





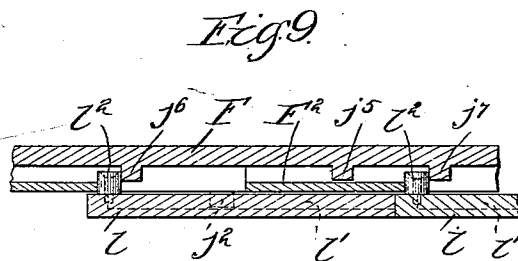
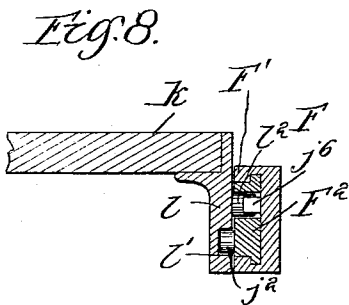
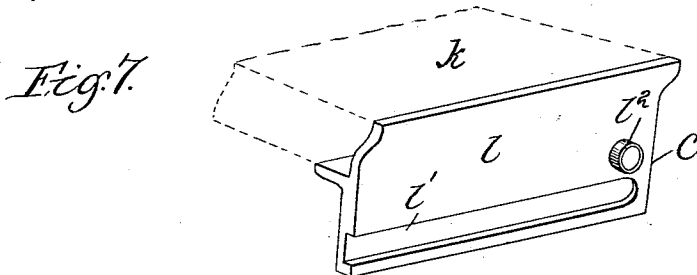
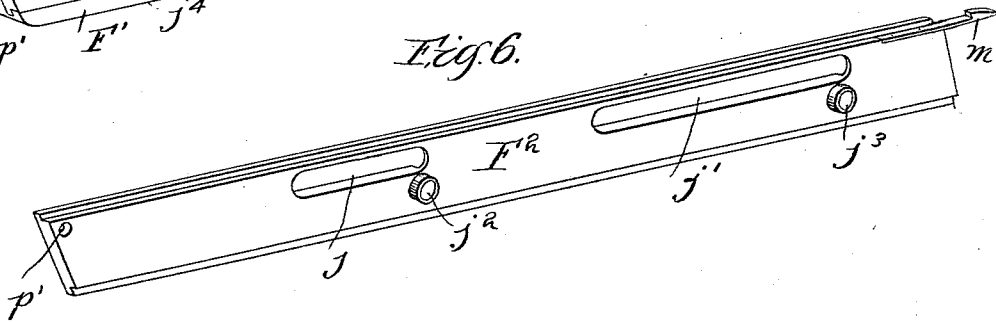
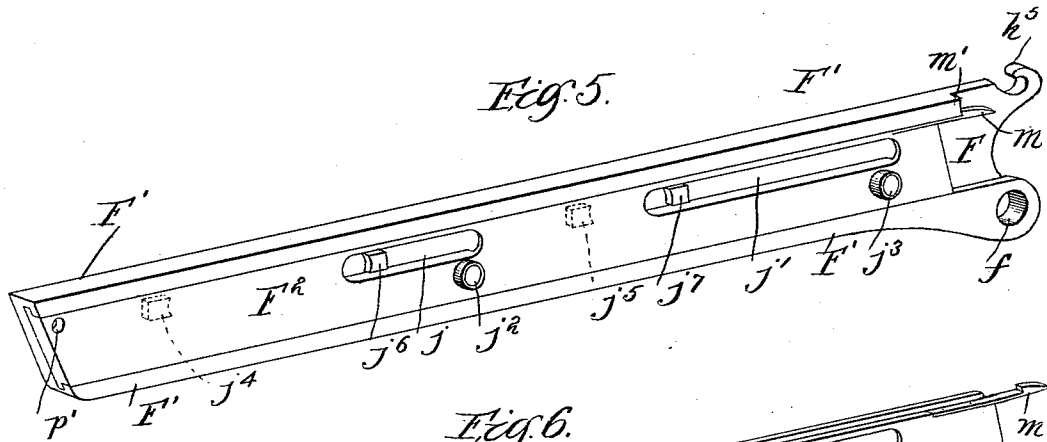
(No Model.)

3 Sheets—Sheet 3.

J. AICHNER.  
ADJUSTABLE CAR STEP.

No. 557,632.

Patented Apr. 7, 1896.



Witnesses.

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# UNITED STATES PATENT OFFICE.

JOHN AICHNER, OF CHICAGO, ILLINOIS.

## ADJUSTABLE CAR-STEP.

SPECIFICATION forming part of Letters Patent No. 557,632, dated April 7, 1896.

Application filed December 9, 1895. Serial No. 571,488. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN AICHNER, a subject of the Emperor of Austria-Hungary, residing in the city of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Adjustable Car-Steps, of which the following is a specification.

My invention relates to improvements in adjustable car-steps; and the object of my invention is to provide steps for railroad-cars which can be closed up to form a part of the platform of the car and let down to be used as car-steps to enable passengers to ascend and descend thereon. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal sectional view of the platform of a car with the steps let down, said section being taken through the center of the steps and connected parts. Fig. 2 represents a detail of the catch to hold the steps in position when raised to form a part of the platform of the car. Fig. 3 represents a longitudinal sectional side view of the steps raised up to form a part of the platform of the car, said section being taken through the center of the steps and attached parts. Fig. 4 represents a sectional rear view of the steps, taken on the line 4 4, Fig. 3, looking in the direction of the arrows. Fig. 5 represents an inside view of the string-board or casing bearing the sliding strip with which the steps are engaged. Fig. 6 shows said inside sliding strip with slots to engage the pins on the steps. Fig. 7 shows the outer part of one of the car-steps, with its pin and groove to engage the pin on the sliding strip. Fig. 8 is a cross-section of one of the car-steps, sliding strip, and outside string-board or casing, taken on the line 8 8, Fig. 3, looking in the direction of the arrows. Fig. 9 is a sectional top view of the steps, sliding strip, and outside string-board or casing, taken on the line 9 9, Fig. 3, as the steps are closed.

Similar letters refer to similar parts throughout the several views.

In the drawings, A represents the body of a car, B the floor of a car, and C the platform.

To the platform C is firmly attached a downwardly-projecting beam *a*, having a downward projection *a'*. Other braces or beams *xx* are shown supporting the platform. To the front

part of this beam *a* is attached a strong metallic plate *a<sup>2</sup>*, which bears at its lower end a yoke *a<sup>3</sup>*. Within this yoke, at *a<sup>4</sup>*, is pivoted a strong lever *b*, which lever is at its outer portion divided and spread into two arms, (not shown,) each arm extending and pivoted to the outer and lower portion of the riser *c* of the outer step at *c'*. To the inner and smaller arm *a<sup>5</sup>* of the lever *b* is pivoted at *a<sup>6</sup>* a perpendicular link *d*, which said perpendicular link *d* is curved outwardly at its lower extremity to reach the pivot *a<sup>6</sup>* and extends upwardly and is pivoted to a lever *e*, which is rigidly attached to a rounded cross-bar *e'*. Said cross-bar *e'* passes through a rounded aperture *f* in each of the outer string-boards F of the car-steps.

The rounded cross-bar *e'* is placed within the beam *a*, which is cut out to receive it, and rests pivotally at its outer extremities in sockets *f<sup>2</sup>* in the solid parts of said beam *a*. Rigidly attached to this rounded cross-bar *e'*, at its portion nearest the car-body, is a lever *g*, to which is pivoted a lever *d'*, which extends up through the platform of the car and is pivoted at its upper portion at *d<sup>2</sup>* to the angular portion *d<sup>3</sup>* of the lever *d<sup>4</sup>*. This lever *d<sup>4</sup>* is pivoted to the upright post D, which is firmly fixed to the platform C and forms a part of the end of the car-body. To the lever *d<sup>4</sup>* is attached a spring-pawl *d<sup>5</sup>*, engaging with indentations in the semicircular ratchet *d<sup>6</sup>*, which is attached to the post D outside the lever *d<sup>4</sup>*. Another rounded cross-bar *h* extends lengthwise of the beam *a*, at the upper portion thereof, above the cross-bar *e'*, and directly beneath the platform of the car. This bar *h* is partially embedded in the upper part of the beam *a* and is held against the inner portion of the said beam *a* firmly by the straps *h' h'*.

Spiral springs *h<sup>2</sup> h<sup>2</sup>* encircle each extremity of the bar *h*, said springs at their inner portions being attached to said bar *h* through an aperture in said bar and extend outwardly to levers *h<sup>3</sup> h<sup>3</sup>*, which are rigidly attached to the extremities of the bar *h*, the ends of said spiral springs extending through apertures in said levers. Said levers *h<sup>3</sup> h<sup>3</sup>* are each formed into a hook in their upper ends, which hooks engage with links *h<sup>4</sup> h<sup>4</sup>*, which links *h<sup>4</sup> h<sup>4</sup>* extend to and engage with the hooks

$h^5$   $h^5$  in the upper and inner portions of the string-boards F. The string-boards or casings F are arranged on each side of the steps and contain slides F' F'.

5 Within the slides F' F' in each string-board is a sliding piece F<sup>2</sup>. This sliding piece F<sup>2</sup> has within it two slots  $j$  and  $j'$ , the slot  $j'$  being about double the length of the slot  $j$ . Upon the said sliding piece, near and below  
10 the inner end of the slots  $j$  and  $j'$ , are the pins  $j^2$  and  $j^3$ , extending outwardly and engaging with the grooves cut in the sides of the steps, as hereinafter described. On the side of the sliding piece F<sup>2</sup>, which lies against the flat in-  
15 side of the string-board F, are grooves, (not shown,) the ends of which engage with the stops  $j^4$  and  $j^5$  and are so arranged as to prevent the sliding piece F<sup>2</sup> from sliding too far outward.

20 The car-steps have the risers  $c$   $c$   $c$  and the treads  $k$   $k$   $k$ . The sides  $l$  of all the steps, except the lower one, have cut in the lower portion thereof the grooves  $l'$ , and each of the steps, except the lower one, has also on the  
25 outside of the side thereof, and just above the extremity of the groove  $l'$ , near the riser, the pin  $l^2$ , which is adapted to slide in its appropriate slot in the sliding piece F<sup>2</sup>. The projections  $j^6$  and  $j^7$  are attached to the inside of  
30 the string-board F in such manner as to hold the pins  $l^2$  on the steps in proper position when the sliding piece F<sup>2</sup> moves back and forth. The lower step has a pin  $p$  on each side thereof extending pivotally into the rounded aper-  
35 tures  $p'$  in the sliding piece F<sup>2</sup>.

Attached to the upper side of the sliding piece F<sup>2</sup>, at its inner extremity, is a strong spring-catch  $m$ , which engages with the shoulder  $m'$  on the upper slide F' of the string-  
40 board F. This spring-catch is acted upon by the hand-lever  $n$ , having a tongue  $n^2$ , which lever is pivoted to the lower part of the post D at  $n'$ .

J represents a section of a vestibule of the  
45 car.

The operation of my device is as follows: The treads of the steps being in line with each other to form a part of the platform of the car, when it is desired to let down the steps  
50 for the ingress and egress of passengers the spring-pawl  $d^5$  is released from its indentation in the ratchet  $d^6$  and the lever  $d^4$  is pulled toward the opposite side of the platform of the car to the position shown in Fig. 1, the  
55 catch  $m$  being also released from engagement with the shoulder  $m'$  by the lever  $n$  and tongue  $n^2$ . This action lifts the lever  $d'$  and the outer end of the lever  $g$  and thus partially rotates the bar  $e'$  and also lifts the outer end  
60 of the lever  $e$  and the link  $d$ . This motion also lifts the short arm  $a^5$  of the lever  $b$ , causing the long arm of the lever  $b$  to descend, bringing with it the pivot  $c'$  of the outer riser  $c$  of the lower step. The pins  $j^2$  and  $j^3$  slide  
65 in the grooves  $l'$  in the sides of their respective steps, and the slots  $j$  and  $j'$  in the sliding piece F<sup>2</sup> slide over the pins  $l^2$  in the sides of

the steps. This conjoint action of the said pins, grooves, and slots brings the pins  $l^2$  and the pins  $j^2$  and  $j^3$ , and their respective grooves 70 and slots, into such relation, as shown in Fig. 1, that the treads assume a horizontal position one above the other diagonally, as shown in said figure. The steps are supported in this position by said pins in their respective slots 75 and grooves at the front part of the steps, and the two lower steps rest at their inner portions upon the lever  $b$ . The inner portion of the upper step rests upon brackets, (not shown,) extending outwardly from the beam 80  $a$ . The spring-pawl  $d^5$ , being allowed to fall into its appropriate indentation in its ratchet  $d^6$ , locks the parts in this position.

When it is desired to close the steps so that they will form part of the platform, the spring- 85 pawl  $d^5$  is released from its ratchet and the lever  $d^4$  pushed outwardly to the position shown in Fig. 3. This movement pushes down the lever  $d'$ , depresses the outer end of the lever  $g$  and the short arm  $a^5$  of the lever 90  $b$ , and lifts the long arm of the lever  $b$  and the outer extremity of the lower step and its connected parts. This upward movement of the steps is assisted by the action of the spiral springs  $h^2$   $h^2$  on the cross-rod  $h$ , which by their 95 resiliency rotate the rod  $h$  backward and thus cause the hooks upon the lever  $h^3$  to exert a backward pull upon the hooks  $h^5$  through the links  $h^4$ . The string-board F being thus lifted the treads of the steps are all brought 100 in line with each other, the pins  $j^2$   $j^3$   $l^2$ , and their respective grooves and slots, are brought into the relations shown in Fig. 3. The spring-pawl  $d^5$  is then allowed to engage with the proper indentation on the ratchet  $d^6$ , which 105 holds the parts in position. To hold the steps more positively in position, the spring-catch  $m$  also engages with the shoulder  $m'$  on the string-board F.

It is obvious that when my improved steps 110 are used the effect is to widen the platform of the car when the steps are closed. This makes it possible to make the vestibule formed between two cars having my improvement much wider than can be done with the 115 car-steps now in use.

While I have shown three car-steps in this application, it is obvious that any convenient number of such steps can be used without departing from my invention. 120

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

1. A series of two or more car-steps, in combination with a hinged or pivoted string-board having a sliding piece therein, and one or 125 more grooves in said sliding piece; one or more of said steps having a groove in the side thereof; and pins suitably located on said steps and in said sliding piece; in combination with means operated from said car, to lift 130 and lower said string-board, and means for holding said steps in position, when opened or closed, substantially as specified.

2. The combination of a series of two or

more car-steps with a hinged string-board having a sliding part therein, with suitable grooves or slots, and pins in said sliding piece and in said steps, to cause said steps to automatically adjust themselves when opened or closed; a lever attached to the outer end of said steps and to the platform of the car; means for operating said lever from the car; and springs suitably arranged to assist in lifting said steps, all substantially as specified.

3. The combination of a series of two or more car-steps, hinged string-boards, each arranged with a sliding piece therein, and a suitable slot or slots in said sliding piece to engage with pins on said steps; grooves in one or more of said steps to engage with pins

on said sliding pieces; a cross-bar, to which said string-boards are pivoted, operated by a lever from the platform of said car; a link operated by said bar to lift and lower a lever hinged to the platform or a suitable projection thereon, and to the outer end of said steps; another rotating cross-bar actuated by a spring or springs thereon, and connected to said string-boards to assist in lifting said steps; and means for holding said steps in a horizontal line with each other, substantially as described.

JOHN AICHNER.

Witnesses:

EMIL GROHSKURTH,  
EMILE WAGNER.