No. 719,815. PATENTED FEB. 3, 1903.

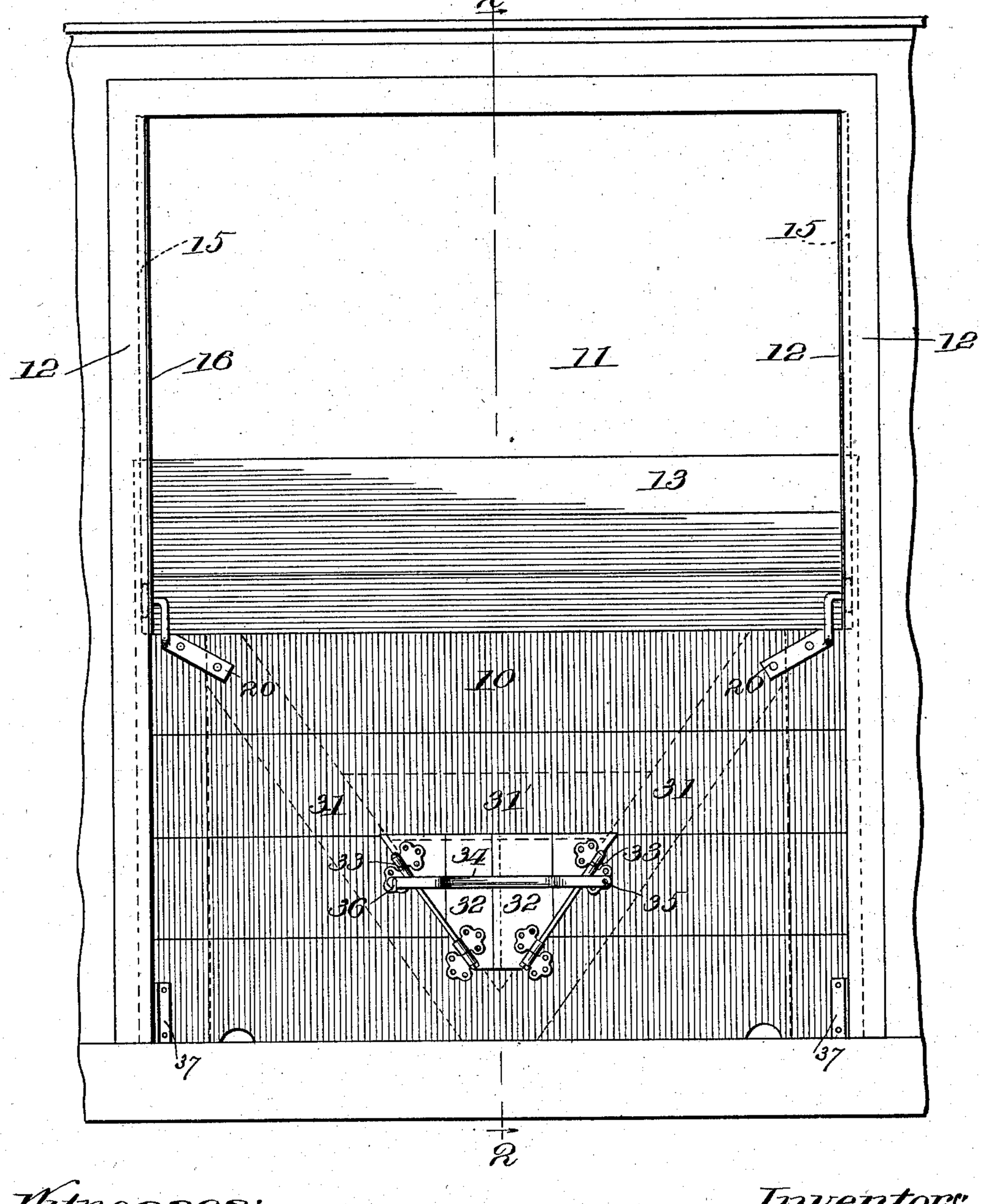
H. V. KUHLMAN & G. A. WOODMAN.

GRAIN CAR DOOR.

APPLICATION FILED SEPT. 22, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1



Witnesses:
H. S. Gaither
P. L. Schmidt

Inventors:
H. V. Kuhlman and
G. A. Woodman
by Wm. V. Belt Attorney.

No. 719,815. PATENTED FEB. 3, 1903.

H. V. KUHLMAN & G. A. WOODMAN.

GRAIN CAR DOOR.

APPLICATION FILED SEPT. 22, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

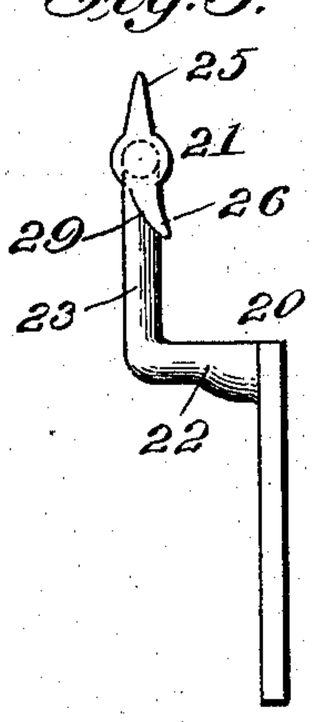


Fig. 5.

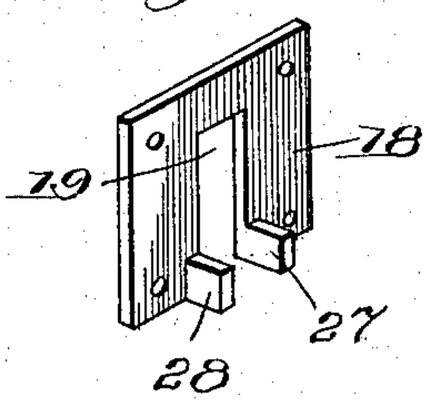


Fig. 6.

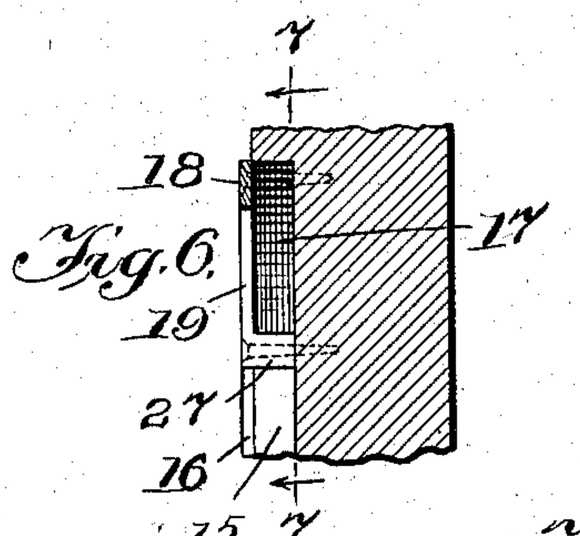


Fig. 4.

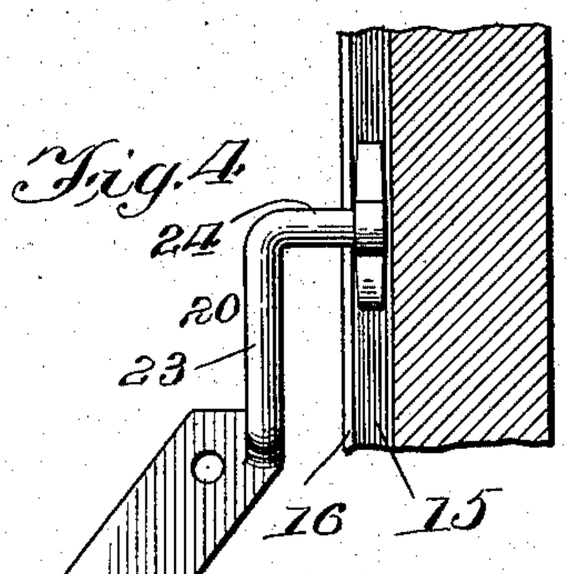


Fig. 7.

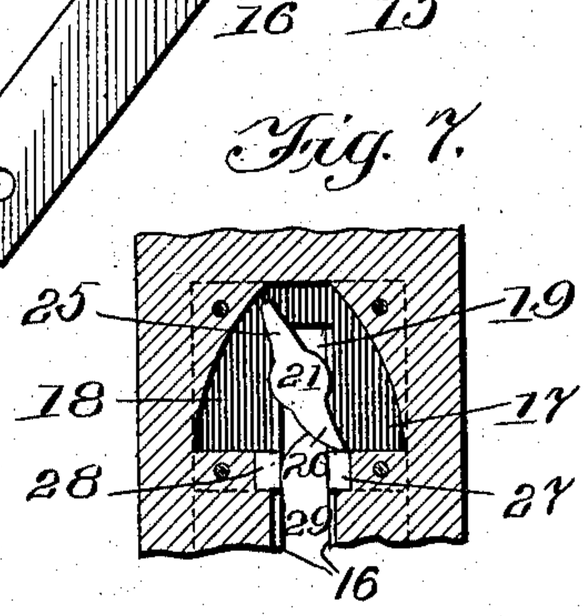


Fig. 9

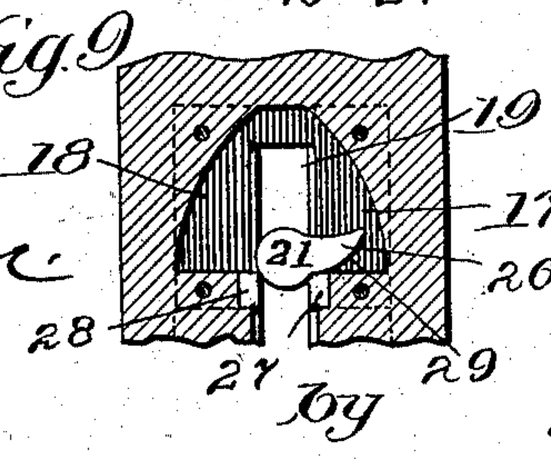


Fig. R.

Fig. 8.

Witnesses:

H. L. Gaither.

P. L. Schmeckel

Inventors:

H. V. Kuhlman and

G. A. Woodman

By W. N. Bell

Attorney.

UNITED STATES PATENT OFFICE.

HENRY V. KUHLMAN AND GEORGE A. WOODMAN, OF CHICAGO, ILLINOIS, ASSIGNORS OF ONE-HALF TO THOMAS B. KIRBY AND FREDERICK W. RENSHAW, OF CHICAGO, ILLINOIS.

GRAIN-CAR DOOR.

SPECIFICATION forming part of Letters Patent No. 719,815, dated February 3, 1903.

Application filed September 22, 1902. Serial No. 124,459. (No model.)

To all whom it may concern:

Be it known that we, HENRY V. KUHLMAN and GEORGE A. WOODMAN, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grain-Car Doors, of which the following is a specification.

This invention relates to improvements in doors for grain-cars. These cars are also used very largely for transporting lumber and miscellaneous freight of all kinds during the seasons when grain is not being shipped extensively and on return trips to the grain regions, as well as at other times when cars are needed. It frequently happens that the guiding devices for the grain-doors, which are generally located within the cars, are broken by careless loading and unloading of heavy articles and also during shipment and that the doors themselves are mutilated and broken by means of crowbars or other implements used in opening them, which is quite a difficult operation in view of the size and weight of the door and pressure of the grain. This necessitates the improvision of a temporary door for holding grain and sooner or later puts the car out of service while the grain-door is being repaired or replaced.

It is our object to provide a door for grain-cars of simple construction and easy to operate and which has its guiding devices located where they are not liable to injury from freight or during loading and unloading; and a further object is to provide the main door with a port-opening to permit the grain behind the door to escape first, and thus relieve the pressure on the main door, so that it can be readily and easily raised.

With these and other ends in view, which will be fully pointed out hereinafter, the invention consists of the novel construction and arrangement of parts illustrated in the accompanying drawings, which show one embodiment of the invention, and referring thereto—

Figure 1 is a front elevation of the outer side of a door embodying our invention and shown in closed position in a car. Fig. 2 is a sectional view on the line 2 2 of Fig. 1. Fig. 3 is a detail view of one of the guiding devices. Fig. 4 is a sectional view through one of the door-posts and showing a guiding device arranged therein. Fig. 5 is a detail view of one of the facing-plates. Fig. 6 is a sectional view through one of the door-posts at the top thereof and showing the chamber 17 and its face-plate. Fig. 7 is a sectional view on the line 7 7 of Fig. 6 and showing the guide-shoe engaged with the stop 27. Fig. 8 is a similar view showing the guide-shoe in its position at rest on the stops while the door is held in elevated position. Fig. 9 shows a guide-shoe without the heel.

Like numerals of reference denote corresponding parts in the several figures, and referring thereto, 10 designates the main door, which is arranged to close the lower part of the door-opening 11 when the car is to be filled with grain or other loose material. This door is constructed so that its ends will overlap the door-posts 12 12, against which it is held by the grain to form a tight closure, and an apron or auxiliary door 13 may be suitably hinged or otherwise connected to the main door, so that it will fold thereon when the door is elevated and hung on a hook 14 at the top of the car, as shown in dotted lines in Fig. 2. The door-posts are provided in their faces or opposing sides with grooves 15, which are faced with metal strips 16, fastened to the posts. These grooves terminate at their upper ends in chambers 17, which are faced with plates 18, and these plates are provided with a slot 19, corresponding to the slot between the strips 16 and forming a continuation thereof. The plates 18 and strips 16, forming the facings of the posts, may be made in one piece; but we prefer to make them separate, as shown, to facilitate the removal of the door when required.

The door is provided at each of its upper corners with a guiding device which comprises an angular arm 20, fastened at one end to the door and carrying a guide-shoe 21 at its other end arranged to travel in the groove of the adjacent post. The guide-arm is bent between its ends outward at 22 from the door, upward at 23 above the upper edge of the door, and outward at 24 through the slot between the facing-strips and into the groove,

the facing-strips being arranged to permit the guiding device to operate easily, but to prevent the guide-shoe from slipping out between them. The guide-shoe has two projections, one of which, 25, is directed upward and forms a heel, and the other is directed downward and forms a toe. The toe is also directed inward sufficiently to cause its end to readily slip upon and engage a stop 27 at the top of the groove when the door is raised, and when thus engaged the shoes are adapted to act as a pivot on which the door may be swung into horizontal position with the shoes resting in the chambers on the stops 27 28 and supporting the door at that edge, Fig. 8. The toe projections 26 are preferably provided with curved cam-faces 29, so that they will ride more easily on the stops. The heel projections 25 can be dispensed with, as shown in Fig. 9, as the door will be prevented from falling by the hook 14 and the toe projections. The parts are preferably constructed so that when fitted accurately the end of the toes 26 will travel against or close to the opposing wall of the guideways formed by the grooves, and the engagement of the toes with the stops 27 will be effected when the shoes reach the chambers 17 without special effort on the part of the operator; but if such an accurate adjustment is not provided or if the parts become worn or the door or its frame shrunken the toes can be caused to engage the stops by a very slight and easy manipulation incidental to raising the door. When the door has been swung to its horizontal position and hooked, the projections of the shoe will lie across the stops and hold the door securely in its elevated position. To close the door, the hook 14 is disengaged and the door swung down to a vertical position, the projections 26 slipping over the stops 27 into the guide-grooves, so that the door can be lowered. The shoes thus act as guides in raising and lowering the door and as pivots in swinging the door.

When the car is loaded, the pressure of the grain behind the door makes it very difficult to raise the door, and the custom obtains of forcing the door upward a little at a time by inserting some implement beneath its lower edge, thus permitting the grain behind the door to escape. In this way the door is frequently mutilated, so that it will not form a tight closure, and the guiding devices are often injured also. To avoid these difficulties and relieve the pressure of grain on the door, we provide the main door with a port-opening 30, which is preferably of triangular form and located between the diagonal braces 31 31 and the cross-brace 31′. The opening is closed by two doors 32 32, which are hinged to the main door at their longest edges, and when open they are arranged to rest against stops 33 33, which hold the doors up in the form of a chute to direct the grain in a single solid stream. The doors 32 are locked by a lever 34, pivoted at 35 and arranged to rest in a socket 36 across the doors. The edges of the doors and the opening are provided with lap-joints to form a tight closure. When the car is to be unloaded, the doors 32 are first opened to let out the grain behind the main door, and when the pressure on the main door is relieved it can be easily raised. Brackets 37 may be provided on the outer face of the main door to work inside of the door-posts and keep the door in its proper position while being raised and lowered.

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

1. The combination of a pair of car-door posts provided with guideways in their opposing faces, a door guided in a substantially vertical plane in said guideways, and means engaged by swinging the door and for supporting the door when it is swung to a horizontal plane with its axial line in approximately the same vertical plane.

2. The combination with a grain-car door, of door-posts having guideways, arms on the door working in said guideways and each having a lateral projection substantially in the plane of the door, each of said guideways being formed to provide a space within which said projection may turn when the door has been raised, and a stop engaged by said projection on the mere turning of the door to horizontal position to sustain that end of the door.

3. The combination with a grain-car door, of door-posts having guideways, arms on the door working in said guideways and each having a downward projection, each of said guideways being formed to provide a space within which such projection may turn when the door has been raised, and a stop engaged by the projection on the turning of the door to horizontal position to sustain that end of the door.

4. The combination with a grain-car door, of door-posts having guideways, arms on the door working in said guideways and each having a downward and inwardly-directed projection, each of said guideways being formed to provide a space within which such projection may turn when the door has been raised, and a stop engaged by the projection on the turning of the door to horizontal position to sustain that end of the door.

5. The combination with a grain-car door, of door-posts having guideways, arms on the door working in said guideways and each having an upward projection, each of said guideways being formed to provide a space within which such projection may turn when the door has been raised, and a stop engaged by the projection on the turning of the door to horizontal position to sustain that end of the door.

6. The combination with a grain-car door, of door-posts having guideways, arms on the door working in said guideways and each having a downward and an upward projection, each of said guideways being formed to provide a space within which such projections

may turn when the door has been raised and stops engaged by the projections on the turning of the door to horizontal position to sustain that end of the door.

7. The combination with a grain-car door, of door-posts having guideways, a stop on each side of each guideway at the top thereof, and devices working in the guideways for guiding the door and adapted to rest upon said stops.

8. The combination with a grain-car door, of door-posts having guideways and chambers at the top thereof, a stop located in the chamber and on each side of each guideway, and devices working in the guideways for guiding the door and adapted to rest upon said stops.

9. The combination with a grain-car door, of door-posts having guide-grooves and chambers at the top thereof, a facing on each post overlapping the groove and chamber and provided with a narrow straight slot, a guiding device carried by the door at each upper corner thereof and projecting through said slot and carrying a lateral projection constructed to engage the facing within the groove or chamber to prevent displacement thereof, and a stop within the chamber to form a rest for said projection when the door is swung up.

10. A grain-car door provided with a port-opening of triangular shape, double doors hinged to the car-door, and means for holding said doors in open position to form a chute for the grain as it flows through said opening.

11. A grain-car door provided with diagonal braces converging approximately at the middle of the lower edge of the door, a port-opening in the triangular space between the converged ends of the braces, and a closure for said opening.

HENRY V. KUHLMAN.
GEORGE A. WOODMAN.

Witnesses:
WM. O. BELT,
P. L. SCHNECHEL.