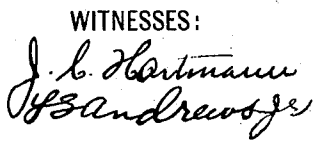


973,691.

3 SHEETS—SHEET 1.



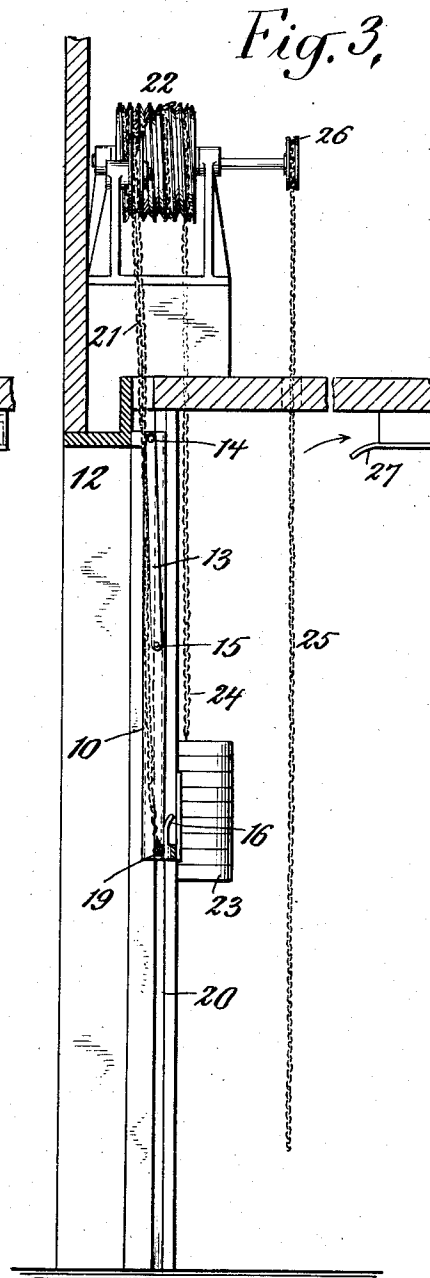
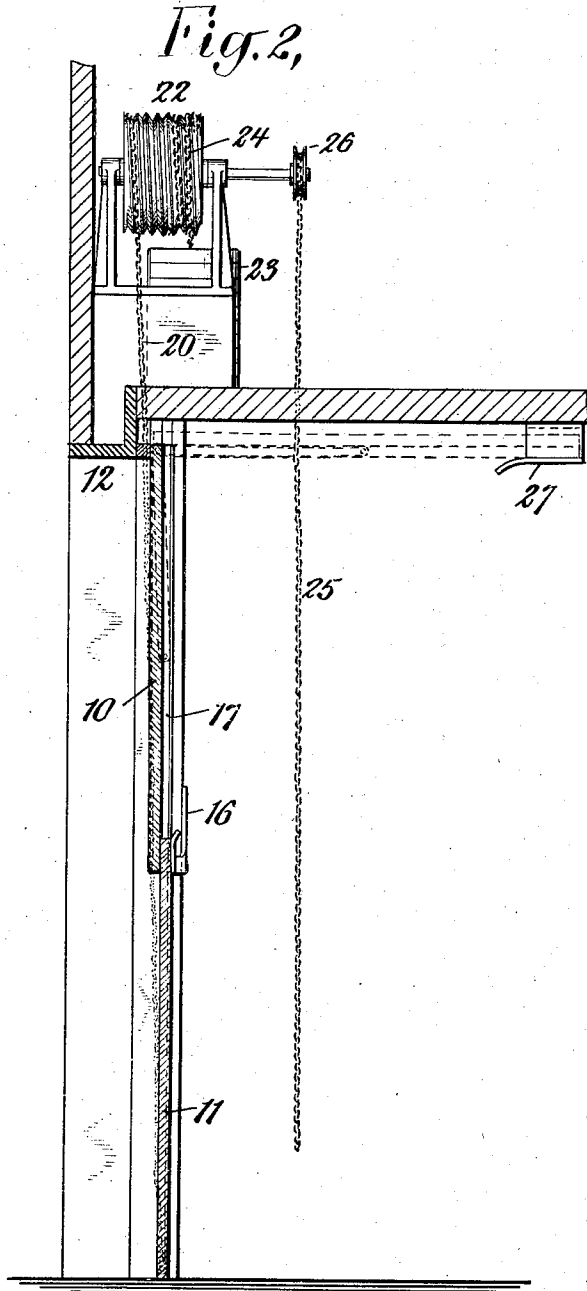
INVENTOR
J. Edward O'Brien
BY
Chapman & Haymond
ATTORNEYS

J. E. OGDEN.
 DOOR AND MEANS FOR OPERATING THE SAME.
 APPLICATION FILED MAY 20, 1910.

973,691.

Patented Oct. 25, 1910.

3 SHEETS—SHEET 2.



WITNESSES:

J. L. Hartmann
H. Andrews Jr.

INVENTOR

J. Edward Ogden
 BY
Chapin Raymond
 ATTORNEYS

J. E. OGDEN.
DOOR AND MEANS FOR OPERATING THE SAME.
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3 SHEETS—SHEET 3.

Fig. 4,

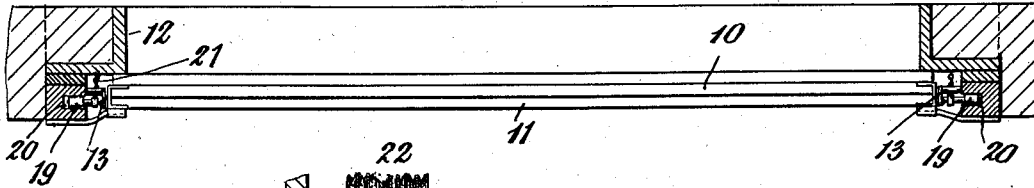
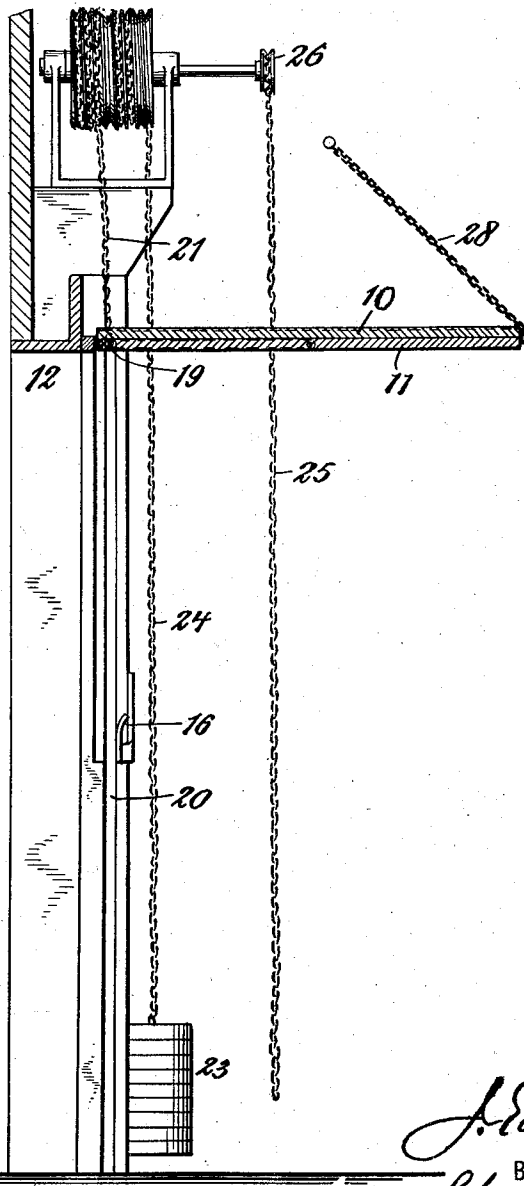


Fig. 5,



WITNESSES:

J. L. Hartmann
B. Anderson

INVENTOR

J. Edward Ogden
BY
Chapman & Thompson
his ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN EDWARD OGDEN, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE PATENT APPLI-
ANCE COMPANY, A CORPORATION OF NEW YORK.

DOOR AND MEANS FOR OPERATING THE SAME.

973,691.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed May 20, 1910. Serial No. 562,378.

To all whom it may concern:

Be it known that I, JOHN EDWARD OGDEN, a citizen of the United States of America, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Doors and Means for Operating the Same, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in doors and means for operating the same, and particularly to that class of doors commonly employed in freight sheds, steamship docks, factories, and the like, where large doorway openings are required.

The main objects of my invention are to reduce the space through which a door of this description shall pass in its opening and closing movement, to facilitate the opening and closing thereof, to provide for the convenient partial opening of such doors, and generally to improve and simplify the construction of doors of this character and the means for operating them.

In carrying out my invention I construct the door in two parts, an upper and a lower part, the lower part being arranged to slide with respect to the upper part, the lower ends of the two parts being thereafter arranged to move upward simultaneously in right lines while the upper edges thereof swing outward under the influence of swinging suspension elements pivotally connected thereto and to the doorway framing.

My invention also consists in many novel details of construction and combinations of parts as will be fully pointed out hereinafter, and in order that my invention may be fully understood, I will now proceed to describe an embodiment thereof, having reference to the accompanying drawings illustrating the same, and will then point out the novel features in claims.

In the drawings: Figure 1 is a view in front elevation of a door and door operating mechanism constructed in accordance with my invention, the door being shown in its fully closed position. Fig. 2 is a view in central vertical transverse section therethrough, the door being shown in full lines in its closed position and in dotted lines in its fully opened position. Fig. 3 is a similar view showing the door as in its half-way

open position. Fig. 4 is a view in horizontal section substantially upon the line 4—4 of Fig. 1. Fig. 5 is a view in vertical transverse section of a door constructed in accordance with my invention showing a modified form of the supplemental supporting means employed, the door in this instance being shown as in its fully opened position.

The door, as a whole, comprises two sections,—an upper main swinging section 10, and a lower sliding auxiliary section 11. The door sections are arranged to close a doorway formed in a framing 12. The upper or main door section is suspended from the doorway framing by means of suspension elements conveniently comprising links 13 which are pivotally connected to the doorway framing at their upper ends 14, at points substantially in line with the upper end of the door, and at their lower ends at 15 to the door at points substantially midway between the upper and lower ends of the said main door section. The said main door section rests against the doorway framing at its rear side and top edges, while the lower ends of the side edges at the front thereof are engaged by guides 16 which tend to confine the door section to its proper position and to hold the same against the said doorway framing. The lower or auxiliary section 11 is mounted to slide in guideways 17 at the front side edges of the upper main door section, the side edges of the said lower section having portions 18 constituting slides which are fitted to the said guideways 17. At its lower extremity the said auxiliary door section is provided with laterally extending pins or trunnions 19 which are received in vertical guideways 20 formed in the side of the doorway framing. Lifting chains 21 are also connected to these pins, the said lifting chains passing over an overhead drum 22 to which the opposite ends of these chains are attached and upon which the said chains are arranged to be wound as the drum is rotated. Suitable means is provided for rotating the said drum, and a counterbalancing weight 23 is also provided, the chain 24 thereof being also conveniently wound around the said drum whereby the said weight will, in the operation of the door, tend to counterbalance its weight. The drum 22 may be rotated to open or close the door by any suitable means, a simple

endless chain hanging from a sprocket wheel upon the spindle being shown as provided for the purpose.

When it is desired to only partly open the door the drum 22 will be rotated to the required degree, initial operation thereof having the effect of merely lifting the lower auxiliary door section with respect to the upper door section. This lower door section may be lifted to any desired height, up to the point where it is substantially upon a level with the main door section 10. The two door sections are preferably of about the same height so that when the door section 11 is lifted to such a level the upper and lower ends thereof will come just about level with the upper and lower ends of the main door section 10, and the entire lower half of the doorway will be open. When the lower door section reaches its uppermost position some portion thereof will be arranged to come into abutting relation with some portion of the upper door section so that it can be moved no farther with respect thereto. Conveniently the trunnions 19 may abut against the lower end of the guide portions 17 of the upper door for this purpose. Thereafter, a continued rotation of the drum 22 will have the effect of lifting the lower end of both the door sections simultaneously, the upper ends being at this guided outward by the links 13. The two door sections will, of course, move as a unit, and the disposition and arrangement of the suspension elements 13 is such that the upper ends thereof will move outward in substantially a horizontal line. The lifting of the lower end of the door sections will cause the door to draw away from the guides 16 so as to free it therefrom, the trunnions 19 being retained however in the guideways 20 so that they act as a vertical guide for the lower end of the door while at the same time permitting the upper end of the door to swing outward under the influence of the suspension elements.

As the door approaches a horizontal position the lower end of the door sections will approach the upper pivotal points 14 of the suspension elements and the door will begin to lose the support of the said suspension elements. For this reason I have provided a supplemental supporting means for supporting the upper and outer edges of the door sections at this time, the same conveniently comprising a rigid support in the form shown in Figs. 2 and 3, or a flexible chain connection 28 in the form shown in Fig. 5. In its complete horizontal position the door will conveniently lie in a position substantially parallel with the said suspension elements as is shown in dotted lines in Fig. 2 and in full lines in Fig. 5, and at this time the said door will be wholly supported by the lifting chains and the supplemental

supporting means 27 or 28. It will, therefore, be seen that at least half the weight of the door, is directly borne by the lifting chains so that when it is desired to lower the door it will be only necessary to start to rotate the drum 22 in a direction to unwind the chains and the door will then start to move downward by its own weight.

By the foregoing it will be seen that the door may be opened at least half way without any appreciable space being occupied in the movement thereof, that is to say, no part of the door will be caused to project inward or outward. It will also be seen that during the completion of the opening from the half open to the full open position but a minimum of space will be occupied by the door, and that the space which is so occupied is space which is ordinarily of little value.

This type of door is especially adapted for steamship docks, freight and warehouse sheds, factories and the like, in that the lower portion of the door can be opened with a minimum of trouble to allow hand trucks to be run in and out (the entire doorway opening being usually twenty feet and upward) without the main door section being opened at all, and that the opening of the auxiliary door section in this manner can be effected while packages, trucks, or the like are occupying the space immediately adjacent to the door. Then if it be required to open the door beyond this point the movement of the main and auxiliary door sections together is one that takes place substantially over-head so that even the small space necessary to accomplish the movement is one which is out of the way of the positions objects are likely to occupy in a dock, warehouse, factory, or the like, the space being one which is usually free and clear in any event.

It will also be noted that the arrangement is such that no head room is necessary above the doorway for the operation of the door. The doorway opening can extend substantially up to the ceiling or roof. The overhead mechanism shown including the lifting chains, drum, counterbalance weight, etc., may of course, be located in any convenient position and designed with respect to the place adapted to receive it. In the drawings this is shown somewhat diagrammatically as the precise form, construction, and arrangement thereof is no part of the present invention.

What I claim is:

1. The combination with a doorway framing and a two-part door fitted thereto, one part comprising an upper door section fitted to the upper portion of the said doorway and the other a lower door section fitted to the lower portion of the said doorway, the two said door sections being provided with co-engaging slides and guideways whereby the lower said door section is guided vertically

in right lines over the face of the upper door section, suspension elements constituting swinging supports pivotally connected to a part stationary with the doorway framing and to the upper door section, means for first lifting the lower door section in right lines from a position substantially beneath the upper door section to a position substantially side by side therewith and for thereafter lifting the lower ends of both of the said door sections together in substantially right lines to a position substantially neutral with respect to the said supporting elements, the said elements serving to guide the upper end of the door sections outwardly during such lifting movement, and supplemental means for supporting the outer end of the said door sections as they approach a neutral position with respect to the said supporting elements and thereby lose the support thereof.

2. The combination with a doorway framing having vertical side guides therein, of an upper door section fitted to the upper portion of the said doorway, a lower door section fitted to the lower portion of the said doorway, the said door sections being provided with co-engaging slides and guideways for guiding the lower section vertically in right lines over the face of the upper door section, trunnions projecting from the lower ends of the lower door section and engaging the vertical side guides of the framing, suspension elements connected to the framing and to the upper door section, the said upper door section being otherwise free to move except as it is controlled by its engagement with the lower door section, a stationary guide normally engaging the upper end of the said lower door section but terminating in a point just above the lower end of the said lower door section when it is in its uppermost position, and means connected with the lower end of the lower door section for first lifting the same in right lines from a position beneath the upper door section to a position substantially side by side therewith and thereafter for lifting the lower ends of both the said door sections together, the suspension elements at such time serving to guide the upper ends of both the said door sections outward.

3. The combination with a doorway framing, of an upper door section fitted to the upper portion of the said doorway, a lower door section fitted to the lower portion of the said doorway, means for first lifting the lower door section in right lines from a position substantially beneath the upper door section, to a position substantially side by side therewith, and thereafter for lifting the lower ends of both the door sections together, suspension elements pivotally connected to the doorway framing and to the said upper door section, the said suspension

elements acting to guide the upper ends of the said door sections outward, during the time the lower end of the said upper door section is being lifted, and supplemental supporting means for supporting the outer end of the said door sections, as the said door sections approach a neutral position with respect to the said suspension elements.

4. The combination with a doorway framing having vertical side guides therein, of a door comprising upper and lower sections, fitted thereto, the said door sections being provided with co-engaging slides and guideways for guiding the lower door section vertically in right lines over the face of the upper door section, trunnions projecting from the lower ends of the lower door section and engaging the vertical side guides of the framing, suspension elements connected to the framing and to the upper door section, and means connected with the lower end of the lower door section to lift the same, the said lower door section being arranged to reach a lifting engagement with the upper door section, after the lower door section has been lifted to a predetermined extent, whereby the lower end of both of the door sections will be lifted together in the continuance of such lifting movement, the said suspension elements acting at such times to guide the upper ends of the said sections outward, the lower ends of both the said door sections being at such time entirely guided by the engagement of the trunnions of the lower section with the said vertical guideways.

5. The combination with a doorway framing, of an upper door section fitted to the upper portion of the said doorway, a lower door section fitted to the lower portion of the said doorway, means for first lifting the lower section in right lines from a position substantially beneath the upper door section, to a position substantially side by side therewith, and thereafter for lifting the lower ends of both the door sections together, suspension elements pivotally connected to the doorway framing at points therein substantially in line with the upper end of the upper door section when closed, and to the said upper door section at points about midway between the upper and lower edges thereof, and supplemental supporting means for supporting the outer end of the said door as the lower end thereof approaches the point of pivotal connection of the suspension elements with the doorway framing and so loses the support of the said suspension elements.

In witness whereof I have hereunto set my hand this 17th day of May, 1910.

JOHN EDWARD OGDEN.

Witnesses:

HENRY HEUSTEN,
A. M. FINN.