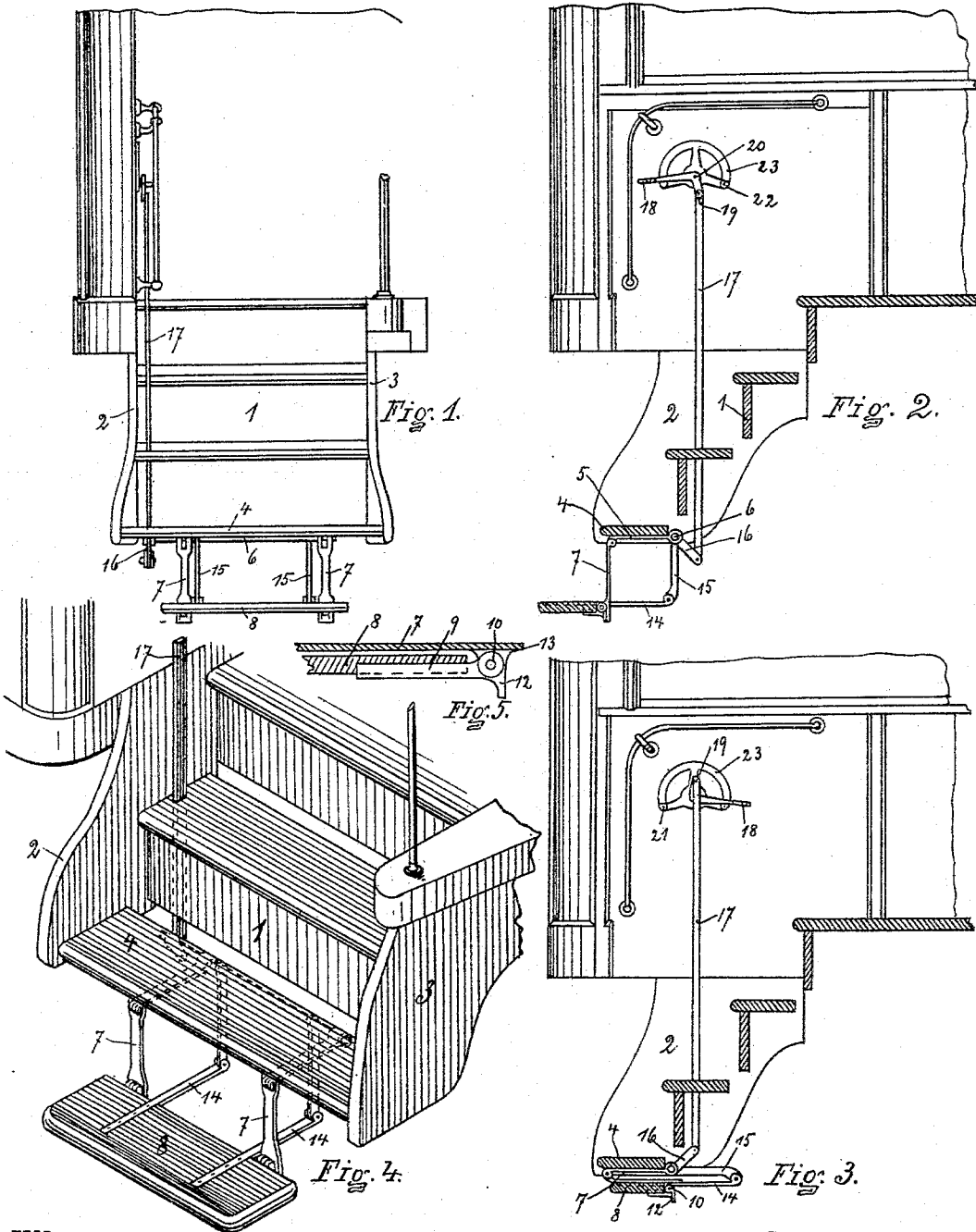


(No Model.)

T. THATCHER.
EXTENSION STEP FOR CARS.

No. 533,568.

Patented Feb. 5, 1895.



WITNESSES.
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EXTENSION-STEP FOR CARS.

SPECIFICATION forming part of Letters Patent No. 533,568, dated February 5, 1895.

Application filed February 26, 1894. Serial No. 501,496. (No model.)

To all whom it may concern:

Be it known that I, THOMAS THATCHER, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Extension-Steps for Cars, &c.; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form part of this specification.

My invention relates to improvements in extension carsteps. This step is also adapted for use with wagons or street cars or in any position where an extension step would be useful or desirable.

In the drawings which accompany and form a part of this specification and in which similar figures of reference refer to corresponding parts in the several figures, Figure 1 shows a front view of a set of car-steps having my extension step applied and shown in extended position. Fig. 2 shows the same parts shown in Fig. 1 on a sectional line through the series of steps and the extension step with the step also in extended position. Fig. 3 shows the same parts shown in Fig. 2 with the step in folded position. Fig. 4 shows in perspective substantially the same as Fig. 1 with the step in extended position. Fig. 5 shows details of construction relating particularly to the joint or hinge between the step and its supporting arms.

Referring more particularly to the reference figures in a more specific description, 1 indicates the set of permanent steps of a car or similar vehicle, which steps with their risers are secured between a pair of sides or walls 2 and 3 projecting downwardly from the body of the car. On the under side of the last permanent step 4, I secure by bolts, or in any other suitable manner, a pair of hanger irons 5 provided at their forward ends with downwardly inclining perforated ears and at their rear ends with eyes in which the rocking shaft 6 has bearing.

To the ears on the front ends of the hang-

ers I hinge the supporting swinging arms 7 which are of a length to provide the desirable rise between the extension step 8 and the last permanent step 4, when the extension step is in its extended position. The extension step 8 is hinged to the lower end of the arms 7 by providing a butt or strap 9 on which the step 8 is secured and which is pivoted at 10 between a pair of ears 11 on the lower end of the arm 7. The strap or butt 9 is provided with an ear or projection 12 adapted to engage on the lower projecting end 13 of the arm 7 and support the extension step rigidly when the device is in extended position.

Extending rearwardly from the step 8 is provided a pair of arms 14 which are rigid with the step and preferably substantially flush with its upper surface and secured thereto by being rabbeted into the upper surface of the step, as shown. This particular form of construction, however, is not necessary; the essential part being the rigid arms projecting from the rear of the step.

On the rocking shaft 6 is rigidly secured a pair of arms or levers 15 which are pivoted or hinged to the rear end of the arm 14 as shown. On the rocking shaft, at a suitable point, preferably substantially in line with the wall of the car, is provided a fixed crank 16 by which the shaft may be rocked by means of the connecting rod 17 extending from the crank 16 up along the side of the car. The upper end of the rod 17 is attached to a bell-crank operating lever 18 by being pivoted to the short arm thereof at 19. The bell-crank 18 is pivoted at 20 at its angle on a fixed support as the side of a car. The bell-crank operating lever 18 is arranged to operate through a little more than a semi-circle around its pivotal point and its movement is limited in each direction by the stops 21 and 22 respectively.

Between the stops 21 and 22 I prefer to provide a semi-circular guide 23 on which the swinging end of the bell-crank operating lever runs to give it strength to resist lateral movement and prevent its being pulled off or disabled by malicious or mischievous persons.

To operate to extend the step, it is simply

necessary to move the operating lever 18 from the position shown in Fig. 3 to that shown in Fig. 2; and to close the step it is simply necessary to operate the lever in the reverse movement, that is, from the position shown in Fig. 2 to that shown in Fig. 3.

By allowing the lever 18 to operate in a little more than half a circle in either limit of movement, the pivotal point 19 is carried beyond the direct line between the pivotal point 20 of the bell-crank operating lever, and the pivotal point of the connecting rod 17 with the swinging end of the crank 16, thus locking as with a toggle joint the step either in extended or closed position. The long arm of the bell-crank operating lever 18 is preferably made a little heavy in order to insure the lever maintaining itself in either of the positions described. It may also be made to rub with more or less friction on the guide 23 to accomplish the same end.

The extension step 8 folds beneath the lower permanent step 4 entirely out of the way when it is in folded position, and when extended is firmly braced and held by the lever arm 15 and the fixed arm 14 and is supported by the arms 7. In moving from its folded to its open position, or the reverse, the extension step is always maintained in a perfectly horizontal position so that if it is not locked in its extended position and a person steps on it, he is not thrown off nor is any injury done to the step; and by the peculiar arrangement of the braces the step is made very rigid in its extended position and is very firmly held in its closed position.

It is evident that the step might be supported with a single hanger arm 7 with a single arm 14 and lever 15; or a single arm 14 with a corresponding lever 15 might be used in connection with a pair of arms 7, or a pair of the operating levers and arms might be used in connection with a single supporting arm as 7, and that other changes, rearrangements and variations of the construction might be made without departing from the equivalents of my invention.

The connecting rod 17 and the operating lever may be entirely dispensed with, in which case the step would be operated by hand, and a suitable catch provided for securing it in closed position and another for securing it in extended position, if desired.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a fixed car step or support of a swinging arm depending from the front edge of the step or support, a swinging arm mounted on a rocking shaft depending from the rear edge of the step or support, an extension step hinged to the lower end of the front swinging arm and having an arm extending to and coupled with the rear swinging arm with means connected with the rock-

ing shaft for operating the device, substantially as set forth.

2. The combination with a permanent car step or other similar support, of a pair of hangers adapted to be secured on the under side of the step or support, a pair of depending arms hinged to the front end of the hangers, a rocking shaft mounted in the rear end of the hangers having swinging arms adapted to project downwardly, a folding step hinged to the swinging end of the front arms and projecting outwardly therefrom and having rigid arms extending to and hinged to the swinging end of the shaft arms with mechanism for operating the step attached to the rocking shaft, substantially as set forth.

3. The combination with a fixed car step or other similar support of a hinged arm adapted to be depended from the front edge of the fixed step or support, a swinging arm depending from the rear edge of the fixed step or support, a folding step hinged to the lower end of the front swinging arm and having a fixed arm extending to and coupled with the lower end of the rear arm, and operating mechanism connected with the rear swinging arm consisting of a connecting rod and crank secured on a fixed support, substantially as set forth.

4. The combination with a fixed step or support 4 of the swinging arms or levers 15 and 7 hinged to the rear and front of the step or support respectively, a folding step 8 hinged on the lower end of the depending arms 7 and having an arm 14 extending to and hinged to the end of arm 15, a rocking shaft 6 on which the arm 15 is mounted, a crank thereon and a connecting rod attached to the crank and an operating crank mounted on a fixed support to which the connecting rod is attached and operating in either direction beyond the pivotal point whereby the step is locked in either position, substantially as set forth.

5. The combination of a fixed step or support, a depending arm hinged to the front part of the fixed step or support, an extension step hinged at its rear side to the lower end of the depending arm, a pair of rigid arms extending rearwardly from the step, a rocking shaft having a pair of arms hinged to the rigid arms of the extension step, and means for operating the step connected with the rocking shaft, substantially as set forth.

6. A hanger, swinging arms depending from each end of the hanger, hinged to swing in parallel planes, an extension step hinged to the swinging end of one of the arms and having a rigid arm extending parallel with the hanger and hinged to the other swinging arm, one of the hinging joints having a shoulder or stop to limit the extending movement of the extension step, combined, substantially as set forth.

7. The combination of a fixed step or support, of a pair of swinging arms hinged to the front portion of the step or support, a pair of rear arms rigidly secured on a rocking shaft and mounted in bearings at the rear of the fixed step or support and adapted to swing in parallel planes with the front pair of arms, an extension step hinged to the swinging end of the front pair of arms, and provided with rigid arms extending to and hinged with the rear pair of arms, and operating mechanism connected with the rocking shaft, substantially as set forth.

In witness whereof I have affixed my signature in presence of two witnesses.

THOMAS THATCHER.

Witnesses:

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GEORGE C. CARTER.