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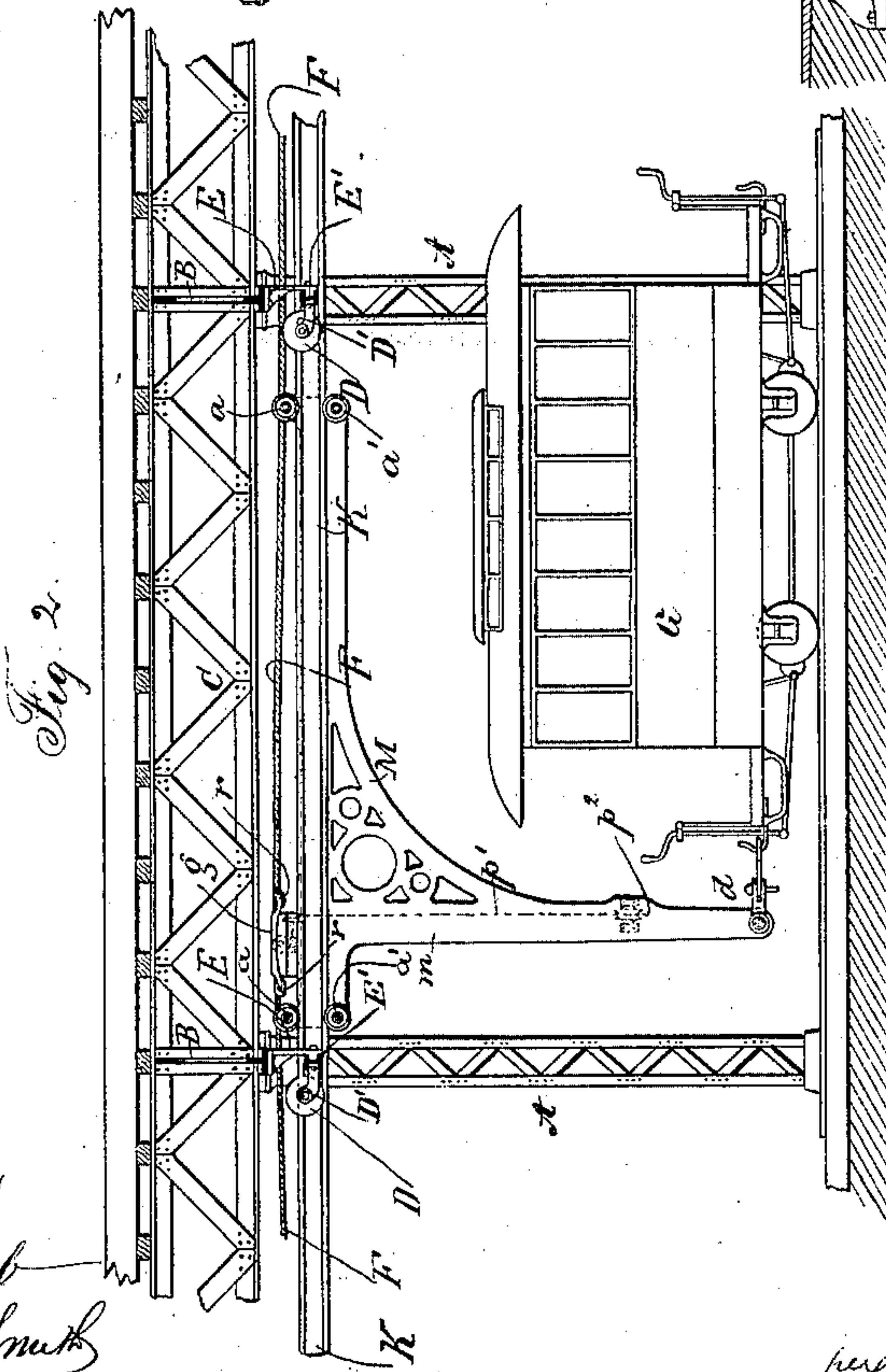
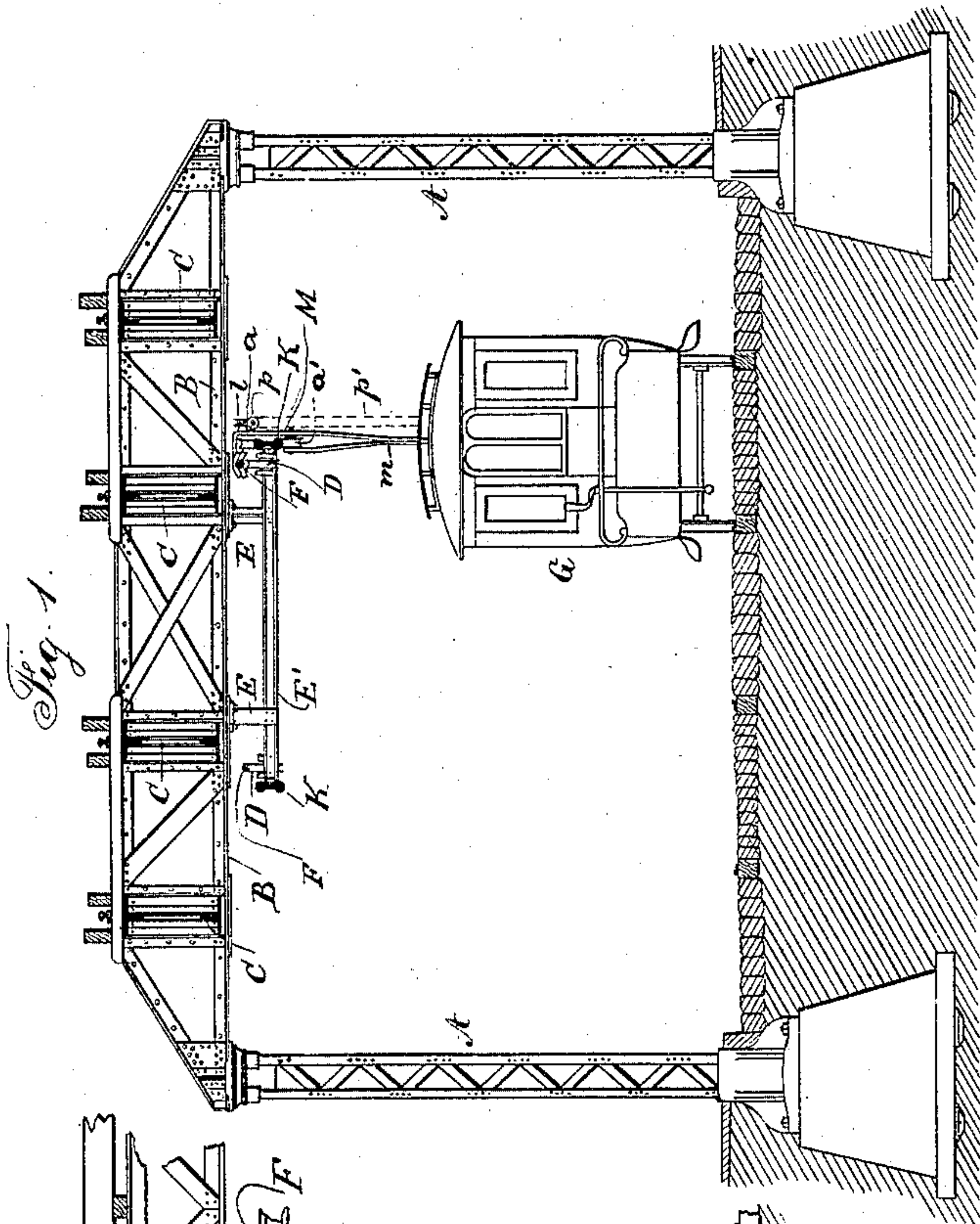
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J. H. PENDLETON.

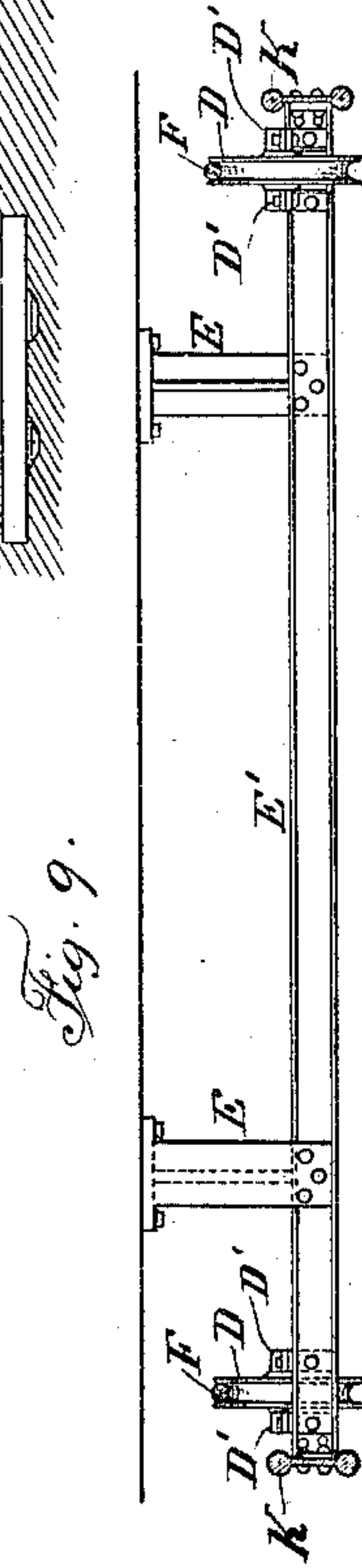
RAILWAY.

No. 312,009.

Patented Feb. 10, 1885.



Witnesses  
J. Staib  
Chas. H. Smith



Inventor  
John H. Pendleton  
per Lemuel W. Ferrell att.



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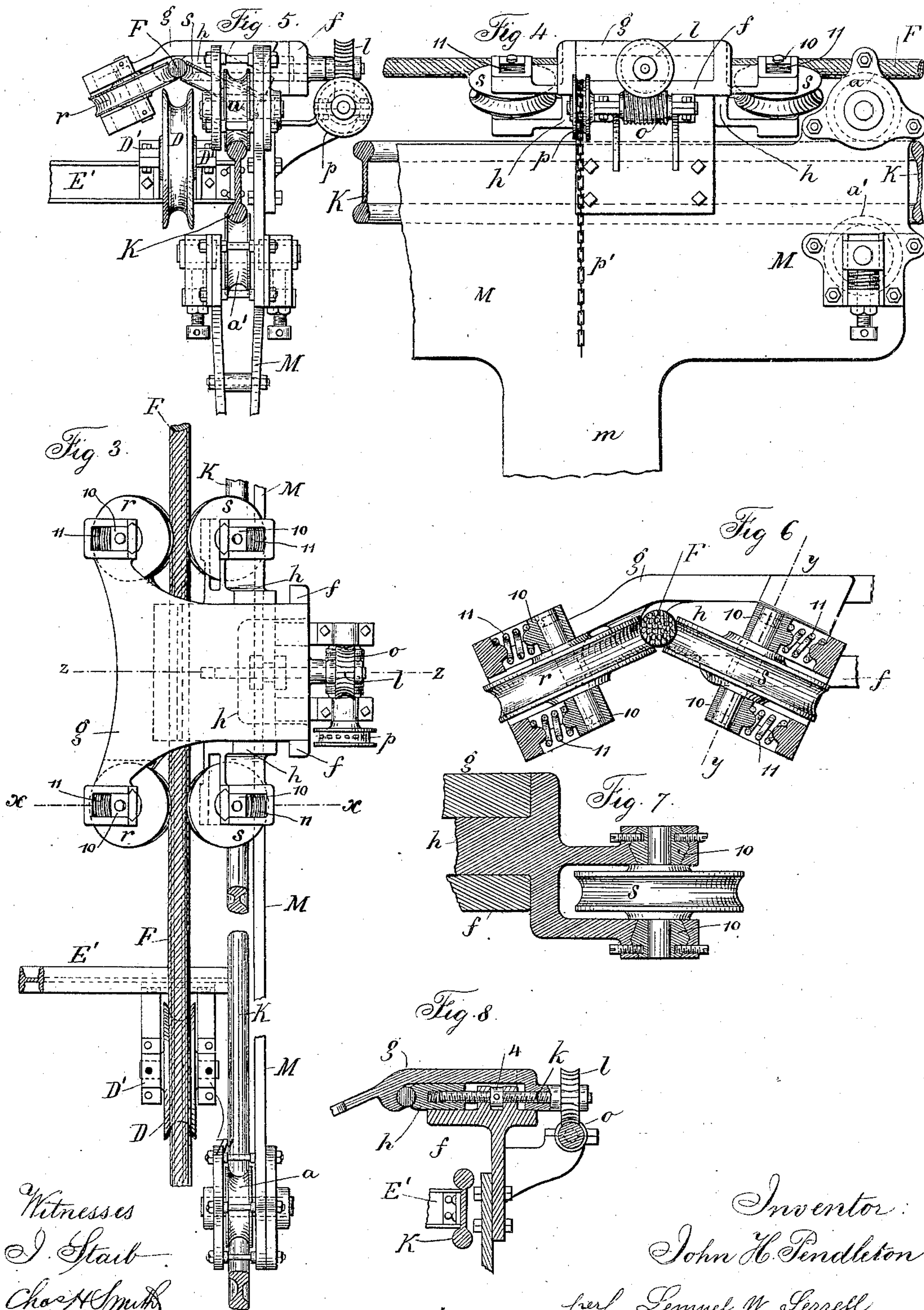
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# UNITED STATES PATENT OFFICE.

JOHN H. PENDLETON, OF BROOKLYN, NEW YORK.

## RAILWAY.

SPECIFICATION forming part of Letters Patent No. 312,009, dated February 10, 1885.

Application filed April 19, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. PENDLETON, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Railways, of which the following is a specification.

Elevated railway structures are in use in many places, and cables have been employed for propelling cars upon surface railways, such cables being below the cars, and sometimes within a tubular case in the earth. Cornelius Tiers, in connection with myself, invented a railway structure in which the cable is supported upon rollers or wheels held by hangers below an elevated railway structure, and provided with a device to clamp or grip the cable, and with a track and a carriage upon that track, and a connection to the railway-car upon a surface road. Such combination of devices, therefore, is not my separate invention, but is set forth in a joint application by the said Tiers and myself.

My present invention relates especially to a carriage traveling upon the elevated track, and having a hanging arm that is connected at its lower end to the car, so that the said car may be drawn along upon the surface railway without any tendency to lift the forward end; also, to an arrangement of gripping or clamping devices, by means of which a carriage can be connected with the cable or disconnected therefrom; also, to devices by which the grip can be conveniently actuated from the car by the driver or attendant; also, to the improved hangers or suspending devices for the support of the elevated track and the wheels for the cable.

In the drawings, Figure 1 is a cross-section of the elevated railway structure and of the cable and track. Fig. 2 is a sectional elevation showing the girders, track, and car. Fig. 3 is a plan view, in larger size, of the carriage and grip mechanism. Fig. 4 is an elevation of the same. Fig. 5 is an end view of the same. Fig. 6 is a sectional elevation, in larger size, at the line  $x x$ , Fig. 3. Fig. 7 is a section at the line  $y y$ , Fig. 6. Fig. 8 is a section, at the line  $z z$ , Fig. 3, showing the two clamps. Fig. 9 is a sectional elevation showing the hangers, cross-bar, track, sheaves, and cables.

The elevated structure is composed of the

columns or supports A A, cross-girders B, and longitudinal girders C. These parts are to be of any desired or usual form, and such structure may have upon it the track for an elevated railway; but my improvement is not limited to the same, because the elevated structure may be built with special reference to supporting the elevated cable and carriage. The cable or wire rope F is endless and driven by any suitable stationary engine. It is supported by and passes over the sheaves or wheels D, and these are upon suitable hangers below the elevated railway, and the track K is composed of a two-edged rail of the required strength, and extending from one hanger to the next, and each sheave or wheel D is provided with an axle the boxes for which are supported by the hanger, and are adapted to the reception of suitable lubricating material. The shape of the hanger may require to be varied, because the distance between an elevated railway structure and the surface railway beneath will often vary, and the rail or track K should be parallel, or nearly so, with the surface railway; hence the hangers E will often vary considerably in length to accommodate these conditions. I make use of the cross-bar E', which receives at its ends the rails or tracks K, one for the carriage of the surface-railway cars going in one direction and the other for the cars going in the other direction; hence the hangers E will be longer or shorter to reach the elevated structure; but the cables and tracks will remain in their proper relative positions. It is preferable to employ jaws projecting out laterally from the cross-bar of the hanger for receiving the boxes D' of the wheels D, and these should be at opposite sides of the hangers, as shown, so that the weight will be balanced upon the hangers.

The carriage M is provided with wheels  $\alpha$   $\alpha'$  in pairs at or near the two ends, one set of wheels being above the rail K, the other set being below, and all the wheels are to be grooved, so as to run upon or against the curved surfaces of the rails without the risk of leaving the track. The axles of two or more of these wheels should be movable, so as to set them up if the surfaces wear. It is preferable to adjust the lower wheels at the front part of the carriage and the upper wheels



at the back of the carriage, as the principal strain and wear come upon the other wheels.

There is an arm, *m*, depending from the carriage *M*, and preferably braced, as shown, and at the lower end there is an eye and connecting link or coupling, *d*, by which the car *G* is connected to the carriage *M*. The cars of the surface railway may be of any desired character, either open or closed cars, and adapted to either passengers or freight.

Upon the carriage *M* is a bracket-piece, *f*, extending over toward the cable *F*, and there is a grip-piece, *g*, that passes over the cable and is formed as a hook-shaped clamp upon its under edge, and there is a second clamping-piece, *h*, at the other side of the cable. One of these pieces *g* or *h* may be in one with the bracket *f*, but usually it is preferable to have the three pieces separate and to move both pieces *g* *h* by the screw *k*, having right and left hand threads upon the surface acting upon the respective parts *g* *h*. In this instance the screw *k* will not have any end motion, but will be held in place by the collar 4 between suitable surfaces or supports on the bracket *f*. If one of the pieces *g* or *h* is in one with the bracket *f*, then the screw *k* only needs one thread, so that the clamp or grip *g* or *h* may be opened by rotating the screw *k* in one direction, or closed by rotating the screw *k* in the other direction. In order to operate this screw *k*, I make use of a chain extending down to the car, so that the attendant can revolve the screw in one direction or the other by moving such chain. Usually the screw *k* will have a toothed wheel, *l*, upon the end of it, and a worm-pinion, *o*, gearing into the same, the chain *p'* hanging upon a chain-wheel, *p*, upon the shaft of this worm-pinion, but the chain-wheel *p* might be upon the end of the screw *k* itself. To keep the chain in position it is preferable to pass it below a guide-wheel, *p*<sup>2</sup>, upon the lower part of the arm *m*. (See Fig. 2.)

The grip or clamp formed of the two parts *g* and *h* may alone be used; but I prefer to employ wheels *r r* at the front and back of the clamp *g*, and wheels *s s* at the front and back of the clamp *h*. These wheels are grooved in their edges so as to receive the cable *F* between them, and they are preferably at an angle of about thirty degrees, so as to act partially beneath the cable to support the same and allow it to run freely through the grip when the carriage is standing still. These wheels should not be in the same line transversely of the carriage in cases where the wheels are upon rigid axles, so that the cable may be slightly bent at the rollers when the surfaces of grip are applied to the cable; but I prefer to place the bearing-boxes 10 for the roller-axles in slots in the respective parts, and to apply springs 11 between the bearing-boxes 10 and the parts which carry the same, in order that the springs may be compressed when the grip is applied to the cable, and said

springs keep the rollers up to the cable to support the same when the grip is relieved.

It will be apparent that the hangers support all the parts necessary for the cable and the carriage moved by such cable; hence by varying the length of the hangers or the manner in which such hangers are attached to the elevated structure the elevated rail for the carriage can be placed parallel with the surface railway independently of the height of the elevated structure above the surface road.

The features of novelty which are not set forth and claimed in the joint application of C. Tiers and myself are my own invention, and the following is the summary of the same.

I do not claim an elevated track, nor a frame with rollers running upon such track, nor a car suspended from the frame, nor a cable running over rollers and giving motion to the frame and car, as these devices have been used.

I claim as my invention—

1. The combination, with an elevated structure, of hangers, a two-edge railway-rail attached to the hangers, and sheaves supported by jaws upon the hangers for the traveling cable, substantially as set forth.

2. In combination with an elevated structure, cross-bars, hangers supporting such cross-bars, two tracks, one at each end of the cross-bars and connected to the same, supporting-wheels for the traveling traction-cable, and bearings for the axles of the supporting-wheels, substantially as set forth.

3. An elevated railway structure having cross and longitudinal girders, in combination with a rail supported below such structure, and parallel, or nearly so, with the surface railway, a carriage traveling upon such rail, supporting-wheels, and a traction-cable traveling over such wheels, and mechanism for connecting the carriage to the cable, substantially as set forth.

4. The combination, with the surface railway and the car upon the same, of an elevated track, wheels above and below such track, and a carriage and pendent arm from such carriage extending down in front of such car, and a coupling or connection to the draft-head of the car, an elevated cable, wheels for supporting the same, and a clamp for the cable operated from the car, substantially as specified.

5. The combination, with the elevated track, supporting-wheels, and traction-cable, of a carriage traveling upon the track, a clamp for the cable, a screw to act upon such clamping-surfaces, and a wheel and endless chain to act upon such screw to move the same in operating the clamp or grip, substantially as set forth.

6. The combination, with an elevated track, supporting-rollers, and traction-cable, of a carriage upon the elevated track, a grip and wheels upon such carriage for supporting and clamping the cable, a pendent arm from the carriage connected at its lower end to the car



upon the surface railway, and mechanism for operating the grip, substantially as set forth.

7. The combination, with the clamps or grips, of supporting-rollers at the ends of and  
5 connected with such grips, movable bearing-boxes for the axles of such rollers, and springs for pressing the rollers toward the cable, and mechanism for applying pressure to the cable, substantially as set forth.

10 8. The combination, with the elevated track, supporting-wheels, and traction-cable, of a carriage upon the track having wheels above and below such track, an arm below the car-

riage to be connected at its lower end to the car that is to be drawn, a grip upon the car- 15  
riage for clamping the traction-rope, and mechanism extending to the lower part of the arm for operating the grip, so that the attendant can operate the grip from the car, substantially  
as set forth. 20

Signed by me this 12th day of April, A. D. 1884.

J. H. PENDLETON.

Witnesses:

GEO. T. PINCKNEY,  
WILLIAM G. MOTT.