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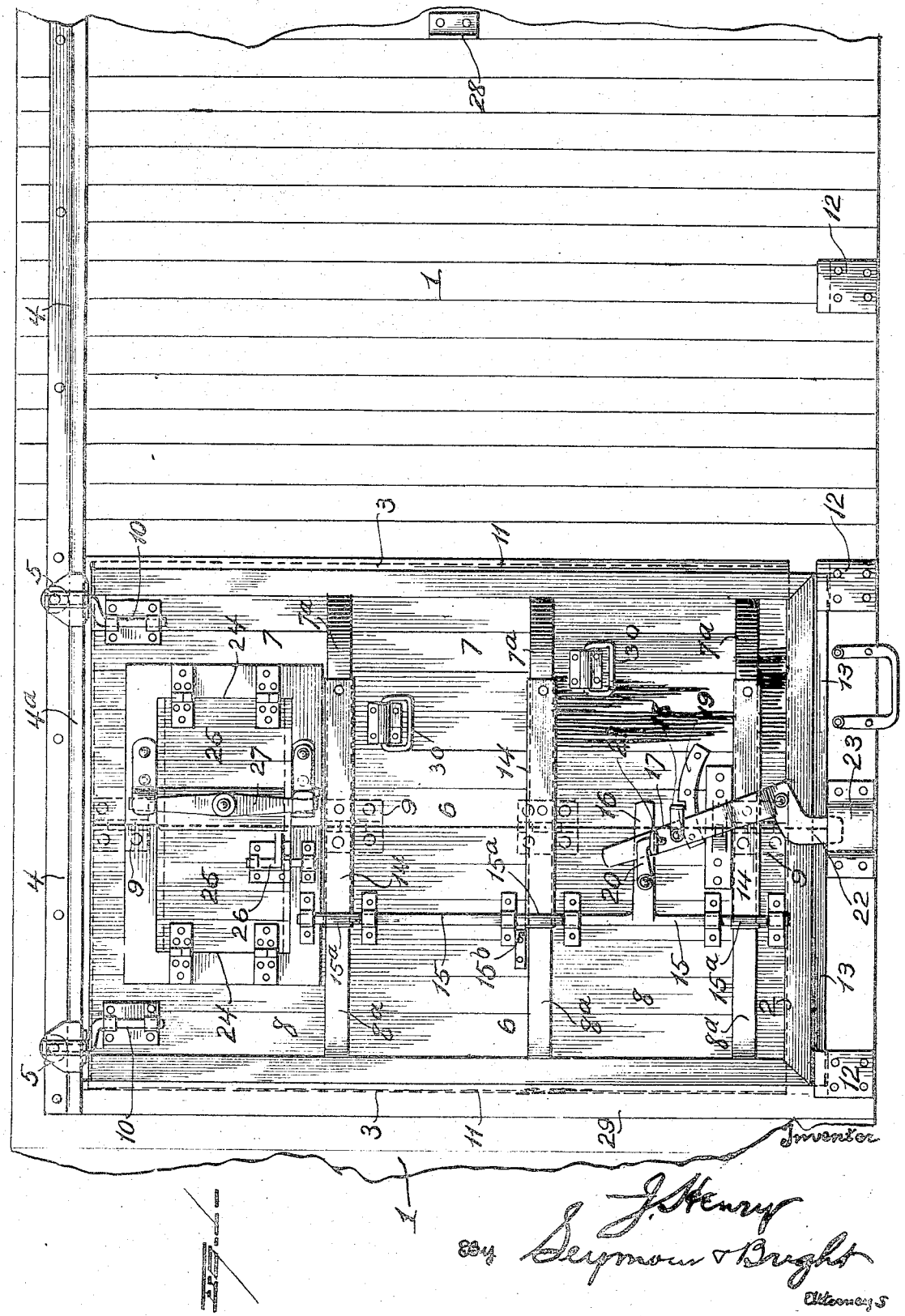
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J. HENRY.

DOOR STRUCTURE.

FILED AUG. 18, 1921.

2 SHEETS-SHEET 1.



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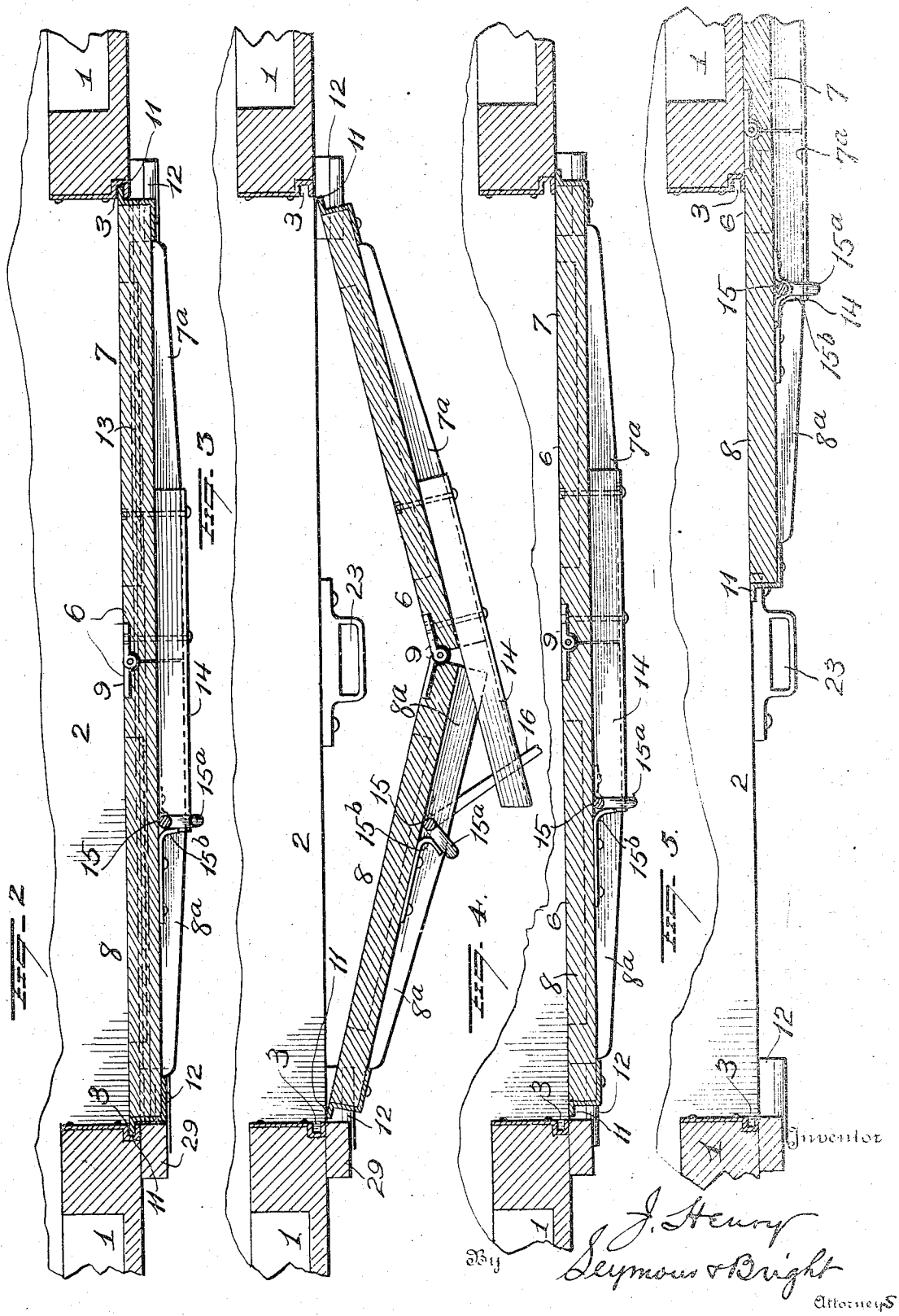
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2 SHEETS-SHEET 2



Inventor

J. Henry

By Seymour & Bright

Attorneys

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UNITED STATES PATENT OFFICE.

JOHN HENRY, OF GRAND FORKS, NORTH DAKOTA.

DOOR STRUCTURE.

Application filed August 18, 1921. Serial No. 493,438.

To all whom it may concern:

Be it known that I, JOHN HENRY, a citizen of the United States, and a resident of Grand Forks, in the county of Grand Forks and State of North Dakota, have invented certain new and useful Improvements in Door Structures; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in door structures and more particularly to such as are adapted for use on box cars,—one object of the invention being to provide a sliding door structure which will operate to close the door opening in such manner as to effect a tight closure and withstand any pressure to which it may be subjected and which shall be weather proof to protect the contents of the car.

A further object is to construct and mount the door in such manner that binding, in the event of bulging of the car side, will be prevented when the door is slid past the door opening.

A further object is to so construct and mount a sliding door of the character specified that the same may be bulged to release it from the keepers at the sides of the door opening and then adjusted with the members composing the door in alignment with each other so that said door may be slid horizontally alongside the wall of the car and so that the door may be bulged and then righted to cause its side flanges to engage the vertical keepers when the door is in position to close the door opening.

A further object is to provide a door structure of the character specified which shall be strong and durable, easy to operate, not liable to bind, and which may be effectually locked in closed position.

With these and other objects in view, the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front view illustrating my improvements. Figure 2 is a central horizontal sectional view. Figure 3 is a similar view with the door bulged. Figure 4 is a similar sectional view showing the door in position to permit the same to slide, and Figure 5 is a sectional view with the door partly open.

While I have shown and will describe my improvements in connection with a grain car, it is evident that the same may be employed in door structures for other purposes than to close the openings in the sides of grain cars.

A side wall of a grain car is illustrated at 1 and it is provided with a door opening 2, having at its sides, vertical keepers 3 which extend throughout the full lengths of said sides of the door opening. Over the door opening and extending a suitable distance laterally beyond the same, is a rail or trackway 4 for the accommodation of door hangers 5.

My improved door 6 comprises two members 7—8 connected at their inner vertical edges by means of hinges 9 and the upper portions of the respective door members have hinged connection with the hangers 5 through the medium of crank hinged members 10, the latter being revolubly connected with the door members 7—8 near their upper and outer corners. The respective members of the door are provided at their free vertical edges with flanges 11 which, when the door is closed interengage with the keepers 3. When the door is in closed position, its side, top and bottom edge portions will bear firmly against portions of the car side adjacent to the door opening. It will be observed that the rail or trackway 4 is made with a depending flange 4^a which operates to stiffen the same, and to the car side, below the plane of the bottom of the door opening, guides 12 are secured and the door members are provided at their bottom edges with flanges 13 which move behind said guides when the door is slid. By providing the door with the flanged portions 13 at the bottom, resting behind two or more guides secured to the car side, pressure from within the car against the bottom portion of the door will be resisted,—it being understood that the door and its supporting means are located on the outer side of the car wall.

The door members 7—8 may be provided with horizontal cleats 7^a—8^a respectively and to the cleats 7^a on the door member 7, channel iron arms or extensions 14 are secured and overlie portions of the cleats 8^a on the door member 8. A shaft 15 is mounted on the door member 8 and provided with cranked portions 15^a which are adapted to engage the projecting ends of the channel iron extensions 14 to lock the door members

normally in alignment with each other and thus provide means to insure the effectual withstanding by the door of pressure from within the car. A spring 15^b serves to cause the cranked portions 15^a of shaft 15 to move to and remain normally in locked relation to the arms or extensions 14. The shaft 15 is provided with a lateral arm 16 normally disposed parallel with the outer face of the door. A lever 17 pivoted to the door member 7 normally overlies the arm 16 to prevent turning of the shaft 15 and this lever is provided with a pivoted detent 18 to engage a notched segment 19 secured to the door member 7. A latch 20 is pivoted to the arm 16 and engages a keeper 21 on the locking lever 17 and said latch is adapted for the reception of a suitable seal (not shown). The lever 17 is provided with a locking arm 22 which, when said lever is moved to overlie the arm 16, will engage a keeper 23 secured to the car side below the door opening.

When my improvements are employed on a grain car, the door will be provided with a filling opening and this may be formed by openings 24—24 in the upper portions of the respective door members and closed by small doors 25—25, and for these doors fastening devices indicated at 26 and 27 may be employed.

When the door is in closed position, with the members thereof locked relatively to each other, the side flanges 11 will engage the vertical keepers 3 and the door will be effectually held tightly in its closed position and capable of withstanding pressure from within the car. By now moving the locking lever 17 backwardly, the arm 16 will be released and the lever withdrawn from the keeper 23. The shaft 15 may now be turned to release the channel iron extensions 14 and then the door members 7—8 may be bulged outwardly by pulling the same with the use of handles 30,—such bulging being permitted by the crank-hinge connections between the door member and the hangers. It will be seen that when the door is thus bulged, the flanges at the outer edges of the members of the door will be moved inwardly sufficient distances to clear the vertical keepers at the sides of the door opening. By now pressing against the door so that its members will be brought into alignment with each other, the vertical flanges 11 will become disposed outside of the vertical keepers 3 and the door as a whole may be slid sidewise to remove it from the door opening. A stop 28 may be secured to the car side to limit the opening movement of the door and a stop 29 may be secured to the side of the car near one edge of the door opening to limit the movement of the door when brought to its closed position. When the door shall have been moved back to close the door opening, the operator will again bulge the door and subsequently press the door members into alignment, thus causing the side flanges 11 to engage behind the vertical keepers 3.

It is evident that when the door is bulged while in position in front of a door opening, grain can be discharged through the opening thus formed at the bottom of the door.

When the door shall have been adjusted as above described to permit it to be slid, the cranks 10 which provide hinge connections between the door members and the hangers, will permit sufficient outward movement of the door to compensate for any bulging of the car side adjacent to the door and thus sticking or binding of the door against the car side while being opened will be obviated.

Having fully described my invention what I claim as new and desire to secure by Letters Patent, is:

1. In a door structure, the combination of door members hinged together along their meeting vertical edges, means at the free edges of said door members to engage the sides of a door opening and retain the door members in alinement closing the door opening, means supporting the door members for swinging and sliding movement whereby they may be bulged to clear the door opening and then shifted to uncover the same, horizontal cleats on the outer sides of the door members, the cleat on one member having an extension to house the end of the cleat on the other member, a rock shaft mounted on said other door member and having a portion constructed to engage over said extension, and means for locking said shaft in position engaging the extension.

2. A door consisting of members hinged together at their meeting vertical edges, means for locking the members in alinement including a rock shaft on one member having a lateral locking arm, a locking lever on the other member having one end arranged to bear upon the locking arm and its opposite end arranged to engage a keeper below the door members, and a latch on said locking arm to engage said locking lever.

3. In a door structure, the combination of door members hinged together along their meeting vertical edges, alined horizontal cleats on said door members, the cleat on one member having a channeled extension to house the cleat on the other member, a vertical rock shaft on the last-mentioned member having a crank portion to engage over said extension, and means for locking said shaft in the engaging position.

4. In a door structure, the combination with vertical keepers at the sides of a door opening, a trackway, and door hangers movable on said trackway, of a door comprising two members hinged together at their adjacent vertical edges, flanges at the free edges of said door members and adapted to engage

said keepers, cranks pivotally connected with said hangers and with the upper portions of said door members, arms secured to one of said door members and adapted to overlie the other door member, a shaft having cranks to engage said arms, and means for locking said shaft.

5. In a door structure, the combination with vertical keepers at the sides of a door opening, a trackway, and door hangers movable on said trackway, of a door comprising two members hinged together at their adjacent vertical edges, flanges at the free edges of said door members and adapted to engage said keepers, means providing hinge connections between said door members and said hangers, an arm secured to one door member and adapted to overlie the other door member, a shaft having a part to engage said arm, an arm on said shaft, a lever to overlie said last mentioned arm, means for locking said lever, a locking arm on said lever, and a keeper for said locking arm.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

JOHN HENRY.

Witnesses:
F. J. CASTELL,
R. S. FERGUSON.