

(Model.)

H. S. WOLFE.

2 Sheets—Sheet 1.

CAR STEP.

No. 290,957.

Patented Dec. 25, 1883.

Fig. 1.

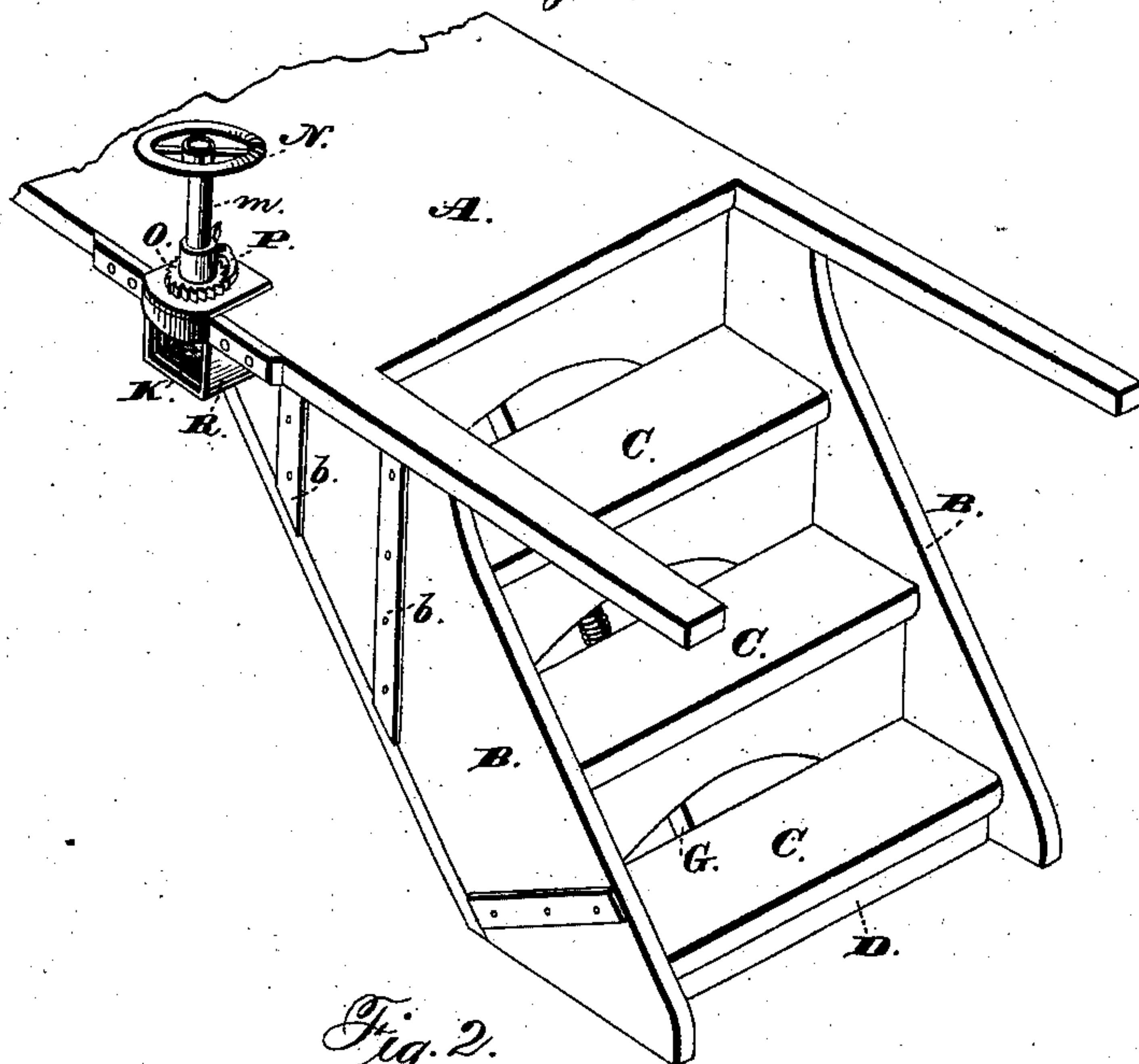
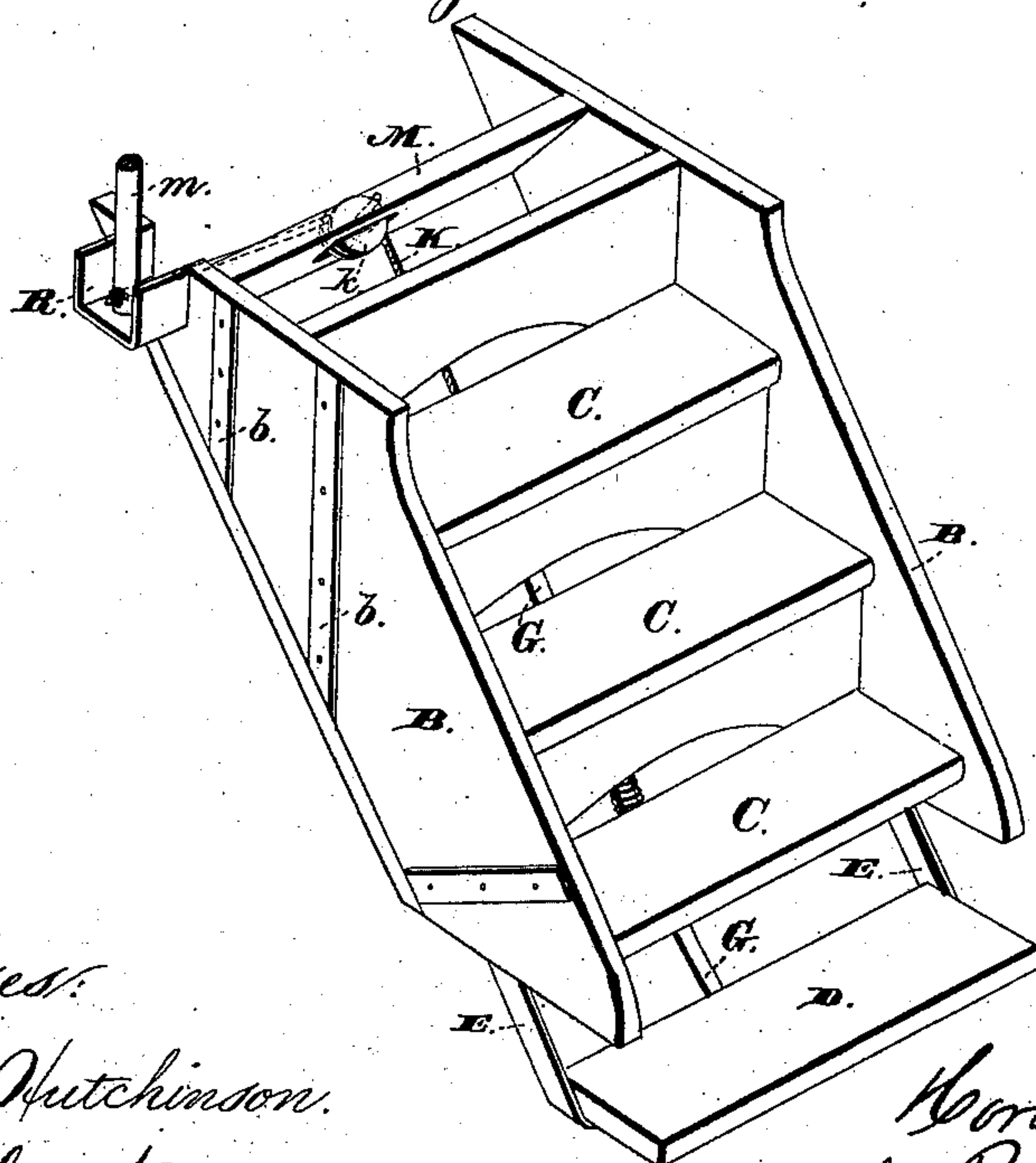


Fig. 2.



Witnesses:

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(Model.)

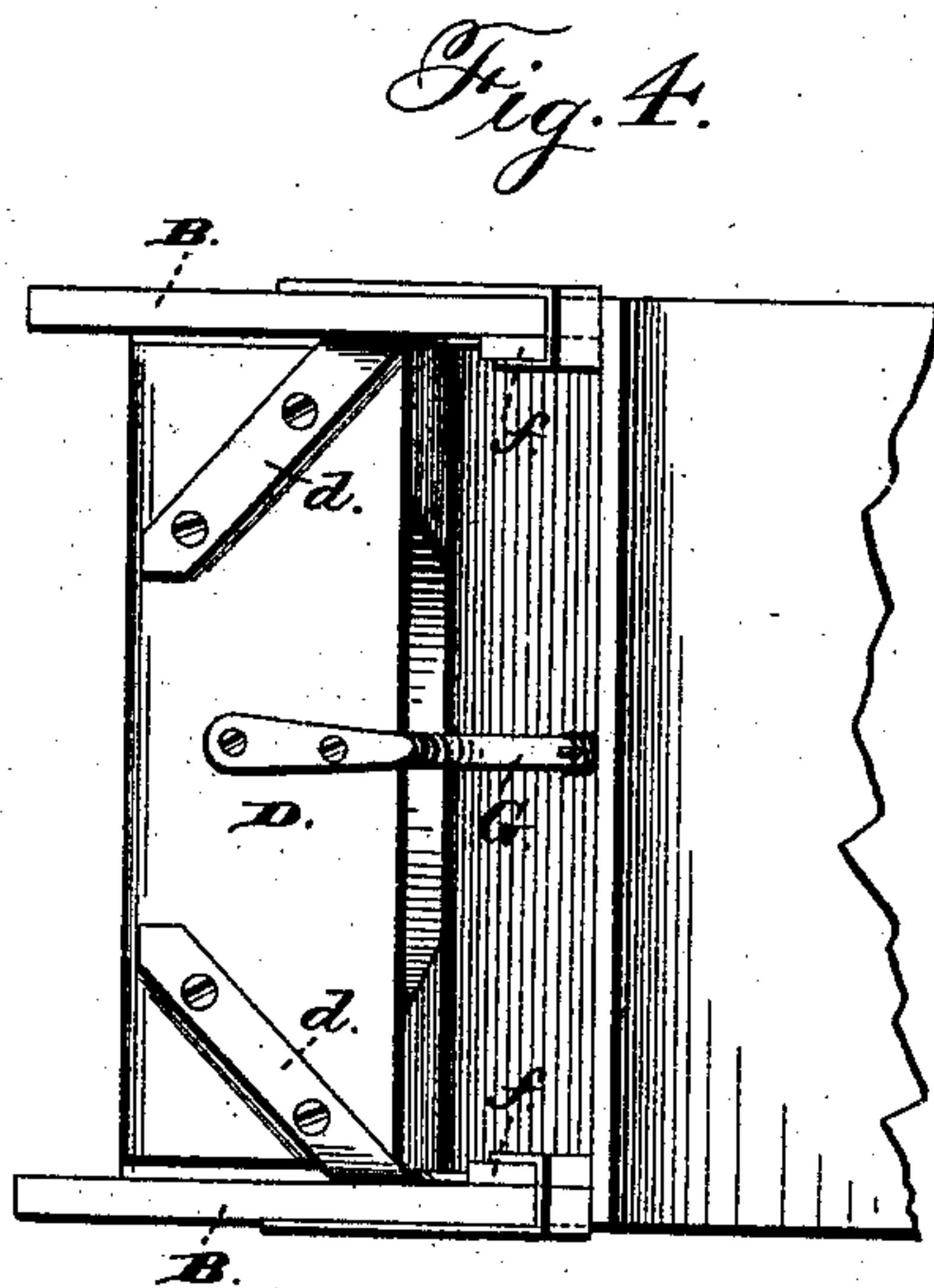
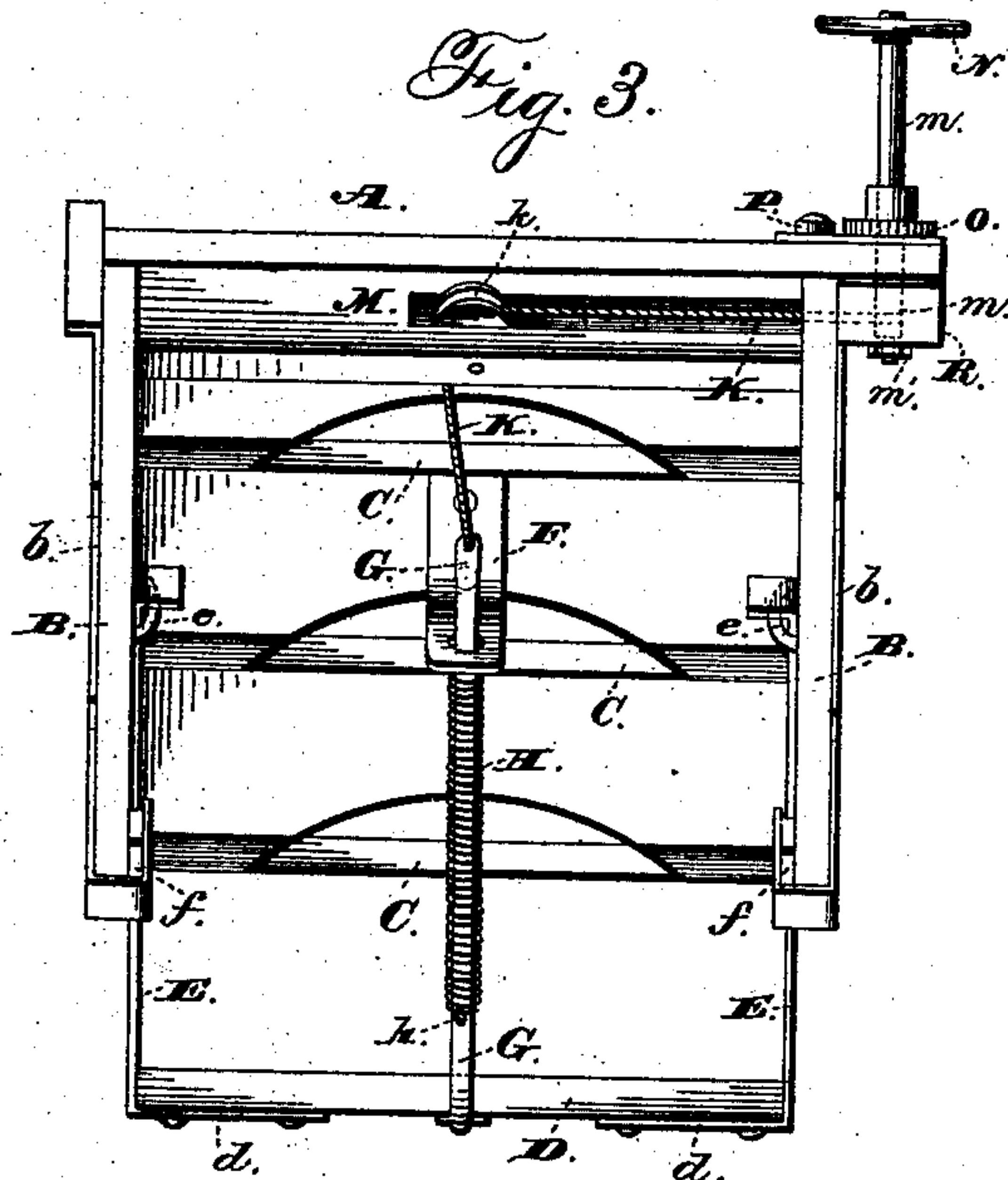
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CAR STEP.

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UNITED STATES PATENT OFFICE.

HORACE S. WOLFE, OF KALAMAZOO, MICH., ASSIGNOR OF THREE-FOURTHS
TO WILLIAM H. McCOURTIE AND CHESTER KELLOGG, OF SAME PLACE.

CAR-STEP.

SPECIFICATION forming part of Letters Patent No. 290,957, dated December 25, 1883.

Application filed May 26, 1883. (Model.)

To all whom it may concern:

Be it known that I, HORACE S. WOLFE, of Kalamazoo, in the county of Kalamazoo, and in the State of Michigan, have invented certain
5 new and useful Improvements in Car-Steps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

10 Figure 1 shows a perspective view of my improved step, with a portion of the car-platform to which it is attached, the movable step being shown as raised. Fig. 2 shows a similar view, with the platform removed and the
15 step let down. Fig. 3 shows a view in elevation of the steps, looking from the back thereof, the back casing or covering being removed and the step being let down. Fig. 4 shows a bottom plan view of the lower portion of the
20 steps and step-frame.

The object of my invention is to provide an improvement in that class of car-steps in which the lower step or steps are made movable, so as to be raised out of the way when not in
25 use; and to this end it consists in the arrangement, construction, and combination of parts, as hereinafter described, and more specifically pointed out in the claims.

In the drawings; A designates the car-platform to which the step-frame B B, carrying the fixed steps C C, is attached at its bottom. I show the sides of the frame as supported and braced by the metal straps b b, attached at
30 their upper ends to the bottoms of the extended side pieces of the platform; but any other desirable means of supporting and strengthening can be used instead.

The movable step D is carried and supported on arms d d, extending under the bottom
40 thereof from the lower ends of the bars E E. These bars slide up and down in the guides e and f, attached to the insides of the side pieces, B B, of the step-frame. The guides are so situated that the bars slide in a line parallel
45 with the general line of the fixed steps and immediately below or back of them. The lower ends of the bars are bent so that the arms formed thereby extend forward in a horizontal plane and in lines converging toward
50 each other in such plane, as shown in Fig. 4. Directly to the top of these arms is fastened in any desirable way the movable step. This step will obviously, therefore, be maintained

firmly with its tread horizontal and parallel to that of the fixed steps as it is raised or
55 lowered. The upper ends of bars E E are bent inward at right angles, so as to act as stops, to limit the possible downward movement of the steps by coming in contact with the upper steps, *e c.* The bars need not be
60 very heavy or thick to be strong enough, as all the strain upon them in the guides acts in the direction of their greatest width and strength. Being set edgewise to the direction
65 of the strain brought upon them by weight upon the step, they offer the greatest possible resistance to bending.

To the back of the rise-board of one of the steps is fixed an ear, F, bent at its outer and lower end to project at right angles to the
70 direction of the steps. The rod G passes through and is guided in this ear, as shown. Its lower end is bent forward and attached to the bottom of step D. A coiled spring, H, surrounds this rod, and bears at its upper end against
75 the lug or ear F and at its lower end against a pin passing through the rod. Instead of this pin a collar could be used without departing from my invention.

To the upper end of rod G is attached a
80 cord or chain, K, which passes up over a pulley, L, journaled in a cross-bar, M, attached, as shown, to the step-frame and platform, then outward to the windlass-shaft m, to which its end is attached. The windlass M is provided
85 with the usual hand-wheel, N, and ratchet-wheel O, engaged by pawl P. Its shaft m is journaled in suitable bearings attached to the platform, as shown. its lower shouldered end bearing upon the bottom of bracket R. The
90 reduced lower end of the shaft is journaled in the bracket, and has fixed upon it and bearing against the lower side of the said bracket the nut m', to prevent end play of the shaft in its bearings. The bracket R is continued
95 inward, to form a protecting covering for the cord or chain K as it passes out through the side of the step-frame. The movable step-supporting bars are of such a length, and the upper guides, e e, are so situated with rela-
100 tion thereto, that the bent upper ends of the bars come into contact with the guides when the step has been let down, so that the distance of its bearing-surfaces from that of the first fixed step is equal to the distance between
105 the bearing-surfaces or treads of the rest of

the steps—that is, so that the rise of all the steps shall be equal. The raising-cord is a little longer than is necessary, to just allow for this downward movement of the step, so that when said step is let down to its lowest position for use, all the weight brought thereon is supported by the bars and guides, and does not come at all upon the windlass cord or chain. By bending the lower step-supporting ends of the bars as shown in Fig. 4, I obtain a considerable extent of bearing and attaching surface for the step, and secure the greatest strength and steadiness possible without increasing the size and weight of the bars.

The operation of my invention is as follows: When the step is to be raised, the windlass is turned by the hand-wheel, so as to wind the cord around its shaft. As the cord is wound up the rod G will be pulled upward, and the spring H surrounding it compressed between the guiding-ear F and the pin h. When the step has been raised to its highest position against the first fixed step, the pawl P is to be turned so as to engage the teeth of the ratchet-wheel O. The spring being compressed, as described above, exerts considerable force in a downward pull upon the cord; but a pull in this direction tends necessarily to turn the windlass-shaft and the ratchet-wheel thereon in such direction that the ratchet teeth are engaged and locked by the pawl, and the stronger and more constant the pull the more firmly and surely are the pawl and teeth kept in engagement in spite of any sudden jars and shocks which may occur. While the movable step is to be kept raised, the spring then tends to maintain the locking mechanism in place. When the pawl is turned so as to release the ratchet-wheel, the spring acts to throw the step down suddenly and surely into place. As the step is caused by the guides and guide-bars to move in a line at a considerable angle with the direction of the force of gravity, its weight and that of its guide-frame cannot act to advantage, and cannot be relied upon alone to carry the step down into place as quickly and surely as is desirable. The spring arranged on the lifting-rod, in conjunction with the guide-ear and pin, as described, does this to perfection.

My invention is applicable to any conveyance where it is desirable to raise and lower one of the steps, so that the same can be usually kept up out of the way, and instantly let down to enable the passengers to enter or alight. For instance, it could be used to advantage on the ordinary form of stage or omnibus. The cord could then be carried up, so that the raising and lowering of the step would be under the control of the driver. Very many of the passenger-vehicles now in use are hung so high that one fixed step is not desirable or sufficient at all times. To all of these my invention can be applied, as I contemplate using it not only in combination with fixed steps, but also alone as a simple adjustable step.

Having thus fully set forth the nature of my invention, what I claim as new is—

1. In combination with the movable step carried on a sliding frame, means for forcing the step down into position when it is released by the holding devices, substantially as shown and described.

2. In combination with the step carried on a sliding guide-frame, means for raising the step, and means for automatically forcing it down into position when released by the raising mechanism, substantially as shown and described.

3. In combination with the movable step, the two supporting-bars therefor, sliding in guides on the fixed step-frame and bent to the front at their lower ends, so as to converge toward each other in a horizontal plane, to form a support for the step fastened thereto, substantially as shown and described.

4. In combination with the fixed frame and guides *ef*, the sliding guide-bars E E, and automatic means for throwing down the step-frame, carrying on their lower ends the step D, and having their upper ends bent inward to come in contact with the upper guides, to limit the downward movement of the bars, substantially as set forth.

5. In combination with the step D, the bars forming a sliding frame therefor, the guides for the bars on the fixed frame, and the lifting rod attached to the step at its lower end and passing through and guided in the ear F, substantially as shown and described.

6. In combination with the movable step carried on the sliding frame, the lifting-rod attached to the step, the stationary guiding-ear, the pin through the rod, and the spring surrounding the rod between the ear and pin, substantially as shown and described.

7. In combination with the rod attached to the movable step, the spring on the rod, adapted to force the rod downward, and means, substantially as shown, for raising said rod against the stress of the spring.

8. The combination of the windlass having ratchet-wheel and locking-pawl with the cord or chain K, pulley *k*, lifting-rod G, attached at one end to the movable step, the stationary guiding-ear F for the rod, the spring H, and the pin *h*, all substantially as and for the purpose set forth.

9. In combination with movable step, the lifting-rod attached at its lower end to the step and at its upper end to the lifting-cord, and sliding in a fixed guiding-ear, the pin passing through the rod near its lower end, and the coiled spring surrounding the rod between the ear and pin, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 28th day of April, 1883.

HORACE S. WOLFE.

Witnesses:

THERON F. GIDDINGS,
WILLIAM H. McCOMTIE.