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DOOR HANGER.

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1,007,228.

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Fig. 1.

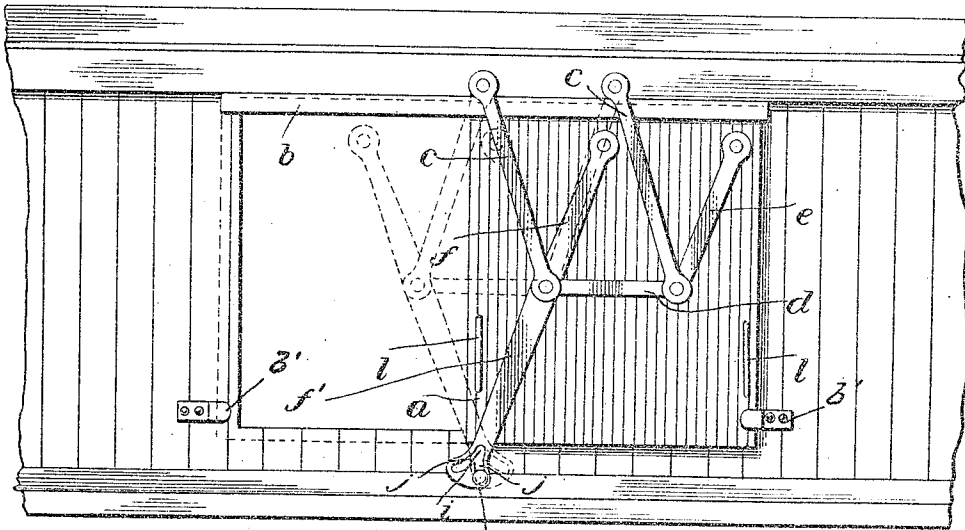


Fig. 2.

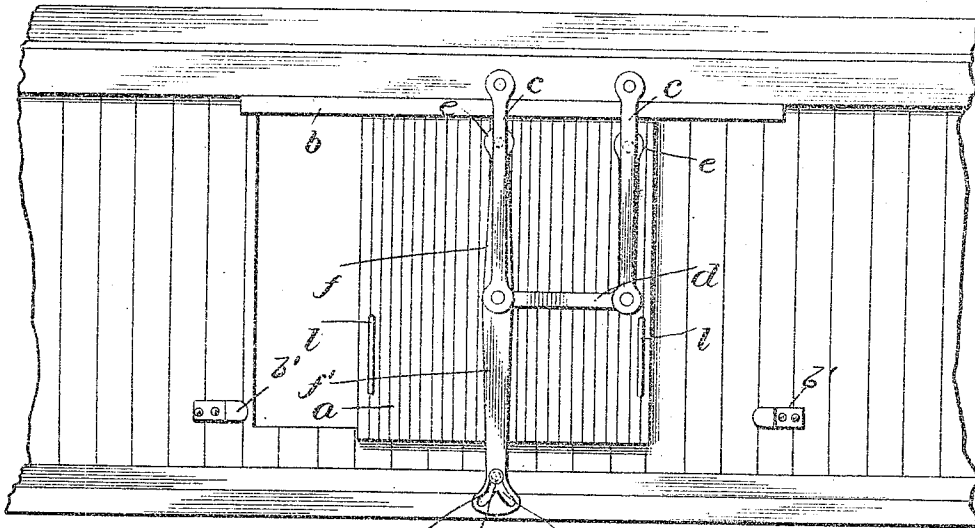
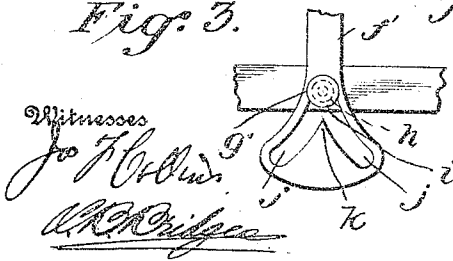


Fig. 3.



Witnesses
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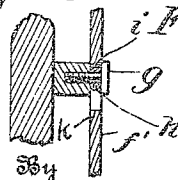


Fig. 4.

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DOOR-HANGER.

1,007,228.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, WILLIAM R. MUNDEN and LYCURGUS J. BOSWORTH, citizens of the United States, and residents of Albert Lea, in the county of Freeborn, State of Minnesota, have invented certain new and useful Improvements in Door-Hangers, of which the following is a full and clear specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation showing our improvements applied to a freight car door, the door being shown open in full lines and closed in dotted lines; Fig. 2 a similar view illustrating the position of the parts when the door is half open; Fig. 3 a detail side elevation, partly in section, showing the slotted retaining guide at the lower end of the shifting lever; and Fig. 4 a detail vertical sectional view of the same.

The object of this invention is to provide means for so hanging an edgewise-movable door that all tracks and rollers will be done away with and also so that the door may be shifted backwardly and forwardly not only noiselessly but also with a minimum of effort, as more fully hereinafter set forth.

Pivoted to the car or other structure at a point above the door *a* is a pair of depending links *c*, the pivots of these links lying in the same horizontal plane, and the lower ends of these links being pivotally connected by a horizontal link *d*, the pivots of this link also lying in the same horizontal plane, whereby the link *d* will always lie in a horizontal plane and the depending links *c* shall always maintain their parallelism. Another link *e* is pivotally connected to the face of the door at a point near its upper edge, above the link *d*, and the lower end of said link *e* swings free of the door but is pivotally connected to the lower extremity of the adjacent link *c* at the point where said link *d* is connected thereto. Another link *f* has its lower end pivotally connected to the lower extremity of the other hanger-link *c*, this link *f* being equal in length to the link *e* and having its upper end pivotally connected to the face of the door in the same horizontal plane with the upper pivot of the link *e*, the two links *e* and *f* being thereby caused to maintain parallelism at all times. The link *f* has an extension *f'* which extends downwardly to a point below the lower edge of the door, at which point it is pivotally and slidingly connected to the sta-

tionary structure of the car or building. The two members *f* and *f'* constitute in fact a single lever, though the upper part *f* cooperates with the link *e* and performs the true function of a link.

The letter *g* designates a pin or bolt rigidly fastened in the stationary structure and provided with a head at its outer end and with an anti-friction roller *h* confined between the head and the structure. The lower extremity of the lever *f f'* is slotted to engage the headed pin *g*, the width of the slot being such that it permits the roller *h* to run back and forth freely therein and at the same time permit the head on the pin or bolt to confine the lever to the face of the structure. The slot in the lever is peculiarly shaped. It has an upper vertical branch *i* and two lower branches *j* and *j* which branch off from the upper slot *i* and curve downwardly away from it, thus leaving a central dividing point *k* which lies centrally below the entrance of the vertical branch *i*. This slot therefore has substantially the shape of an inverted Y, the arms being curved downwardly and away from each other.

The door may be readily shifted edgewise in either direction by taking hold of either one of the handles *l*. When shifted from a full open position to a full closed position, and vice versa, it will be seen that the lower ends of the hanger-links *c* and the bar *d* first move downwardly and then upwardly. This would necessarily cause the door to move in the same direction but for the fact that the pivotal connections of the link *e* and the lever-link *f* to the door are at the same time caused to move in an exactly opposite vertical direction and to the same distance in the opposite direction, by reason of the pivotal connection of the lever to the stationary structure, so that the door will be caused to maintain a horizontal path in its movements back and forth. When the door is mid-way the length of its movement, as shown in Fig. 2, it will be seen that the lever is in an upright position, with its lower end moved far enough downwardly to bring the guide pin *g* to the upper end of the vertical slot *i*, and when the door is moved in either direction from this central position the lever will be drawn upwardly and shifted laterally at its lower end to cause the headed pin to pass into one or the other of the curved slot branches *j, j*, where-

by in all positions the lower end of the lever will be practically locked against edge-wise movement by the walls of the slots engaging with the roller on the pin. It will be understood that the entire weight of the door is transmitted to the hanger links *c* through the medium of the links *e* and *f* and the connecting pivots, so that the support for the door is in the nature of a floating suspension, thus enabling the door to be shifted in either direction without binding and with a minimum of wear and resistance.

It will be observed that the upwardly extending part *i* of the slot is formed simply by the junction of the two curved branches *j*. It will be observed also that the gravitational action of the door and the hanger structure when the door is in a position at either side of center tends to swing the lower end of the lever in the opposite direction and thus will keep the convex wall of the slot *j* pressed against the roller on the headed-pin *g* this pressure being sufficient to cause the door to normally remain in any of its adjusted positions. It will therefore be seen that the active wall of each slot *j* is the outer, convex wall, which acts virtually as a cam, and that the inner wall, formed by part *k* acts simply to prevent the lever being disengaged from the headed pin.

An overhanging flange or keeper *b* or other means may be employed at the top to keep out rain-water and to assist in confining the upper edge of the door to the structure and suitable stops *b'* *b'* may be employed to limit the edgewise movement of the door.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is—

1. In combination with a structure and an edgewise movable door, of means for suspending the door on the structure, said means consisting of a pair of depending parallel hanger links, a pair of shorter links arranged in parallelism and pivotally connecting the lower ends of said hanger links to the door at points above the lower ends of said hanger links, one of said links being extended downwardly to a point below the door, means for maintaining each pair of links parallel and devices for pivotally

and slidingly connecting said extension to the structure at a point below the door.

2. In combination with a structure and an edgewise movable door, of means for suspending the door on the structure, said means consisting of a pair of depending parallel hanger links, a pair of shorter links arranged in parallelism and pivotally connecting the lower ends of said hanger links to the door at points above the lower ends of said hanger links, one of said links being extended downwardly to a point below the door, and devices for pivotally and slidingly connecting said extension to the structure at a point below the door, and a horizontal link pivotally connecting the lower ends of the hanger links.

3. In combination with a structure and an edgewise movable door, of means for suspending the door on the structure, said means consisting of a pair of depending parallel hanger links, a pair of shorter links arranged in parallelism and pivotally connecting the lower ends of said hanger links to the door at points above the lower ends of said hanger links, one of said links being extended downwardly to a point below the door, and devices for pivotally and slidingly connecting said extension to the structure at a point below the door, said devices consisting of a headed pin carried by the structure and an approximately Y-shaped slot in said extension.

4. In combination with a supporting structure, an edgewise movable door, a swinging link structure affording the sole means of suspending the door to said structure and arranged to cause the movement of the door to be approximately in a horizontal plane, a lever rigidly depending from said link structure to a point below the lower edge of the door, and means for pivotally and slidingly connecting the lower end of said lever to the structure below the door.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses this 25th day of February 1911.

WILLIAM R. MUNDEN.
LYCURGUS J. BOSWORTH.

Witnesses:

N. B. THOMPSON,
NORMAN E. PETERSON.