

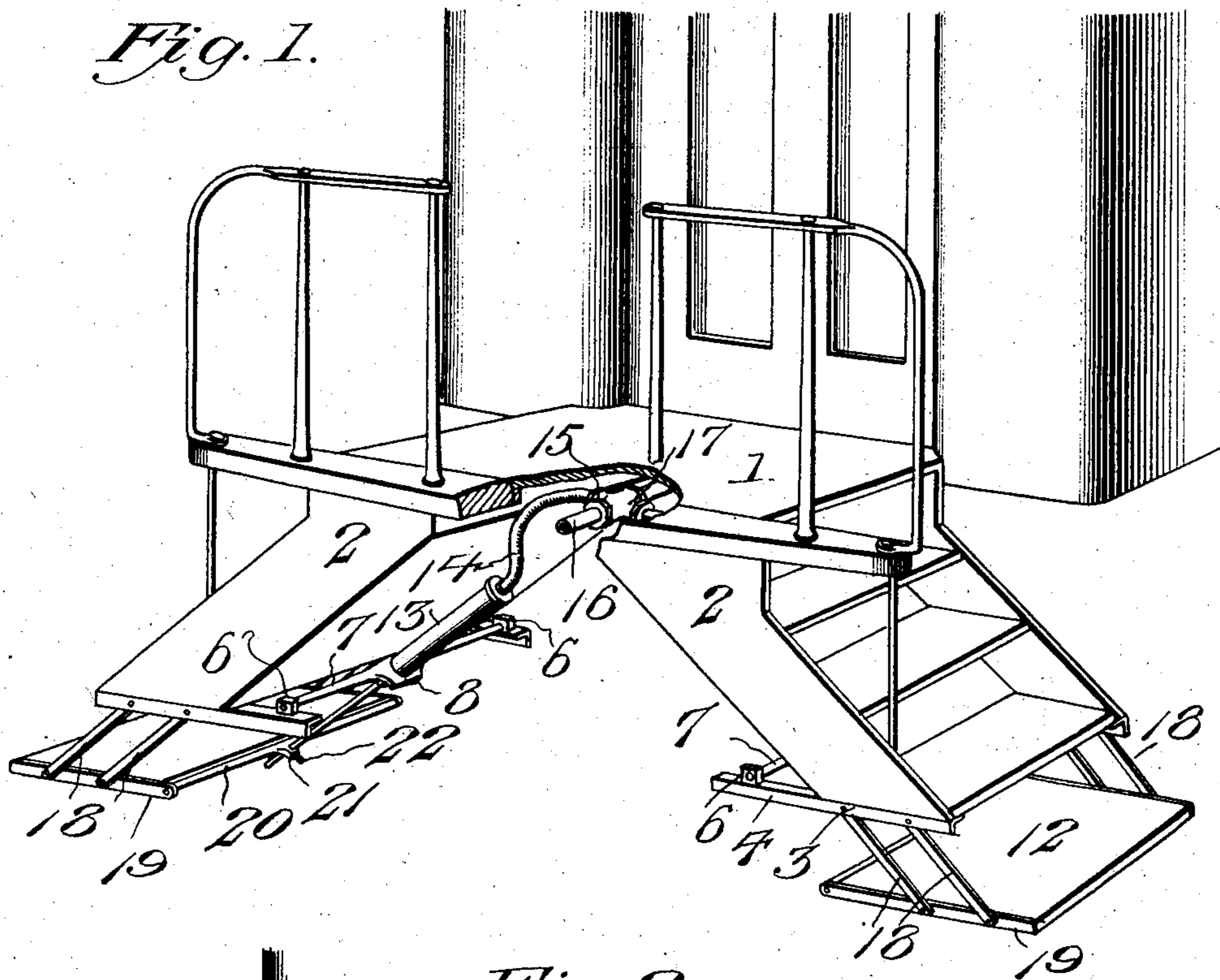
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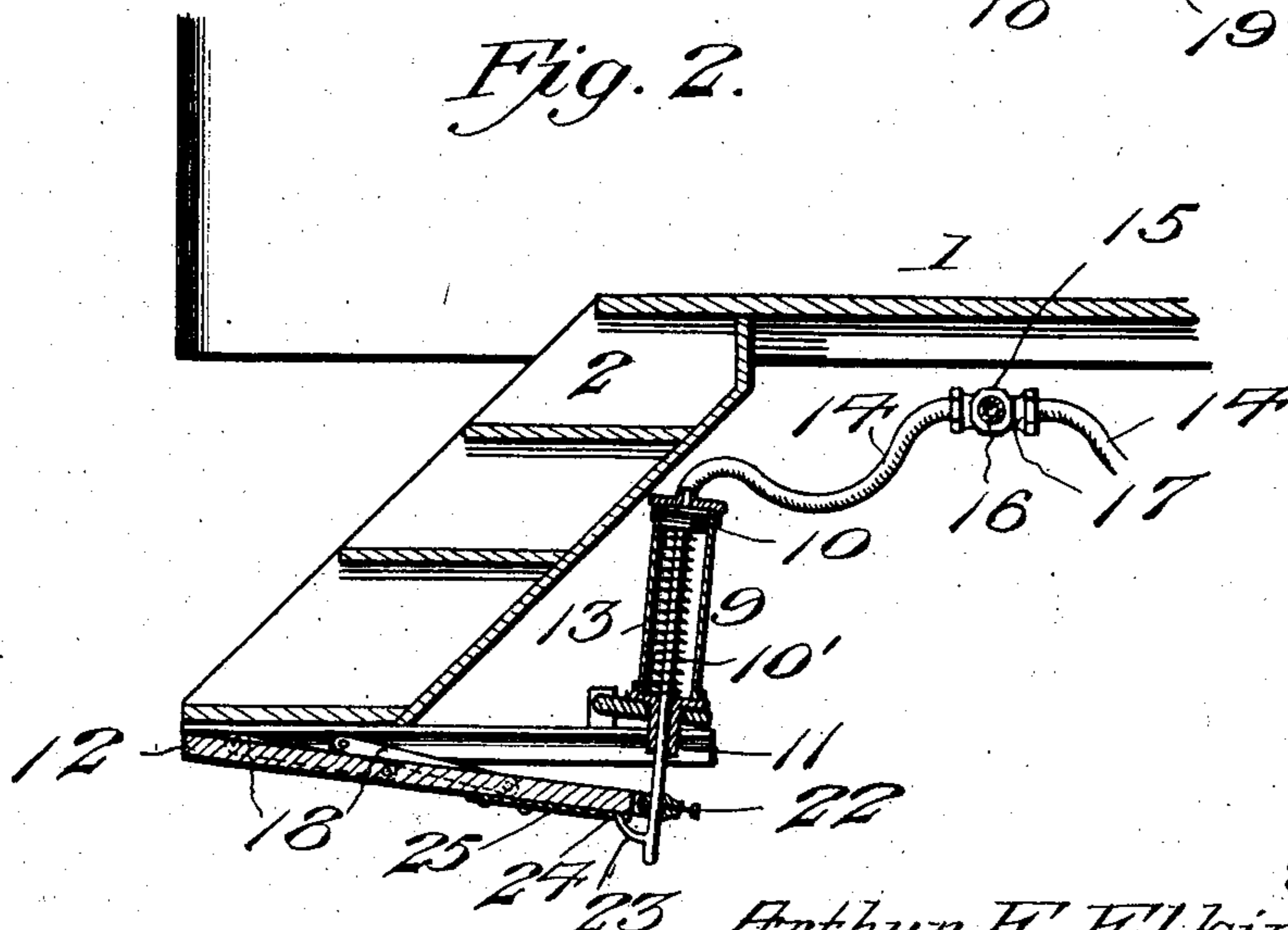
A. F. ELKINS.  
SUPPLEMENTAL STEP FOR RAILWAY CARS.

APPLICATION FILED NOV. 12, 1904.

*Fig. 1.*



*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

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## SUPPLEMENTAL STEP FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 790,195, dated May 16, 1905.

Application filed November 12, 1904. Serial No. 232,535.

*To all whom it may concern:*

Be it known that I, ARTHUR F. ELKINS, a citizen of the United States, residing at Iron-  
ton, in the county of Lawrence and State of  
Ohio, have invented new and useful Improve-  
ments in Supplemental Steps for Railway-  
Cars, of which the following is a specification.

This invention relates to supplemental or  
extension steps for railway-cars designed to  
be extended below the permanent steps when  
a train approaches or arrives at a station to  
facilitate the ingress and egress of passengers  
to and from the cars; and its primary object  
is to provide a supplemental step which may  
be mounted upon the permanent steps and con-  
trolled by air or steam pressure, the construc-  
tion being such that the supplemental steps of  
all the cars of a train may be controlled by the  
engineer, conductor, or other train official,  
who by merely operating a valve may project  
and retract the steps at will.

A further object of the invention is to pro-  
vide a novel construction and organization of  
operating parts whereby the supplemental  
step may be readily and conveniently applied  
for use and removed for repairs and whereby  
it is adapted to have free and easy movement  
and automatically locked in its projected and  
retracted positions.

With these and other objects in view the in-  
vention consists of the features of construc-  
tion, combination, and arrangement of parts  
hereinafter fully described and claimed, ref-  
erence being had to the accompanying draw-  
ings, in which—

Figure 1 is a perspective view showing the  
application of the invention for use in connec-  
tion with the permanent steps of a car, a por-  
tion of the car-platform being broken away  
to show the air or steam supplying connec-  
tions; and Fig. 2 is a vertical transverse sec-  
tion through one of the sets of permanent steps  
and the supplemental step and its controlling  
mechanism, the supplemental step being shown  
in folded or retracted position.

The numeral 1 in the drawings represents one  
of the end platforms of a car, and 2 repre-  
sents the permanent steps supported there-  
from. Secured to the frame of each set of steps  
2 is a supporting-frame 3, comprising a pair of

side bars or bracket-bars 4, suitably attached  
at their forward ends to the base portion of  
the frame of the steps 2 or to the lower step  
thereof and braced by transverse brace-pieces.  
The arms 4 project inwardly from the steps 2  
and are provided at their inner ends with bear-  
ings 6, which receive the trunnions or journal  
ends of a swinging support 7, comprising a  
cross piece or bar extending across the space  
between the inner ends of said arms and pro-  
vided with an intermediate enlargement 8.  
Upon this intermediate enlargement 8 is  
fixedly mounted a cylinder 9, in which is a  
piston-head 10, the stem 10' of which extends  
to the exterior through an elongated bearing-  
sleeve 11, disposed at the bottom of the cyl-  
inder and extending through an opening there-  
in, and is operatively connected to the supple-  
mental or extension step 12 in the manner  
hereinafter described. Surrounding the pis-  
ton-stem within the cylinder 9 is a coiled re-  
traction-spring 13, which bears at its lower  
end against the bottom head of the cylinder  
and at its upper end against the piston-head  
10 and serves to normally hold said piston-  
head in its retracted position or at the upper  
end of said cylinder, as shown in Fig. 2. The  
upper end of the cylinder is connected by a  
hose or other suitable pipe connection 14 to a  
fitting 15, connected with a pipe 16, through  
which air or steam may be supplied to operate  
the piston from a storage-reservoir or other  
suitable part of the air-brake system or from  
the boiler of the locomotive or system of heat-  
ing-pipes of the heating apparatus on the car.  
In practice a controlling-valve will be sup-  
plied upon the locomotive or each one of the  
cars, whereby the engineer, conductor, or one  
of the trainmen may let on or cut off the sup-  
ply of steam or air to the cylinders of all the  
operating devices of the supplemental or ex-  
tension steps of the cars of a train to enable  
said steps to be simultaneously projected and  
retracted at will. In the construction shown  
in the drawings the fitting is illustrated in the  
form of a coupling adapted to join contigu-  
ous ends of an air or steam supply pipe 15 and  
having laterally-projecting portions 17, to  
which the ends of the two sets of devices  
mounted on each platform for operating the

extension or supplemental steps at the sides thereof may be coupled.

The extension or supplemental step 12 is hung by links 18, at each side thereof, from bracket-arms 4 of the supporting-frame 3, so that it may be swung to a horizontal position below the lower step of the set of steps 2 at a suitable distance beyond said step and to be retracted to the position shown in Fig. 2, in which it lies below and inwardly of said step. The links 18 are pivotally connected at their lower ends to metallic straps or plates 19, secured to and reinforcing the sides of the supplemental step 12, and these plates are extended at their rear ends beyond the step and apertured to form bearings receiving journals or trunnions on the outer ends of a transverse wrist-rod 20, which is provided at a central point with an enlargement in the form of a crank-arm, lug, or projection 21, having an opening therein for the reception and downward projection of the lower end of the piston-stem 10', the said stem being detachably secured thereto by means of a set-screw 22. By this construction a movable connection is provided between the stem and extension or supplemental step to adapt the step to swing from the position shown in Fig. 2 to the horizontal position shown in Fig. 1 without interference from the piston-stem. The lower end of the piston-stem is provided with a locking element to cooperate with the locking element on the extension-step to lock the latter in its projected and extended positions, the locking element on the stem being embodied in the present instance in the form of a hook-shaped stud or projection 23, adapted to engage a keeper-opening 24 in a keeper-plate 25, secured to the under side of the step near its inner or rear end.

The normal position of the parts when the step is folded or retracted is shown in Fig. 2, from which it will be seen that the forward end of the step lies beneath the bottom permanent step and extends inwardly on a slight downward angle therefrom, while the cylinder 9 is tilted to a slight degree in an inward or rearward direction. When fluid-pressure is admitted to the cylinder through the pipe 14, the piston-head 10 is forced downward thereby in the cylinder 9 against the tension or resistance of the spring 13, and this action causes the stem 10' to be projected outward and downward. Upon the initial downward movement of the stem the locking projection 23 is withdrawn from engagement with the keeper 24, thereby releasing or unlocking the step, and as the said stem continues to move downward the step will be gradually swung forward and downward by its own gravity and the action of the stem, the wrist-rod 20 turning in its bearings to permit the step to assume the horizontal position. (Shown in Fig. 1.) As the step nears the limit of its outward or projective movement the resistance offered by the

stem to such movement increases and under the pull of the step 12, which at this point attains its full swing under the weight or gravitational action thereof, the stem 10' is tilted and the cylinder 9 swings inwardly through its connection with the swinging support 7 to permit the step to swing outward to its full projected position without interference, and at the same time the tilting action of the stem causes the locking projection 23 to be moved upwardly and forwardly to engage the keeper 24 and lock the step in its extended position. By this means the step will be held unfolded or extended against the expansive tendency of the spring 13, the resistance to retraction by the cylinder 9, as well as the direct downward pressure of the weight of the person entering or leaving the car, serving, in addition to the locking connection, to prevent the step from swinging inwardly. When the air or steam pressure is released or exhausted from the cylinder, the spring 13 expands and in so doing forces the piston 10 to the upper end of the cylinder 9, thereby unlocking the step and restoring the same to its normal position. Under the initial impulse imparted to the head 10 and stem 10' by the spring 13 the said stem and cylinder are first tilted or rocked to a slight extent on the swinging support 8 and wrist-rod 20, thereby withdrawing the locking projection 23 from engagement with the keeper 24, and in the further movement of the piston head and stem the cylinder is tilted back to its normal position and the step 12 swung back to the position shown in Fig. 2. When the step reaches the limit of its retracted or folded position, the wrist-rod 20 turns until restored into the position shown in Fig. 2, at which time the keeper 24 is brought into alignment with the locking projection 23 and engaged therewith to lock the step against outward movement.

By the construction and organization of parts shown a supplemental or extensible step is provided which is freely movable with the minimum amount of resistance in either direction and the steps of the several cars composing a train may be readily controlled from a single point, the engineer, conductor, or other trainman by simply operating a controlling-valve being enabled to supply a motive fluid under pressure to operate the pistons of the controlling mechanisms to project all of the steps simultaneously as the train nears or reaches a station at which a stop is to be made and just prior to or at the starting of the train in the resumption of its trip to exhaust the fluid-pressure from the several cylinders and permit the retraction-springs to restore the steps to their normal position. The construction is such that the supplemental steps may be supplied at a comparatively low cost and mounted upon cars already in use without change in the structure thereof.

From the foregoing description, taken in

connection with the accompanying drawings, the construction and mode of operation will be apparent without a further extended description.

5 Changes in the form, proportions, and minor details of construction may be made without departing from the spirit or sacrificing any of the advantages of the invention.

10 Having thus described the invention, what is claimed as new is—

1. A swinging supplemental step, fluid-pressure-operated means for projecting and retracting said step, and means for locking the step in its projected and retracted positions.

15 2. A swinging supplemental step, a swinging cylinder, a piston therein provided with a stem pivotally connected with the step, means for supplying fluid-pressure to move the piston in one direction and swing the step to projected position, and a spring acting on the piston to restore the parts to their normal position, substantially as described.

20 3. A swinging supplemental step, a swinging cylinder, a piston therein provided with a stem jointed to the step whereby the step is adapted to swing as the stem reciprocates, means for supplying fluid-pressure to operate the piston in one direction, a spring for operating the piston in the reverse direction, and automatic means for locking the step in its projected and retracted positions substantially as described.

25 4. A swinging supplemental step, fluid-pressure-operating means therefor having a stem, said stem being pivotally connected with the step, whereby the latter may be swung when said stem reciprocates, and locking means operated under the swinging movements of the step and stem to lock the step in projected and retracted positions.

30 5. A swinging supplemental car-step, a tiltable cylinder, a piston therein, a stem connected with said piston, a wrist member connecting said stem with the step, means for

supplying fluid-pressure for projecting the piston and stem, a spring for retracting the same, and locking means operated under the swinging movement of the step and wrist member and the tilting movement of the cylinder to lock the step in projected and retracted position.

6. A swinging supplemental step, a tiltable cylinder, a spring-retracted piston therein having a stem projecting therefrom, means for supplying fluid-pressure to project the stem and piston, a wrist member pivotally connecting the stem to the step, and coacting locking devices on the step and stem operative under the swinging movements of the step and wrist member and the tilting action of the cylinder to lock the step in projected and retracted positions.

7. A swinging step, an oscillatable cylinder, a piston in said cylinder having a projecting stem, an oscillating connection between said step and piston-stem, and means for operating said piston.

8. A swinging step, an oscillatable cylinder, a piston in said cylinder having a projecting stem, an oscillating connection between said step and piston-stem, and automatic locking means controlled in action by said oscillating connection.

9. The combination with a stationary car-step, of a swinging car-step, links connecting said swinging step with the stationary step; a pivotally-mounted cylinder, a piston operating in said cylinder, a stem attached to the piston and pivotally connected to the swinging step, and means for operating the piston in said cylinder.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR F. ELKINS.

Witnesses:

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