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J. I. BYRNE

2,109,898

DOOR CONSTRUCTION

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FIG.2.

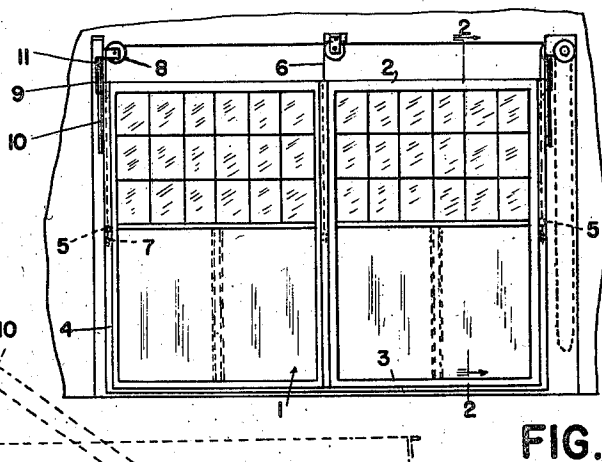
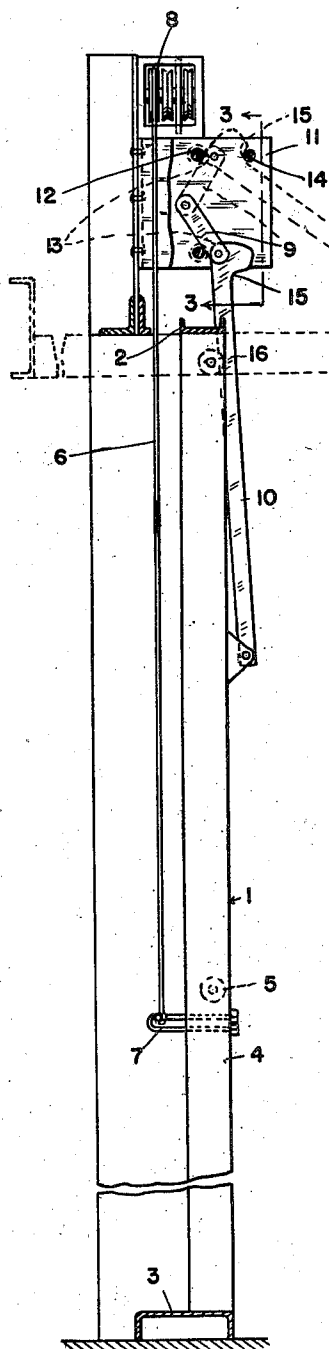


FIG.1.

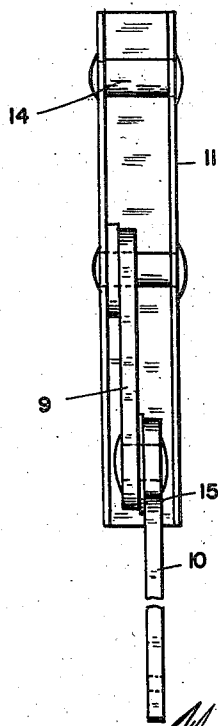


FIG.3.

INVENTOR
JULIUS I. BYRNE

BY *Whittemore & Whittemore*
ATTORNEYS

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DOOR CONSTRUCTION

Julius I. Byrne, Detroit, Mich.

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4 Claims. (Cl. 20-19)

The invention relates to door constructions and refers more particularly to door constructions for use in warehouses, airplane hangars and the like.

One of the objects of the invention is to provide an improved door construction which is opened by raising the same and in which the door moves bodily vertically during the first portion of the raising movement and then swings toward horizontal position. Another object is to so construct the door construction that it has positive guiding means. A further object is to provide an improved means for guiding the door during its raising and lowering movements.

These and other objects of the invention will become apparent from the following description, taken in connection with the accompanying drawing, in which

Figure 1 is an inside elevation of a door construction showing an embodiment of my invention;

Figure 2 is a cross section on the line 2-2 of Figure 1;

Figure 3 is a cross section on the line 3-3 of Figure 2.

As illustrated in the present instance, the door construction is for use in warehouses. The door 1 has a metal frame with the top and bottom rails 2 and 3 respectively and the upright rails 4. The door is movable bodily or as a unit and is adapted to be opened by being raised. It is desirable that the door in opening first move vertically and then be swung or tilted to horizontal position. The door has secured to its end upright rails the rollers 5 which are located between the upper and lower edges of the door and which engage suitable upright guide channels secured to the jambs at the sides of the door opening.

To open the door, I have provided the series of flexible linear members 6, such as steel cables. These linear members extend in front of the door when closed and have their lower ends secured to the door by suitable means, such as the clevises 7, which are located preferably near the vertical center of the door. In this connection, the rollers 5 are located with respect to these clevises to secure practical operating clearances for the clevises. The linear members extend over the sheaves 8, which latter are mounted upon the framework of the building and are located above the door. Suitable counterweights for the door are secured to the linear members and the linear members may be actuated either manually or by power to effect the raising and closing of the door. It will be seen that with this arrangement, the linear members in raising the door tend to tilt the

door in a direction such that its upper edge will move rearwardly.

For guiding the door during its opening and closing movements, I have provided means at each end of the door. Each means comprises a hanger formed of the upper and lower links or arms 9 and 10 respectively, with the lower end of the lower link pivotally connected to one of the faces of the upper portion of the door when closed. Specifically, the lower link is pivotally connected to the rear face of the door when closed and at a considerable distance below its upper edge. The upper end of the upper link is pivotally connected to and between the side walls of the supporting U-shaped plate 11 and the lower end of this upper link is pivotally connected to the upper end of the lower link. The base of the U-shaped plate is fixedly secured to the framework of the building above the door opening and the side walls extend rearwardly from the base and parallel to the path of movement of the door.

During the first portion of the raising movement of the door, the upper link 9 is movable angularly rearwardly and upwardly to assume the position shown in dotted lines in Figure 2, at which time this movement is limited by reason of the transverse pin 12 which extends between the side walls of the supporting plate 11 and which is engageable with an edge portion 13 of the enlarged upper end of the lower link 10. To hold the upper link in its predetermined position of angular adjustment while the door is being tilted upon continued raising thereof, I have provided the transverse stop 14 preferably in the nature of one or more rollers. This stop is located between the side walls of the supporting plate 11 and is engageable with the edge portion 15 of the enlarged upper end of the lower link 10. Both the edge portions 13 and 15 are concentric with the pivot connecting the upper and lower links, so that the upper link is fixedly secured in predetermined angular position during the tilting movement of the door.

In order to positively control the movement of the door during the rearward and upward swinging movement of the upper link of each hanger, the door may be provided with the auxiliary rollers 16 secured to the upper portions of its end rails and engageable with the jamb guides at the sides of the door opening. The jamb guides terminate to provide clearance for these auxiliary rollers just prior to the upper links reaching their limits of rearward and upward movement.

What I claim as my invention is:

1. In a door construction, the combination with

a door and means for bodily raising said door, of hanger means for said door and support means for said hanger means, said hanger means comprising a link pivotally connected to said support means, and a link pivotally connected to said door and to said first mentioned link, and cooperating means upon said hanger means and support means for holding one of said links in a predetermined angular position during a portion of the raising movement of said door.

2. In a door construction, the combination with a door and means for bodily raising said door, of supports above said door and hangers depending from said supports and connected to said door, each of said hangers comprising an upper link pivotally connected at its upper end to a support and a lower link pivotally connected at its upper end to the lower end of said upper link and pivotally connected at its lower end to the upper portion of said door, said lower link having an enlarged upper end with edge portions concentric with the pivot, and means upon each support engageable with said edge portions upon predetermined angular movement of the upper link to retain said upper link in a predetermined angular position.

3. In a door construction, the combination with a door and means for bodily raising said door and exerting a rearward pressure upon its upper por-

tion, of hanger means for said door and support means for said hanger means, said hanger means comprising a link pivotally connected to said support means and adapted to swing rearwardly and upwardly from its normal position and a link pivotally connected to said door and to said first mentioned link, and means upon said support means for limiting the rearward and upward swinging of said first mentioned link during initial raising movement of said door and for retaining the first named link in a predetermined position during continued raising movement of the door.

4. In a door construction, the combination with a door adapted to move upwardly and rearwardly to open position, of hanger means for said door and support means for said hanger means, said hanger means comprising a link pivotally connected to said door, and a second link pivotally connected to said first mentioned link and to said support means, said second link being movable angularly relative to said support means during a portion of the opening movement of said door, and means upon said support means for limiting the angular movement of said second link and for retaining the latter in a predetermined position during continued opening movement of the door.

JULIUS I. BYRNE.