(No Model.)

2 Sheets—Sheet 1.

A. M. KING.

CAR DOOR OPERATING MECHANISM.

No. 523,213. Patented July 17, 1894.

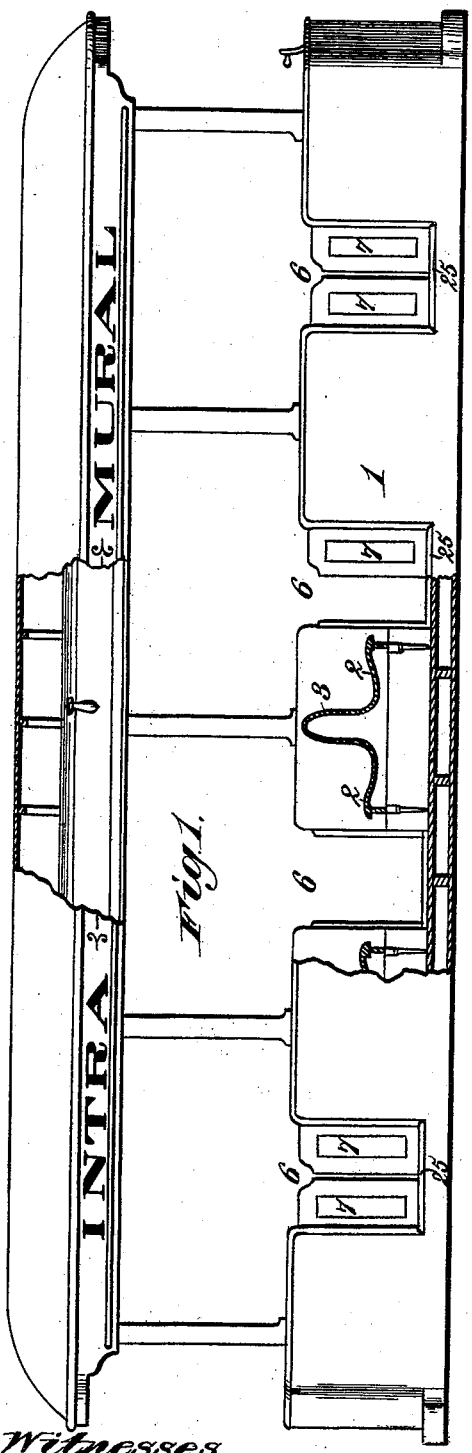


Fig. 1.

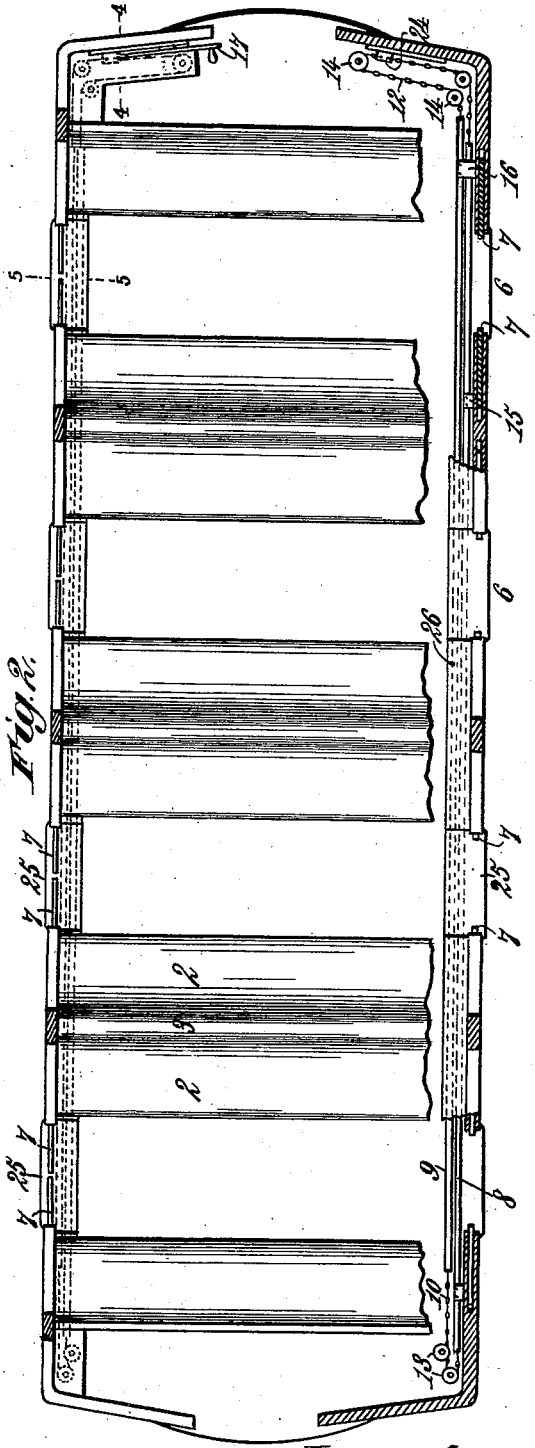


Fig. 2.

Witnesses,
Robt. Burnett.
G. W. Rea.

Inventor.
Albert M. King.
By James L. Norris.
Atty.

(No Model.) 2 Sheets—Sheet 2.

A. M. KING.

CAR DOOR OPERATING MECHANISM.

No. 523,213. Patented July 17, 1894.

Fig. 3.

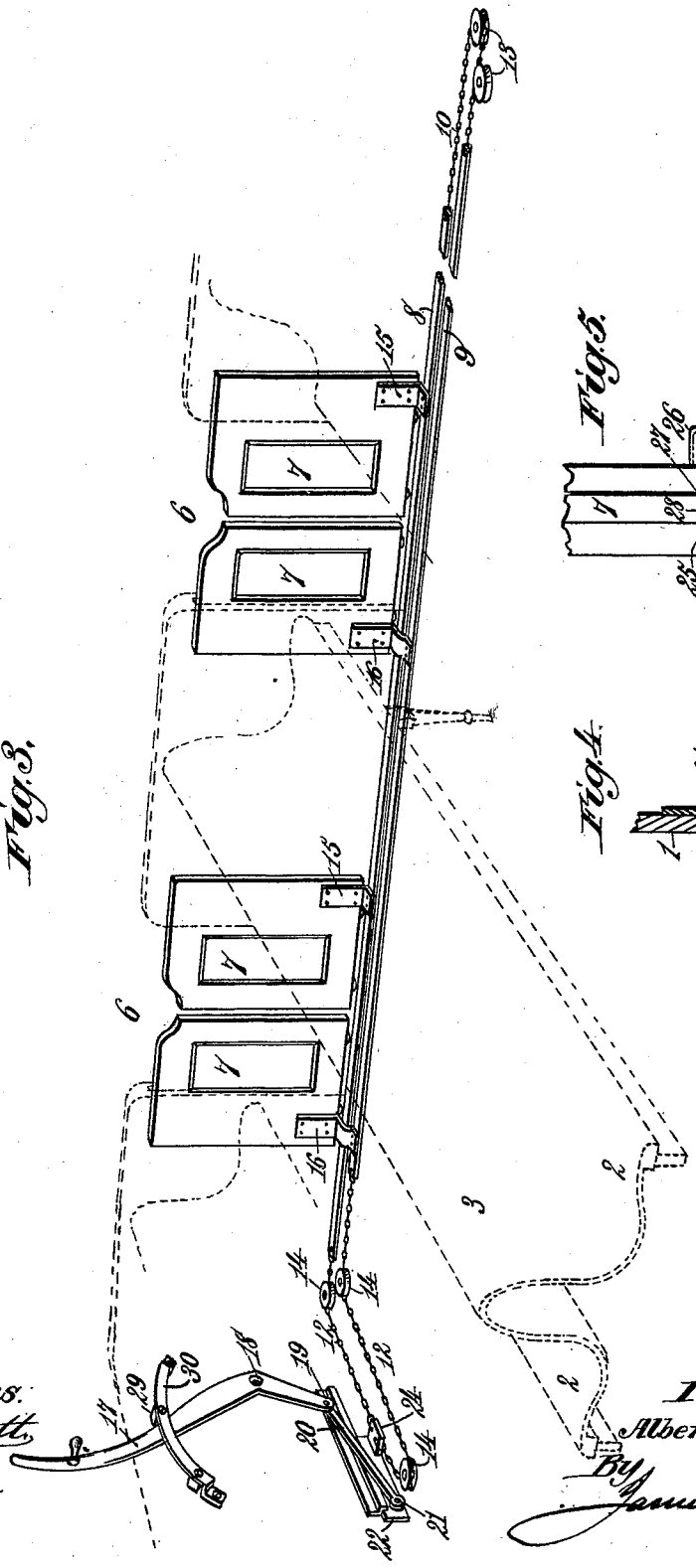


Fig. 5.

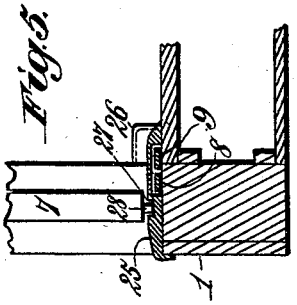
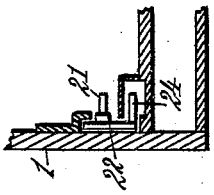


Fig. 4.



Witnesses.
Robert Everett,
G. W. Rea

Inventor:
Albert M. King.
By James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

ALBERT M. KING, OF WILMINGTON, DELAWARE.

CAR-DOOR-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 523,213, dated July 17, 1894.

Application filed February 8, 1894. Serial No. 499,525. (No model.)

To all whom it may concern:

Be it known that I, ALBERT M. KING, a citizen of the United States, residing at Wilmington, in the county of New Castle and State of Delaware, have invented new and useful Improvements in Car-Door-Operating Mechanism, of which the following is a specification.

This invention relates to railway cars or wheeled vehicles having a series of sliding doors disposed at intervals along one or both sides of the car body for opening and closing exit and inlet passages or door ways between the ends of transverse seat frames which extend the full width of the car body.

The invention is particularly designed for open or summer cars, or coaches on elevated tracks, but is useful with box or other cars, or wheeled vehicles moved on surface tracks or roads by steam, cable, electric, or other motive power.

The objects of the present invention are to provide new and improved means for simultaneously sliding the doors to their open or closed positions; and to lock or hold them, when closed, so that it is impossible to open the same until the devices, under control of the authorized attendants or employés, are manipulated, thus avoiding the possibility of accidents resulting from passengers opening the doors while the train or car is in motion.

To accomplish these objects my invention consists in the features of construction and the combination or arrangement of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a broken side elevation of the body of an open or summer car, provided with my invention. Fig. 2 is a sectional plan view of the same. Fig. 3 is a detail perspective view, showing two pairs of sliding doors, and the operating mechanism, and indicating by dotted lines one of the seat frames, and portions of the car-body. Fig. 4 is a detail vertical sectional view, taken on the line 4—4, Fig. 2; and Fig. 5 is a detail sectional view taken on the line 5—5, Fig. 2.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein the numeral 1 indicates the body of a passenger car of the open or summer type, wherein the seats 2 and seat frames 3 extend the full width of the car-body, and are separated a sufficient distance apart to accommodate the passengers who enter and leave the car through passages or door-ways 6, provided at intervals in the opposite side walls of the car body at points between the ends of the seats. The number of seats and door-ways will vary according to the conditions required, and therefore I do not wish to be understood as limiting myself in this respect.

The sliding car doors 7 are arranged in a series at each side of the car, and a pair of doors is used to close or open every inlet and exit passage or door way. The doors are designed to be about the height of the seat frames, and the doors of each pair are susceptible of sliding horizontally toward each other to close an inlet and exit passage or door-way, and away from each other to open such passage or door-way for the purpose of simultaneously operating the pairs of doors.

I provide a pair of horizontal, parallel slide bars or rods 8 and 9, best seen in Fig. 3, which extend nearly the full length of the car. The slide-bars or rods are preferably arranged in the same horizontal plane, and at one end they are connected by a suitable cable or flexible connection composed, preferably, of a chain 10, while at the opposite end they are connected by a similar cable or flexible connection, preferably composed of a chain 12. The cable 10 extends around guiding supports 13 composed of suitably journaled horizontal wheels, preferably in the form of sheaves. The cable 12 extends around similar guiding supports 14 so arranged that the end portions of the cable 12 run longitudinally parallel with the sides of the car, while the remaining portion is deflected approximately at right angles across the platform at the end of the car.

The doors 7 are arranged in pairs, one pair for each passage or door-way 6, and one of the doors of each pair is provided at its lower end with a bracket 15 rigidly secured to the slide-bar or rod 8; while the other door is provided with a similar bracket 16 extending over the slide-bar or rod 8 and rigidly secured to the slide-bar or rod 9.

The slide bars or rods constitute, in effect,

rigid sections of the cables, and thus provide what may be termed an endless door-operating band. The rigid sections formed by the slide bars or rods may move on and be supported by parts of the car-floor at the inside of the car, as shown in Fig. 5; but they may be otherwise supported as by anti-friction rollers or wear-plates, and they need not necessarily be inside the car. By supporting the slide-bars or rods the doors are firmly sustained in erect positions, and their upper ends may be unsupported by special guides, or contrivances. The doors preferably terminate at about the height of the seat frames, particularly in open or summer cars.

The doors, as here illustrated, slide horizontally inside of the side walls of the car body, but I do not confine myself to this particular arrangement.

If the car is provided with a series of passages or door-ways and slide doors at each side, the slide bars or rods, cables, and guiding supports, are duplicated at the sides of the car, and both sets of door-operating bands are preferably arranged so that they are placed under control of an attendant or employé on the platform at one end of the car. This is accomplished by providing a pair of operating levers 17 at one end of the car, each pivoted intermediate its ends, as at 18, to provide a long and a short arm. The short arm is pivoted, as at 19, to one end of a link 20, the opposite end of which is mounted on a wrist-pin 21 on a horizontal cable operating slide 22, of any suitable construction. The slide 22 is provided with a laterally projecting rigid arm or lug 24, to which the cable 12 is attached, all in such manner that when the lever 17 is shifted in one direction the cable 12 will be positively operated to move the slide-bars 8 and 9 in opposite directions for sliding the doors 7 away from each other, and thus opening the inlet and exit passages or door-ways, while by shifting the lever in the reverse direction the parts will be operated to slide the doors toward each other for closing the said passages or door-ways. When the doors are slid to their closed position they cannot be opened by pressure applied directly to the doors, because the arrangement of the cable-operating slide 22, link 20, and lever 17 is such as to prevent any shifting of the cable 12 unless the lever is positively manipulated or shifted. By this means I provide very simple, economical, and efficient locking mechanism for locking the doors in their closed position by the same devices which serve to slide the doors to their open and closed positions.

The base of each inlet and exit passage or door-way 6 is provided with a sill piece 25, best seen in Fig. 5, which extends over the slide-bars or rods 8 and 9, and effectually covers them at this point, and at intermediate points between the sills 25, the slide-bars or rods are covered and shielded by a housing 26, best seen in Fig. 5, by which means the slide-bars or rods are continuously covered throughout their length, and passengers are not liable to come in contact therewith.

The sills 25 are provided with grooves 27 to receive projections 28 on the lower edges of the doors 7, for the purpose of steadying and guiding the doors in their sliding movements.

The movement of the doors toward each other is limited in such manner that the adjacent edges of the pairs of doors cannot come together. This is desirable and important, in that it avoids the possibility of passengers occupying the end seats having their fingers, arms, or other parts of the body squeezed, or injured between the edges of the doors. To prevent the doors coming together, or in contact, I provide a suitable stop-device which limits the movement of the door-operating mechanism in closing the doors. In the present example, this stop device is composed of a rigid block or abutment 29, fixed to a curved guide-bar 30, behind which the lever 17 works. The block or abutment is arranged in the path of the lever and is so adjusted that when the lever strikes the block or abutment, each pair of doors will be separated at their adjacent edges the desired distance apart. The stop-device may be constructed and arranged to stop the door-operating mechanism at any suitable point and thus leave the edges of the doors any distance apart that may be suitable for the conditions required.

I have illustrated the lever 17 of a particular form or shape, but the construction of this lever may be varied without altering the character of my invention.

I do not confine myself to a series of doors at each side of the car, as they may be arranged only at one side, in which event a single endless door-operating band, actuating lever, and connecting devices therefor, will be used.

In an open or summer car the slide doors are preferably of about the same height as the height of the frames, but the dimensions of the doors may be largely varied without affecting the spirit of my invention.

The invention provides very simplified and efficient mechanism for simultaneously operating the sliding doors, and it has been practically used under conditions which tested its perfect operation and usefulness.

Having thus described my invention, what I claim is—

1. The combination with a car or vehicle having a series of door-ways along its side, and a series of pairs of oppositely sliding-doors governing said door-ways, of an endless door-operating band to which the doors are connected, guiding supports for the endless band, a band-operating slide attached to a part of said endless-band and movable back and forth to shift the latter, and an actuating lever pivotally connected with the slide for operating the same and holding it for the purpose of preventing the doors being opened

until the lever is intentionally operated, substantially as described.

2. The combination with a car or vehicle having a series of door-ways along its side, and pairs of oppositely sliding doors governing said door-ways, of an endless door-operating band arranged along one side of the car or vehicle, attached to the doors and having one end portion deflected at the end of the car or vehicle approximately at right angles to the main body portion of said band, guiding supports for the band, a lever mounted on a part of the car platform and connected with the deflected part of the band, and a lever stop, whereby the edges of each pair of doors are prevented from coming together, substantially as described.

3. The combination with a car or vehicle having a series of door-ways along its side, and a series of pairs of oppositely sliding doors governing said door-ways, of an endless door-operating band arranged along one side of the car or vehicle, attached to the doors and having one end portion deflected at the end of the car or vehicle approximately at right angles to the main body portion of said band, guiding-supports for the band, a band-operating slide attached to the deflected part of the endless band and movable back and forth to shift the latter, and a lever mounted on a part of the car platform and connected with the said slide for operating the same and holding it to prevent the doors being opened until the lever is actuated, substantially as described.

4. The combination with a car having pairs of sliding doors at the side thereof, of an endless door-operating band having parallel parts connected respectively with the doors, guiding-supports for the endless door-operating band, a pivoted lever having a link connection with a part of the endless band for shifting the latter and sliding the doors, and a lever-stop, whereby the edges of each pair of doors are prevented from coming together, substantially as described.

5. The combination with a car having pairs of sliding doors at one side thereof, of a pair of parallel slide bars or rods to which the doors are connected, a cable connecting the slide bars or rods at one end, a cable connecting the opposite ends of the slide bars or rods, guiding-sheaves for the cables, a pivoted lever connected with one of the cables, and a lever-stop, whereby the edges of each pair of doors are prevented from coming together, substantially as described.

6. The combination with a car having pairs of sliding doors at the side thereof, of an endless door-operating band having parallel parts connected respectively with the doors, guiding-supports for the endless door-operating band, a band-operating slide connected with a part of the endless band for shifting the latter, a guide for guiding the slide, a pivoted actuating lever, a link pivoted to the lever and to the slide, and a lever-stop, whereby the edges of each pair of doors are prevented from coming together, substantially as described.

7. The combination with a car having a series of doorways in its side, of a series of sliding doors having projections on their lower ends, an endless door-operating band to which the doors are connected at their lower ends, mechanism for moving the endless-door-operating band, and sill pieces arranged at the bases of the door-ways, extending over the endless door-operating band and having grooves to receive the projections on the doors, substantially as described.

8. The combination with a car or vehicle having a series of doorways and a pair of sliding doors for each doorway, and a door-operating mechanism for sliding each pair of doors toward and from each other, of a stop for limiting the movement of the door-operating mechanism to prevent the edges of the doors coming together, substantially as and for the purpose described.

9. The combination with a car or vehicle having a series of doorways and a pair of sliding doors for each doorway, and a door-operating mechanism comprising a lever by which the doors are simultaneously opened or closed, of a stop device arranged in the path of the said lever for limiting its movement and preventing the edges of each pair of doors coming together, substantially as described.

10. The combination with a car or vehicle having doorways and sliding doors therefor, and door-operating mechanism for opening or closing the doors, of a stop for limiting the movement of the door-operatimg mechanism to prevent complete closing of the doors, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

ALBERT M. KING. [L. S.]

Witnesses:
WM. E. HAWKINS,
THOMAS TATNALL.