J. E. OGDEN.

DOOR.

APPLICATION FILED MAY 17, 1916.

1,258,439.

Patented Mar. 5, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

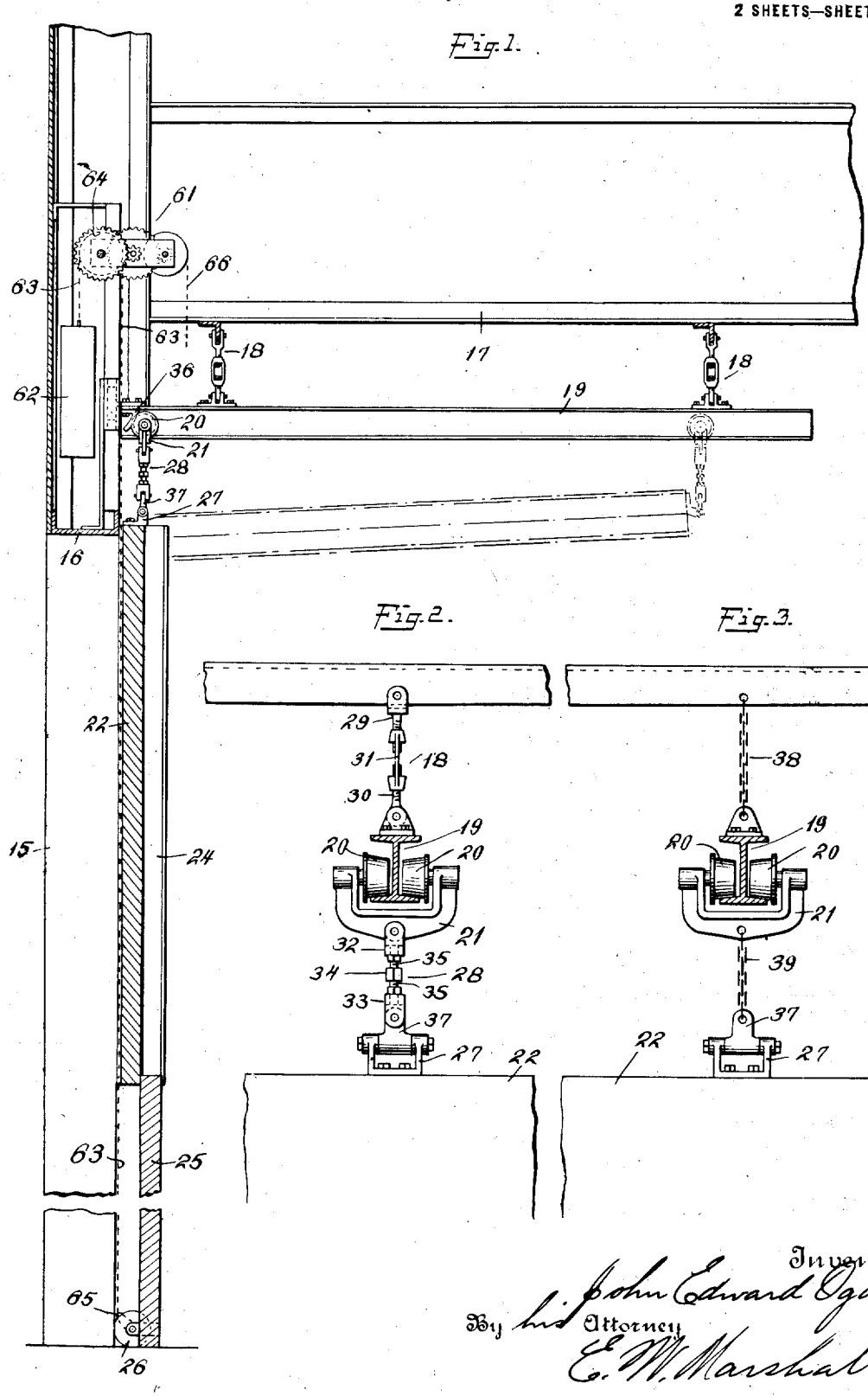

Fig. 2.

Fig. 3.

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2 SHEETS—SHEET 2.

Fig. 4.

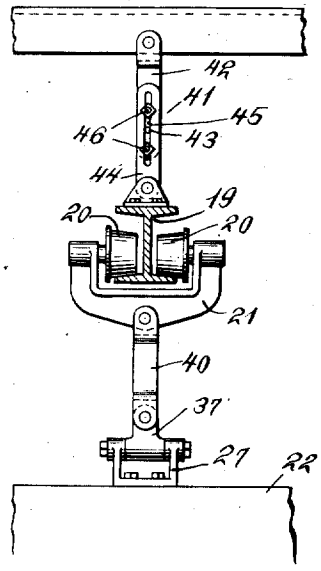


Fig. 5.

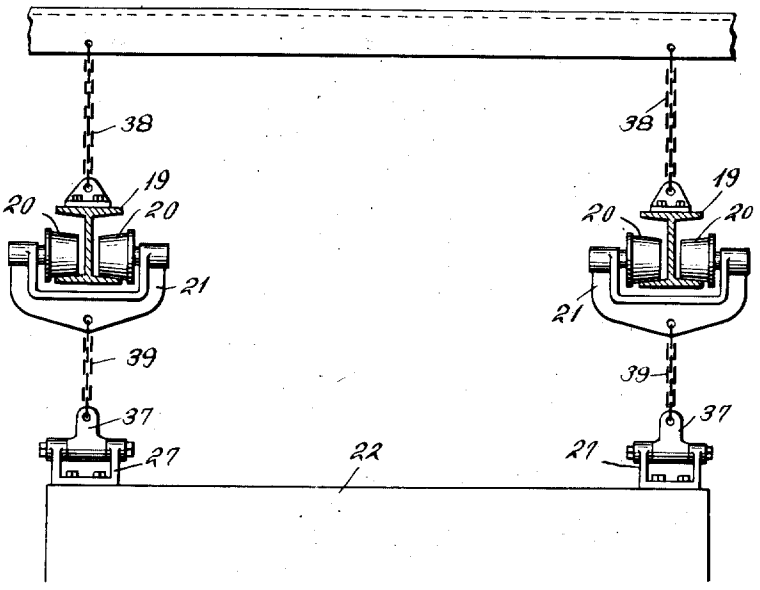


Fig. 6.

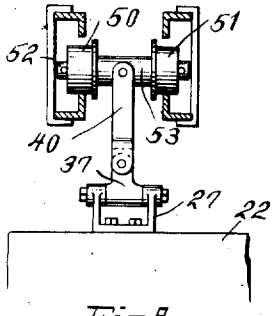


Fig. 7.

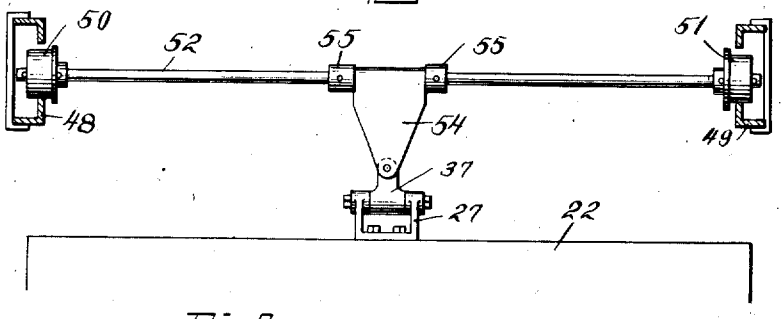


Fig. 8.

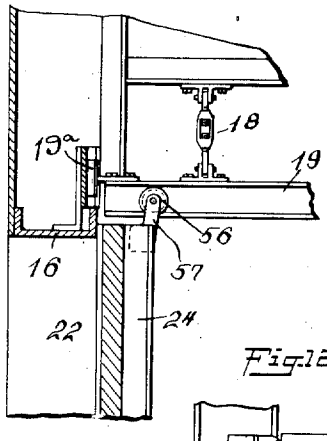


Fig. 9.

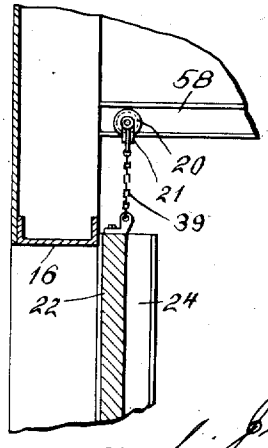


Fig. 10.

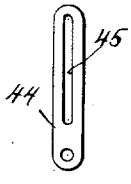


Fig. 11.

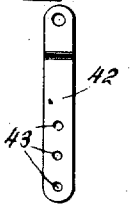
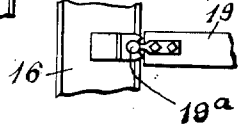


Fig. 12.



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DOOR.

1,258,439. Specification of Letters Patent. Patented Mar. 5, 1918.

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To all whom it may concern:

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

My invention relates to doors and has special reference to such as are elevated substantially in the plane of the door opening by suitable hoisting mechanism and swing away from the plane of the opening at the top on relatively stationary track rails. Furthermore, my invention pertains more particularly to large, heavy doors which are adapted for warehouse, factory or like purposes.

One object of my invention is to provide one or more track rails for a door of the aforesaid character with simple and improved means for either supporting the rails, suspending the door therefrom, or both, whereby the operation of the door is rendered practically independent of the warping, settling or displacement of the surrounding parts of the building.

Another object is to provide flexible and adjustable means for supporting a guide track or tracks for a door of the aforesaid character, and means for similarly suspending the door from the track.

Still another object is to provide a track and a hanger adapted to coöperate therewith which shall be particularly adapted for supporting a door and which shall be arranged and constructed to preclude the possibility of the hanger becoming disengaged from the track.

Another object is to provide a three-point support for a door which is arranged to swing away from the door opening at the top and has a pair of hoisting chains connected at its lower corners whereby the door is free to adjust itself without being subjected to warping strains.

Another object is to provide a top support for doors of the aforesaid character that shall permit the door to rise somewhat in a vertical plane before it swings away from the opening, thereby enabling it to swing inwardly without any tendency to put strains upon the top guide and support.

Other objects and advantages of my invention will be set forth hereinafter, and in order that my invention may be thoroughly understood, I will now proceed to describe the same in the following specification and then point out the novel features thereof in appended claims.

Referring to the drawings:

Figure 1 is a sectional elevation of a door arranged and equipped in accordance with my invention and constituting an embodiment thereof.

Fig. 2 is a partial front elevation of the suspension mechanism showing the track rail in cross section.

Figs. 3 and 4 are views corresponding to Fig. 2, showing modified hangers which also embody my invention.

Fig. 5 corresponds to Fig. 3 except that it shows a pair of rails and suspension members employed with a single door.

Still another modification of my invention is shown in Fig. 6 which corresponds to Figs. 2, 3 and 4, but comprises a fixed rail or rails from which the door is suspended.

Fig. 7 is a modification of the arrangement of Fig. 6 in which a pair of rails are employed, spaced apart by a distance substantially equal to the width of the door.

Figs. 8 and 9 show still further modifications of my invention and correspond to a portion of Fig. 1.

Details of the suspension structure of Fig. 4 are shown in Figs. 10 and 11, and the pivotal mounting of the rail is shown in plan in Fig. 12.

In Figs. 1 and 2, 15 designates one of the door posts, 16 the lintel and 17 a ceiling beam extending inwardly away from the plane of the door opening.

Suspended from the ceiling beam 17 by a pair of adjustable links 18 is a relatively stationary track rail 19. As shown in Fig. 2, this rail may comprise an I-beam of well known form with which a pair of frusto-conical rollers 20 are adapted to coöperate. It is furthermore preferably joined to the lintel at its inner end by means of a slidable pivot 19^a to permit freedom of movement as far as allowed by the suspension links. (See Figs. 8 and 12.) The rollers are mounted on a yoke or clevis 21 so that they are on opposite sides of the track.

The door, which may have one or more sections, comprises, in the arrangement shown, an upper door section 22 having guideways 24, and a lower door section 25, having guide rollers 26 near its lower cor-

ners, adapted to slide upon the upper section, being guided by the guideways 24.

The upper section is provided near the middle point of its upper edge, with a U-shaped bracket 27, an adjustable suspension link 28 being interposed between the yoke 21 and the bracket 27. I prefer to establish a double joint connection by introducing a hinge block 37 between the adjustable link 28 and the U-shaped bracket 27, as shown in Fig. 2.

The adjustable links 18 may be formed in any suitable manner; for example, they may comprise a pair of bolts 29 and 30, joined by a turn-buckle 31.

The link 28 may be similarly constructed, or, as shown in the drawings, it may comprise a pair of nuts or sockets 32—33 joined by a stud 34 having oppositely extending left and right hand threaded projections 35.

At the inner end of the rail 19 I prefer to utilize wedge-shaped blocks 36, one of which is shown, for the purpose of starting the rollers 20 away from the plane of the door opening when the upper door section is first forced upwardly by the hoisting mechanism.

Instead of links 18 and 28 of Fig. 2, chains 38 and 39 may be substituted as shown in Fig. 3, or the adjustment of the length of the link may be obtained by other means, as, for example, that shown in Figs. 4, 10 and 11.

As here shown, a link 40 replaces the link 28 of Fig. 2, and for the links 18 is substituted an adjustable link 41, composed of a member 42 having a plurality of holes 43 and a member 44 having a slot 45. The members are attached by bolts 46 which extend through one or more of the holes 43 and through the slot 45.

Instead of utilizing a single track 19 and a single hanger as in the arrangement of Figs. 1 to 4 inclusive, two or more rails or hangers may be employed as shown in Fig. 5. Each of these hangers corresponds to that of Fig. 3 in the arrangement illustrated, but of course any suitable arrangement may be utilized.

In the modification of Fig. 6, a pair of channel shaped suspension rails 48 and 49 are employed. These rails may be close together as in Fig. 6, or spaced at considerable distance apart as in Fig. 7. They may be suspended as in the previous figures, but this is not essential and they may on the other hand be supported in fixed position by any suitable means.

A pair of rollers 50 and 51 coöperate with the respective rails and are mounted near the respective ends of a shaft 52. In the arrangement of Fig. 6 a sleeve 53 spaces the rollers apart and is connected to the door bracket 27 by hinge block 37 and link 40 as in the arrangement of Fig. 4.

In the structure of Fig. 7, the shaft 52 is of considerable length and a hanger 54 is pivotally mounted upon it near its middle point, being held in position by collars 55. The hanger is pivotally connected to the hinge block 37, the arrangement of parts being such that the hanger 54 permits the door to swing in one plane and the pivotal connection between the hanger and the hinge block permit the door to swing in another plane.

If the rail 19 is suspended by links 18 as is Figs. 1 and 8, the door may have rollers such as rollers 56 mounted on door brackets 57, the brackets being rigidly attached to the top of the door as shown in Fig. 8.

Another modification in which a stationary rail 58 is provided is shown in Fig. 9. The rollers 20 of the yoke 21 are connected to the door by a chain 39 as in Fig. 3.

Any suitable hoisting mechanism may be employed such as that shown in Fig. 1, for example, and designated 61. This mechanism comprises counterweights 62 suspended by chains 63 which extend over pocket sheaves 64 and are connected to the lower door section 25 by corner brackets 65. It further comprises a hand chain 66 which may be actuated in the usual manner.

The operation of the door will be clearly understood from the foregoing description of its parts, and may be briefly outlined as follows: Assuming that the door is closed as shown in full lines in Fig. 1 and that the hand chain 66 is actuated to hoist the bottom section, this section is first raised and overlaps the upper section 22; upward pressure is then applied to both sections together and temporarily a force is exerted through the link 28 which tends to push the roller 20 into engagement with the inclined cam surface of the bracket 36. This action assists in "breaking in" the door at the top and as the hoisting is continued, the upper end of the door swings inwardly, the rollers 20 riding on the rail 19 until the door occupies the position shown in broken lines in Fig. 1.

Of course the bracket 36 may be omitted and will be of no value when chains or flexible suspenders such as the chains 39 are employed.

Attention is particularly directed to the fact that the guide and supporting rail itself or the connection between the rail and the door, or both, are yielding structures, or, in other words, they permit a material freedom of movement and thus not only relieve the door from stresses and strains which tend to warp and twist it, but also largely eliminate strains upon the supporting structure itself. This yielding of the supporting rail is also facilitated by the pivotal or hinge connection which is established between the rail and its end support: for example, the arrangement clearly shown in Fig. 8 permits the rail 19 to rise somewhat

when the door is first hoisted as well as to swing about the pivot as an axis to follow the natural movement of the door.

It will be readily apparent that since the door is guided at its lower corner and is supported by hoisting chains, the single support at the top of the door constitutes a third point of a three-point support, with the result that the door is particularly free from strains either tending to warp it or tending to interfere with its operation.

Further modifications will suggest themselves to those skilled in this art, and I intend that no limitations be imposed other than those indicated in appended claims.

What I claim is:

1. The combination with a door frame and a rail extending inwardly above the door opening, of a door, hoisting means therefor acting substantially in the plane of the door opening, and means movable in relation to the rail for suspending the door from the rail, said suspending means comprising a non-rigid connection.

2. The combination with a door frame and a rail extending inwardly above the door opening, of a door, hoisting means therefor acting substantially in the plane of the door opening, and means movable in relation to the rail and adjustable in length for suspending the door from the rail, said suspending means comprising a non-rigid connection.

3. The combination with a door frame, a rail extending inwardly above the door opening, and non-rigid means for suspending the rail in position, of a door, hoisting means therefor, and means movable in relation to the rail for suspending the door from the rail.

4. The combination with a door frame, a rail extending inwardly above the door opening, non-rigid links for suspending the rail in position, of a door, hoisting means therefor, and means movable in relation to the rail for suspending the door from the rail.

5. The combination with a door frame, a rail extending inwardly above the door opening, and non-rigid means for suspending the rail in position, of a door, hoisting means therefor acting substantially in the plane of the door opening, and means movable in relation to the rail for suspending the door from the rail, said means comprising a non-rigid connection.

6. The combination with a door frame, a rail extending inwardly above the door opening, and non-rigid means for suspending the rail in position, of a door, hoisting means therefor acting substantially in the plane of the door opening, means movable in relation to the rail for suspending the door from the rail, said means comprising a non-rigid connection, and means for providing for the vertical adjustment of the suspending means.

7. The combination with a door frame, a rail extending inwardly above the door opening, and non-rigid means for suspending the rail in position, of a door, hoisting means therefor, and adjustable means movable in relation to the rail for suspending the door from the rail, said suspending means comprising a non-rigid connection.

8. The combination with a door frame and a single rail extending inwardly above the center of the door opening, of a door, hoisting means therefor, and means movable in relation to the rail attached to the door near the center of its upper edge for suspending the door from the rail.

9. The combination with a door frame and a single rail extending inwardly above the center of the door opening, of a door, hoisting means therefor connected with the lower corners of the door, and non-rigid means movable in relation to the rail attached to the door near the center of its upper edge for suspending the door from the rail.

10. The combination with a door frame and a single rail extending inwardly above the center of the door opening, of a door, hoisting means therefor connected with the lower corners of the door, and means movable in relation to the rail attached to the door near the center of its upper edge for suspending the door from the rail.

11. The combination with a door frame, a rail joined to the frame by a sliding pivot or hinge and extending at an angle to the plane of the door opening, and non-rigid means for suspending the rail in position, which permits the rail to move upwardly of a door, hoisting means and means for suspending the door from the rail.

12. The combination with a door frame and a rail extending inwardly, of a door adapted to swing away from the frame at the top into a substantially horizontal position beneath the rail, flexible hoisting elements supporting the door near its lower corners in the plane of the frame, and a traveling hanger depending from said rail and connected to the door near the top forming a third and only other point of suspension.

In witness whereof, I have hereunto set my hand, this 16th day of May, 1916.

JOHN EDWARD OGDEN.

Witness:

I. B. MOORE.