

N. E. LANDIN.  
 AUTOMATIC STEP FOR CARS.  
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963,589.

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Fig. 1,

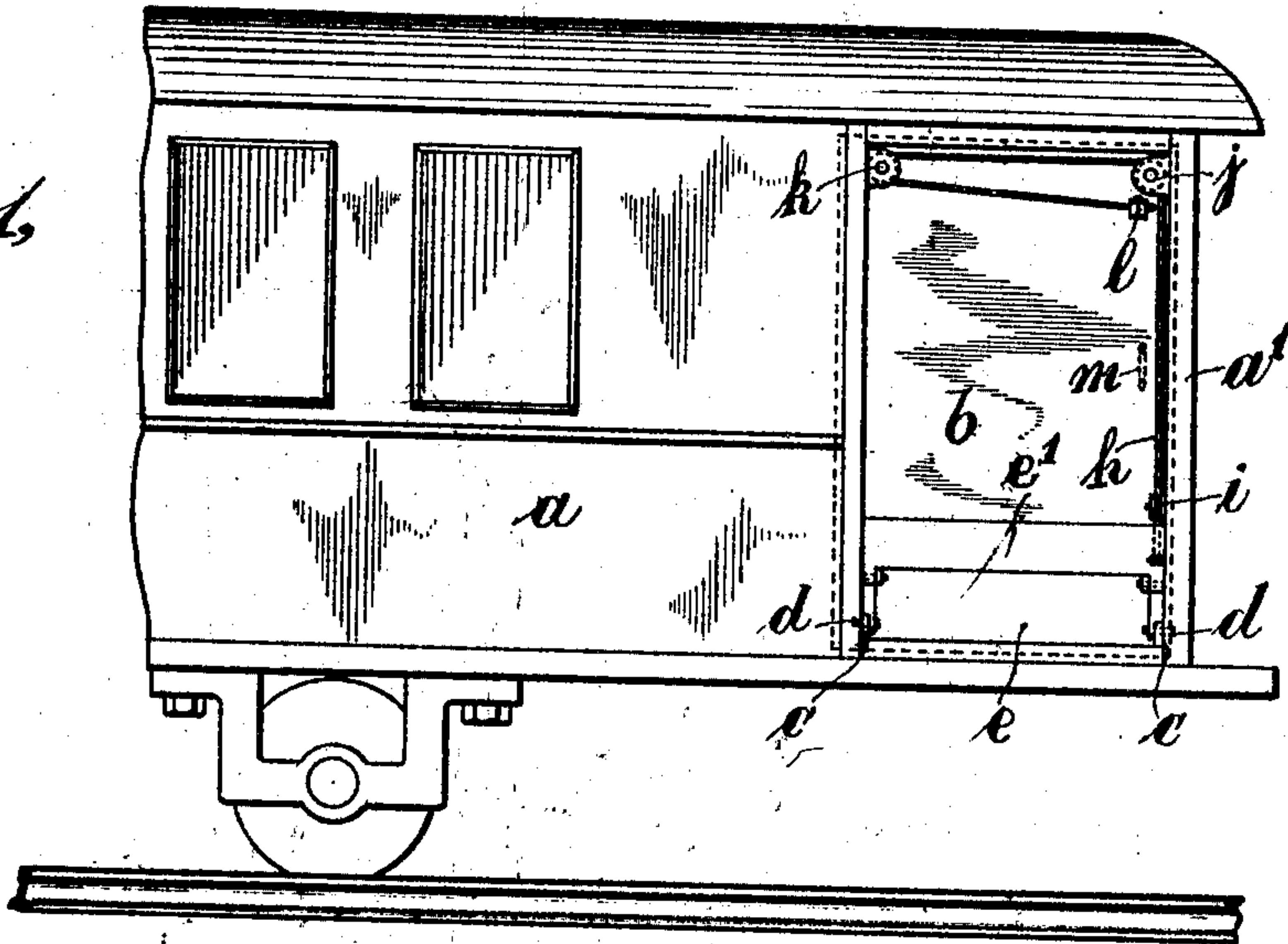


Fig. 2,

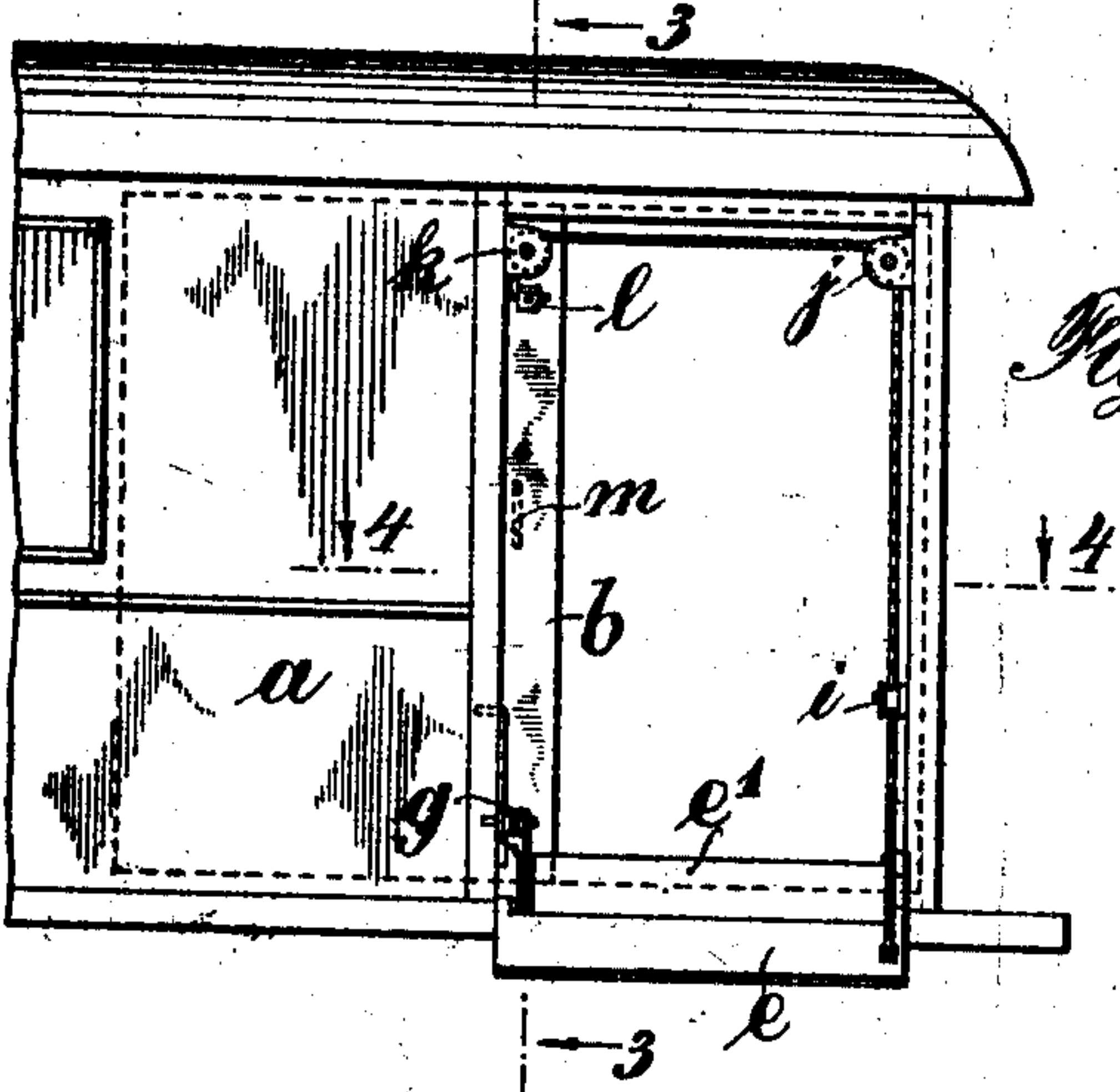


Fig. 3,

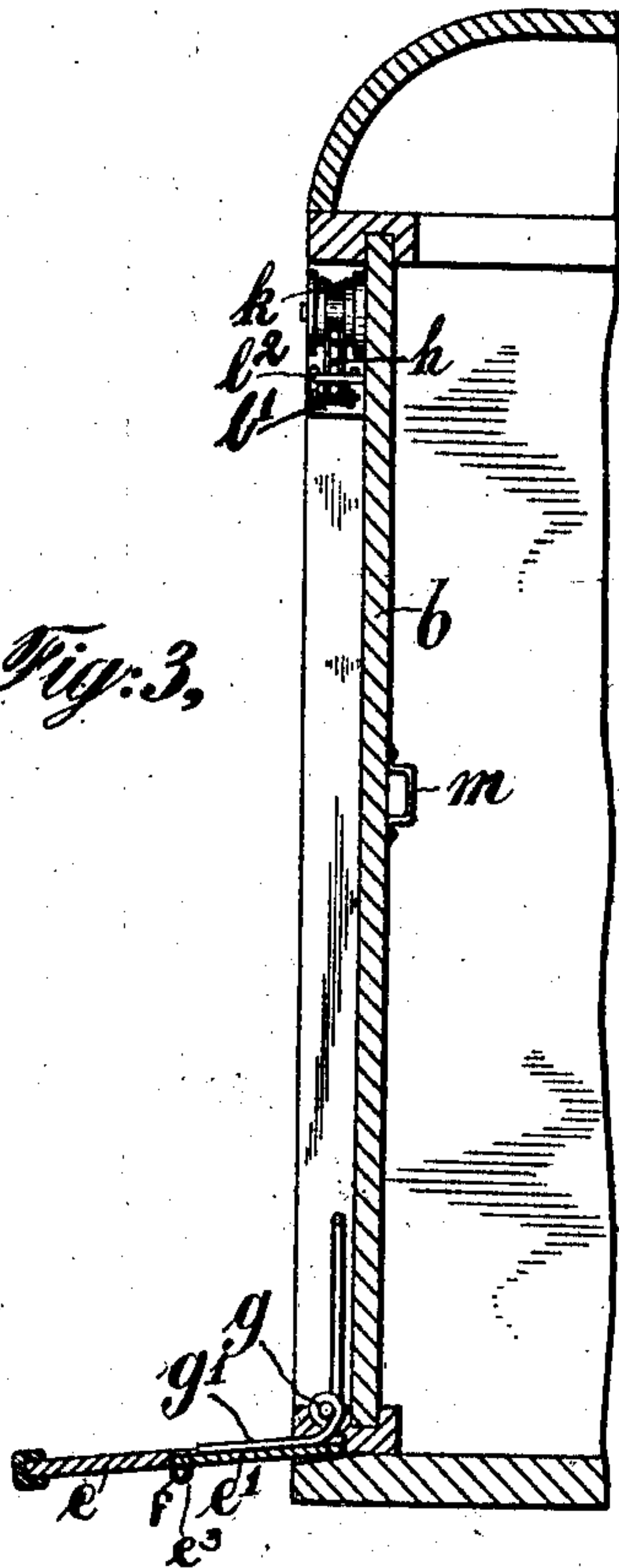
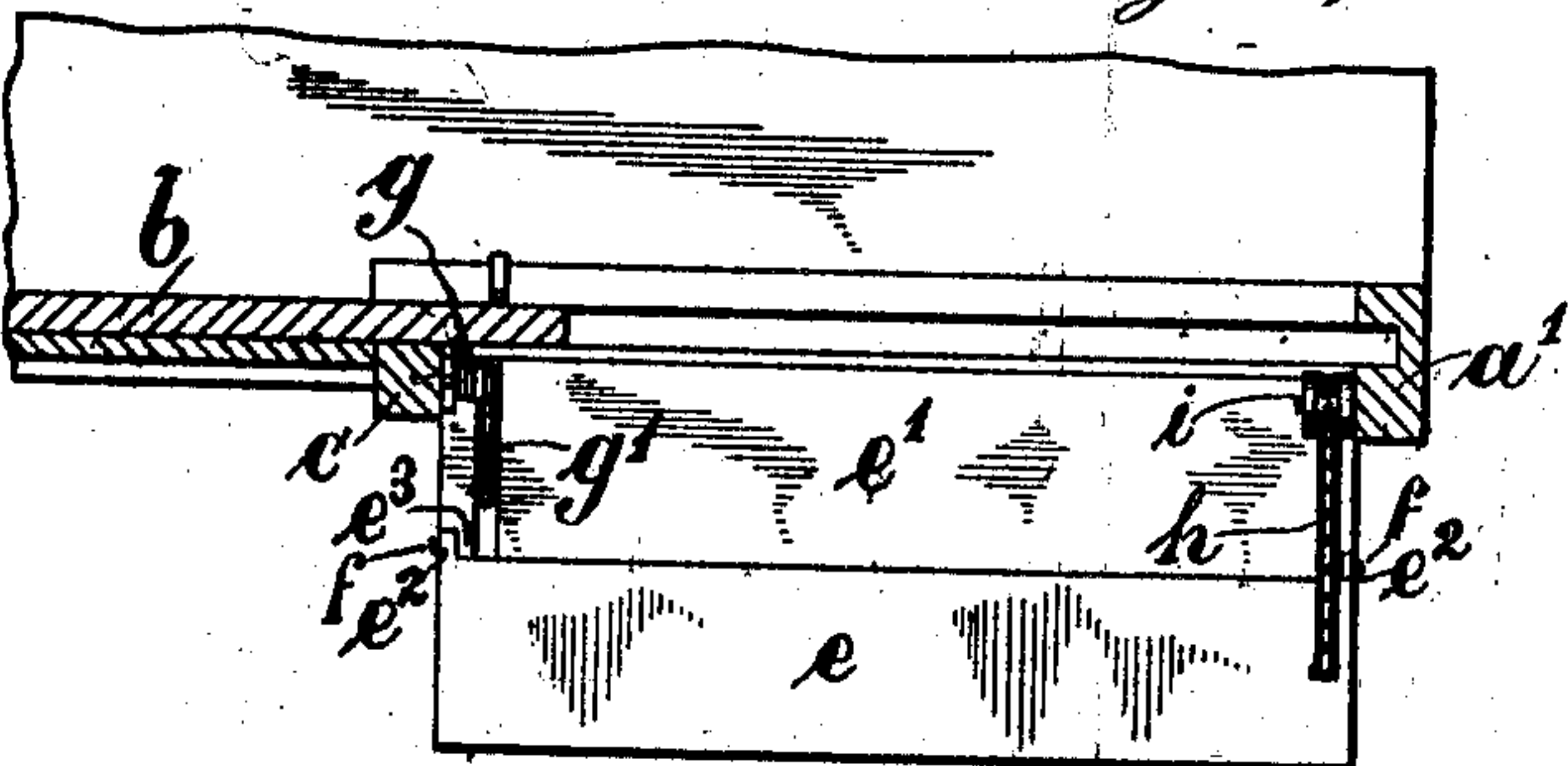


Fig. 4,



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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC STEP FOR CARS.

963,589.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed February 23, 1910. Serial No. 545,336.

*To all whom it may concern:*

Be it known that I, NILS E. LANDIN, a citizen of the United States of America, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Automatic Steps for Cars, of which the following is a specification.

This invention has reference to improvements in automatic steps for cars.

It is the special object of my invention to produce a step forming a permanent part of a car which is automatically operated by the trainman or guard when he opens or closes a sliding door. This is so arranged that the step is out of the way and flush with the side wall of the car when the door is closed and down in position for use when the door is open forming then a flat projection or tread upon which the foot may be placed while entering or leaving the car.

This invention has been primarily devised for use on cars which run up close to a platform in such manner that the truck and wheels of the car are below and the floor of same is about level with the platform. In many cases, particularly in subways it so happens that the car tracks under the streets are slightly curved and the platform therefore is sometimes close to the door of the car and sometimes a foot or so away from same leaving thus a dangerous space and extra guards are required to call the attention of the passengers to that gap for the purpose of preventing accidents.

It is the purpose of the present invention to produce a step which automatically falls onto the platform when the guard opens the sliding door of the car forming a bridge over the dangerous gap. When all the passengers are in or out of the car the guard closing the door simultaneously draws up the step, thus the guard does not need to pay special attention to it. When the platform is level with the car floor or somewhat lower a straight step or bridge may be used. However when the platform is somewhat higher than the floor of the car a straight projection or bridge is undesirable. In order to render the novel automatic step useful under the latter condition it is longitudinally divided and the front part independently movable from the rear part. Further, care has been taken to produce an easily movable and secure device to avoid delay, all as will be

fully described hereinafter with reference to the accompanying drawing in which:

Figure 1 represents in side elevation part of a car with the automatic step applied thereto embodying in desirable form the present improvements, showing the door closed and the step flush with the side wall of the car. Fig. 2 is a like elevation showing the door open and the step down ready for use. Fig. 3 is a vertical section on line 3—3 of Fig. 2, and Fig. 4 is a horizontal section on line 4—4 of Fig. 2.

Similar characters of reference denote like parts in all the figures.

On the drawing *a* represents the side wall of a car and *b* is a sliding door. The automatic step is secured in front of the door at the bottom of same. The step is supported by blocks *c* on pins *d* formed directly at the inner ends of same. The step is formed of two parts *e*, *e*<sup>1</sup> suitably connected preferably by forming two downward extensions *e*<sup>2</sup> on the front part *e* and two like projections *e*<sup>3</sup> on the rear part of same which are connected by short bolts *f*. In this manner the front part *e* may fall downwardly but can not move upwardly beyond the plane of the rear part because the inner straight surfaces of the two parts will prevent this when meeting so that normally a level surface of both parts is formed. To prevent hurting the foot of a passenger when the step falls down the front portion of the part *e* of same is covered with rubber, as shown in Fig. 3. A coiled spring *g* is secured to the side wall of the car as shown in Figs. 3 and 4. The lower end *g*<sup>1</sup> of the spring runs into a groove of the inner part *e*<sup>1</sup> of the step. This spring keeps the step normally down in a position for use. To the front part *e* of the step a chain *h* is secured which runs over a sheave or pulley *i* secured to the front wall *a*<sup>1</sup> of the car before the door. From here the chain *h* runs vertically up to the top of the car below the roof and passes over a sheave *j* mounted rectangularly to the sheave *i* in the front wall of the car so that the chain *h* may pass horizontally over to a sheave *k* mounted like the sheave *j* in the side wall of the car. The chain *h* then runs across to the forward top portion of the door and is secured there in a securing device *l* which preferably consists of a small iron part *l*<sup>1</sup> having a notch through which the chain passes which latter is provided with an enlarged end. To pre-



vent the chain from jumping out of the notch a small top plate  $l^2$  is secured on top of the part  $l^1$  to cover its notch.

The operation of the device is easily understood from the above. Assuming that the door is closed as shown in Fig. 1 then the step is in a vertical position and flush with the side wall of the car. When the trainman now opens the door by means of the door handle  $m$  the chain  $h$  passes accordingly over the sheave  $k$ , the sheave  $j$  and the sheave  $i$  releasing the step which then is forced down by the spring  $g$ . When the door is completely open the step is down in position ready for use as shown in Figs. 2, 3 and 4. When the guard closes the door the chain  $h$  travels over the sheave  $i'$ , the sheave  $j$  and the sheave  $k$  and thereby pulls the step automatically up into a vertical position. If however the floor of the car is somewhat higher than the stationary platform the step descends to meet it. Should however the platform be a little higher than the floor of the car a rigid step would point in an upward direction and render it very inconvenient for the passengers to board same. For this reason the step is divided as above described and when the step descends its front portion rests flatly on the platform leaving the outer edge of the rear portion at the platform level while its chain  $h$  is held in a definite corresponding position by the pivot  $d$ .

In the described manner an automatic step is produced particularly useful on subway cars stopping near platforms which are often somewhat away from the car leaving dangerous gaps between.

I claim as my invention.

1. An automatic step for cars comprising a step proper secured in front of the sliding side door of the car at the bottom of same, a coiled spring on the side wall of the car with lower portion extending onto the step to keep it normally down, three sheaves one near the bottom on the front wall of the car, one near the top on said wall mounted rectangularly to the first named sheave and

one on the inner top portion of the side wall, a chain secured at one end to the front portion of the step running over the sheaves and then across the top portion of the door, and a securing device for the chain in the outer top portion of the door.

2. An automatic step for subway cars comprising a step proper longitudinally divided into a front and rear part so connected that the front part may move downward only relative to the rear part, three sheaves one near the bottom on the front wall of the car, one near the top on said wall mounted rectangularly to the first named and one on the inner top portion of the side wall, a chain secured at one end to the front part of the step, running over the sheaves and then across the top portion of the sliding side door, and a securing device for the chain in the outer top portion of the door.

3. In combination with the sliding door of a car, a step operatively in connection with said door comprising a divided projection or tread, a spring adapted to keep the tread normally down, and means in connection with the front part of the step and the door to raise and lower the step automatically when the door is operated.

4. In a step for cars automatically operated by opening and closing a sliding door, a step or tread composed of two parts, having downward projections on the side portions where they meet adjacent to each other and bolted together so that the front part may move downward only relative to the rear part, said rear part having a transverse groove near one side end adapted to receive part of a spring to keep the step normally down and two pins one at each inner end to secure the step.

Signed at New York, N. Y., this 18th day of February, 1910.

NILS E. LANDIN.

Witnesses:

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