C. T. Harvey.

Propulsion & Construction of Elevated-Railroad.

No. 79755 Patented Jul. 7, 1868.

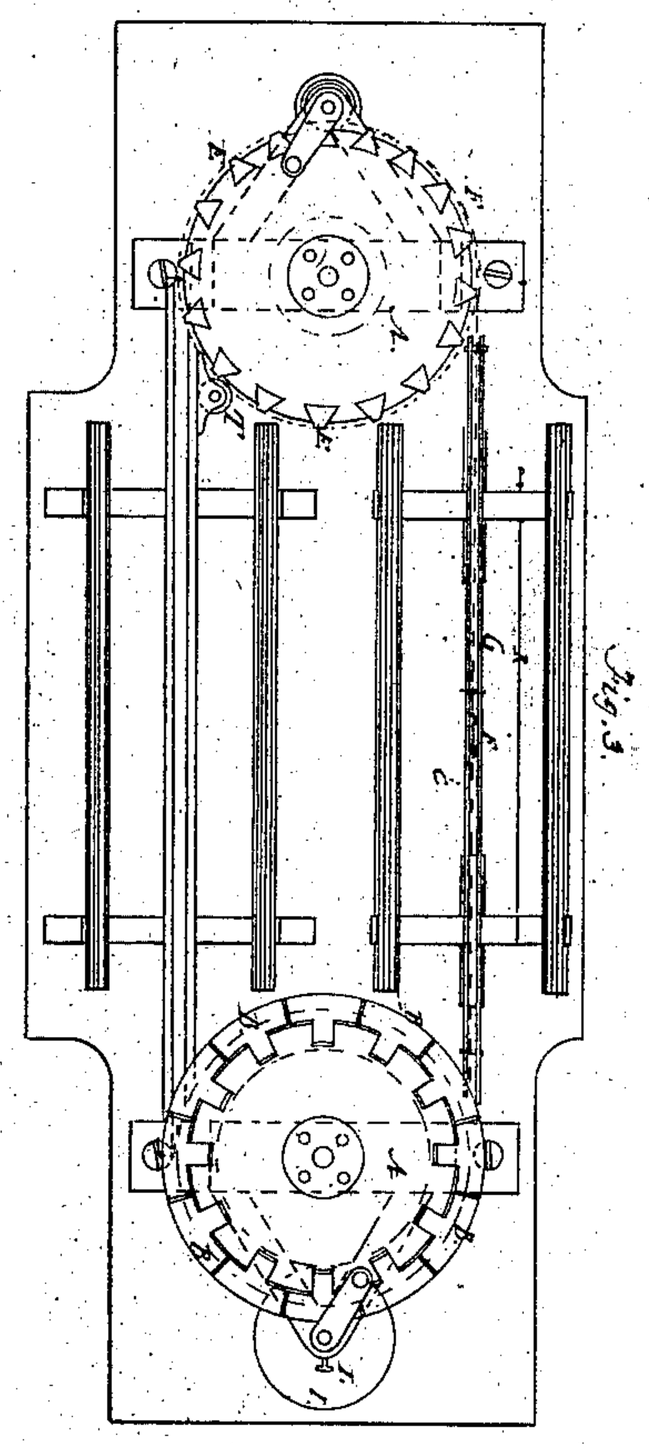

Fig. 3.

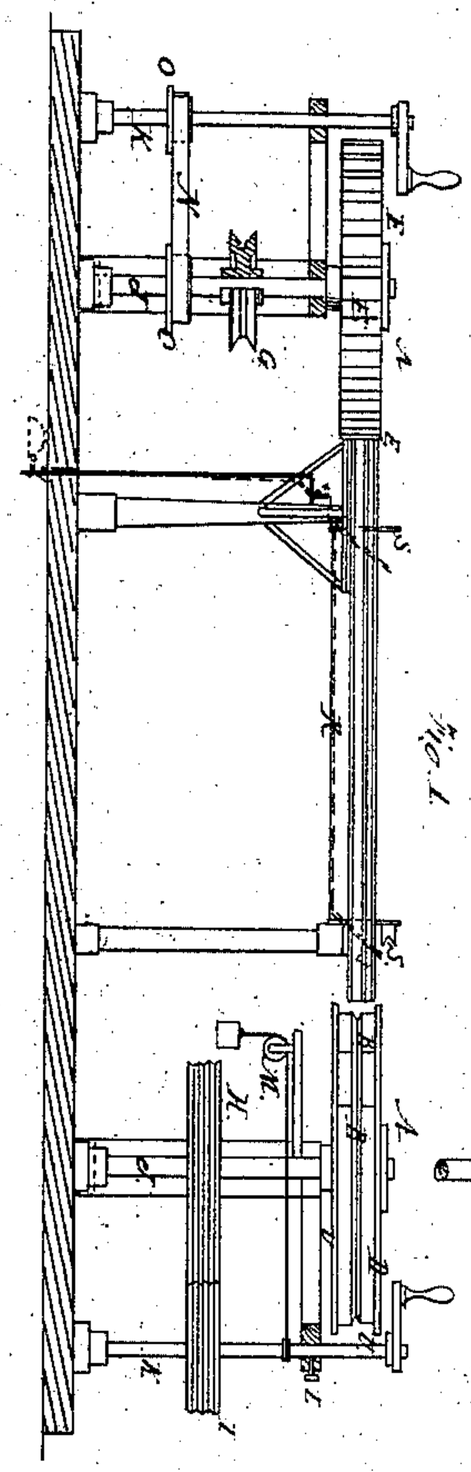

Fig. 1.

Fig. 9.

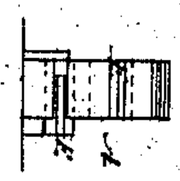

Fig. 7.

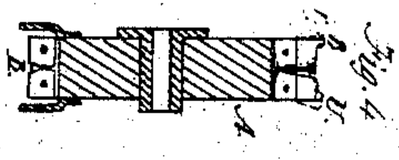

Fig. 4.

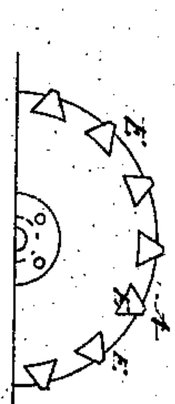

Fig. 8.

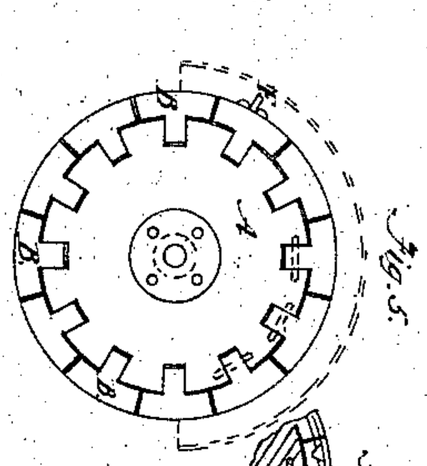

Fig. 5.

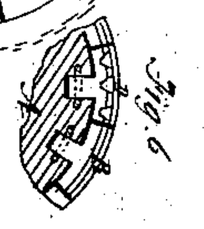

Fig. 6.

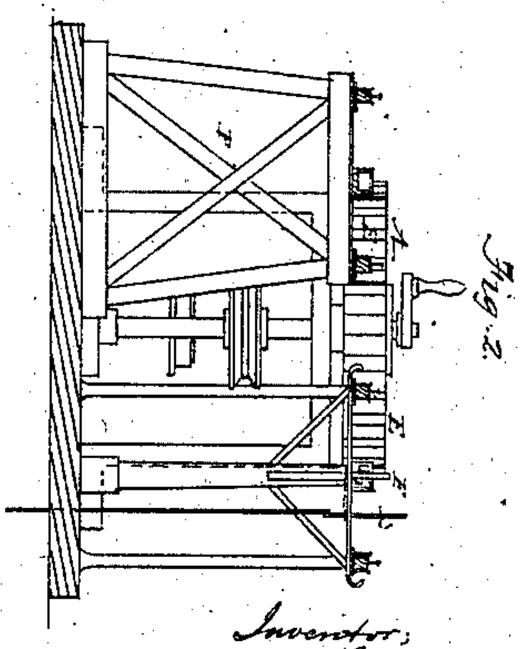

Fig. 2.

Witnesses
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Attys

UNITED STATES PATENT OFFICE.

CHARLES T. HARVEY, OF TARRYTOWN, NEW YORK.

IMPROVED MODE OF PROPULSION AND CONSTRUCTION OF ELEVATED RAILWAYS.

Specification forming part of Letters Patent No. **79,755**, dated July 7, 1868.

To all whom it may concern:

Be it known that I, CHARLES T. HARVEY, of Tarrytown, in the county of Westchester, in the State of New York, have invented a new and useful improvement in railroads and canals having endless cables and stationary power; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which drawings—

Figure 1 is a side elevation of a portion of an elevated railroad with my improvement applied thereto. Fig. 2 is an end view of an elevated railroad, showing how the same can be supported upon a frame instead of upon columns. Fig. 3 is a plan view of the parts represented in Fig. 1. Fig. 4 is an axial section, and Fig. 5 is a side elevation, of a driving-drum. Fig. 6 represents a portion of a driving-drum in longitudinal section. Figs. 7 and 8 are respectively face and side views of one-half of a pulley made according to my invention. Fig. 9 is a peripheral view of a modification of a driving-drum wherein the compressing-cams that form its face are set alternately in different planes.

The object of this invention is, first, to obtain the greatest amount of traction upon the propelling-cable consistent with the least amount of wear and the least liability to injury from resistance; secondly, to decrease the cost and simplify the construction of a railroad or other works using a propelling-cable; thirdly, to avoid or obviate danger by signaling from a car to the place where the motion of the propelling-cable is produced. In carrying out the first feature of my invention I employ a novel method of constructing the driving-drum and of obtaining therefrom great tractive power to be exerted upon the propelling-cable.

The letter A designates a driving-drum whose periphery or face is composed of a series of compressing-cams, B, hinged to the periphery of the solid part of the drum in such a manner as to be capable of swinging or vibrating to and from each other. The adjacent parts of the compressing-cams overlap each other, and are so constructed as to form a groove in which the propelling-cable C runs. The said compressing-cams are forced apart by springs, and when the strain or pressure on the compressing-cams is sufficient to overcome said springs the compressing-cams are drawn toward each other, so as to bite the cable and prevent it from slipping. I increase the holding or gripping surfaces of the compressing-cams and obtain additional security against the slipping of the cable by forming corrugations or depressions D in their opposing faces. (See Fig. 6.) I also increase their holding capacity by setting every alternate pair of compressing-cams in a different plane on the face of the drum, thereby forming a groove which is composed of a succession of straight lines, and consequently the cable, in following said groove, is seized or gripped closely at the angle formed at the end of one pair of compressing-cams and the beginning of the next pair.

I do not claim the invention of a drum with compressing-cams, as I believe the same has been used on agricultural machines; but I claim the combination of the same with stationary power for peculiar purposes, as mentioned.

In Figs. 1 and 2, and also in Figs. 7 and 8, I have shown another method of making a driving-drum or traction-pulley, consisting of a wheel whose face is provided with a series of elastic ribs, E, arranged longitudinally with the axis and secured in dovetailed recesses which allow the ribs to be moved to new positions to compensate for wear and to be removed for removal.

The ribs E are made of india-rubber or other suitable elastic material, which allows the cable to become embedded therein, and thereby increases the hold of the cable on the drum. In using cables which have cable-heads or trucks F the said driving-drums or traction-pulleys can be provided with vertical side flanges, as shown in red in Fig. 4, between which the said heads or trucks will be confined while passing around the drums or pulleys.

Another mode of making a driving-drum or traction-pulley is shown at G, Fig. 1; and the same consists in forming a deep circumferential groove in its face, in which groove I place a bed of india-rubber or other suitable elastic material, which forms an elastic cushion in

which the cable will be embedded more or less, according to the strain put upon it, and which cushion can be renewed when worn.

In order to avoid danger or injury from sudden shocks arising from unexpected resistance to the movement of the propelling-cable or from the sudden contact or impact of the cable, or of one or more of its heads or spurs against a car at rest, I employ friction-pulleys H I for giving motion to the driving-drum, whereof one, H, is fixed on the shaft J of the driving-drum, and the other, I, is fixed on the driving-shaft K, the said pulleys being set up toward each other by means of set-screws L, whereof one is shown in Fig. 1, or by a cord and weight, M.

It results from this arrangement and construction that if a shock comes upon the cable from suddenly connecting a car thereto the cable will not break or slip upon the drum; but the friction-pulleys H I will slip on each other without permitting or causing any damage, and will continue to slip until the power to which they have been set by the screws L or by the cord and weight M is sufficient to overcome the inertia of the car or the resistance which caused the shock. Another method of accomplishing this result is shown at the left-hand end of Fig. 1, the same consisting of an ordinary band, N, going around pulleys O O, fixed on the shafts J K. Equivalent methods need not be further described, as the principle is shown thus sufficiently. In decreasing the cost and simplifying the construction of railroads on which a propelling-cable is used, I substitute "bents" or frames of timber P (see Fig. 2) in place of single supporting-columns, such as I have described in former applications for improvements in elevated railroads. A great saving is effected thereby in building elevated railroads in country districts, where the space occupied by the supporting-structure is of little value. I can also employ a series of wooden piles instead of using such supporting-columns, as is also illustrated at the right-hand side of Fig. 2.

Another improvement consists in making the guide in which the propelling-cable runs of open-work, instead of making it with closed sides, as explained by me in previous applications. Such an open guide, Q, is represented in Fig. 3 on the upper side of that figure, and by that construction I save material not only, but obviate the filling up or obstruction of the guide by accumulations of snow or ice, dirt, or other foreign substances which might impede the movement of the cable. The open guide Q is made of light railroad-iron or flat bar-iron, or of gas-pipes, as may be preferred. The cable-guide that conducts the cable during its onward movement is carried between the rails of the railroad-track and about on a level therewith; but in its return course it may be carried beneath the top timbers of the bent frame P.

I further simplify and cheapen the railroad and machinery for propelling cars thereon by arranging the driving drum or drums A in such a manner, in combination with a double track, that the same driving-drums will do service for both tracks at the same time, the endless cable going out in the middle of one track in one direction and returning in the opposite direction, whereby both tracks are served by the same cable. In accomplishing this result I make the driving-drums of such dimensions that they extend from about the center of the adjoining track, so that the cable, both on leaving the face of the drum to enter one cable-guide and on returning to the drum from the other guide, will move in straight lines tangential, or nearly so, to the periphery of the drum. This arrangement saves the expense of a separate cable and a separate drum for each track.

The driving-drum may be placed either in a horizontal or perpendicular position, as may be most convenient, without affecting the nature of the invention.

When it is necessary to make a bend or deflection in the cable-guide, so as to form an angle in the direction of the cable in passing from the cable-guide to the drum, or vice versa, I employ guiding pulleys or rollers at the place where the cable leaves or enters such guide, for the purpose of conducting the cable in its proper course without frictional contact with adjoining surfaces. Such a guiding pulley or roller is seen at T in Fig. 3.

In carrying out the third feature of my invention—to wit, signaling from the car in cases of danger—I use a wire, R, that extends along the track or along the cable-guide and is suspended upon tilting or movable levers S, which are so constructed and arranged as to be within reach of a lever or apparatus to be extended at pleasure from a passing car whenever a signal is desired to be given. The said wire R communicates with a bell or other signaling apparatus placed near to the driving-drum, being led thereto by the ordinary devices used in bell-hanging. By means of this signaling device the conductor of a car can, whenever he discovers danger ahead, or desires that the propelling-cable shall be stopped, or desires to make any other signal, put himself in communication with the engineer, a code of signals being agreed upon beforehand for the use of the road. The same principle is applicable to propelling apparatus used on canals.

When I desire to produce additional tractive power upon a propelling-cable I can use two driving-drums arranged in line with each other, so that the cable will be compelled to pass around both before it reaches the cable-guide, and I apply to the shaft of each drum similar devices for avoiding shocks as those shown in Fig. 1 applied to shafts J K.

It will be observed that compressing-cams B of the driving-drum are made with flanges U, which project outward from the drum. Their object is to provide a path for the cable, from which the cable heads or spurs will not be likely to fly out or escape while the cable is in rapid motion. In order to obtain additional security against such an accident, I also form

rigid flanges on the solid periphery of the drum, which flanges project outward beyond and on either side of the movable compressing-cams. (Shown in red in Fig. 4.) I also provide against such an accident by surrounding a portion of the driving-drum with a circular guard. (Shown in red outline in Figs. 5 and 8.) Said guard is independent of the drum, and is of course stationary.

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

1. The construction and arrangement of a driving-drum having elastic ribs across its face, in combination with a propelling-cable.

2. The construction and arrangement of a driving-drum having compressing-cams, in combination with a propelling-cable operated by any stationary motor, for railway or analogous purposes, substantially as described.

3. The construction of a driving-drum with a central elastic cushion for receiving the impact of and imparting motion to a propelling-cable, for railway or canal transportation purposes, substantially as described.

4. The construction of the opposing surfaces of the compressing-cams B with a series of corrugations or depressions for obtaining greater adhesion, substantially as described.

5. In combination with a driving-drum for railway or analogous purposes, the construction and arrangement of intermediate adjustable frictional attachments to the stationary motor, substantially as described.

6. The open cable-guide Q, substantially as described.

7. The arrangement of cable-guides and combining the same with a double track of a railway and a driving-drum in such manner that an endless cable running therein will propel cars in opposite directions on the different tracks, substantially as described.

8. The construction and arrangement of anti-friction pulleys or rollers in the sides of a cable-guide at points where the cable diverges from a straight line, substantially as described.

9. The flanges U on the periphery of a driving-drum, substantially as and for purposes above mentioned.

CHAS. T. HARVEY.

In presence of—
W. HAUFF,
J. C. POTTER.