H. J. LOTZ.

DOOR STRUCTURE.

APPLICATION FILED OCT. 27, 1919

1,438,047.

Patented Dec. 5, 1922.

2 SHEETS—SHEET 1.

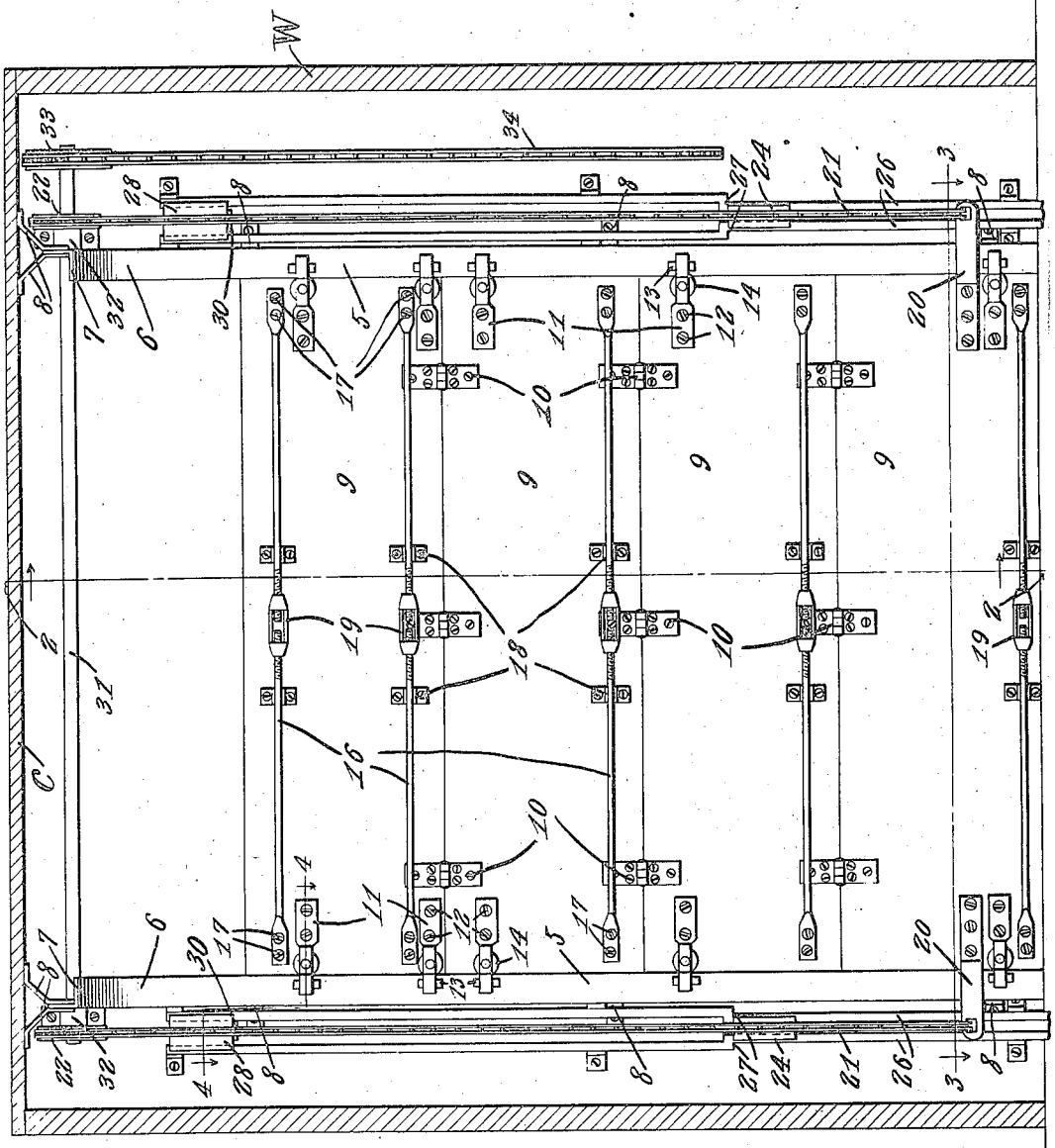


Fig. 1.

H. J. Lotz, Inventor

Witness

By Cushman & Co.

Attorneys

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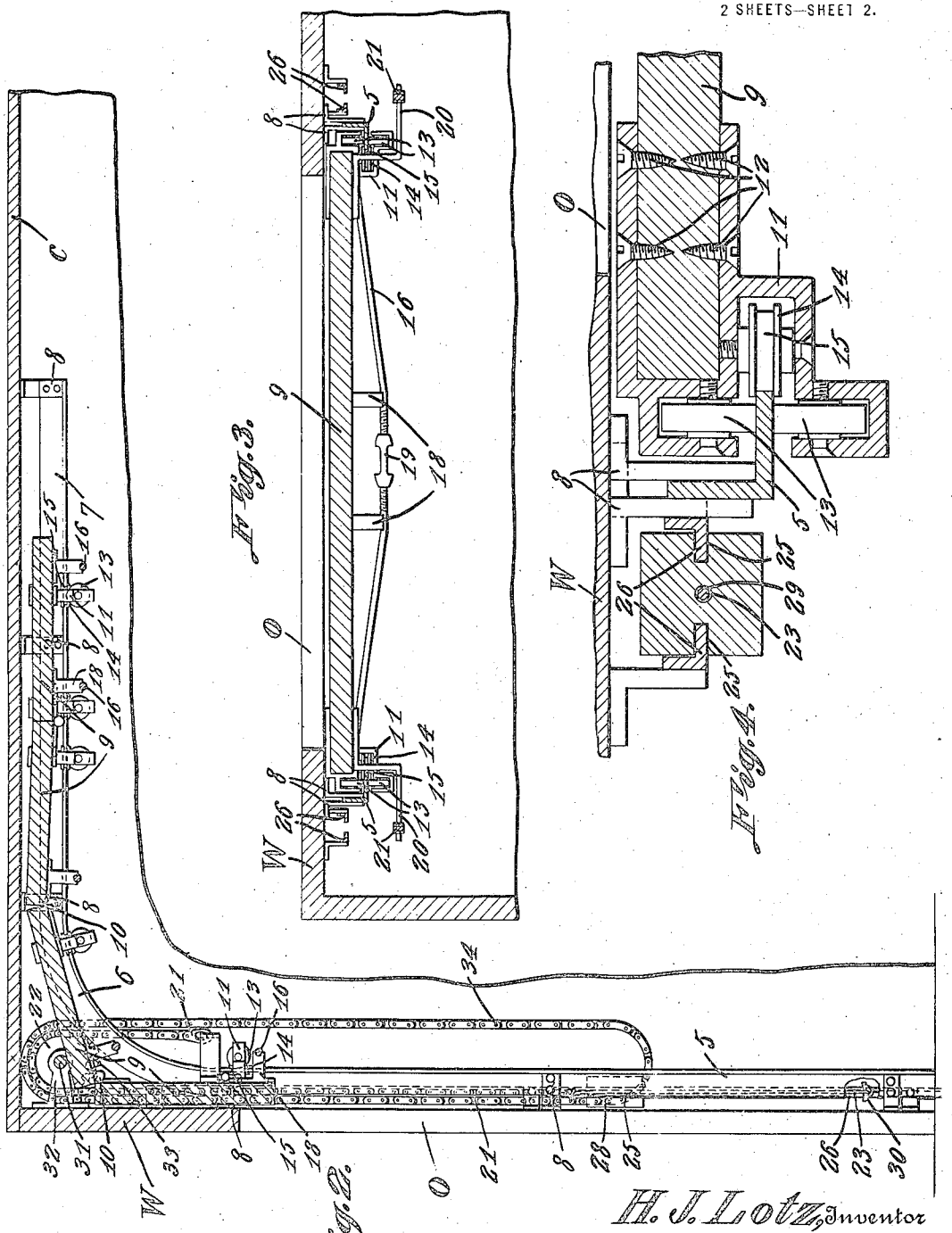


Fig. 3.

Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

HENRY J. LOTZ, OF NORTH YAKIMA, WASHINGTON.

DOOR STRUCTURE.

Application filed October 27, 1919. Serial No. 333,498.

To all whom it may concern:

Be it known that I, HENRY J. LOTZ, a citizen of the United States, residing at North Yakima, in the county of Yakima and State of Washington, have invented a new and useful Door Structure, of which the following is a specification.

This invention relates to doors or closures and more particularly to doors adapted for use in structures having only a limited space.

An object of this invention is to provide a sliding door or closure comprising separate panels and so constructed that the entire door may slide along one wall and ceiling of a structure to its open position thereby providing a closure which occupies a relatively small space.

Another object of this invention is to provide a sliding door having improved operating instrumentalities and incorporating novel means for counterweighting so that their counterbalancing effect will vary during the movement of the door along its tracks.

A further object of this invention is to provide a sliding door of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable, and efficient in its use.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed without departing from the spirit of the invention.

The invention has been illustrated in its preferred embodiment in the accompanying drawings wherein;—

Figure 1 is a rear elevation of the improved door structure, showing it in its lowered or closed position, the lower portions of the guide members being broken away.

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 1 and showing the door in its open position.

Figure 3 is a horizontal sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken on the line 4—4 of Figure 1, showing the guide members in detail.

Referring to the drawing there is shown a structure comprising a wall W and ceiling C, the wall W having a door way or opening O.

The invention comprises spaced parallel tracks or guide members 5, which extend vertically along the wall W until they approach the ceiling where they are curved at 6 and merge into horizontally disposed portions 7. Brackets 8 support the tracks in spaced relation to the wall W and ceiling C. A composite door is provided that includes separate horizontally disposed panels 9 which are hinged to each other, as shown at 10. The panels have roller brackets 11 secured thereto, as indicated at 12, and each bracket is provided with opposed laterally disposed rollers 13 journaled thereto and these rollers engage the opposed sides of the outer portions of the track 5. A third roller or sheave is journaled to the bracket 11, and this roller or sheave is perpendicularly disposed with respect to the rollers 13 and so positioned that its annular groove 15 engages the lateral edge of the track 5. Each of the lower panels is provided with a bracket 11 positioned at each lateral edge of the panel, while the uppermost panel 5 is provided with two brackets disposed at each lateral edge thereof. The panels are each provided with a truss or brace rod 16 which is secured at its opposed ends to the panel at points adjacent its lateral edges as indicated at 17 and the intermediate portion of each brace rod is spaced from the panel by separate posts 18. Turnbuckles 19 are secured to the truss rods at a point intermediate the posts 18, thus providing means for readily adjusting the length of these rods. The uppermost panel 9 is provided with two brace rods because this panel is only provided with one set of hinges, which deprives it of the re-enforcing or bracing action that is afforded by the double sets of hinges in the intermediate panels, therefore this arrangement is resorted to to uniformly distribute the stress throughout the entire door structure.

Arms 20, are secured to the lower panel at each lateral edge thereof, and suitable chains 21 are secured to the outer terminals of these arms, which chains lead upwardly and pass over spaced sprockets 22 and then lead downwardly and are connected with cable 23. Each cable 23 extends downwardly and has a counterweight 24

secured to the lower end thereof, and this counterweight is provided with opposed grooves 25 for the reception of opposed flanges of spaced parallel vertically disposed angle-bars or guides 26. The angular counterweight guides 26 are offset at points remote from their lower terminals to provide shoulders or stop members 27, and from this point they extend upwardly to provide guides for separate counterweights 28. The guide members may be placed in any convenient position, and in the present instance the guide members 26 extend downwardly through the floor, as shown in Figure 1. Each cable 23 passes vertically through a longitudinal aperture 29 formed in each weight 28, and an enlargement or stop member 30 is formed on each cable 23 to limit the downward movement of the weight 28 with respect to this cable. The sprockets 22 are supported by a horizontally disposed shaft 31, that is journaled in spaced bearings 32, which are secured to the wall W at each side of the doorway O. A relatively large sprocket 33 is secured to the shaft 31 adjacent one terminal thereof, and an endless hand chain 34 passes over the sprocket 33 and extends downwardly to a point which is within convenient reach of an operator.

In use, when it is desired to raise the entire door, one leg of the hand chain 34 is drawn downwardly to rotate the sprocket 33 in a clock-wise direction, which action rotates the shaft 31 and sprockets 32, thereby lifting the door and lowering the counterweights 24 and 28. As the door moves upwardly the upper panels 9 thereof move around the curved portions 6 of the tracks 5 and then traverse the horizontally disposed portions 7. As this takes place the pull of the door on its counterweights is obviously decreased and then the counterweights 28 engage the shoulders 27 which limits the downward movement of these weights and consequently compensates for the decreased pull of the door. As the door continues to move upwardly it is only counterweighted by the weights 24, which will be sufficient to support the door in this position. By this arrangement a highly efficient structure is provided in which the action of the counterweights are varied to conform to the varying pull of the door during the several phases of its operation, thereby providing a smooth and positive operating structure. As the separate panels 9 of the door pass from the vertical portions of the tracks 5 onto the horizontal portions 7 these panels tend to sag at their centers, but this action is overcome by the brace rods 16 which insure rigid panels and therefore uniform operation.

Having thus described my invention, what is claimed is:—

1. A device of the class described including a track member having vertically and horizontally disposed portions, a composite closure slidably mounted upon the track, a relatively small counterweight, a flexible member operably connecting the said closure and the small counterweight, a relatively large counterweight slidable upon the flexible member, opposed guide members, said guide members being offset intermediate their ends to provide a lower guide way to slidably receive the small counterweight and an upper guide way to slidably receive the large counterweight, the offset portions of the guide members providing an integral stop to limit the downward movement of the large counterweight after the said closure has moved a predetermined distance upwardly, and means for moving the closure along the said track.

2. A device of the class described including a track member having vertically and horizontally disposed portions, a composite closure slidably mounted upon the track, a relatively small counterweight, a flexible member operably connecting the small counterweight to the closure, a relatively large counterweight slidable relative to the flexible member, said counterweights having opposed grooves formed therein, opposed guide members formed of commercial angle bars and one flange of each angle bar extending into one of said grooves to slidably secure the counterweights to the guide members, the lower portions of the guide members vertically guiding the small counterweight, the upper portions of the guide members vertically guiding the large counterweight and the intermediate portions of the guide members being offset to provide an integral stop to limit the downward movement of the large counterweight after the said closure has moved a predetermined distance upwardly, and means for moving the closure along the said track.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HENRY J. LOTZ.

Witnesses:
J. F. RICE,
ANTHONY ERLEY.