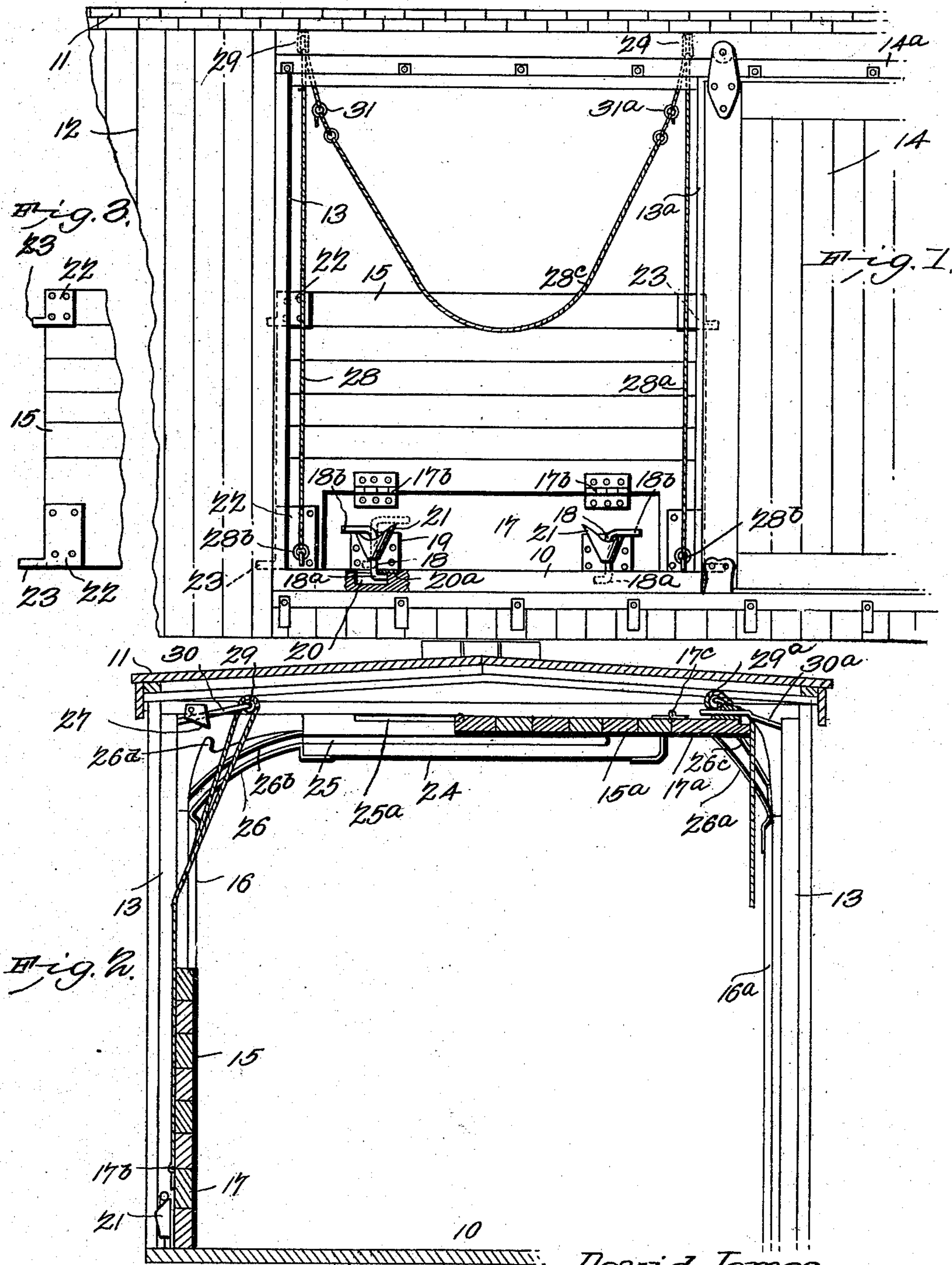


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D. & J. A. JAMES.
GRAIN DOOR FOR CARS.
(Application filed May 28, 1902.)

(No Model.)



Witnesses
E. J. Steward
C. H. Woodward

David James
John A. James Inventors
by *C. A. Snow*
Attorneys

UNITED STATES PATENT OFFICE.

DAVID JAMES AND JOHN A. JAMES, OF COFFEYVILLE, KANSAS.

GRAIN-DOOR FOR CARS.

SPECIFICATION forming part of Letters Patent No. 714,705, dated December 2, 1902.

Application filed May 28, 1902. Serial No. 109,366. (No model.)

To all whom it may concern:

Be it known that we, DAVID JAMES and JOHN A. JAMES, citizens of the United States, residing at Coffeyville, in the county of Montgomery and State of Kansas, have invented a new and useful Grain-Door for Cars, of which the following is a specification.

This invention relates to grain-cars, and has for its object the production of a movable supplemental door which may be moved downward across the ordinary doorway-opening of the car when grain is to be carried and which may be folded upward into the roof of the car when other freight not requiring the supplemental door is carried.

The invention consists in certain novel features of the construction, as hereinafter shown and described, and specified in the claims.

In the drawings illustrative of the invention, Figure 1 is a side view of a portion of a car with one of the improved doors in position in its doorway. Fig. 2 is a transverse section of the same, showing the supplemental door on one side of the car in position in its doorway and the supplemental door of the opposite side folded up in the roof of the car. Fig. 3 represents an enlarged detail of one side of the supplemental door, showing the wear-plates and studs for engaging the grooves in the sides of the door-frame.

The device may be applied to any of the various constructions of freight-cars, and the framework of such a car is illustrated in the drawings, 10 representing the floor; 11, the roof; 12, the side walls; 13 13^a, the side posts of the doorway-opening, of the usual construction.

The usual sliding door is represented at 14, disposed to travel upon tracks 14^a.

The grain-doors are represented at 15 15^a and are arranged to slide vertically in guides 16 16^a, respectively, upon the side posts 13 13^a, so as to form closures to the lower half of the doorway-openings at opposite sides of the car. These grain-doors are usually constructed of wood, properly supported and braced and with metal wear-plates at their edges to prevent the undue wearing of the wooden parts.

In the present structure the lower portion of each door is provided, respectively, with a smaller door or valve 17 17^a, hinged by their

upper edges in recesses in the lower edges of the grain-doors, as indicated at 17^b 17^c, to provide for the discharge of the grain by gravity opposite the doorway-openings.

When first discharging the cargo from the car, a large share of it at the center of the car or between the doorway-openings will flow out by gravity, and to provide for this automatic discharge the smaller doors or valves 17 17^a are provided. Each of the valves will be provided with spaced catches adapted to forcibly engage recesses in the sill of the car to lock the grain-doors in their downward positions in close engagement with the door-sills to prevent the escape of the grain. These catches consist of vertical rods 18, supported revolvably in brackets 19, and with laterally-extended lower ends 18^a, projecting below the lower edge of the valves and adapted when depressed to enter cavities in the sill of the car and extend beneath plates 20^a, partially covering the recess, as shown at the left in Fig. 1.

The brackets 19 are provided with cam-plates 21, having one of their cam-surfaces disposed in position to engage the upper end 18^b of the rods 18 and cause the rods to be carried upward when turned horizontally in one direction, as shown by dotted lines at the left of Fig. 1, so as to elevate the end 18^a of the rod 18 above the lower line of the valve 17 17^a, and thus release it from the plate 20^a and the recess 20. The cam-plate 21 also has a reversed cam-surface, which also engages the part 18^b of the rod 18 when turned in the opposite direction, so as to elevate the rod and cause the "toe" 18^a to forcibly engage the plate 20^a, and thus lock the valve and the door forcibly downward in engagement with the car-sill. By this simple means the turning of the rod 18 will cause it to be locked firmly in place and correspondingly lock the door firmly in engagement with the sill of the car.

The corners of the doors 17 17^a are supplied with wear-plates 22, and each wear-plate will be provided with a stud 23, extending into the channels formed by the guides 16, and thus maintain the doors in engagement with the guides. At the upper end of each guide is arranged a casting curving inwardly and connected at its upper end to a transverse plate 24, this plate having spaced channels

25 25^a, the castings being indicated at 26 26^a and disposed to merge at their lower ends into the channels formed by the guide 16 and at their upper ends, respectively, into the channels 25 25^a, so that when the grain-doors are elevated the upper ones of the studs 23 will run over the castings and into the channels 25 25^a.

The channels 25 25^a are far enough apart so that the doors will overlap centrally of the car, as they are too wide to be arranged beneath the roof of the car otherwise.

Each of the castings 26 26^a is provided with a guide-rib 26^b 26^c to serve as a stop to the studs 23 on the upper end of the grain-doors and to properly guide them into the channels 25 25^a.

Each of the castings will be provided with a lug 26^d at their upper parts, and the lowermost of the studs 23, or the studs on the lower edge of the doors 17 17^a, will project farther from the end of the door than the upper studs, so that they will project beyond the entrance to the channel in the castings and run up over the lugs 26^d when the door is elevated to prevent the doors running backward again down the guides and to lock them in their upward positions.

As an additional precaution to prevent the doors running backward down the guides 16 gravity-catches 27 will be connected to the rafters of the roof 11 and adapted to engage the doors when elevated and obviate any tendency of the doors to be shaken loose from engagement with the lugs 26^d by any movement of the car in transit.

Means will be provided for elevating the doors, and such a means is shown consisting of cables 28 28^a, attached to the opposite lower corners of the doors, as indicated at 28^b, and leading upward over pulleys 29 29^a, supported in brackets 30 30^a, extending inward from the car just beneath the roof 11 and in vertical alinement with the couplings 28^b.

The cables 28 28^a are united centrally or the two cables formed in one, as may be preferred. Usually each cable will be formed separately and ending in an eye or ring 31 31^a, respectively, as shown. By drawing downward on the cables by power applied to the rings 31 31^a the doors will be drawn upward and positioned in the channels 25 25^a, as before described. The cables 28 28^a being attached to the outer surfaces of the doors when they are drawn upward will naturally cause the upper edges of the doors to swing inward, and thus follow the castings 26 26^a, so that the uppermost of the pins 23 will run into the channels 25 25^a, while the longer lower pins will engage the studs 26^d, as above noted, and also pass the gravity-catches 27. The cables 28 28^a may be operated in any suitable manner, but will be preferably engaged by section 28^c of a draft-cable, provided with hooks at its ends engaging the rings 31 31^a. By this means both cables will be operated at the same time by any force

applied to the draft-cable, so that one person may elevate the door, as will be understood. By this simple arrangement a very efficient and practicable grain-car door is produced which may be applied to any of the cars now in use and which will efficiently close the doorway-openings and prevent the leakage of grain or other similar freights from the car.

The proportions may be varied and altered to adapt the device to different sizes and constructions of cars and modified in minor particulars without departing from the principle of the invention or sacrificing any of its advantages.

Any suitable construction of the doors 17 17^a may be employed to correspond to the requirements of different lines of railroad or construction of car.

Having thus described our invention, what we claim is—

1. In a grain-car door, the framework of the car having vertical guideways adjacent to the doorway-openings, substantially horizontal guideways adjacent to the roof of the car, curved plates having extended lugs and connecting the adjacent ends of said guideways, the grain-door having short studs at the upper corners engaging said vertical guideways and adapted to be guided into said horizontal guideways by said curved plates, and longer studs at the lower corners of said door adapted to be guided into engagement with said lugs, substantially as described.

2. In a grain-car door, the framework of the car having vertical guideways adjacent to the doorway-openings, substantially horizontal guideways adjacent to the roof of the car, curved plates having extended lugs and connecting the adjacent ends of said guideways, the grain-door having short studs at the upper corners engaging said vertical guideways and adapted to be guided into said horizontal guideways by said curved plates, longer studs at the lower corners of said door adapted to be guided into engagement with said lugs, and a gravity-catch depending from the roof of the car, and adapted to engage the lower edge of the door when elevated, substantially as described.

3. In a grain-car door, the framework of the car having opposite pairs of vertical guideways adjacent to the doorway-openings, horizontal guideways spaced apart and disposed in opposite pairs adjacent to the roof of the car, curved plates having extended lugs and connecting the adjacent ends of one opposite pair of said horizontal guideways with the corresponding opposite pair of said vertical guideways, curved plates having extended lugs and connecting the adjacent ends of the other of said opposite pair of horizontal guideways with the other opposite pair of said vertical guideways, the doors having short studs projecting from their upper corners and adapted to be guided respectively into said

spaced guideways when elevated, and longer studs projecting from the lower corners of the doors, and adapted to be guided with their respective extended lugs and to be superposed beneath the car-roof, substantially as described.

4. In a grain-car door, the framework of the car having vertical guideways adjacent to the doorway-openings, horizontal guideways adjacent to the roof of the car, curved plates connecting the adjacent ends of said guideways, and having extended lugs and with ribs merging into said guideways, the grain-doors having short studs at the upper corners engaging said guideways, and with longer studs at the lower corners adapted to be guided into engagement with said lugs, and means operating upon the outer surface of the door whereby it may be elevated, substantially as described.

5. In a grain-car door, the framework of the car having vertical guideways adjacent to the doorway-openings, horizontal guideways adjacent to the roof of the car, curved plates having extended lugs and connecting the adjacent ends of said guideways and having ribs merging into said guideways, the grain-door having short studs at the upper corners engaging said guideways, longer studs at the lower corners adapted to be guided into engagement with said lugs, guide-pulleys supported above said doorway-openings, and draft-cables connected to the outer side of said door at or near the bottom and engaging said guide-pulleys, whereby said door may be elevated and supported, substantially as described.

6. In a grain-car door, the framework of the car having vertical guideways adjacent to the doorway-openings, horizontal guide-

ways adjacent to the roof of the car, means for connecting the adjacent ends of said guideways, lugs upon said connecting means, the grain-door, means carried by said door for causing it to be guided in said guideways, and into engagement with said lugs when elevated, guide-pulleys supported above said doorway-openings, draft-cables connected to the outer side of said door at or near the bottom and engaging said guide-pulleys, and a coupling-cable connecting the free ends of said draft-cables, substantially as described.

7. In a grain-car door, the framework of the car having vertical guideways adjacent to the doorway-openings, means carried by said door for engaging said guideways, a valve movably engaging a recess in the lower part of said door, vertically-disposed rods supported upon said valve and with their ends extended laterally in opposite directions, recesses in the sill of the car adapted to receive said lower laterally-extended ends, a cam-plate having cam-surfaces on opposite sides of said rods and adapted to engage said upper laterally-extended ends alternately, whereby when said rod is rotated in one direction it will be elevated above the lower line of the valve and the valve released, and when rotated in the opposite direction the valve will be locked into engagement with the sill of the car, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

DAVID JAMES.
JOHN A. JAMES.

Witnesses:

T. M. ROBERDS,
GEO. S. COLBY.