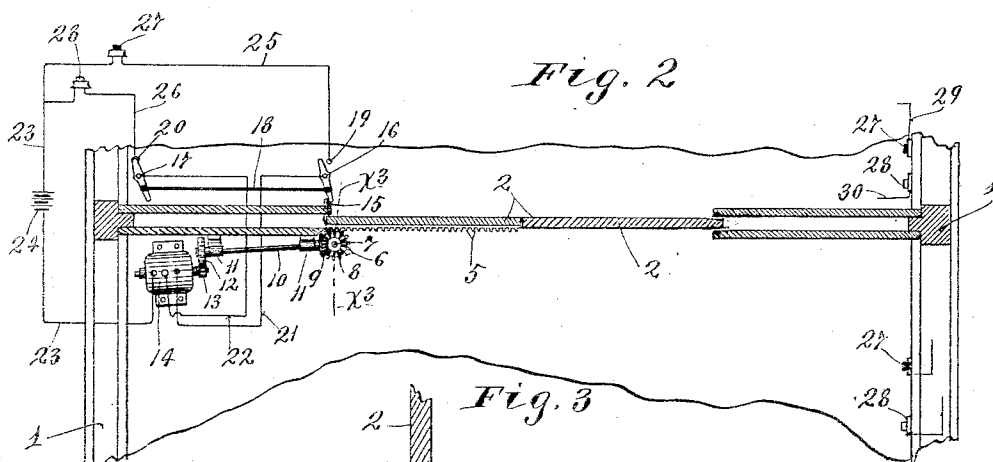
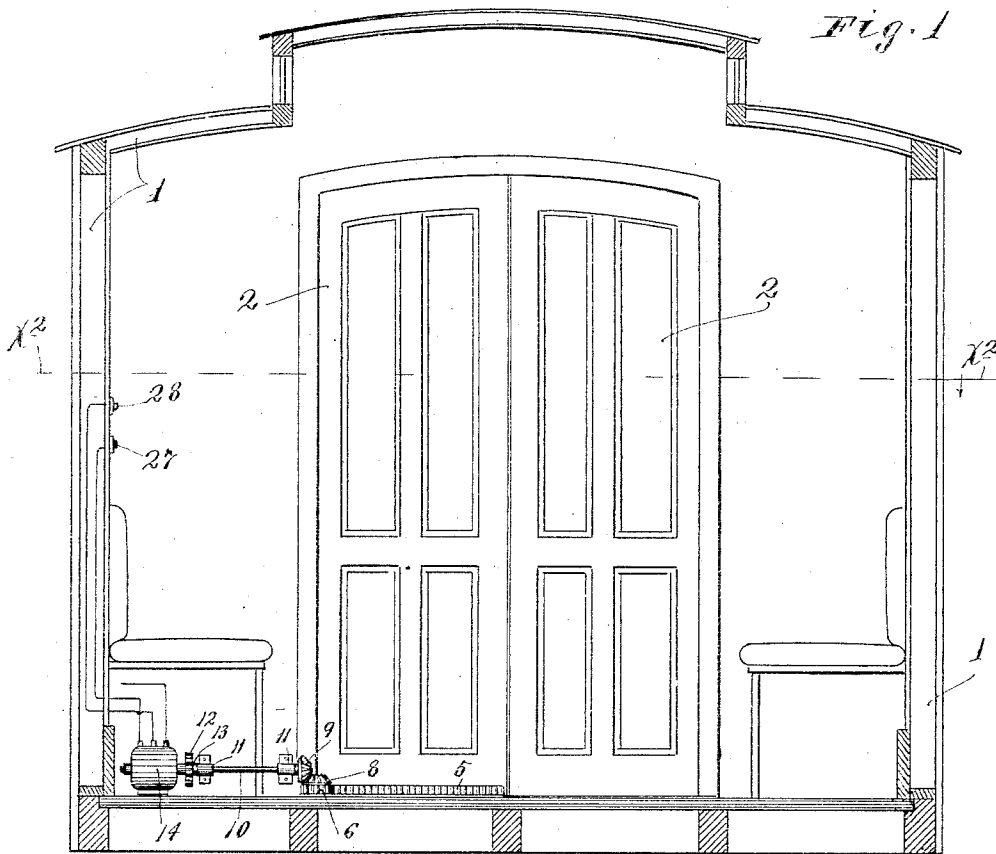


1,057,547.

Fig. 1



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN P. HEIMER AND WILLIAM A. HEIMER, OF MINNEAPOLIS, MINNESOTA.

DOOR-OPERATING MECHANISM.

1,057,647.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed January 22, 1912. Serial No. 672,663.

To all whom it may concern:

Be it known that we, JOHN P. HEIMER and WILLIAM A. HEIMER, citizens of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Door-Operating Mechanism; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention has for its object to provide an improved door operating device, especially adapted for use in opening and closing the doors of street cars and the like, and to this end, the invention consists of the novel devices and combinations of devices hereinafter defined and described in the claim.

The invention is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view showing a street car in transverse vertical section and also showing our invention applied thereto in working position, some parts being shown in side elevation and other parts being shown in diagram; Fig. 2 is a horizontal section, taken on the line $x^2 x^2$ of Fig. 1; and Fig. 3 is a detail view, in vertical section, taken on the line $x^3 x^3$ of Fig. 2.

The numeral 1 indicates a car body having at one end the customary pair of sliding doors 2. These doors, in actual practice, are mounted for sliding movements toward and from each other, and are connected, so that the movement of one door imparts a like movement to the other door. But for the purpose of this case, it is not thought necessary to illustrate the same. On the bottom of each door 2, is secured an inverted channel shaped guide bar 3, that embraces and is adapted to slide upon a horizontally extended guide rail 4 secured to the floor of the car body 1. The guide bar 3 and rail 4 hold the doors against lateral movements and guide the same in their opening and closing movements.

On one edge of one of the guide bars 3, as shown, the one at the left with respect to the drawings, is an integrally formed and horizontally extended rack 5. Meshing with the rack 5, is a spur gear 6 journaled on a short

vertically extended shaft 7 secured to the floor of the car body 1. Integrally formed with the spur gear 6 and located above the same, is a beveled gear 8 that meshes with a beveled pinion 9 rigidly secured at the outer end of a horizontally extended shaft 10. This shaft 10 is rotatively mounted in a pair of suitable bearings 11 rigidly secured to the car body 1. On the other or inner end of the shaft 10 is rigidly secured a spur gear 12 that meshes with a spur pinion 13 rigidly secured to the armature shaft of a motor 14. As shown, the motor 14 is located under one of the seats of the car body 1.

Secured to the outer lower edge of the door 2, to which the rack 5 is secured, is a laterally projecting striking pin 15. This pin 15 is adapted to operate, at the extreme opening and closing movements of the doors 2, a pair of horizontally spaced movable contact levers 16 and 17. The contact levers 16 and 17 are connected for simultaneous movements by means of a tie rod 18 which is insulated therefrom. The contact levers 16 and 17 are arranged to alternately engage a pair of fixed contacts 19 and 20 respectively.

The motor 14 has three lead wires indicated by the numerals 21, 22, and 23. The lead wire 21 is connected to the contact lever 16 and the lead wire 22 is connected to the contact lever 17. In the lead wire 23, is a battery 24 and this lead wire has two branch wires 25 and 26. The branch wires 25 and 26 are connected respectively to the fixed contacts 19 and 20. In the branch wire 25, is a normally open push button 27 and in the branch wire 26, is a normally open push button 28.

The operation of the improved door operating mechanism may be briefly described as follows: When the doors 2 are closed, as shown in the drawings, the contact lever 17 is in engagement with the contact 20 and closes the circuit through the lead wires 22 and 23 and the branch wire 26, except at the push button 28. By pressing on the push button 28, the circuit is closed thereby starting the motor 14 to run in the proper direction to open the doors 2. At the extreme opening movements of the doors 2, the striking pin 15 engages the contact lever 17 and moves the same out of engagement with the contact 20, thereby stopping the motor 14 by breaking the circuit between the lead wires 22 and 23 and the branch wire 26. At the

same time the contact lever 17 is moved out of engagement with the contact 20, it moves the contact lever 16, by means of the insulating connecting rod 18, into engagement with the contact 19. In this position of the mechanism, the circuit is closed through the lead wires 21 and 23 and the branch wire 25, except at the push button 27. By pressing the push button 27, the circuit is closed and the motor 14 is started to run in the proper direction to close the doors 2. At the extreme closing movements of the doors 2, the contact levers are again re-set in the positions shown in the drawings, by means of the pin 15 coming in contact with the contact lever 16. To permit the doors 2 to be opened and closed by the conductor or passengers from any part of the car, a plurality of sets of push buttons 27 and 28 are located at convenient points within the car and on the platform. The additional sets of push buttons 27 and 28 are connected to the main set of push buttons 27 and 28 by means of branch wires 29 and 30 respectively. In order to distinguish the push buttons 27 and 28 one from the other, the push buttons 27

are indicated in black and the push buttons 28 are indicated in white. As is evident, in place of the battery 24 any other source of electrical energy may be employed. 30

What we claim is:

The combination with a door mounted for sliding movement, and switch operating means carried thereby, of a motor, connections from said motor to said door for opening and closing the same including a rack and pinion, push buttons and electrical connections for starting said motor to drive the same in either direction, parallel switches, and a link connecting said switches for simultaneous movements, said switches arranged to be alternately operated by said switch operating means at the extreme movements of said door for throwing the motor out of action. 45

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN P. HEIMER.

WILLIAM A. HEIMER.

Witnesses:

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