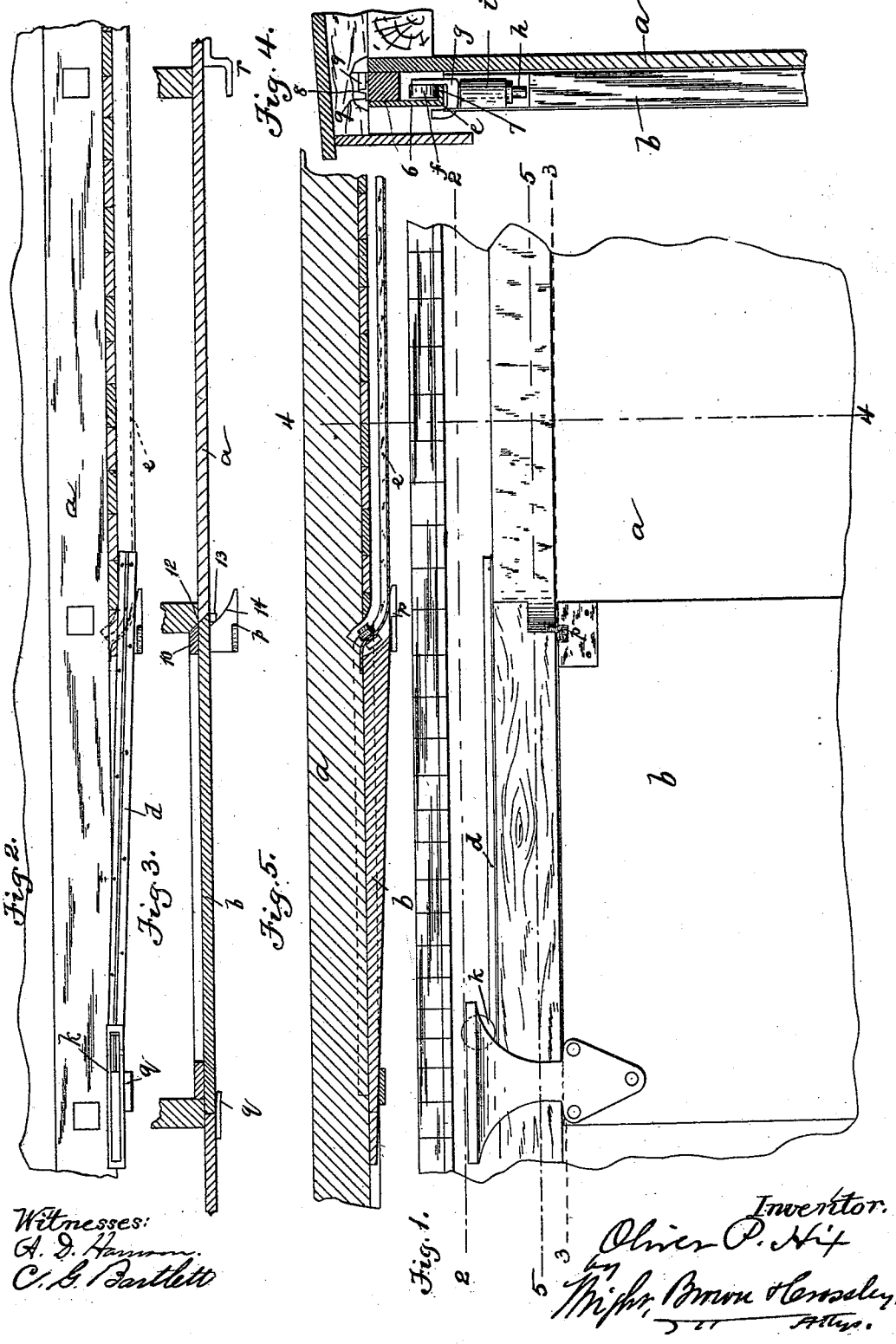
(No Model.) 2 Sheets—Sheet 1.

O. P. HIX.

FLUSH DOOR FOR FREIGHT CARS.

No. 457,994. Patented Aug. 18, 1891.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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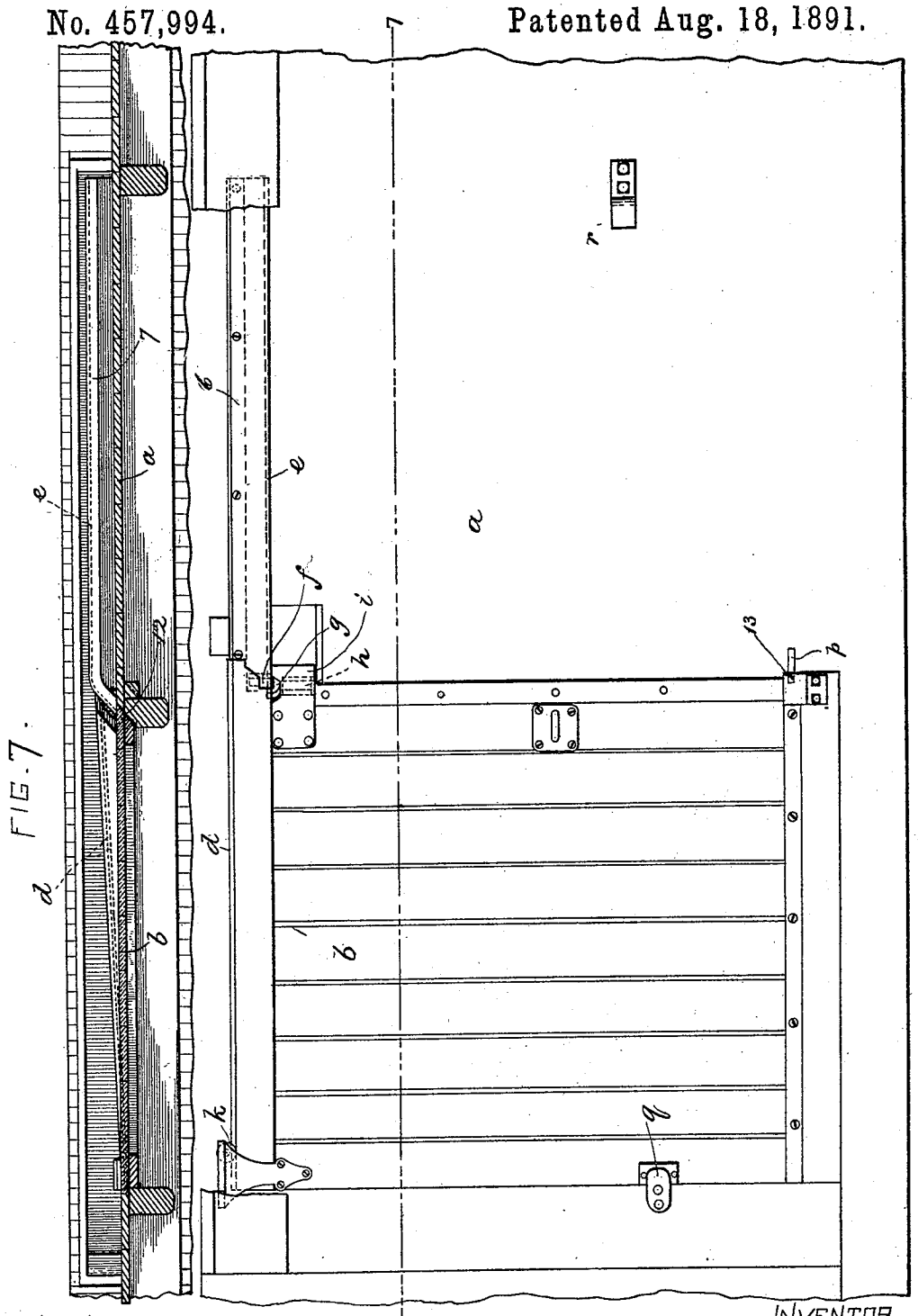


FIG. 7.

FIG. 6.

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UNITED STATES PATENT OFFICE.

OLIVER P. HIX, OF ROCKLAND, MAINE, ASSIGNOR OF ONE-HALF TO THE DUNHAM MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS.

FLUSH DOOR FOR FREIGHT-CARS.

SPECIFICATION forming part of Letters Patent No. 457,994, dated August 18, 1891.

Application May filed 23, 1890. Serial No. 352,819. (No model.)

To all whom it may concern:

Be it known that I, OLIVER P. HIX, of Rockland, in the county of Knox and State of Maine, have invented certain new and useful Improvements in Flush Doors for Freight-Cars, of which the following is a specification.

This invention has for its object to provide a freight-car door and guiding appliances therefor of such construction that the outer side of the door will be flush with the side of the car when the door is closed; and to this end it consists, first, in the combination with a freight-car having two elevated tracks, one located over the doorway and arranged diagonally, while the other is located at the rear of the doorway at a lower point than the inclined track, said lower track being higher than the door and formed so that its main portion stands out from the side of the car and is substantially parallel therewith, while its forward end is curved inwardly to a point under the rear end of the diagonal track, combined with a door having at its forward end a wheel or trolley arranged to run on the diagonal track and at its rear end a swiveled wheel or trolley arranged to run on the lower track and adapted to turn so as to conform to the curvature of said track.

The invention also consists in certain details and combinations of parts, all of which I will now proceed to describe.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a portion of a freight-car provided with my improvements. Fig. 2 represents a top view of a portion of the car, showing the diagonal track and in dotted lines the lower track extended backwardly from the door-opening. Fig. 3 represents a horizontal section on line 3 3, Fig. 1. Fig. 4 represents a vertical section on line 4 4, Fig. 1. Fig. 5 represents a horizontal section on line 5 5, Fig 1. Fig. 6 represents a side view of the entire door in its closed position and a portion of the car. Fig. 7 represents a section on line 7 7, Fig. 6, looking upwardly.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the side of a freight-car having a door-opening, and *b* represents a sliding door which covers said opening when the door is closed. The door is provided with wheels or trolleys at its upper portion, which are arranged, as hereinafter described, to run upon tracks above the door, the arrangement of the tracks and wheels being such that when the door is closed it occupies a position in which its outer side is flush with the outer side of the car and when the door is opened it is moved outwardly and stands outside the side of the car, the opening movement of the door being a combined longitudinal and outward lateral movement. To accomplish this movement, two tracks are required, one of which *d* is located over the doorway and is arranged diagonally, its forward end being at or near the plane of the side of the car, while its rear end is outside of said plane, so that a wheel running on said track from the forward end of the doorway to the rear end thereof will be carried outwardly while it is moving lengthwise of the car. The other track *e* is located somewhat below the track *d* and extends from a point over the rear end of the doorway and under the rear end of the track *d* backwardly along the side of the car. The said track *e* is composed of a substantially vertical plate 6, which is suitably attached to the car, and a horizontal inwardly-projecting plate 7, which constitutes the tread for the swiveled wheel or trolley, hereinafter described, connected with the rear portion of the door. The vertical portion 6 is separated from the side of the car by a space of sufficient width to receive said wheel or trolley, and the horizontal or tread portion 7 projects under said space, as clearly shown in Fig. 4. The main portion of the track *e* is parallel with the side of the car and stands outside of the same, as shown in Fig. 4; but its forward portion is curved inwardly and terminates so that the tread portion 7 at the forward end of the track is about flush with the side of the car.

f represents a wheel or trolley which is journaled in a yoke *g*, formed on a vertical stud *h*, which is journaled in a vertical socket *i*, attached to the rear portion of the door near its upper end. The trolley *f* is adapted to run upon the tread portion 7 of the track *e*, and its connection with the door by means of the swivel-yoke *g* enables said trolley to turn

and conform to the direction of any part of the track on which it may run. For example, when the trolley is running on the straight portion of the track its sides will be parallel with the sides of the car; but when it is running on the curved forward portion of said track its sides will assume an angle to the track corresponding to the angle or curvature of the curved portion of the track.

The door is provided at its forward portion with a wheel or trolley *k*, which is connected to the door by a suitable hanger and is formed to run upon the diagonal track *d*. Said track is preferably composed of a vertical central web 8 and two horizontal flanges 9 9 at opposite sides of said web, as shown in Fig. 4, the wheel *k* having two tread-surfaces adapted to run on the flanges 9 9, said tread-surfaces of the wheel being separated by a space sufficiently wide to receive the web 8. When the door is closed, the wheel *k* is at the forward inner portion of the track *d* and the wheel *f* is at the forward inner portion of the track *e*, said portions of the tracks being arranged so that the outer side of the door is flush with the side of the car, as shown in Fig. 3. When the door is opened, its rear end is guided abruptly outward from the side of the car by the abruptly-curved forward portion of the track *e*, and its forward end is guided gradually outward as it moves backwardly by the diagonal track *d*, so that when the door is fully opened it stands entirely outside the side of the car and parallel therewith, its forward wheel *k* being then on the outermost portion of the diagonal track, while its rear wheel *f* is on the rear portion of the track *e*.

The door is preferably provided with a beveled rear edge 10, and the rear end 12 of the doorway is preferably correspondingly beveled, as shown in Fig. 3, so that when the door is closed its rear end has a wide bearing on the corresponding portion or seat of the doorway, the inclination of the said surfaces 10 and 12 being such that the surface 12 offers no resistance to the outward movement of the rear end of the door when the latter is being opened.

To guide the lower portion of the rear end of the door inwardly when the door is being closed, I provide said portion with a stud or projection 13, which bears against the curved or inclined surface 14 on an ear *p*, attached to body of the car below the door, said ear being formed to project upwardly above the lower edge of the door to a sufficient extent to engage the projection 13. The lower portion of the forward end of the door is held against the side of the car when the door is closed by means of a suitable ear or guide *g*, attached to the side of the car, as shown in Figs. 3 and 6. When the door is opened, its rear end is held by means of a guide or bracket *r*, attached to the side of the car and formed to receive the rear edge of the door.

My invention is not limited to the details and mechanical construction of parts here shown, and the same may be variously modified without departing from the spirit of my invention.

It will be observed that the employment of the two independent tracks—one for the forward wheel, arranged diagonally to give the front edge of the door a gradual outward movement, and the other for the rear wheel, arranged to give the rear end of the door an abrupt outward movement when it is first opened and then a movement parallel with the side of the car—enables the door to be opened and closed with the minimum expenditure of power, the front end of the door moving with no more resistance than in an ordinary straight-moving door, so that the only excess of power over that required to operate a straight-moving door is involved by the movement of the rear wheel over the curved portion of the rear track.

Heretofore in flush doors running entirely on tracks above the door the tracks have been formed to give an abrupt outward movement to both the front and rear ends of the door at the same time, or, in other words, to move the entire door suddenly outward—an operation which involves much greater resistance than the movement of a door on my improved tracks.

I claim—

The combination of a freight-car, a diagonal track over its doorway, the rear end of said track being outside of the plane of the side of the car, another track located below and at the rear of the diagonal track, but above the level of the top of the doorway, the main portion of said lower track being outside of and substantially parallel with the side of the car at one end of the doorway, while its forward end is curved inwardly toward the side of the car, and a door having at its forward portion a wheel or trolley arranged to run upon the diagonal track and at its rear portion a swiveled wheel or trolley arranged to run upon the lower track and mounted to turn so as to conform to the curvatures thereof, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 17th day of May, A. D. 1890.

OLIVER P. HIX.

Witnesses:
C. F. BROWN,
A. D. HARRISON.