No. 885,455. PATENTED APR. 21, 1908.

F. V. DRAKE.

ROPE CARRIER DIRECTION CHANGING DEVICE.

APPLICATION FILED JAN. 10, 1908.

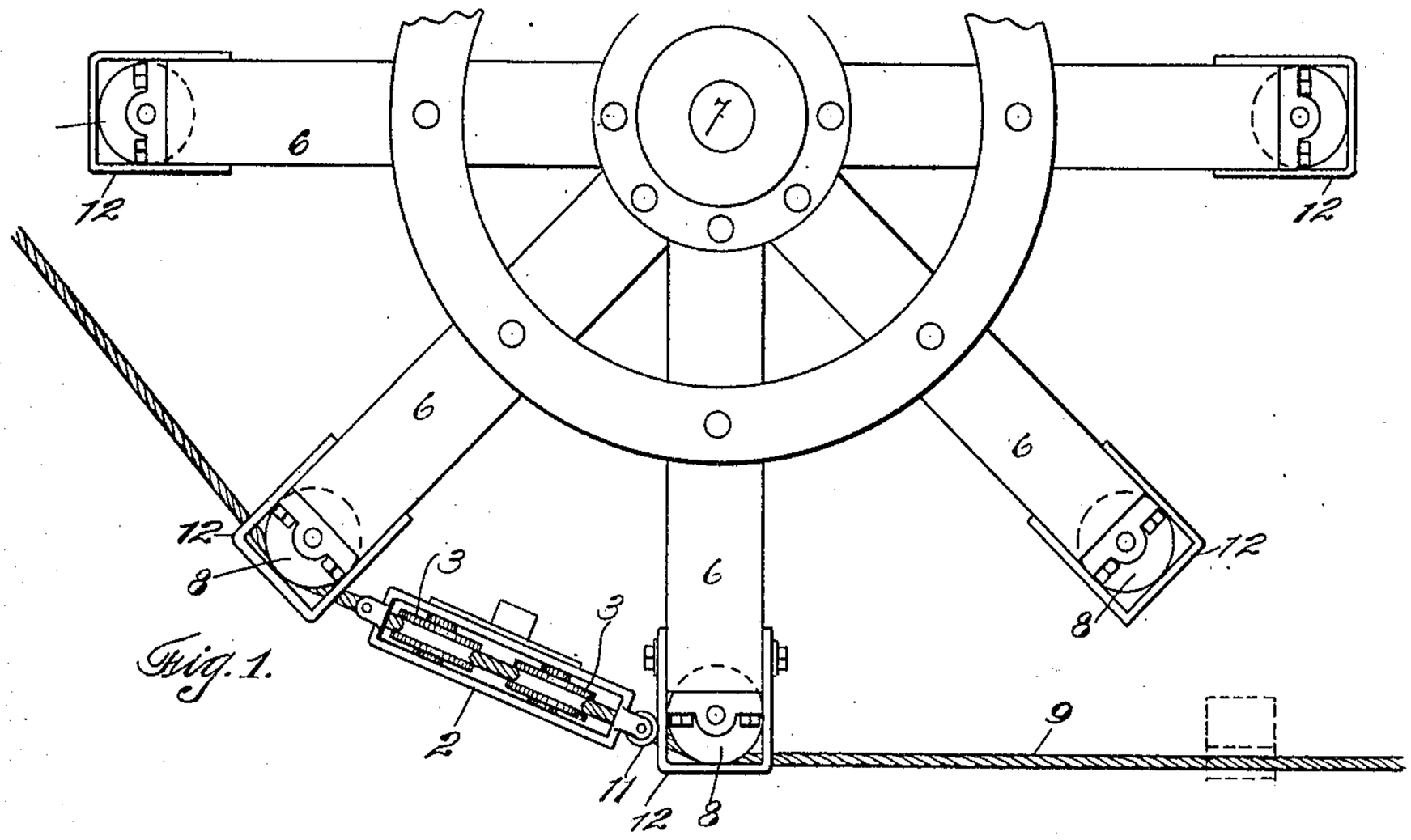


Fig. 1.

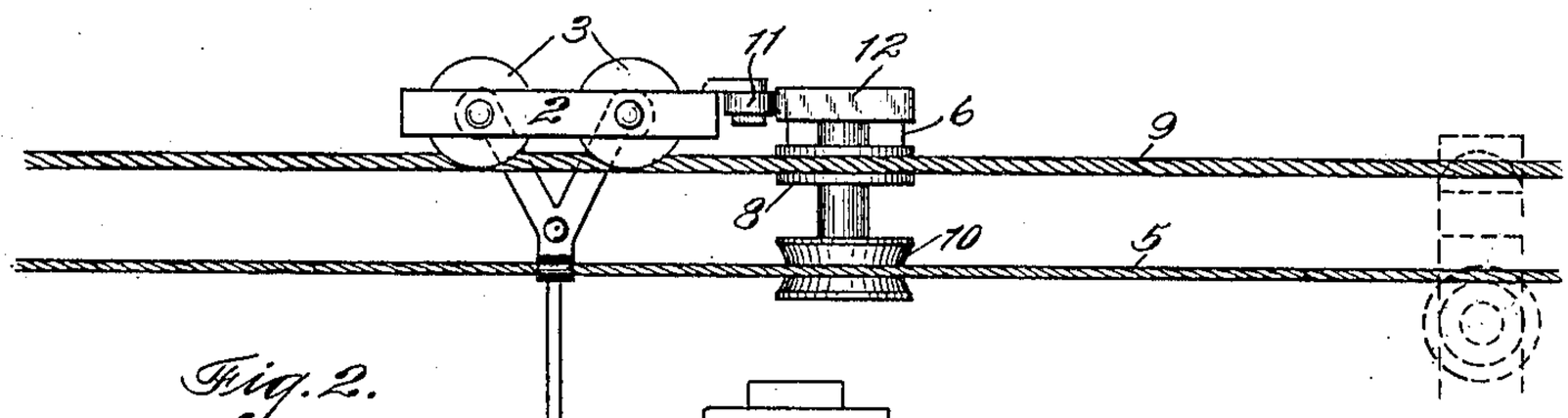


Fig. 2.

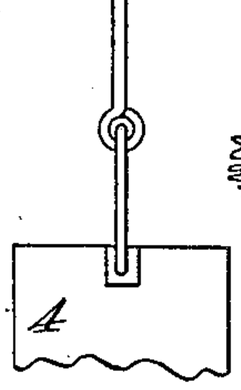
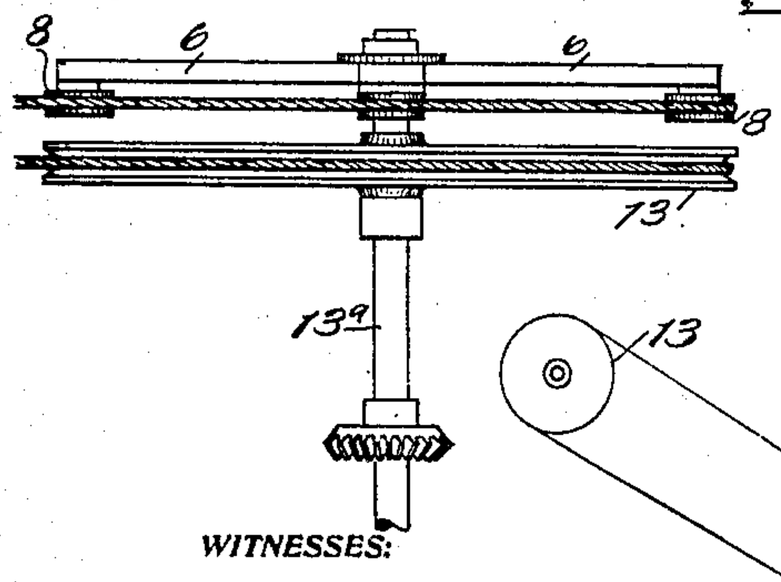


Fig. 4.



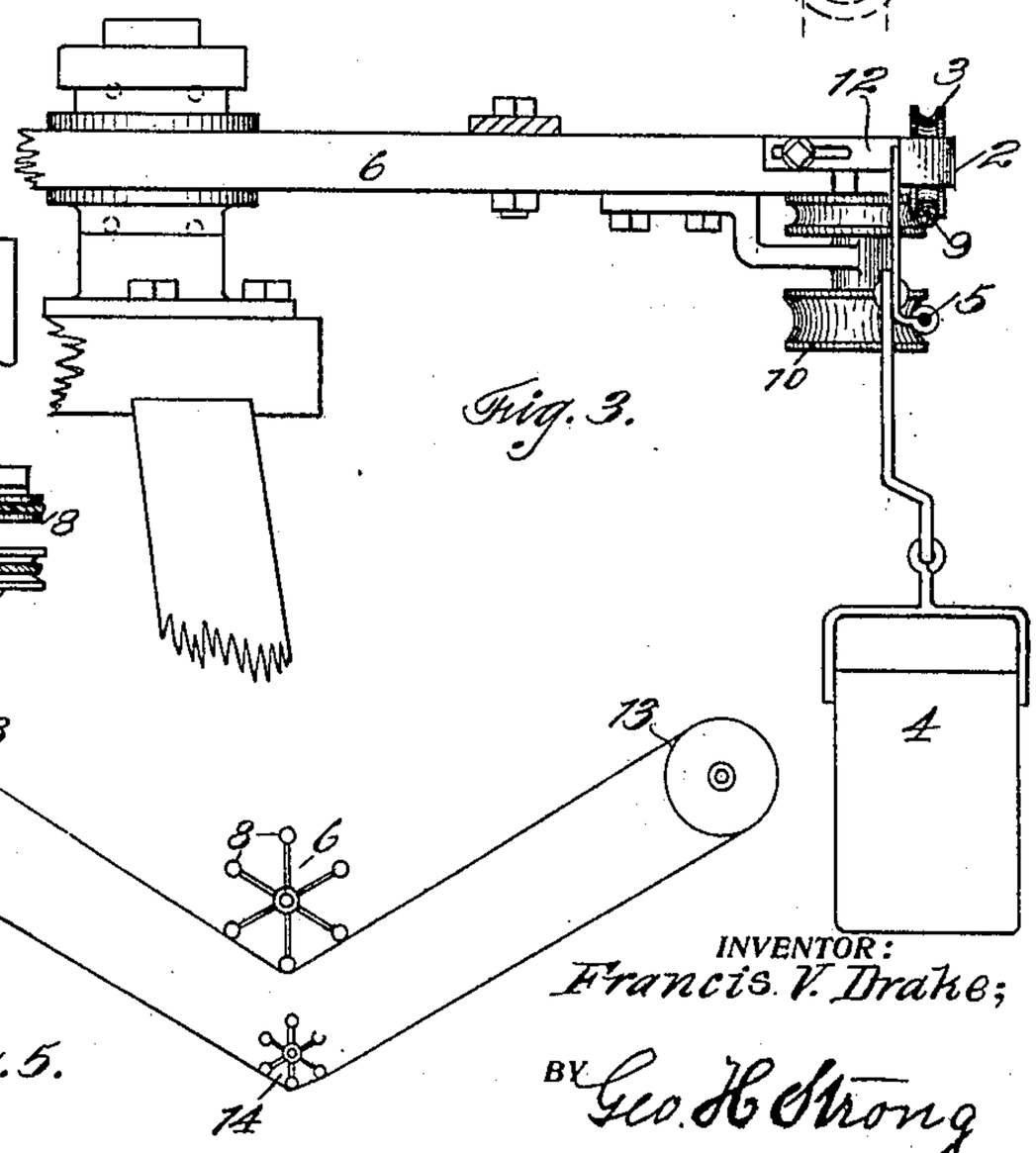


Fig. 3.

Fig. 5.

WITNESSES:

F. E. Maynard.

J. A. Morse

INVENTOR:

Francis V. Drake;

BY Geo. H. Strong

ATTORNEY

UNITED STATES PATENT OFFICE.

FRANCIS V. DRAKE, OF BISHOP, CALIFORNIA.

ROPE-CARRIER-DIRECTION-CHANGING DEVICE.

No. 885,455. Specification of Letters Patent. Patented April 21, 1908.

Application filed January 10, 1908. Serial No. 410,238.

To all whom it may concern:

Be it known that I, FRANCIS V. DRAKE, citizen of United States, residing at Bishop, in the county of Inyo and State of California, have invented new and useful Improvements in Rope-Carrier-Direction-Changing Devices, of which the following is a specification.

My invention relates to a means for changing the direction of endless, traveling rope power-transmitters, and maintaining the stationary cable in position with relation to said rope, so that the trolley or carriage which is adapted to travel upon the cable and be impelled by the traveling rope, will be maintained in its proper relative position, and will be carried around the curve in unison with the travel of the rope, and maintained in its proper position upon the cable.

It consists in the combination and arrangement of parts, and in details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a plan view showing the standing cable and trolley or carriage, and the direction-changing device. Fig. 2 is a side elevation showing the relative position of the cable and the traveling rope, and side of carriage. Fig. 3 is a similar view showing end view of carriage. Fig. 4 is a side elevation of direction-changing devices, and driver for rope pulley. Fig. 5 is a diagrammatic plan of outgoing and incoming ropes of an endless system.

In the transportation of ore or merchandise, and for other equivalent transportation, it is customary to employ either an endless traveling rope, from which the load is suspended, or a standing cable or equivalent track, upon which a carriage is adapted to travel, and to connect an endless traveling rope with said carriage so that it may be propelled upon its supporting track, the load being generally suspended beneath the carriage.

It is the object of my invention to provide means by which the carriage traveling upon such a cable or track may be carried around any desired curvature in unison with the movement of the traveling rope, so that a change of direction may be effected, and the load may be carried in other than straight lines.

In a previous patent No. 861,818 issued to me July 30, 1907, I have shown an apparatus designed to be employed in connection with an endless traveling rope carrier, from which the load is suspended so as to travel with, and be carried by, the rope.

In my present device, 9 is a fixed or standing cable or rigid support, and 2 is a carriage with one or more bearing-wheels 3 adapted to travel upon the standing support. The lower part of the carriage has means for attachment, from which a load 4 may be suspended.

5 is an endless traveling rope which may be connected with the carriage, or with a series of carriages at suitable intervals along the line of the rope. The rope may be attached to the loads in any suitable or desired manner, and when so attached the load will be impelled along the line.

Where the terminus of the line is at such point that the load may be carried in a substantially straight line, little or no difficulty arises; but where the load must be carried around obstructions, and the direction of travel changed, it is necessary to provide a means by which such change of direction may be effected. In my device, such a means is shown in the form of radially disposed arms 6 connected with a central hub or support, and turnable around a shaft 7 vertically mounted on suitable anti-frictional bearings, not shown.

At the ends of the arms 6 are journaled sheaves or pulleys 8, and the standing cable 9 normally rests against these pulleys, and its change of direction is effected by bending it around such an arc as may be desired to connect it with the two straight portions of the cable, which will be tangent to the curvature thus described. Upon this cable is mounted the carriage 2 supported by one or more bearing-wheels 3, which are grooved and adapted to travel upon the cable.

5 is the traveling rope, which may be endless, and is propelled by any suitable source of power. This rope is provided with means by which it can be attached to the carriage 2, and the latter has in turn means for attachment of a load 4, which is thus suspended from the carriage and supported by the cable 9, or its equivalent. The traveling rope being connected with the carriage, propels the load along the fixed support to its destination.

In order to safely carry the carriage around the curve, and to prevent its leaving the supporting track or cable, it is preferable that it move around the curvature in a series of short, straight lines, which are substantially

tangent to the curvature. This is effected by means of the arms 6, against the pulleys 8 of which the standing cable lies, and it will be seen that in the spaces between these arms the cable assumes substantially straight lines. These arms remain stationary and form a support for the cable at all times until the traveling rope has brought a carriage to the turning point. This traveling rope passes around rollers 10 which are independently journaled upon vertical bearings substantially in line below the pulleys 8 which support the cable. It will be thus seen that the pulleys 8 will remain stationary under normal conditions, or while the arms 6 are not being turned, and simply act as supports for the cable while the rollers 10 will be revolved by the action of the traveling rope.

When a carriage approaches the point of turning, the anti-friction rollers 11 at the end of the carriage will contact with the adjustable shoe member 12 at the ends of arms 6, and will turn the radially-armed structure, the pulleys 8 allowing it to turn with relation to the fixed cable; and as it turns, the carriage will proceed between two of the arms 6; and as these arms approach to such point that the cable rests upon two of the pulleys 8, it will be seen that this section of the cable becomes temporarily tangent to the line of curvature at the point, or points, between the ends of the arms 6. Thus a carriage having a plurality of bearing-rollers 3 will rest upon a straight portion of the cable, and the line of the cable will at these points lie in a straight line of travel of the carriage. This prevents any tendency of the carriage to continue its line of motion tangent to the curvature, and prevents the carriage wheels from climbing the cable in their effort to maintain their original direction of travel, and thus becoming displaced.

If it be found desirable to replace the flexible cable with a rigid track curved so as to make the desired change of direction, the rollers around which the traveling rope passes will act to change the direction of travel of the carriage, and by their pulling force, acting constantly in the direction of the curve, they will serve to change the direction of travel of the carriage and the supporting wheels, and prevent them from leaving the track. The advantage, however, of the cable, is that the carriage wheels are continually traveling upon straight lines while passing around the curve, and the strain of changing direction of a heavy load is materially lessened.

In the above description I have only shown a single part of the fixed or standing cable, but in order to complete an apparatus in which the carriages may travel in both directions, it will be manifest that the standing cable and the traveling rope will pass around return wheels or structures 13 at each terminus, and also around a similar direction-changing device 14 at the outer direction-changing point, as shown in Fig. 4.

The shoes 12 at ends of arms 6 are made adjustable, to the end that by such adjustment the movements of the arms shall be such that when a carriage has passed the turn (change of direction) and clear on its new course, a pulley 8 will be left at, or very near, contact with the cable at the point where next approaching carriage will engage same; that is, so that the roller attached to the carriage frame will surely engage the shoe 12 at that point.

In an endless cable construction, the rollers 10 at ends of arms 6 are omitted at both terminals, and the traction rope is carried at those points in, and partly around, a grooved, horizontal sheave of substantially same diameter as the radially-armed structure. These grooved sheaves revolve immediately below and contiguous to the radially-armed devices; in fact, take the places, in a sense, of the rollers 10. These terminal sheaves are driven by the shafts 13^a upon which they are mounted. The radially-armed devices are loosely mounted on the same shaft. Thus the grooved sheaves can be utilized, through suitable gearing, to control the movement of the traction rope. By power applied to these shafts, one or both, the movement of the traction rope and its loads will be under absolute control. That is, applied power will propel the rope, and suitable braking device on the shafts will restrain or hold the rope and loads on steep gradients or inclines.

The usual tension devices may be placed at either terminal point.

By this means a series of loaded carriages may be moved in one direction automatically or otherwise discharged at one terminal, and returned to the other terminal for reloading.

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

1. In an apparatus of the character described, means for changing the direction of travel of a suspended load, said means including a fixed or standing track, a traveling rope supported and driven parallel with the track, rollers located at the point of curvature and following substantially said curvature, a load-suspending carriage with which the traveling rope is connected, and wheels journaled to the carriages and supported upon the standing track.

2. A means for changing the direction of travel of suspended loads, said means including a fixed or standing track, means by which said track is curved to change its direction, a carriage having wheels adapted to move freely upon said track, means for suspending a load from said carriage, horizontal rollers

journaled beneath the line of curvature of the track, an endless traveling rope guided and movable by said rollers, and means for connecting said rope with the load-carrying carriage.

3. In an apparatus of the character described, a fixed or standing cable, arms projecting radially from a central shaft and turnable around said center, pulleys journaled horizontally in the outer ends of said arms, forming a support around which a change of direction of the cable is effected, a carriage having bearing-wheels adapted to move upon said cable, means for suspending a load from the carriage, an endless traveling rope connected with the carriage, and rollers coincident with those which support the fixed cable around which the change of direction of the rope is effected.

4. A device for transporting loads and changing the direction of travel thereof, said device including a fixed standing cable, a load-supporting carriage with wheels movable upon said cable, an endless traveling rope connecting with the carriage, and radially-disposed arms having a journaled shaft at the point where change of direction is made, said arms having pulleys at the outer ends around which the standing cable passes, the space between the arms being adapted to receive the upper part of the carriage and the wheels, when said carriage arrives, and the structure being revolved in unison with the movement of the carriage while the change of direction is being effected.

5. In an apparatus of the character described, a direction-changing device, said device consisting of radial arms turnable about a central support and having pulleys journaled in the outer ends, a fixed or standing cable passing around said pulleys and forming substantially tangent lines between any two arms upon which it rests, a carriage having wheels adapted to travel upon the cable, and an endless traveling rope connected with the carriage to travel parallel with the cable, whereby each carriage will enter a space between the arms and impart a movement to said arms while the carriage is passing around the curvature between the tangent portions of the cable.

6. In an apparatus of the character described, a stationary cable or support, a radially-armed turnable structure around which the cable is supported to change direction, a carriage adapted to travel on said cable or support and means for suspending loads from the carriage, a traveling rope connected with the carriage, and means by which a change of direction of travel of the carriage is effected in lines tangential to the arc of curvature.

7. In an apparatus of the character described, a stationary cable or support, a radially-armed turnable structure around which the cable is supported to change direction, a carriage with supporting pulleys adapted to rest upon the cable, said carriage occupying substantially the space between any two arms of the structure, a traveling rope connected with the carriage and supported substantially parallel with the stationary cable, rollers carried by the radial arms to maintain the traveling rope in position with relation to the stationary cable, and rollers journaled to the carriage end and adapted to contact with the radial arms during the change of direction.

8. In an apparatus of the character described, a stationary cable or support, a radially-armed and normally stationary structure having pulleys in the ends of the arms around which a change of direction of the cable is effected, a carriage with wheels adapted to travel upon the cable, a traveling rope supported substantially parallel with the cable and connected with the carriage, and contacts upon the carriage adapted to engage the radial arms and to turn the structure a part of a revolution during the passage of each carriage.

9. In an apparatus of the character described, a stationary cable or support, a journaled radially-armed and normally stationary structure with pulleys in the end around which the cable passes to change direction, and by which said change is effected in substantially straight lines between the pulleys of each pair of arms, a wheeled carriage supported and movable upon the cable and having a length less than the distance between the arms, and contact rollers upon the end, a traveling cable connected with the carriage, and guide rollers by which said rope is maintained substantially parallel with the stationary cable, said rope causing each carriage to contact with an arm of the direction changer, whereby the latter is caused to turn with relation to the stationary cable during the passage of a carriage.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANCIS V. DRAKE.

Witnesses:
GEO. H. STRONG,
C. A. RENFIELD.