

(No Model.)

2 Sheets—Sheet 1.

E. F. HARDIN.
STORM DOOR FOR RAILWAY CARS.

No. 540,979.

Patented June 11, 1895.

Fig. 1.

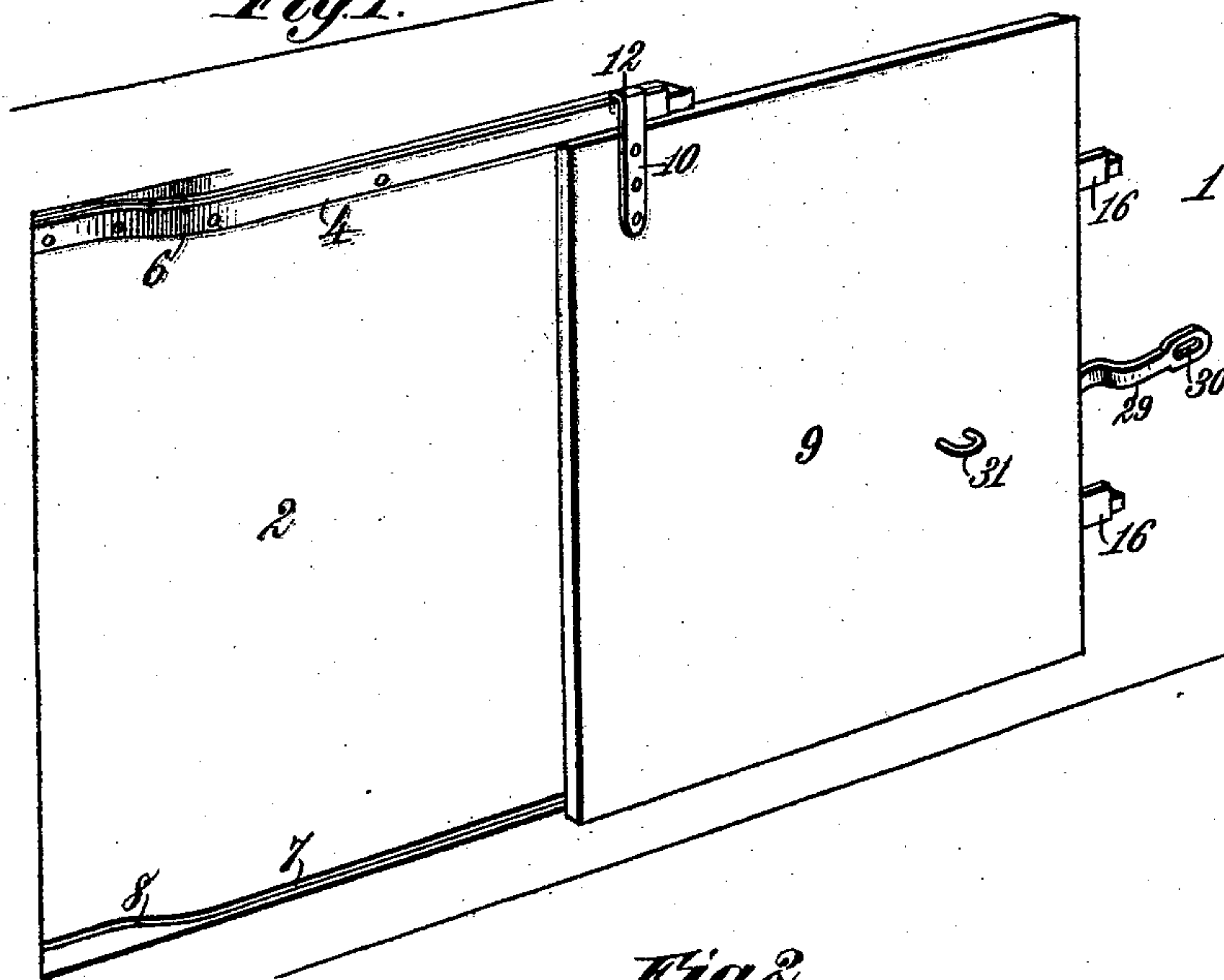


Fig. 2.

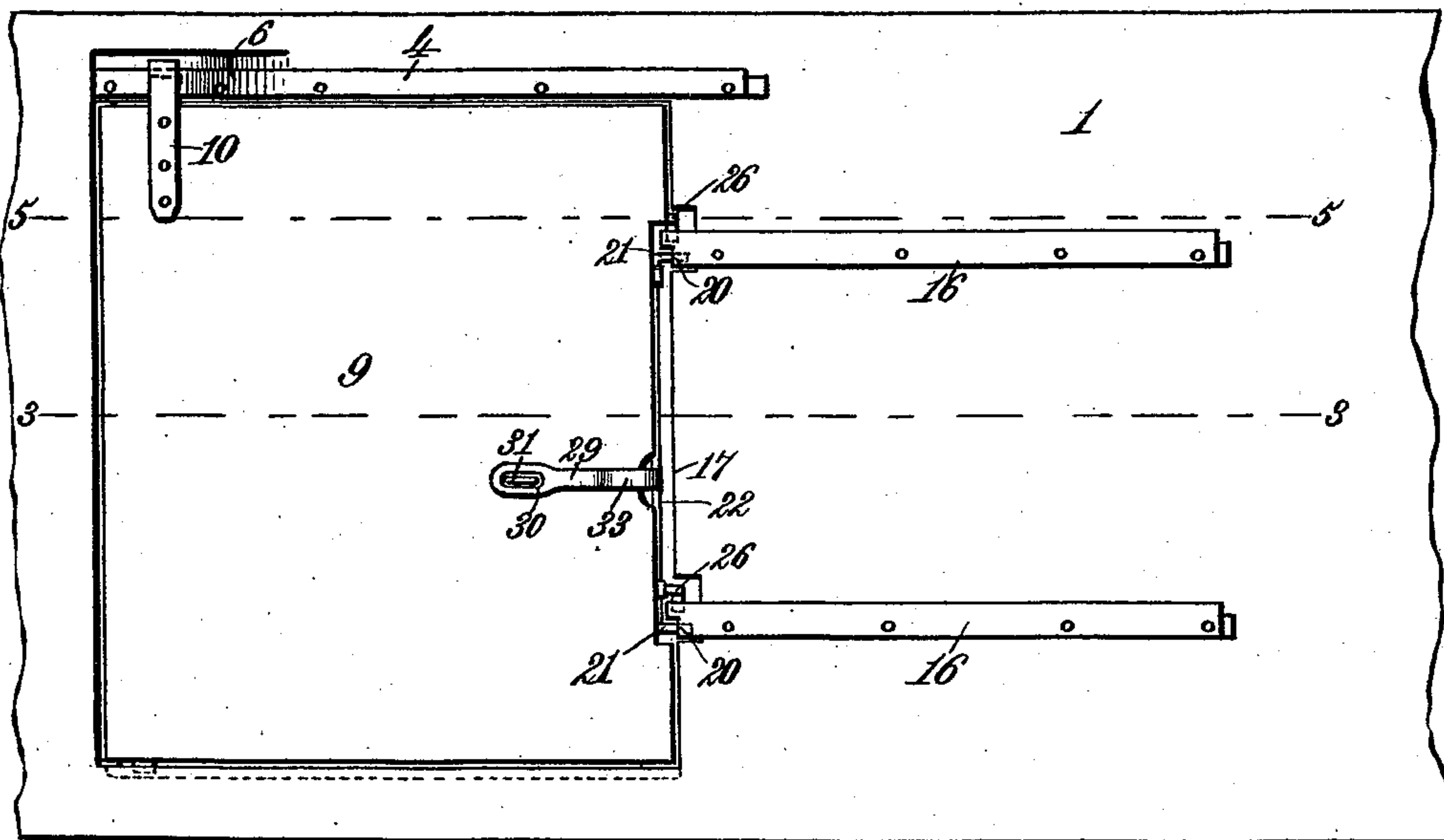
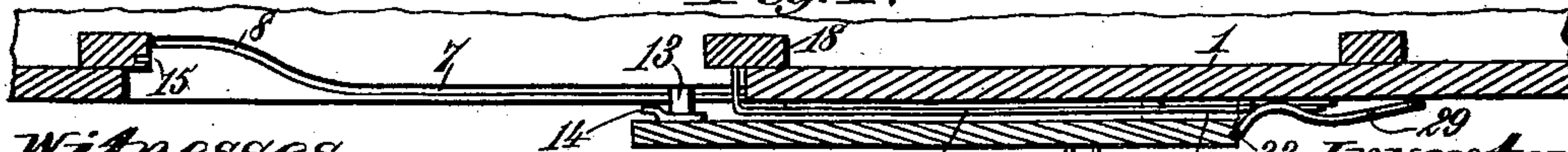


Fig. 3.



Fig. 4.



Witnesses.
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G. W. Rea.

Inventor.
Eugene F. Hardin
By James L. Norris, Atty.

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Fig. 5.

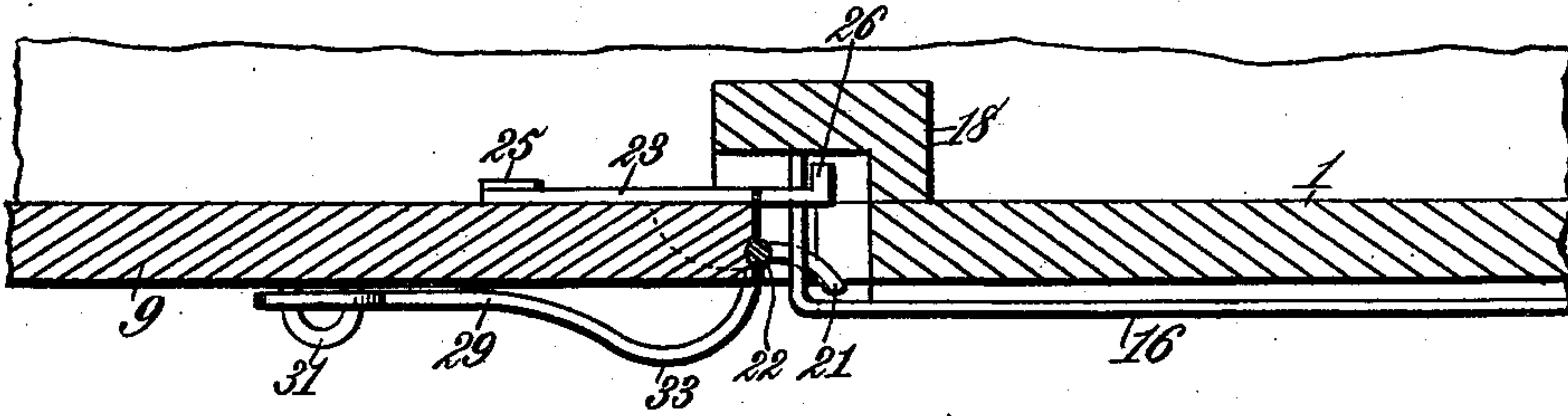


Fig. 6.

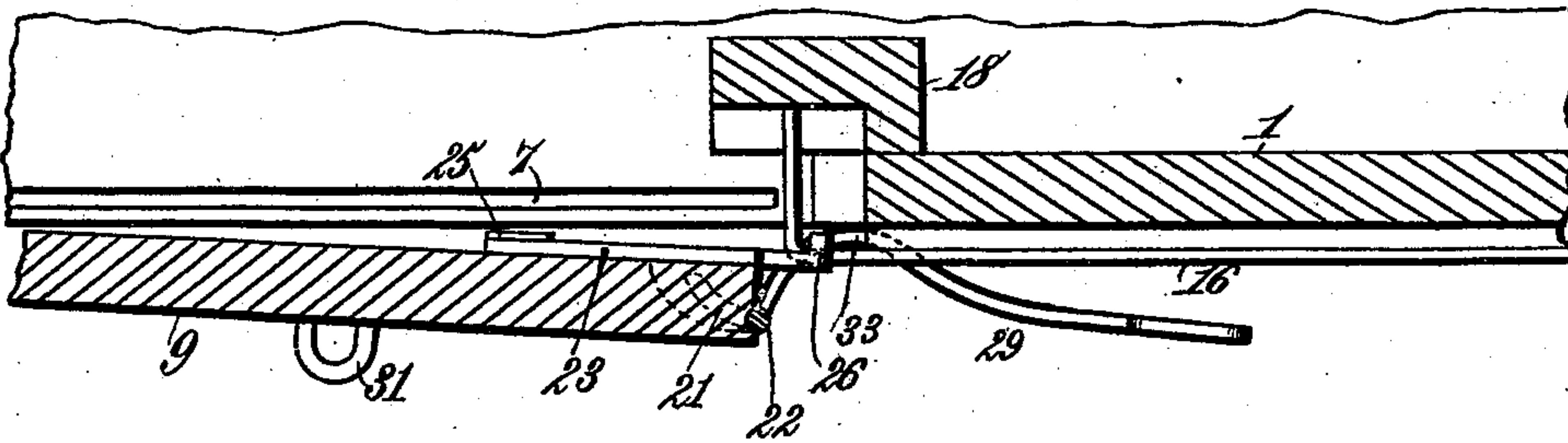


Fig. 7.

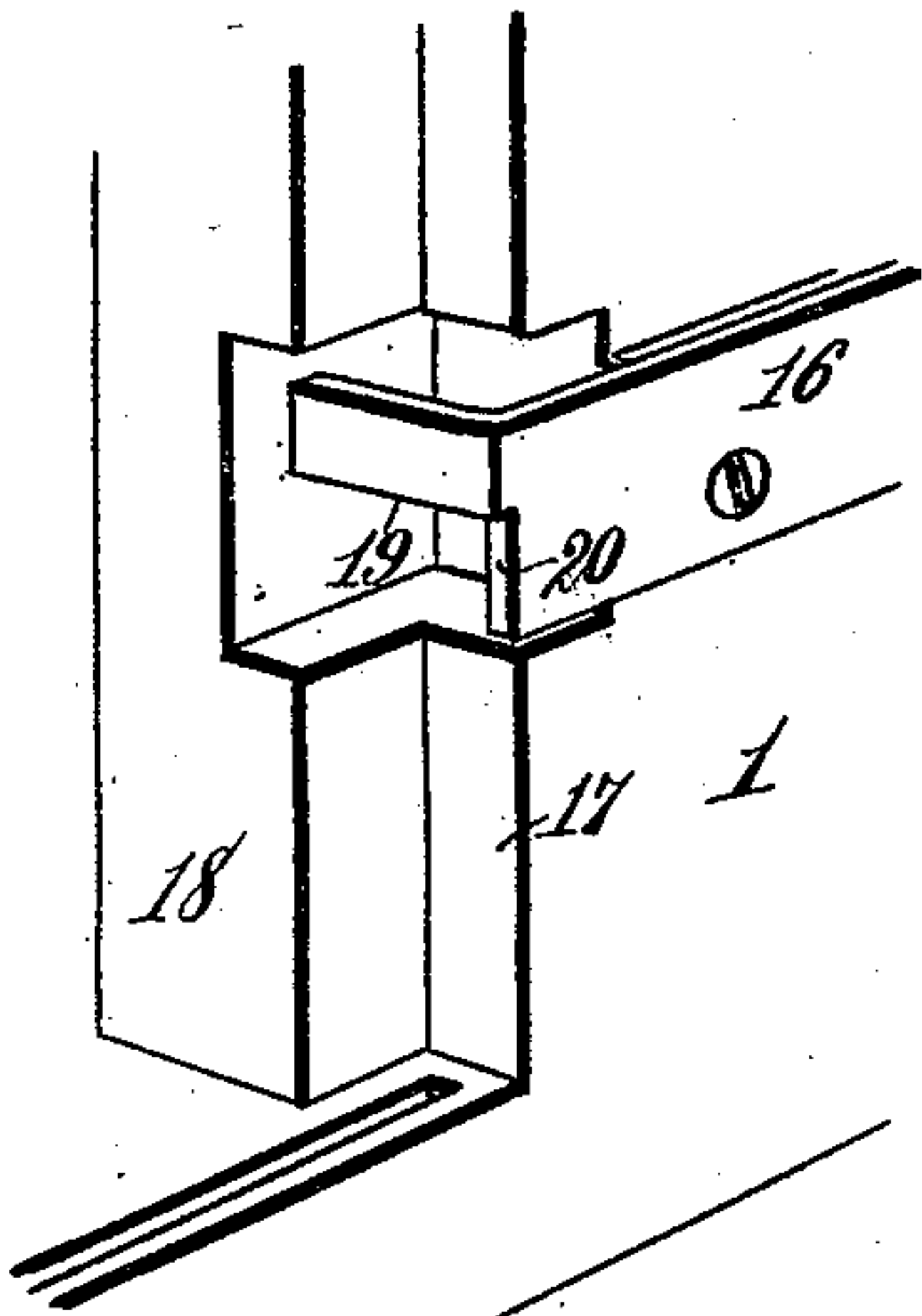
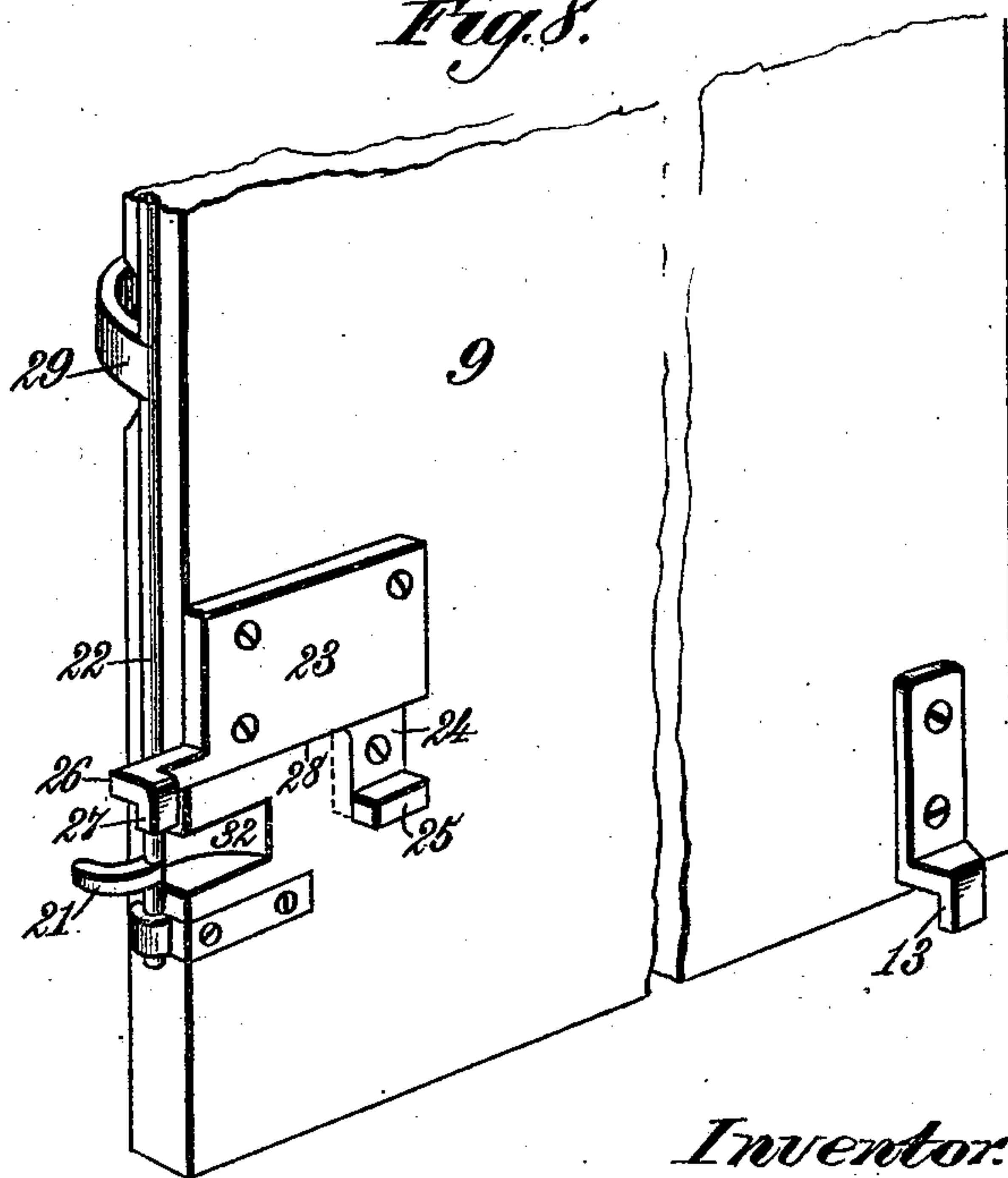


Fig. 8.



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UNITED STATES PATENT OFFICE.

EUGENE F. HARDIN, OF LINCOLN, NEBRASKA.

STORM-DOOR FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 540,979, dated June 11, 1895.

Application filed February 11, 1895. Serial No. 537,997. (No model.)

To all whom it may concern:

Be it known that I, EUGENE F. HARDIN, a citizen of the United States, residing at Lincoln, in the county of Lancaster and State of Nebraska, have invented new and useful Improvements in Storm-Doors for Railway-Cars, of which the following is a specification.

This invention relates to that type of car-doors which slide on top and bottom tracks or rails in a plane approximately parallel with the car side or wall, and are provided with lever devices adapted to bind or clamp the door inward flush with the car side or wall when the door is shifted over the door-opening, and also to shift the door outward when the lever is moved into position to open the door. In the sliding doors of this character the lower guide-track or rail is usually located beneath the door and door-opening, and is supported at some distance—say several inches—from the car side or wall, in consequence of which the track or rail is frequently broken, damaged, or injured by carts, drays, or vehicles backed against the car for loading and unloading the same. Further, the sliding-doors are provided with vertical rock-shafts having cranks at their upper and lower ends, which operate against the top and bottom guide-tracks or rails to shift the door laterally, or in a direction to and from the side wall of the car, and the lower crank connections are liable to be struck, and damaged by carts or drays, so that the door is rendered inoperative, or very difficult of operation.

For the reasons stated prior sliding car-doors and lever devices of the class alluded to are objectionable.

The objects of my invention are to avoid the objections stated; to provide a new construction and arrangement of parts, whereby the door is accurately and nicely guided in its sliding movements, while the tracks or rails are so placed that none of them can be struck and damaged by carts, drays, or vehicles backed against the car; to provide novel, simple and efficient means for binding or clamping the door inwardly and approximately flush with the car wall when the door is shifted over the door opening; to provide a novel construction of lever for forcing the door outwardly when it is to be slid to its open

position; to provide a novel construction and arrangement of parts not liable to become disarranged or inoperative, or difficult of operation when the door is to be opened or closed; and to provide a new improved storm door for box and refrigerator cars which will effectually exclude cold, cinders, dust, rain and snow, and will not be wedged or be difficult of movement if packages fall against the inside thereof during transportation in the car.

To accomplish all these objects my invention involves the features of construction, the principles of operation, and the combination or arrangement of parts hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a perspective view of a portion of the side wall of a box or refrigerator car provided with my invention, the door being in its open position. Fig. 2 is a side elevation of the same, showing the door in its closed position. Fig. 3 is a horizontal sectional view taken on the line 3 3, Fig. 2, the door being in its closed position. Fig. 4 is a similar sectional view showing the door in its open position. Fig. 5 is a horizontal sectional view on a somewhat larger scale, taken on the line 5 5, Fig. 2, the door being in its closed position. Fig. 6 is a similar sectional view showing the lever or handle swung to force the door laterally in an outward direction, so that it can be slid to its open position. Fig. 7 is a detail perspective view of a portion of the door-frame, showing the inner end of one of the bracket-supporting guide-rails; and Fig. 8 is a broken perspective view looking at the inside of the door.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, where the numeral 1 indicates the side wall of a box or refrigerator car, or any other car designed to be provided with a door-opening and a sliding-door.

The door-opening, indicated by the numeral 2, is provided at its upper edge with a hanger-supporting track-rail 4, which, for the greater part of its length, runs parallel with the side wall of the car, and thence curves inward, as at 6. The sill of the door is provided with a groove 7 of a shape corresponding approxi-

mately to the shape of the track-rail; that is to say, it runs parallel with the side of the car for the greater portion of its length, and then curves inwardly, as at 8.

5 The horizontally sliding-door 9 is provided at its upper edge with a hanger 10, formed or provided with a hooked upper end 12, which overhangs and engages behind the track-rail 4. The lower edge of the door is provided with an
10 offset projecting lug or arm 13, best seen in Fig. 8, which is adapted to travel in the groove 7, 8. The front edge of the door is provided with pins 14, designed to enter sockets 15 in one of the vertical posts of the door-frame.

15 The side wall of the car is provided with rigidly attached horizontal, bracket-supporting guide-rails 16, arranged parallel with each other, and slightly offset from the side wall of the car. These guide-rails 16 are both
20 located between the upper and lower edges of the door-opening and the door, and their inner ends terminate in juxtaposition to the rear edge 17 of the door-frame, which rear edge is provided with a door-post 18, as usual.
25 The inner ends of the guide-rails 16 are notched or recessed, as at 19, best seen in Fig. 7, for the purpose of providing each rail with a vertical lip 20 to engage the crank-arms 21 formed at the end portions of a vertical rock-shaft 22, as will hereinafter appear.
30

The rock-shaft 22 is journaled in bearings directly upon the rear edge of the sliding-door, and this door is provided, at its upper and lower parts, in proper relation to the
35 guide-rails 16, with brackets or blocks 23, one of which is clearly illustrated in Fig. 8. The brackets or blocks are each provided with an offset pendent-arm 24, mortised into the inner side of the sliding-door, and having at its
40 lower end a laterally projecting lug 25. The rear end of each bracket or block is also constructed with a projecting arm 26 having a pendent lug 27, all in such manner that the lower edge 28 of each bracket or block 23 will
45 rest squarely upon the upper edge of one of the guide-rails 16, while the lug 27 will engage behind the upper edge of such guide-rail and the lug 25 will engage beneath the lower edge of the guide-rail. By this means the brack-
50 ets or blocks are properly held in operative connection with the guide-rails; they effectually support the door by reason of the lower edges 28 bearing against the upper edges of the guide-rails, and vertical and lateral dis-
55 placement of the door is prevented. The construction is such that the door is confined in proper position, and is susceptible of freely sliding longitudinally.

60 The hanger 10 supports the door at its upper end, and since the door is also supported by the rails 16, it is possible for the lug 13 to freely move in the groove 7, 8 without liability of binding or wedging. This result is attained by the proper and entire support of

the door through the medium of the track-rail 65 4 and guide-rails 16.

The rock-shaft 22 is provided, between the upper and lower crank portions 21, with a curved lever or handle 29 having an eye 30 adapted to engage a staple 31 on the sliding-
70 door. When the door is slid to its closed position, the curved portions 6 and 8 of the track-rail 4 and groove 7 force the front edge of the door laterally in an inward direction, so that the front edge will lie flush with the
75 side wall of the car. The lever or handle 29 is then swung to the left, and its eye 30 engaged with the staple 31, and locked in position by any desired seal lock, or any other device suitable for the conditions required.
80 When the handle or lever 29 is swung to the left, as above stated, the crank-arms 21 engage behind the vertical lips 20 of the guide-rail 16 and force the rear edge of the door laterally in an inward direction, so that the
85 entire door lies flush, or approximately flush, with the side wall of the car. As the door is closed the pins 14 enter the sockets 15, and when the lever is adjusted, as above explained, a very secure and tight closure of the door is
90 effected, and the door is not liable to vibrate during the travel of the car. The tight closure of the sliding door is very advantageous in a box or refrigerator car, in that it effectually excludes cold, cinders, dust, rain and
95 snow.

In the travel of the car packages are liable to fall against the inside of the door, and tend to interfere with the convenient opening of the same, but in opening the door it is first
100 shifted laterally in an outward direction, as indicated in Fig. 6, and consequently will be moved away from the packages, so that they will not likely obstruct the free movement of the door to its open position. To shift the
105 door in a lateral outward direction, as above stated, the lever 29 is swung to the right, and the crank arms 21 enter recesses 32, Fig. 6, in the rear edge of the door. The segmental or curved portion 33, Fig. 6, of the lever 29 bears
110 against the edge of the door-opening, or against the side of the car, and the latter acts as a fulcrum to the lever, so that the crank-arms force the door in an outward direction, after which the door can be freely slid along
115 the track-rails 4 and guide-rails 16 to its open position, as shown in Figs. 1 and 4.

It will be observed that in my improved construction and arrangement of parts, the guide-rails 16, and the lower crank-arm 21 of
120 the rock-shaft 22, are all located entirely above the lower edges of the door-opening and the door, and consequently these parts cannot be struck and damaged by carts, drays, or vehicles backed against the car for loading and
125 unloading purposes. This is very important in horizontally sliding doors for box and refrigerator cars, in that ordinarily the bottom

guide-rails are located below the door and door-opening, and are blocked out to a considerable distance from the side wall of the car, so that carts, drays, and vehicles backed against the car frequently break and damage the bottom rails, and also the lateral crank connections of the door with the bottom rails, thus rendering the door inoperative, or very difficult of operation.

10 In my invention the brackets or blocks 23 have a broad bearing surface on the upper edges of the guide rails 16 and effectually support the door while permitting free sliding movements thereof. At the same time the
15 brackets or blocks, with their broad bearing surfaces 28, are effectually held in operative connection with the guide-rails through the medium of the lugs 25 and 27.

To permit the shifting of the rear edge of the door laterally in an inward direction to lie flush with the side wall of the car, I prefer to construct the door-post 18 with recesses to receive the projecting parts of the brackets or blocks 23, as will be understood by reference to Fig. 5.

Having thus described my invention, what I claim is—

1. The combination with a car having a door-opening, a track-rail arranged above said door-opening, and a sliding-door having a hanger engaging said track-rail, of a guide-rail arranged on the side of the car above the lower edges of the door-opening and door, a bracket secured to one vertical edge portion of the door and engaging said guide-rail, and a vertical rock-shaft having a lever or handle and provided with a crank engaging the inner end of the guide-rail when the door is closed to force the door inward approximately flush with the side wall of the car, substantially as described.

2. The combination with a car having a door-opening, a track-rail arranged above said door-opening and curved inward at one end, and a sliding-door having a hanger engaging said track-rail, of a guide-rail arranged on the side of the car above the lower end of the door-opening and door, a bracket secured to one vertical edge portion of the door and having lugs which engage the upper and lower edges of said guide-rail, and a vertical rock-shaft having a lever or handle and provided with a crank located between the upper and lower edges of the door, and engaging a part on the rear vertical edge of the door opening when the door is closed for forcing the door inward approximately flush with the side wall of the car, substantially as described.

3. The combination with a car having a door-opening, a track-rail arranged above said door, and a sliding-door having a hanger engaging said track-rail, of parallel guide-rails arranged on the side wall of the car above the lower edges of the door-opening and door, brackets secured to one vertical edge portion

of the door and engaging said guide-rails, and a vertical rock-shaft having a lever or handle and provided with cranks engaging the inner ends of the guide-rails when the door is closed to force the door inward approximately flush with the side wall of the car, substantially as described.

4. The combination with a car having a door-opening, a track arranged above said door-opening and curved inward at one end, and a sliding-door having a hanger engaging said track-rail, of parallel guide-rails arranged on the side wall of the car above the lower edges of the door-opening and door and having their inner ends notched or recessed, brackets secured to one vertical edge portion of the door and having lugs engaging the upper and lower edges of the guide-rails, and a vertical rock-shaft having a lever or handle and provided with cranks engaging the said notched or recessed ends of the guide-rails when the door is closed to force the door inward approximately flush with the side wall of the car, substantially as described.

5. The combination with a car having a door-opening, a track-rail arranged above said door-opening, and a sliding-door having a hanger engaging said track, of a guide-rail arranged on the side wall of the car above the lower edge of the door-opening and provided with a notched or recessed end in juxtaposition to one edge of the door-opening, a bracket secured to one vertical edge portion of the door and having lugs engaging the upper and lower edges of said guide-rail, and a vertical rock-shaft having a lever or handle and a crank engaging the said notched or recessed end of the guide-rail when the door is closed to force the door inward approximately flush with the side wall of the car, substantially as described.

6. The combination with a car having a door-opening, a track-rail arranged above said door-opening and curved inward at one end, and a sliding-door having a hanger engaging said track-rail, of a guide-rail arranged on the side wall of the car above the lower edge of the door-opening, a bracket secured to one vertical edge portion of the door and engaging said guide-rail, a vertical rock-shaft journaled on one vertical edge of the door and having a crank to force the door inward flush with the side wall of the car, and a lever or handle on the rock-shaft provided with a curved or segmental portion which bears against the side of the car to force the door laterally in an outward direction when the said lever or handle is swung for the purpose of opening the door, substantially as described.

7. The combination with a car having a door-opening provided at its upper edge with a track-rail curved inward at one end and at its lower edge with a groove similarly curved inward at one end, a sliding-door having at

its upper end a hanger engaging the track-rail and at its lower end an arm engaging the curved parallel guide-rails arranged on the side wall of the car above the lower edges
5 of the door-opening and door, brackets secured to the door and engaging said guide-rails, and a vertical rock-shaft having a curved lever or handle and provided with cranks engaging the ends of the guide-rails when the
10 door is closed to force the door inward ap-

proximately flush with the side wall of the car, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EUGENE F. HARDIN.

Witnesses:

OSCAR J. JUNGE,
C. M. M. KROGH.