To all whom it may concern:

Be it known that I, ANNA K. WINTER, a citizen of the United States, and resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Car-Door Safety Devices, of which the following is a specification.

The object of this invention is to provide means for arresting the closing movement of a door in a car when a passenger is in the act of moving through the doorway, either in or out of the car; which is effected by means of the passenger stepping on a plate in the doorway.

A further object of the invention is to provide a warning signal, such as a light or bell, that is operated at the end of the car where the guard is usually located to control the movement of the door, so as to warn him that a passenger is in the doorway and he can reverse the closing movement of the door.

In the accompanying drawing showing one embodiment of my invention, Figure 1 is a partial side view of a car showing the interior arrangement of the parts. Fig. 2 is a detail view showing the parts enlarged; and Fig. 3 is a cross-section on the line 3—3 of Fig. 2.

The car 4 is shown as having a sliding door 3 arranged to close the doorway 6 at the side of the car. Means are provided for engaging the door during its closing movement to arrest the door, that are controlled or actuated by the passenger stepping on a plate at the sill of the door. As shown, I provide a plate 7 that is located beneath the door in the closed position and projects beyond the same on each side. This plate 7 is shown as hinged at 8 at the end extending below the door in the open position, so that the portion of the plate exposed when the door is in the open position will be depressed by the weight of the passenger. To arrest the movement of the door in any position after it has started to close, I provide a toothed rack 9 on the door, preferably secured to its lower edge, and having ratchet teeth. A pawl 10 is pivoted below the door in the car and carries a plunger 12 that will be pressed upwardly by the pawl against the rack, that will engage with the teeth and prevent the closing movement of the door, but not interfere with the opening movement, as the pawl will ride over the inclined faces of the teeth during such movement. Means are provided for causing the depression of the sill plate 7 to swing the pawl 10 and raise its plunger 12. As shown, I provide an electrical control for such movement, by having an electromagnet 13, in a circuit including a contact plate 14 and a spring plunger 15 that is attached to the plate 7. A spring 16 keeps the plate 7 normally raised and the plate 14 separated from the plunger 15, that will break the circuit of the magnet. From this it will be readily understood that when a passenger entering or leaving the car, steps on the sill plate 7, the said circuit will be closed, and the magnet actuated, that will swing the pawl and its plunger to once engage the rack 9 on the door. This will at once arrest the closing movement of the door and hold the door against being closed as long as the pressure is on the contact plate. But as soon as the sill plate is raised the magnet will be de-energized and a coil spring 17 on the plunger 12 will retract the plunger and pawl 10, thus freeing the door.

For the purpose of warning the guard at the end of the car that the sill plate has been actuated and the door arrested, I provide a signal device, preferably by extending the circuit wires 18 and 19 to the end of the car to include a signal light 20, that may be a red light if desired. A bell 21 may be also placed in this circuit, or may be substituted for the red light if preferred. Either of these will warn the guard that the door has been arrested, and he will reverse the closing lever so that the door will swing to its open position again. This is permitted, although the passenger may still be depressing the sill plate, by reason of the ratchet teeth and the spring plunger engaging such teeth. When the door sill is depressed, the circuit is from the battery through wire 19 and the solenoid, sill plate 7, plunger 15, contact 14, wire 18, signals 20 and 21 and back to the battery through wire 19.

An arrangement of this character can be applied to the existing form of cars, by merely attaching the ratchet plate to the bottom edge of the door, and arranging the pawl and plunger with the magnet below the same; and inserting the sill plate with the circuit closing means in connection therewith. The circuit can be actuated by a battery, or the current for the electric lights and power of the car could be employed.
It may sometimes occur that a passenger might keep his foot on the sill plate when inside of the car and thus prevent the door being closed by the guard at the proper time. In order to notify such passenger that the door cannot be closed because of this contingency, I provide an indicating device that can be actuated by the guard at the end of the car. As shown, a signal device such as a frame 22 is arranged near the door, that may have a suitable legend thereon such as “step-off sill plate.” One or more electric lights can be arranged back of this plate that may be colored or not, which lights are in circuit with push button 23 at the end of the car. By pushing this button, the guard can flash this signal device to call the attention of the person who is interfering with the proper closing of the door.

Having thus described my invention, what I claim is—

1. In a car, the combination with the side having a doorway and a door slidable to close the doorway, of a sill plate pivoted at the doorway beneath the door so as to be held operatively disposed thereby in its closed position and arranged to be depressed by a passenger when the door is open, and means for arresting the closing movement of the door that is caused to operate by the said depression of the sill plate.

2. In a car, the combination with the side having a doorway and a door slidable to close the doorway, of a sill plate pivoted at its inner end in the doorway and beneath the door in its closed position and arranged to be depressed by a passenger when the door is open, means for arresting the closing movement of the door that is caused to operate by the said depression of the sill plate, said means including a contact carried by the opposite end of the sill plate for closing an electric circuit, and a signal device included in the circuit and located at a part of the car remote from the doorway, that is operated by the sill plate of the door during the closing movement of the door.

3. In a car, the combination with the side having a doorway, and a door slidable to close the doorway, of a sill plate located at the doorway beneath the door in closed position and arranged to be depressed by a passenger when the door is open, a toothed rack on one edge of the door, a pawl on the car arranged to engage the teeth of the rack when swung from normal position, a bell crank for sliding the pawl to engage the rack and arrest the closing movement of the door, and a magnet included in a circuit closable upon the depression of the sill plate for rocking the bell crank.

4. In a car, the combination with the side having a doorway, and a door slidable to close the doorway, of a sill plate located at the doorway beneath the door in closed position and arranged to be depressed by a passenger when the door is open, a toothed rack on the lower edge of the door, a vertically movable, spring actuated pawl on the car arranged to engage the teeth of the rack when moved from normal position, an electromagnet arranged to shift the pawl to engage the rack, an electric circuit including said magnet, and a switch in said circuit normally open but arranged to be closed on depression of the sill plate by the passenger whereby the electromagnet will swing the pawl into the rack and arrest the closing movement of the door.

5. In a car, the combination with the side having a doorway, and a door slidable to close the doorway, of a sill plate located at the doorway beneath the door in closed position and arranged to be depressed by a passenger when the door is open, a toothed rack on the lower edge of the door, a vertically movable pawl on the car arranged to engage the teeth of the rack when moved from normal position, a bell crank lever having the pawl seated on one arm, an electromagnet arranged to attract the other arm of the bell crank lever to shift the pawl to engage the rack, an electric circuit including said magnet, a switch in said circuit normally open but arranged to be closed on depression of the sill plate by the passenger whereby the electromagnet will swing the pawl into the rack and arrest the closing movement of the door, and a signal light at a remote part of the car connected with said circuit to be lighted when it is closed by the sill plate.

ANNA K. WINTER.