F. G. BORG.

CAR.

APPLICATION FILED MAR. 11, 1911.

1,000,891.

Patented Aug. 15, 1911.

3 SHEETS—SHEET 1.

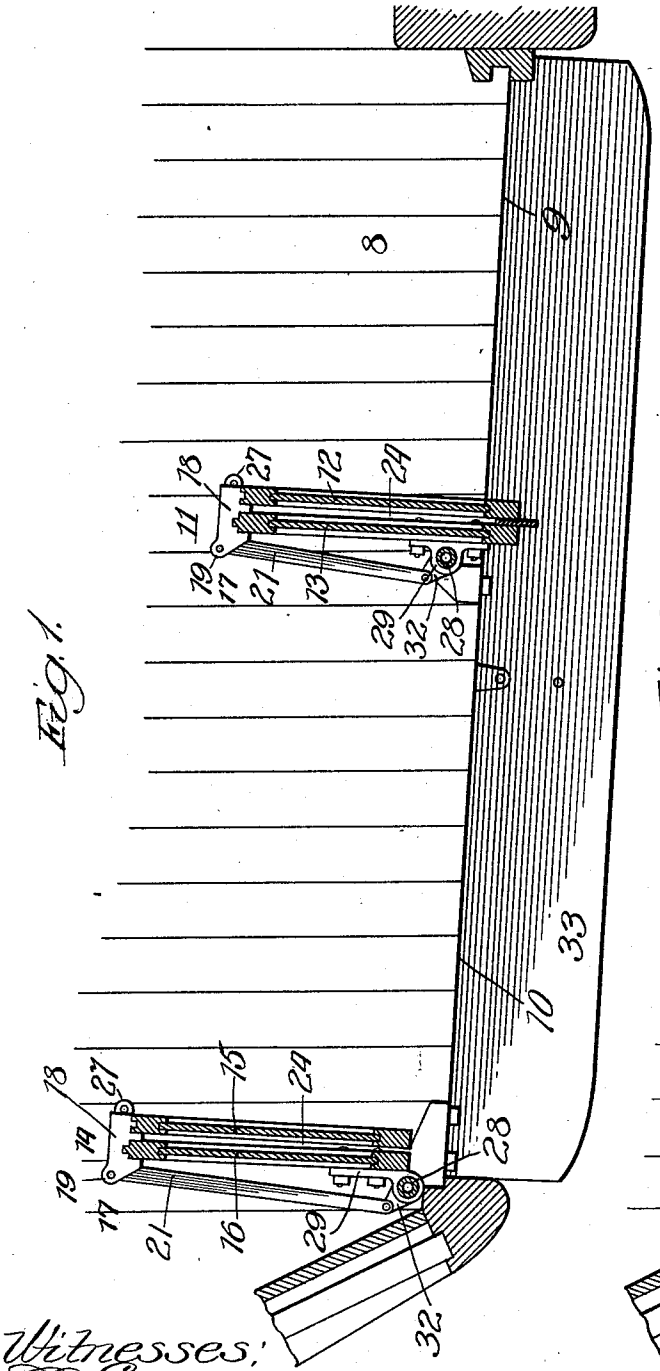

Fig. 1.

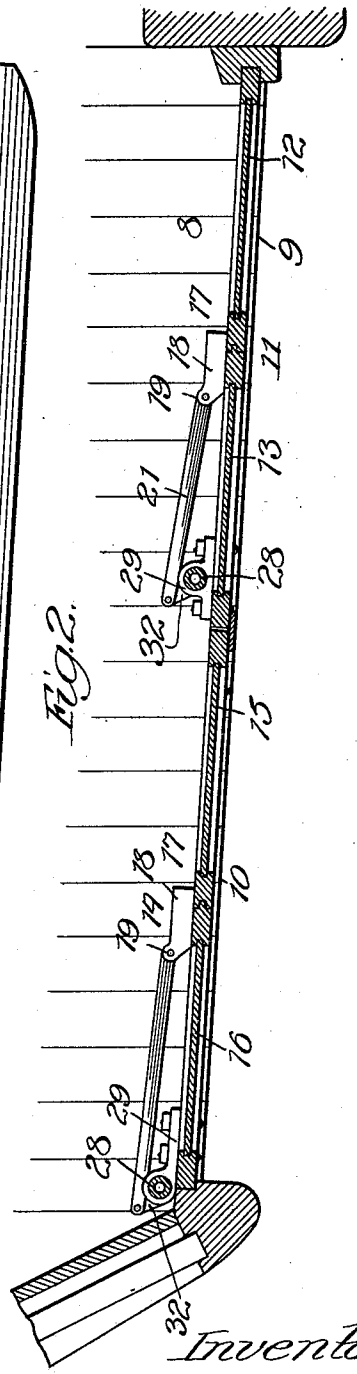

Fig. 2.

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3 SHEETS—SHEET 2.

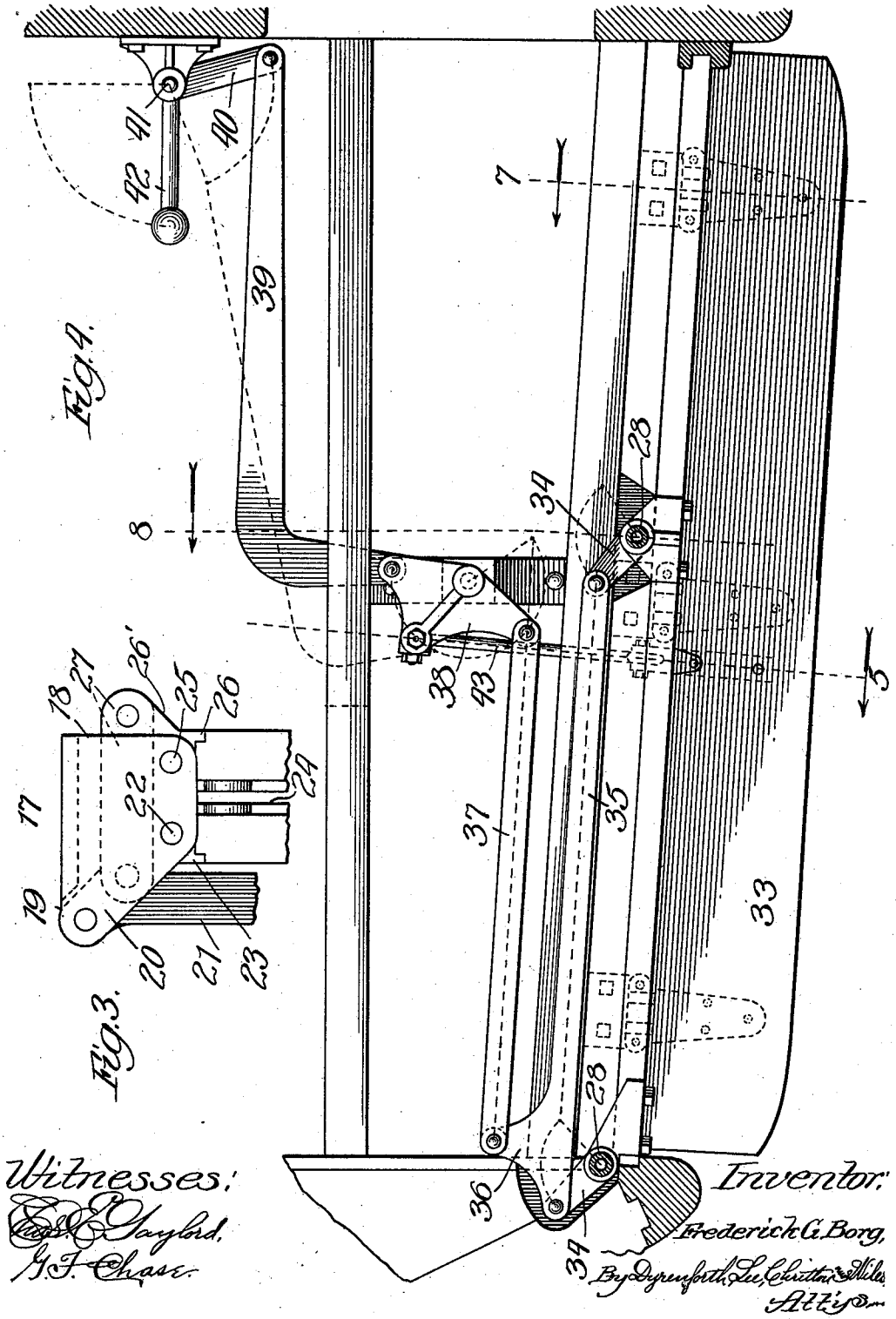

Fig. 4.

Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 5.

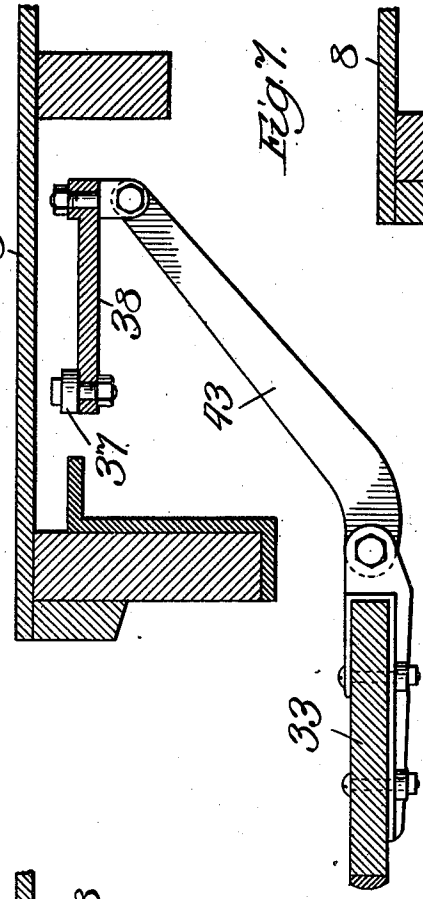


Fig. 7.

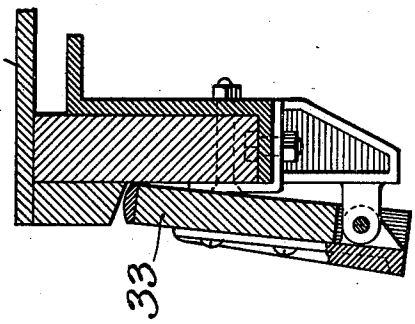


Fig. 8.

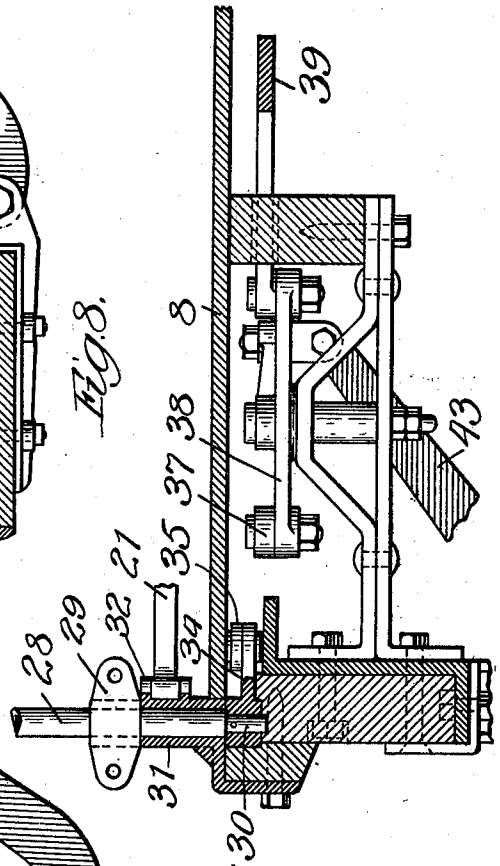
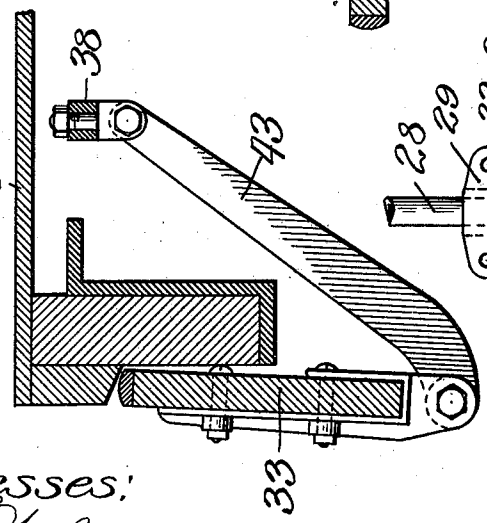


Fig. 6.



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UNITED STATES PATENT OFFICE.

FREDERICK G. BORG, OF CHICAGO, ILLINOIS.

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1,000,891. Specification of Letters Patent. Patented Aug. 15, 1911.

Original application filed January 16, 1911, Serial No. 602,800. Divided and this application filed March 11, 1911. Serial No. 613,894.

To all whom it may concern:

Be it known that I, FREDERICK G. BORG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Cars, of which the following is a specification.

My invention relates to an improvement in the door-operating mechanism of cars in connection with means for operating the car-step; and it is illustrated and described in my pending application for Letters Patent, Serial Number 602,800, filed January 16, 1911, of which the present application is a division.

As in my said application, the present improvement, being more especially designed for use on street-railway cars of the pay-as-you-enter variety, is hereinafter described in that particular connection and is so illustrated in the accompanying drawings, in which—

Figure 1 is a broken plan section showing part of one car-platform equipped with my improvement and representing the doors in their opened position with the step lowered; Fig. 2 is a similar view of the same showing the doors in their closed position whereby the step is hidden from view; Fig. 3 is a broken plan view showing the hinge-device in its position with the door-members controlled by it in their folded relation; Fig. 4 is a plan section taken just below the platform-floor, showing the preferred operating mechanism for the hinged doors and step; Fig. 5 is an enlarged section on line 5, Fig. 4, showing the hinged step in its lowered position; Fig. 6 is a similar view showing the step in its raised position; Fig. 7 is a section like that presented by Fig. 6 but taken, through a hinge-device, on line 7, Fig. 4, and Fig. 8 is a broken section on line 8, Fig. 4.

The platform 8 of a pay-as-you-enter street-car is usually arranged with a forward exit-way 9 and a rear entrance-way 10 for passengers, to require them in entering the car to pass the conductor, with a door for each way; and it is desirable to provide the platform with a hinged step to be folded or raised when the doors are closed. The purpose is to have the doors, under the control of the conductor, standing on the rear platform, closed and the step raised while the car is in motion to then prevent the exit and entrance of passengers, and to permit such exit and entrance only when the car comes to a stop. To this end I have applied my improvement in a manner to cause the doors to be simultaneously opened by folding them inwardly and closed by unfolding them, and at the same time to effect lowering and raising of the step; all from a single point.

A door 11, for the exit-way, is composed of two similar hingedly-folding members 12 and 13, and a similar door 14, for the entrance-way, is likewise composed of the members 15 and 16. A description of the construction of the door 11 will suffice, therefore, for both:

At a plurality of points the members 12 and 13 are connected at corresponding edges by similar hinge-devices 17. The construction of the hinge-device is shown and described in detail in three different forms in my said pending application, and any one of said forms may be employed with the present improvement. That illustrated in the present connection, which corresponds with the one referred to as representing the preferred construction in said former application, comprises a metal housing 18 (Fig. 3) of general U-shape, having a perforated extension 19 on one end in the nature of a crank-arm, in which is pivoted one end of a head 20 extending diagonally of an end of a tie-link 21. The housing is pivoted at 22 to a metal head 23, into which the edge of the door-member 13 is mortised, and which has a strap-extension 24 extending transversely of that member, to which it is screwed at a plurality of points. The housing has also pivoted in it, at 25, a metal head 26, into which the edge of the door-member 12 is mortised; and this head, which has a crank-like extension 26^1 is connected from the latter by a link 27 with the diagonal head 20.

A vertical rock-shaft 28 is secured in brackets 29 fastened at intervals to the door-member 13 near one edge. The shaft is shown tubular with a bearing-pin 30 driven into its lower end (Fig. 8), about which it is rotatably confined in a sleeve-bearing 31 secured in proper position to the framework of the car. The upper end of the tubular shaft (not shown) is similarly equipped and journaled. From each bearing 31 extends a rigid arm 32, with which a tie-link 21 is pivotally connected, thereby tying each hinge-device, from the crank-ex-

tension 19 of its housing 18 through the medium of a tie-link, to a stationary object (arm 32) eccentric to the axis 28.

By turning the shaft 28 in either direction it necessarily turns in that direction the door-member 13 to which it is fastened, while turning the companion door-member in the opposite direction. Thus with the members of the door 11 in their folded position represented in Fig. 1, turning the shaft 28 through a quarter-turn toward the right turns the member 13 to the closed position in which it is represented in Fig. 2, and in thus turning, the links 21 swing with it but being fastened at 32, whereby they cannot elongate, the movement of the member 13 causes these links to turn the housings of all the hinge-devices on their pivots 22 with the effect of causing the links 27, by their connection with the heads 20, to be pulled in the direction to cause them, by their connection with the heads 26, to turn the member 12 to the closing position. The hinged edges of the door-members are thus caused to meet. Obviously, by turning the actuating rock-shaft in the opposite direction, the housings 18 are turned on their pivots 22 to restore the parts of the hinge-devices to their relative positions to fold the door-members outwardly into the position of the door 11 in Fig. 1.

A step 33 is hinged at three points, as indicated in Fig. 4, to a sill of the frame-work of the platform.

For operating both doors 11 and 14 and the step 33 simultaneously the mechanism is provided which is illustrated in Fig. 4, and described as follows: To the lower end of each rock-shaft 28, on the projecting end of the pin 30 thereon, is fastened a crank 34 (Figs. 4 and 8). A link 35 connected at one end with one crank 34 is connected at its opposite end to the other crank 34, adjacent to which it is provided with a laterally-extending arm 36 connected by a link 37 with one arm of a three-armed bell-crank 38, fulcrumed as shown in Fig. 4, the opposite arm of which is connected by a bent link 39 with a crank 40 on a vertical shaft 41 jornaled in bearings in suitable position on the car-platform for convenient access by the conductor to an operating lever 42 on the shaft. The intermediate arm of the bell-crank 38 is connected by a link 43 to the step behind its line of hinging and centrally between its ends.

With the parts in the relative positions of their full line representation in Fig. 4, the doors are open and the step is down, as shown in Fig. 1, and by turning the lever 42 to bring the parts to the dotted positions, the doors are closed and the step is raised, as shown in Fig. 2.

What I claim as new and desire to secure by Letters Patent, is—

1. In combination with a car-platform, a door formed of folding members, a shaft journaled on said platform and secured to a member of the door, hinge-devices on the door each comprising heads on the adjacent door-members connected together to turn in relatively-opposite directions by turning one head, and correspondingly turn said members, links connecting the hinge-devices with stationary points on the car adjacent to said shaft, a crank on said shaft, a step hinged to the platform, and lever-operated mechanism connected with said crank and step for turning said shaft and raising and lowering the step.

2. In combination with a car-platform, a plurality of doors each formed of folding members, vertical shafts journaled in bearings on said platform and each secured to a member of a different door, hinge-devices on the doors, each comprising heads on adjacent door-members connected together to turn in relatively-opposite directions by turning one head and correspondingly turn said members, links connecting the hinge-devices with stationary points on the car adjacent to said shafts, cranks on the shafts, a step hinged to the platform, and lever-operated mechanism connected with said cranks and step for turning the shafts and raising and lowering the step.

3. In combination with a car-platform, a plurality of doors each formed of folding members, vertical shafts journaled in bearings on said platforms and each secured to a member of a different door, hinge-devices on the doors, each comprising heads on adjacent door-members connected together to turn in relatively-opposite directions by turning one head and correspondingly turn said members, links connecting the hinge-devices with stationary points on the car adjacent to said shafts, cranks on the shafts, a step hinged to the platform, and mechanism for actuating the shafts and steps from the platform comprising a link connecting said cranks and provided on one end with a laterally-extending arm, a bell-crank fulcrumed on the frame-work of said platform, a link connecting said bell-crank and arm, a link-connection between said bell-crank and step, an operating-shaft journaled on the platform and provided with an operating-lever and a crank, and a link connecting the crank of the operating-shaft with said bell-crank.

FREDERICK G. BORG.

In the presence of—
L. HEISLAR,
R. SCHAEFER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."