

R. KNUDSEN.  
Inclined-Plane Railway.

No. 198,888.

Patented Jan. 1, 1878.

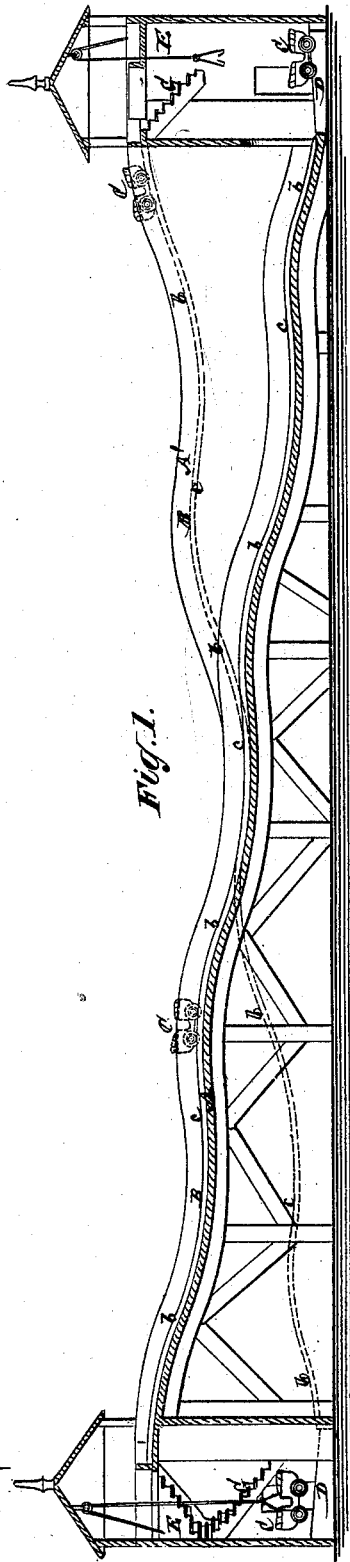


Fig. 1.

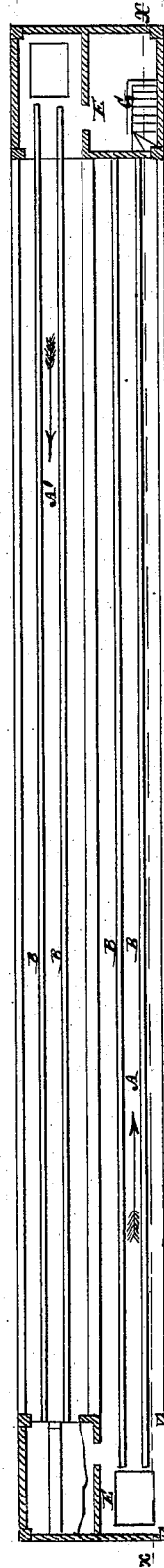


Fig. 2.

Witnesses  
John Decker  
Geo. Haynes

Richard Knudsen  
by his Attorneys  
Brown & Allen

# UNITED STATES PATENT OFFICE.

RICHARD KNUDSEN, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN INCLINED-PLANE RAILWAYS.

Specification forming part of Letters Patent No. **198,888**, dated January 1, 1878; application filed November 12, 1877.

*To all whom it may concern:*

Be it known that I, RICHARD KNUDSEN, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Inclined-Plane Railways, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

This invention, which is more especially applicable to passenger-railways, to be used in public gardens and other places of amusement, consists in a combination with an inclined-plane railway-track, the rails of which present a series of ascending and descending inclined planes, of a friction-slide arranged at the foot or lower end of said track, and constructed to receive the body of the car upon it, for overcoming the impetus acquired by the car, and arresting the latter with certainty at termination of the trip by acting as a drag to the body of the car moving over it.

Figure 1 represents a longitudinal section, on the line *x x*, of a double or two-track inclined-plane railway having my invention applied; and Fig. 2, a horizontal section of the same.

A A' represent two reverse inclined-plane tracks of a double-road railway, each of which constitutes an independent railway. The rails B B of each of these tracks, down which the car C, with its load, descends by gravity, are constructed to present a series of descending inclined planes, *b*, and ascending inclined planes *c*, the latter of which, throughout the general incline or descending grade of the track, are only steep enough to check the too free descent of the car without stopping it

from passing from one descending inclined portion *b* of the rails to the next one thereof.

At the base or lower end of each inclined-plane track is a friction-slide, D, which may or may not have an ascending inclined-plane surface, and which is constructed to relieve the car C from support by its wheels, and to receive the body of the car upon it, thus effectually overcoming the impetus acquired by the car, and arresting the latter with certainty at the termination of the trip.

At the ends of the reversely-inclined tracks A A' are hoistways E for elevating the car, by any suitable means, from the lower end of one track to the higher end of the reverse track, whereby a continuity of run or action for the car alternately, in reverse directions, is provided for, and whereby the passengers may be elevated in starting on their trip, or in making a double trip, by transferring them from one track to another.

If desired, however, staircases G may be used for enabling the passengers to ascend from one level to another.

I claim—

The combination, with an inclined-plane railway-track, the rails of which present a series of ascending and descending inclined planes, of a friction-slide arranged at the foot or lower end of said track, and constructed to relieve the car of support by its wheels, and to act as a drag to the body of the car moving over it, substantially as specified.

R. KNUDSEN.

Witnesses:

FRED. HAYNES,  
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