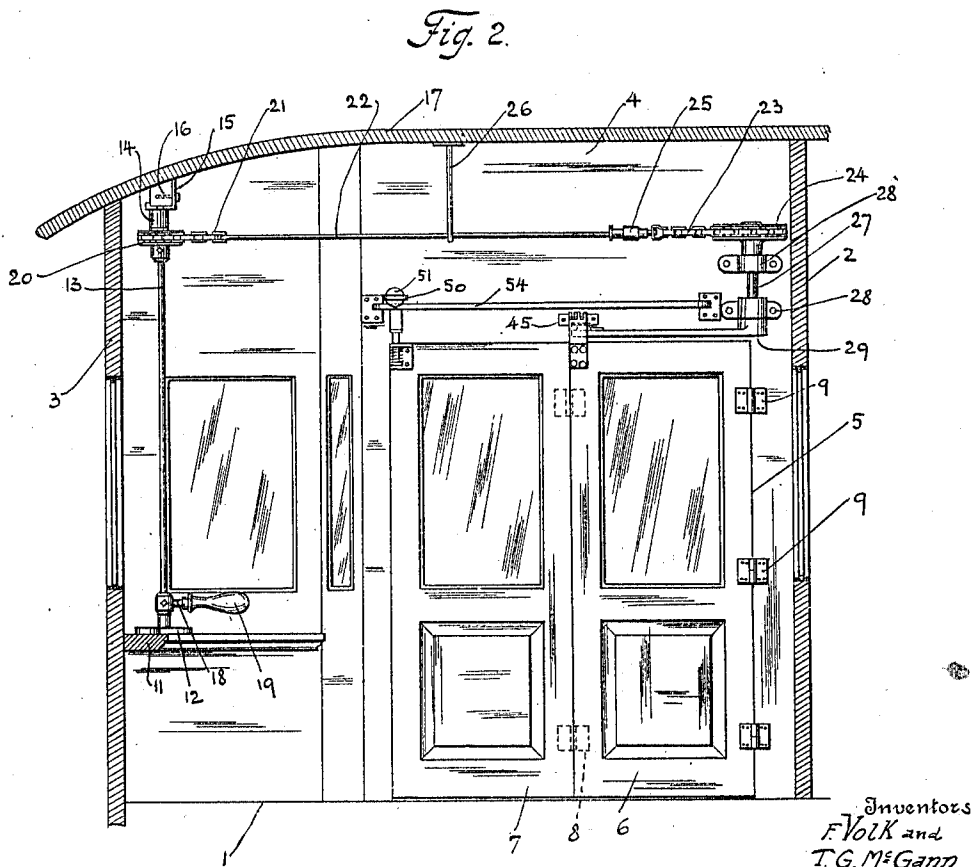
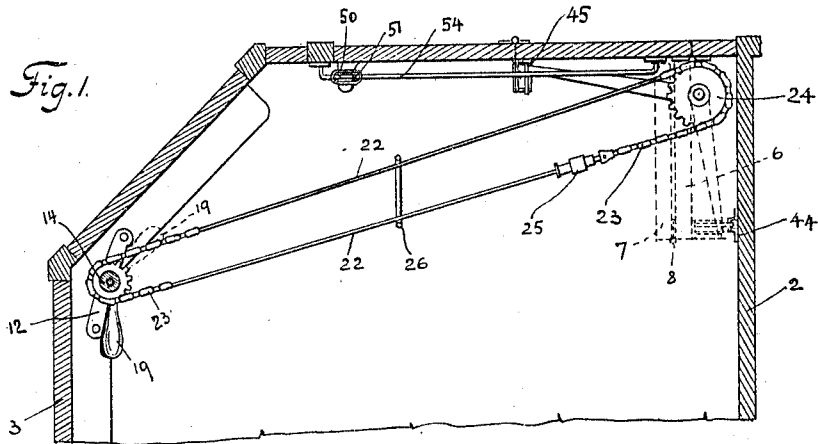


F. VOLK & T. G. MCGANN.
DOOR OPERATING MECHANISM FOR STREET CARS.
APPLICATION FILED JULY 2, 1909.

952,966.

Patented Mar. 22, 1910.

2 SHEETS—SHEET 1.



Witnesses
Frank P. Zimmer

W. H. Butler

334

H. C. Evert & Co.

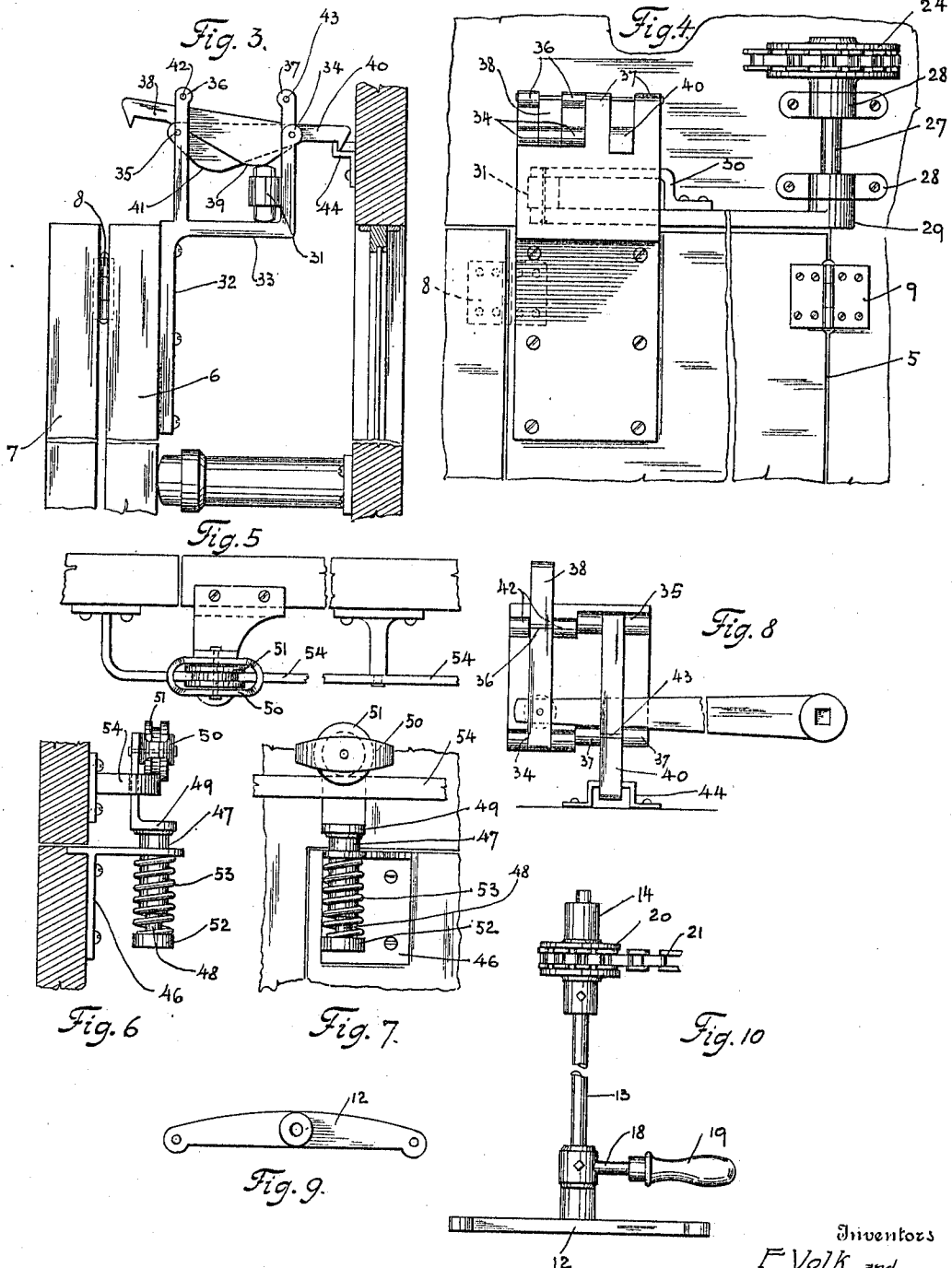
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Witnesses
Frank Trimmel

W. H. Butler

Inventors
F. Volk and
T. G. McGann.

By *H. C. Everett & Co.*

Attorneys

UNITED STATES PATENT OFFICE.

FERDINAND VOLK AND THOMAS G. MCGANN, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS OF ONE-THIRD TO JAMES A. DUFFY, OF PITTSBURG, PENNSYLVANIA.

DOOR-OPERATING MECHANISM FOR STREET-CARS.

952,966.

Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed July 2, 1909. Serial No. 505,739.

To all whom it may concern:

Be it known that we, FERDINAND VOLK and THOMAS G. MCGANN, citizens of the United States of America, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Door-Operating Mechanisms for Street-Cars, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to a door operating mechanism, particularly designed for opening and closing the doors of a street car or passenger coach, and the object of our invention is to provide a door operating mechanism that can be easily and quickly actuated by the motorman or operator of a street car to open or close the door or exit of a car. Our invention aims to provide a door operating mechanism that can be advantageously used in connection with that type of street car known as "the-pay-as-you-enter" car where the passengers enter the car from the rear platform thereof, and leave the car from the front platform, it being necessary to maintain the door of the front platform in a closed position, to prevent persons from entering the car at the forward end thereof, so, also as to prevent passengers from leaving the forward platform before the car stops. It is the present practice to utilize compressed air for opening and closing the door of a car, the use of the air being under the control of the motorman or operator of the car. In using compressed air, a complicated and expensive mechanism is necessary which is difficult to maintain in working order and difficult to control by the motorman or operator of the car.

It is a desideratum in connection with automatic opening and closing doors to use a mechanism that will be positive in its actions, free from danger of injury by ordinary use, and readily controlled by the motorman or operator of the car, and it is in view of these requirements, that we have devised a mechanism that can be economically and advantageously used in connection with either a sliding door or a two part hinged door, the latter type of door being common to the "pay-as-you-enter" cars extensively used.

The invention further aims to provide a door operating mechanism that can be quickly applied to a car without altering the construction of the same, also to provide a mechanism that will prevent a door from sagging and will automatically lock the door in either an opened or closed position. This last mentioned feature of our invention is an important characteristic, distinguishable from the present type of operating mechanism in so much as it will be impossible for the door to swing to a closed position or move when the same is supposed to be open. Considerable trouble is experienced at present by passengers gripping the door or a handle bar upon the same when leaving a car, the door being depended upon by passengers as a fixture to assist them in alighting from a car, consequently, with the door moving, a passenger is often precipitated upon the street, resulting in injury that is avoided by our mechanism holding the door in a locked open position.

The invention will be hereinafter considered in detail and then specifically pointed out in the appended claims and reference will now be had to the drawings forming a part of this application, wherein there is illustrated a preferred embodiment of the invention, but it is to be understood that the structural elements thereof can be varied or changed, as to the shape, proportion and manner of assemblage without departing from the spirit and scope of the invention.

In the drawings:—Figure 1 is a horizontal sectional view of a portion of a car equipped with the door operating mechanism, Fig. 2 is a longitudinal sectional view of a portion of the car showing the door operating mechanism in elevation, Fig. 3 is a vertical sectional view of a portion of the car, illustrating the door thereof in an open locked position, Fig. 4 is an enlarged elevation of a portion of the car, illustrating the door in a closed position, Fig. 5 is a plan of a portion of the car illustrating the door hanger, Fig. 6 is an end view of the same, Fig. 7 is a side elevation of the door hanger, Fig. 8 is a plan of the double door lock, Fig. 9 is a plan of a bearing, and, Fig. 10 is an enlarged elevation of a portion of the operating shaft of the door operating mechanism.

In the drawings, 1 denotes the forward or

motorman's platform of a car inclosed by a partition 2, a front wall 3, and side walls 4, the side walls shown in the drawings having a doorway 5 adapted to be normally closed by a hinged door, comprising sections 6 and 7 hinged together, as at 8, the sections 6 being hinged to the wall 4, as at 9.

The front wall 3 is provided with a ledge 11, having a bearing 12 for a vertical operating shaft 13, the upper end of said shaft being revolubly mounted in a bearing 14, carried by an angle bar 15 secured to a block 16 fixed to the roof 17 of the car. The lower end of the operating shaft 13 adjacent to the bearing 12 is provided with a crank 18 having a handle 19 adapted to be manipulated by the motorman or operator of the car. The upper end of the shaft 13 adjacent to the bearing 14, is provided with a sprocket wheel 20 and adapted to engage said sprocket wheel is a sprocket chain 21 having the ends thereof connected to rods or cables 22 extending toward the partition 2, where the ends of said rods or cables are connected to another sprocket chain 23 adapted to travel over a sprocket wheel 24. One of the rods or cables 22 is provided with a conventional form of turnbuckle 25 and said rods or cables pass through a hanger 26 carried by the roof 17 to prevent said rods or cables from sagging.

The sprocket wheel 24 is mounted upon a shaft 27 journaled in brackets 28 carried by the walls 4 above the hinges 9 of the sectional door. Fixed to the lower end of the shaft 27 is a crank arm 29 having the outer end thereof extending to the confronting hinged edges of the door sections 6 and 7, where said arm is provided with a bracket 30. The roller 31 is journaled between said bracket 30 and the arm 29, the object of which will presently appear.

Secured to the upper inner edge of the door sections 6 and at the hinged edge thereof, is a bracket 32 supporting a U-shaped frame 33 providing oppositely disposed bearings 34 and 35 having vertical extensions 36 and 37. Pivotaly mounted between the bearings 34 is a latch 38 having a cam surface 39. Pivotaly mounted between the bearings 35 is a latch 40 having a cam surface 41. The said latch 40 being disposed opposite the latch 38, for locking the door section 6 in either an open or closed position as will hereinafter appear.

The vertical extensions 36 are connected by a pin 42 for preventing the latch 38 from becoming displaced while the extensions 37 are connected by a pin 43 for preventing the latch 40 from becoming displaced, these latches coöperating with keepers 44 and 45 for locking the door sections 6, the keepers 46 being secured to the partition 2 and the keeper 45 to the wall 4.

The crank arm 29 extends into the frame

33 and the roller 31 thereof is adapted to contact with the vertical sides of said frame, while the bracket 30 of said arm is adapted to contact with the cam surfaces 39 and 41 of the latches 38 and 40.

Fixed to the upper inner edge of the door section 7 is a bracket 46 having a vertical socket 47 for a revoluble pin 48. The upper end of the pin is provided with a bearing 49 for a horizontal yoke 50 supporting a revoluble grooved wheel 51. The lower end of the pin 48 is provided with a head 52 and encircling the socket 47 between the bracket 46 and the head 52 is a coil spring 53. There is sufficient play between the lower end of the socket 47 and the head 52 to allow the pin 48 to raise in the socket should occasion demand.

The grooved wheel 51 is adapted to travel upon a track 54 supported by the wall 4, and said track, together with the elements 46 to 53 inclusive constitute means for insuring an easy movement of the door sections 6 and 7, also means for preventing said door sections from sagging.

Operation: Assuming that the door of the car is closed, with the latch 38 in engagement with the keeper 45 of the car wall 4, and the motorman or operator of the car moves the crank 18 through the medium of the handle 19, the shaft 13 is partially rotated and through the medium of the sprocket chains 21 and 23, cables or rods 22 and a sprocket wheel 24 the shaft 27 is approximately rotated a quarter of a revolution, to swing the crank 29 in a horizontal plane from a position approximately parallel with the wall 4 to a position approximately parallel with the partition 2. One movement is imparted to the crank 29, the outer end thereof first contacts with the cam surface 39 of a latch 38 and elevates said latch and retains the same in an elevated position while said crank contacts with the frame 33 and swings the door sections 6 upon the hinges 9. When the outer ends of the crank 29 elevate the latch 38, said crank moves out of engagement with the cam surfaces 41 of a latch 40 and allows said latch to assume a position which will cause the same to contact with and ride over and engage the keeper 44 of the partition 2, when the door section 6 assumes a position shown in dotted lines of Fig. 1 of the drawings. Considering now the door sections 7 which is hinged to the door section 6, the door operating mechanism is adapted to swing the door section 6 with the free edges of the door section 7 supported by and retained in alinement with the track 54, by virtue of the revoluble bracket pin 48 retained in the socket 47. A reverse movement of the handle 19 by the motorman or operator of the car causes the crank 29 to impinge the cam surface 41 of the latch 40, releasing said

latch and the latch 38 and allowing the said latch 38 to assume a position that will cause the same to engage the keeper 45 and lock the door section 6 in a closed position. It is obvious that the door section 7 cannot be opened when the door section 6 is closed on account of the grooved wheel 51 engaging the track 54. The frame 33 is of a sufficient width to allow the crank 29 to actuate the latches 38 and 40. By positioning the shaft 27 and the elements thereof a sufficient distance from the wall 4, the crank 29 can be loosely connected to a sliding door to open and close the same; the latches 38 and 40 being dispensed with.

Having now described our invention, what we claim as new, is:—

1. A door operating mechanism comprising a pair of revoluble shafts, cranks carried by each of said shafts, an operative connection between the said shafts whereby when one of the shafts is operated by its respective crank, motion will be transmitted to the other shaft, a frame adapted to be secured to the door and engaged by the other of said cranks, latches carried by the frame and adapted to lock the door in an open position and to lock the door in a closed position, and one of said latches actuated by that crank which engages the frame when said crank is operated in one direction and the other of the said latches operated by the crank when actuated in the opposite direction.

2. A sectional door operating mechanism comprising a pair of revoluble shafts operatively connected together, means carried by one of said shafts for rotating it whereby motion is imparted to the other of said shafts, a crank carried by the other of said shafts, a frame adapted to be carried by one of the sections of the door, and adapted to be engaged by said crank, a pair of latches carried by the frame for respectively locking the door in an open and in a closed position, one of said latches operated by the movement of the crank in one direction and the other of said latches operated by the movement of the crank in the other direction, and means for guiding the other section of said door during the opening and closing movement of the door.

3. A door operating mechanism comprising, in combination with a car having a sectional hinged door, of revoluble shafts, a crank carried by one of said shafts, a frame carried by one of the sections of said door and adapted to be engaged by said crank, means carried by said frame for locking said door, means in connection with said car for guiding the other section of said door, and means for rotating said shafts in unison.

4. The combination with a car, and a sectional hinged door, of revoluble shafts carried by the car, a crank carried by one

of said shafts for moving said door, a track carried by said car for guiding said door, and means for rotating said shafts in unison.

5. The combination with a car, and a sectional hinged door, of shafts carried by said car, a crank carried by one of said shafts, a frame carried by one of the sections of said door and adapted to be moved by said crank, pivoted latches carried by said frame for locking said door and adapted to be moved by said crank a track carried by said car, and a wheel adapted to travel upon said track for guiding the other section of said door.

6. In a door operating mechanism, the combination with a car, and a door, of a revoluble shaft carried by said car, a crank carried by said shaft for swinging said door, latches carried by said door for locking said door and adapted to be actuated by a movement of said crank, a track carried by said car, movable bracket carried by said door and guided by said track, and means carried by said car for revolving said shaft.

7. In a door operating mechanism, the combination with a car, and a door, revoluble shafts supported by said car, a crank carried by one of said shafts for moving said door, keepers carried by said car, latches carried by said door for engaging said keepers, said latches being moved out of engagement with said keepers by a movement of said crank, and means carried by said car for revolving said shaft.

8. In a door operating mechanism, the combination with a car, and a door, revoluble shafts supported by said car, a crank carried by one of said shafts for moving said door, keepers carried by said car, latches carried by said door for engaging said keepers, said latches being moved out of engagement with said keepers by a movement of said crank.

9. In a door operating mechanism, the combination with a car having a door, of a crank for moving said door, keepers carried by said car, and latches carried by said door and adapted to engage said keepers, said latches being moved out of engagement with said keepers by a movement of said crank.

10. In a door operating mechanism, a shiftable crank for moving the door to open and closed position, a pair of latches carried by the door and alternately shifted to operative position by said crank, keepers adapted to be alternately engaged by said latches whereby the door is maintained respectively in an open and in a closed position.

11. In a door operating mechanism, a frame adapted to be carried by the door, keepers pivoted on said frame and provided with cam faces and adapted to be alternately shifted to operative and inoperative position, a crank engaging in said frame for

shifting the door to open and closed position,
said crank further adapted to engage the
cam faces of said latches for shifting them
alternately to operative and inoperative po-
5 sition, and keepers adapted to be alternately
engaged by said latches whereby said door is
respectively maintained in an open and in a
closed position.

In testimony whereof we affix our signa-
tures in the presence of two witnesses.

FERDINAND VOLK.
THOMAS G. McGANN.

Witnesses:

K. H. BUTLER,
A. J. TRIGG.