To all whom it may concern:

Be it known that we, FRANK HEDLEY and JAMES S. DOYLE, both citizens of the United States, residing, respectively, at Yonkers and Mount Vernon, in the county of Westchester and State of New York, have made a certain new and useful Invention in Auxiliary Control Devices for Car-Doors, of which the following is a specification.

This invention relates to door control systems of the character set forth in our pending application, Serial No. 709,503, filed July 15, 1912, and particularly to auxiliary devices and connections for controlling the door movements.

The object of the invention is to provide auxiliary devices and connections whereby, in emergencies, the car door may be opened without regard to the ordinary system of control thereof.

A further object is to provide means whereby when the emergency brake or any other emergency device concerned in the safety operation of cars or trains is operated, the car doors will also be opened independently of the normal control system therefor.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts and circuit connections, all as will be more fully hereinafter set forth, as shown in the accompanying drawing and finally pointed out in the appended claims.

The single view of the drawing shows a circuit diagram illustrating a practical application of our invention.

In our application Serial No. 709,503, above referred to, we have shown, described and claimed a car control system wherein are employed means under the control of the conductor for opening and closing the car doors, but which means are ineffective, through the agency of suitable interlock connections, while the car is in motion, to accomplish their functions, and which, when the doors are open prevent the operation of the car propelling motor. The conductor's control devices, in the system referred to, includes a switch or push button designed to be operated by the conductor.

In the practical operation of cars or trains employing this safety system the exigency sometimes arises which requires an operation of the doors independently of their normal control system, as, for instance, in case the conductor's door control switch or push button should get out of order, or a short circuit in the system at some point, or for other reason liable to cause passengers in the car to become frightened. Such emergencies have occurred in the operation of street railway systems, and the inability, in the emergency, to effect the opening of the door increases the fright and alarm of the passengers and creates a panic condition which it is extremely desirable to avoid.

It is among the special purposes of our invention to provide auxiliary means for controlling the doors independently of the normal safety control system therefor, and, in one arrangement of practical application of our invention, we propose to utilize the emergency brake control in such manner that, when operated, to accomplish an emergency brake application, it will also effect the opening of the door, although it is evident that our invention contemplates the operation of the auxiliary door control coincidently with the operation of any other safety or emergency device.

In the drawing, 1 designates the car propelling motors, 2 the motorman's controller in the circuit thereof, 3, 4, respectively, the motor circuit closing and grounding switches, 5, a relay coil so connected and related as to be energized by the counter electro-motive force of the motor circuits, and which coil controls a switch 6 in the circuits of coils 7, 8, which control the door operating motors (not shown). The circuits of coils 7, 8, are grounded through switch devices 9, 10, under the control of the conductor. The motor circuit closing and grounding switches 3, 4, are controlled by coils 11, 12, in the safety control circuit which includes the usual conductor's emergency valve switch indicated at 13, the door interlock switch, indicated at 14, which is closed only when the associated door is closed, the fender interlock switch, indicated at 15, which is automatically opened when the car fender is tripped.

The parts and arrangements so far referred to may be of the type, detail construction, arrangement and relation and operation as more fully set forth in our application above referred to, and in the specific details thereof, form no part of our present invention.

The operation of the system referred to,
brieﬂy, is as follows: Assuming that the doors are all closed, the fender, door interlock emergency brake and other safety device switches are all closed, current ﬂows from the trolley or other source through wire 16, coils 11, 12, the various switches, safety interlocks and the like, 13, 14, 15, to ground at 17. This energizes coils 11, 12, thereby closing switches 3, 4. Thereupon the motor circuit is completed and controlled from trolley or other source through wire 17, switch 3, controller 2, motors 1, switch 4 to ground at 18. The operation of the motors builds up counter-electro-motive force in the circuit of relay coil 3, thereby opening switch 6. This condition continues till the motors are arrested, whereupon coil 6, is de-energized, thereby closing switch 6, and completing circuit from trolley or other source through wire 19, switch 6, coils 7, 8, to the conductor’s control switches 9, 10, by the closing of either or both of which the circuits of coils 7 or 8, or both are completed to ground thereby opening the door or doors, which also opens the door interlock switches 14, and hence opens the safety control circuit and thus causes the motor circuit closing switch 3 and grounding switch 4 to open. Now in case of any derangement of the system or apparatus of the nature above referred to which makes it advisable or desirable to open the doors independently of the normal control circuit therefor, we propose, in accordance with our present invention to provide an auxiliary circuit for the door control coils 7, 8, which, if desired, may be placed under the control of the conductor, and through the closing of which the doors may be opened. This auxiliary circuit may receive current from any desired or convenient source. In the arrangement shown, however, as illustrating a practical application of our invention, this auxiliary circuit includes the trolley or current source wire 19, counter-electromotive force relay operated switch 6, and coils 7, 8, but are by-passed around the conductor’s control switches 9, 10, to ground, respectively, through wires 20, 21, auxiliary switches 22, 23, and wires 24, 25, to ground at 26, 27. Thus, when either of the switches 22 or 23 is closed the circuit of the corresponding door control coil 7, 8, is closed thereby causing the door to open. In the particular arrangement shown, to which, however, our invention is not to be limited or restricted, this auxiliary circuit cannot be closed until the car stops because of the relay switch 6, therein which is closed only when there is no counter-electromotive force in the propelling motor circuit.

In accordance with our invention the switches 22, 23, in the auxiliary door control circuits are under the control of the conductor. A convenient arrangement is for these switches to be closed when the conductor’s emergency valve interlock switch 13 is opened. It is obvious, however, that said switches may be closed when any other desired emergency safety device is operated.

Having now set forth the objects and nature of our invention and a construction and arrangement embodying the principles thereof, what we claim as new and useful and of our own invention and desire to secure by Letters Patent is,—

1. The combination with a car door controlling device, a circuit therefor, including a control switch, of an auxiliary circuit for said device around said switch, and means to control said auxiliary circuit independently of said switch and without affecting the operation thereof.

2. The combination with a car door controlling device, a circuit therefor including a relay switch operated by the counter-electro-motive force of the car propelling motor circuit, said controlling device circuit also including a control switch, of a by-pass circuit connection around said control switch, and included in said controlling device circuit and means to control said by-pass circuit.

3. In a control system for car doors, a safety control circuit, a propelling motor operating circuit and a door control circuit, said door control circuit including an auxiliary by-pass circuit connection, means arranged in the motor operating circuit to control the door control circuit, and means in the safety control circuit to control the auxiliary by-pass circuit.

4. In a control system for car doors, safety devices, a propelling motor circuit, a door control circuit, a relay in said door control circuit, said relay operating to maintain said circuit open while the motors are operating, an auxiliary circuit for the door control, and means operated by the action of a safety device for closing said auxiliary circuit.

5. In a control system for car doors, safety devices, a propelling motor circuit, a door control circuit, a relay in said door control circuit, said relay operating to maintain said circuit open while the motors are operating, a manually controlled switch in said door control circuit, a by-pass auxiliary circuit around said manually controlled switch and connected to the door control circuit, and means to control said auxiliary circuit.

6. In a control system for car doors, a propelling motor circuit, a control circuit therefor, a door control circuit, a relay in said door control circuit, said relay operating to maintain said control circuit open while the motors are operating, a manually operated switch in said door control circuit, an auxiliary circuit connected to the door.
control circuit and forming a by-pass around said manually operated switch and means operated by the opening of the propelling motor control circuit for closing said auxiliary circuit.

In testimony whereof we have hereunto set our hands in the presence of the subscribing witnesses, on this 21st day of September A. D. 1914.

FRANK HEDLEY.
JAMES S. DOYLE.

Witnesses:

H. P. TITUS,
WARREN MARCUS.