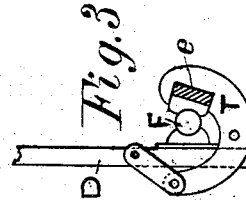
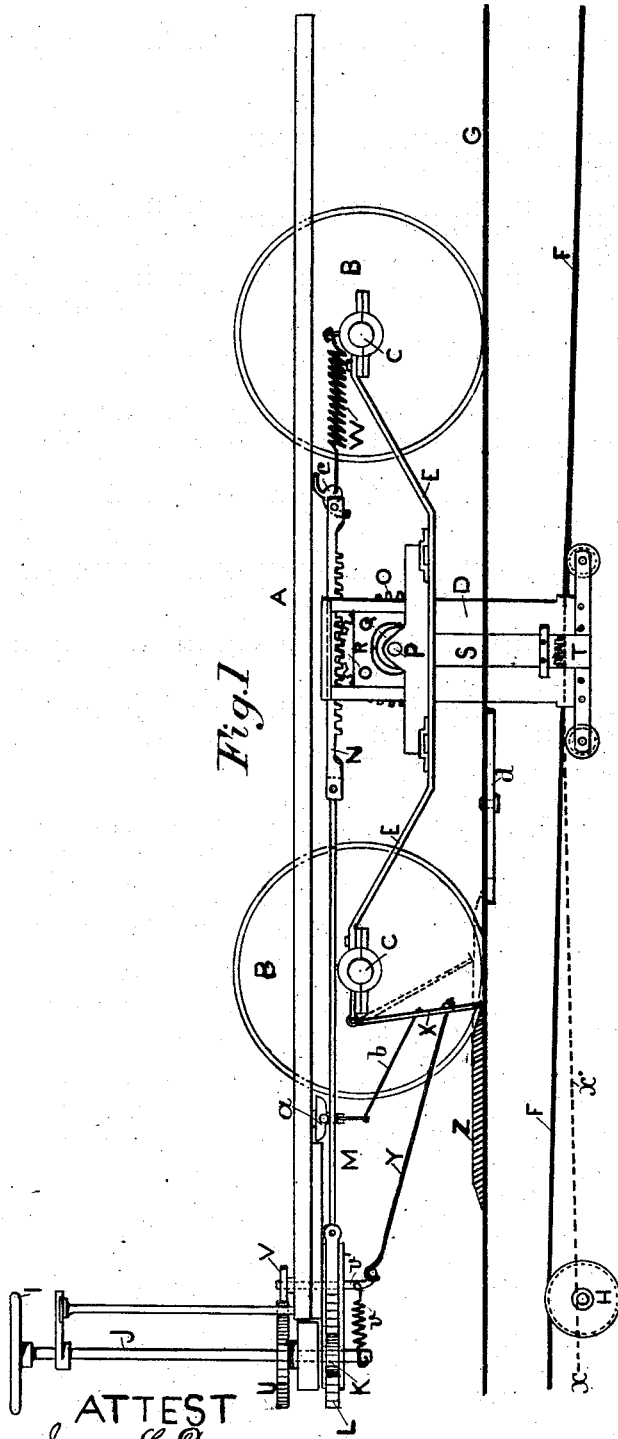


(No Model.)

J. B. LOW & A. K. GRIM.  
ROPE RAILWAY.

No. 264,413.

Patented Sept. 12, 1882.



ATTEST  
James L. Drum  
Saml. D. Baker

INVENTORS  
Joel B. Low  
Abraham H. Grim  
by George Parley  
Atty

# UNITED STATES PATENT OFFICE.

JOEL B. LOW AND ABRAHAM K. GRIM, OF SAN FRANCISCO, CALIFORNIA.

## ROPE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 264,413, dated September 12, 1882.

Application filed May 2, 1882. (No model.)

*To all whom it may concern:*

Be it known that we, JOEL B. LOW and ABRAHAM K. GRIM, both of San Francisco, State of California, have invented a new and useful Improvement in Rope Railways, of which the following is a specification.

Our invention relates to certain improvements in the construction and operation of street-railways which have the motive power transmitted by an endless wire rope; and it consists in certain devices for automatically disengaging the car from the rope at certain points on the line—as, for instance, where a cross-rope line exists—for checking any retrograde movement of the car when so disengaged, and for preventing any damage to the rope in case of accidental inoperation of the parts.

In the accompanying drawings, Figure 1 is a side view of our automatic disengaging device or trip with automatic stop lever or latch. Fig. 2 is a plan of the parts needing to be thus shown. Fig. 3 is a sectional view of a portion of a grip, illustrating the application of our safety-spring behind the die or wearing-plate of the grip-jaw.

In the different figures the same letters refer to the same parts.

A is the floor of a car; B, the carrying-wheels; C, the axles; and D is the grip, which in the present case is a modified form of the one patented to Grim and Low August 16, 1881, No. 245,627. This grip is supported on the frame E, which rests on the axles.

F is the rope.

G is the channel-iron, which also represents in Fig. 1 the line of the surface of the road-bed.

H is a pulley set above the ordinary rope-carrying pulleys of the road, so that when the grip-jaws are opened the rope will be lifted out from between them.

The grip is operated as follows: By the hand-wheel I the shaft J is turned, and with it the pinion K. This pinion K engages with the rack-gear L. This rack-gear is connected by the rod M to the rack-gear N. This in turn engages with the gear-wheel O upon the spindle P. On this spindle the eccentric Q is secured, which, moving within the frame R, raises and lowers the bar S to open and close the grip-jaws T, a more complete description

of the grip itself being given in the before-named patent.

Upon the shaft J there is a ratchet-wheel, U, with a spring-pawl, V, *v* being the spring, connected between a projecting arm on the spindle *v'* of the pawl and the shaft J or other convenient anchorage.

Attached to the end of the rack-gear N there is a spiral spring, W, one end of which is secured to the frame E.

X is a hinged lever hanging from the frame E to within an inch or so of the surface of the channel-iron G. This lever connects through the rod Y with a horizontal arm of the pawl-spindle *v'* in such a manner as that when the hanging lever is swung back by coming in contact with the block Z, permanently set in the road-bed, as the car advances the pawl-spindle will be turned sufficiently to throw the pawl out of engagement with the ratchet-wheel. Immediately upon this operation the spring W acts to draw back the rack-gear N, and the grip-jaws are opened and the rope released. At the same time the gong *a* is struck, which is connected by a cord, *b*, to the lever X. The block Z is long enough to insure that the lever X will be kept back a sufficient length of time to give an opportunity for the machinery to act.

A hook, *c*, with a tail-piece for a handle, is shown in Fig. 1, which connects the rack N with the spiral spring W. This is for the sake of convenience in hooking and unhooking this spring in removing and placing the grip.

*d* is our swinging latch to stop any backward motion of the car when the grip is opened and the car is proceeding up a grade. The latch is pivoted under or upon the channel-iron. It has a hooked back end with a beveled point, and a forward end bent at an angle, as shown in drawings, Fig. 2. When the grip-shank passes through the slot it strikes the back end, pushes it aside, and throws forward the other end across the path of the grip. The grip, still advancing, strikes this end, pushes it to one side, and returns the hooked end into the path of the grip to block its way if a retrograde movement should occur. This latch may be rigidly secured by a couple of rivets, and the natural spring of the lever between the fastening and the hooked point may be relied upon

to return the hook to the path of the grip when pushed aside. In this case the lever should be long enough to give the required spring, and the forward part might be dispensed with.

5 In Fig. 3 we show a piece of rubber, *e*, placed behind the wearing plate or die of the grip-jaw. This is provided in case the latch *d* should be so misplaced as to block the progress of the car before the grip-jaws were opened. Its effect is to allow the rope to pull through the jaws instead of breaking or stranding it, the rubber yielding sufficiently for the purpose, though ordinarily it would hold sufficiently to draw the car. This rubber backing for the grip-dies is also used to prevent the shock which occurs when a quick motion is given to the grip-jaws in reclosing them after the obstruction is passed. The spring may be placed behind either or both dies.

20 The dotted line *x* shows the ordinary level of the rope when not required to be lifted out from between the grip-jaws.

The block Z can be arranged under the channel-iron instead of upon it, if desired, the parts being modified to suit, and the lever X can be fitted with a little friction-roller at its lower end, if desired, to roll over the block Z instead of scraping over it.

What we claim as our invention, and desire to secure by Letters Patent, is as follows:

35 1. In a rope railway having the rope carried under ground and the gripping device passing through a narrow slot in the road-bed, the combination, with the gripping device, of an automatic trip to open the jaws of the grip at cer-

tain definite points in the line, substantially as herein described.

2. In a rope railway having the rope carried under ground, the combination of the lever X, attached to the underportion of the car, and the stationary block Z, placed permanently upon the road-bed, so as to form no material obstruction, as a means of obtaining a motion when they pass each other to automatically operate suitable machinery to open a gripping device to release the rope, substantially as herein described.

3. In a rope railway, the combination of the lever X, block Z, rod Y, and pawl V, operating together as a means of releasing the lock upon the ratchet-wheel U to allow the spring W to act upon suitable machinery to open a gripping device, substantially as herein described.

4. In a rope railway, the combination of the lever X, block Z, and gong *a*, operating together as a means of notifying the engineer of his arrival at a definite point in the road, substantially as herein described.

5. In a rope railway having slot in road-bed, and grip-shank passing therethrough, the latch *d*, secured at side of said slot and vibrated horizontally by the passing grip-shank as a means of preventing retrograde movement of the car, substantially as herein described.

JOEL B. LOW.  
ABRAHAM K. GRIM.

Witnesses:

GEORGE POWDY,  
JAMES L. DRUM.