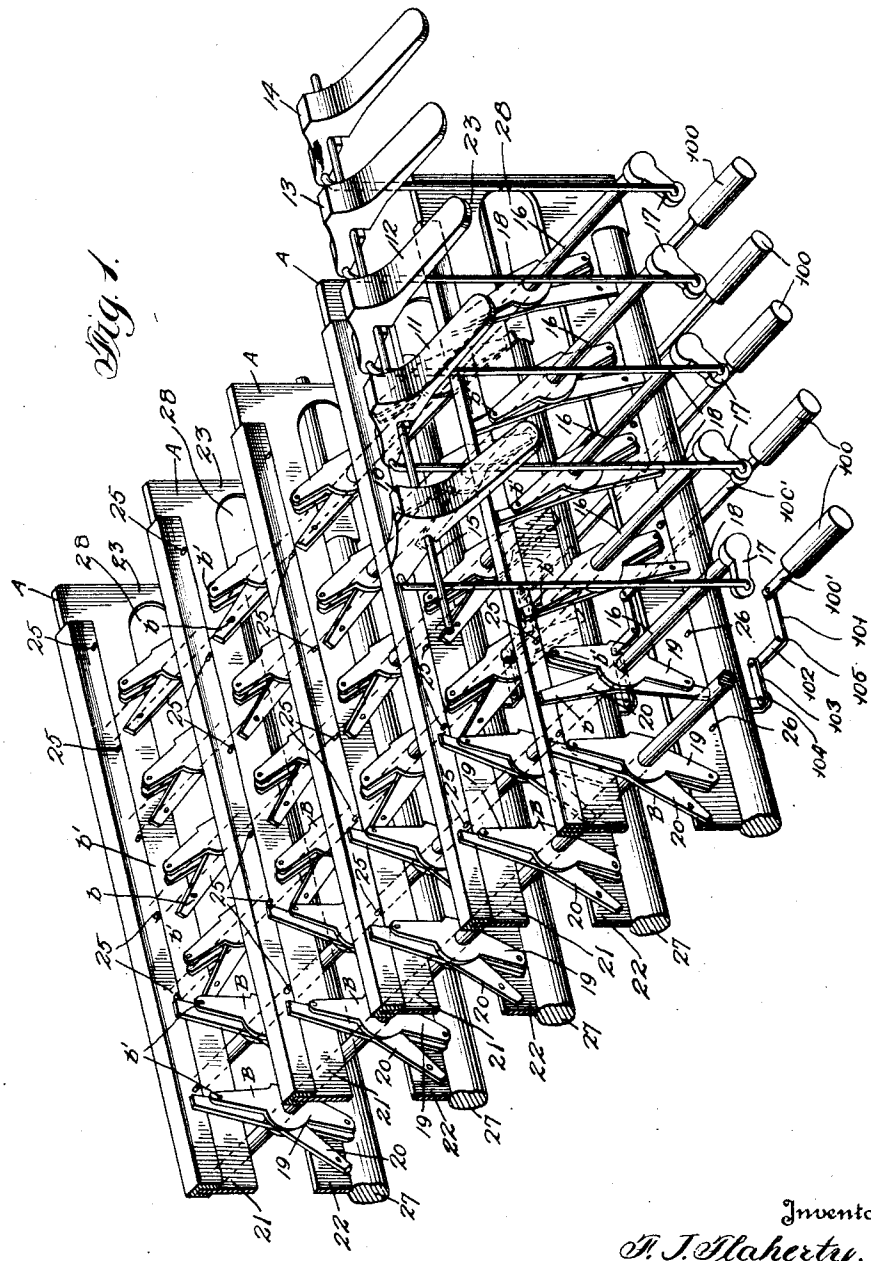
Aug. 20, 1929. F. J. FLAHERTY 1,725,707

COMBINATION STOP MECHANISM FOR ORGANS AND THE LIKE

Filed June 4, 1925 2 Sheets-Sheet 1

Fig. 1.



Inventor
F. J. Flaherty.

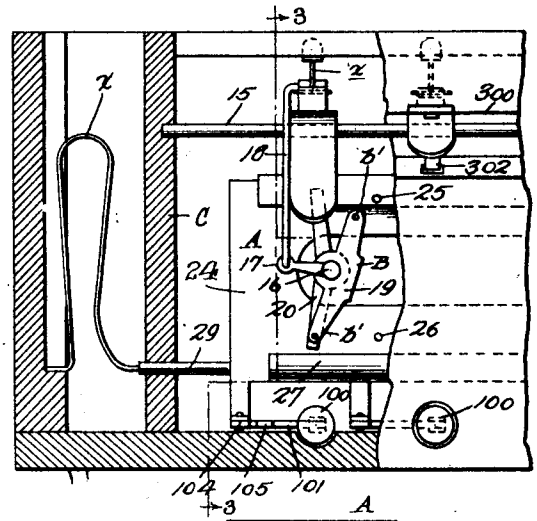
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Aug. 20, 1929. F. J. FLAHERTY 1,725,707

COMBINATION STOP MECHANISM FOR ORGANS AND THE LIKE

Filed June 4, 1925 2 Sheets-Sheet 2

Fig. 2.



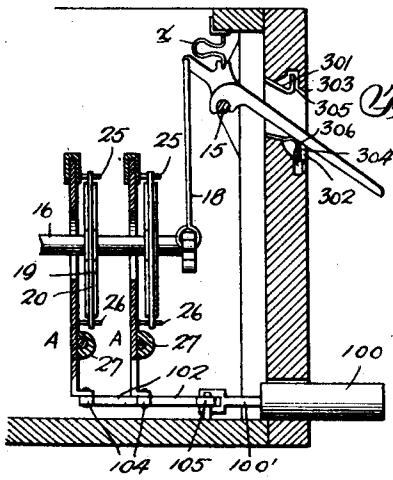


Fig. 3.

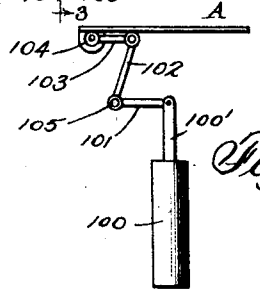


Fig. 4.

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Patented Aug. 20, 1929. 1,725,707

UNITED STATES PATENT OFFICE.

FREDERICK J. FLAHERTY, OF WOODSTOCK VALLEY, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WELTE-MIGNON CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

COMBINATION STOP MECHANISM FOR ORGANS AND THE LIKE.

Application filed June 4, 1925. Serial No. 34,973.

In an application for Letters Patent of the United States filed by me of even date herewith and numbered, serially, 34,971, I have shown, described, and generacally claimed three typical embodiments of combination stop actions each of which embodiments includes a series of "actuators" settable into "on" position, "off" position or "neutral" position by the conjoint operation of appropriate stop keys and slides: each "actuator" comprising two complementary members so correlated with each other that they may be moved relatively by corresponding stop keys in to such position that they will be locked one to the other at one end of the actuator to come "on", or at the other end of the actuator to go "off", or be detached from each other at both ends to remain "neutral," when the corresponding slide is operated. All the embodiments illustrated in the aforesaid application include provision for relative movement of the stop keys and slide of greater extent in the setting operation than in the playing operation. In two embodiments, which have been made the subject of claims in aforesaid application numbered 34,971 and a companion application numbered 34,972, respectively, the slides are the elements which move a longer distance in the setting operation than in the playing operation.

The present application is based upon that embodiment of the generic invention wherein the stop keys, in lieu of the slides, have the additional movement in the setting operation.

One of the aforesaid applications also illustrates, describes, and generically claims two typical embodiments of means for operating the slides, one exemplifying a practical means of an electro-pneumatic nature and the other exemplifying a means of a mechanical nature. The means of electro-pneumatic nature have been made the subject of claims in the said application, and, therefore, constitute the particular species of slide operating means claimed in the said application.

In the other application for Letters Patent of the United States, filed by me of even date herewith and numbered, serially, 34,972, I have illustrated, described, and claimed that particular species of the generic invention in which the slides are operated by means of mechanical nature instead of electro-pneumatic nature. In the present application, means of a mechanical nature are preferred and, accordingly, I have illustrated the means of such nature exemplified in the aforesaid applications: but I do not herein limit myself to said means as means of any construction or nature suitable for the purpose may be employed without departing from the spirit of the invention as defined by the claims.

In the accompanying drawing illustrating the present invention, and wherein like characters of reference denote corresponding parts in the several views:—

Fig. 1 is a view partly in perspective and partly in section showing a part of a combination stop action constructed in accordance with my invention,

Figs. 2 and 3 are detail views showing the species of the invention made the subject of the present application for patent; Fig. 2 being a view partly in elevation with a part of the front board broken away and partly in vertical section and Fig. 3 being a vertical section on the line 3—3 of Fig. 2,

Fig. 4 is a detail view partly intended to illustrate a suitable form of connecting means between the plunger and the corresponding slide.

10 to 14 inclusive designate stop keys which may be of any suitable kind, the ones illustrated being the pivoted tablets now preferred for use in the modern pipe organ. These stop keys are individually pivoted upon a common stationary shaft 15 so as to be severally movable about the shaft into "on" or "off" position, by the organist. They govern communication of the sets or groups of tone emitting elements, couplers, swells, etc., respectively, with the wind system of the organ, it being understood in this connection that when the outer end of any tablet is depressed to its "on" position the particular stop controlled thereby is operative and that when the outer end of said tablet is raised to its "off" position the particular stop controlled thereby is inoperative.

Since the tone emitting elements, couplers, tremulant, etc., through which they have communication with the wind system of the organ and the means operable under control

of the stop keys to control said means of communication form no part of the present invention and are well known in the art, they have not been herein illustrated and need not be particularly described.

Each stop key is provided, as usual, with a spring *x* operatively related thereto to throw the key to either its "on" or "off" position when it has passed a position midway between the two, these springs thereby operating to hold the keys against accidental displacement from their set positions, either "on" or "off."

It will, of course, be understood that the number of stops and stop keys varies in different organs and that each stop included in the organ will have its appropriate stop key, and, further, that wherever the term stop or stop keys is used herein, it is intended to include not only those stops which have reference to speaking pipes or tone emitting elements, but also to the mechanical stops, as swells, couplers, etc., which may be incorporated in the instrument.

A series of shafts 16 corresponding to the respective stop keys have their outer ends suitably connected to the inner ends of the latter, the means shown for this purpose comprising cranks 17 and links 18. Each of these shafts is provided along its length with a series of actuators B, each comprising two complementary members, marked 19 and 20, respectively. One member, as 19, of each actuating element is fixed on its shaft 16 and the other member, 20, is supported by said shaft and has pivotal movement relatively thereto.

Each of these actuators also has at each of its ends a means, indicated at *b*, *b'* operative automatically to releasably lock their corresponding ends to each other when said ends have been brought into juxtaposition: suitable means for this purpose comprising cup-shaped recesses and corresponding projections in the respective members. It is preferred in practice that each member 19 be composed of two sides spaced from each other to receive the complementary member 20 between them. The members 19 and 20 of each actuator are relatively so shaped that between the two extremes of their relative movement they will be free from any locking engagement one with the other and when at either extreme of their relative movement they will be locked to each other at the corresponding end of the actuator and free from engagement with each other at the other end of the actuator.

It will be understood that there is a shaft 16 for every stop key, and that each shaft is so connected with the corresponding stop key that the shaft and its stop key will rock synchronously whenever rocking movement is imparted either to the stop key by the finger of the organist on said key or by pressure applied to the appropriate actuator B.

Pressure is applied to the actuators to move the corresponding stop keys by a means which includes combination operating elements here shown as a series of slides A, each of which comprises two members 21 and 22 arranged on opposite sides of all of the shafts 16 and connected with each other for unitary movement, as by the end strips 23 and 24. The number of these slides varies in accordance with the number of different combinations which the instrument is constructed to provide for at any one time. Each slide is suitably pressed resiliently outward, as by means of a spring such as shown at X in Fig. 2. Each has one of its longitudinal members provided with a series of lateral projections 25 and its other longitudinal member provided with a like series of lateral projections 26. The series of projections 25, and also the series of projections 26, on each slide, correspond in number with the number of shafts 16, and the projections 25 are operatively related to one end of the respective actuators B while the projections 26 are operatively related to the other ends of said actuators. The co-operative action of the projections and actuators will be hereinafter set forth. In the construction illustrated each slide A is formed of a flat plate and a longitudinal member 27 of greater thickness than the plate: said plate having a longitudinal opening 28 bounded by the members 21 and 22 and end strips 23 and 24 and said longitudinal member 27 being preferably of rounded cross section and fixedly secured to the lower edge of the plate and having an end portion or member, 29, projecting therefrom beyond the vertical plane of the end 24 of the plate. In the illustrated construction, the projections 29 of the several slides form bearing elements through which the respective slides have their inner ends supported by a wall C which also acts as a stop member defining the inward movement of the slides.

In the operation of preparing a combination, the particular slide A which has been selected to operate the combination is moved inward. This movement is relative to the actuators B and places the slide A in such position with relation to the corresponding actuators B that its projections will substantially engage the protruding ends of the members 20 of said actuators. While the parts are in this position, the outer end of the stop keys corresponding to the particular stops which are to come "on" are pressed downward to their fullest extent, while the outer ends of the stop keys which are to go "off" under control of this slide are pressed up to their fullest extent, and the outer ends of those keys which are to be "neutral" in this particular combination, are moved to a

mid-position. The described movement of the key or keys corresponding to the stop or stops which are to come "on" turns the corresponding shaft or shafts 16 and actuator-members 19 and since the members 20 of said actuators are held against movement at this time, by contact of the projections 25, 26 with the ends thereof, it follows that the lower ends of the actuator-members 19 will be brought into juxtaposition with the lower ends of the actuator-members 20. The parts are so correlated that at the end of this movement of the stop key or keys the holding elements *b*, *b'* at the lower ends of the corresponding actuator-members will snap into engagement with each other so as to hold these ends together. The described movement of the key or keys corresponding to the stops which are to go "off" under control of this particular slide, turns the corresponding shaft or shafts 16 and actuating member or members 19, relatively to the corresponding member or members 20 and causes these members to be locked together at their upper ends instead of at their lower ends: and the described movement of stop key or keys to mid-position places the slide and the actuator or actuators corresponding to the keys so moved, in such relation that no movement of the slide will be communicated to said actuators.

By way of concrete examples: let us assume that the organist desires to prepare three different combinations of the stops controlled by the stop-keys marked 10–14, inclusive, in Fig. 1 of the drawing and that in one of these combinations, identified as "first combination", the stops controlled by keys 10 and 12, are to come "on" while the stops controlled by keys, 11, 13 and 14 are to go "off" when the particular slide A selected to operate this combination is actuated; while in another combination, identified as "combination No. 2", the stops controlled by keys 10, 11 and 13 are to come "on" and the stops controlled by keys 12 and 14 are to go "off" when the particular slide A selected for this operation is operated; and in still another combination, identified as "combination No. 3," the stops controlled by key 10 is to remain "neutral", while the stops controlled by keys 12 and 14 are to come "on" and the stops controlled by keys 11 and 13 are to go "off": the organist in preparing these combinations, proceeds as follows:—

The particular slide which is to operate the "first combination" is moved inward and while in said position the organist presses the outer ends of stop keys 10 and 12 downward as far as they will go and all other stop keys upward as far as they will go; in preparing "combination No. 2" he similarly presses the outer ends of stop keys 10, 11 and 13 downward and the remaining stop keys upward, while the slide which controls this combination is in its inward position; and in preparing "combination No. 3" he places stop key No. 10 in a mid-position, presses stop keys Nos. 12 and 14 downward to their fullest extent and stop keys 11 and 13 upward to their fullest extent, while the selected slide is in its inward position. As already described, in preparing the first combination, the members 19 and 20 of the actuators corresponding to keys 11, 13 and 14 were locked to each other at their upper ends: and that in preparing combination number 2, the actuators corresponding to keys 10, 11 and 13 have their members 19 and 20 locked to each other at their lower ends, while the similar members of the actuators corresponding to keys 12 and 14 are locked together at their upper ends: and that in preparing combination No. 3 the members of the actuators corresponding to keys 12 and 14 are locked together at their lower ends, the members corresponding to keys 11 and 13 are locked to each other at their upper ends, while the members of the actuators corresponding to key 10 will be free from each other at both ends of said actuator.

Of course, it will be understood that when each combination has been prepared the slide which has been selected to operate said combination and which was held inward while the combination was being prepared, is released and thereupon will be returned to its outer position by its spring X.

From the foregoing, it will be clear that if the particular slide selected to operate or control the "first combination" be thereafter pressed inward it will act upon the lower, locked together, ends of the actuators corresponding to keys numbered 10 and 12 and upon the upper, locked together, ends of the actuators corresponding to keys 11, 13 and 14 in such manner as to cause the stops corresponding to keys 10 and 12 to speak, and the others to discontinue speaking, if they were "on" or to remain "off" if they were already "off" it, of course, being understood that in this operation the keys 10 and 12 are moved to their "on" position and the keys 11, 13 and 14 moved to their "off" position, if "on" at this time, by the co-operative action of the said slide and actuators; and similarly that when in the playing of the organ the particular slide selected to operate or control combination No. 2 is moved inward it will act upon the lower, locked together, ends of the actuators corresponding to keys 10, 11 and 13 in such manner as to bring said keys into "on" position and upon the upper locked together ends of the actuators corresponding to keys 12 and 14 to move them to "off" position; and, finally, that when the slide selected to operate or control combination No. 3 is moved inward

by the organist to bring this combination into operation, stop keys 12 and 14 are lowered to "on" position and stop keys 11 and 13 are raised to "off" position, by the cooperative action of said slide and the actuators corresponding to said keys, while the slide will have no effect whatever upon the actuators corresponding to key 10 and hence the stop controlled by said key will remain "on" if already "on" or "off" if it was "off" at this moment.

The means, thus far described except the fixed wall C are common to the various embodiments in the applications hereinbefore referred to.

A suitable means for operating the respective slides A comprises a plunger 100 for each slide, connected with the latter by a bell crank lever, one arm (101) of which is pivoted to the inner end of a projection 100′ from the plunger and the other arm (102) of which is pivoted to one end of an arm (103) whose other end is pivoted at (104) to an end of the corresponding slide A. Each bell crank lever is pivoted at 105 to an appropriate part of the organ structure.

Since in this particular embodiment of the invention the stop keys are to have movement for the setting operation additional to their movement for the operation of the combinations for playing purposes, it will be noted that the opening 300 through which the finger portion of the corresponding stop key projects is provided above and below said finger portion with resilient fingers 301 and 302, respectively so correlated with the stop key and opening 300 that they will define the normal movement of the stop key—, i. e., the movement of the stop key from or into its "off" position, while permitting additional movement of said key in the setting operation. It will be noticed in this connection that the opening 300 is enlarged at opposite sides of the stop key and contiguous to the outer portions of the fingers, as shown at 303 and 304, respectively, and have channels 305 and 306 which receive the bent free outer end of said fingers when the key is pressed up or down beyond its before mentioned normal travel. Of course, it will be understood that there is one pair of these spring fingers for every stop key. Therefore, it will be seen that this embodiment typifies a construction in which there are two phases of movement of the stop key for the setting operation and one of said phases only for the playing operation.

It will be understood that the construction illustrated is merely exemplary and that the details may be changed and the invention otherwise and variously embodied without departing from its spirit or the scope of the appended claims.

Having thus described the invention what I believe to be new and desire to secure by Letters Patent, is:—

1. A combination stop mechanism for organs or the like having actuators settable into "on" position, "off" position and "neutral" position and means to set the actuators into any of said positions, selectively, including stop keys having for setting purposes a range of movement greater than their normal movement for playing operation.

2. A combination stop mechanism for organs or the like, comprising actuators settable into "on" position, "off" position or "neutral" position, and relatively movable means operative to set any of the actuators into any of the aforesaid positions, one of said means having for the setting operation a range of movement greater than that for the playing operation and the other of said means being operative to control the combination.

3. A combination stop mechanism for organs or the like, comprising actuators settable into "on" position, "off" position or "neutral" position, and means including stop keys and combination operating elements operative to set any of said actuators into position in which the corresponding stop will come on or go off under control of the combination operating elements or be unaffected by the operation of the latter, said stop keys having for the setting operation a movement different from that for the playing operation.

4. A combination stop mechanism for organs or the like, comprising setting and operating means including actuators, stop keys connected to the actuators and operating elements to operate the combinations through the actuators in accordance with the settings of said actautors, and wherein the actuators are reversibly operative and are settable also to a neutral position and the stop keys are movable beyond their normal "off" and "on" positions and to an intermediate "neutral," position, to correspondingly adjust the actuators.

5. A combination stop mechanism for organs or the like, comprising a series of actuators each having a plurality of members releasably securable to each other at either end of the actuator, to render the actuator reversibly operative, said members being also settable to an intermediate position, to render the actuator inoperative in either direction; together with stop keys and combination operating members, said stop keys connected to the actuators and having movements in opposite directions beyond their normal "off" and "on" positions to cause the members of the actuators to be correspondingly engaged with each other at their ends, and being also movable to an inter-

mediate position to cause the members of the actuators to be free from holding relation with each other at both ends, and said combination operating members acting with relation to the actuators to operate the combinations in accordance with the settings of the actuators.

6. In a combination stop mechanism for organs or the like, a plurality of shafts, a plurality of actuators on each of the same, each actuator comprising a member fixed to the corresponding shaft and a complementary member supported by the shaft and movable relatively thereto, said member, correlated to be releasably securable to each other at either end, to render the actuator reversibly operative, and settable to any intermediate position to be inoperative in either direction; in combination with setting and operating means, including stop keys respectively connected to said shafts and operative to turn the same to one position for the engagement of the members of the corresponding actuators with each other at one end of the actuators, and to another position to cause them to engage each other at the other ends of the actuators, and to a third position to cause the members of the actuators to be free from engagement with each other at both ends of the actuators, and means to operate each combination in accordance with the settings of the actuators.

7. In a combination stop mechanism for organs or the like, a plurality of shafts, a plurality of actuators on each of the same, each actuator comprising a member fixed to the corresponding shaft and a complementary member supported by the shaft and movable relatively thereto, said members correlated to be releasably securable to each other at either end, to render the actuator reversibly operative, and settable to an intermediate position to be inoperative in either direction; in combination with setting and operating means, including stop keys each having for the setting operation a range of movement in opposite directions beyond its movement for the playing operation, and being also movable to a mid position, connections between the said keys and the respective shafts to turn the latter in accordance with the movements given the keys, and means operative upon the actuators to operate the combinations in accordance with the settings of the actuators.

8. A combination stop mechanism for organs or the like comprising: stop keys, resilient stop elements at opposite sides of each stop key to indicate the position at which the key is "off" or "on," each key being movable with its said resilient elements beyond the said positions, actuators each comprising complementary members releasably securable to each other at either end of the actuator and movable to a position in which they are not engageable with each other at either end of the actuator, connections between the stop keys and the actuators to cause the members of the actuators to be releasably secured to each other at one end of the respective actuator when the corresponding stop key has been moved to a place beyond its "off" position and to be releasably engaged with each other at the other end of said actuators when the corresponding stop key has been moved to a position beyond its "on" position and to be moved to a position in which both ends of the members of the actuators will be free from engagement with each other when the corresponding stop key has been moved to a substantially mid position; and combination operating member operating relative to said actuators.

9. A combination stop mechanism for organs or the like, having actuators settable into "on" position, "off" position and "neutral" position, and means to set the actuators into any of said positions, including stop keys having for the setting operation a range of movement additional to their movements in the operation of the combinations, and resilient elements at opposite sides of each stop key to indicate the position at which the key is "off" or "on."

10. A combination stop mechanism for organs or the like, comprising setting and operating means including reversibly operative actuators comprising complementary members relatively adjustable to a "neutral" position, stop keys connected to the actuators and operating elements to operate the combinations in accordance with the settings of said actuators, said stop keys having movement to "off" and "on" positions and also having movement beyond its said positions for the setting operation, and resilient elements at opposite sides of each stop key to indicate the position at which the key is "on" or "off."

In testimony whereof I affix my signature.

FREDERICK J. FLAHERTY.