A. F. BILTGEN.

FOLDING CAR STEPS.

APPLICATION FILED DEC. 15, 1914.

1,136,581.

Patented Apr. 20, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

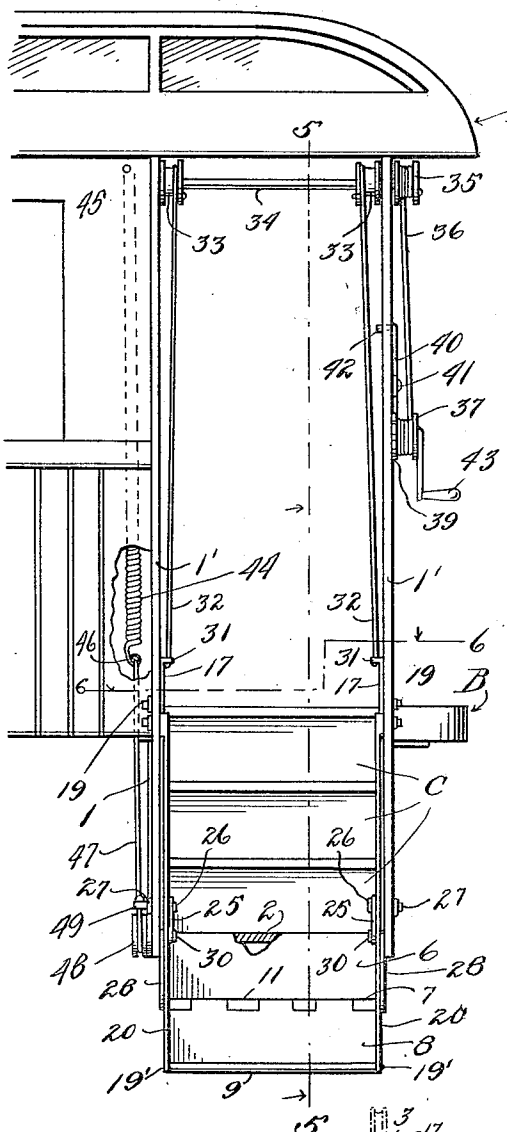


Fig. 2.

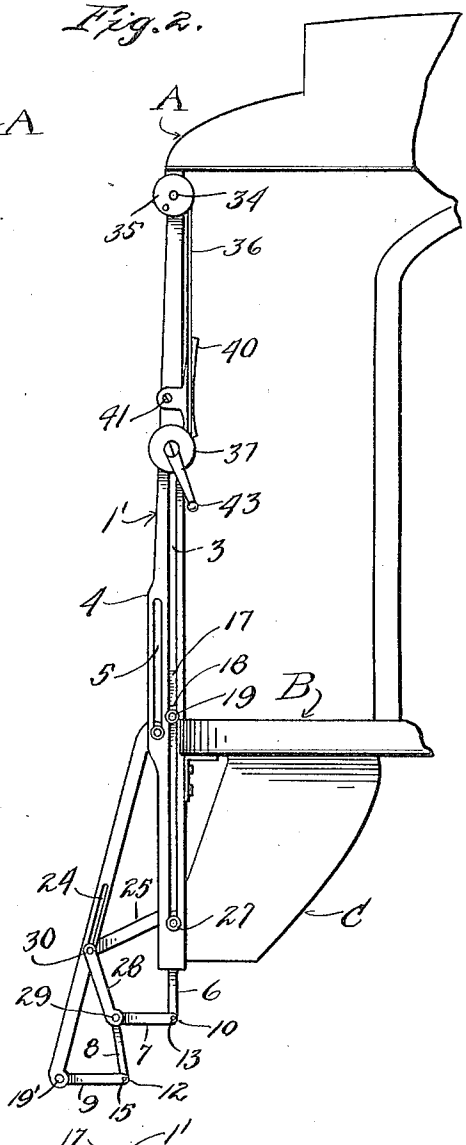
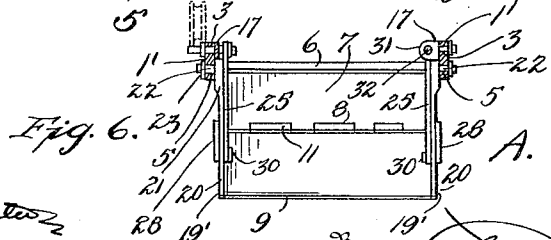


Fig. 6.



Witnesses

J. MacCarter

R. B. Clarough.

Inventor

A. F. Biltgen

By Howard & Howard

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 3.

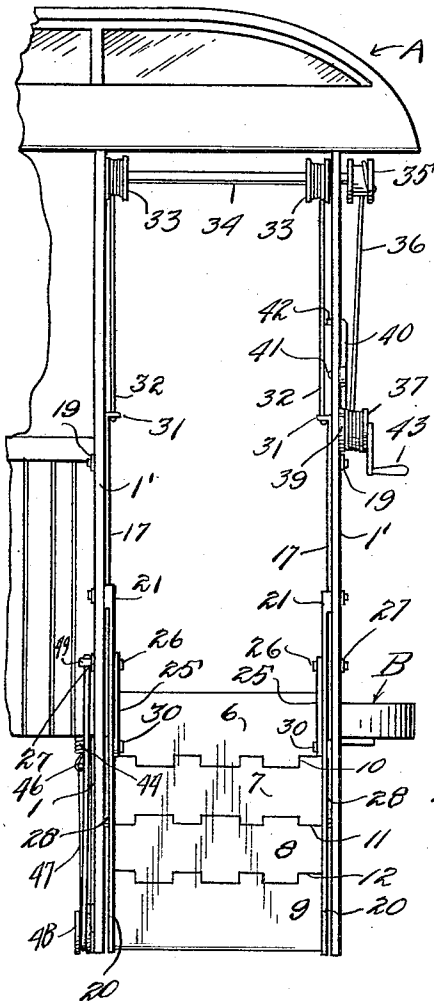


Fig. 4.

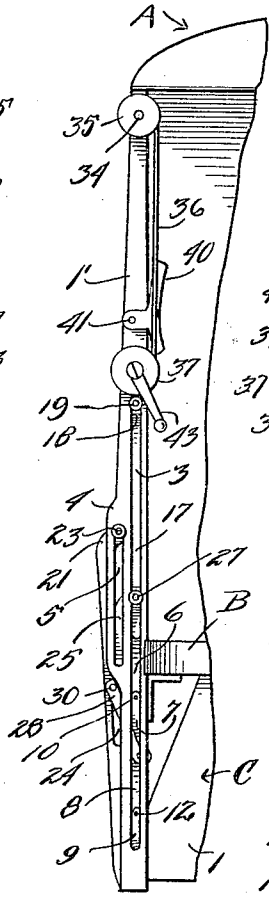
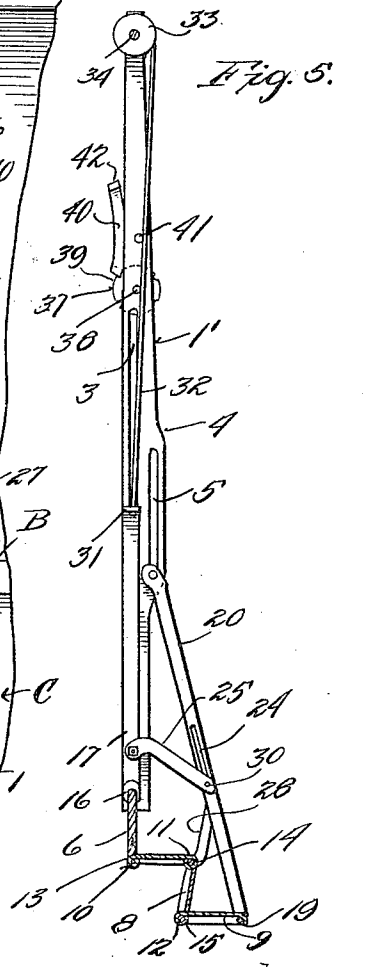


Fig. 5.



Witnesses

J. MacCarter

R. B. Cavanagh

Inventor

A. F. Biltgen

By Howard & Howard

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT F. BILTGEN, OF ARROWROCK, IDAHO.

FOLDING CAR-STEPS.

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Application filed December 15, 1914. Serial No. 877,305.

To all whom it may concern:

Be it known that I, ALBERT F. BILTGEN, a citizen of the United States, residing at Arrowrock, in the county of Boise, State of Idaho, have invented certain new and useful Improvements in Folding Car-Steps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain novel and useful improvements in car steps, which when in extended position are adapted to form a convenient and safe means for the passengers to ascend to and descend from the platform of a car, and which when in folded position will constitute a gate for the platform to prevent persons entering and leaving the car.

In the present instance it is my purpose to provide a step which is adapted to be operated by the conductor or other trainman, the steps being so constructed and correlated relative to the ordinary platform of the car that when desired the steps may be quickly and easily lowered into position to enable the persons to ascend to and descend from such platform, and when necessary may be turned up and folded to constitute a gate or barrier to prevent persons entering or leaving such car.

Still a further object of my invention is the provision of a device of this character wherein the steps during the raising and lowering operation thereof, will move in a substantially vertical path, the steps being steadily guided in such movement so that not only is the swinging or turning of the steps in a circular path avoided, but the steps will be accurately and positively guided either into folded or extended position.

Another object of my invention is the provision of a folding car step which will embody the desired features of simplicity, efficiency, safety and convenience, and because of embracing but relatively few parts may be manufactured and installed for use at a relatively low cost.

With the above recited objects and others of a similar nature in view, my invention consists in the construction, combination and arrangement of parts set forth in and falling within the scope of the appended claims.

In the accompanying drawings: Figure 1 is a view in front elevation of a portion of a car showing my invention applied thereto, and illustrating the steps in their extended position ready for use. Fig. 2 is a side view, showing the steps in extended position. Fig. 3 is a view in front elevation showing the steps in folded position to constitute a gate. Fig. 4 is a side view of the steps in the position shown in Fig. 3. Fig. 5 is a longitudinal sectional view taken on the line 5—5 of Fig. 1, the portion of the car being omitted. Fig. 6 is a cross sectional view taken on the line 6—6 of Fig. 1, with the car omitted.

Referring now to the accompanying drawings in detail, the letter A designates conventionally a portion of the car, while B is the platform thereof, and C the ordinary, permanent platform steps, the sides of the steps being shown at 1, and the lowermost tread of the stationary platform step is designated by the numeral 2. Arranged at the sides of the steps and extending from the roof of the car to the bottom edge of the sides of the step are the parallel standards 1′, preferably made of metal, these standards being fastened in any suitable manner. Each standard is provided with a relatively long slot 3, and each slot extends from a point adjacent the lower end of the standard to a point approximately two-thirds of the way up the standard, as will be clearly seen by reference to Figs. 2 and 4. Each standard has an intermediate swelled or enlarged portion 4, and each enlarged portion is provided with a longitudinal slot 5. The slot 5 of each standard extends parallel to the slot 3 thereof, and the slots 5 of the two standards are directly opposite each other, as are the slots 3.

The folding steps proper preferably comprise the top riser 6, the intermediate tread 7, the intermediate riser 8 and the bottom tread 9. The top riser 6 is hinged as at 10 to the intermediate tread 7, the intermediate tread 7 is hinged to the intermediate riser 8, as at 11, and the bottom tread 9 is hinged to the intermediate riser as at 12. The pintle or pivot rod of the hinge 10 is shown at 13, that of the hinge 11 at 14, and that of the hinge 12 at 15. The pintles or hinged rods 14 and 15 extend slightly beyond the side edges of the step for the purpose hereinafter described.

Rigidly secured at their lower ends to the

top riser 6, as at 16, are the vertical sliding rods 17, these rods sliding against the adjacent inner faces of the standards 1, and these rods carry outwardly projecting studs 18 which extend through the relatively long slots 3, and are provided at their outer ends with caps or nuts 19 to prevent the disengagement of the bars from the standards, and yet at the same time permit such bars to slide relative to the standards. Pivotally connected at their lower ends as at 19′ to the bottom step 9, are the two arms 20, the upper ends of which are enlarged as at 21 and provided with outwardly projecting studs 22 extending through the relatively short slots 5 in the enlarged intermediate portions of the standards, these studs also having caps or nuts 23 on the outer ends thereof to prevent the disengagement of the arms from the standards and yet permit said arms to slide relative to the standard so far as the limits of the slots 5 will allow. These arms 20 are provided intermediate their ends with longitudinal slots 24. Links 25 are pivotally connected by short studs 26 with the standards 1′, these studs extending through the slots 3 and are provided with caps or nuts 27 to permit the sliding movement of the links relative to the standards and yet prevent their disengagement therefrom. Links 28 are pivoted at their lower ends as at 29 to the intermediate tread 7 and at their upper ends are pivotally connected by studs 30 to the adjacent ends of the links 25, the studs 30 extending through the slots in the arms 20, and as will be seen the links 28 lie at the outside of the arms, while the links 25 lie at the inside thereof.

The upper ends of the sliding bars are inturned to form lugs 31 to which are attached cables 32 which are drawn upward and wrapped upon the spools 33 fast with the shaft 34, this shaft 34 being journaled at its ends in the standards 1′ adjacent the top of the car. It is understood that the cables 32 may be of any suitable character, such as chains, ropes or the like. The shaft 34 is provided at its outer end with a spool 35 to which is connected one end of the cable 36, the opposite end of the cable being attached to a small winding drum 37 rotatably mounted in a stud shaft 38 projecting from the side of the outermost standard 1. This winding drum is provided with a ratchet flange 39 adapted to be engaged by the locking dog 40, pivoted at 41 to one standard 1′, the upper end of the dog being bent laterally as at 42 to form a stop for the limiting movement of the ratchet engaging end of the dog away from the ratchet flange of the winding drum, and also to form a grip for the conductor to enable him to throw the grip into locking engagement with the flange when desired. A handle 43 is provided for operating the winding drum.

The numeral 44 indicates a retractile spring, the upper end of which is fastened at 45 to the side of the car. The lower end of this spring is connected at 46 to the cord 47 which trains around the grooved pulley 48 mounted at the lower portion of the adjacent side of the permanent steps, the other end of the cord being fastened to a lug 49 extending from the cap nut 27 of the adjacent stud 26. The tendency of this spring is, therefore, to pull the folding steps downward into extended position.

From the above description, taken in connection with the accompanying drawings, the construction and manner of operating my invention will be readily apparent to those skilled in the art. Assuming the steps to be pulled down into extended position by the action of the spring 44, as shown in Figs. 1 and 2, at this time the slotted arms 20 are inclined outward and downward and away from the standards 1′, the links 25 also project outward, almost at right angles to the standards 1′, and the links 28 extend vertically between the links 25 and the tread to which they are attached. At this time also the studs connecting the links 25 with the standards rest at the bottom of the slots 3 and the studs at the top of the arms 20 rest in the bottom of the slots 5. If it be desired to lift the steps and to fold the same the conductor turns the winding drum through the medium of the handle, winding up the cable leading to the winding drum and consequently turning the spool shaft at the top of the car. This causes the cable attached to the vertically sliding bars to be wound up on the spools, thereby drawing up the vertically sliding bars against the action of the spring 44. This upward movement of these sliding bars causes the links 25 to be turned inward, pulling with them the arms 20 and links 28 until the arms and links lie almost in parallelism with the vertical standards. The continued winding of the drum will cause the steps, through the links and arms to be folded until they all lie in substantially the same vertical plane, and the sliding bars being pulled up until they occupy the position shown in Figs. 2 and 4, in which position it will be noted, they constitute a gate. When the steps have been folded to constitute a gate, the locking dog is thrown into engagement with the ratchet flange of the arm to prevent the steps being pulled into extended position by the spring 44, and the parts will be held as shown in said Figs. 3 and 4. When it is desired to lower the steps it is only necessary to release the locking dog from the ratchet flange of the winding drum when the steps will be pulled down by the spring 44, assisted by gravity, the cable unwinding from the winding drum and the cables leading to the spools unwinding therefrom so that the

steps may drop to the position shown in Figs. 1 and 2, when, as will be seen, the top edge of the top riser 6 is on the level with the bottom step of the stationary platform steps.

While I have herein shown and described one particular embodiment of my invention, I wish it to be understood that I do not confine myself to all the precise details of construction herein set forth by way of illustration, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

What I claim is:

1. The combination with the platform of a car including the steps thereof, of a set of hinged steps, vertical standards attached to the car at each side of the platform steps, a winding device located above the platform of the car, bars connected at their lower ends to the hinged steps, connections between said bars and the winding devices, link arms slidingly engaging the standards at their upper ends and pivotally connected to the hinged steps at their lower ends, toggle links pivotally connected to the vertically sliding bars, and to the hinged steps, and slidingly engaging the arms, means normally tending to move the steps into extended position and means for operating the winding device to raise and fold the steps.

2. The combination with the platform of a car including the platform steps thereof, of vertical standards located at the sides of the steps of the platform, a set of hinged steps, arms pivotally and slidingly engaging the standards at their upper ends and pivoted to the steps at their lower ends, toggle connections pivoted to the hinged steps and slidingly engaging the arms, vertically sliding bars connected at their lower ends with the steps, said toggle connections being pivotally connected with the sliding bars, means for normally tending to pull the steps to extended position, and means for raising the steps.

3. The combination with a pair of standards, of a set of hinged steps, a pair of bars sliding alongside the standards and connected at their lower ends with the hinged steps, said bars having studs sliding in slots formed in the standards, a pair of arms pivotally connected at their lower ends with the hinged steps and having studs at the upper ends thereof sliding in slots formed in the standards, pairs of links connected with the sliding bars and with the steps, studs connecting the members of each pair of links, said studs sliding in slots formed in the arms, a spring connected with one of the sliding bars for lowering and extending the steps, and means for raising and folding the steps against the action of the spring.

4. The combination with a pair of standards, of a set of hinged steps, a pair of bars sliding alongside the standards and connected at their lower ends with the hinged steps, said bars having studs sliding in slots formed in the standards, a pair of arms pivotally connected at their lower ends with the hinged steps and having studs at the upper ends thereof sliding in the slots formed in the standards, pairs of links connected with the sliding bars and with the steps, studs connecting the members of each pair of links, said studs sliding in slots formed in the arms, means normally tending to move the steps to extended position, and means connected with the sliding bars for raising and extending the steps, said means including a winding shaft, winding spools on said shaft, cables connected at their lower ends with the sliding rods and adapted to wind and unwind on the spools, a third spool at one end of the shaft, a winding drum and a cable training over the winding drum and third spool, said winding drum being actuated to rotate the winding drum, and a locking device for the winding drum.

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

ALBERT F. BILTGEN.

Witnesses:
J. E. BILTGEN,
O. J. COLVIN.

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