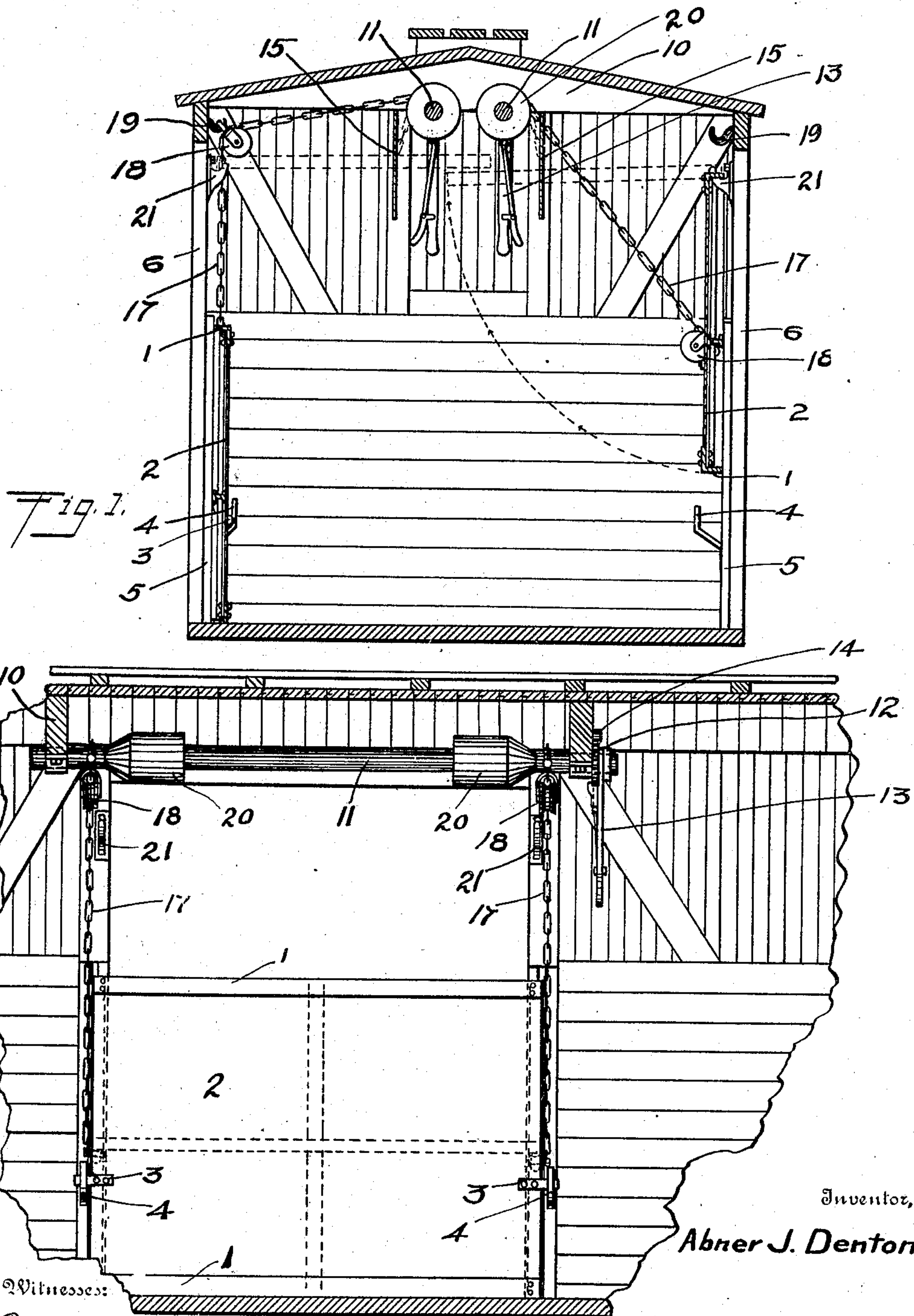


900,491.

A. J. DENTON.
GRAIN CAR DOOR.
APPLICATION FILED DEC. 18, 1907.

Patented Oct. 6, 1908.
2 SHEETS—SHEET 1.



Witnesses:
Roy G. Kraz
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Fig. 2.

By

David O. Barnell,
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Inventor,
Abner J. Denton.

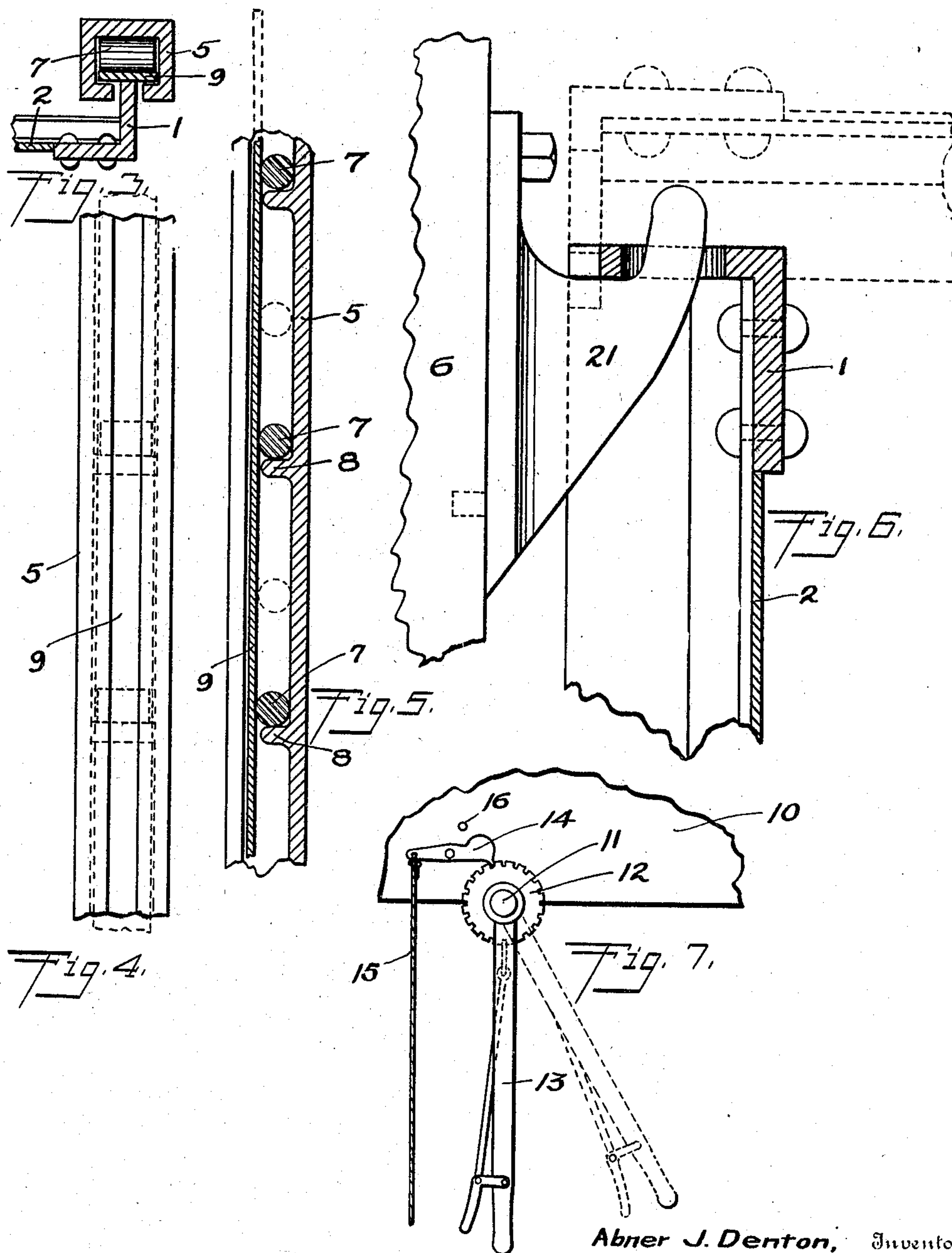
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Abner J. Denton, Inventor

Witnesses:

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Roy G. Kraz
Burton A. Parr

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Attorney.

UNITED STATES PATENT OFFICE.

ABNER J. DENTON, OF NEBRASKA CITY, NEBRASKA.

GRAIN-CAR DOOR.

No. 900,491.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed December 18, 1907. Serial No. 407,078.

To all whom it may concern:

Be it known that I, ABNER J. DENTON, a citizen of the United States, and a resident of Nebraska City, in the county of Otoe and State of Nebraska, have invented certain new and useful Improvements in Grain-Car Doors, of which the following is a specification.

My invention relates to doors for grain-cars and it is the object thereof to provide a door of this class of simple, inexpensive and durable construction, and having means for raising the same to provide a relief opening thereunder, means for elevating the door and suspending the same near the roof of the car, and means for reducing the friction between the door and door-frame to facilitate the raising thereof when under pressure of the grain in the car:

A construction embodying my invention is illustrated in the accompanying drawings in which

Figure 1 is a transverse section of a car having my doors applied thereto, Fig. 2 is an inside elevation showing one of the doors in closed position, Fig. 3 is a detail plan section through one side of the door and the anti-friction guide therefor, Fig. 4 is a detail elevation of the face of said guide, Fig. 5 is a sectional elevation of the same, Fig. 6 is a detail section of the upper side of the door, showing one of the suspension hooks therefor, and Fig. 7 is a detail end elevation of one of the hoisting-shafts.

In carrying out my invention I provide a one-section door which is preferably formed by a frame 1 of angle-iron, or similar rolled-steel structural shapes, with a covering 2 of sheet-metal placed over said frame. To the inside of the door, at the positions shown in Fig. 2, are secured the lug-bars 3 which are adapted to be engaged by hooks 4, as shown, to hold the door in upright position against the guides therefor, before the car is filled with grain. The outwardly extending flanges of the side-members of the door-frame 1 extend between the flanges of the U-shaped guide-bars 5 which are secured to the door-posts 6 at the positions shown. Within said guide-bars 5 are disposed the small rollers 7, the same normally resting upon and being spaced apart at regular intervals by transverse lugs 8, integral with the guide-bars, as shown in Fig. 5. Resting against said rollers 7 are the plates 9 which, in turn, are engaged by the edges of the outwardly extending

flanges of the side-members of the door-frame 1. Thus when the car is filled with grain, the outward pressure thereof upon the door is received on said rollers 7 and the door may be raised with comparative ease, the engagement between the door-frame and the plates 9 causing the latter to move up with the door, while the rollers 7 roll up between said plates and the backs of the guide-bars, as indicated by the dotted lines in Fig. 5. The plates 9, in addition to providing an enlarged bearing surface for the rollers, prevent leakage of grain around the flanges of the door-frame through the U-shaped guide and between the rollers.

For raising the door, a hoisting mechanism is provided, as follows: To the roof-beams 10 of the car, near the center thereof and extending longitudinally of the car, a shaft 11 is revolvably mounted as shown in Figs. 1, 2 and 7. On one end of said shaft is secured a notched wheel 12, and adjoining said notched wheel is mounted a ratchet-lever 13 carrying a manually-releasable dog adapted to engage the notched wheel so that the shaft may be turned thereby. A pawl 14 is mounted on one of the roof-beams 10 near the notched wheel, said pawl being weighted to hold the same normally in engagement with the wheel. The pawl may be raised out of engagement with the wheel by pulling downwardly on the cord 15, a stop-pin 16 being provided to limit the upward movement of the pawl. To the shaft 11, at points in alinement with the edges of the door, are connected chains 17 which extend from the shaft over the pulleys 18 and thence downwardly, being connected with the sides of the door, as shown. The pulleys 18 are supported by hooks 19, disposed near the roof of the car, and, when necessary in the operation of the door, may be released from said hooks. On the shaft 11 near the ends of the chains 17 are secured the drums 20, the ends of which are coniform, tapering toward the chains. Near the tops of the door posts 6 are hooks 21 which are adapted to engage the outwardly extending flange of the upper member of the door-frame, when the same is elevated as shown at the right of Fig. 1, and in Fig. 6.

In unloading a car provided with my door, the hoisting-shaft 11 is turned, by means of the ratchet-lever 13, to wind the chains 17 on the shaft. One or two turns of the shaft raises the door sufficiently to form a relief opening

thereunder through which the grain adjoining the door may escape, thus relieving the pressure on the door. By further turning of the shaft the chains are wound on the drums 5 20, climbing from the shaft on the conical end portions of the drums. Owing to the diameter of the drums being considerably larger than that of the shaft, in the latter part of the operation the door will be 10 raised a much greater distance by each turn of the shaft than at first. This may be done for the reason that after the pressure of grain on the door has been released the same may be very easily raised and, therefore, the 15 leverage of the hoisting apparatus may be reduced to accelerate the operation. After the door has been raised vertically far enough to enable it to be engaged by the suspension hooks 21, the chains are slackened slightly 20 and the pulleys 18 are disengaged from the hooks 19. The chains are then drawn taut, as represented at the right of Fig. 1, and by further turning of the hoisting-shaft the door is swung up to a position near the roof of the 25 car, as represented by the dotted lines in Fig. 1, the outer edge thereof being supported by the hooks 21 and the hoisting-shaft being held to its position by the engagement of the pawl 14 with the wheel 12. In returning the 30 door to its closed position, the same is lowered by alternately releasing the pawl, turning the shaft by means of the ratchet-lever, to lower the door, and reengaging the pawl to hold the shaft while the ratchet-lever is 35 released in making the return movement thereof. After the door is swung down to the vertical position, the pulleys 18 are reengaged with the hooks 19, the door is released from the suspension hooks 21, and lowered 40 to its closed position.

Now, having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a grain car, the combination with a 45 door having vertical outwardly extending flanges at the sides thereof, of guides secured

to the door-posts, rollers held within said guides, and plates resting against said rollers, the flanges at the sides of the door being arranged to engage said plates, substantially 50 as described.

2. In a grain car, the combination with a door having vertical outwardly extending flanges at the sides thereof, of guides secured to the door posts, rollers held within said 55 guides, means for spacing and supporting said rollers, and plates held by each of said guides and resting against said rollers, the flanges at the sides of the door being arranged to engage said plates, and the ar- 60 rangement being such that the plates may move up with the door when the same is raised while under pressure of grain.

3. In a grain car, a vertically slidable door, hooks disposed near the roof of the car above 65 the door and adapted to support the same when engaged therewith, a hoisting-shaft disposed near the center of the car and extending longitudinally near the roof thereof, chains connecting said shaft and the door, 70 and pulleys engaged by said chains and removably held near the supporting-hooks, as and for the purpose described.

4. In a grain car, a door, anti-friction devices arranged between the door and door- 75 posts, means disposed above the door near the car roof for swingably supporting the door, a hoisting-shaft and chains adapted to raise the door vertically, and pulleys engaged by said chains, the said pulleys being 80 releasable to change the direction of pull of the chains upon the door, whereby the same after being lifted and engaged with the supporting means may be swung upwardly to a position adjoining the car roof. 85

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

ABNER J. DENTON.

Witnesses:

LEILA J. BAKER,
RAY L. MILLAR.