E. B. REEDER.

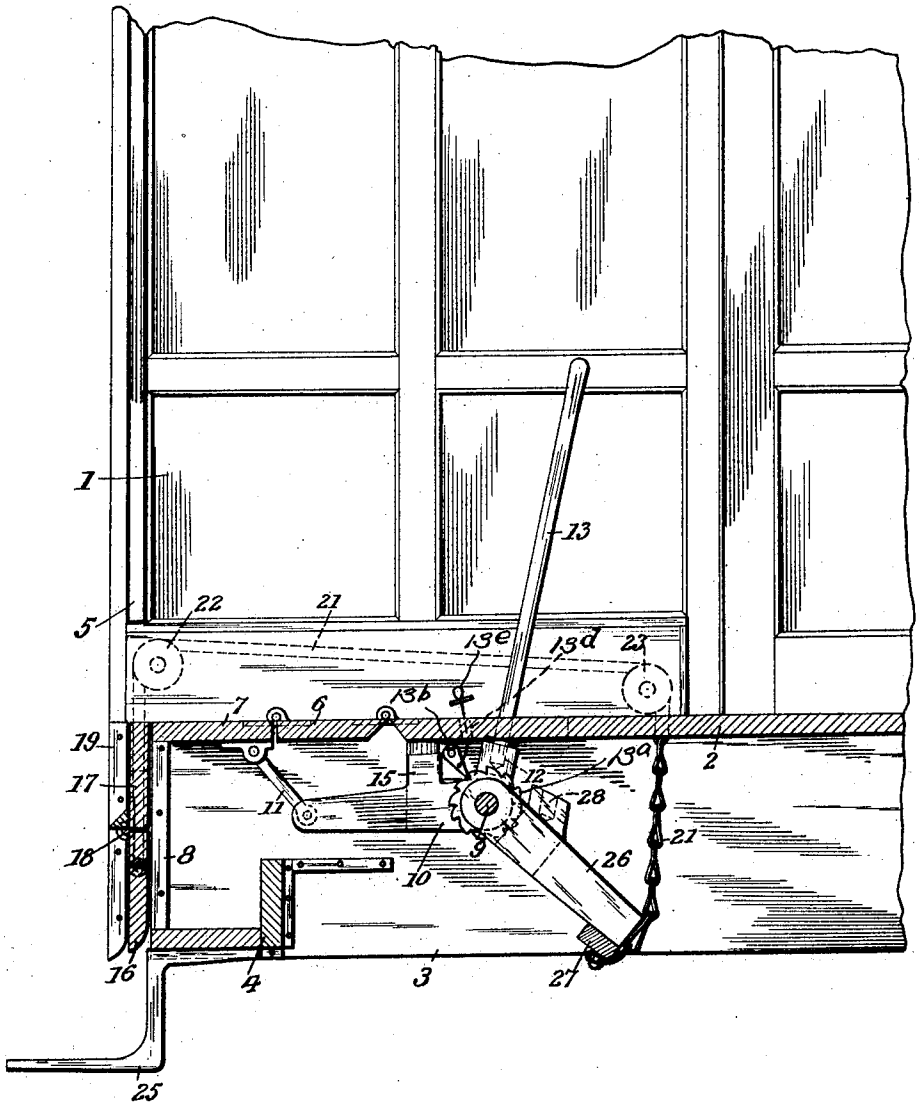
AUTOMATIC RAISING AND LOWERING STEPS.

APPLICATION FILED APR. 5, 1921.

1,397,294. **Patented Nov. 15, 1921.**

3 SHEETS—SHEET 1.

Fig. 1.



Inventor

E. B. Reeder

By *William J. Jaeckli*

Attorney

E. B. REEDER.

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3 SHEETS—SHEET 2.

Fig. 2.

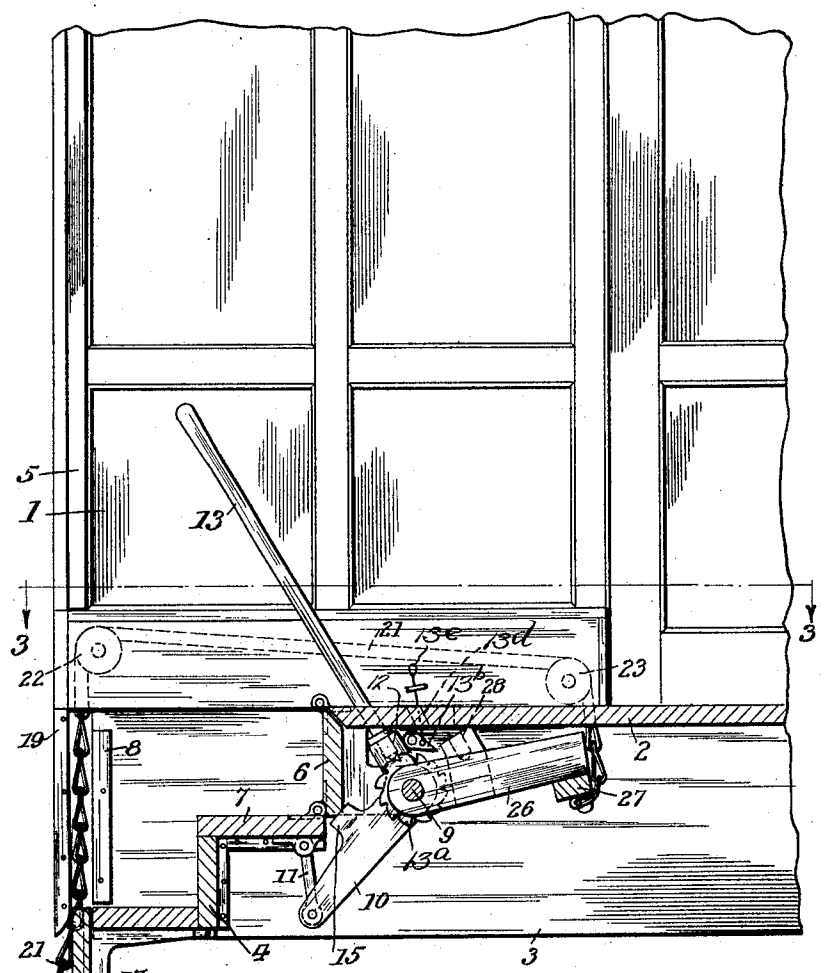


Fig. 5.

Inventor

E. B. Reeder

By *William J. Jacobi*

Attorney

E. B. REEDER.

AUTOMATIC RAISING AND LOWERING STEPS.

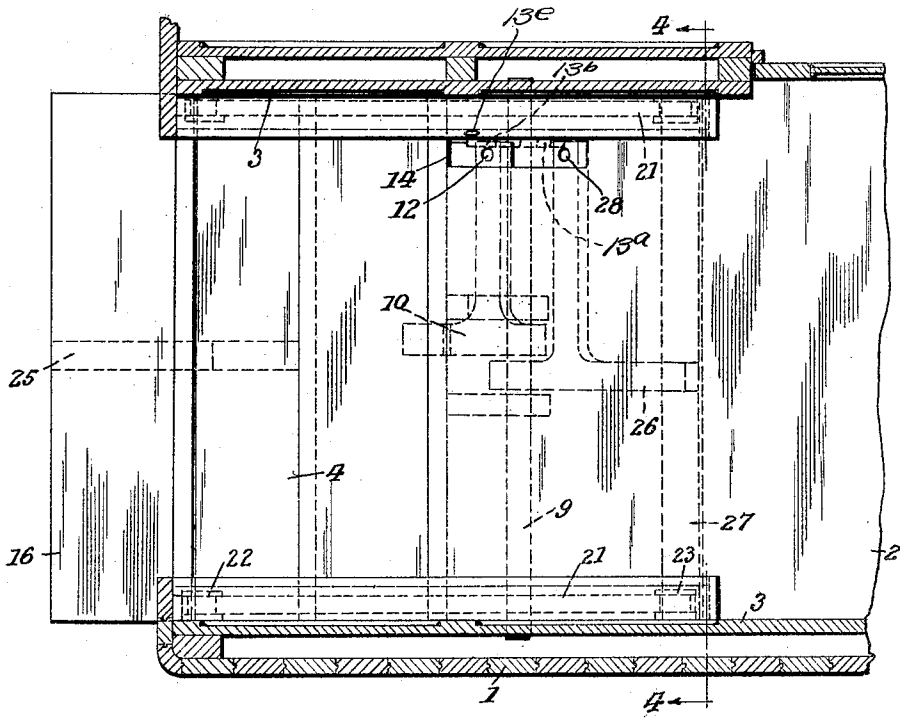
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3 SHEETS—SHEET 3.

Fig. 3



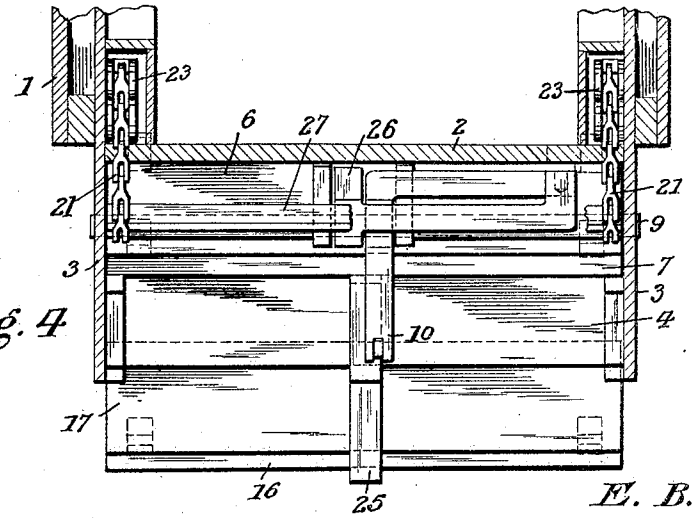


Fig. 4

Inventor

E. B. Reeder

By *William J. Jaeckle*

Attorney

UNITED STATES PATENT OFFICE.

ERNEST B. REEDER, OF MADISON, INDIANA.

AUTOMATIC RAISING AND LOWERING STEPS.

1,397,294. Specification of Letters Patent. Patented Nov. 15, 1921.

Application filed April 5, 1921. Serial No. 459,010.

To all whom it may concern:

Be it known that I, ERNEST B. REEDER, a citizen of the United States, residing at Madison, in the county of Jefferson and State of Indiana, have invented certain new and useful Improvements in Automatic Raising and Lowering Steps, of which the following is a specification.

My invention relates to new and useful improvements in adjustable steps for railway coaches and the like, and the primary object is to provide steps for railroad cars which may be closed or opened at the will of the attendant, or conductor, and when closed form a part of the platform of the car and when let down will be used as a car step to enable passengers to ascend or descend thereon.

In the majority of the railway cars now in use, a steel platform is used to close down over the top of the step and when the door of the vestibule of the car is open and the steel platform raised, it is necessary for the attendant or employee of the road to place a step on the ground for the convenience of the passengers ascending or descending the step. When the door of the vestibule is closed and the steel platform let down, the steps are left unprotected below the door of the car. In northern parts of the country, the unprotected steps become covered with snow, ice and sleet which makes it quite dangerous for passengers. Considerable difficulty has been experienced in railroads due to the conditions herewith mentioned.

My improved adjustable step further contemplates a means whereby these difficulties will be avoided and provides steps which may be adjusted to complete the platform and certain other steps which may be adjusted to protect the remaining steps.

A further object of my invention resides in providing a device which is simple and durable in construction, inexpensive to manufacture and one which will be extremely efficient and useful in operation.

With these and other objects in view, my invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter referred to and more particularly pointed out in the specification and claims.

In the accompanying drawings forming a part of this application,—

Figure 1 is a longitudinal section through a car provided with adjustable steps constructed in accordance with my invention, the steps being adjusted so as to complete the platform and protect the same, that is, in raised position;

Fig. 2 is a similar view showing the steps let down in operative position;

Fig. 3 is a horizontal section as seen on the line 3—3 of Fig. 2;

Fig. 4 is a vertical section as seen on the line 4—4 of Fig. 3; and

Fig. 5 is a fragmentary perspective view of the lower adjustable step disposed to its operative position and showing the guide members and chain connection therewith.

In describing the invention I shall refer to the drawings in which similar reference characters designate corresponding parts throughout the several views, and in which 1 designates a car of the passenger type used in railways, and 2 the platform thereof. Depending from the platform along the sides thereof are the vertical side walls 3 which form a housing for the steps or stairway when the same is in operative position. Rigidly secured between the side walls 3 of the stairway is a step 4 which for convenience will be termed an intermediate step, the same being provided with the usual horizontal and vertical sections, as clearly shown in Figs. 1 and 2 of the drawings. This rigid step is the only permanent one utilized and the remaining steps are adjustable to coöperate with this step when in operative position to complete the stairway, and when in inoperative position to cover said step 4 and complete the platform 2, as will be hereinafter described.

The platform 2 terminates short of the door 5, as clearly indicated in Fig. 2 of the drawings, and hinged to the platform is a section 6 to which is also hinged an additional section 7, said sections 6 and 7 together forming an upper adjustable step, as clearly indicated in Fig. 2 of the drawing.

When disposed to a horizontal position, as shown in Fig. 1, the sections 6 and 7 complete the platform 2 in the vestibule of the car, the end of the section 7 in such position resting for support upon the upper ends of the supporting strips or the like 8 which are secured to the vertical side walls 3. When the sections 6 and 7 are disposed to a lowered position so as to form a step, the outer end of the section 7 rests upon the upper edge of the vertical portion of the step 4, as clearly shown in Fig. 2 of the drawings.

I have provided a means for operating this adjustable step and to this end a rod 9 is secured between the side walls 3 and pivotally mounted thereon is a bell crank lever 10. One arm of the bell crank lever is considerably longer than the other and the free end of this latter arm has a link 11 pivotally connected thereto, the outer end of which link pivotally connects with the under face of the section 7 of the adjustable step, adjacent the hinged end of the latter, as clearly shown in Figs. 1 and 2 of the drawings. The opposite end of the bell crank lever 10 is provided with an opening 12 in which is adapted to be inserted a hand lever 13 which projects upwardly through the platform 2, through the medium of an opening 14 formed in said platform, as clearly shown in Fig. 3 of the drawings. Thus it will be seen by actuation of the lever 13, the sections 6 and 7 of this adjustable step may be disposed upwardly to complete the platform 2, or disposed downwardly to complete the stairway. A projection 15 is formed on the bell crank lever 10 and this projection is adapted to receive thereagainst the lower portion of the section 6 when the adjustable step is disposed in its operative position, as shown in Fig. 2. Thus a support is provided for the adjustable step when the latter is disposed to such operative position, and any desired means may be provided, if desired, for locking the hand lever 13 or the part connected therewith in the various operative positions. As stated previously, the sections 6 and 7 constitute an adjustable upper step for the stairway desired, and when disposed in a horizontal position complete the platform 2. In practice it may be necessary to provide some means for holding the steps 6 and 7 in their horizontal positions, as shown in Fig. 1 of the drawing, so that in the event someone walks thereon, said steps would not give way under the weight. To this end a ratchet 13^a is mounted on a rod 9 adjacent one end thereof and pivotally supported on the adjacent side wall 3 is a pawl 13^b which under its own weight drops into position in engagement with the teeth of said ratchet. Connected with the pawl adjacent its free end is a flexible connection 13^c which extends through an opening 13^d in the platform 2. A handle or finger piece 13^e is carried on the outer end of the flexible connection so that when it is desired to actuate the lever 13 it is only necessary to withdraw the pawl 13^b from its effective position whereupon said lever may be operated. The engagement of the pawl with the ratchet is obviously adapted to retain the steps 6 and 7 in their adjusted horizontal positions.

I also desire to provide a lower step which when in its inoperative position constitutes a protection for the step 4. To this end I provide a pair of sections 16 and 17 which are hinged together as at 18. These sections are adapted to be guided between a guideway formed on the one hand by the vertical strips 8 previously referred to, and by additional vertical strips 19 secured to the vertical side pieces 3, as clearly shown in Figs. 1 and 2 of the drawings. The side edges of the section 16 of this lower adjustable step are slightly cut away as shown at 20, and connected to this section in the cut away portions thereof are the ends of a pair of link chains or cables 21 which extend upwardly through the channels or guideways formed by the vertical pieces 8 and 19, and are disposed over grooved rollers or pulleys 22 which are mounted in the side pieces 3 secured to the side walls of the car along the platform. The chains or cables 21 then continue substantially horizontally and are disposed over additional grooved rollers or pulleys 23 mounted in the inner ends of the side pieces just referred to, as clearly shown in Figs. 1 and 2 of the drawings. The chains or cables 21 then continue downwardly through openings in the floor of the platform 2 to be connected with apparatus hereinafter described.

The front wall of the section 17 of the lower adjustable step is slightly cut away at its edges, as shown at 24, to permit of the chain or cable 21 being disposed in the guideway between the strips 8 and 19 at the same time the sections 6 and 7 are being drawn upwardly therethrough, and when the sections 16 and 17 are disposed to their lowermost position to constitute an adjustable step, the section 16 is adapted to rest upon an angular bracket 25 secured to the under face of the horizontal section of the step 4, as clearly shown in Figs. 1 and 2 of the drawings. When the sections 16 and 17 are drawn upwardly and through the guideways, however, it will be seen that the same will constitute a protection for the step 4. When lowered as shown in Fig. 2 the same will constitute a step to continue the stairway formed by the step 4 and the upper adjustable step.

In order to provide a means for operating this lower adjustable step, an additional bell crank lever 26 is pivotally carried on the rod 9, one arm of which is considerably

longer than the other, and the longer arm carries a cross beam or bar 27 thereon, to the ends of which are connected the ends of the link chains or cables 21, as clearly shown in Figs. 1 and 2 of the drawings. The shorter arm of the bell crank lever 26 is provided with an opening 28 into which is adapted to be disposed the lever 13. The lever 13 after being used to operate the bell crank lever 10 may be disposed into the opening 28 to operate the bell crank lever 26. And, thus it will be seen that the handle lever 13 may be operated with this bell crank lever 26 to dispose the lower adjustable step to its operative position completing the stairway, previously referred to, or to dispose this lower adjustable step to its collapsed position between the guideways formed by the strips 8 and 19, thus forming a protection for the step 4, as clearly shown in Fig. 1 of the drawings. Any desired means may be provided for locking the bell crank lever 26 in its desired adjusted position.

When the car is in motion and the device is disposed to a position as shown in Fig. 1, the lever 13 is preferably removed from engagement with either of the bell crank levers so that passengers may not tamper therewith and a door, of course, is provided for the vestibule so as to prevent egress therefrom.

From the foregoing description of the construction of my improved device, it will be seen that I have provided a series of steps capable of elevation from their normal operative position for the ingress and egress of passengers to and from the coach to a position wherein one adjustable step completes the platform of the car, and the other adjustable step completes a protective means for the one rigid or permanent step of the stairway. Thus passengers and others will be prevented from riding on the steps or from boarding or descending from the coach while the latter is in motion, and the single permanent step prevented from collecting snow, ice and the like.

It will further be seen that I have provided a simple, inexpensive and efficient means for carrying out the objects of my invention, and while I have particularly described the elements best adapted to perform the functions set forth, it is obvious that various changes in the form, proportion and in the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the principles of the invention.

What I claim is:

1. In combination with a car having a platform and vertical side walls forming a housing for a stairway; of a permanent step secured between said side walls, upper and lower adjustable steps adapted to coöperate with said permanent step and means separately operative for manually disposing said adjustable steps to their operative and inoperative positions.

2. In combination with a car having a platform and vertical side walls forming a housing for a stairway; of a permanent step secured between said side walls, an adjustable upper step adapted to coöperate with the permanent step in one position and adapted to complete the platform in another position, a lower adjustable step adapted to coöperate with said permanent step in one position and adapted in another position to constitute a protection for said permanent step, and manually operative means for disposing said adjustable step sections to their operative and inoperative positions with respect to said permanent step.

3. In combination with a car having a platform and vertical side walls forming a housing for a stairway; of a permanent step secured between said side walls, an adjustable step hinged to the platform and in one position adapted to form a continuation of said platform and in another position coöperating with said permanent step, an additional adjustable step adapted in one position to coöperate with said permanent step and in another position disposed to a vertical position forward of the permanent step to provide a protecting wall therefor, means for manually operating the first mentioned adjustable step and additional means for operating the additional second mentioned step.

4. In combination with a car having a platform and vertical side walls forming a housing for a stairway, said side walls being provided with vertical guideways at predetermined points therein; of a permanent step secured between said side walls inwardly of said guideway, an upper adjustable step formed of a pair of hinged sections which in turn are hinged to said platform, manually operative means for disposing said adjustable step to a position coöperating with the permanent step and also to a position constituting a continuation of the platform, a lower adjustable step consisting of a pair of sections hinged together and adapted to operate through the guideways, and manually operated means adapted to dispose said last mentioned step to a position in cooperation with the permanent step and to a position acting as a protecting wall for said permanent step.

5. In combination with a car having a platform and vertical side walls forming a housing for a stairway, said side walls being provided with vertical guideways adjacent one end thereof; of a permanent step secured between said side walls, an upper adjustable step consisting of a pair of sections hinged together and also hinged to said platform whereby when positioned horizontally

they will constitute a continuation of the platform and when disposed to lowermost position will coöperate with said permanent step, a lower adjustable step consisting of a pair of sections hinged together and adapted to slide vertically through said guideways to constitute in one position a section wall for the permanent step and in lowermost position an element coöperating with the permanent step, manually operated means for actuating said upper adjustable step, and additional manual means for disposing said lower adjustable step to its adjusted position.

In testimony whereof I affix my signature.

ERNEST B. REEDER.