

March 26, 1929.

O. L. DAUTRICK

1,706,442

DOOR

Filed Aug. 13, 1926

3 Sheets-Sheet 1

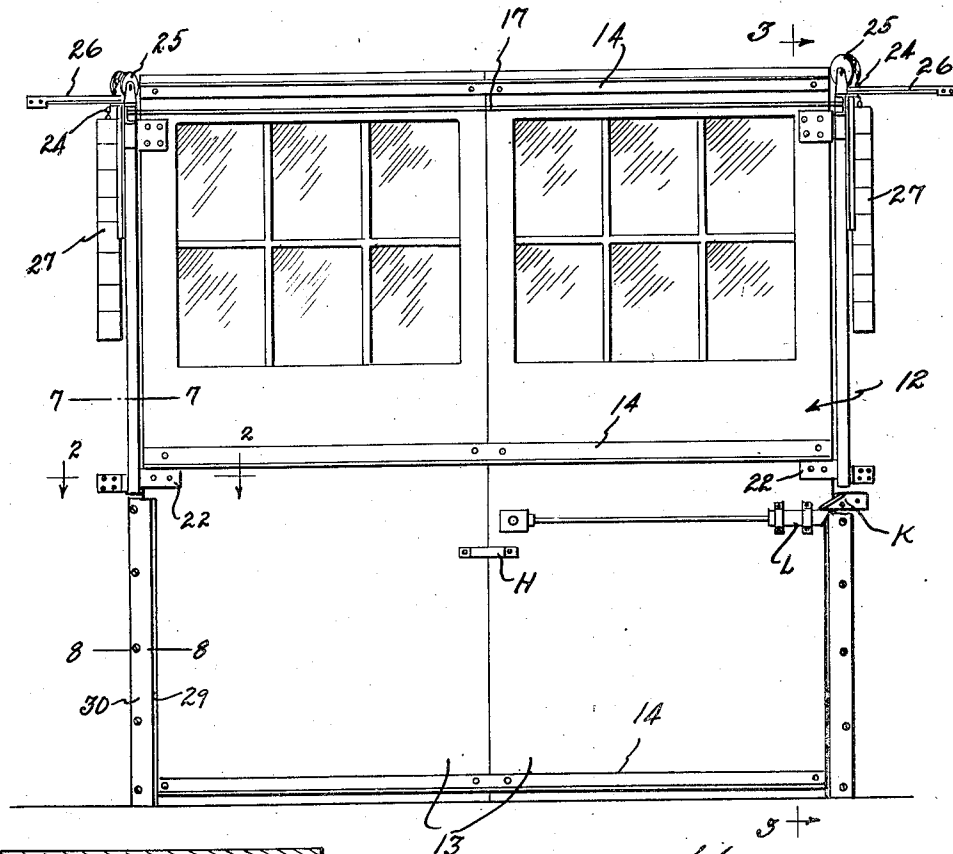


Fig. 1

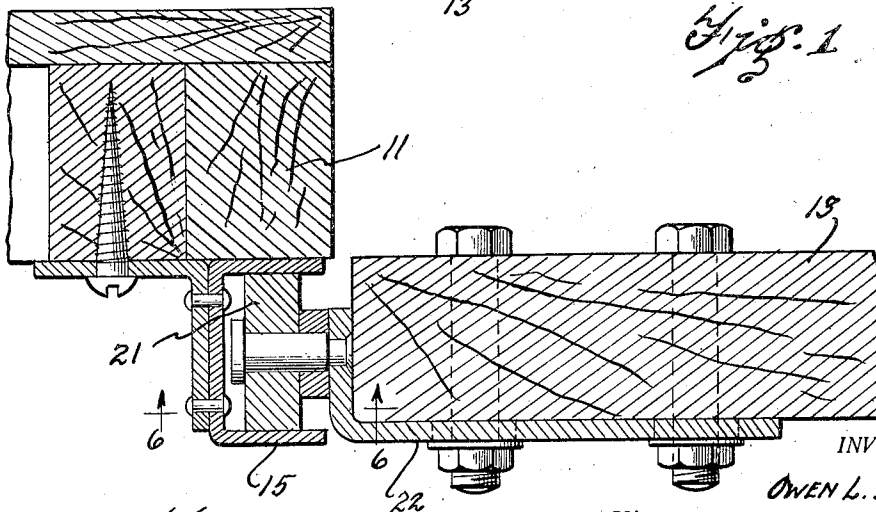


Fig. 2

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3 Sheets-Sheet 2

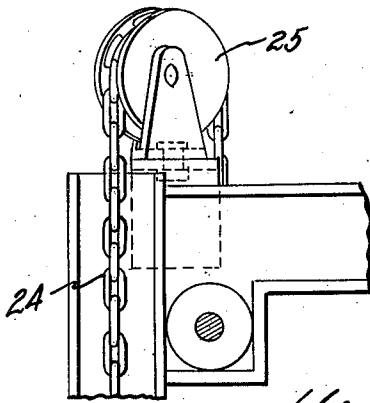


Fig. 4

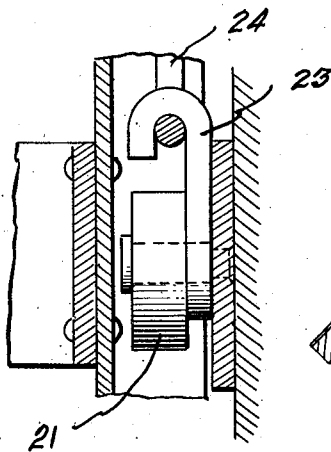


Fig. 6

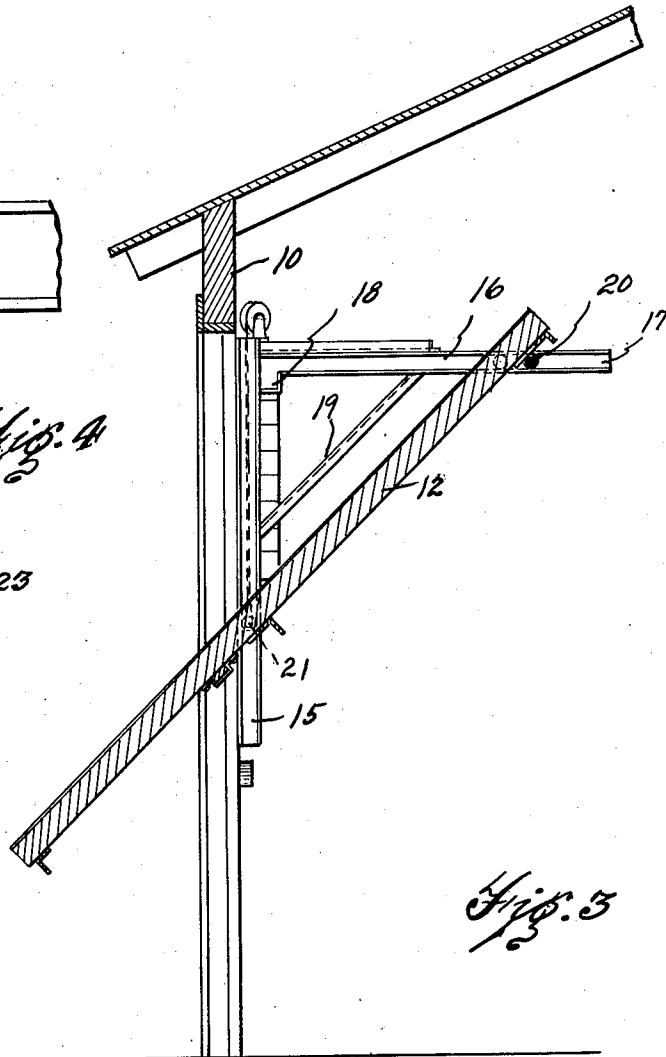


Fig. 5

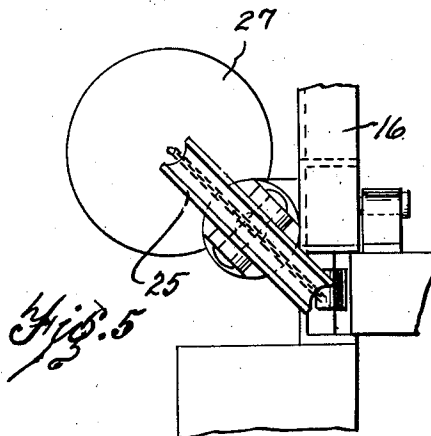


Fig. 5

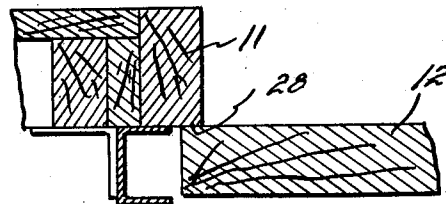


Fig. 7

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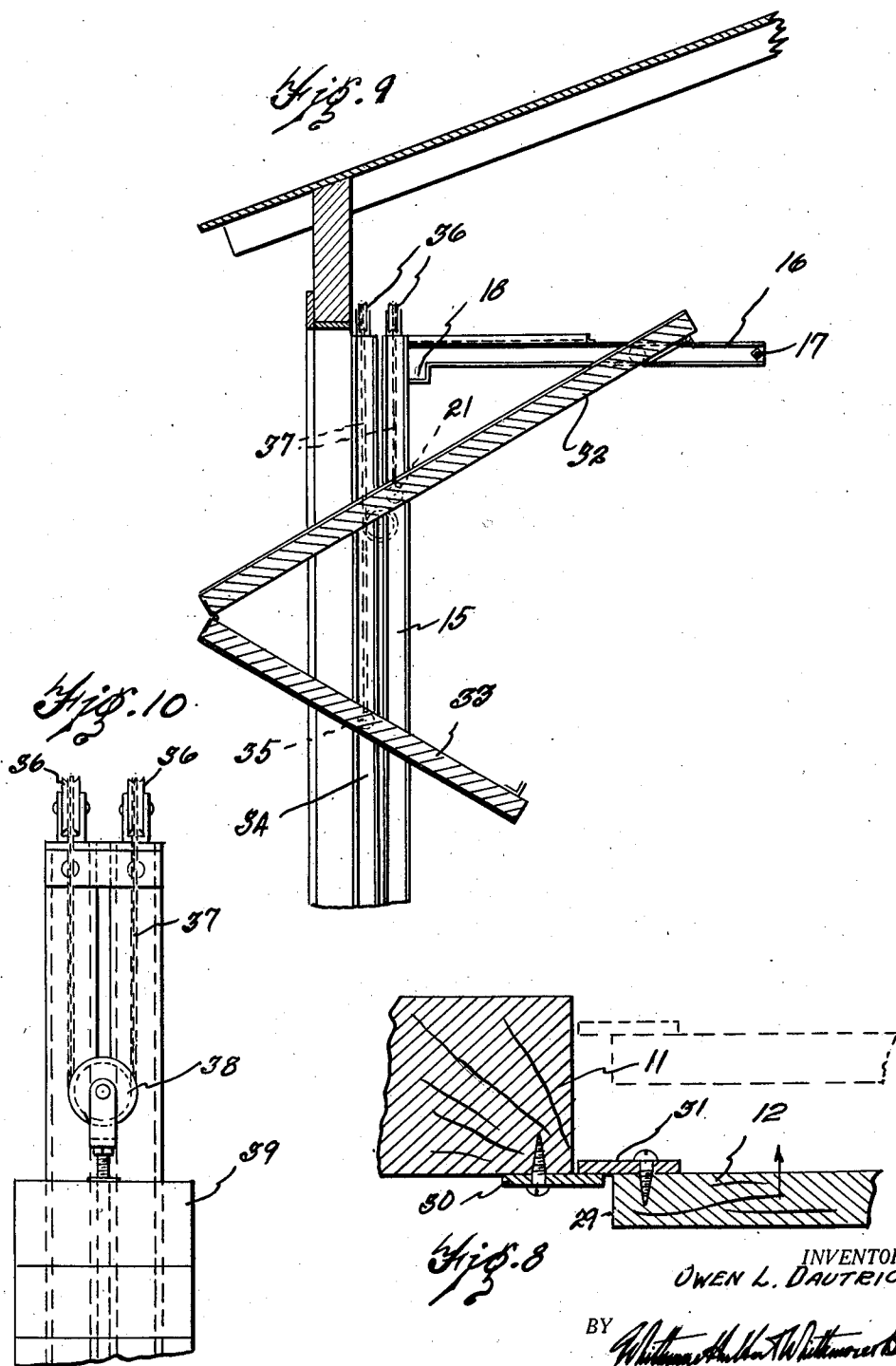
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Filed Aug. 13, 1926

3 Sheets-Sheet 3



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DOOR.

Application filed August 13, 1926. Serial No. 128,924.

The invention relates to doors and refers more particularly to an improved door or panel for use in garages, buildings, etc.

One of the objects of my invention resides in providing simple means for converting a pair of swinging doors into a one-piece door of the sliding type; also a sliding door construction affording low head room in the garage or other building. A further feature is in providing for the removal of strain from the door itself; also in providing a door counterbalanced at all times and which will automatically adjust itself in closing to irregularities of the ground or floor toward which the door moves in closing.

The above and other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:—

Figure 1 is an elevational view of the door from within the garage or other building;

Figure 2 is a detail sectional view along line 2—2 of Figure 1;

Figure 3 is a vertical sectional view along line 3—3 of Figure 1, showing the door substantially half way open;

Figure 4 is an enlarged detail view showing the upper door roller in position corresponding to the closed position of the door;

Figure 5 is a detail plan view of a chain sheave shown in Figure 4;

Figure 6 is a detail sectional elevation view along line 6—6 of Figure 2;

Figure 7 is a fragmentary sectional view taken substantially on the plane indicated by line 7—7 in Figure 1;

Figure 8 is a sectional view taken substantially on the plane indicated by line 8—8 of Figure 1;

Figure 9 is a view similar to Fig. 3 of a modified form of construction; and

Figure 10 is an elevational view of the sheave arrangement of the modified construction.

Referring now to the drawings and more particularly to Figures 1 to 8 inclusive, it will be noted that there is illustrated fragmentarily a building 10, such as a garage or the like, provided with a door frame 11. A door 12 is adapted to close the door opening of the building, and in the present instance, the door 12 comprises a pair of door sections 13, because in addition to the other features

the invention contemplates the conversion of a pair of swinging doors to a single sliding door panel. For this purpose the two door sections 13 are united by cross beams 14 arranged at suitable spaced points, beams which are L-shaped in cross section being found satisfactory for this purpose. Thus the two door sections 13 may be united into a single panel and operable in a manner to be more fully hereinafter described for closing the door opening.

Arranged adjacent each vertical side of the door opening and preferably secured to the door frame 11 thereof is a track member 15 formed, for instance, of a channel bar. In the embodiment of the invention illustrated in Figures 1 to 8, these track-ways 15 extend from a point substantially intermediate the vertical height of the door-way to a point adjacent to the top thereof, as more particularly illustrated in Figure 3. Extending at right angles to each track-way 15 is a track-way 16, these latter track-ways extending inwardly of the building 10 or at right angles to the normal plane of the door. These latter track-ways may also be conveniently formed of channel bars. These track-ways project horizontally from adjacent the upper ends of the track-ways 15 and their outer ends are connected by a brace 17 extending therebetween, which functions to maintain these track-ways in proper spaced relation and to reinforce the same. The portion of each track-way 16 adjacent the track-way 15 is provided with a downwardly extending leg or branch 18 so that the guide rolls working in the track-ways 16 may, when moved coincident with the laterally extending branches 18, enter the same to permit a short vertical movement of the door. Diagonally arranged supports or braces 19 may be provided for maintaining the horizontal track-ways 16 in the position illustrated.

Guide rollers 20 are secured to the vertical sides of the door adjacent the upper edge thereof, these rollers being adapted for engagement with the track-ways 16 for guidingly supporting the upper edge of the door 12. In addition, rollers 21 are secured, for instance, by means of brackets 22, to the vertical side edges of the door substantially intermediate the height of the door and are arranged for engagement in the vertical track-ways 15. Through the medium of hooks or the like 23 flexible members, such as chains 24, may be connected to the door

at points coincident with the rollers 21, which chains extend upwardly in the channels of the vertical track-ways 15 and over sheaves 25 arranged adjacent to the top of the door-way. These sheaves are supported by means of brackets 26 secured to the building 10. Secured at the free end of each chain 24 is a counterbalancing weight 27 sufficient to substantially counterbalance the weight of the door 10, so that the same may be readily moved from its closed to its open position.

With the structure thus far described it will be readily apparent that in opening the door from its substantially vertical or closed position to a substantially horizontal open position, the rollers 21 will travel upwardly in the vertical track-ways 15, while the rollers 20 adjacent the top edge of the door will be first moved out of the vertical branches 18 of the horizontal track-ways 16 and will subsequently move longitudinally through these track-ways to a point adjacent the end thereof. The weight of the door is practically entirely supported by means of the chains 24 and the counterbalancing weights 27 so that the rollers 21 and 20 and their cooperating guideways 15 and 16 function only as guides for directing the movement of the door and changing the movement from a vertical one into a horizontal one. As will be apparent from the disclosure in the drawings, buildings with low head room may be equipped with doors of this character, as the body of the door never passes above a point substantially in horizontal alignment with the top edge of the door when the latter is closed.

For the purpose of weather-proofing the door, I provide the following construction: Substantially the lower half of the door is of a reduced width sufficient to permit it to be swung between the vertical sides of the door frame 11, as illustrated in Figure 3, while the upper half is of a width sufficient to abut the door frame. Figure 7 represents a fragmentary sectional view taken through the upper portion of the door and from this it will be noted that the edge 28 of the door 12 in the closed position is arranged in overlapping engagement with the door frame 11, while in Figure 8, which is a section taken through the lower half of the door, the edge 29 of the door clears or stops short of the door frame 11. For closing the space between the door frame and the door throughout the lower half of the latter, I provide weather-proofing strips 30 secured to the door frame and adapted to be engaged in overlapping relation by means of weather-proof strips 31 carried by the door. Thus the door may be swung to open position, as suggested in dotted lines in Figure 8, but in closed position the weather-proofing strips 30 and 31 will engage to

close the space between the door and door frame.

A handle H may be provided which will be grasped by the operator when initially raising the door, and for securing the door in closed position, a latch L may be employed engageable with a keeper K. Obviously the form of the handle H, as well as the locking mechanism L—K, may be altered as found necessary or expedient.

In Figures 9 and 10 a slightly modified form of construction is illustrated in which the door consists of upper and lower sections 32 and 33 respectively. In addition to the track-ways 15 and 16 a second vertical track-way 34 is arranged at each side of the door-way adjacent to and parallel with the other vertical track-way 15. The lower door section 33 is provided at both vertical edges with a guide roller 35 similar to the guide rollers 21 associated with the door 10 in the first described construction and with the door sections 32 in this modified form. The track-way 16 will be provided with a short vertical branch 18, as in the first form described.

In place of the single sheave 25 arranged at each side of the doorway, I provide in this present form a pair of sheaves 36, over which a flexible member 37 extends, the free ends of which are connected respectively to the door sections 32 and 33 preferably at the points at which the guide rollers 21 and 35 are located. This flexible member 37 after passing over the sheaves 36, will be looped around a sheave 38, to which a counterbalancing weight 39 is connected. Thus the counterbalancing weights at each side of the door act on the two door sections to assist in moving the same from closed to open position, but inasmuch as the sections of the door may move at different rates of speed or different distances, such independent relative movement of the door sections is permitted by looping the flexible members around the sheaves 38. Hence the door may be moved from its closed to its open position and during this movement the sections 32 and 33 will be folded one upon the other and together moved to a substantially horizontal position. In this form likewise practically the entire weight of a door is supported by the counterbalancing weight 39 so that the track-ways 15, 16 and 34 cooperate with the associated guide rollers for guiding purposes only.

In both forms of the invention the short vertical branches 18 of the horizontal track-ways 16 permit the door to automatically adjust itself in closing to irregularities in the ground or floor toward which the door moves. The length of these short vertical branch track-ways will be sufficient so that when the lower edge of the door is resting upon the floor or ground, the rollers 20 will

still be spaced from the lower end of these track-ways.

From the foregoing it will be apparent that with the herein described door construction, means are provided for conveniently converting a pair of swinging doors into a slidable door panel, but obviously the invention also contemplates the use of any type of door, whether converted from a pair of swinging doors or not, and pertains more especially to mounting such a door so that it may be moved from a substantially vertical position to a substantially horizontal position. The invention provides a door construction affording low head room in a garage or other building, because, as previously pointed out, the door is so guided that in its movement from closed to open position no part thereof extends beyond a plane in substantial alignment with the top edge of the door when closed. The invention also provides simple and efficient means for counterbalancing the door at all times and for supporting the door by the counterbalancing means in practically every position thereof and for removing practically all strains from the door itself.

While a preferred and a modified construction of the door has been illustrated herein somewhat in detail, it will be readily apparent to those skilled in this art that various changes and modifications may be resorted to in many of the essential and non-essential details without departing from the spirit and scope thereof and to this end reservation is made to make such changes as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. In a door construction for buildings or the like, a door member, a pair of substantially vertical tracks arranged at opposite sides of the door, a pair of substantially horizontal tracks extending inwardly of the building near the top of the said vertical tracks and closed with respect thereto, rollers carried by the door engageable in said tracks, said horizontal tracks having vertically disposed pockets closed at their lower ends for receiving certain of said rollers in the closed position of the door.

2. In a door construction, the combination of a door, substantially vertical track on each side of the door, a substantially horizontal track on each side of the door, each horizontal track having a vertically extending portion for permitting a vertical movement of the door while the same is in vertical position, rollers on the said door engageable in the said tracks, counter-balancing means acting on the said door whereby it may be moved from a substantially vertical closed position to a substantially horizontal open position guided by said tracks, and flexible means movable in said vertical tracks

and connecting said counterbalancing means to said door.

3. In a door construction, the combination of a door, a substantially vertical track on each side of the door, a separate track on each side of the door angularly arranged with respect to each vertical track, each of the said angularly arranged tracks having a pocket for permitting a vertical movement of the door while the same is in vertical position, rollers on the said door engageable in the said tracks, counter-balancing means acting on the said door whereby it may be moved from a substantially vertical closed position to a substantially horizontal open position guided by said tracks and flexible means movable in said vertical tracks and connecting said counterbalancing means to said door.

4. In a door construction, the combination of a door comprising hinged sections, a pair of substantially vertical tracks on each side of the said door, a substantially horizontal track on each side of the door, each horizontal track being provided with a laterally extending portion for permitting a vertical movement of the door while the same is in vertical position, rollers carried by the said door sections and engageable in the said tracks, a counter-balancing weight on each side of the door, a sheave carried by said counter-balancing weight, and a flexible member extending around the said sheave and having its opposite ends arranged to extend, one into each of the said substantially vertical tracks and to be connected to the said door.

5. In a door construction, a door, means for mounting the door for movement from a substantially vertical closed position to a substantially horizontal open position, said means including a system of vertical and horizontal tracks and a plurality of rollers carried by said door and engageable with said tracks, said horizontal tracks having means associated therewith for receiving certain of said rollers in the closed position of the door whereby to permit of a limited vertical movement of the door to compensate for any irregularities beneath the same and at the same time preventing horizontal movement thereof.

6. In a door construction, the combination with a door frame and a door in said frame, of means for mounting the door for movement from a substantially vertical closed position to a substantially horizontal open position, said means including a system of vertical and horizontal tracks carried by said frame and a plurality of rollers carried by said door and engageable with said tracks, said horizontal tracks having depending branches receiving certain of said rollers in the closed position of the door whereby to permit of a limited vertical

movement of the door to compensate for any irregularities beneath the same and at the same time maintaining the said door in a strictly vertical plane in close proximity to
5 said frame.

7. In a door construction for buildings or the like, a door frame, a door member, substantially vertical tracks carried by said frame and arranged at opposite edges of
10 said door, substantially horizontal tracks extending inwardly of the building adjacent the upper ends of said vertical tracks, rollers

carried by the door engageable with said tracks, said horizontal tracks being provided with laterally and downwardly extending
15 branches for receiving certain of said rollers in the closed position of the door, said branches permitting a limited vertical movement of the door while maintaining said door in a strictly vertical plan in close proximity
20 to said frame.

In testimony whereof I affix my signature.

OWEN L. DAUTRICK.