3 Sheets—Sheet 1.

M. A. WHEATON.

CAR-PROPELLER.

No. 192,314. Patented June 19, 1877.

Fig. 1.

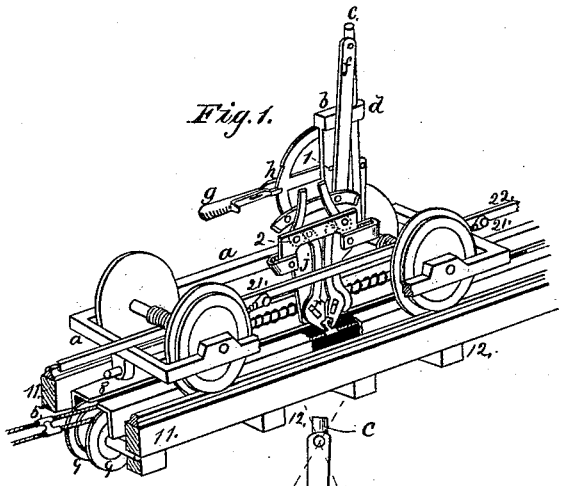


Fig. 2.

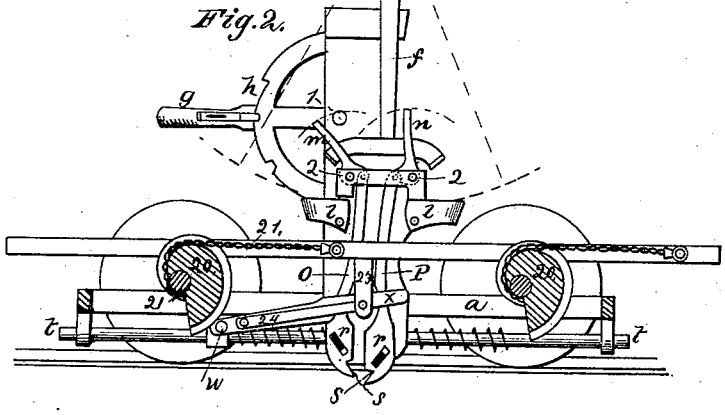
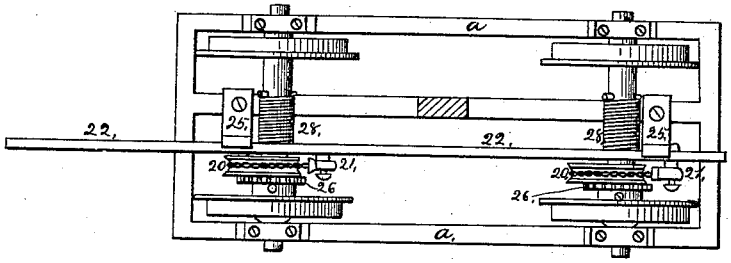


Fig. 3.



WITNESSES

Henry N. Miller

Francis L. Durand.

INVENTOR

Milton A. Wheaton

Alexander Mason

ATTORNEY

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3 Sheets—Sheet 2

M. A. WHEATON.

CAR-PROPELLER.

No. 192,314. Patented June 19, 1877.

Fig. 4.

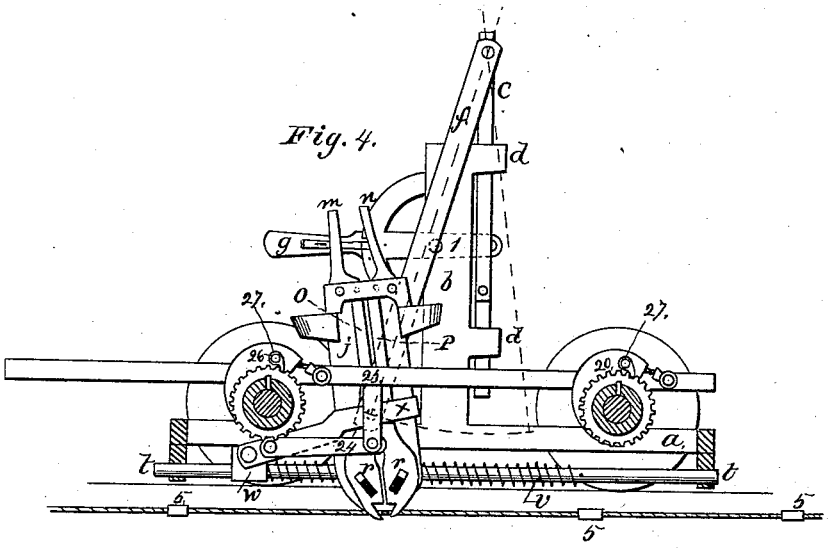
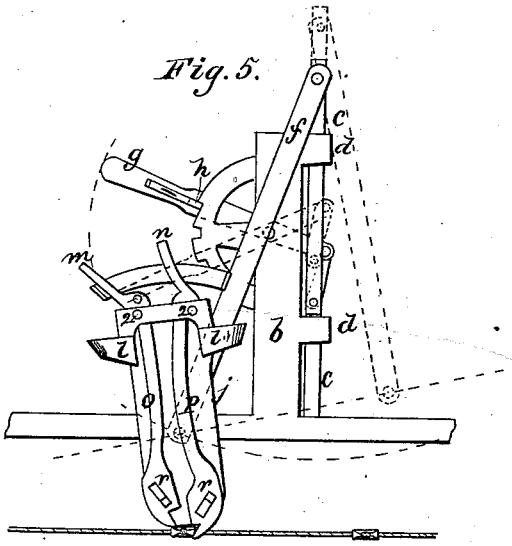


Fig. 5.



WITNESSES

Henry N. Miller

Frank L. Ouraud

INVENTOR

Milton A. Wheaton

Alexander Mason

ATTORNEY

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3 Sheets—Sheet 3.

M. A. WHEATON.

CAR-PROPELLER.

No. 192,314. Patented June 19, 1877.

Fig. 6.

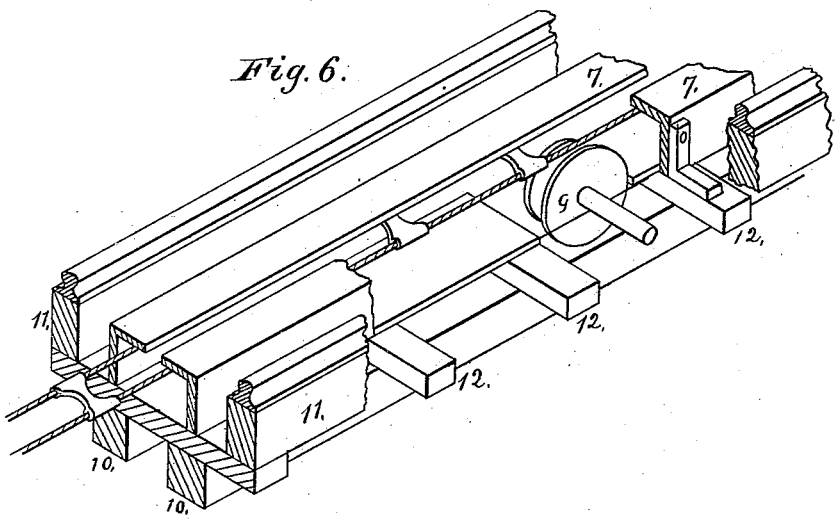


Fig. 7.

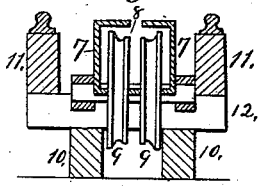


Fig. 10.

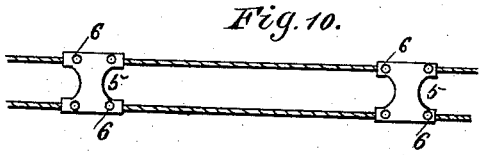


Fig. 8.

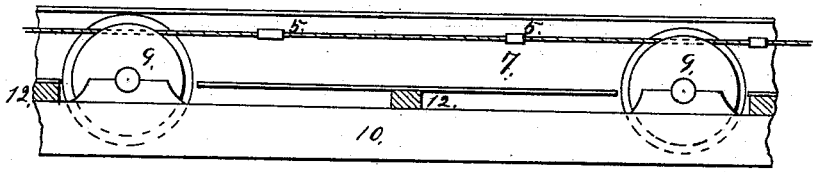


Fig. 11.

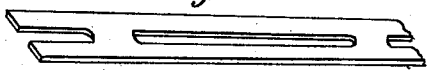
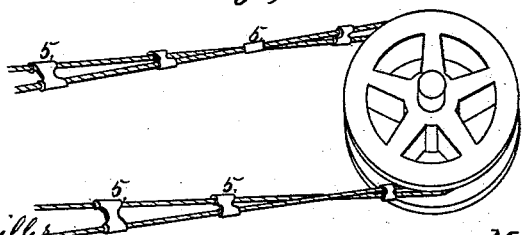


Fig. 9.



WITNESSES

Henry N. Miles

Frances L. Durand

INVENTOR

Milton A. Wheaton

Alexander Mason

ATTORNEY

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MILTON A. WHEATON, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN CAR-PROPELLERS.

Specification forming part of Letters Patent No. **192,314**, dated June 19, 1877; application filed April 16, 1877.

To all whom it may concern:

Be it known that I, MILTON A. WHEATON, of the city and county of San Francisco, and in the State of California, have invented certain new and useful improvements in that class of railways in which the cars are propelled by ropes or cables; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to improvements in that class of street-railroads, and the means of operating them, in which wire ropes or cables are used as the means of propelling the cars; and consists of the use of an improved double rope or cable, or its equivalent—a flat slotted cable—with an improved griping device for connecting the car or dummy with such double cable, with suitable devices for gradually starting the cars or dummy, and relieving or avoiding the strain and shock incidental to the starting of a car or dummy from a stand-still instantaneously into full motion.

In the drawings, Figure 1 is a perspective view, showing a dummy with the griping attachment attached to the cable while being drawn along the rails. Fig. 2 is a sectional elevation of a part of the dummy, showing the devices for starting and continuing the same in motion. This figure shows the position of the various devices when the dummy is about half-way between its first starting and the attainment of its full speed. Fig. 3 is a top view of the dummy, showing the cams or eccentrics, with chains and connecting-rods and coil-springs, by the assistance of which the dummy is gradually started and the eccentrics afterward thrown back to their original position, ready to take a new start. Fig. 4 is a sectional elevation, showing the dummy just griped to the moving cable and about starting. Fig. 5 shows the griping attachment just engaging with the catches on the cable. Fig. 6 is a perspective view of a section of the railroad-track, together with the tube in which the cable works, with its longitudinal slot; also, a section of the cable, with the double rollers on which the cable runs, and the ends of the timbers which form a gutter underneath. Fig. 7 is an end view of Fig. 6 less the cable. Fig. 8 is a side sectional elevation, showing the cable inside of the tube. Fig. 9 shows a large horizontal wheel, with the cable passing around it at the end of the road. In order to pass around this and other horizontal wheels the cable turns up edgewise. Fig. 10 is a section of the double cable, with its connecting plates or catches. Fig. 11 is a section of flat slotted wire cable or belt, which can be used in place of the double cable more particularly described herein.

In the drawings similar letters of reference refer to corresponding parts.

In my invention I use a cable made of two ropes laid parallel with each other, and connected by metallic plates 5, as shown in Fig. 10. One of the outer edges of the plate 5 is bent around one of the ropes, and the other edge of the plate is bent around the other rope. The length of the plates 5 should be such that the ropes will be about one and a half inch from each other, although this distance may be varied. When the plates are thus bent around the ropes rivets may be put through the bent part of the plates and the ropes, as at 6 6, Fig. 10. The rivets in such case should pass between the strands or wires of the ropes and not cut them. The plates 5 should have recesses in them between the ropes, so that the griper will be forced to take hold of the plates half-way between the ropes, so as to make the draft steadier and equalize the strain upon the ropes. The plates thus made resist any tendency of one of the ropes to get ahead of the other.

If the plates pass over the ropes the ends of the plates can be bent nearly around the ropes, thus leaving the full size of the ropes to run in the pulley-grooves without being lifted out when that portion of the plates that extends from one rope to the other passes the pulleys.

The cable may run in an underground tube, 7, having a longitudinal slot, 8, in the top. I use a double pulley, 9 9, Fig. 7, for the cable to run over, so that one of the ropes in the cable will run over one pulley, and the other rope in the cable will run over the other pulley. These pulleys should be just far enough

apart to allow those parts of the griping device which reach below the cable to pass between them.

The longitudinal timbers 10 10 are placed in the road underneath the ties for the double purpose of making room for the lower part of the pulleys and also forming a useful gutter-way or sewer.

11 11 (see Fig. 7) are the stringers upon which the car-tracks are laid, and 12 are the railroad-ties.

a is a frame made of any suitable material. *b* is a standard projecting upward and rigidly attached to the frame. C is a vertical movable rod moving in the slides *d d*. To the upper end of C is pivoted a vibrating connecting-rod, *f*. A lever, *g*, pivoted at 1, Fig. 2, has its short end connected by a vertical link with C. A ratchet, *h*, by means of a slide on the lever *g*, serves to hold the lever *g* and the parts which it controls at any desired point of elevation or depression.

The lower end of the vibrating rod *f* is pivoted to a thin metallic plate, *j*. To the plate *j*, near its upper end, is attached a thin metal strip, *l*, which extends a short distance from one side of *j*, and then doubles backward and passes back of *j* beyond its other side, when it is again doubled back and attached to said other side. The strip *l*, by means of its doubled ends and the narrow space between it and the back of the plate *j*, furnishes a slot through which the vibrating rod *f* passes. By these means the plate *j* with its attachments are kept in a vertical or nearly-vertical position.

Upon the face of the plate *j* are pivoted two bent levers, *m* and *n*, having their fulcrums at 2 2. To the short arm of *m* is pivoted the long vertical strip O, and to the short arm of *n* is pivoted the other long vertical strip, *p*.

The strips O and *p* are movable upon the face of the plate *j*. Near the lower ends of O and *p* are inclined slots *r r*, through which pass lugs from the plate *j*. The slots *r r* are inclined, as shown in the drawings, so that the strips O and *p* will recede from each other when they are raised upward along on the plates *j*, and will approach toward each other as they descend. Recesses S S are made in the strips below the inclined slots. The lower sides of these recesses should be at about the same degree of inclination as the slots *r r*. These recesses are for the purpose of engaging the strips O and *p* with the plates or catches 5 of the cable.

The size and proportion of the various devices used in my invention admit of great variation, but will be readily understood by any mechanic skilled in the manufacture of ordinary machinery, as will also the materials of which the said devices can be constructed to the best advantage. For this reason there is no necessity here for naming either size or proportions or materials.

A rod, *t*, runs underneath the dummy or car from front to rear, and is rigidly attached to it. A sliding collar, *w*, is placed upon the rod *t*. A coil-spring, *v*, is also placed upon the rod *t* to act as a bumper. One end of the coil-spring is in front of the sliding collar *w*, and is left free to slide with it, while the other end of the coil-spring is fixed to the rod *t* by a pin or other suitable means, so that it cannot slide. An arm, X, is pivoted at one end to the sliding collar *w*, while the other end is rigidly fastened to the plate *j*.

The operation of these portions of my invention is as follows: The dummy is placed upon the railroad, the cable being in constant motion, driven by any suitable machinery and power. The griping device, by means of the lever *g*, is lowered until the lower end of the plate *j* and strips O and *p* are on a level with the tops of the moving plates 5 of the cable. The outer edges of the strips O and *p*, and the parts of the plate *j* adjoining them, are made on an incline, as shown in the drawings, so that if the griper is lowered too far the moving plates 5 will come in contact with the inclined parts and raise the griper to the proper height. To allow this to be done the lower part of the upper catch-notch in the ratchet *h* is beveled out downward so the long end of the lever *g* may pass downward without serious obstruction.

When the griper is thus lowered the long arm of the bent lever *n* is raised, causing the strip *p* to descend until the recess S in its lower end is below the end on the plate *j*. In this position the forward edge of the moving plate 5 enters the recess S, and thus comes in contact and engages with the lower end of the strip *p*, as shown in Fig. 5.

The front and back edges of the plates 5 should be beveled vertically, leaving the tops of the plates wider than the bottom. As soon as one of the moving plates 5 engages with the lower end of the strip *p* the two are carried along together.

As the griper is thus drawn forward by the cable the arm X and the sliding collar *w* are also drawn forward, being attached to the griper. The sliding collar *w* comes in contact with the end of the coil-spring *v*, and presses it forward until the resistance of the coil-spring is sufficient to cause the car or dummy to start on its course. The long arm of the other bent lever being then raised the other strip O is lowered, and is at the same time carried forward by means of the lug and inclined slot *r*.

This action brings the two extreme lower ends of the strips O and *p* so nearly together underneath the plate 5 that the plate is nearly inclosed, as shown in Fig. 4.

In this condition the plate 5 cannot get out of the griper, and they travel along together.

The griper can then be raised and secured in position by the lever *g* and ratchet *h*, so as to carry the cable at any point of elevation desired. The strip O prevents the car from running away from the cable on a down-grade.

In some instances, as on a level road, the strip O can be dispensed with and the car or dummy managed with its brakes and the strip *p*.

When it is desired to stop the car, the bent lever *n* is reversed and the strip *p* is raised. When this is done any upward movement of the plate 5 is arrested by the lower end of the thin plate *j*, and the plate 5 cannot be drawn upward with the strip *p*. When the strip *p* is drawn upward the inclined slot *r* and lug passing through it make the strip move forward as well as upward. By these means the bevel at the lower end of the strip *p* is drawn forward from under the plate 5, and is easily disengaged from it. The other strip is then lifted entirely out of the way of the cable by either the bent lever *m* or by the lever *g*. A slight bevel of the sides of the slots *r* enables the mechanic to fit into them the lugs with their outer ends slightly enlarged, and thus secure the strips O and *p* to the plate *j* without having the lugs project farther than the face of the strips. The strips *o* and *p* may be constructed to slide between the plate *j* and the arm X, which crosses, and is attached to it so as to leave the necessary spaces for the strips to slide in.

Whenever double pulleys are placed over the ropes forming the cable, such upper pulleys must not have any connections made with each other, but must be placed with a sufficient space between them to allow the griper to pass between them.

The following are among the advantages obtained by my invention over the other kinds of cable railroads now in use:

The cable being made of two ropes, the cross connecting-plates cannot be grasped by a friction-griper, and escapes the rapid wearing out and other injuries which are consequent upon the use of friction-gripers.

The thickness of that part of my griper which extends through the slot of the underground tube is less than the width of the slot, so that the griper can instantly and at all times and places be let down into the tube or removed from it.

The action of my griper is positive. Whenever the griper engages with the cable it must move with it.

The griper is cheaply made, is simple in its construction, and not liable to get out of order.

In order to avoid the shock of starting the car too suddenly I attach a car-starter, which may be constructed as follows, viz: 20 20, Figs. 2, 3, and 4, are two scroll-shaped cams or eccentrics having a groove around their outer edges, and are placed loosely one upon each of the axles of the car or dummy. 21 21 are two chains, which work in the said grooves. 22 is a rod that slides in convenient guides 25 25. One end of the chains is fastened to the sliding rod, while the other ends of the chains are fastened as near the center of the motion of the cams or eccentrics as possible. 23 is a rigid arm extending downward from the sliding rod 22, and the arm 23 is connected by the link 24 with the arm X. On account of these connections the sliding rod 22 must move forward and backward with the griping device. 26 26 are two ratchet-wheels, fixed rigidly one upon each of the said axles and close to the eccentrics 20 20. (See Figs. 3 and 4.) A pawl, 27, is pivoted to each of the eccentrics or cams, and engages with the ratchets in the edge of the ratchet-wheels 26 26, so that whenever the cams or eccentrics are turned forward the ratchet-wheels and axles and car or dummy wheels are turned forward also; but when the cams or eccentrics are turned backward the pawls disengage from the ratchets, and leave the axles and car or dummy wheels free from their influence. The ratchet-wheels may turn forward faster than the eccentrics or cams, but cannot while the pawl is in position turn slower, neither can they turn backward.

Around the car-axles are coil-springs 28 28, Fig. 3. One end of each of the springs is fastened to one of the cams or eccentrics, and the other end is fastened to the car-frame at any convenient point, so that the axle turns freely within the coils of the spring.

The operation of this part of my invention is as follows, viz: When the car or dummy is in position for starting, as shown in Fig. 4, the gripers engage with the cable, as already explained, and the sliding bar 22 is forced forward with the gripers. The ends of the chains which are connected with the sliding bar at the upper corner of the cams or eccentrics are drawn forward by the bar, and the cams or eccentrics are compelled to turn to allow the chains to unwind.

The cams start slowly at first, but their constantly-decreasing diameters cause them to turn with a corresponding increase of motion, the chains being drawn forward by the cable at a practically-constant velocity. The slow starting and constantly-increasing motion of the cams are imparted to the car or dummy through the action of the pawls and ratchet-wheels. The gripers also move forward in starting until the swing-bar *f* inclines forward, as shown by the dotted lines in Figs. 2, 4, and 5. By the time the gripers have got thus far forward the chains are unwound, the car or dummy has reached its full velocity equal with that of the propelling-cable, and the draft is transferred from the chains to the arm X and sliding draft-collar *w*. The coil-spring *v* should be in such position and of such strength that it will act as a bumper as it receives the burden of the draft. Any other suitable bumper may be used in its stead.

Whenever the gripers are released from the cable the coil-springs 28 28 immediately throw the cams, and with them the sliding bar 22 and the griper, back to their original starting positions. At the same time the pawls engage with the ratchets, and prevent the

car or dummy going backward. This is of advantage when the car or dummy is stopped on a rising grade.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A double cable constructed and arranged in a railroad substantially as and for the purposes herein described.

2. A griping apparatus constructed and operating substantially as and for the purpose herein described.

3. In a griping device to be used with a double cable, each of the lugs and inclined slots *r r*, by means of which the compound vertical and horizontal movement of the gripers are obtained, substantially as and for the purposes herein described.

4. In combination with a car or dummy and griping device, the swing-bar *f*, substantially as and for the purposes herein set forth.

5. The plates *j*, provided with inclines at the lower ends, in combination with the strips O and *p* having corresponding inclines, substantially as and for the purposes herein set forth.

6. The combination of the strips O and *p* and the plates *j*, all having inclines, as described, with the ratchet-notches for the lever *g*, having their lower parts beveled out so that the passing cable may lift without injury to the griping apparatus when too low, substantially as herein described.

7. The combination of the gripers with the sliding collar *w* and the bumper *v*, substantially as and for the purposes herein described.

8. The combination of the plate *j*, metal collar *l*, and vibrating rod *f*, substantially as and for the purposes herein set forth.

9. The strips O and *p*, in combination with a lever, *m*, substantially as and for the purposes herein set forth.

10. The double cable provided with the plates or catches 5, in combination with the strips O *p*, having recesses S, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand.

MILTON A. WHEATON.

Witnesses:

ED. J. SMITH,

OSCAR T. SHUCK.