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PATENTED MAR. 31, 1908.

L. J. BERG.
TRAP DOOR.

APPLICATION FILED MAR. 19, 1907.

2 SHEETS—SHEET 2.

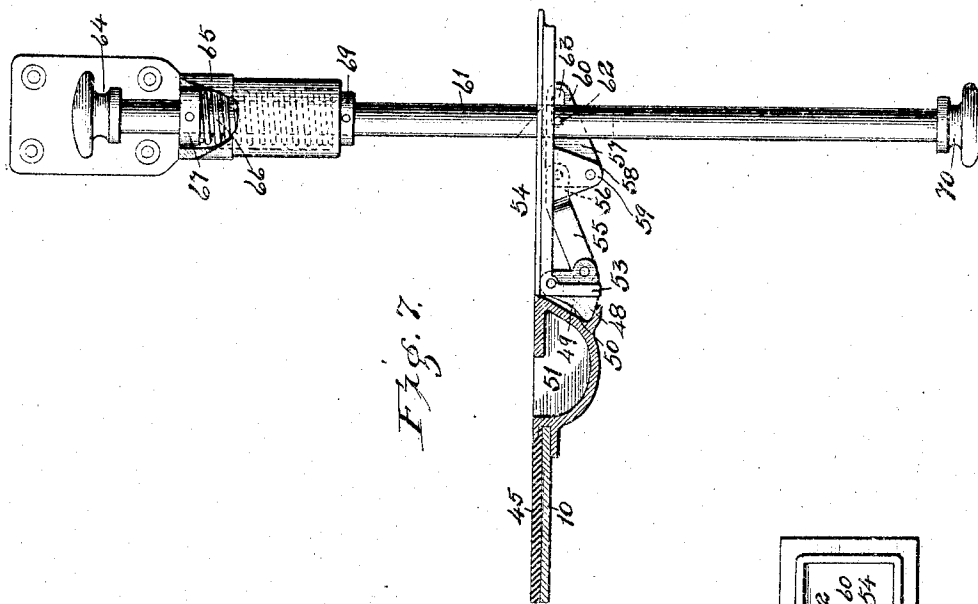


Fig. 7.

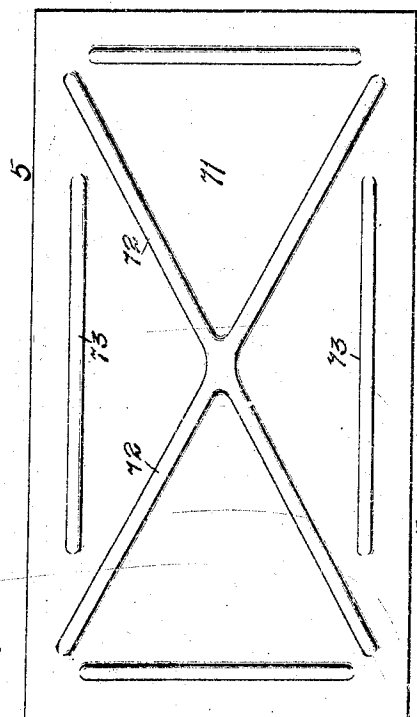


Fig. 6.

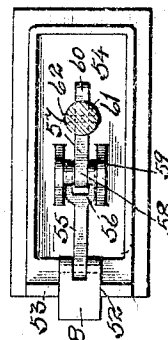


Fig. 8.

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UNITED STATES PATENT OFFICE.

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TRAP-DOOR.

No. 883,443.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed March 19, 1907. Serial No. 363,207.

To all whom it may concern:

Be it known that I, LARS J. BERG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Trap-Doors for Vestibule-Cars, of which the following is a specification.

This invention relates to trap doors of the character ordinarily used for closing the stair openings on the platform of a vestibule car, which openings are always closed when the steps are not in use.

The object of the invention is to provide spring mechanism for automatically raising the door into vertical position against the end of the car and out of the way of passengers ascending or descending the steps.

The invention more particularly relates to the method of positioning and adjusting the spring, and to the means employed for imparting a spring action, of the required degree, to the trap door when released.

The invention further relates to the door body, to the journal mounting for the actuating parts, to the mounting for the spring, and to the device as a whole and the individual parts thereof.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings Figure 1 is a perspective view of a car platform, partly broken away and showing the door in raised position; Fig. 2 a sectional view of the door, showing, in elevation, the actuating mechanism; Fig. 3 a top or plan view of the operating mechanism and one end of the door plate; Fig. 4 the opposite end of the door plate, showing the journal mounting therefor; Fig. 5 a cross sectional view of the door, lowered, showing the actuating rod in section; Fig. 6 an under face view of the platform, showing the preferred method of construction; Fig. 7 a side elevation of the locking latch, showing the edge of the door in section; Fig. 8 an under face view of the latch plate; and Fig. 9 a cross section of the spring cage.

The door of the present invention, as shown in Fig. 1, is applied to a car platform 50 having a stair opening 6 of the usual character. The stair opening is limited at its front side by the buffer beam 7 of the car, and at its rear side by the end wall 8 of the

car. At the outer corner of the car is a forwardly extending door jamb 9, to which the side door, not shown, of the platform is hinged in the ordinary manner. These features are common to all vestibule cars, and a detailed description is deemed unnecessary.

The trap door of the present invention comprises an iron plate 10, of suitable size and shape to bridge the stair opening, and the door, when lowered, has its forward edge entered into a recess or socket 11 on the inner edge of the buffer beam. The plate 10 of the door has secured thereto, at one of its edges, a bar 12 provided with reinforcing tongues 13, which bar is provided at its outer end with an outwardly projecting stud 14, which is journaled within a socket plate 15 which is secured to the inner edge of the vestibule door jamb near the lower end thereof. The opposite or inner end of the plate 12 has formed on its under face a socket lug 16, which has formed therein an angular socket hole 17. The socket hole receives the squared end 18 of an operating shaft 19, which shaft is provided at its inner end with a bearing stud 20 of slightly reduced diameter, and is likewise provided, near its outer end, with a bearing recess or channel 21 of the same reduced diameter, which stud and channel afford shoulders for preventing endwise displacement of the shaft.

The shaft is journaled on the upper edge of a bracket plate 22 of angular formation, having forwardly extending arms 23 and 24, provided with journal recesses 25 and 26, respectively, which recesses afford journal bearings for the bearing stud 20 and channel 21 on the shaft, permitting rotation of the shaft and preventing vibration or displacement. The bracket plate 22 is secured between the riser board 27 of the upper step and a longitudinally extending platform sill 28, the outer and inner side arms 24 and 23 being bolted or otherwise secured to the riser board and sill, respectively, as shown in Fig. 1. The journal mounting for the shaft is positioned immediately beneath the floor of the car platform, so that it is hidden from sight, and at the same time its operation is not interfered with. The shaft 19 has integrally formed therewith an arm 29, which extends at substantially right angles to the plane of the trap door, so that when

the door is raised, as indicated in Fig. 1, the arm 29 will extend forward, and when the trap door is lowered, as shown in Fig. 2, the arm will extend downward. The end 30 of the arm is divided to receive the end of an operating rod 31, which is pivoted to the end of the arm by means of a pivot pin 32. The rod 31 extends forward, beneath the vestibule platform, and is entered into the end of a cage 33, having side bars 34 provided near their forward ends with longitudinally extending slots 35, and the side bars at their rear end are connected by a cross head 36 through which the operating rod extends.

The operating rod extends within the cage for a considerable distance and is encircled by a coil spring 37 which, at its rear end, bears against the inner face of the cross head 36, and at its outer end bears against a guide plate 38, which is provided on its sides with lugs or projections 39 which enter the elongated slots 35 and serve to guide the rod within the slots. The guide plate 38 is slidably mounted on the operating rod 31 and is adapted to be positioned at a suitable point of adjustment by means of a nut 40 which is screw-threaded onto the end of the operating rod. This permits the tension of the spring to be regulated. The forward ends of the side bars 34 are brought together, as indicated in Fig. 3, to provide contacting tongues 41 which are entered between ears 42 rearwardly extending from a plate 43 secured to the buffer beam. The tongues are pivoted by means of a pivot pin or bolt 44.

The trap door plate or body 10 is preferably provided with diagonal ribs 10^a and parallel ribs 10^b, and is covered by a covering of rubber tiling 45 which is fastened to wooden strips 10^c laid in the channels of the ribs, which tiling is secured around its edge by a lip of metal 46 on the edge of the body, which overlies the rubber tiling and unites the metal body and at the same time gives a suitable finish for the edge of the trap door. The bar 12 is provided at its rear edge with an overhanging lip 47 which serves the same function for the pivoted edge of the door that is served by the lips 46 on the other three edges of the door. These features, however, may be varied to correspond to the finish of the vestibule platform to which the trap door is applied. The door is adapted to be held closed by a snap latch 48 which is provided with a beveled face 49 and is adapted to enter a recess 50 formed in the edge of the door, which recess is adjacent to a hand hole or socket 51 on the right side of the door near the edge thereof. The latch is pivoted within a recess 52 in a depending flange 53 on the edge of a flat latch plate 54 which is embedded in the edge of the buffer beam. The latch is adapted to be retracted by means of a link 55 forked at its end 56, which fork end embraces a triangular lever arm 57 pivoted at

its lower corner 58 between a pair of ears 59 depending from the latch plate. The triangular lever arm has its forward end 60 entered through a vertical operating rod 61, within which it is held by means of a pin 62 which is adapted to travel within a slot 63 in the lever arm as the rod is raised and lowered. The rod at its upper end is provided with a knob 64, the rod being slidably mounted within a housing 65, which is secured to the front wall of the vestibule at a suitable height to permit the rod to be depressed by the action of the foot. The rod within the cage is surrounded by a coil spring 66 which bears against a collar 67 on the rod, and also against the inner wall of the housing. The upward movement of the rod is limited by an exterior collar 69 which bears against the under face of the housing. The operating rod is passed through the buffer beam and projects below the lower edge thereof and terminates in a knob 70 which permits the trap door to be raised from a point outside of the car. The preferred construction of the platform is indicated in Fig. 6. Like a trap door, the platform comprises a body plate 71 provided with diagonally extending ribs 72 and transversely extending ribs 73 which serve to reinforce the structure; and the platform, like the trap door, is covered by rubber tiling, the edges of the metal being overturned to form lips 74 which overlie the edge of the rubber tiling and secure the same in place.

In use, the bolt 40 may be adjusted to any desired position to bring the spring to a proper tension to raise the door easily and noiselessly without slamming it back against the wall of the car. When the door is in raised position, the arm 29 will be forwardly extended, which relieves the spring from tension. However, when the door is lowered the arm 29 will be moved back into the position indicated in Fig. 1, thereby drawing back with it the operating rod 31 and compressing the spring. The movement of the cage, incidental to the swinging of the arm 29, is permitted by the pivotal mounting for the cage. The snap lock 48 holds the door in its normal position, but as soon as the lock is released the door will swing up into upright position, out of the way of the passengers, and into position to be concealed by the vestibule side door, which opens inwardly against the end of the car. As the door rises from horizontal to vertical position, the power required to lift the door will decrease in substantially the same ratio as the tension on the spring, so that an easy, steady movement of the door will result and no slamming or violent movement will be occasioned. The action is a positive and direct one and there is practically no friction or lost motion, and the parts are adapted to be adjusted to the proper degree, depending upon

the tension of the spring and the weight of the door.

The lock is intended to be operated, either from within or without the car, by a downward movement of the operating rod, which serves to draw down the outer end of the triangular lever arm which is permitted to swing on its pivot by reason of the slot therein; and this movement of the lever arm draws back the link and with it the latch which serves to release the door and allow it to swing up into vertical position. This release of the latch would ordinarily be performed by pressure of the foot on the upper knob, although it can be performed by a pull on the lower knob. The construction of the trap door and car platform is one which permits a light grade of plate metal to be employed which is rendered sufficiently stiff by reason of the ribs, which furthermore serve as channels for the reception of wooden strips to which the tiling is attached. Furthermore, the overturned lips around the edges of the trap door and the platform obviate the necessity for using binding strips of metal, and at the same time render the structure more strong and rigid than would be the case in use of such binding strips.

The operating parts of the device are entirely concealed beneath the car platform, the end only of the shaft projecting from the riser of the upper step, and this arrangement permits the trap door to be very quickly and easily removed, if desired, by removing the socket plate 15 and thereafter drawing back the door to disengage the socket stud 16 from the squared end of the shaft. The trap door is planned with special reference to the ordinary construction of vestibule cars, but it is not intended to be limited exclusively to car construction, since the door and actuating mechanism can be used in other capacities in which a trap door is required.

What I regard as new and desire to secure by Letters Patent is:

1. The combination of a door, a shaft connected with the door, an arm on the shaft, a rod pivoted to the arm, a pivotally mounted cage into which the arm is entered, a guide plate on the free end of the arm and slidably mounted within the cage and a spring surrounding the arm within the cage and adapted to be put under tension by a movement of the arm in one direction, and released from tension by a movement of the arm in the opposite direction, substantially as described.

2. The combination of a trap door, a shaft for swinging the door, an arm on the shaft, a rod connected with the arm, a spring adapted to be put under tension when the rod is moved in one direction and released from tension when the rod is moved in another direction, a latch adapted to hold the door locked, a link adapted to retract the latch, a vertically movable rod, a pivoted lever connected with the rod and connected with the link, and a spring for returning the rod to normal position, substantially as described.

3. A vestibule car trap door comprising a metallic body provided with reinforcing ribs and provided around its edges with overlying lips, and a tiling secured to the surface of the door and retained in place by the overlying lips, substantially as described.

4. A vestibule car trap door comprising a metallic body provided with diagonal reinforcing ribs and parallel reinforcing ribs and having around its edge an overturned lip, wooden strips entered into the channels formed by the ribs, and a rubber tiling secured to the wooden strips and retained by the lips, substantially as described.

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Witnesses:

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