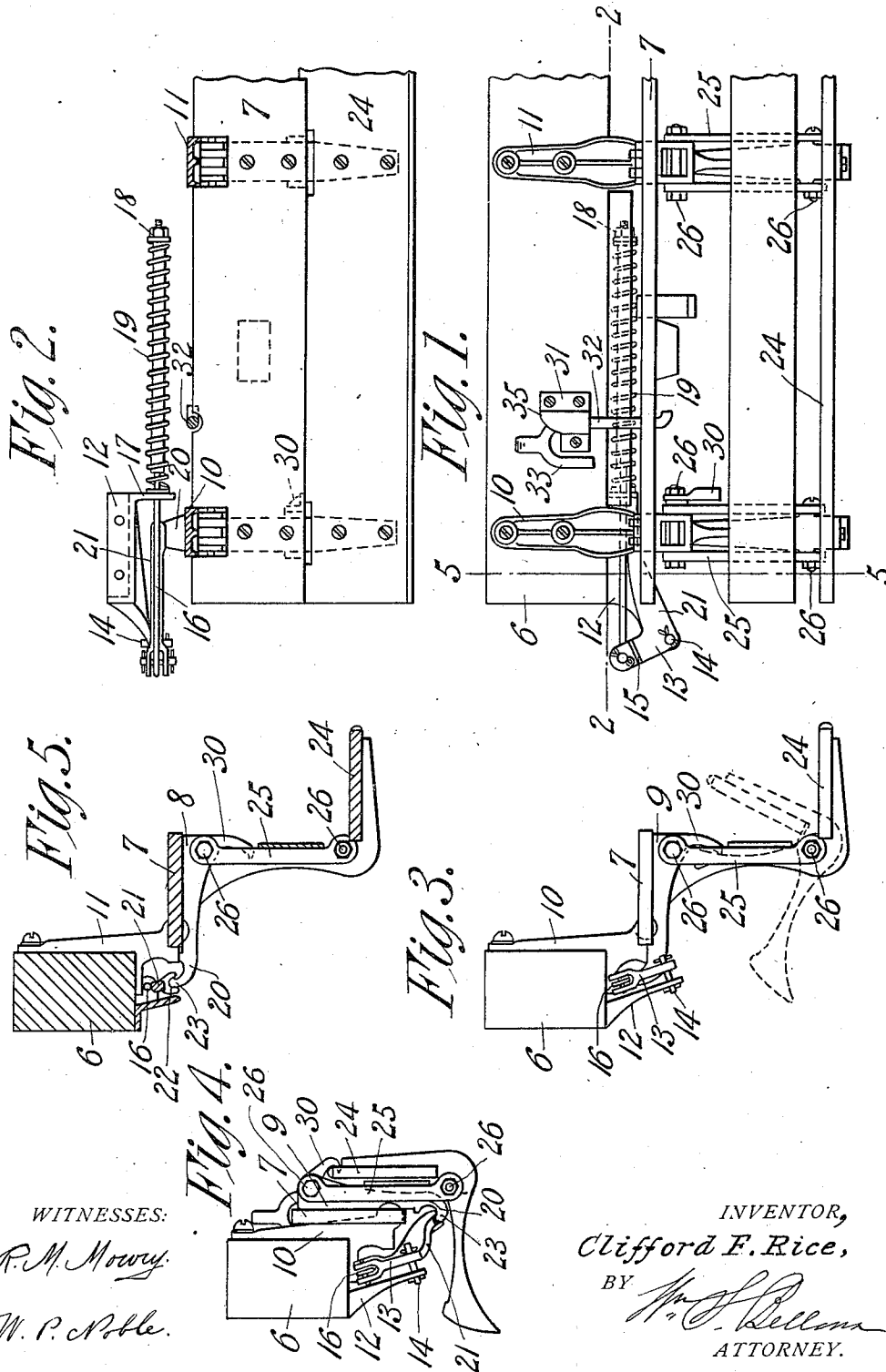


C. F. RICE.
FOLDING CAR STEP.
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1,046,332.

Patented Dec. 3, 1912.



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FOLDING CAR-STEP.

1,046,332.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CLIFFORD F. RICE, a citizen of the United States of America, and resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Folding Car-Steps, of which the following is a full, clear, and exact description.

This invention relates to improvements in foldable car steps, such, for instance, as the kind set forth in Letters Patent of the United States granted to me under date of December 29, 1908, No. 908,137.

The particular object of the invention is to provide spring reactive means so connected with, and operative relatively to, the foldable step or steps that in the manual operation of swinging the step to a vertical position alongside the sill of the car the exertion of but very slight force is required, the reaction of the spring assisting in a most satisfactory manner and conducing greatly to the facility with which a car-man may effect the folding up of the step.

Another object is to provide an improved form of latch device to retain a folding step in the upright position against a sill or side member, which device when released from the step and free to move will be caused, by its own weight, to swing back against the face of the sill.

In the accompanying drawings illustrating one embodiment of my invention,—Figure 1 shows a front elevation; Fig. 2 is a plan partly in section, as seen on the line 2—2, Fig. 1. Fig. 3 is an end elevation with the steps in the open position; Fig. 4 is an end view showing the steps folded upright against the sill; and Fig. 5 is a vertical section on the line 5—5 of Fig. 1 with the steps in the open position.

The device is shown connected with a sill 6 of a car or the like, but it is to be understood that it can be attached to any suitable member of the car or vehicle.

A step 7 has brackets 8 and 9 by which the step is hinged to brackets 10 and 11 respectively, secured to the sill 6; by which means the step 7 can swing upwardly from the horizontal position indicated in Fig. 5 to the upright or vertical position shown in Fig. 4.

A bracket 12 secured to the under face of the sill has pivoted thereon a lever 13 by

means of a pin 14. This lever is shown as bent and one arm 15 is connected with the sill through a spring; a rod 16 being pivoted to the arm 15 by one end, its other end passing through an apertured lug 17 on the bracket 12 and having a nut 18 on its extremity which engages one end of a coil spring 19 to compress the spring between the nut and the lug 12, the spring surrounding the rod.

The bracket 8 has an extension forming an arm 20 at its rear which engages the arm 21 of the lever 13, the spring 19 drawing the lever 13 to press its arm 21 into engagement with the arm 20; these two members having a kind of ball and socket connection because as the step 7 swings up the arm 20 will swing down in a vertical plane, while the lever 13 is mounted to swing in a plane substantially transverse of the plane of the arm; the arm 21 having a kind of socket 22 into which the extremity 23 of the arm extends.

It will be noted that the pivot pin 14 for the lever is inclined to the horizontal, and the aperture in the lever by which it engages this pin is somewhat enlarged or rounded to permit a limited lateral movement of the lever transverse of the axis of the pin. From this arrangement it results that the spring 19 will swing the lever 13 and retain its arm 21 in engagement with the arm 23 of the step 7, and when the step 7 is in the upright position as shown in Fig. 4, the tension of the spring will retain the step in this position. But when the step is in the horizontal position as shown in Fig. 5, the comparatively short distance of the engagement of the arm 23 with the lever, from the pivotal axis of the step will result in the spring being overbalanced, and the step will not be swung upward; the tension of the spring being regulated by the nut 18.

A second or lower step 24 is suitably connected with the upper step 7, so that a double step arrangement is provided to facilitate the entrance to the car, which is of especial advantage along the running board at the side of the open type of trolley cars. This step is shown as formed with a rise portion 25 hinged at 26 to the rear of the tread 24, whereby the tread can fold upwardly as indicated in broken lines in Fig. 3, to lie substantially parallel therewith; and the rise 25 is shown as hinged at 26 to the

outer portion of the upper step 7, preferably at the hinge brackets 8 and 9; and this construction permits the rise portion 25, when the step 7 is swung to the upright position of Fig. 4, to swing back against the under face of the step 7, and the tread 24 being swung up against the outer face of the rise 25, brings these three members 7, 25 and 24 to an upright and parallel position in close proximity, as shown in this figure. The weight of the second step member comprising the tread 24 and the rise 25 being on the outer portion of the step 7 will retain the step 7 in the horizontal position, and the spring 19 is so arranged and tensioned as to be simply overbalanced by the weight and pressure of these members; but when these three members are swung to the upright folded position as indicated in Fig. 4, there will be comparatively little weight outside of the axis on which the step 7 swings, and, consequently, the spring 19 pulling on the lever 13 will serve to assist very much in the swinging up of these step members at the latter part of the operation of folding them together and bringing them to the upright position.

Suitable means are provided for retaining the steps in their folded position, a hook latch 30 on the upper part of the rise 25 engaging the tread 24 to retain it folded against the rise 25.

A latch is provided to retain the step 7 folded against the sill 6, shown in the form of a socket plate 31 forming a vertical semi-cylindrical socket with the sill 6 in which socket swings the shank 32 of the latch member, and which also has an endwise vertical movement in this socket; the latch being provided with a hook-shaped arm 33 that when the latch key moves upward and is swung outward it will slide upon the upper edge of the step 7, and then the latch is moved downward to have the hook engage the step, as indicated in Fig. 4.

The upper edge 35 of the socket plate 31 is spirally inclined from one side of the socket to the other, as indicated in Fig. 1, and this will act as a cam on the hook portion of the latch, and when the shank of the latch moves downwardly, the latch will be swung back against the face of the sill by its own weight and retained in this position when not in use; thereby preventing it from protruding outward to a position likely to cause damage to the passengers.

It will be understood that my arrangement of spring members can be used with a single step as 7, or with a pair of steps as 7 and 24, and the spring will be provided of such strength, and will be so tensioned so that it will be but slightly overbalanced so that the step or the pair of steps will remain in their normal horizontal position for use; but as soon as the step or pair of steps have been

swung upward a short distance and thereby decreasing the leverage working against the short arm 23, the spring member will do effective work to assist in the operation of folding the step or step members upward to their closed position.

I claim:—

1. The combination with a car sill, of a step hinged to the sill to swing from the open position to an upright position, a lower step member connected with said step to be folded up against the upper step in the folded position of the latter, and a spring member connected between the sill and the upper step member, the spring being overbalanced by the step members in their open horizontal position and being arranged to assist during the entire closing movement of both of the step members.

2. The combination with a car sill, of a step hinged to the sill to swing from the open horizontal position to an upright position, and a spring member connected between the step and the sill, and arranged to retain the step in the upright folded position and to assist during the entire closing movement of the step, the spring being overbalanced in the open horizontal position of the step.

3. The combination with a car sill, of a step hinged to the sill to swing from the open horizontal position to an upright position, a lower step member connected with said step to be folded up against the upper step in the folded position of the latter, and a spring member connected between the sill and the upper step member, and operable to assist in the folding-up operation of the step, the spring member being overbalanced by the step members in their open horizontal positions.

4. The combination with a car sill, of a step hinged to the sill to swing from the open horizontal position to an upright position, a lower step member connected with said step to be folded up against the upper step in the folded position of the latter, a lever pivoted on the sill, a spring connecting the lever with the sill, the lever having one end engaging a portion of the upper step and being pressed by the spring into engagement with the step in all positions from the horizontal to the upright position, whereby the step members are forced in the folded upright position by the spring and lever.

5. The combination with a car sill, of a step hinged to the sill to swing from the open horizontal position to an upright position, a lower step member connected with said step to be folded up against the upper step in the folded position of the latter, the upper step having an arm extending rearwardly, a lever pivoted on the sill and having a portion engaging the said arm on the

step, a spring connected between the sill and the lever to retain the lever in engagement with the arm of the step, the lever having a lateral movement on its pivot whereby the portion engaging the step arm is retained in engagement therewith during the swinging of the arm and step from the horizontal to the upright position.

6. The combination with a car sill, of a step hinged to the sill to swing from the open horizontal position to an upright position, a lower step member connected with said step to be folded up against the upper step in the folded position of the latter, the upper step having an arm extending rearwardly, a lever pivoted on the sill and having a portion engaging the said arm on the step, a spring connected between the sill and the lever to retain the lever in engagement with the arm of the step, the lever having a lateral movement on its pivot whereby the portion engaging the step arm is retained in engagement therewith during the swinging of the arm and step from the horizontal to the upright position, the spring retaining the step members in upright position but overbalanced by the step members in their horizontal position.

7. The combination with a car sill, of an upper step member hinged to the sill to swing from horizontal position to an upright position, a lower step member comprising a rise and a tread, the rise being hinged at its top to the outer portion of the upper step to swing back against the bottom of the upper step, the tread being hinged to the lower part of the rise to swing up against the outer face of the rise, whereby the upper step can be folded up against the sill with the said rise folded against the outer face of the folded upper step and with the tread folded against the outer face of the rise with the three members in upright positions, and a spring member connected between the sill and the step members to retain the step members in said folded upright positions.

8. The combination with a car sill, of an upper step member hinged to the sill to swing from horizontal position to an upright position, a lower step member comprising a rise and a tread, the rise being hinged at its top to the outer portion of the upper step to swing back against the bottom of the upper step, the tread being hinged to the lower part of the rise to swing against the outer face of the rise, whereby the upper step can be folded up against the sill with the said rise folded against the outer face of the folded upper step and with the tread folded against the outer face of the rise with the three members in upright positions, and a spring member connected between the sill and the step members to retain the step members in said folded up-

right positions, the spring member being overbalanced by the step members in their open horizontal positions.

9. The combination with a car sill, of an upper step member hinged to the sill to swing from a horizontal position to an upright position, a lower step member comprising a rise and a tread, the rise being hinged at its top to the outer portion of the upper step to swing back against the bottom of the upper step, the tread being hinged to the lower part of the rise to swing against the outer face of the rise whereby the upper step can be folded up against the sill with the said rise folded against the outer face of the folded upper step and with the tread folded against the outer face of the rise to bring the three members in upright position, the upper step having an arm extending rearwardly, a lever pivoted on the sill and having a portion engaging said arm, a spring connected between the sill and the lever to retain the lever engaging the arm, the lever having a movement on its pivot transverse to its axis whereby the lever and arm are retained in engagement during the swinging of the upper step from the horizontal to the upright position, the spring being overbalanced by the step members in their open positions.

10. The combination with a car sill, of a step hinged to the sill to swing from the open horizontal position to an upright position, a lever pivoted on the sill, a spring connecting the lever with the sill, the lever having one end engaging a portion of the step and being pressed by the spring into engagement with the step in all positions from the horizontal to the upright position, whereby the step is forced to the folded upright position by the spring and lever.

11. The combination with a car sill, of a step hinged to the sill to swing from the open horizontal position to an upright position, the step having an arm extending rearwardly, a lever pivoted on the sill and having a portion engaging the said arm on the step, a spring connected between the sill and the lever to retain the lever in engagement with the arm of the step, the lever having a lateral movement on its pivot whereby the portion engaging the step arm is retained in engagement therewith during the swinging of the arm and step from the horizontal to the upright position.

12. The combination with a car sill, of a step hinged to the sill to swing from the open horizontal position to an upright position, the step having an arm extending rearwardly, a lever pivoted on the sill and having a portion engaging the said arm on the step, a spring connected between the sill and the lever to retain the lever in engagement with the arm of the step, the lever having a lateral movement on its pivot whereby the

portion engaging the step arm is retained
in engagement therewith during the swing-
ing of the arm and step from the horizontal
to the upright position, the spring assisting
5 in the folding-up operation of the step but
overbalanced by the step in horizontal posi-
tion.

Signed by me at Springfield, Mass., in
presence of two subscribing witnesses.

CLIFFORD F. RICE.

Witnesses:

G. R. DRISCOLL,
WM. S. BELLOWES.

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