

H. C. HEFFNER.
PASSENGER CAR.

APPLICATION FILED MAR. 12, 1909.

957,057.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

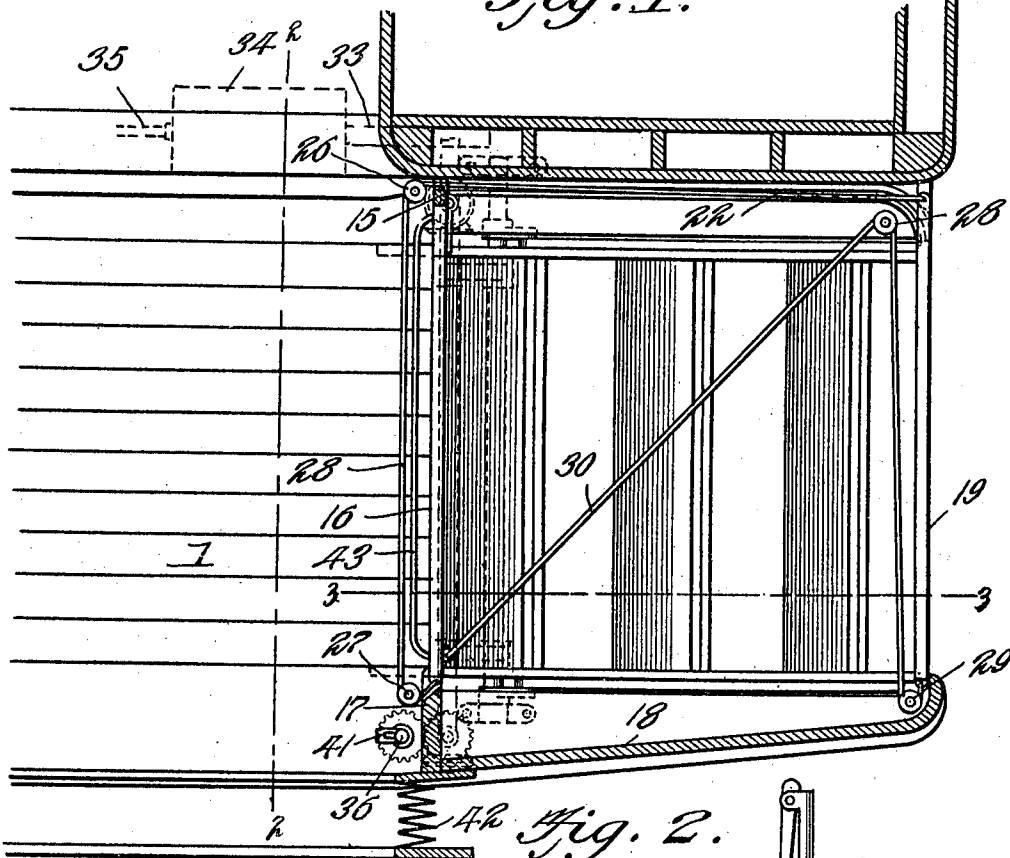
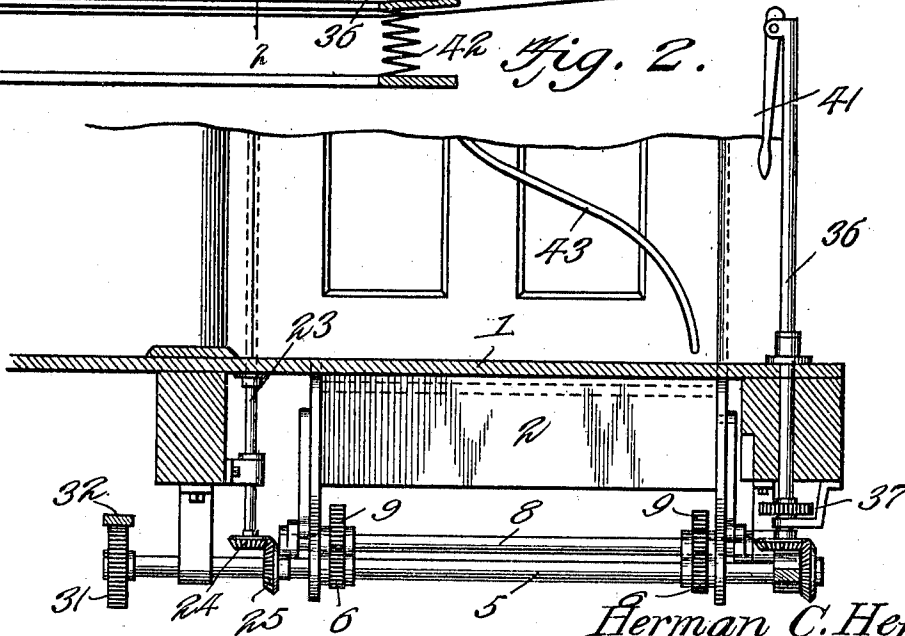


Fig. 2.



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2 SHEETS—SHEET 2.

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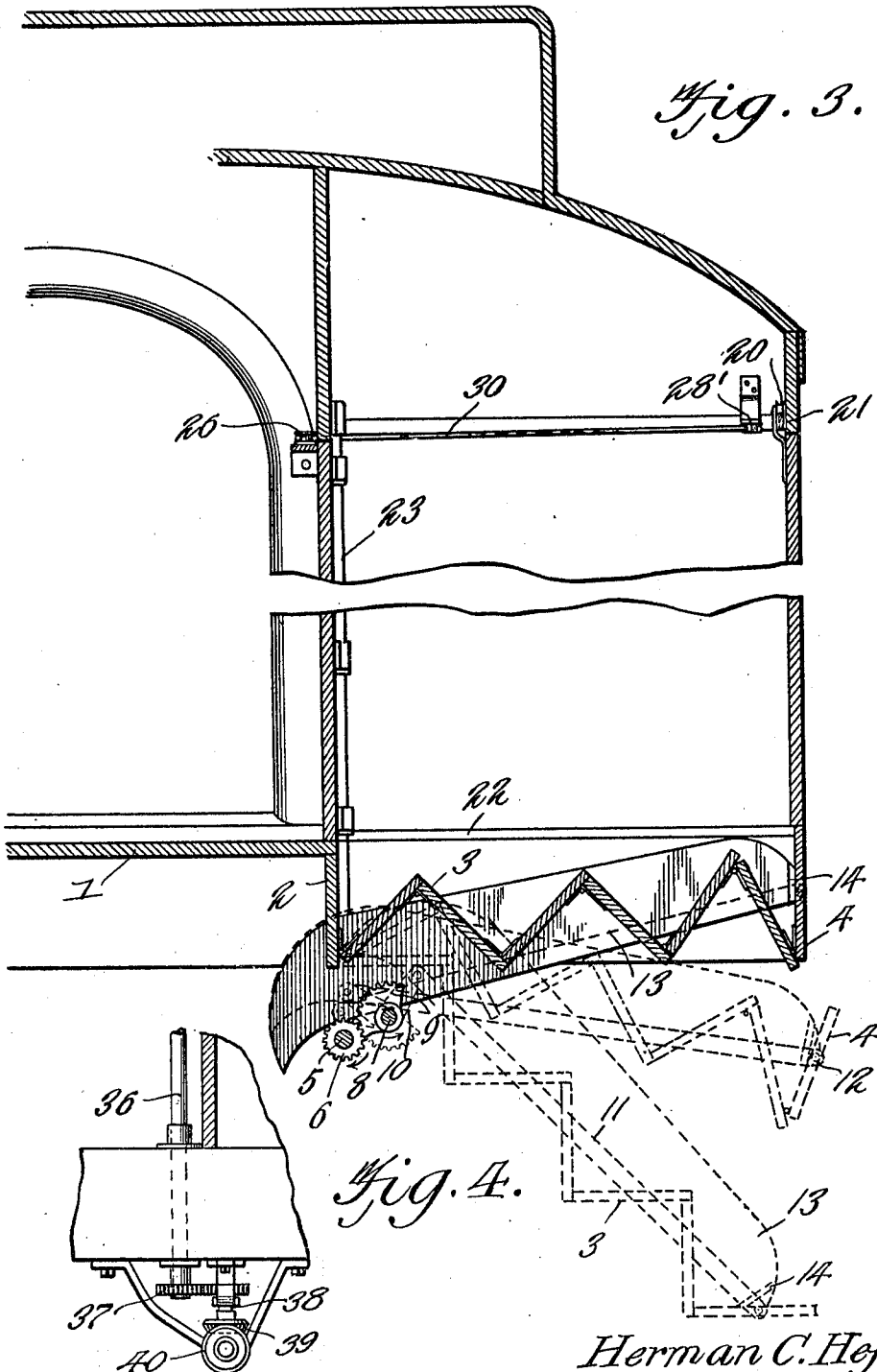


Fig. 4.

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UNITED STATES PATENT OFFICE.

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PASSENGER-CAR.

957,057.

Specification of Letters Patent.

Patented May 3, 1910.

Application filed March 12, 1909. Serial No. 482,954.

To all whom it may concern:

Be it known that I, HERMAN C. HEFFNER, a citizen of the United States, residing at Martinsburg, in the county of Berkeley and State of West Virginia, have invented new and useful Improvements in Passenger-Cars, of which the following is a specification.

The invention relates to an improvement in passenger cars, being more particularly directed to a vestibule construction whereby the doors and steps leading to the vestibule are automatically controlled and operated.

The main object of the present invention is the provision of a vestibule construction for passenger cars in which the space beyond the platform above the steps is normally closed by an inner and an outer door, which doors, together with the steps are automatically operated, the doors to open and the steps to project into operative position, the closing of the doors serving to fold the steps into inaccessible position.

The invention will be described in the following specification, reference being had particularly to the accompanying drawings, in which:—

Figure 1 is a horizontal section of one end of the car taken just above the doors. Fig. 2 is a broken vertical section on the line 2—2 of Fig. 1. Fig. 3 is a transverse vertical section on the line 3—3 of Fig. 1. Fig. 4 is a broken elevation, partly in section, illustrating the connections between the power shaft and the hand shaft.

Referring particularly to the accompanying drawings, my improved vestibule construction is, as is usual in this type of car, arranged at the ends of the cars so that when coupled an unbroken protected passageway is provided throughout the length of the train. For the purposes of the present invention, the vestibule may be said to include a platform 1, which is ordinarily alined with the aisle in the car proper, and the spaces beside the platform ordinarily occupied by the steps. The space beside the platform is designed to be closed by an inner and an outer door, thereby providing an aisle space in the vestibule guarded by a door on each side, while the vestibule space is also provided with an outer door to be arranged flush with the side of the car.

Secured to and depending from each side edge of the platform 1 is a supporting strip 2, to the lower edge of which is connected the steps 3. The steps are made up of the

usual treads and risers, being for the purpose of the present invention hingedly connected to permit their collapsing when moved in one direction while holding them rigid in step forming position when extended. The supporting plate 2 forms one of the risers when the steps are extended, and the final or end tread 4 of the steps has an added function when collapsed or elevated, which will presently appear.

Extending longitudinally of the platform 1 approximately beneath the supporting plate 2 is a power shaft 5, which shaft, within the planes formed by the ends of the steps, is provided with gears 6. Mounted in brackets secured to the framework of the car is an operating shaft 8 arranged in spaced parallel relation with the power shaft 5 and immediately adjacent thereto. The operating shaft is provided with gear segments 9 designed to mesh with the gears 6 of the power shaft, whereby movement may be transmitted from the power shaft to the operating shaft. The respective ends of the operating shaft are provided with relatively fixed arms 10, which at their free ends are connected to bars 11, as shown. The free or outer ends of the bars 11 are pivotally connected to the opposing ends of the terminal tread 4 of the steps, so that in the operation of the shaft 8 the bars 11 will, through the arms 10, be drawn rearwardly and their outer ends elevated so as to collapse and raise the steps. Guard plates 13 are secured to the respective bars 11 so as to form a guard at the side of the steps when lowered, and these plates near their ends are provided with abutment strips 14 against which the tread 4 of the steps is designed to abut when the parts have been operated to elevate the steps. The relative arrangement of the parts is such that when the tread 4 of the steps is in inoperative position, that is when the steps are elevated, said tread 4 will be arranged vertically flush with the side of the car, as clearly shown in Fig. 3.

Hingedly secured to a frame strip 15 fixed to the end of the car proper immediately adjacent the side edge of the platform 1 is a door 16, which may be of any ornamental construction and will be hereinafter termed the inner door. The free edge of the door is designed to engage a frame strip 17 forming a support for the closure section which bridges the step space across the end of the platform 1, forming the usual perma-

5 nent closure at this point. The space be-
 10 between the outer end of the closure 18 and
 the car proper is designed to be closed by a
 door 19, which will be hereinafter termed
 the outer door, it being understood that the
 step space is included between the inner and
 15 outer doors. The outer door 19 carries roller
 supports 20 designed to travel upon a track
 21 secured to the overhead structure of the
 vestibule, and this track extends longi-
 20 tudinally of the overhead structure in aline-
 ment with the side edge of the car and at the
 inner or rear end is curved and extended
 in position transverse the length of the car
 to provide a section 22 which extends across
 25 the end of the car proper, as clearly shown
 in Fig. 1. The track for the outer door is
 so arranged that said door may be moved
 into a position to close the outer portion of
 30 the step space of the vestibule or be moved
 rearwardly into a position in contact with
 and practically against the end surface of
 the car proper.

It will be noted that the inner door is
 35 hinged, while the outer door is slidably
 mounted, and the invention contemplates
 means for operating the doors so that in
 open position the outer door will be ar-
 ranged against the end of the car body
 40 while the inner door will be folded or swung
 over the outer door. To secure this result I
 mount in the vestibule structure an upright
 shaft 23, which is either directly connected
 with, or forms the hinge support for the
 45 inner door so that in the operation of the
 upright shaft the inner door will be swung
 into or from operative position. The up-
 right shaft is provided at its lower end with
 a bevel gear 24 designed to mesh with a
 50 bevel gear 25 on the power shaft, so that as
 the latter is operated in one direction or the
 other the inner door will be correspondingly
 actuated. Mounted in the vestibule struc-
 55 ture adjacent the respective side edges of
 the inner door 16 are pulleys 26 and 27, the
 former being arranged adjacent the hinged
 edge of the door and the latter adjacent the
 free edge thereof. A cable 28 is secured at
 60 one end to the free edge of the inner door,
 passed thence over pulley 27, then over pul-
 ley 26 and transverse the car to the rear or
 inner end of the outer door 19, to which
 door it is connected in a manner to induce
 a sliding movement of the door under proper
 65 pull upon the cable. Pulleys 28' and 29
 are arranged adjacent the respective side
 edges of the outer door, and a cable 30 is
 connected to the free edge of the inner door
 passed thence diagonally of the step space
 70 between the doors to and around the pulley
 28' at the rear edge of the outer door, thence
 to and over the pulley 29 arranged adjacent
 the forward edge of the outer door, and
 then connected to said outer door.

From the above construction it will be

seen that when the upright shaft 23 is op-
 erated to swing the inner door into the open
 position, the cable 28 will be drawn upon
 during such movement of the inner door
 with the effect to move the outer door upon
 75 a track and arrange the same in open po-
 sition in rear of the inner door. The move-
 ment of the upright shaft in the opposite
 direction to close the inner door will,
 through the medium of the cable 30, re-
 80 turn the outer door to normal or closed po-
 sition.

The end of the power shaft 5 arranged
 beneath the platform 1 is provided with a
 gear 31 designed to be engaged by a rack
 32 carried on the end of the piston stem 33
 connected to a piston, not shown, and op-
 erative within a cylinder 34. The cylinder
 has communication through a pipe 35 with
 the train pipe or other pressure apparatus,
 85 and is controlled by means of a valve de-
 signed to be operated by the trainman. By
 this means, at any desired time fluid under
 pressure may be admitted to the cylinder 34
 with the effect to operate the power shaft
 90 and thereby project the steps into operative
 position and open both inner and outer
 doors, as heretofore described. For induc-
 ing a reverse operation of the parts I mount
 in the platform a hand shaft 36, which at
 95 the lower end through the medium of gear
 37, stub shaft 38, and bevel gears 39 and 40,
 is operatively connected to the power shaft
 5. The upper end of the hand shaft has a
 pivoted drop lever 41, which, when elevated,
 100 extends at right angles to the hand shaft
 to insure sufficient leverage for the operation
 of said shaft. The hand shaft may also be
 used to open the doors and set the steps in
 the event the power apparatus is for any
 105 reason inoperative. The car is provided
 with usual vestibule connections 42 and the
 inner door is provided on its inner surface
 with a hand rail 43, which, when said door
 is open, provides a hand rail for the steps.
 110

The invention described provides, there-
 fore, a simple means whereby, through the
 manipulation of a single valve the train-
 man can open the doors guarding the exit
 from the train and project the steps into
 115 position to permit the convenient discharge
 of the passengers; and by the operation of
 a shaft close the doors and fold the steps
 into a position absolutely inaccessible from
 the outside.
 120

Having thus described the invention what
 is claimed as new, is:—

1. A car vestibule construction including
 a platform, steps secured to one edge thereof,
 inner and outer doors arranged at the re-
 125 spective ends of the step space, and door
 actuated means for simultaneously opening
 both of said doors and projecting the steps
 into operative position.

2. A car vestibule construction including 130

a platform, collapsible steps having hinged connection with the platform, inner and outer doors closing the step space, and means for operating said doors and steps simultaneously, said means arranging a portion of the steps in alinement with the outer door when the parts are in closed positions.

3. A car vestibule construction including a platform, steps connected thereto, an inner door mounted for swinging movement, an outer door mounted for sliding movement, connections between the inner door and outer door whereby the opening or closing movement of the former will induce a similar movement of the latter, means for operating the inner door, and means intermediate the door operating means and the steps to actuate the latter in the movement of the door operating means.

4. A car vestibule construction including a platform, steps movably connected to the edge of the platform, inner and outer doors closing the step space, a power shaft arranged below the platform, means actuated by the movement of the power shaft to simultaneously operate the doors and steps, and manually controlled power means for actuating the power shaft.

5. A car vestibule construction including a platform, steps movably connected to the edge of the platform, inner and outer doors closing the step space, a power shaft arranged below the platform, means actuated by the movement of the power shaft to simultaneously operate the doors and steps, manually controlled power means for actuating the power shaft, and hand operated means for operating the doors and steps in a direction reverse to that incident to the power means.

6. A car vestibule construction including a platform, steps movably connected to the edge of the platform, inner and outer doors closing the step space, a power shaft arranged below the platform, an upright shaft operated by the power shaft and directly operating one of the doors, an operating shaft actuated by the power shaft, and means connecting the operating shaft with the steps.

In testimony whereof I affix my signature in presence of two witnesses.

HERMAN C. HEFFNER.

Witnesses:

OSWALD L. BENDER,
LENNIS L. SHOOP.