

No. 791,348.

PATENTED MAY 30, 1905.

C. A. LINDSTRÖM & J. F. STREIB.

CAR DOOR MECHANISM.

APPLICATION FILED-JUNE 15, 1904.

5 SHEETS-SHEET 1.

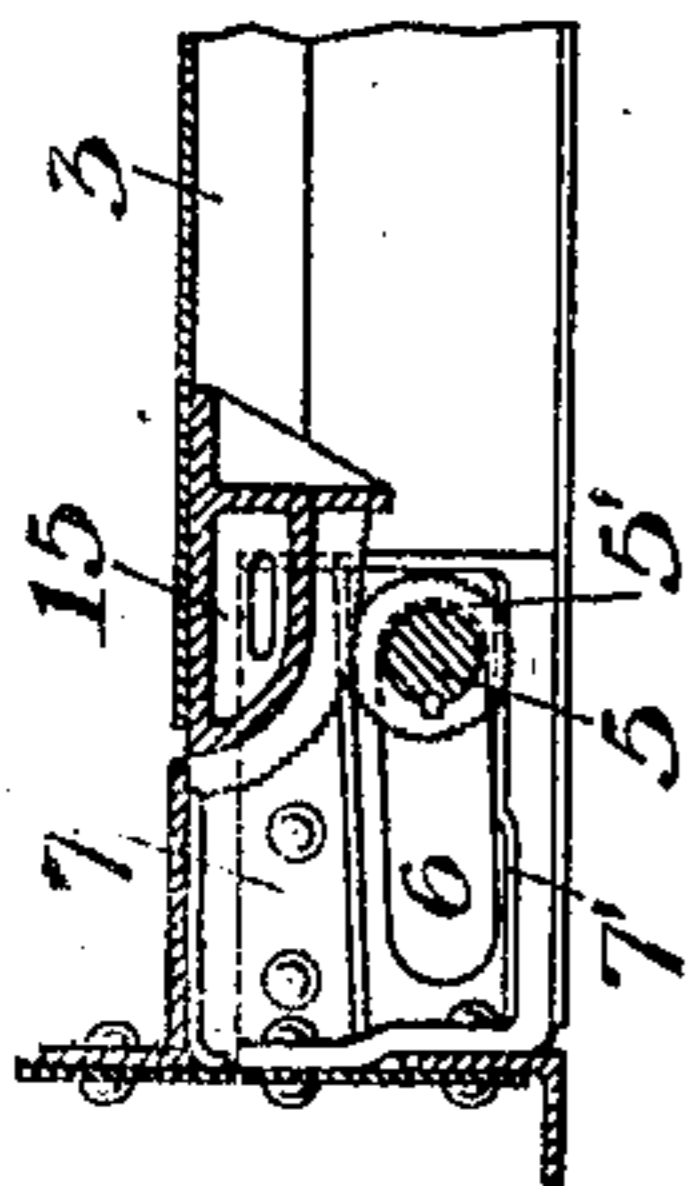
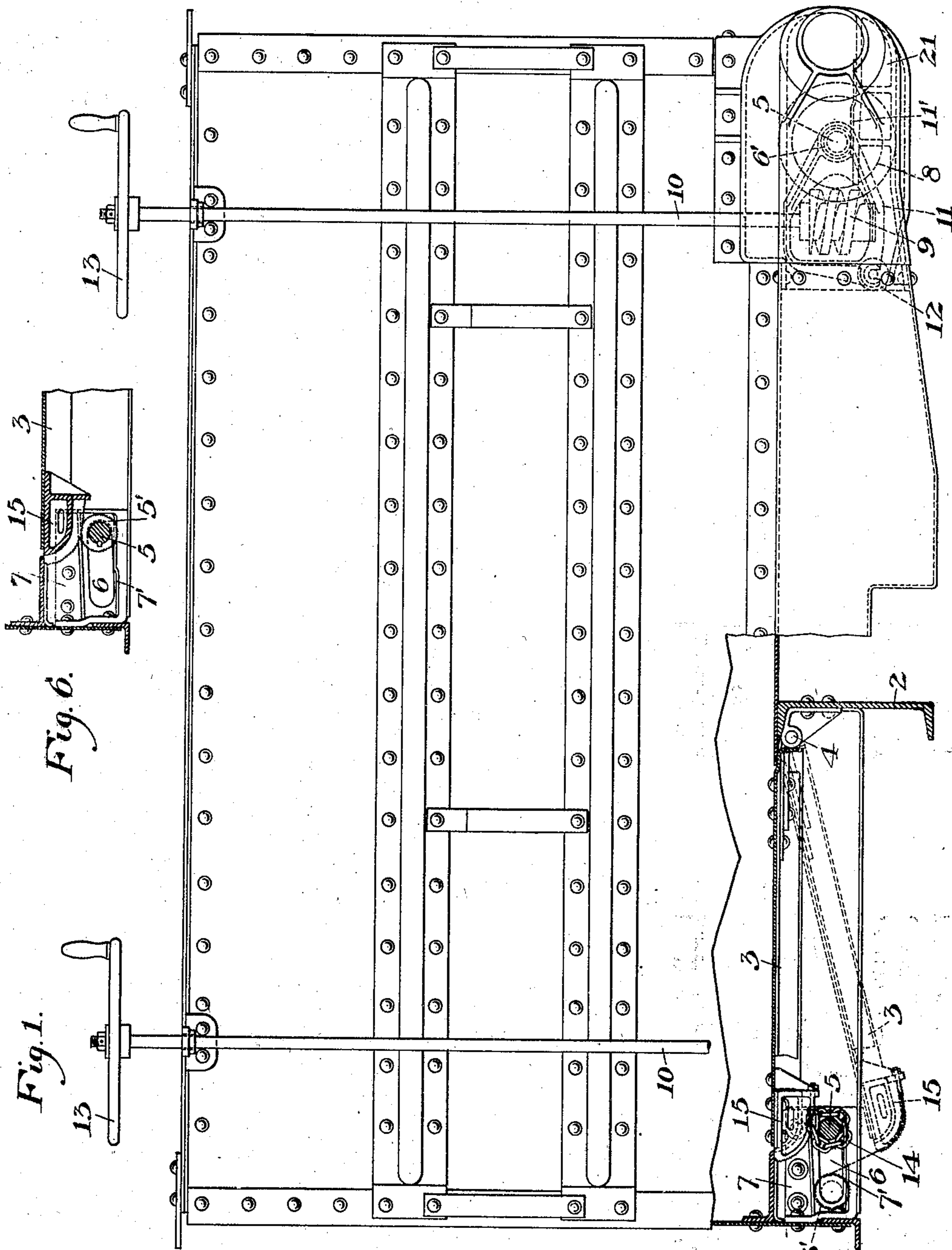


Fig. 6.

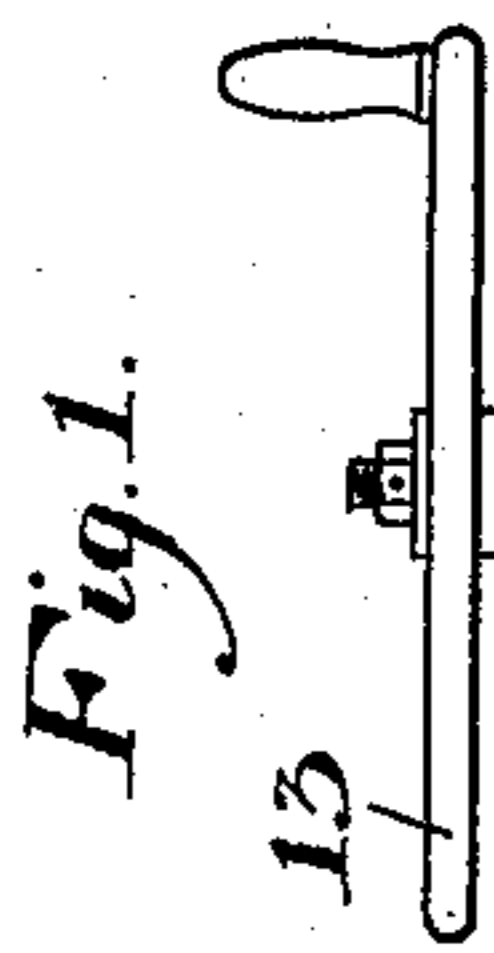
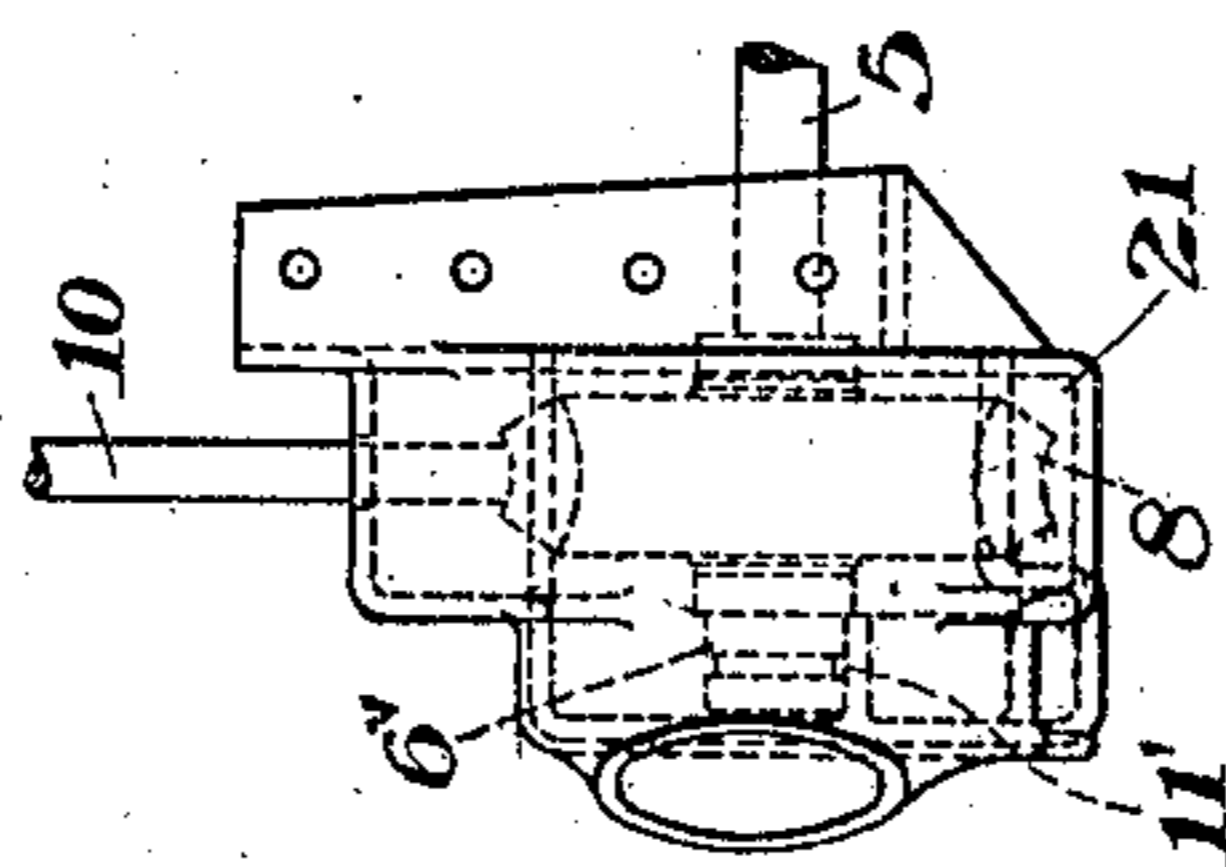


Fig. 1.

WITNESSES

Warren W. Swartz
St. M. Corwin

Fig. 2.



INVENTORS

C. A. Lindström
J. F. Streib
by Baxwell & Lyman
their Attorneys

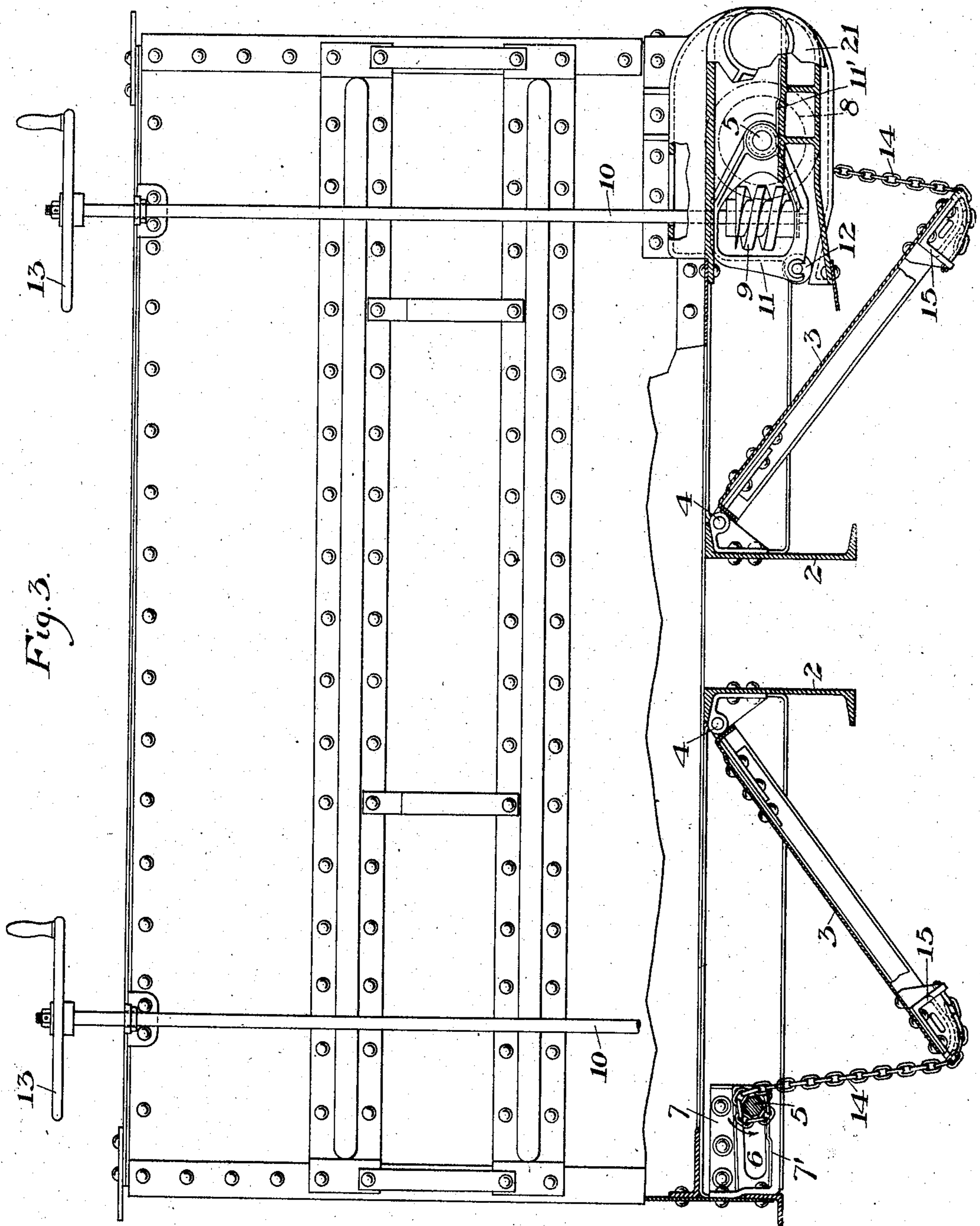
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WITNESSES

Warren W. Swartz
H. M. Corwin

INVENTORS

C. A. Lindström
J. F. Streib
by Baxendell & Byrnes
their Attorneys

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C. A. LINDSTRÖM & J. F. STREIB.

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5 SHEETS—SHEET 3.

Fig. 4.

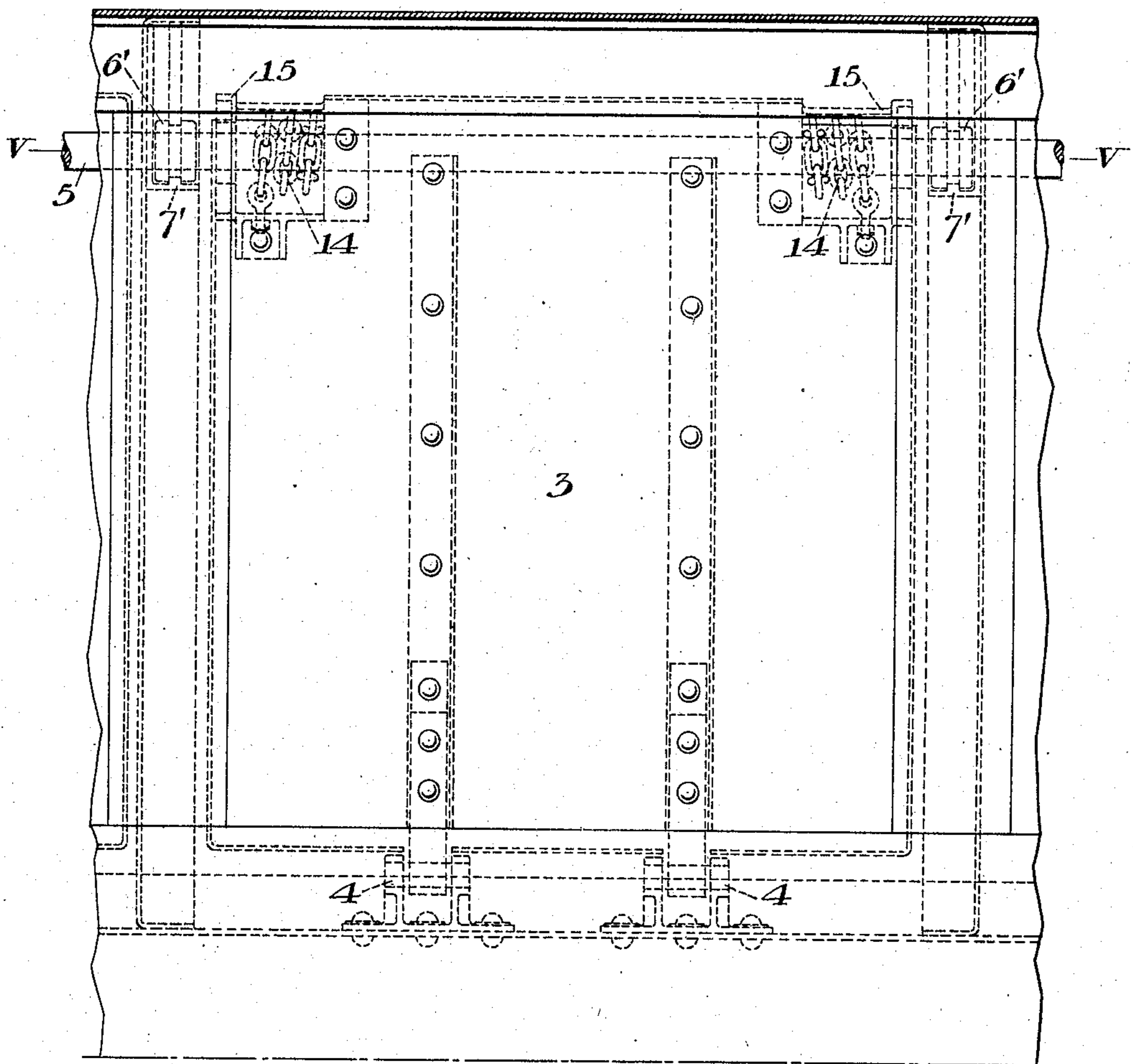
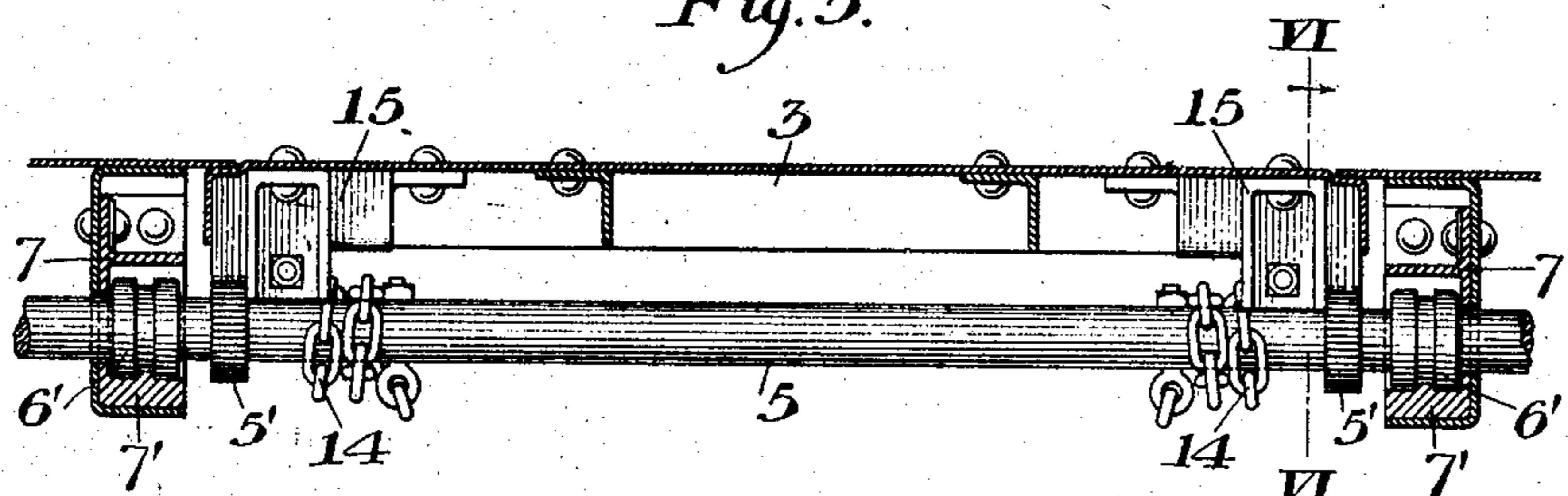


Fig. 5.



WITNESSES

Warren U. Swartz
H. W. Conner

INVENTORS

C. A. Lindström
J. F. Strick
by Baxendell Byrnes
their Attorneys

No. 791,348.

PATENTED MAY 30, 1905.

C. A. LINDSTRÖM & J. F. STREIB.

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5 SHEETS—SHEET 4.

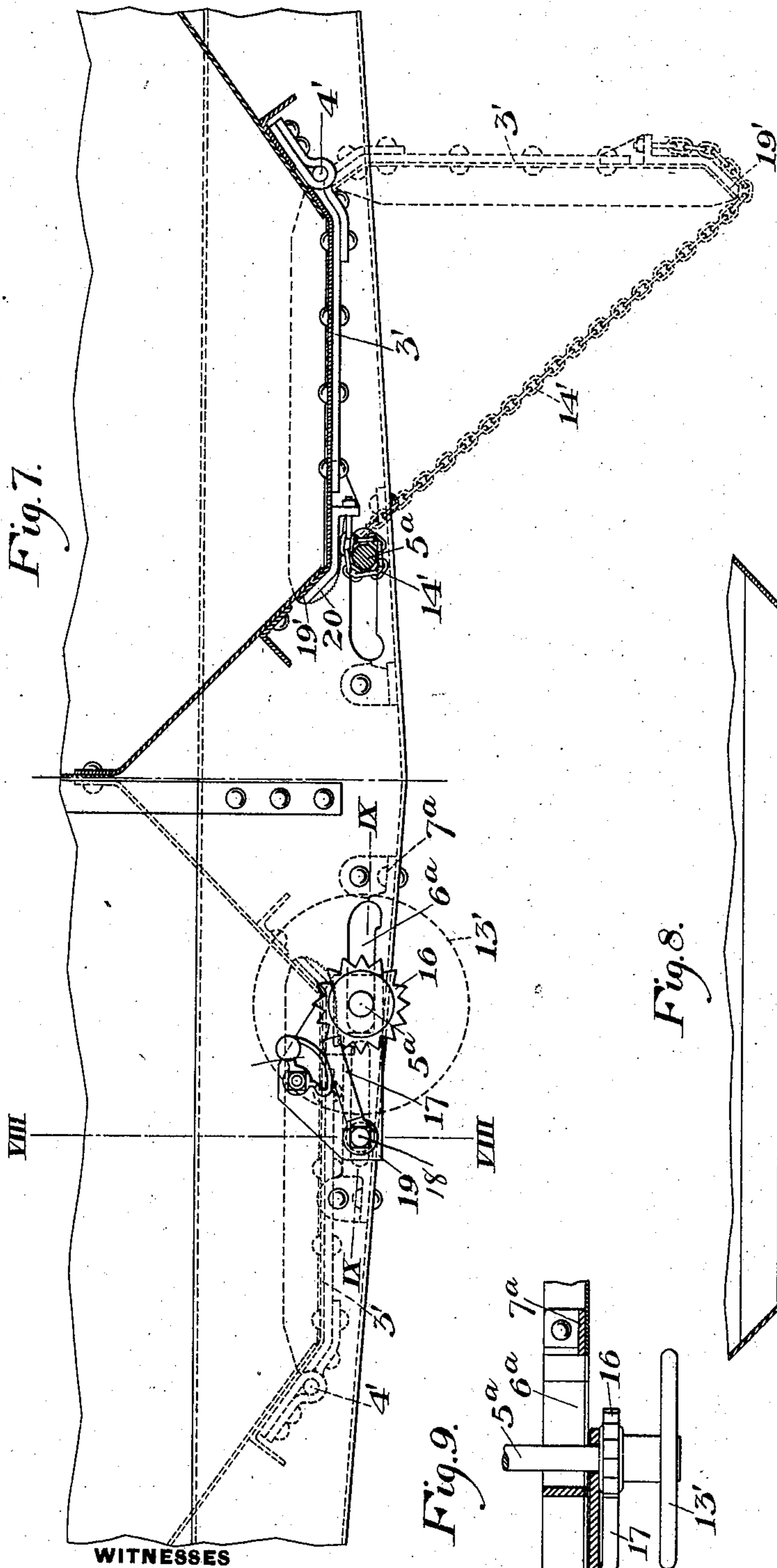


Fig. 7.

WITNESSES
Warren U. Swartz
H. M. Corwin

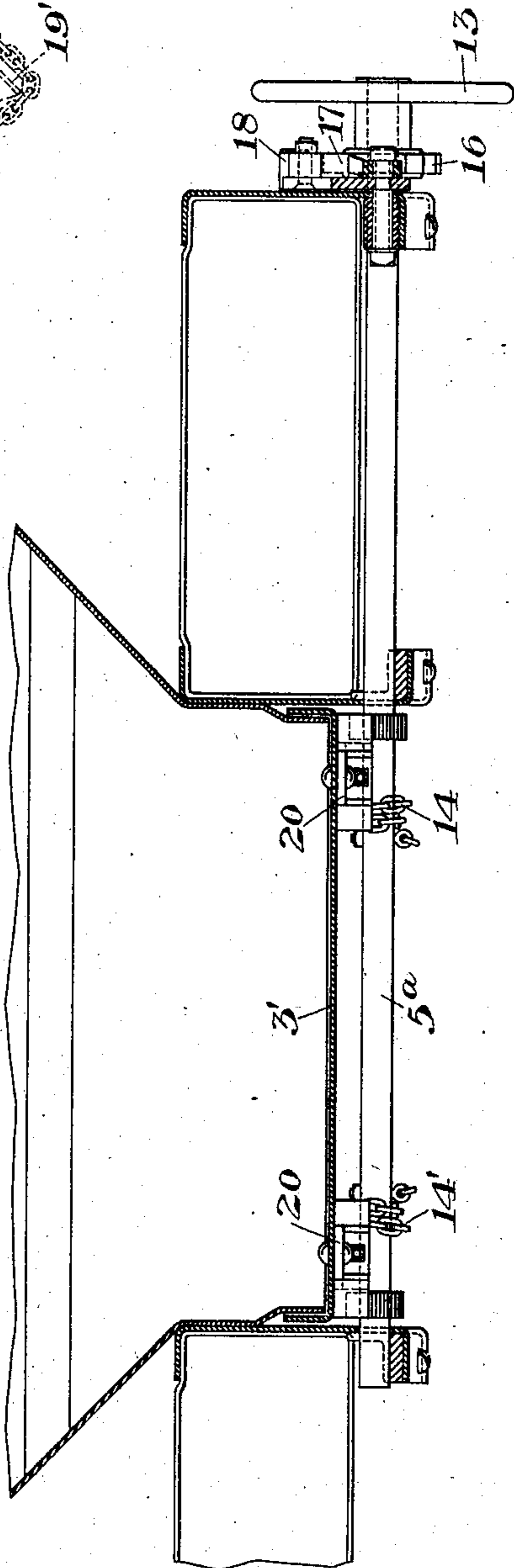


Fig. 8.

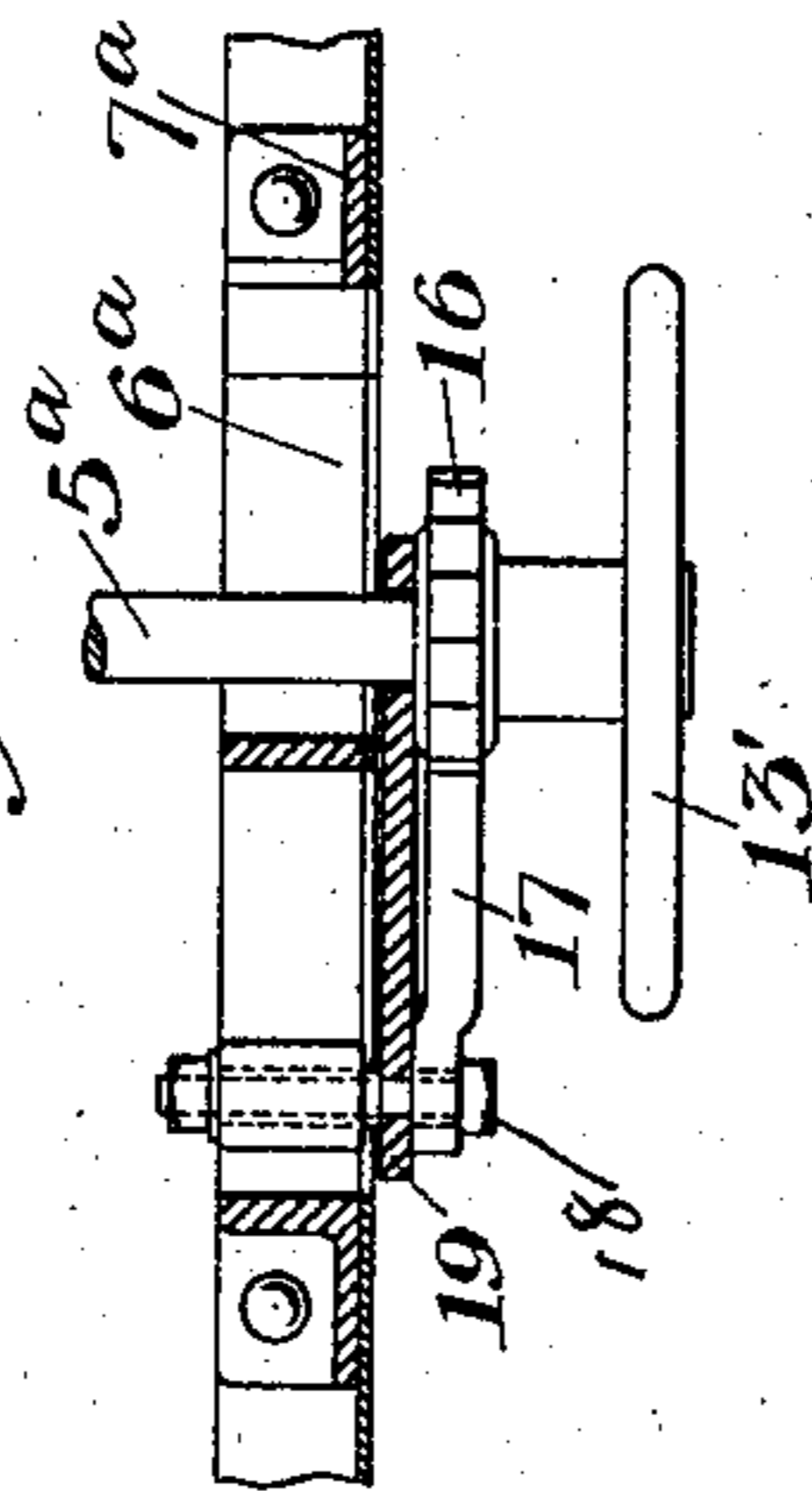


Fig. 9.

INVENTORS

C. A. Lindström
J. F. Streib
by Russell B. Byrnes
Attorneys

No. 791,348.

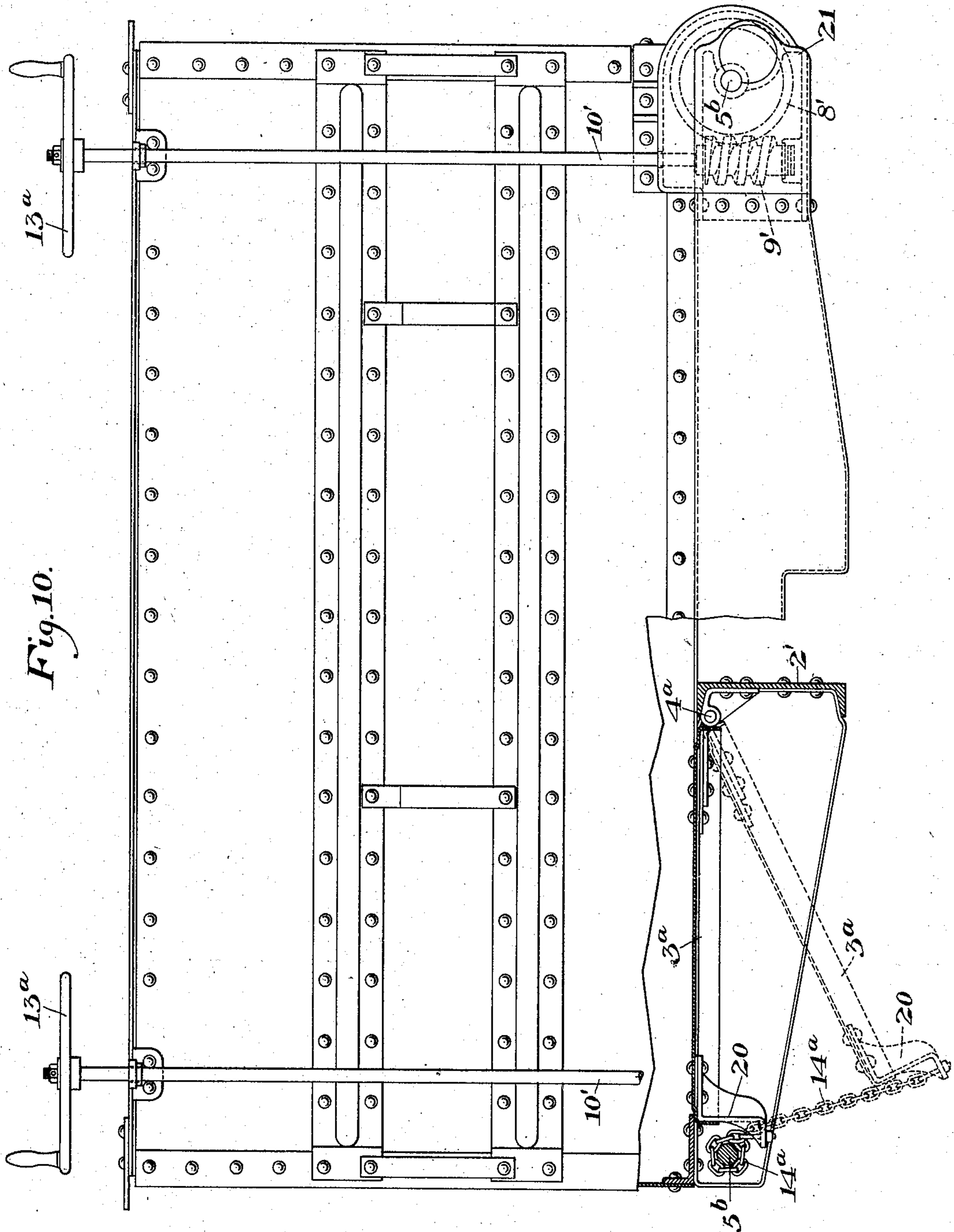
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C. A. LINDSTRÖM & J. F. STREIB.

CAR DOOR MECHANISM.

APPLICATION FILED JUNE 15, 1904.

5 SHEETS—SHEET 5.



WITNESSES

Warren W. Swartz
H. M. Corwin

INVENTORS

C. A. Lindström
J. F. Streib
by Baxendell & Byrnes
their Attorneys

UNITED STATES PATENT OFFICE.

CHARLES A. LINDSTRÖM, OF ALLEGHENY, AND JOHN F. STREIB, OF AVALON, PENNSYLVANIA, ASSIGNORS TO PRESSED STEEL CAR COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

CAR-DOOR MECHANISM.

SPECIFICATION forming part of Letters Patent No. 791,348, dated May 30, 1905.

Application filed June 15, 1904. Serial No. 212,689.

To all whom it may concern:

Be it known that we, CHARLES A. LINDSTRÖM, of Allegheny, and JOHN F. STREIB, of Avalon, Allegheny county, Pennsylvania, have invented a new and useful Car-Door Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end elevation of a car provided with our improved car-door mechanism, part of the car being shown in vertical cross-section. Fig. 2 is a detail view. Fig. 3 is a vertical cross-section of a car, showing the doors in open position. The right-hand part of the figure is shown in section on a vertical plane in advance of the worm-shaft, and the left-hand part of the figure is in vertical section on a plane back of the worm-shaft. Fig. 4 is a plan view on a larger scale. Fig. 5 is an irregular vertical longitudinal section on the line V V of Fig. 4. Fig. 6 is a detail sectional view on the line VI VI of Fig. 5. Fig. 7 is a side elevation of a car, partly in vertical section, showing a modified construction of the invention applied to a car whose doors are hinged on axes crosswise of the car. Fig. 8 is a vertical section on the line VIII VIII of Fig. 7. Fig. 9 is a detail view, being a horizontal section on the line IX IX of Fig. 7; and Fig. 10 is an end elevation of a car, partly in vertical section, showing a modified construction of the device.

The mechanism of car-doors is one which has presented many difficulties to railroads. It is essential that the door mechanism should be without complication of parts and that it should not only be able to raise and lower the doors as may be desired, but also to hold the doors securely in position when closed and that there should be no likelihood of accidental discharge of the lading through breakage of supporting-chains, &c. Door mechanisms generally used in the past have been of the kind which as soon as the retaining or holding device is released permit the doors to fly open with a shock, releasing at once al-

most the whole contents or as much thereof as can escape through the doors.

The object of this device is to operate the doors, lock them in position when closed, and open them gradually to any desired point to effect the partial or total discharge of the lading, as circumstances may demand, as, for example, in distributing ballast along the line of the road the doors may be partially opened and, with the car in motion, the ballast will run out along the track in proportions required instead of being discharged at one point, from which it is afterward distributed by shoveling or by means of a wheelbarrow.

Our invention also provides means by which the doors, although elevated by chains attached to their ends, are supported independently of the chains when closed, and also provides means by which such support is constituted by the lifting-shafts themselves, which, after the doors are raised automatically, move into supporting position and cannot be disengaged therefrom until the mechanism is purposely reversed for opening the doors.

In the drawings, 2 indicates the center sill of a car, and 3 3 are the doors, hinged along the outer sides of the center sill on hinges 4. The car shown in Figs. 1 and 3 has doors along both sides, preferably divided in four sections operated from each corner of the car, although all the doors on a side may be operated from one end of the car. The car shown in the drawings has four such doors, each of which is provided with an opening mechanism comprising a shaft 5, having a rolling bearing in an inclined slot 6, formed in castings 7, which extend crosswise of the car. Each shaft has a worm-wheel 8, meshing with a worm 9 on an operating-shaft 10. The worm 9 and shaft 5 are journaled in a frame 11, which is adapted to move transversely with the shaft 5 on a guideway 11', preferably formed in the push-pocket 21 of the car-frame. To facilitate the lateral movement, each shaft 5 has roller portions 6', which bear on shoes 7', and the frame 11 has an antifriction-roller 12. The shafts 10 have hand-wheels 13 for rotating them and

imparting rotation through the worms 9 and worm-wheels 8 to the respective shafts 5, and each shaft 5 carries a chain 14, which is connected to the door, the outer end of the door
 5 having a shoe 15, whose under side is beveled or inclined and preferably serrated, so as to form a wedge-shaped bearing for engaging a serrated roller 5' upon the shaft. When it is desired to close a door from the open position
 10 shown in Fig. 3, the trainman rotates the hand-wheel 13, and thus rotates the shaft 5 in the direction of the arrow in Fig. 3, thereby causing the shaft to roll along the inclined slots 6, preferably upon the roller-bottoms 6' toward
 15 the outside of the car, and to rest in the ends of these slots. The rotation of the shaft will also wind up the chain 14 and will raise the door. When the door reaches the level of the shaft 5, the winding of the chain thereon will
 20 draw the shaft toward the door and will cause it to engage the inclined under side of the shoe 15 and to pass thereunder with a wedging action, and will thus force up the door to the closed position shown in Figs. 1, 6, 7, and 8.
 25 These devices, therefore, first roll the shafts outwardly out of the path of the doors, then raise the doors to the level of the shafts, and, finally, draw the shafts under the doors, in which position they will relieve the load from
 30 the chains and will uphold the doors in a safe and satisfactory way. We believe we are the first to use a chain-shaft to support the door from below when the doors are in the closed positions, thus relieving the chains from carrying the load, and desire to claim it broadly.
 35 The worm-wheels will serve as automatic locking devices to hold the parts stationarily in every position in which they may be, so that the trainmen can set the doors either in full
 40 open position or partially open, as desired. This is of great importance, especially in the distribution of ballast along the track of a railway or in discharging other lading in a gradual manner. The frames 11 being connected
 45 with the shafts 5 travel back and forth with them, carrying the worm-gearing, which is thus kept constantly in meshing engagement.

In Figs. 7, 8, and 9 we show a modified construction, in which the apparatus is applied to a car having doors which are hinged on axis 4', extending crosswise of the car. In this case the shafts are mounted in slots 6^a, formed in castings 7^a; but instead of operating the shafts with worm-gearing we operate them directly with a hand-wheel or lever
 50 13', and we lock them with a ratchet-wheel 16, having a pawl 17, carried by an arbor 18, which by a frame 19 is connected to the shaft 5^a and moves back and forth therewith. The
 55 rotation of the shaft 5^a first winds up the chain and moves the shaft laterally out of the path of the door, and when the door is raised to the level of the shaft the shaft moves toward and under the door, forcing it up with
 60 a wedge action. In these figures we show

doors with deep edges or margins to prevent loss of fine lading while in transit. The side margins are vertical and the end margins 19' inclined so as to effectively discharge the lading when the door is open, as shown in dotted
 70 lines at the right of Fig. 7.

The construction shown in Fig. 10 resembles that of Figs. 1, 2, and 3 in that we employ operating-shafts 10' and wheels 13^a for turning a worm 9', which meshes with a worm-wheel 8' on the shaft 5'. Each door is connected with its shaft by a chain 14^a, but the shafts are mounted in stationary bearings. In order to elevate the door to its full height, we connect the chain with a downwardly-projecting bracket 20 on the door.
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Within the scope of our invention as defined in the claims the construction of the parts may be modified in many ways by the skilled mechanic, since—
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What we claim is—

1. Car-door mechanism comprising in combination with the door, a lifting-shaft, and a connection therefrom to the door, said shaft being movable by said connection into supporting position when the door is raised; substantially as described.
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2. Car-door mechanism comprising in combination with the door, a lifting-shaft, mounted to roll in laterally-extending bearings, and a connection extending therefrom to the door; substantially as described.
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3. Car-door mechanism comprising in combination with the door, a lifting-shaft, mounted to roll in laterally-extending bearings and arranged to be rotated therein in direction away from the door, and a connection extending therefrom to the door; substantially as described.
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4. Car-door mechanism comprising in combination with the door, a lifting-shaft, located below the door when closed, a chain extending directly from the lifting-shaft to the door, an operating-shaft, and a connecting worm-gearing engaging the lifting-shaft; substantially as described.
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5. Car-door mechanism comprising in combination with the door, a lifting-shaft having a bearing at the push-pocket of the car; substantially as described.
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6. Car-door mechanism comprising in combination with the door, a lifting-shaft, mounted to roll in inclined bearings, and a connection extending therefrom to the door; substantially as described.
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7. Car-door mechanism comprising in combination with the door, a lifting-shaft, mounted to roll in laterally-extending bearings, and a connection extending therefrom to the door, said shaft having rollers; substantially as described.
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8. Car-door mechanism comprising in combination with the door, a lifting-shaft, and a connection therefrom to the door, said shaft being movable into supporting position when
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the door is raised, the door having an inclined margin for engagement with the shaft; substantially as described.

9. Car-door mechanism comprising in combination with the door, a lifting-shaft, and a connection therefrom to the door, said shaft being movable into supporting position when the door is raised, the door having an inclined margin for engagement with rollers on the shaft; substantially as described.

10. Car-door mechanism comprising in combination with a door a lifting-shaft, and a connection therefrom to the door, said shaft being movable into supporting position when the door is raised, the door and shaft having serrated engaging portions; substantially as described.

11. Car-door mechanism comprising in combination with the door, a lifting-shaft, and a connection therefrom to the door, said shaft being movable into supporting position when the door is raised, operating-gear, and a sliding frame carrying the shaft and gear; substantially as described.

12. Car-door mechanism comprising in combination with the door, a lifting-shaft, a connection therefrom to the door, said shaft being movable into supporting position when the door is raised, operating worm-gear, and

a sliding frame carrying the shaft and gear; 30
substantially as described.

13. Car-door mechanism having a lifting-shaft arranged to support the door directly when the door is raised and a flexible connection between the shaft and door; substantially 35
as described.

14. Car-door mechanism having a lifting-shaft arranged to roll toward the door and to support the door directly when the door is raised, and a connection between the shaft and 40
door; substantially as described.

15. Car-door mechanism comprising a lifting device and flexible means whereby it is moved automatically into supporting position under the door when the door is closed; sub- 45
stantially as described.

16. A hinged car-door adapted to swing in a vertical direction, and having on its upper surface an inclined end margin; substantially 50
as described.

In testimony whereof we have hereunto set our hands.

CHARLES A. LINDSTRÖM.
JOHN F. STREIB.

Witnesses:

K. L. ROBINSON,
FRANK DITCHFIELD.