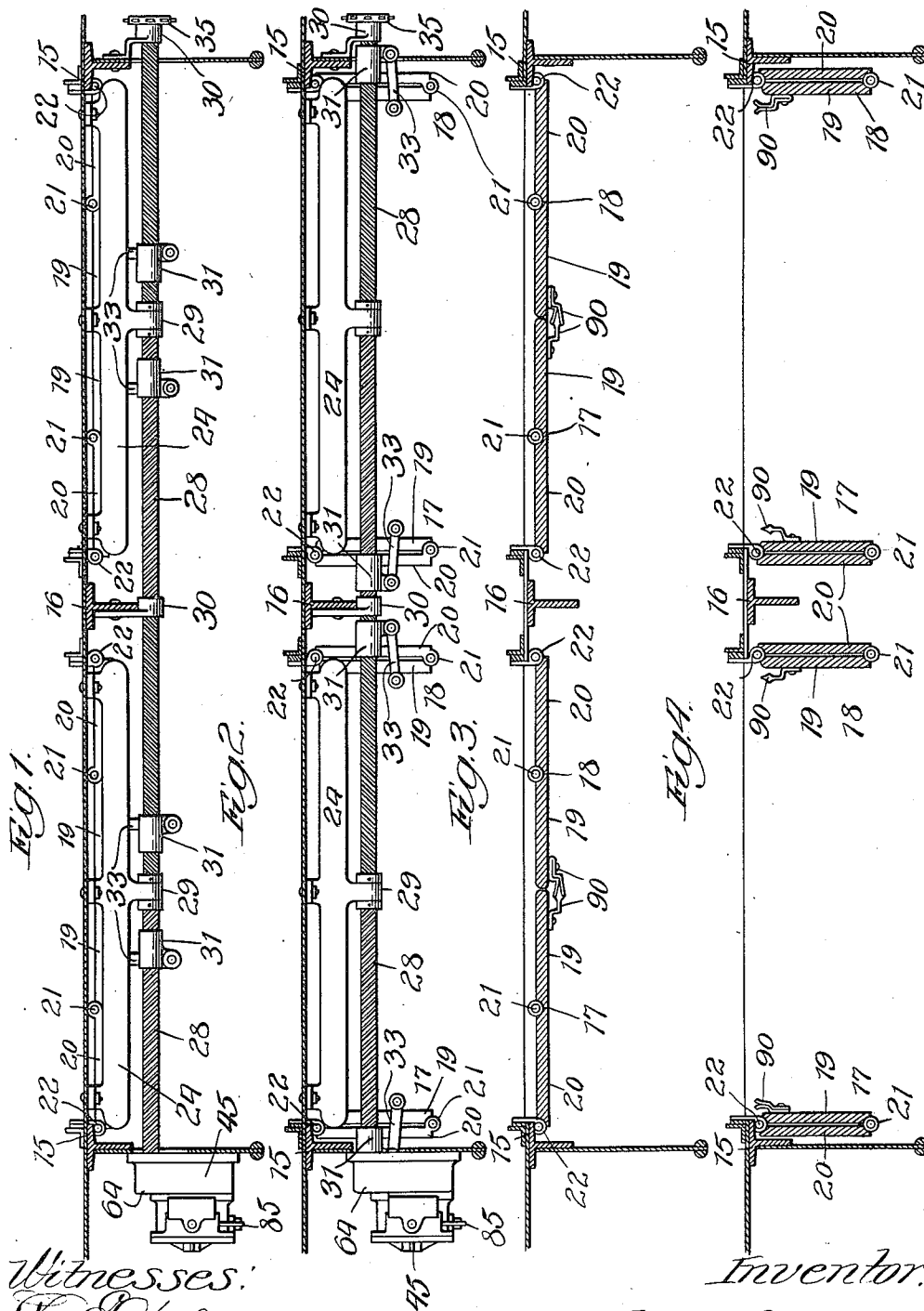


C. H. ANDERSON.
CAR DOOR AND OPERATING MEANS THEREFOR.
APPLICATION FILED NOV. 12, 1910.

1,051,054.

Patented Jan. 21, 1913.

5 SHEETS—SHEET 1.



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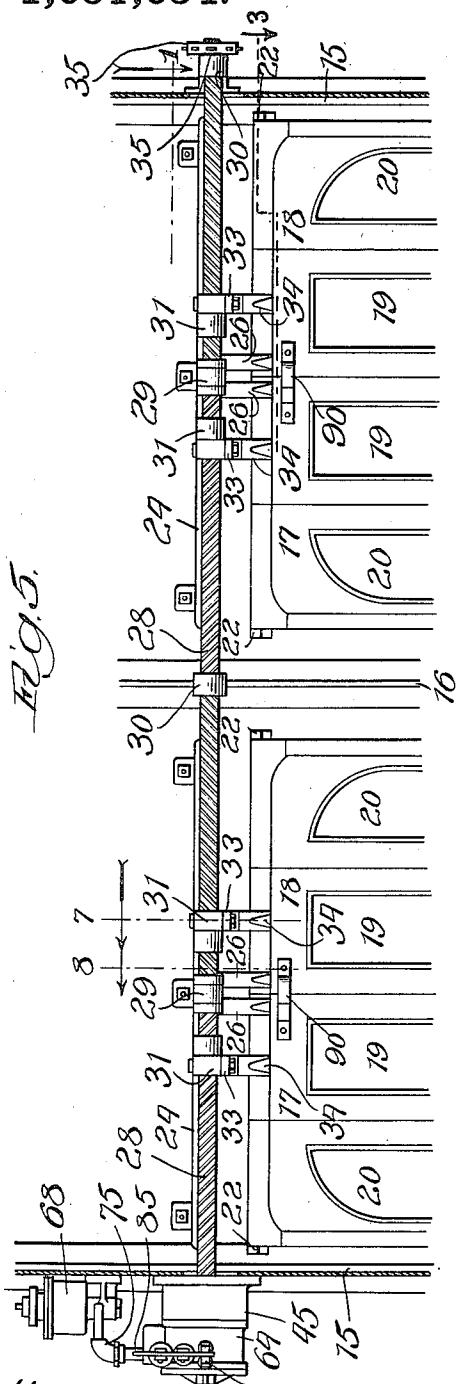


Fig. 5.

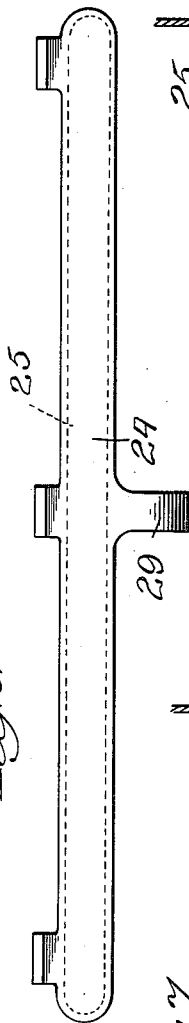


Fig. 6.

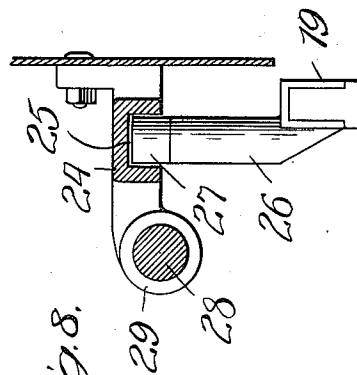


Fig. 7.

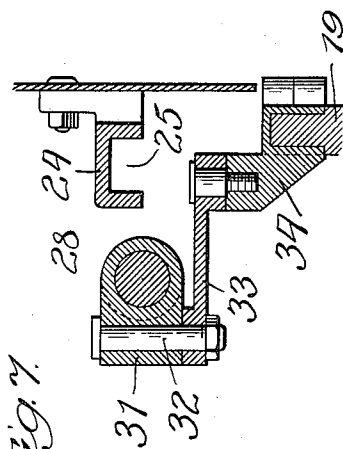


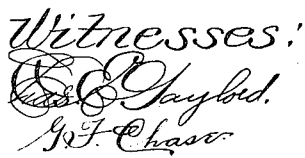
Fig. 8.

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1,051,054.

5 SHEETS—SHEET 3.



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1,051,054.

Patented Jan. 21, 1913.

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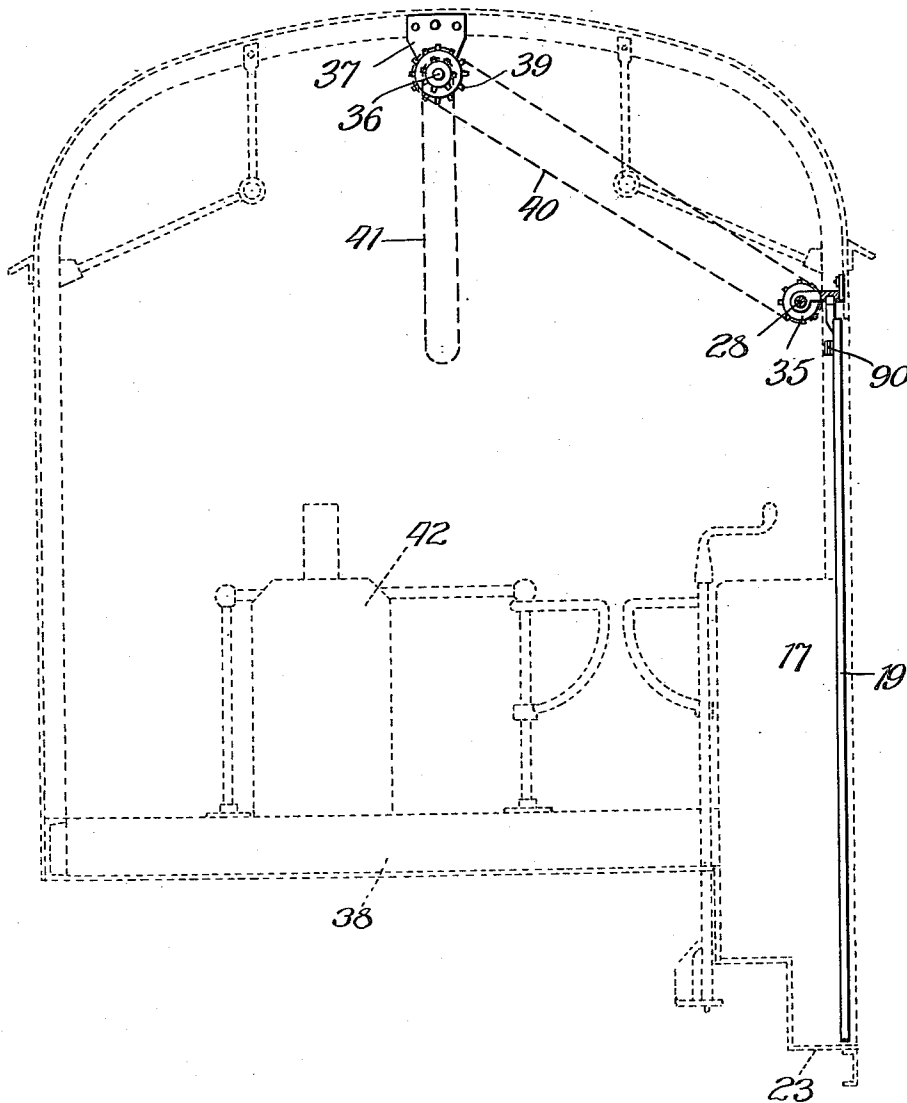
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5 SHEETS-SHEET 5.

Fig. 13.



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UNITED STATES PATENT OFFICE.

CHARLES H. ANDERSON, OF SEATTLE, WASHINGTON.

CAR-DOOR AND OPERATING MEANS THEREFOR.

1,051,054.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed November 12, 1910. Serial No. 592,036.

To all whom it may concern:

Be it known that I, CHARLES H. ANDERSON, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented a new and useful Car-Door and Operating Means Therefor, of which the following is a specification.

My object is to provide a car-door and operating means therefor, all of an improved construction adapted, more especially, for side-entrance passenger-coaches employed in interurban service.

I have devised my invention with a view to providing a car with entrance and exit doors which may be quickly opened and closed from a distance and which in opening fold in a manner to occupy but little space, as required by the construction of the car. In interurban service to avoid danger of accident the car-doors should be operated only by one in authority. In the case of a train of several cars it is desirable that the doors of all the cars should be opened by the motorman when he comes to a full stop and be closed by the conductor or collector on each car, whereby the closing of the door last closed may be utilized to operate as a signal to the motorman to start the train. In the case of a single car of the pay-as-you-enter or pay-within type, where the conductor remains in one position, the opening and closing of the doors may safely be left to him.

In the accompanying drawings, wherein my improvements are illustrated as applied to a steel car of the general construction shown and described, for example, in Letters Patent No. 943,213, granted to me December 14, 1909, Figures 1 and 2 are plan sections taken in a plane above the side entrance and exit doors of the car, on line 1 in Fig. 5 and show, respectively, the door-operating mechanism in its door-closing and door-opening positions; Figs. 3 and 4, plan sections taken on line 3 in Fig. 5, and showing, respectively, the doors in closed and open position; Fig. 5, an elevation of the upper portions of the doors and their operating mechanism taken from the inner side of the car; Fig. 6, an enlarged plan view of one of the roller-guides forming a detail of the construction; Figs. 7 and 8, enlarged broken sections taken, respectively, on lines 7 and

8, in Fig. 5; Fig. 9, an enlarged broken sectional view on line 9 in Fig. 11, showing electro-pneumatic door-opening and-closing mechanism whereby the doors may be opened by the motorman and closed by the conductor; Fig. 10, a diagrammatic view of an electric circuit; Fig. 11, a section on line 11 in Fig. 9; Fig. 12, a section on line 12 in Fig. 11; and Fig. 13, a view in the nature of a cross-section of the body of a pay-as-you-enter, side-entrance car, showing means whereby the door may be both opened and closed from the conductor's position.

The numerals 15 represent the door-posts and 16 the center-post which divides the opening in the side of the car into two door-ways. In each of said door-ways is a pair of right and left doors or door-sections 17, 18, each formed of a pair of vertically-extending members 19, 20 fastened together with hinges 21. The doors are fastened by means of the hinges 22 to the door-posts 15, 16 and the free edges of each pair of door-members 19 meet when the doors are closed, as indicated in Fig. 3. In opening the door-members fold upon their hinges 21 as illustrated in Fig. 4. When closed the doors extend approximately flush with the outer side of the car-body and in opening they fold over only the lowermost step indicated in Fig. 13.

Extending across the top of each pair of doors is a roller-guide plate 24 fastened securely in place and having a groove in its under side. Extending upward from the free edge-portion of each door-member 19 is a pin 26 carrying a roller 27 which runs in the groove of the respective plate 24. Mounted in front of the plates 24 is a horizontal shaft 28 passing through the bearing-projections 29 on the said plates 24 and through bearing-brackets 30 on the door-posts. The shaft is formed with the alternate right and left hand screws, as indicated, each of said screws carrying a traveling nut, sleeve or slide 31 provided with a pin 32 pivotally connected by means of a horizontal swing-link 33 with a bracket 34 secured to the top of the adjacent door-member 19. When the shaft 28 is turned to cause the sleeves 31 to slide toward the respective bearings 29 the doors are unfolded and closed, the free edges of the door-sections 19 being guided to move in a straight line by the travel of the rollers 27

in the guide grooves 25. When the shaft 28 is turned in the opposite direction the slides 31 of each pair of doors travel away from each other causing their links 33 to flex the door-members on their hinges 21 and draw and fold them in an out of the way position, as indicated in Fig. 4, to open the door-ways.

Where, as before stated, the door is to be opened and closed from the conductor's position, the shaft 28 may be provided in any convenient position along the same with a sprocket-wheel 35, and, as shown in Fig. 13, a short shaft 36 may be mounted in bearings 37 above the conductor's platform 38. The shaft 36 carries a sprocket 39 connected by a chain 40 with the sprocket 35, and it also carries a sprocket over which extends an endless chain 41 hanging near the fare-box 42 convenient to the conductor's position. A downward pull upon the chain 41 from one side will rotate the shaft 28 and open the doors 17, 18, and a downward pull upon the said chain from the opposite side will close the said doors.

Mounted at one end of the screw-shaft 28 is an air-motor 45 having an air-cylinder 46 and an oil-cylinder 47. Extending through the said cylinders is a shaft 48 carrying a vane 49 in the air-cylinder 46 and a vane 50, in the oil-cylinder 47, provided with an opening 51. On the cylinder 46 is a valve-box 52 having a chamber 53 fitted with a slide-valve consisting of a stem 54 and pistons 55, 56. In the valve-box are a central port 57 and exhaust ports 58, 59. The valve-chamber 53 communicates with the air-cylinder through ports 60 and 61, in the relative positions shown and at opposite sides of a radial partition 62. In the oil-chamber 47 is a radial partition 63. Forming part of the air-motor structure is a gear-casing 64 containing a gear-wheel 65 keyed to the shaft 48. The gear 65 meshes with a pinion 66 on the screw-shaft 28.

The pipe 67 shown in Fig. 9 may communicate with a source of fluid pressure as the main-reservoir of an air-brake system with which the car is equipped. The numeral 68 designates a magnetic-valve device containing a magnet 69 having a hollow core 70 and an armature 71 on a stem 73. The shell of the device 68 contains a port and valve-seat 74 through which communication is had from the pipe 67 to a pipe 75 connected with the port 57 of the valve-device 52. The said shell also contains a port and valve-seat 76 through which communication is had between the pipe 75 and an exhaust port 77. The stem 73 carries a valve 78 for the port 76 and a valve 79 for the port 74. A spring 80 serves normally to raise the stem 73 and armature 71 whereby the valve 79 closes the port 74 and the valve 78 is open. The valve-device 68 is of a well-known construction

and, it is thought, needs no further description in the present connection. The magnet is in circuit with a battery or generator 81 and a normally open contact-switch 82 is interposed in the circuit in the motorman's cab. On the casing 45 is a pair of contact-springs 83 wired to a circuit, having a current supplier 83^a, as indicated in Fig. 10, and insulated from the casing. Pivoted to a bearing 84 on the casing 45 is a lever 85 pivotally connected with the slide-valve stem 54 and held in the normal position shown in Fig. 9 by a spring 86. Connected with the lever is a cord 87 which may extend through the car in any convenient manner. The lower end-portion 88 of the lever is adapted to enter between the spring-contacts 83 and close the circuit therethrough. In practice, the chamber 47 is filled with oil.

When the vanes 49, 50 carried by the shaft 48 are in the position shown, the sleeves 31 on the screw-shaft 28 are slid to the position shown in Fig. 1, and the car-doors are closed. The slide-valve in the chamber 53 opens communication through said chamber between the ports 57 and 60 and between the port 61 and exhaust-port 58. In practice, when the train comes to a full stop the motorman by closing the switch 82 will excite the magnet 69 and cause it to draw down the armature 71, close the valve 78 and open the valve 79. This causes air from the pipe 67 to pass through the port 74, pipe 75 and ports 57, 60 into the cylinder 46 and drive the vane 49 in the direction of the arrow until it arrives at the opposite side of the partition 62. The air in front of the vane exhausts through the ports 61, 58. In this movement of the vane 49 the shaft 48 and gear 65 are given nearly one revolution, whereby they turn the pinion 66 and shaft 28 several revolutions and sufficiently to move the slides 31 to open and fold the doors into the position shown in Figs. 2 and 4. The purpose of the oil-chamber 47 and perforated vane 50 therein is to cause the shaft 48 to turn with the desired moderate speed and without jar.

When the doors are opened the motorman may open the switch at 82, thus breaking the circuit and permitting the spring 80 to close the valve 79 and open the valve 78. When the conductor desires to close the doors he pulls upon the cord 87, thereby sliding the valve to open communication between the ports 57, 61 and between the port 60 and exhaust port 59. At the same time the part 88 of the lever closes the circuit at the contacts 83, causing the magnetic valve 68 to open the port 74 and close the port 76, whereby air-pressure from the pipe 67 will be exerted against the vane 49 to turn it back to the initial position shown, thus closing the doors.

It is to be understood that where the train is made up of two or more cars, the electric

circuit wires would be coupled together between cars, so that all the doors can be opened by the motorman from the motorman's cab.

5 When the valves on the spring returned stems are in their normal positions, indicated in Fig. 9, the car-doors may be readily opened and closed by the conductor, employing the mechanism shown in Fig. 13, because the exhaust ports 58, 76, for the
10 cylinder 46 at opposite sides of the vane 49, are both open. The motorman may open all the doors, as described, but he cannot close them owing to the positions of the
15 slide-valves 55, 56. The conductor can close the doors on his own car, by pulling the cord 87, but cannot open them by that means.

For purposes of illustration merely, I show in Fig. 3 electric contact-fingers 90
20 which come together when the doors are completely closed. These contacts form making and breaking points in a single electric circuit which extends throughout the train and is arranged to operate a suitable
25 signaling device in the motorman's cab. The circuit is open until all the doors are closed, and when this is effected the signal is actuated to inform the motorman of the fact that he may start the train.
30 This system of signaling the motorman to start by the closing of the last door requires such a simple and apparent electric installation that it is not thought necessary, in the present case, to encumber the drawings with
35 a full illustration thereof.

While I prefer to construct my improvements throughout as shown and described, they may be variously modified as to details without departing from the spirit of
40 my invention as defined by the claims.

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

1. In a railway-car, the combination with the entrance-way, of a door therefor hung to swing horizontally on one edge and formed
45 of vertical door-members hinged together so as to be foldable, a stationary guide extending parallel with the door when closed, and door opening and closing means comprising a screw-shaft, a slide upon said
50 shaft, a swing-link connecting said slide with one of said door-members and means for rotating said shaft alternately in opposite directions.

2. In a railway-car the combination with
55 the entrance-way, of a pair of oppositely-swinging doors therefor, each hinged at one edge and formed of members hinged together so as to be foldable, a stationary guide extending parallel with both doors
60 when closed, and means for opening and closing both doors comprising a shaft provided with oppositely-threaded screw-sections, a slide upon each of said screw-sections, a swing-link connecting a member of
65 each door with one of said slides, and means for rotating said shaft alternately in opposite directions.

3. In a railway-car the combination with the entrance-way, of a door therefor, and
70 door-opening and closing means comprising a screw shaft, a slide upon the shaft, a swing-link connection between the slide and door, a motor operatively geared to said shaft, and means for starting, for stopping
75 and for reversing said motor.

CHARLES H. ANDERSON.

In presence of—

R. A. RAYMOND,
L. HEISLAR.