P. J. FICKINGER.

COMPENSATING STAIRWAY.

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1,167,893.

Patented Jan. 11, 1916.

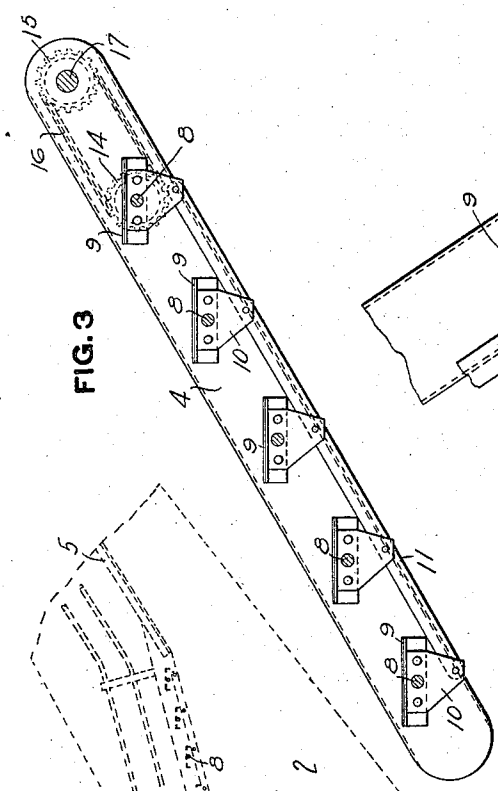


FIG. 3

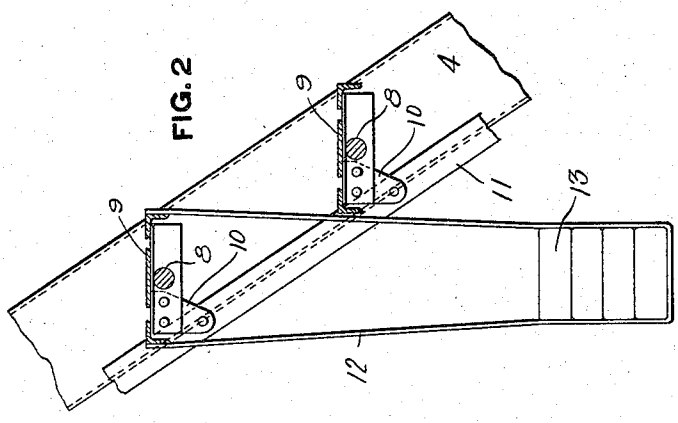


FIG. 2

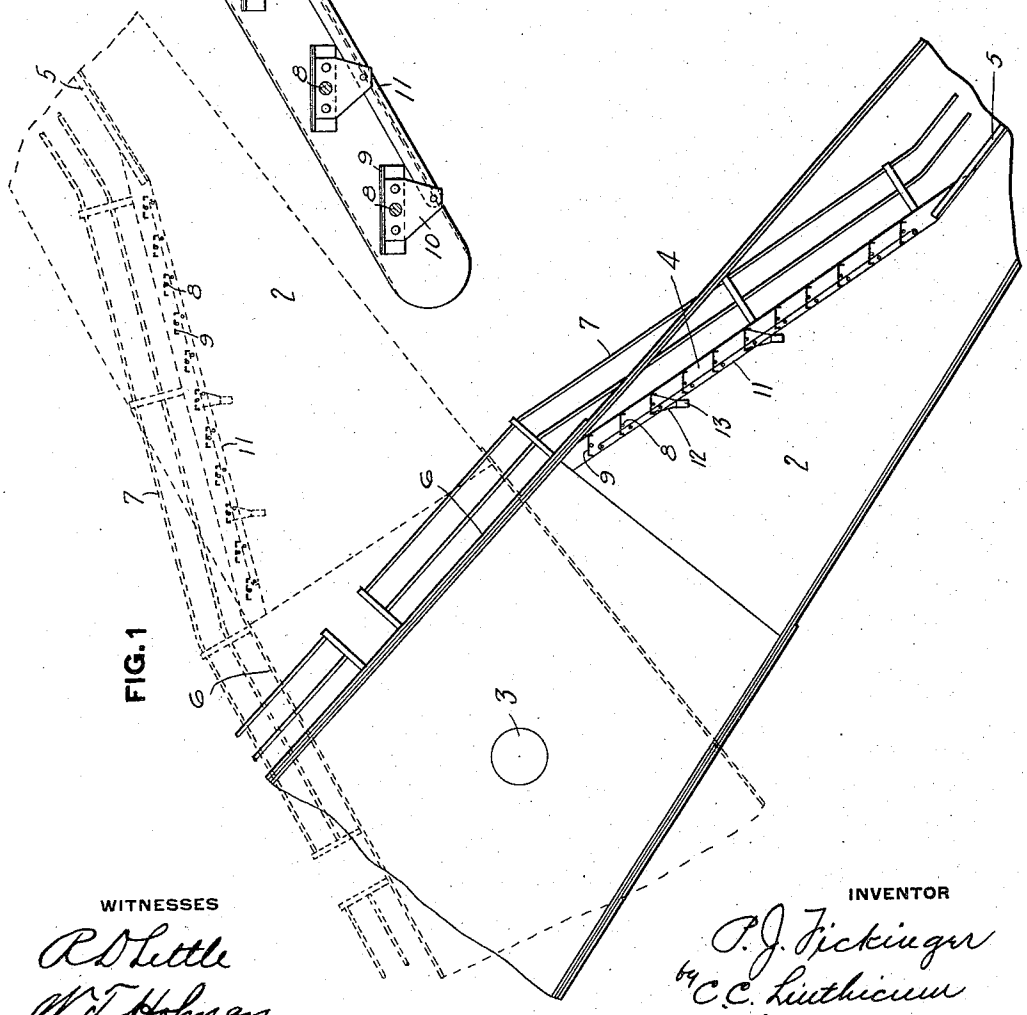


FIG. 1

WITNESSES

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COMPENSATING STAIRWAY.

1,167,893. Specification of Letters Patent. Patented Jan. 11, 1916.

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To all whom it may concern:

Be it known that I, PRESLY J. FICKINGER, a citizen of the United States, and resident of Conneaut, in the county of Ashtabula and State of Ohio, have invented certain new and useful Improvements in Compensating Stairways, of which the following is a specification.

My invention relates to the construction of stairways for use in connecting separated points on a moving or swinging member such as the illustrated construction in which the invention is applied to the oscillating beam of unloading mechanisms used in unloading ore and similar bulk cargoes from ore boats and similar vessels.

One object of my invention is to provide a stairway of improved construction having oscillating treads and having novel means whereby the treads are maintained in substantially horizontal planes while the stairway is being swung through the arc of a circle.

Another object of the invention is to provide a movable stairway having pivoted treads adapted to swing when the stairway is moved and remain as substantially horizontal planes while the stairway is being moved.

A further object of my invention is the provision of a stairway having the novel combination and arrangement of parts shown in the accompanying drawings, to be more fully described hereinafter, and to be specifically pointed out in the appended claims.

Referring now to the drawings, forming part of this specification, Figure 1 is a side elevation showing part of the oscillating beam of an ore unloading mechanism with a stairway constructed and arranged and applied for use thereon in accordance with my invention. Fig. 2 is a sectional elevation showing a detail of the construction of the movable treads and means employed in maintaining the flat top surface of the treads in horizontal planes. Fig. 3 is a similar detail showing a modification in the means employed in maintaining the stair treads in parallel planes and horizontal position on the swinging arm or other movable member to which the stairway is applied for use.

In the accompanying drawings, the numeral 2 designates the oscillating beam of an ore unloading apparatus which is pivoted on a shaft 3 so as to rock between the positions shown in full lines and in dotted lines in Fig. 1. Secured on the side of the oscillating beam 2 which is of built up construction is a compensating stairway embodying my invention. This stairway comprises sides 4, which (as shown in Fig. 1) are rigidly secured to extend in the desired angular position from one end of a platform 5 to the platform formed by the top cover plates 6 of the beam 2. A hand rail 7 provided on one or both sides of the stairway and platform is usually employed for the sake of safety.

Secured to the sides 4 of my improved stairway to extend between the opposite faces thereof are shafts or pins forming trunnions 8 and pivotally connected to each trunnion is a stair tread 9. Each of the treads 9 is provided on one end as shown with a downwardly extending arm forming a lever 10 by which the series of treads are pivotally connected to a link bar 11 which extends lengthwise parallel with the sides 4 of the stairway below the treads 9. Fastened to part of or when desired, to each of the treads 9 are the ends of a U-shaped strap 12 the strap being secured to the treads so as to depend therefrom and on the depending or lower end of the U-shaped straps are heavy balance weights 13, the weights and the strap forming a pendulum which acts to maintain the upper surfaces of the treads 9 in horizontal planes throughout the swinging movement of the stairway.

By providing part of the pivoted treads 9 with the balance weights or pendulums 13, and by pivotally connecting the arms or levers 10 on each tread to the link bar 11, as shown in the drawings, the treads are caused to automatically move in unison when the stairway is rocked or swung and the treads are maintained in parallel, horizontal planes at all points in the swinging movement of the stairway and the arm to which the stairway is applied. It will be thus seen that a workman can ascend or descend between the platforms 5 and 6 without reference to the angular position of the stairway and at any point in the swinging movement as the treads 9 will always extend horizontally in all positions of the oscillating arm.

In the modified construction shown in Fig. 3, the treads 9 are provided with arms 10 by which they are connected to a link bar 11 in the same manner as has been described. In this construction the U-straps

and balance weights are omitted and sprocket wheels 14, 15 with a sprocket chain 16 are employed to maintain the treads 9 in parallel horizontal planes during the swinging movement of the stairway. As will be seen in Fig. 3, the trunnion 8 for one of the treads 9 is provided with a sprocket wheel 14 which is keyed or otherwise fixed to the trunnion 8 to rock the trunnion. The sprocket wheel 14 is connected to a second sprocket wheel 15 by the endless sprocket chain 16, and the sprocket wheel 15 is keyed or otherwise fixed on the pivot pin 17 by which the upper ends of the sides 4 of the stairway turning on the pivot pin 17 so that when the sides move angularly or swing the sprocket chain 16, sprocket wheel 14 and link bar 11 causes the treads to move with respect to the sides 4 and the upper surfaces of the treads are thereby maintained in substantially horizontal planes.

The advantages of my invention will be apparent to those skilled in the art. My invention provides a compensating stairway which is applicable for use on the swinging arms of ore unloaders and on the rocking members of various structures and by the use of my invention a stairway is provided in which the treads are always in the desired horizontal position irrespective of the swinging movement of the structure to which the stairway is fixed so that it is safe and easy to ascend or descend the steps even during the swinging movement of the stairway.

Modifications in the construction and arrangement of the parts may be made without departing from my invention as defined in the appended claims.

I claim:—

1. In a stairway the combination with a swinging arm, of stair sides secured thereto, a plurality of treads pivotally mounted on the sides, means pivotally connecting said treads and means for moving said treads in unison, said tread moving means having a swinging weight arranged to maintain the moving treads in parallel planes when said arm is swung.

2. A swinging stairway comprising a series of treads, swinging means to which the treads are pivoted, means for swinging said pivoted treads in unison, and a swinging weight whereby said treads are maintained in parallel, horizontal planes in the swinging movement thereof.

3. A swinging stairway comprising a series of treads, swinging means to which the treads are pivoted, means for moving said pivoted treads in unison, and a depending weight whereby said treads are maintained in parallel horizontal planes in the movement thereof.

4. A swinging stairway comprising a series of treads, swinging means to which the treads are pivoted, means for moving said pivoted treads in unison, means for moving said swinging means to which the treads are pivoted and a pendulum whereby said treads are maintained in parallel horizontal planes in the movement thereof.

In testimony whereof I have hereunto set my hand.

PRESLY J. FICKINGER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."