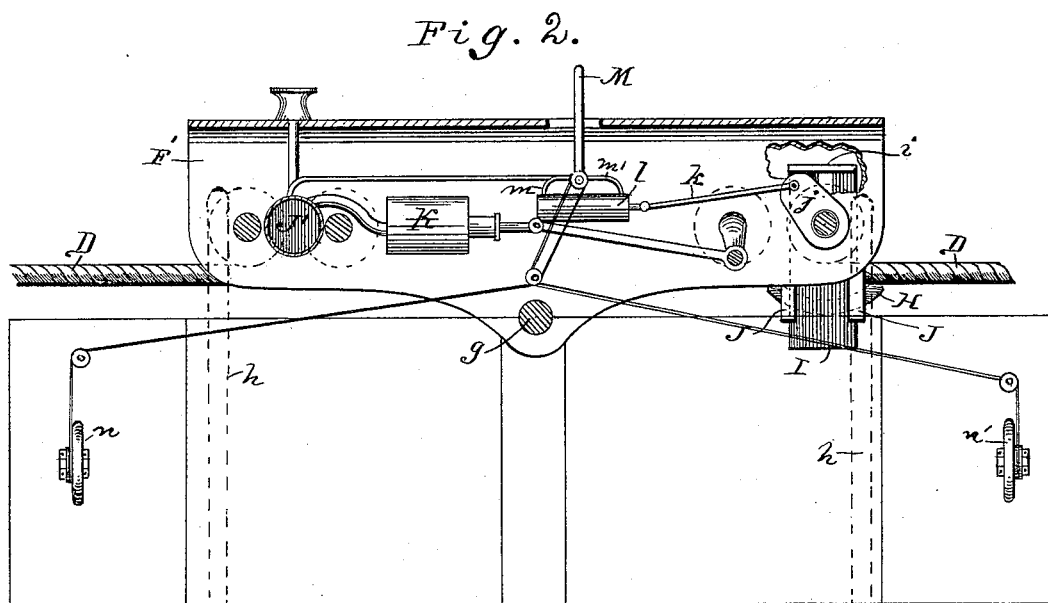
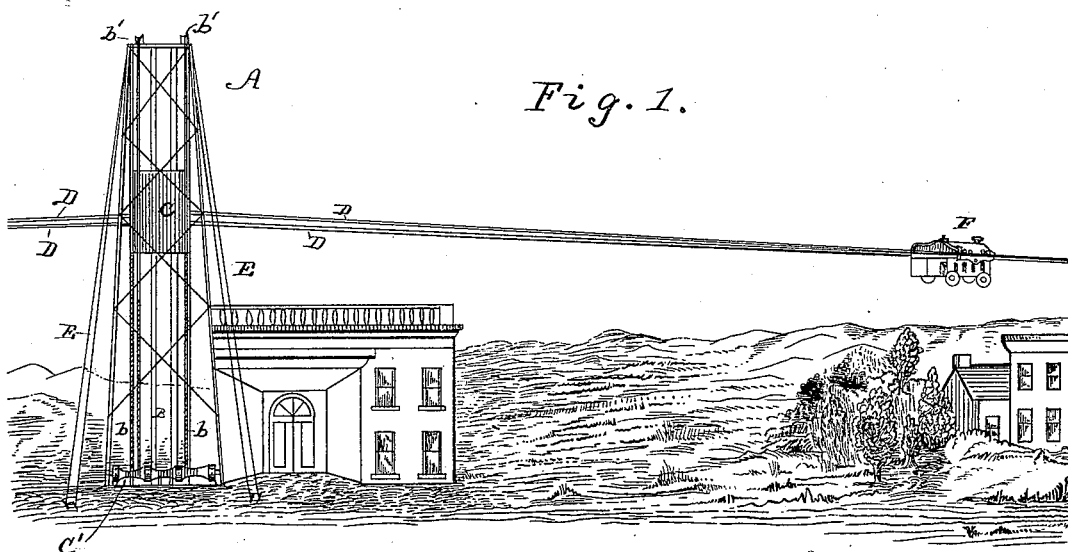


A. J. MORRISON.  
AERIAL RAILWAY AND CAR.

No. 342,757.

Patented May 25, 1886.



WITNESSES:  
*Thos. Houghton.*  
*Edw. W. Beyer.*

INVENTOR:  
*A. J. Morrison*  
BY *Mum & Co.*  
ATTORNEYS.

(No Model.)

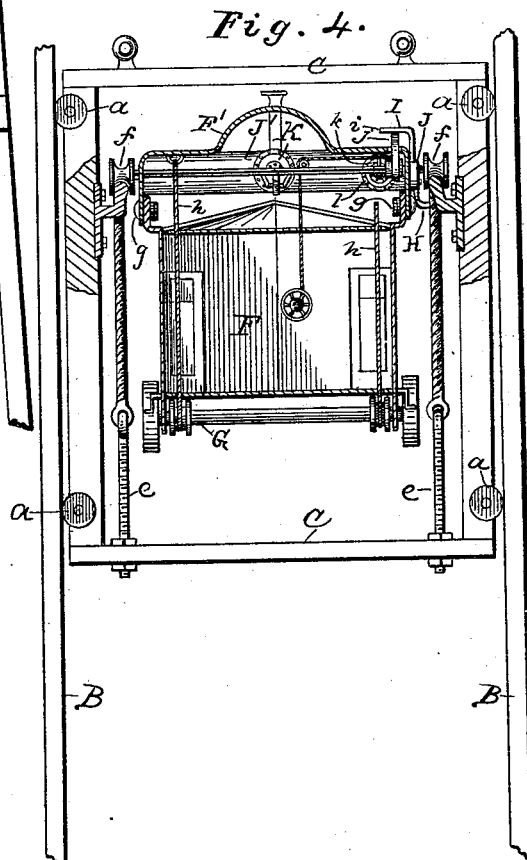
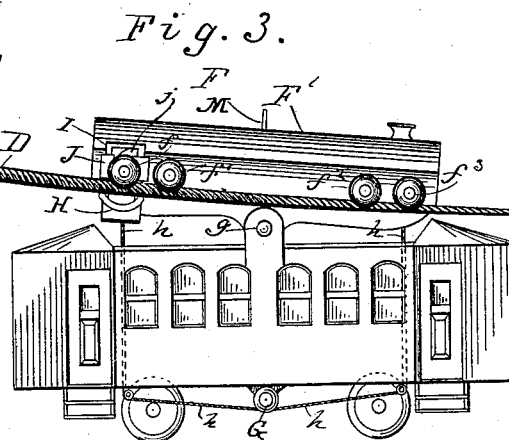
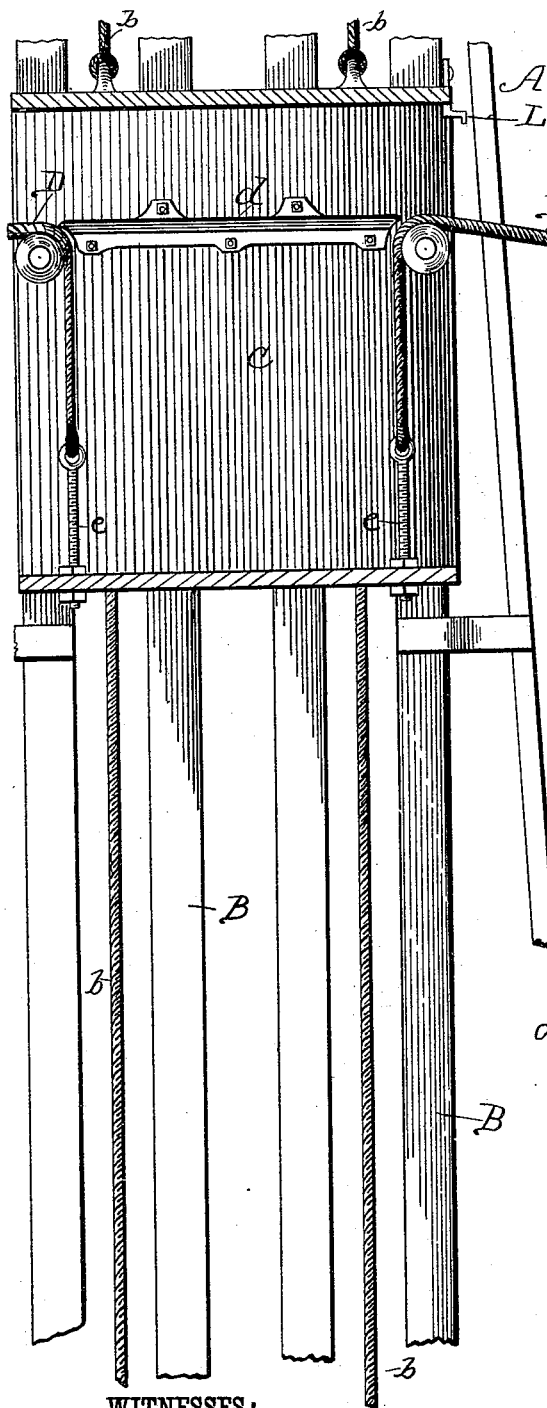
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# UNITED STATES PATENT OFFICE.

ANDREW J. MORRISON, OF HUME, NEW YORK.

## AERIAL RAILWAY AND CAR.

SPECIFICATION forming part of Letters Patent No. 342,757, dated May 25, 1886.

Application filed November 2, 1885. Serial No. 181,731. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW J. MORRISON, of Hume, in the county of Allegany and State of New York, have invented a new and useful Improvement in Aerial Railways and Cars, of which the following is a description.

Figure 1 is a perspective view of the elevated railway with car in transit. Fig. 2 is a vertical longitudinal section of the upper portion of the car. Fig. 3 is a vertical sectional view through the elevator and tower, showing the car in side elevation; and Fig. 4 is a transverse vertical section of the car in the elevator.

My invention relates to certain improvements upon that form of aerial railway in which a car is suspended upon elevated wire cables or tracks sustained upon towers at intervals, which cables or tracks are provided with means for raising or lowering them, and which tracks, by being raised behind the car, cause the car to continually travel upon an incline, and thus move from tower to tower by its own gravity.

My present invention consists of such improvements in the trucks and means for operating them, and in the peculiar construction and adaptation of the car to the same, as will be hereinafter fully described.

In the drawings, A represents one of the towers, of which there are a series placed at a suitable distance apart. These towers are made of sectional iron bars or beams strongly braced, and having vertical guide-bars B B within the same. Inside these guide-bars is arranged an elevator-frame, car, or inclosure, C, having anti-friction rollers *a*, that bear against the guide-bars B as the elevator rises and falls. This elevator-frame is sustained and is raised and lowered by a rope, *b*, at each corner, which passes over a pulley, *b'*, at the top of the tower, and thence extends down to a windlass, *C'*, on each side of the tower, upon which two windlasses the four ropes are wound or unwound to raise or lower the elevator-frame. These windlasses are operated by a steam-engine, (not shown,) and by means of suitable underground or overhead cables. One engine may be arranged to drive the windlasses of several towers.

On the inner sides of the two opposite vertical walls of the elevator are secured the

track-cables D D, which are composed of steel wires. These track-cables are made in sections, which extend from one tower to the next, so that there shall be no splice or joint between the towers, and the ends are secured to the sides of the elevator in line with the flange-sections of track *d d*, affixed to the elevator, the ends of the cables being connected to the elevator, and provided with tension-pulleys around which the cables pass, and then turn and are secured to the floor-timbers of the elevator-car by adjustable screw-bolts *l*, for the purpose of taking up the slack in the cables or adapting them to the expansion and contraction of varying temperatures. The cables are also made of increased thickness as they near the towers, the object being to render them stiffer at these points and less liable to sag or hang down with a sudden incline as they leave the elevators, which would interfere with the smooth running of the car.

To hold the towers steadily in place against any tendency to deflection from the winds, guy-ropes E are attached to the four corners at the top, and are fastened to the ground at a distance from the base of the tower.

F is the car, which is suspended upon and travels over the cable-tracks D D. This car is, however, provided with wheels underneath the same to allow it to move gradually off from and onto the landing-platforms, and said car is also made wedge shape, so as to present as little resistance to the air as possible. To the upper portion of the car is attached a rocking frame or top, F', which carries the wheels *f f' f'' f'''* and their axles, which wheels rest upon the track-cables. This top frame is centrally pivoted or fulcrumed to the car at *g*, and from the ends of this top frame cords *h* extend downwardly to the under side of the car, where they are wound upon a windlass, G. These cords and the windlass, together with the joint at *g*, permit the top frame of the car to occupy any inclination on the track-cables while the car itself may, by winding up the ropes at one end and unwinding them at the other, be set always horizontal or level.

H is a brake, which rests beneath the cable-track and presses the same in a curve up around the wheel *f* when it is desired to retard or stop the car. This brake is attached to

slide I, which moves in guides J on the top part of the car, and has an inturned upper end, *i*, which is lifted to apply the brake by a cam, *j*, hung loosely on the shaft of wheels *f*.

5 This cam, when swung in one direction, raises the brake, and when moved in the other direction allows the brake to drop down. To operate this cam, a rod, *k*, is connected at one end to the same and at the other end is attached to a piston working in a cylinder, *l*. Into this cylinder, upon one side of the piston, an air-pipe, *m*, opens, and into the cylinder upon the other side of the piston another air-pipe, *m'*, opens, and both these are connected to a compressed-air chamber, *J'*, and are provided with valves and hand-wheels *n n'*, by means of which compressed air may be admitted to either side of the piston, to work the same and apply or remove the brakes.

10 For filling the air-chamber with compressed air the shaft of one of the wheels *f*<sup>2</sup> is provided with a crank that works the piston of an air-pump, K, which air-pump is thus operated by the revolution of the wheels *f*<sup>2</sup> on the cable, and serves to constantly pump air into the receiver *J'*. This chamber is provided with a safety-valve, which automatically allows the air to escape when it reaches a given pressure.

15 In connection with the air-brake as thus described I propose to use an ordinary brake mechanism operating by a chain and shaft with hand-wheel for the purpose of applying the brake by hand if the air-brake should get out of order.

20 For stopping a car at any one of the towers or stations an adjustable tappet-lever, L, is arranged in the top part of the elevator, which, when adjusted to a certain position, strikes an arm, M, on the valve-shaft, which applies the air-brake, and which tappet-lever L may be set by the station-keeper so as to come into range of the arm M and apply the brake, and thus stop the car or be removed from contact therewith when it is not desired to stop the car. This device is mainly intended for freight-cars on which no person need to travel.

25 At the terminal stations, and also at the towers, suitable landing-platforms are provided for the car to rest upon.

30 The railway as thus described is designed not only for crossing streams, but also for crossing heavy grades, mountains, &c.

35 Among the advantages that this system comprehends are the following: There is no smoke nor dust, no blockade from snow nor washouts

from flood, no bridges to build, no grading to be done, no culverts, no ties, and no engine, the car passing of its own gravity on the track-cables, which, where they connect with the towers, are raised by the raising of the elevator as soon as the car has passed the towers, thus repeating the incline between each and every tower.

Having thus described my invention, what I claim as new is—

1. The combination, with the towers, having each an elevator constructed as a vertically-adjustable car or inclosure, C, with guides for controlling the movement of the same, of a set of cable-tracks attached to the elevators, a set of suspending-ropes for the elevators, pulleys at the top of the tower for carrying these ropes, and windlasses at the bottom of the tower for raising and lowering the elevators, substantially as described.

2. The combination, with the track-cables, of the vertically-adjustable elevator car or inclosure C, attached to the ends of the cables, and having track-sections *d d*, attached to the sides of the elevator, in line with the cable, as and for the purpose described.

3. The combination, with the vertically-adjustable elevators, of the track-cables attached to the same and made of increased thickness nearer the elevators, as and for the purpose described.

4. The combination, with the elevator cars or inclosures C, and means for raising and lowering the cars, of the cables D, passed around pulleys on the sides of the elevator and connected to the floor-timbers of the elevator by adjustable screw-bolts *e*, as and for the purpose described.

5. The combination, with the suspended car, of a jointed upper portion bearing the suspension-wheels *f f' f<sup>2</sup> f<sup>3</sup>*, a windlass arranged under the car, and ropes running therefrom to the ends of the jointed top section, to adjust the level of the car, as described.

6. The combination, with the suspended car, of an air-chamber, an air-pump connected to and deriving motion from one of the supporting-wheels of the car, a cylinder, *l*, with piston and rod *k*, the cam *j*, and slide I, carrying brake-shoe H, and valves for regulating the admission of air to the cylinder *l*, to apply or remove the brake-shoe, as described.

ANDREW J. MORRISON.

Witnesses:

JOHN H. HOWDEN,  
MARTIN D. WILDAY.