R. T. SENTER.

STEP AND STEP OPERATING MECHANISM.

APPLICATION FILED MAR. 4, 1912.

1,105,705.

Patented Aug. 4, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

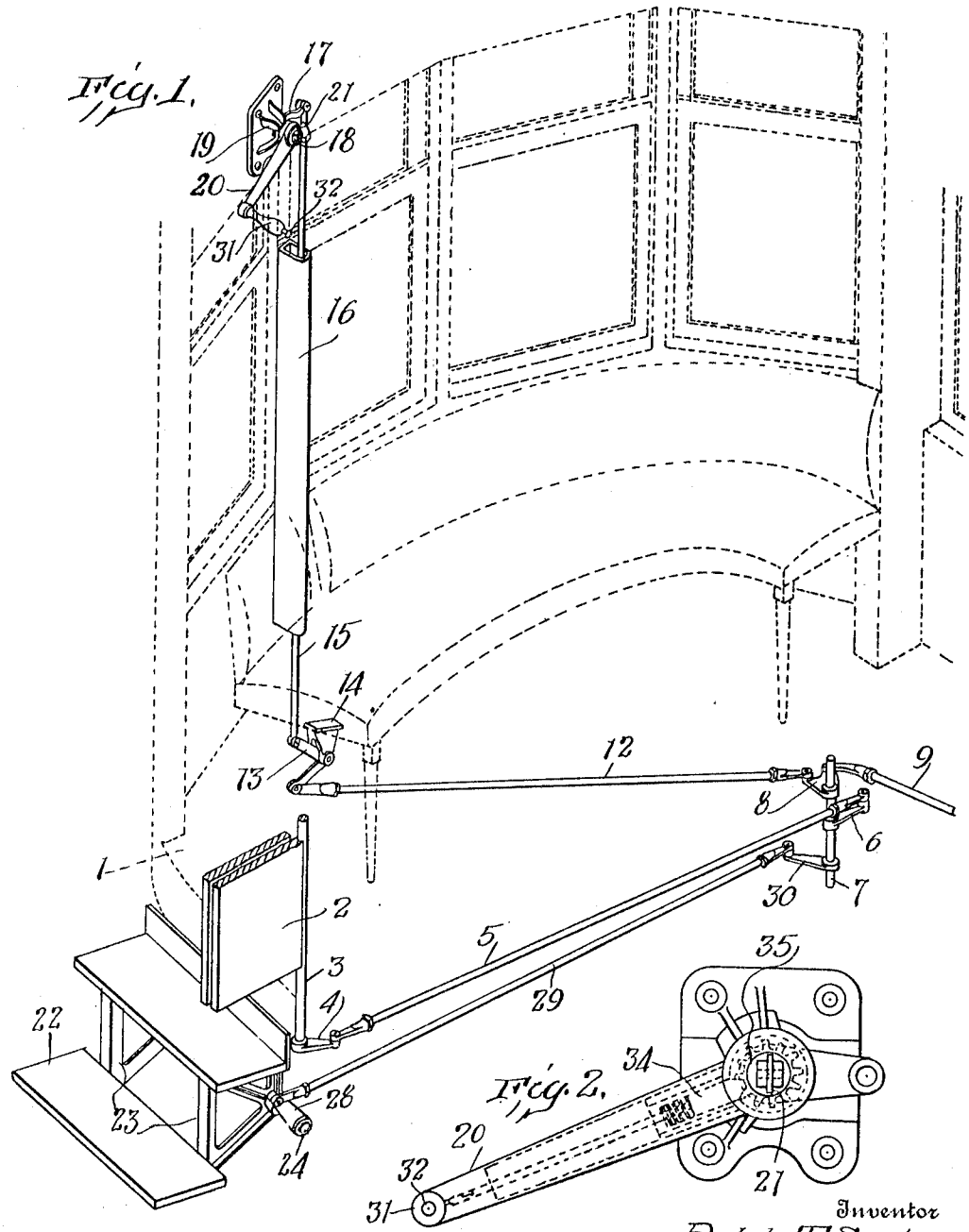


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

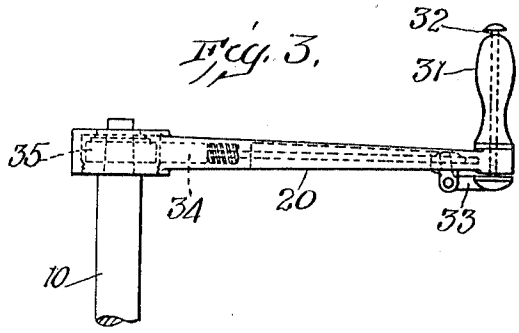


Fig. 5.

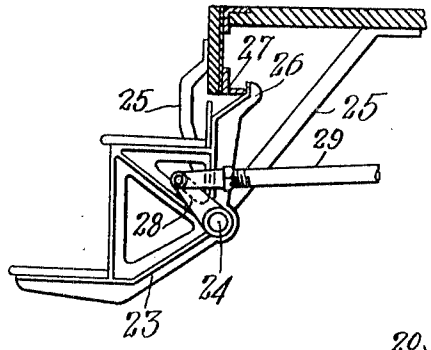


Fig. 6.

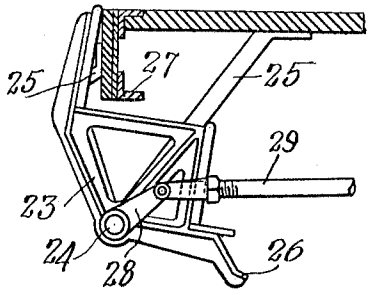
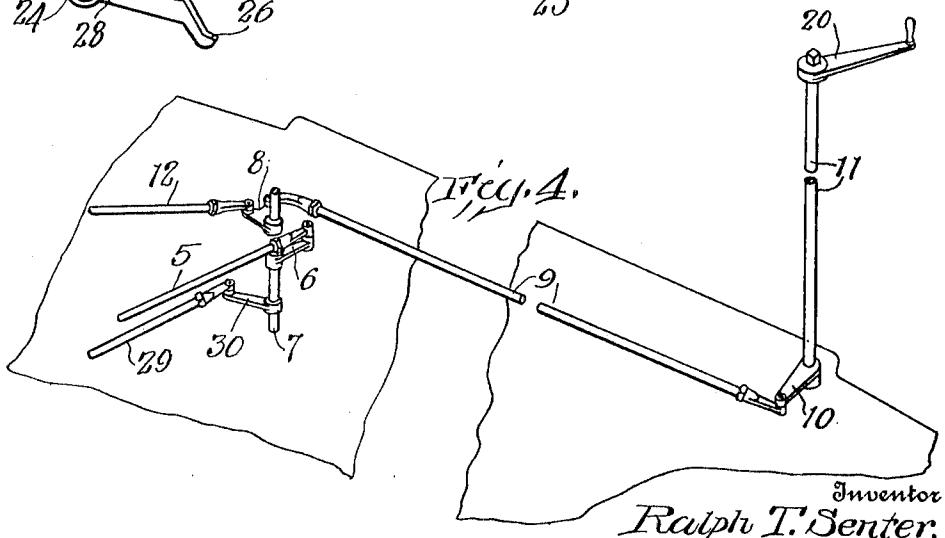


Fig. 4.



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UNITED STATES PATENT OFFICE.

RALPH T. SENTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NEAR-SIDE CAR COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

STEP AND STEP-OPERATING MECHANISM.

1,105,705. Specification of Letters Patent. **Patented Aug. 4, 1914.**

Original application filed July 5, 1911, Serial No. 638,635. Divided and this application filed March 4, 1912. Serial No. 681,543.

To all whom it may concern:

Be it known that I, RALPH T. SENTER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in a Step and Step-Operating Mechanism, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to a step and step operating mechanism and is designed more particularly for use in connection with street cars.

I have shown the invention as applied to the emergency exit of a street car of the type shown and described in the application filed by me July 5th, 1911, Serial Number 638,635, of which application the present application is a division.

The object of the invention is to provide a step having two treads which can be moved into an operative or an inoperative position.

It is also an object of the invention to provide a step, the tread of which may be folded against the frame of the car and which will be retained in either its folded or its operative position by gravity; to provide means whereby this step may be operated from different parts of the car; and to provide means for operating the same in unison with the door controlling the exit adjacent to which the step is mounted.

In the accompanying drawings, Figure 1 is a detail view of the step and its operating mechanism showing the adjacent portions of the car in dotted lines; Fig. 2 is an elevation of the rear operating mechanism for the step and door; Fig. 3 is a plan view of the same; Fig. 4 is a perspective view of a portion of the front platform of a car showing the mechanism for operating the door and step from the front end of the car; Fig. 5 is a side elevation of the step showing the same in its operative position; and Fig. 6 is a similar view of the step showing the same in its inoperative or folded position.

In these drawings I have illustrated one embodiment of my invention and have shown the same as applied to a street car having its main entrance and exit at the front end thereof and provided at the rear end with an emergency exit only. It will be obvious, however, that the step and the operating mechanism can be used in various positions and with cars of various kinds. Cars of the type here illustrated have no back platform, that is, the floor of the rear portion of the car is on the same level as the floor of the main portion of the car and, consequently, the door sill is a considerable distance above the street level, thus making it desirable to provide a step having two treads.

In Fig. 1 of the drawings the floor of the rear portion of the car, which is shown in dotted lines, is indicated by the reference numeral 1 and the door 2 is shown as controlling an exit or doorway at the side of the car. This door is formed in two sections, as shown, and one of the sections is rigidly secured to a door-supporting rod 3 mounted in bearings and arranged vertically along one edge of the doorway or exit. The other section of the door is hinged to the first-mentioned section and is so guided that when the door-supporting rod 3 is actuated to move the door into an open position, said second section will be folded onto the first section, as shown in the drawings. This construction of door is not a part of the present invention and need not be further shown or described in detail. It is desirable that this door 2 should be capable of being operated from either the front platform, where the officers are ordinarily stationed, or from the rear of the car. In the ordinary operation of the car this rear exit is used for emergency purposes only, as when a loaded car reaches its destination or a stop where all or a large number of the passengers wish to alight, then the officer on the front platform will open the emergency door and permit the passengers to alight from the rear end, as well as the front end of the car. Sometimes in the operation of cars of this type the conductor is stationed for a portion of the route on the rear platform and it is then desirable that the rear doors should be capable of being controlled from the rear end of the car. When applied to other types of cars or other locations it may be desirable to operate the door from different points of the car for other reasons. To permit of the door being so operated the pivoted supporting rod 3 is provided at its lower end with

a crank arm 4, which crank arm is connected by a rod 5 with a crank arm 6 on a vertical rockshaft 7 which is supported from the frame of the car beneath the rear portion thereof. Mounted on the rockshaft 7 and rigidly secured thereto is a bell crank lever 8. One arm of this bell crank lever is connected by a rod 9 with a crank arm 10 on the lower end of a vertical rod or shaft 11 mounted in the forward part of the car adjacent to the station of the officer who is to control the rear exit. In the present arrangement of the car the conductor has charge of the rear exit and the vertical shaft 11 is arranged near his station. The other arm of the bell crank lever 8 is connected by a rod 12 with one arm of a bell crank lever 13 which is pivotally mounted in a bracket 14 depending from the frame of the car near the rear end thereof. The other arm of the bell crank lever 13 is connected by a rod 15, which extends upwardly through a protecting casing 16, to an arm 17 secured to a short shaft 18 journaled in a bracket 19 secured to the rear wall of the car. The upper end of the vertical shaft 11 and the outer end of the short shaft 18 at the rear end of the car are both squared and are adapted to receive a detachable handle 20, thus enabling the handle to be transferred from one operating member to the other and permitting the conductor or other officer to operate the door from that end of the car at which he may be stationed. The outer end of the squared shaft at the rear of the car is provided with a slot in which is pivoted a cross bar or member 21 adapted to be turned lengthwise of the shaft to permit the handle to be placed upon the squared end thereof and then turned crosswise of the shaft to lock the handle in position thereon.

The step for the rear exit is shown at 22 and is adapted to be moved into an operative or inoperative position as the door is opened or closed. In the present instance the step structure consists of two cast iron brackets 23 upon which are mounted the two treads of the step. The brackets 23 which constitute the frame of the step are pivotally mounted upon a shaft 24, the axis of which is so arranged that when the step is tilted the upper tread and the upper portion of the bracket will form a counterweight to hold the step in its inoperative position, that is, with the lower tread against the face of the door sill, without the use of extra weights. The shaft 24 is journaled in suitable bearings formed in brackets 25 carried by the frame of the car. The upper and inner portion of the frame of the step is provided with a projection 26 arranged to engage a suitable stop, such as an angle iron 27, carried by the door sill or other suitable portion of the car frame, and thus limit the downward movement of the step and support the same in its operative position. When tilted up to its inoperative position the face of the lower tread will rest against the sill and the frame of the step and the upper tread will lie beneath the rear portion of the car and there will be no parts to project outwardly beyond the limits of the side of the car. The step structure is operated in unison with the door for the rear exit and, in the present instance, the shaft 24 has secured thereto a crank arm 28 which is connected by a rod 29 with a crank arm 30 on the vertical shaft 7, the arm 30 being so arranged with reference to the arm 6 that the movement of the shaft will simultaneously impart the proper movements to the door and the step.

The lever 20 is preferably of such a character that it can be adjusted to the desired position with relation to the shaft on which it is mounted. As shown in Figs. 2 and 3 the lever is provided with a handle 31 in which is slidably mounted a pin 32, the lower end of which rests upon one arm of a bell crank lever 33 pivoted on the lever 20 and the other arm of which is connected with a spring-pressed dog 34 adapted to engage between the teeth of a head 35, rotatably mounted in the end of the lever, which is enlarged to receive it, and provided with a squared opening to receive the squared end of the shaft. By pressing the pin 32 when the handle 31 has been grasped the dog 34 can be released from the toothed head 35 and the lever adjusted to the desired position with relation to the shaft.

In order to prevent the opening of the rear door without the conductor's consent the shaft 11 at the front platform is prevented from rotation by a pin 36 projecting therefrom and arranged to strike against a second pin 37 mounted on a fixed part, such as a bracket in which the shaft is journaled. The shaft 11 cannot be rotated until the pin 37 is removed or raised so as to clear the projection or second pin 36. When the door is to be operated from the rear portion of the car the pin 37 must first be removed, as it will be understood that the shaft 11 rocks about its vertical axis whenever the door is opened or closed regardless of whether the mechanism is actuated from the front or the rear of the car.

It will be apparent from the foregoing description that I have provided a car step having two treads which can be folded into a position in which there will be no parts projecting beyond the side of the car; and that this step can be operated in unison with the rear door and that both the door and the step may be operated from any one of a plurality of different points upon the car.

While I have shown and described one

embodiment of the invention it will be understood that this has been chosen for the purposes of illustration only and that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

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

1. The combination, with a car frame, of a step comprising brackets, a tread carried by said brackets, means for pivotally supporting said brackets beneath the frame of the car, the pivotal center of said brackets being so arranged that the tread may be moved against the frame of the car and when in this position the remainder of the step structure will lie beneath the frame of the car and the center of gravity of said step structure will lie on that side of said pivotal center opposite the tread.

2. In a passenger car, the combination, with a doorway and a pivoted step therefor, said step having a plurality of treads so arranged that when raised into inoperative position the lower tread of the step will lie against the doorway sill, the upper part of the step structure at the same time being thrown back beneath the car structure.

3. In a passenger car, the combination, with a doorway and a pivoted step therefor, said step having a plurality of treads so arranged that when raised into inoperative position the lower tread of the step will lie against the doorway sill, the upper part of the step structure at the same time being thrown back beneath the car structure, and means operable from different parts of the car for controlling the position of said step.

4. In a passenger car, the combination, with a doorway and a pivoted step therefor, said step having a plurality of treads so arranged that when raised into inoperative position the lower tread of the step will lie against the doorway sill, the upper part of the step structure at the same time being thrown back beneath the car structure, operating mechanism to raise and lower said step, and actuating devices arranged in the front and rear portions, respectively, of said car, and a single handle for said actuating devices adapted to be transferred from one to the other thereof.

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

RALPH T. SENTER.

Witnesses:
EDWARD P. RAWLE,
HENRY C. ESLING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."