(No Model.) 2 Sheets—Sheet 1.

L. F. COOK.

ELEVATED FRICTION CABLE RAILWAY.

No. 496,188. Patented Apr. 25, 1893.

Fig. 1

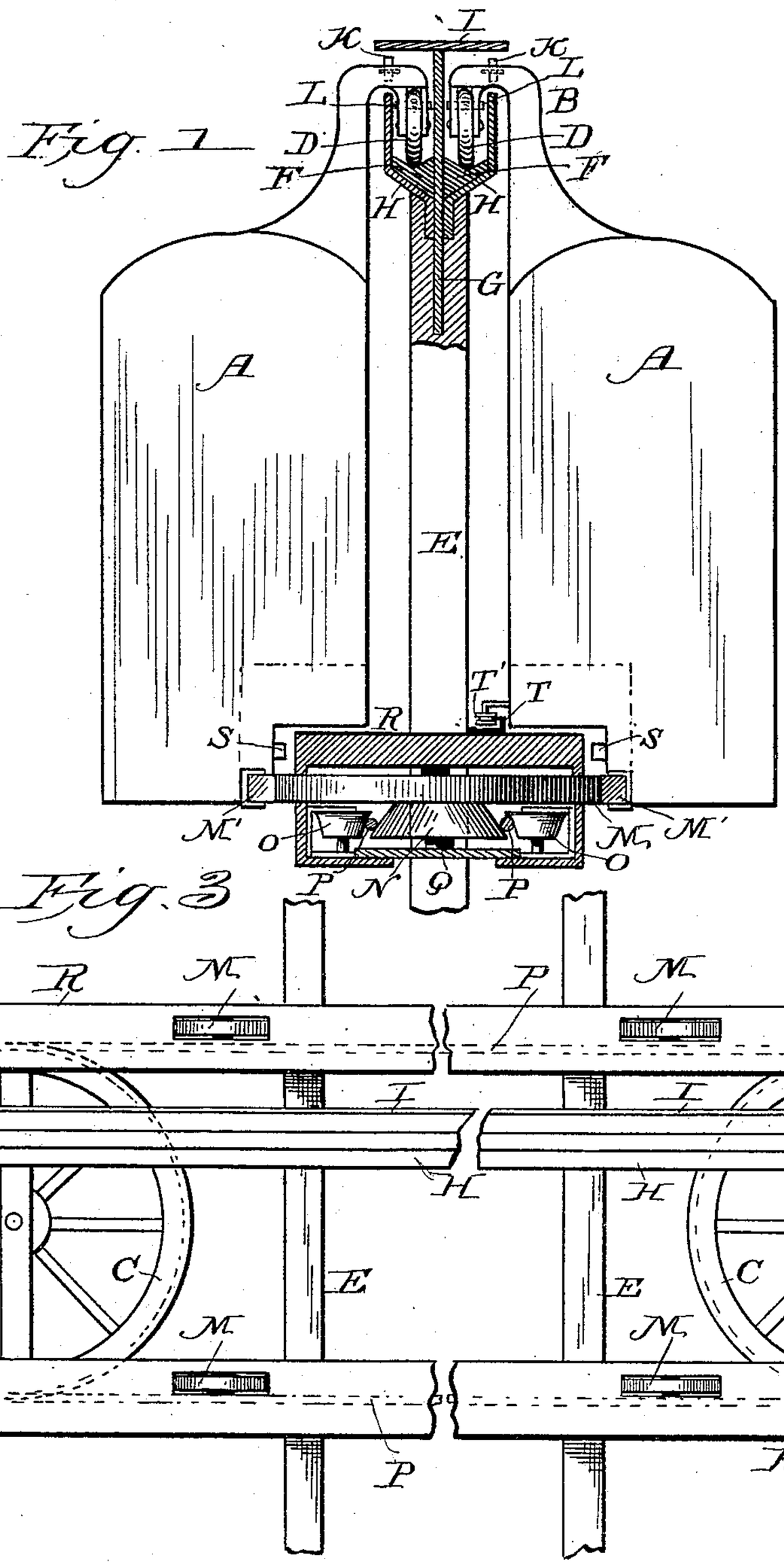

Fig. 3

Witnesses
J. W. Reynolds
Laurence Mulstead

Inventor
Lucian F. Cook.

(No Model.) 2 Sheets—Sheet 2.

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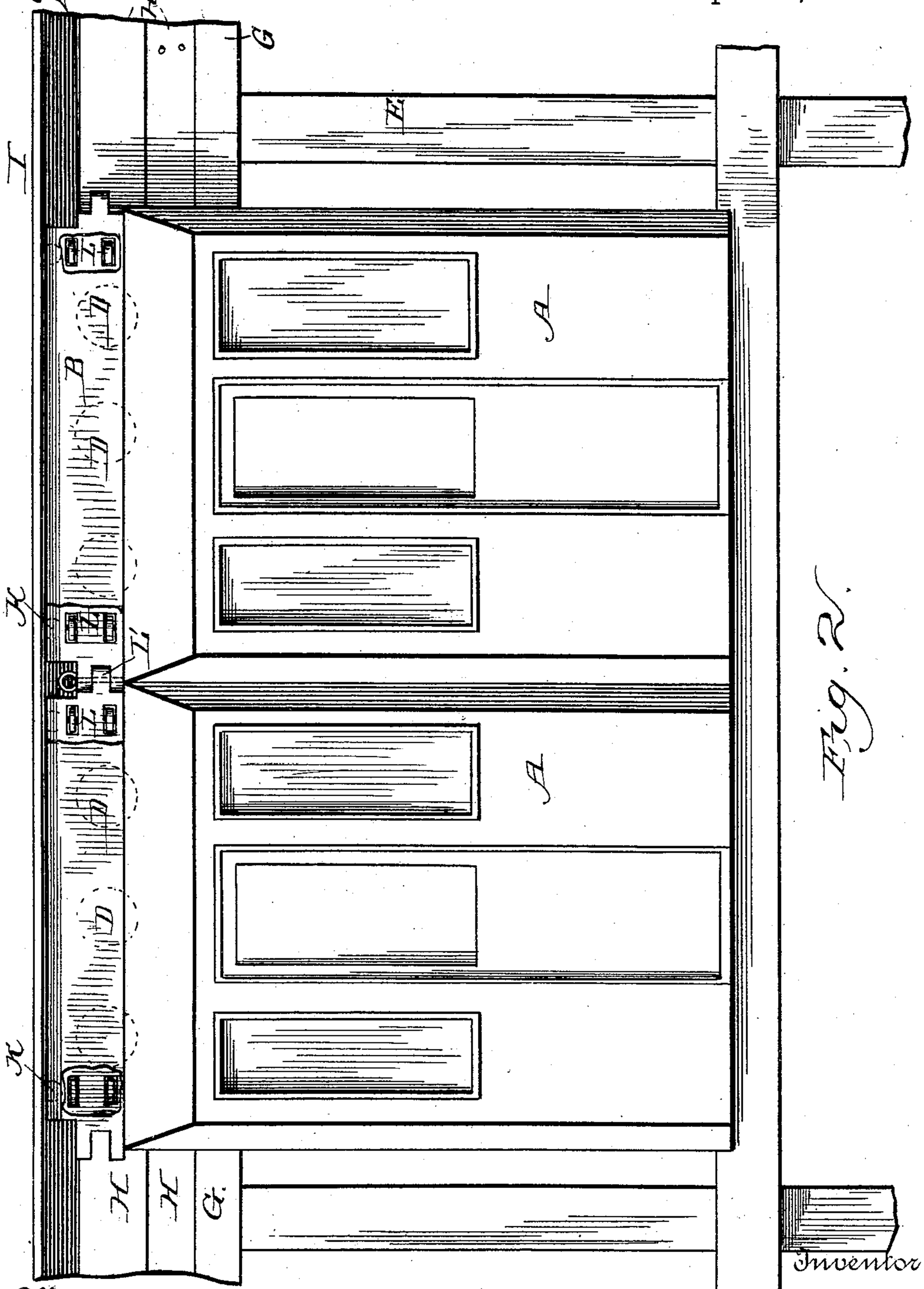

Fig. 2.

Witnesses
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Lawrence Milstead

Inventor
Lucian F Cook

UNITED STATES PATENT OFFICE.

LUCIAN F. COOK, OF TACOMA, WASHINGTON.

ELEVATED FRICTION CABLE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 496,188, dated April 25, 1893.

Application filed April 9, 1892. Renewed November 12, 1892. Serial No. 451,794. (No model.)

To all whom it may concern:

Be it known that I, LUCIAN F. COOK, a citizen of the United States, residing at Tacoma, in the county of Pierce, in the State of Washington, have invented certain new and useful Improvements in Elevated Friction Cable Railways, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The present improvements relate to that class of elevated railway systems wherein the cars are suspended from off their center of gravity, whereby they are caused to bear against their propelling agency by gravity; and said improvements relate particularly to the type of elevated railway propulsion set up in my application Serial No. 417,122, and filed January 5, 1892, and allowed February 26, 1892.

One feature of the present invention is the employment of continuous V-shaped or concave rails upon the elevated structure, and supporting wheels upon the cars, to travel over such rails, in lieu of the grooved supporting rollers, and V-rail on the car, as in my above-referred-to application. Another feature is the construction of my cars in sections, hinged together so as to facilitate their turning curves; and still another, and very important, feature is a provision for causing the propelling cable to bear with sufficient friction against the drum of the driving wheels, to drive the same without said cable being wound around said hub. And finally, I am enabled by the present manner of propelling my drive-wheels, to employ one endless cable to drive four lines of cars, or rather two up and two down lines, at the same time, one line being located above the other; and this is a very important feature.

In the drawings accompanying this description, and in which like reference letters refer to like parts in the several figures: Figure 1 is a vertical sectional view of my elevated structure and propelling mechanism, and showing the cars in elevation. Fig. 2 is a side view of two of my cars or carriages hinged together by their hangers, and also a portion of the elevated structure. Fig. 3 shows an arrangement of the drive-wheels and cable whereby a lower and an upper double line of cars can be propelled by one endless cable.

Referring to the drawings by letter, A, A are two cars or carriages which are connected through their supporting hangers or bars B, which are hinged together at L'.

D are the supporting wheels journaled in the hangers B.

E represents the supporting columns, which support the upper track-rails F near their top. The rails have a concave or V bearing surface, along which the wheels D travel.

G is a girder extending from post to post, and to which is secured on each side a girder-plate H, which provides seats for the rails, and their upper ends act as guard-rails to prevent the lateral displacement of the trucks or wheels D.

I is a top safety plate secured on G, and rollers K on the hangers B contact therewith in case of a tendency on the part of the wheels to jump the track. The hangers are also provided with horizontal wheels or rollers L which bear against the plates H, or girder G, in case of undue lateral vibration of the wheels D upon the track.

M are the drive-wheels against which the cars bear through their rails M', and whereby they are propelled.

N is a conical friction drum secured to the drive-wheel and upon which the propelling cable bears. Opposite said drum are the conical grip drums O, the pitch or level of the two being of different degree, whereby a wedge or V-shaped space is provided between them in which the cable moves; thereby giving sufficient friction or "bite" to the cable to always insure a sufficient application of power to the drive-wheels from the cable.

Q represents the shaft of the drive-wheels.

R is a frame-work or inclosure which carries the propelling mechanism; the upper outer edges of the inclosure being utilized as the brake beam to stop the cars, same as in my former application before referred to.

C are sheaves which direct the cable from one line to the other when employed to propel an upper and lower line of cars.

P represents the endless propelling cable.

T is a rail secured to the elevated structure,

and T′ is a wheel or pulley upon the car and which is actuated by proper lever appliances thereon, for the purpose of drawing the car against the drive-wheels when necessary to increase the traction between the car and drive-wheels. Further description of this mechanism is not thought necessary in view of the fact that it is fully set forth in my application hereinbefore referred to.

It is evident as regards my hinged car sections, that I can make up trains readily as demanded, and also can with facility turn corners that could not be made with very long cars. When traffic is light, a few sections can be run only, and others added as the demand may require.

Regarding my means for causing the cable to drive the propelling wheels, it is evident that a considerably shorter cable can be employed in this system than where it is necessary to take a turn around the drum of each pulley. Also much power is saved over that required to drive the cable when it is wound around said drum; and there is also less wear upon the cable than where it is kinked or turned about so many drums.

Another great advantage of the present manner of propelling my drive-wheels is that it permits the use of one strand or run of the cable to propel one set of drive-wheels, and the return strand or run for still a different set either above, below or at the side of the first set, thus utilizing one endless cable to propel four lines of cars instead of two only, as in my former application.

In the operation of my device, the drive-wheels being in motion, the cars will be propelled so long as their bearing rails are in contact with said wheels, and to stop them, it is only necessary to force the brake-rails S against the frame-work R, thereby removing the car from contact with the wheels M. By the present system of employing the cable to rotate the drive-wheels through its contact between the conical friction drums and the conical drums of the drive-wheels, I can readily make the same amount of cable do double the work as compared to where the cable was compelled to pass around each drum on the drive-pulley as in my former application. Fig. 3 shows this application of my present means of driving my propelling wheels.

In Fig. 1 I have shown the arrangement of the cable as employed on a single double-track line; but when employed to propel two double track lines, but one friction drum O will of course be necessary opposite each drive-pulley drum.

It will be seen that the present track structure is compact and secure, the girder G and the plates H being let into the top of the posts or columns, and the track-rails being secured between said girder and plates. The top plate I prevents the vertical displacement of the wheels, and the side plates H, the lateral displacement and hence it is impossible to derail the cars. By hinging the several hangers together, I am enabled to turn curves that could not well be traversed by long rigid cars, and a ready and simple means for connecting my cars or carriages together is afforded.

Regarding the manner of conveying the power from the traveling cable to the drive-wheels by varying the angle or pitch of the friction drums O and drums N, relative to each other, a wedge or approximate V-shaped space in which the cable tends to wedge itself is provided, whereby sufficient friction can always be maintained between the drums N, and the cable for driving cars, whether loaded heavily or otherwise.

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

1. In a transportation system, drive-wheels provided with inclined drums combined with similarly formed friction drums, and a traveling cable supported by said drums, substantially as shown and described.

2. In a transportation system, a car hanging from an upper track and a line of friction drive-wheels acting against said cars to move the same, and mechanism whereby said wheels are driven, consisting of conical or inclined friction drums arranged near said drive-wheels, conical or inclined drums carried by said drive-wheels, the pitch or inclination of said friction drums, and that of the drive drums being different, whereby a wedge-shaped space is formed between said parts, and a traveling cable supported by said friction drums and drive-wheel drums, substantially as shown and described.

3. In a transportation system, the combination with supporting posts or columns, of a track structure comprising a longitudinal girder, side girders secured thereto and concave or grooved track-rails secured between the first named girder and the side girders, substantially as shown and described.

4. In a transportation system, the combination with supporting posts or columns, of a track structure comprising a longitudinal girder, side girders secured thereto and extending vertically above the track rails, track rails between the longitudinal girder and the side girders, and a plate secured to the upper part of the longitudinal girder, substantially as shown and described.

5. In combination with an elevated track structure, cars suspended therefrom by hangers carrying supporting wheels, said hangers being hinged together at their ends, substantially as shown and described.

6. In combination with an elevated track structure, cars suspended therefrom by hangers hinged together, said hangers being provided with guard-wheels, and supporting wheels, substantially as shown and described.

7. In a transportation system, the combination with two lines of double track railway, of an endless cable or series of endless cables,

and a series of propelling drive-wheels for each of said lines, one series of said wheels being driven by one strand or run of said cable, and the other series by the return or reverse strand or run of the cable, substantially as shown and described.

8. In a transportation system, the combination with the car of the concave or V-shaped track, supported on the posts, by means of the girders G and H, of the propelling wheels M carrying the conical drums, the conical friction drums, the endless cable supported by said drums and the car, substantially as shown and described.

LUCIAN F. COOK.

Witnesses:
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H. C. SNYDER.