Nov. 30, 1926. 1,608,877

T. ELLIOTT

RAILWAY CAR DOOR

Filed Oct. 27, 1924 2 Sheets-Sheet 1

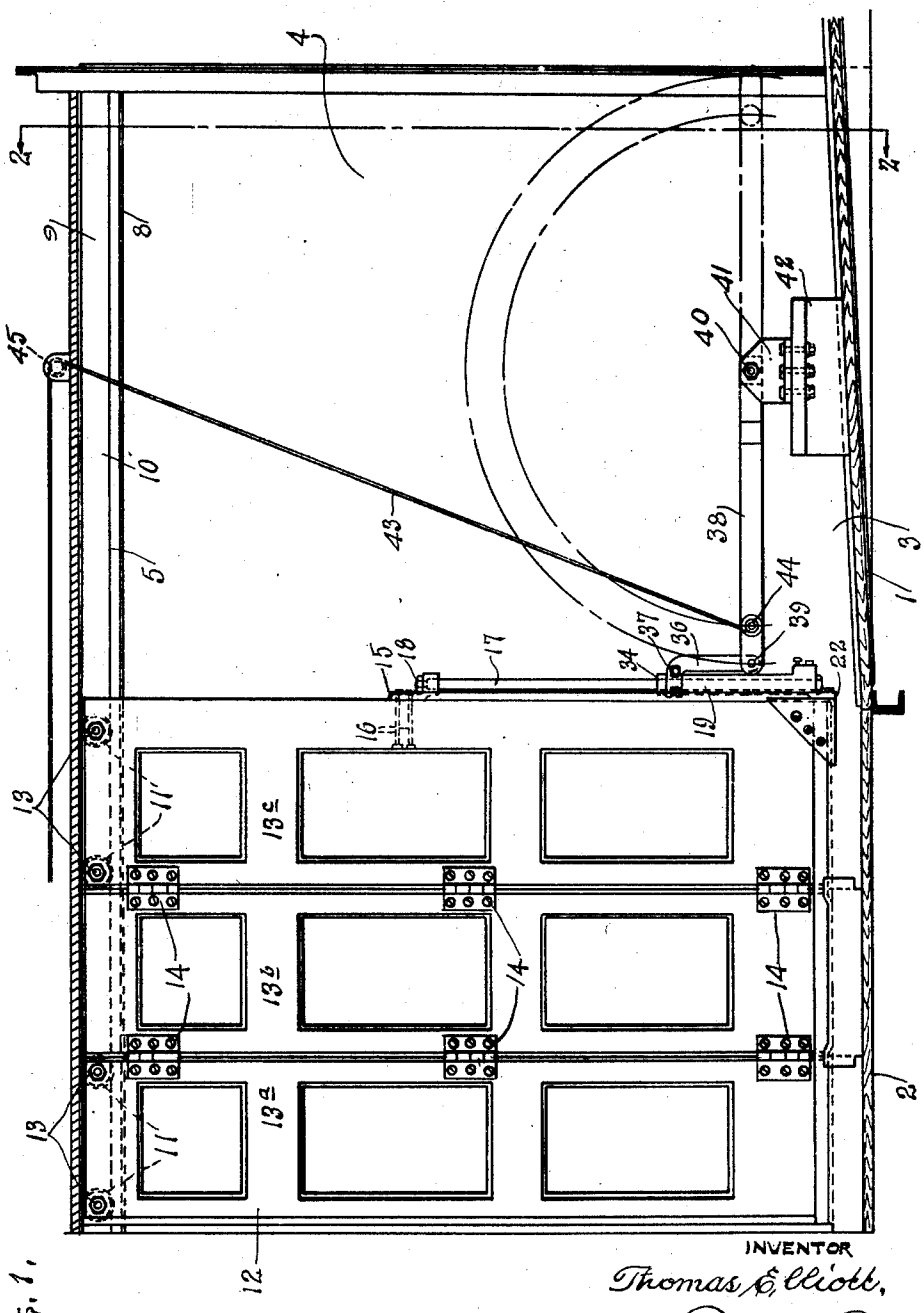


Fig. 1.

INVENTOR

Thomas E. Elliott,

BY Toulmin & Toulmin,

ATTORNEYS

Nov. 30, 1926. 1,608,877

T. ELLIOTT

RAILWAY CAR DOOR

Filed Oct. 27, 1924 2 Sheets-Sheet 2

Fig. 2.

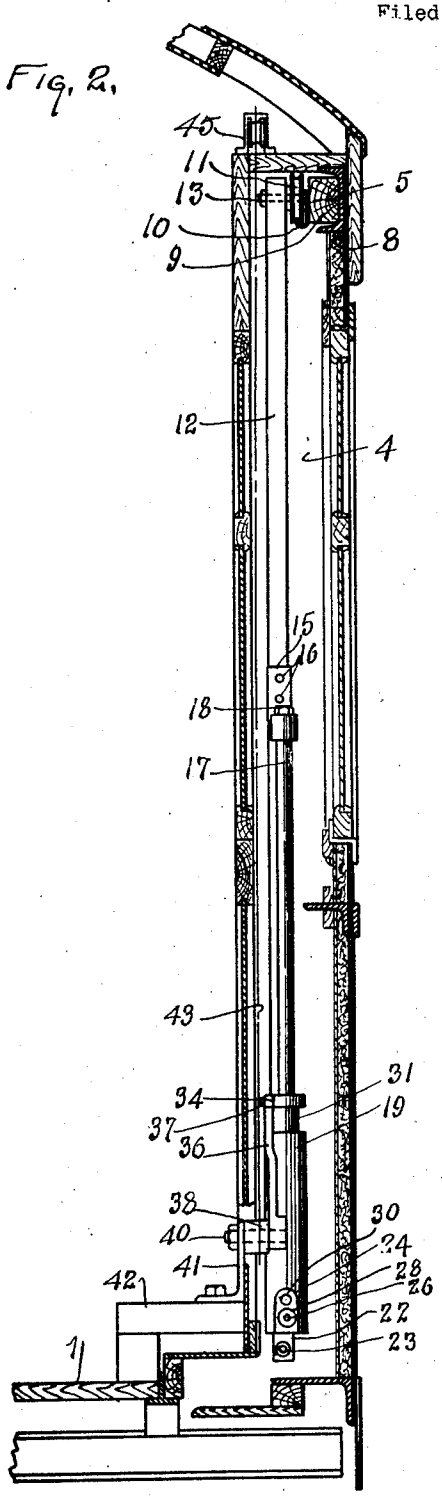
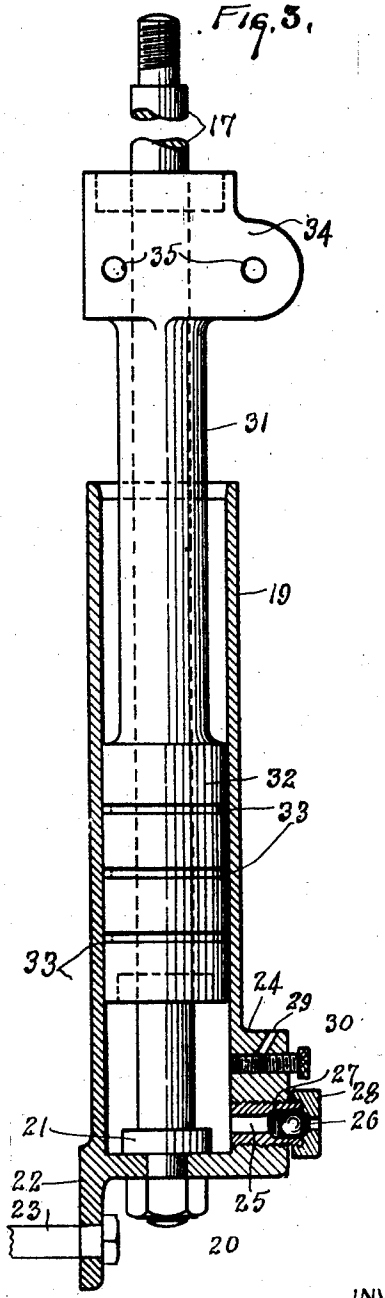


Fig. 3.



INVENTOR
Thomas Elliott,
BY Coulmin & Coulmin
ATTORNEYS

Patented Nov. 30, 1926. 1,608,877

UNITED STATES PATENT OFFICE.

THOMAS ELLIOTT, OF CINCINNATI, OHIO, ASSIGNOR TO THE CINCINNATI CAR COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

RAILWAY-CAR DOOR.

Application filed October 27, 1924. Serial No. 746,032.

This invention relates to improvements in door-operating mechanism for railway car doors.

The object is to provide a hand operable mechanism for opening and closing sliding doors quickly and with small manual effort and at the same time to prevent the doors from striking their jambs to their injury and to the annoyance of passengers.

This object is carried into practical effect by means, essentially, of a swinging lever combined with a sliding door and a dash-pot adapted to travel with the door and having its piston connected with such lever, whereby when the lever is in one position the door will stand across the doorway, and when the lever is thrown from that position to one beyond its fulcrum or pivot, the door will recede into a pocket in the body of the car, the dash-pot functioning to check the momentum of the door as it approaches its jamb or final position both in the closing and the opening movements of the door.

In the accompanying drawings forming a part of this specification:

Figure 1 is a side elevation of a sliding door combined with my said mechanism and of a portion of a railway car in which the door is mounted.

Figure 2 is a vertical transverse sectional view on the line 2—2 of Figure 1 looking in the direction of the arrows, the door being shown within the pocket through which the section is taken.

Figure 3 is an enlarged detail view of the dash-pot.

My mechanism is designed to be mounted in a railway car, particularly of the city or interurban types, of such construction that the car will have a doorway or opening which leads to the steps, whereby the passengers may enter and leave the car; and which will also have a pocket or compartment built within the car walls and in line with the doorway, so that a sliding door may be mounted to travel from a position in the doorway, when the door may be said to be closed, to a position within the pocket or compartment, when it may be said to be open. So much of such a car as is necessary for present purposes is illustrated in the accompanying drawings.

Referring specifically to the illustrations, the numeral 1 designates the floor of a part of the car body, a vamped floor; the numeral 2, the platform floor; the numeral 3, a doorway, and the numeral 4 a pocket or compartment. A track 5 is mounted across the upper part of the doorway and within the upper portion of the pocket.

It will be seen, more particularly from Figure 2, that between the outer wall or side plate 7 and the outer sashes 7^a and 7^b, of the car body, and the inner wall or lining 7^c and inner sashes 7^d and 7^e, a pocket 4 is formed.

The track 5 is preferably secured to the channel beam 8 which forms a plate in the car structure. The track is composed specifically of a wood beam 9 secured in a certain channel and a track proper indicated at 10, being a metal strip with its lower edge upturned to receive the grooves of the door rollers 11.

To these rollers is hung the door 12 by means of journal bolts 13. The door is preferably made in sections 13^a, 13^b, and 13^c; and in cases where the door is to travel in a curved path these sections are hinged together as indicated at 14, the more readily to conform to such a path. But that feature forms no part of the present invention.

Secured to what may be called the inner edge of the door is a bracket 15 held to the door by bolts 16. The upper end of a guide rod 17 extends into this bracket and is held by a nut 18. This guide rod extends thence downward centrally through the cylinder 19 of the dash pot where it is secured, as seen in Figure 3, by a nut 20 which clamps the rod and cylinder together against a shoulder 21 on the rod. The cylinder has a flange 22 which is also secured to the edge of the door by means of a bolt 23.

The cylinder 19 is provided with a boss 24 having an air inlet passage 25 controlled by a ball check valve 26 adapted to play between a stop 27 in the inlet and a cap 28 which retains the ball. On the up stroke of the piston to be presently referred to, air is drawn into the cylinder through this inlet port 25, the ball valve permitting the entrance of the air by settling back against the stop pin 27. The boss is further provided with an air exhaust port 29 controlled by a screw 30 so as to adjust the escape of the air according as the screw is positioned more or less across the exhaust port.

In this way a sufficient volume of air is drawn into the cylinder on the up stroke of

the piston to well fill the cylinder in that part below the piston, while on the down stroke the exit of this quantity of air is delayed or retarded by the smaller area of the exhaust than of the inlet port, so that the air is compressed more or less and always sufficiently to check the descent of the piston as it approaches the end of its down stroke. The air escapes fast enough to permit the descent of the piston but yet slow enough to hold back a portion of the air to form, when compressed, a cushion which checks the movement of the piston before it can strike any metallic parts at or near the bottom of the cylinder, and before the door can reach its jamb, either when being swung across the doorway or back into the pocket. Then as the door and piston complete their movement slowly under the checking influence of the compressed air, the air gradually escapes sufficiently to let the piston make its full stroke and the door its full movement to softly come against its jamb.

Referring now to the piston which forms a part of the dash-pot, the numeral 31 designates the rod and 32 the piston head having conventional packing rings 33. The head and rod are hollow so as to fit snugly over the guide rod 17 on which the piston travels as well as within the cylinder. The upper end of the piston rod is fashioned with a flat face 34 having holes 35 by which may be attached to the piston rod an arm 36 which becomes a rigid projection on the piston. Bolts 37 are used to secure the arm to the piston rod.

A lever designated at 38 is connected as by a bolt 39 to the arm 36 and at the other end is mounted on a fulcrum or pivot pin 40 carried by a standard 41 on a base 42 supported conveniently within the pocket 4.

A hand cord or cable 43 is secured to the lever 38 at the point 44 and passes thence over a guide pulley 45 mounted in the car structure at a point above the pocket or in the upper part thereof, as seen in Figure 2. This cable extends to any convenient point within the car for manipulation by the motorman or conductor.

It will now be seen that a stiff pull on the cable will raise the lever from the full line position shown in Figure 1 to the dotted position indicated at 46 and that in this movement the lever carries with it the arm 36 and therefore the dash-pot with the guide rod 12 and the door to which it and the cylinder are attached. As the lever swings in the first half of its movement, it is under the pull of the cable and the door and its connected parts follow it with considerable momentum. As the lever passes into the second half of its movement the cable is slackened and the momentum of the parts carry them on. But in the meantime, due to the upward movement of the piston in the cylinder, a quantity of air has entered through the inlet port 25. As the lever reaches the end of the first half of its movement the piston reaches the limit of its up stroke. When the lever starts into the second half of its movement the piston begins to make its down stroke. In doing so it acts on the air and begins to compress so much of it as does not escape through the outlet port 29. As the lever approaches the end of the second half of its travel and the door approaches its jamb, the air being now considerably compressed forms a cushion which checks the down stroke of the piston and slows it down gradually until its complete stroke is made so that the door likewise slows down and softly comes in contact with its jamb, whether while in the pocket or while crossing and closing the doorway.

A particular feature of my invention is that of thus softening the contact of the door with those objects which define the limit of its movement. Or on other words, this feature is that of checking the piston and door by the action of the air in resisting the piston to reduce the momentum of the parts as they approach the end of the opening and closing movements of the door.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. The combination with a railway car having a doorway and door pocket and provided with a track extending across the doorway and into the pocket, of a door adapted to travel on said track, a cylinder secured to the door, a guide rod extending through the cylinder and secured thereto at one end and to the door at the other end, a piston fitted exteriorly to the cylinder and having a bore extending therethrough within which fits said rod, the cylinder having air inlet and outlet openings, an arm secured to the piston, a lever pivoted within the pocket and connected at one end with said arm, and hand-devices to operate said levers.

2. In a device of the character described, the combination with a door, of a guide rod secured thereto, a cylinder surrounding and secured to said rod and having air inlet and outlet ports of different diameters, a piston operable in the cylinder and on said rod, an arm secured to the piston, and a lever connected to said arm.

In testimony whereof, I affix my signature.

THOMAS ELLIOTT.