Feb. 25, 1947. G. W. SLOPA 2,416,459

DOOR ACTUATING MECHANISM

Filed Feb. 5, 1945

Fig. 1.

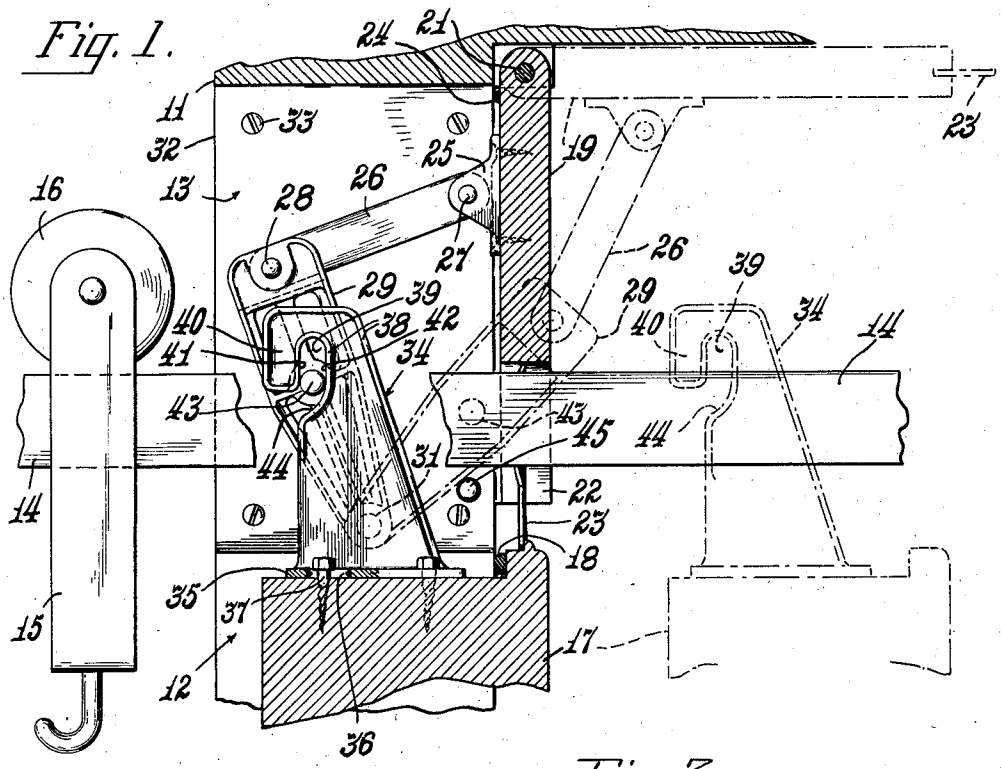


Fig. 2.

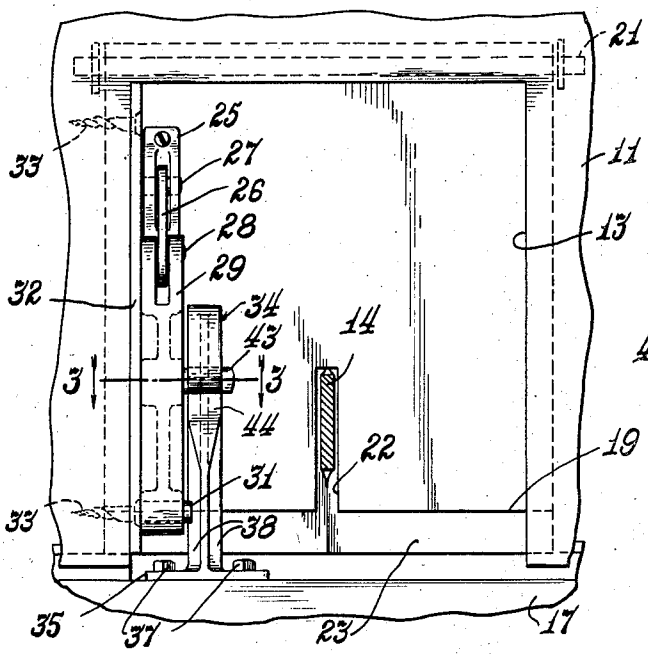


Fig. 3.

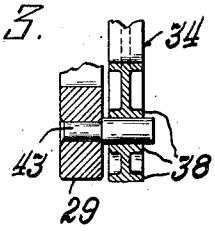
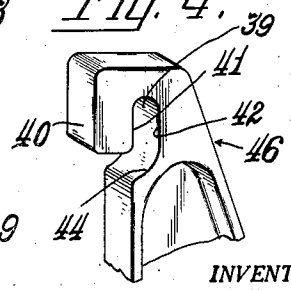


Fig. 4.



INVENTOR.
GEORGE W. SLOPA
BY Maurice S. Cayne
ATTORNEY

Patented Feb. 25, 1947

2,416,459

UNITED STATES PATENT OFFICE

2,416,459

DOOR ACTUATING MECHANISM

George W. Slopa, Chicago, Ill.

Application February 5, 1945, Serial No. 576,257

2 Claims. (Cl. 268—14)

1

The invention relates to improvements in door operating mechanism, and more particularly to novel means actuable to open and close a supplemental door upon opening or closing a main door in a multiple door system.

The door operating mechanism of the present invention is particularly concerned with such installations as are provided in large storage compartments, such as refrigerators, wherein a main door and a supplemental door are associated in such a manner as to require automatic opening and closing of the supplemental door upon opening and closing of the main door. Such a mechanism is indicated when a conveyor track is extended into the storage compartment from the outside so as to facilitate movement of large articles, suspended from hangers movable along said track, from the outside to the inside of the storage compartment. In such installations the track extends through the supplemental or track opening located above the main door opening and the articles hang from the hangers on said track so as to pass through the main door opening freely when the hangers are moved through the supplemental door opening. When no articles are being moved into or out of the compartment, the main and supplemental door openings are closed tightly. It is, therefore, an object of the present invention to provide a door control system of the kind referred to with novelly constructed means of a kind that is easy to install to move the supplemental door into a full open position upon initial opening of the main door and to move the supplemental door into a closed position when the main door is fully closed.

Another object of the invention is to provide a mechanism of the kind referred to with a novelly constructed cam element carried on the main door and effective to positively actuate mechanism associated with the supplemental door easily and quickly upon initial movement of the main door into an open or a closed position.

Other and further objects of the invention will be apparent from the following description and claims and are illustrated in the accompanying drawing which, by way of illustration, shows preferred embodiments of the principle thereof which are considered to be the best mode contemplated for applying that principle. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the spirit of the present invention and the purview of the appended claims.

2

In the drawings:

Fig. 1 is a fragmentary vertical sectional view of the upper portion of a multiple door system embodying features of the present invention.

Fig. 2 is an inside elevational view of the supplemental door illustrated in Figure 1, and showing the track in section.

Fig. 3 is a sectional detail view taken on line 3—3 of Figure 2.

Fig. 4 is a fragmentary perspective view of a modified form of standard.

In the accompanying drawing the refrigerator compartment to which the multiple door system is shown applied includes a front wall 11 having a main door opening 12 and a supplemental or port opening 13 located above and communicating directly with the main door opening 12. The supplemental door opening 13 is provided to accommodate a conveyor track 14 which is extended through said opening into the compartment from the outside. Various devices are provided for use in the association with the track 14 whereby articles, such as sides or quarters of cattle, hams and the like, may be moved into and out of the compartment, and in the present disclosure such means consists of a suitable carrier 15 including a roller 16 to travel along the track 14. The carrier depends below said track and may have, on its lower end, a gambrel-hook so as to afford means for suspending an article therefrom.

It is desired that the main door opening 12 and the supplemental door opening 13 be closed at all times when articles are not being moved into or out of the compartment. Accordingly, the main door opening 12 is provided with a main door 17, which may be of any conventional construction and which is hingedly mounted along one of its vertical edges to the frame of the main door opening so that it may swing through an arc into open and closed positions. The door 17 preferably is provided with a sealing strip 18, of rubber or other like material, so that the opening 12 is securely sealed when the door is closed tightly.

The port or supplemental door opening 13 similarly is provided with a door 19 pivotally mounted, as at 21, for swinging movement vertically form the closed position illustrated in Figure 1 in full lines into the fully open position illustrated in said figure in broken lines. This manner of mounting the supplemental door 19 is required so that when said door is in a fully open position it is located above the track 14 to insure a clear uninterrupted passage for the

carriers 15 when they are moved along the track 14 through the supplemental door opening 13.

The supplemental door 19 is provided on its lower edge with a slot 22 so that it may fit over and around the track 14 while in closed position, and its lower edge and the edges of the slot 22 preferably are provided with a flexible flap 23 of sufficient width to substantially contact the top edge of the main door 17 when both doors are fully closed. The inside face of the supplemental door 19 also may be provided with a sealing strip 24 to abut against the outside face of the compartment wall 11 adjacent the opening 13. Thus it will be observed that when the main door 17 and supplemental door 19 are in fully closed positions the compartment is substantially and effectively sealed against the passage of atmosphere into or out of said compartment.

The present invention is concerned with means for effecting automatic opening and closing of the supplemental door 19 when the main door 17 is moved into open or closed positions. Accordingly, the inside face of the supplemental door 19 is provided with a bracket 25 having a link 26 pivotally secured thereto at one end as at 27. The other end of the link 26 is pivotally connected as at 28, to one end of a lever 29. The lever is pivotally mounted at its other end upon a pin or trunnion 31 secured to and extending laterally into the opening 13 from a wall plate 32 firmly secured by screws 33 to the inside face of the supplemental opening 13. When the supplemental door 19 is in closed position the link 26 and lever 29 assume the positions shown in full lines in Figure 1, and when said supplemental door is in its open position, said link and lever rest substantially in the positions illustrated in broken lines in said figure.

Movement of the link 26 and lever 29 from one of these positions of rest into the other is effected through cooperative association therewith of means carried on the main door 17, which is rendered effective during initial opening and final closing movement only of said main door.

As shown, the main door 17 has a standard 34 mounted upon its upper edge which extends upwardly therefrom into the supplemental door opening 13. The standard 34 includes a base 35 having slotted openings 36 therein to receive mounting screws 37 for securing said standard in any position of adjustment on said door. The standard 34 preferably consists of a substantially web-like body having laterally extending flanges 38 on each side thereof to provide relatively wide edges. The edge of the standard 34 facing the inside of the main door 17 is formed with a cam slot 39 opening at its lower end on said face and substantially vertically upwardly from said opening. An overhanging portion 40 on the upper end of the body defines the front wall 41 of the slot 39 and this wall and the back wall 42 of said slot are formed with continuations of the laterally extending flanges 38 on the standard so as to thereby present relatively wide faces.

The cam slot 39 is adapted to cooperate with means of the lever 29, when the main door 17 is being moved into open or fully closed positions, so as to actuate the lever 29 for moving it and its associated link 26 into one or the other of the positions illustrated. For this purpose, the lever 29 carries a stud 43 substantially midway between its ends, which stud extends laterally from one face thereof into the path taken by the standard 34 when said standard is moved into and out of the supplemental opening 13. When the main door 17 and supplemental door 19 are in the open position illustrated in broken lines of Figure 1, the open mouth of the slot 39 is in substantial alignment with the stud 43. As the main door 17 approaches its fully closed position, the lower portion 44 of the back wall 42 of the slot 39 engages the stud 43 whereupon said stud is carried upwardly into the slot 39 upon continued closing movement of the main door 17. Such upward movement of the stud 43 as it rides along the back wall 42 of said slot results in movement of the link 29 about its trunnion 31 so as to break the toggle relationship between the lever 29 and link 26 whereupon the supplemental door 19 begins its descent toward a closed position. When the main door 17 reaches its fully closed position the lever 29 will have been carried into the full line position shown in Figure 1 and the back wall of the slot 39 will remain in engagement with the stud 43 to hold the supplemental door in its closed position shown.

When the main door 17 is moved into open position, the front wall 41 of slot 39 bears against the stud 43 so as to cam said stud upwardly and in a direction to swing the lever 29 about its trunnion 31 into the open position illustrated, whereupon the stud 43 becomes disengaged from slot 39 so that the main door 17 is free to be swung into its fully opened position. A stop 45, carried by the wall plate 32, is provided to limit forward rocking motion of lever 29 beyond the fully open position illustrated.

If desired, the slotted end of the standard 34 may be formed substantially solid such as is illustrated at 46 in Figure 4, which construction is best adapted for heavy duty installations. In other respects the standard illustrated in this figure is identical to the standard described hereinabove and like numerals identify corresponding parts.

It should be understood that the supplemental door operating mechanism disclosed herein may embody various modifications in detail construction and may be installed on either side of the supplemental opening without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A closure system for storage compartments having a main door opening and a supplemental opening above the main door opening, a vertically swinging door for the supplemental opening, an operating mechanism for the supplemental door, comprising a link having one end thereof pivotally connected to the supplemental door, a lever having one end thereof pivotally connected to the door frame and having its opposite end pivotally connected to the opposite end of said link, a standard carried by the main door and extending into the supplemental opening and having an inverted substantially U-shaped upper portion defining a vertically disposed slot the mouth of which opens inwardly away from the supplemental door when closed, and a member on said lever adapted to extend into the slot for engagement with the walls thereof to effect opening and closing of the supplemental door upon opening and closing of the main door.

2. Operating means for moving a supplemental door into open and closed position upon opening and closing of a main door in a frame comprising, in combination, a lever fulcrumed at one end to said frame, a link pivoted at an end to the other end of said lever and having a pivoted connection at its other end to said supplemental door, said

lever and said link constituting a toggle linkage moveable past a dead center position to hold the supplemental door in an open position, a lug extending laterally from one face of said lever between its ends, a standard carried on said main door having an upwardly extending body portion formed with a vertical cam surface on an edge facing the inside of said compartment, and an arm on said body portion overhanging said cam surface and spaced forwardly therefrom to define with said surface a cam slot, said arm terminating short of an end of the cam surface to define a mouth to admit the lug into the cam slot while

the main door is being moved into fully closed position whereby the lever is moved about its fulcrum to close the supplemental door.

GEORGE W. SLOPA.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,208,309	Leonard	July 16, 1940
2,012,925	Fritz	Aug. 27, 1935