

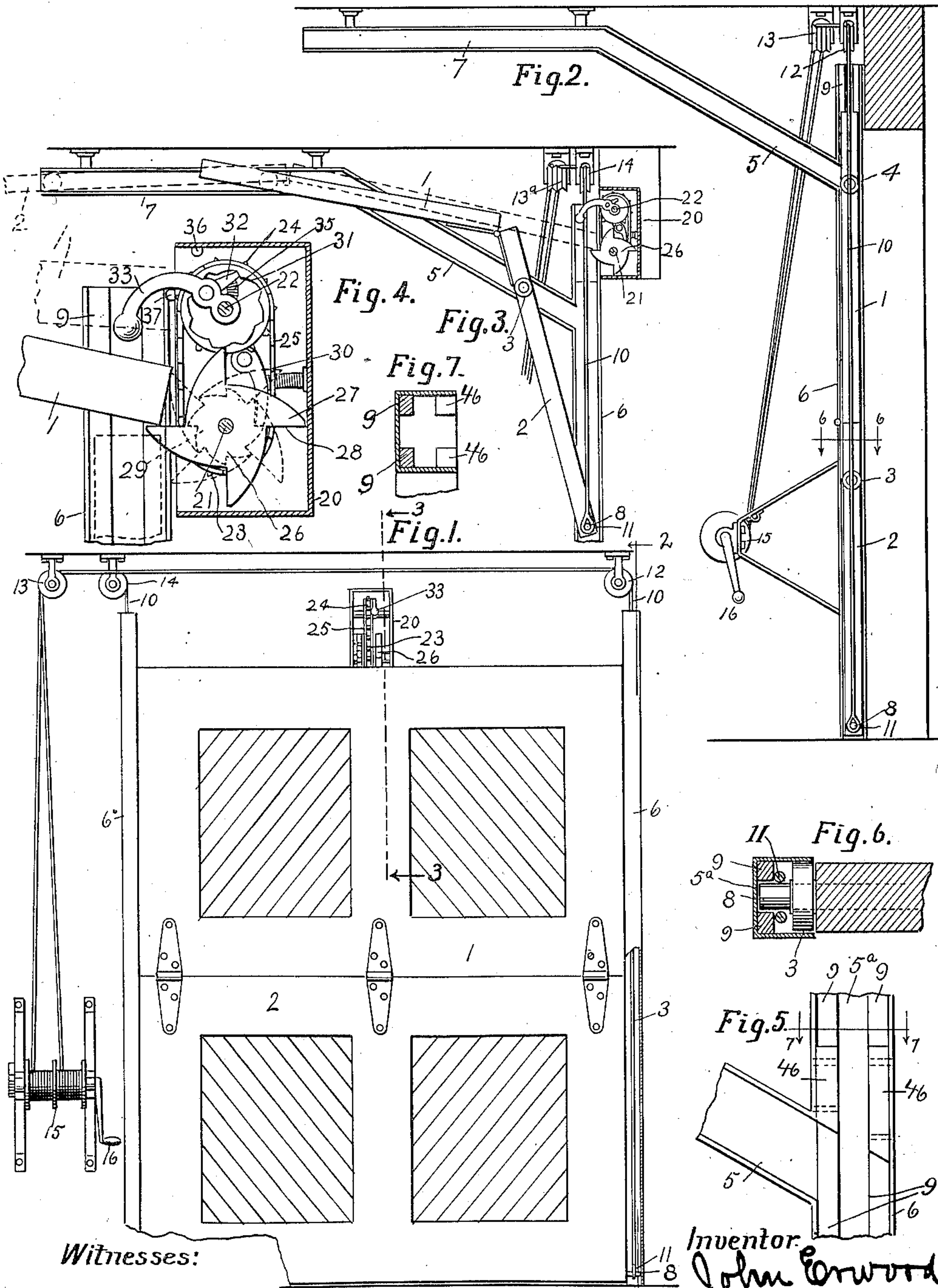
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J. ERWOOD.
WAREHOUSE DOOR.

APPLICATION FILED JAN. 30, 1903.

NO MODEL.



Witnesses:

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JOHN ERWOOD, OF CHICAGO, ILLINOIS.

WAREHOUSE-DOOR.

SPECIFICATION forming part of Letters Patent No. 756,609, dated April 5, 1904.

Application filed January 30, 1903. Serial No. 141,139. (No model.)

To all whom it may concern:

Be it known that I, JOHN ERWOOD, a citizen of the United States, residing at No. 1604 West Adams street, in the city of Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Warehouse-Doors, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved door of the character whose most frequent use would be for warehouses, but adapted for any situation requiring a door which can open upward and be disposed of overhead.

It consists of the features of construction which are set out in the claims.

In the drawings, Figure 1 is an elevation of a door embodying my invention, same being shown in the closed position. Fig. 2 is a section at the line 2 2 on Fig. 1. Fig. 3 is a detail section at the line 3 3 on Fig. 1, showing the door in full line at partly-elevated and in dotted line at fully-elevated position. Fig. 4 is an enlarged detail view of a portion of the latching mechanism seen in connection with the door in Fig. 3. Fig. 5 is a detail elevation of a portion of a guide-track. Fig. 6 is a section at the line 6 6 on Fig. 1, showing the parts on an enlarged scale. Fig. 7 is a section at the line 7 7 on Fig. 5.

My improved warehouse-door is made in two sections 1 and 2, which are hinged together at a horizontal line, the upper section 1 being usually most conveniently made longer than the lower. The lower section has a guide stud and roll 3 at each edge, the two being in line horizontally a little below the hinge-line of the two sections, and the upper section has a similar pair of stud and roll guides similarly situated relatively at about the same distance from the upper edge of said upper section. These stud and roll guides take into the channel guide-track, which is formed by means of channel-iron bar 6, secured at the two opposite edges of the door-opening. This channel-bar extends the whole height of the door-opening and a little above the same for purposes hereinafter pointed out. From the point a little below the top of the

door-opening at which the guide 4 stands when the door is at its lower position—that is, closed—there is extended from each of the guide-channels 6 an oblique channel 5, taking off from the channel 6 sideward and upward toward the ceiling in a vertical plane at right angles to the wall having the door, and from said guide-channels at a level somewhat above the top of the door there is extended in the same vertical plane the horizontal channel 7, both the channels 5 and 7 being the same formation as the channel 6—that is, made of angle-iron bar and being rigidly supported, preferably from overhead. At opposite edges of the lower section 2 near the lower end there are studs 8 8, which project into the guide-channels. At the back or bottom of the vertical guide-channel 6, commencing anywhere below the oblique channels 5, it is reduced in width—as, for example, by filling in at the opposite sides with parallel strips 9 9, leaving a narrow channel 5^a in the middle adapted only to receive the stud 8, which is of sufficient length to extend into the space between said strips. These strips 9 9 are continued up past the oblique channel 5, thereby excluding the stud from said channel 5, which admits and accommodates the stud and roll guides 3 and 4. The guide-studs 3 and 4 are shorter or adapted to project into the channel a less distance than the stud 8, their rolls, as illustrated in the case of the roll 3, (seen in Fig. 6,) being enough narrower or thinner than the depth of the channels 6 to leave room between them and the back or bottom of each channel even where it is filled in by the strips 9 9 for a lifting chain or cable 10, which is secured by an eye 11 to the stud 8 and extends up in the channel past the guides 3 and 4 and past the oblique channel 5 and out at the top of the vertical channel 6, such chain or cable at one side passing over a guide-pulley 12 and thence along above the top of the door to a guide-pulley 13 beyond the other side, while the cable from said other side passes up similarly to a guide-pulley 14 and thence over a guide-pulley 13^a on the same axle with the pulley 13, both cables passing thence down to a windlass 15, provided with a crank-handle 16 for winding up the doors. The doors are

thus lifted by the bottom, where the eyes 11 of the cables are secured to the studs 8 8.

Immediately above the position of the stud and roll guides 4 when the door is down there are secured in the vertical channel blocks 46 46, corresponding in thickness to the width of the rolls of the guides 3 and 4 and in the path of said guides—that is, so as to overhang them—and having their lower ends cut away on a slant corresponding to and in continuation of the lower surface of the upper flange of the oblique channel 5, as seen in Fig. 5. These blocks, it will be seen, operating to prevent the guides 4 from passing up in the channel 6 above the entrance to the oblique channel 5, cause said guides to be deflected into said oblique channels as soon as the door is lifted, and as it continues to rise these guides following the oblique channels cause the upper section of the door to be tipped inward, and as the door is further lifted this upper section of the door approaches more and more nearly to a horizontal position until the stud and roll guide 3 reaches the entrance to the oblique channel and is deflected into it in the same manner as the preceding guide, causing the lower section also to be tipped inward, as seen in Fig. 3. As the door is further elevated the guide 4 passes into the horizontal channel 7 and the upper section of the door becomes eventually nearly horizontal by the time the guide 3 reaches the entrance to the horizontal channel 7, which may be the highest position of the door, the lower end of the lower section being at that time a little distance above the entrance to the oblique channel, as seen in dotted line in Fig. 3. The door is designed to be elevated, as described, by the windlass and crank 15 16; but it may also be counterpoised by devices provided for that purpose, not herein shown, but which, it will be understood, may be connected at suitable points to the cables 10 10 or in any other convenient manner.

It will be noticed that by reason of the stud and roll guides 3 and 4 being at some distance back from the upper edges of the door-sections to which they pertain, respectively, so much of the weight of said sections as is located beyond—i. e., above—the guides counterbalances a like portion at the other side of the guides when the door is in elevated position and that to the extent, therefore, of double the amount which is beyond or above said guides the counterbalancing-weight of any means which might be employed to uphold the door is relieved. This is of special importance when a latching device is employed, since then lighter construction can be used than if the whole weight of the door had to be sustained by it.

In order that the door when raised to its highest position may be perfectly safe against any possibility of falling should the supporting-cables give way, I provide the automatic

lock device seen in Figs. 3 and 4. This device comprises a metal plate or casing 20, which is strongly mounted on the partition or wall which the door closes just above the door-opening and at the side opposite that toward which the door is deflected as it is raised. On this plate or casing are journaled two shafts 21 22, having equal sprocket-wheels 23 24, which are connected by the chain 25, causing them to have synchronous movement. On the lower shaft 21 rigid with the sprocket-wheel 23 there is a four-armed ratchet-like latching-wheel 26, each of whose ratchet-shaped arms 27 has an abrupt face 28, adapted at proper position of the wheel to afford lodgment for the lower end of the door when the latter is lifted to its highest position, as seen at Fig. 3. On this shaft, also rigid with the latching-wheel, there is a ratchet-disk 29, engaged by a pawl 30 to lock the latching-wheel against rotation backward—that is, in direction to let down the end of the door, which may be supported on the ratchet-arm of the wheel. The sprocket-wheel 24 on the upper shaft has an interior clutch-rim 31, which is engaged by a dog 32 on the lever 33, which is fulcrumed on the shaft 22 and projects off therefrom in position to overhang the lower end of the door when the latter is elevated to nearly horizontal position, as seen in Figs. 3 and 4. A spring 35 reacts against the dog 32 to engage it with the clutch-rim, and suitable stops 36 and 37 above and below the arm 33 limit its play about its pivot. For each of the ratchet-arms 27 there are two ratchet-teeth on the disk 29, and the clutch-rim 31 has the same number of dog-engaging shoulders or notches as the number of the teeth of the ratchet-wheel. With this construction it will be noticed that as the latching-wheel is rotated step by step one tooth of the ratchet-disk at a time its latching-arms pass successively into position at which they may operate to hold the door up, each alternate step of such movement bringing a latching-arm into such door-holding position, the intermediate alternate steps bringing the arms into position which leaves a clear path for the door either up or down past the wheel. The device being adjusted so that when the door is down the latching-arms are in the last-mentioned position, it will be seen that by lifting the door past the wheel and against the pawl-lever 33, lifting that lever so as to give one-step feed movement to the wheel, a latching-arm is brought up under the door in position to hold it, when it is let back a little distance to allow the lever-arm 3 to drop to the lower stop, and that when it is desired to release the door to let it down this may be accomplished by first pushing it up again against the lever-arm 33 and giving another step movement to the latching-wheel, which will carry its latching-arms out of the track of the door on the descent of the latter.

I claim—

1. A warehouse-door and means for operating it, comprising two door-sections horizontally hinged together; guide-channels at the vertical edges of the door-opening; channels leading from said vertical channels respectively a substantial distance below the top of the door-opening, and extending off obliquely upward therefrom in parallel vertical planes transverse to the plane of the door-opening, each door-section having a substantial distance below its upper edge, guide-studs taking into the channels respectively, and means for lifting the door by engagement therewith near the bottom of the lower section.

2. A warehouse-door and means for operating the same, comprising two door-sections hinged together in horizontal line; vertical guide-channels at the opposite edges of the door-opening; oblique channels leading from said vertical channels extending off upward therefrom in parallel vertical planes transverse to the plane of the door-opening, and horizontal channels leading from the upper ends of said oblique channels respectively, each door-section having at a substantial distance below its upper edge guide-studs taking into the guide-channels respectively, and means for lifting the door by engagement therewith near the bottom of the lower section.

3. A warehouse-door and means for operating the same, comprising two door-sections hinged together at a horizontal line; parallel guide-channels in the opposite vertical edges of the door-opening; oblique channels leading off upward from said vertical channels respectively, at a short distance below the top of the door; guide-studs projecting from the lateral edges of both door-sections at a distance below the upper edges thereof, respectively, equal to the distance below the top of the door at which the oblique channels lead off from the vertical channels, and means for lifting the door arranged to engage the same near the bottom of the lower section.

4. A warehouse-door and means for operating the same, comprising two door-sections hinged together at a horizontal line; guide-studs projecting from the lateral edges of both sections at a short distance below their upper edges respectively; vertical channels into which said guide-studs take at the lateral edges of the door-opening; oblique channels leading off upward from said vertical channels adapted to be entered and followed by said studs; guide-studs at the lower end of the opposite lateral edges of the lower section taking into said vertical guide-channels, said last-mentioned studs being less in one dimension than the first-mentioned guide-studs, the vertical guide-channel being reduced to the dimension of said bottom studs, commencing immediately above the point at which the oblique channels lead off from the vertical channels, whereby the first-mentioned studs cannot fol-

low the vertical channel beyond such point, and means for engaging the door to lift it.

5. A warehouse-door and means for operating it, comprising two door-sections hinged together at a horizontal line; vertical guide-channels at the vertical edges of the door-opening, and oblique channels leading off upward therefrom near the upper ends of the vertical channels, both door-sections having guide-studs taking into said guide-channels and adapted to travel both in the vertical and oblique portions thereof; studs projecting from the lateral edges of the lower section at the lower end thereof into said vertical guide-channels, said last-mentioned studs being longer than the first-mentioned guide-studs, the vertical channels having grooves at the bottom, into which said longer studs protrude, said grooves commencing in said vertical channels below the point of divergence therefrom of the oblique channels, and extending up past that point, whereby the lower end of the lower door-section is guided vertically past said oblique channels when the door is lifted.

6. A warehouse-door and means for operating it, comprising a plurality of door-sections horizontally hinged together, and thereby adapted to fold; means for elevating the door and for deflecting it laterally at the upper part, to carry it overhead; a latching device at the top of the doorway in position to engage the bottom of the door when the same is elevated, and means overhanging the bottom of the door when thus elevated and latched, for releasing the latch by further elevating the bottom of the door.

7. In combination with a warehouse-door, a latching device for automatically engaging the same when elevated, and a device for releasing the latch, adapted to be operated for such release by lifting the door beyond latching position.

8. In combination with a warehouse-door, a latching device for holding the same elevated, comprising a latching-wheel having a plurality of latching-arms; a ratchet-disk connected with such wheel for rotation, having two ratchet-teeth for each latching-arm of the wheel; means for operating the rotating latching-wheel in steps corresponding to the ratchet-teeth, the angular movement of the latching-wheel caused by each step being sufficient to take it into or out of latching position, whereby it alternates between latching and releasing position at the successive steps of its rotation.

9. In combination with a warehouse-door, means for latching the door in open position, consisting of a latching-wheel having a plurality of latching-arms, and arranged to rotate to bring said latching-arms successively into latching position and carry them out of the same, the angular interval between said arms being such that at an intermediate point between their respective latching positions they

are out of latching position; mechanism operated by the door moving beyond latching position for actuating the latching-wheel step by step, the length of each step being the angular
5 distance from latching to unlatching position, whereby such movement of the door, when latched, unlatches it, and when unlatched, latches it.

10. In combination with a warehouse-door,
10 means for latching and unlatching it, comprising a latching-wheel having a plurality of latching-arms whose angular separation successively is twice the angular movement from latching to unlatching position; a ratchet connected with such latching-wheel for rotation,
15 and a pawl for engaging the same, the ratchet having two teeth for each latching-arm of the wheel; a second wheel and means by which it rotates the latching-wheel; a clutch for actuat-

ing the second wheel with step-by-step movement, and an operating-arm of such clutch, extending in the path of the door when the latter is moved past latching position, each step movement of such clutch-wheel being adapted to rotate the latching-wheel one ratchet-tooth's
25 distance, whereby each movement of the door beyond latching position against the clutch-arm rotates the latching-wheel one step from latching to unlatching, or from unlatching to latching position, as the case may be.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 24th day of January, A. D. 1903.

JOHN ERWOOD.

In presence of--

CHAS. S. BURTON,
FREDK. G. FISCHER.