

(No Model.)

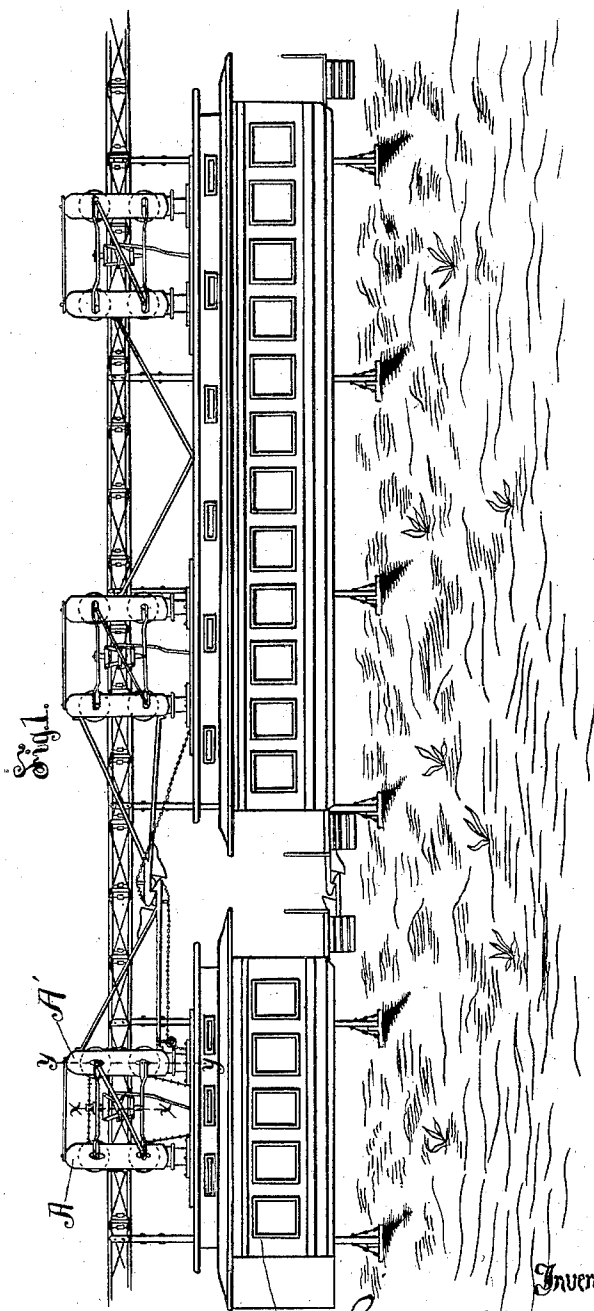
2 Sheets—Sheet 1.

G. A. STEPHENSON.

DOUBLE TRACTION MOTOR FOR ELEVATED RAILROADS.

No. 468,842.

Patented Feb. 16, 1892.



Witnesses.

P. H. Carlson.
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Inventor.

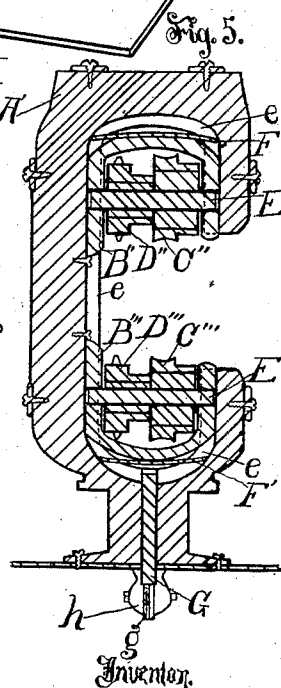
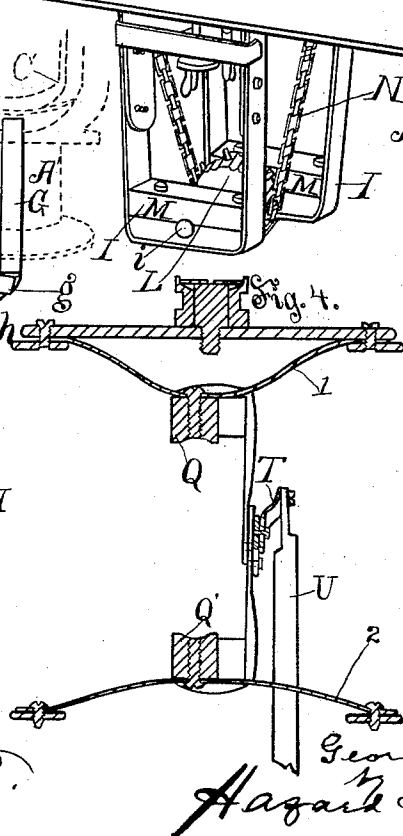
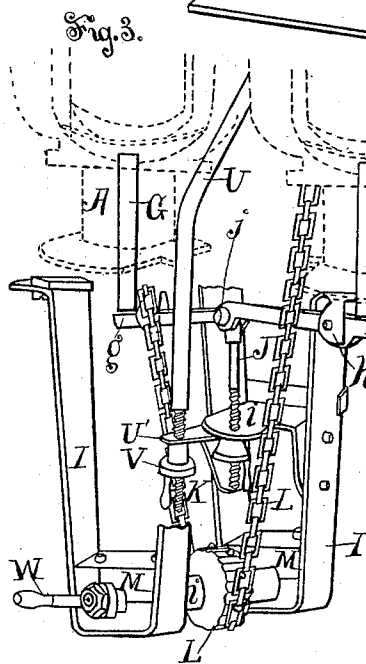
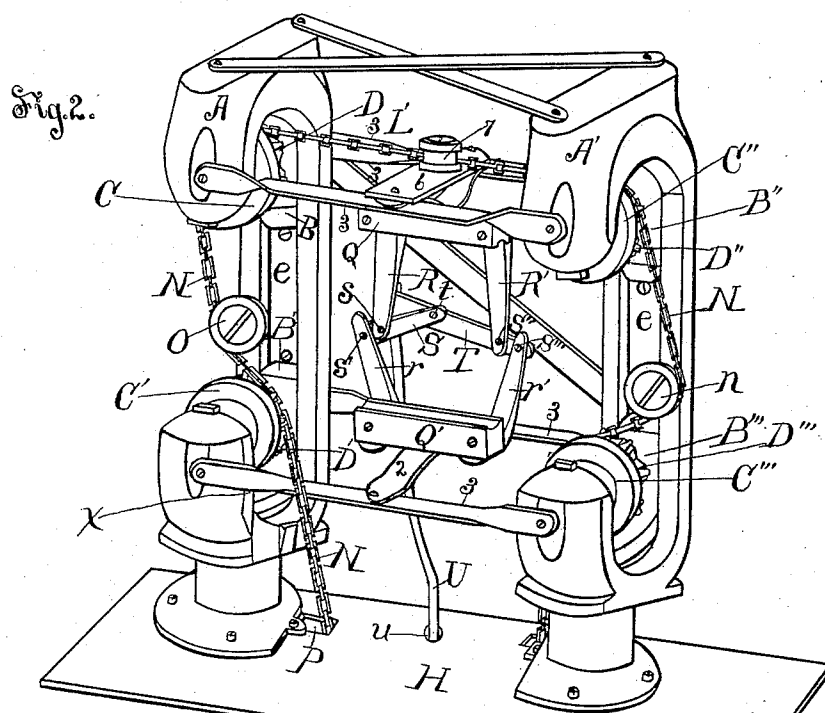
George A. Stephenson
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DOUBLE TRACTION MOTOR FOR ELEVATED RAILROADS.

No. 468,842.

Patented Feb. 16, 1892.



Witnesses.
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UNITED STATES PATENT OFFICE.

GEORGE A. STEPHENSON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO JOHN F. BUTLER, OF SAME PLACE.

DOUBLE-TRACTION MOTOR FOR ELEVATED RAILROADS.

SPECIFICATION forming part of Letters Patent No. 468,842, dated February 16, 1892.

Application filed July 23, 1891. Serial No. 400,394. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. STEPHENSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Double-Traction Motor, of which the following is a specification.

One object of my invention is to produce a motor which will exert double traction upon the rails along which it runs, so that a light motor may be used to draw heavy loads up steep inclines.

A further object is to provide a motor suitable for use on an elevated railway for pendant cars, in which railway the track is provided with two traction-surfaces arranged in a vertical plane, as illustrated in my application for Letters Patent, Serial No. 400,393, filed in the United States Patent Office at the date of filing this application.

The accompanying drawings illustrate my invention.

Figure 1 is a plain elevation of my motor as applied in drawing a car on my improved elevated railway. Fig. 2 is a perspective view of the operative parts of my motor as arranged to be applied in use upon such elevated railway. Fig. 3 is a perspective view showing the lower portion of the operative parts of the motor. Fig. 4 is a sectional view of the brake on line *x x*, Fig. 1, showing the operative parts removed from the rail. Fig. 5 is a sectional view on line *y y*, Fig. 1, showing the arrangement of the driving and traction wheels.

My motor embraces the combination of a pair of drive-wheels oppositely arranged, with a space between them to receive a rail, operative means arranged to force the opposite wheels toward each other to clutch the rail, and operative means for driving the opposite drive-wheels in opposite directions, so that each of said wheels is caused to exert traction-power to advance the motor.

My invention comprises various features and combinations hereinafter set forth and claimed.

In the drawings, A A' are C-shaped brackets, within which are mounted vertically-movable sashes B, B', B'', and B''', which respectively carry the traction-wheels C C' C''

C''' and their respective sprocket-wheels D D' D'' D'''. The traction-wheel and sprocket-wheel of each sash are fixed together and are journaled to the sash. E is a shaft arranged for this purpose. The sashes are preferably mounted to slide in sash-grooves *e*, provided in the inner faces of the brackets. Each bracket is provided with a pair of such sashes oppositely arranged, one in the upper and the other in the lower arch or member of the bracket.

Springs F F' are arranged to press the sashes toward each other. In practice these springs F F' are designed to be sufficiently strong to press the traction-wheels against the rails with sufficient force to produce the traction necessary to propel the train along an ordinarily level track; but in order to produce sufficient traction to enable the motor to draw a train up a steep incline I provide the motor with a traction-increasing device, which consists of the sash-actuating pins G, which project upward through the bottom of the brackets A A' against the center of the springs F', which are situated underneath the sashes B' B'''.

Suitable means are provided for operating the sash-actuating pins vertically. The means shown consists of the sash-operating levers *g*, which are pivoted to the base-plate H through the medium of the brackets *h*. The plate H is secured to the brackets A A'. To the under face of the base-plate is secured the frame I, and to this frame is secured the bracket *i*, through which passes the screw-threaded lower end of the sash-lever-actuating rod J, the upper end of which rod is attached to the inner ends of the levers by suitable means, such as the pivot *j*. Suitable means for drawing the rod J downward are provided, such as the screw-wheel K, which is screwed upon the rod J below the bracket *i*, with which it engages.

In the lower portion of the frame I is the driving sprocket-wheel L, which is mounted upon the power-shaft *l*, which is mounted in journal-blocks M, which are secured to the bottom of frame I. The traction-wheels are driven by driving sprocket-chain N, connected with suitable means for driving the

same (indicated by crank W, but not shown) and arranged about the several sprocket-wheels to drive the upper and lower traction-wheels in opposite directions. The driving sprocket-chain N passes under the driving sprocket-wheel L, and from thence upward through the base-plate H, thence upward on the inside of the sash A' and over the driven sprocket-wheel D''' and outward and over the idler-wheel n, thence upward and over the top of the driven sprocket-wheel D'', thence across to the bracket A, where it passes over the top of the driven sprocket-wheel D, thence downward over the idle-wheel O, and then passes inward over the driven sprocket-wheel D' and passes downward through the base-plate H and back to point of beginning.

The means I employ for actuating the brake consists of a system of compound levers, whereby I obtain great pressure upon the rails with the application of very little force to actuate the levers.

Q is the upper brake-shoe, and Q' is the lower brake-shoe. To the upper brake-shoes are secured the two shoe-actuating arms R R', which are secured on the outer side of the shoe and extend downward a little beyond the mid-line between the two brake-shoes. To the lower brake-shoe Q' are attached the two actuating-arms r r', which extend upward a short distance above such mid-line. The arms R r are pivoted to the short lever S by pivots s s', and the arms R' r' are pivoted to the actuating-lever T by pivots s'' s''', to which lever is also pivoted the longer arm of the lever S by pivot t, which is arranged so that the distance from the pivot t to the pivot s' and from the pivot t to the pivot s''' are equal. The distance between the pivot s and pivot s' and the distance between the pivot s'' and the pivot s''' are also equal. The free end of the actuating-lever T extends outward beyond the pivot t and is attached to the brake-rod U, which extends downward through a hole u in the base-plate H and is actuated by suitable means, such as the screw-wheel V, which works upon the lower end of the rod U and bears against the bracket U', which is secured to the frame I.

The brake-shoes are secured to springs 1 and 2, which are secured to the stay-braces, which secure the brackets together. Above the spring 1 is secured the strap 6, which is also secured to the upper pair of braces 3 3, and upon which is mounted the idle-wheel 7, which is used to guide the sprocket-chain N.

In practice the motor is placed upon the rails, as shown in Fig. 1. It will be understood that the distance between the bearing-surfaces of the rail or rails is such that when the traction-wheels are in position thereon the springs F will hold the traction-wheels D and D' and D'' and D''' firmly against their bearing-surface, and so increase the traction thereon. The driving-shaft l and driving sprocket-wheel L being revolved toward the right, the driven sprocket-wheel D''' and the

traction-wheel C''' and the driven sprocket-wheel D' and the traction-wheel C' are revolved toward the left and the sprocket-wheels D and D'', with their respective traction-wheels C and C'', are revolved toward the right, and the motor moves toward the right. The reverse motion is accomplished by reversing the motion of the driving sprocket-wheel.

It will be understood that the cab Z of the motor is suspended from the base-plate H by suitable means and the motive power is applied to the shaft l by suitable means within such cab, but not shown.

When it is desired to ascend a steep grade, as in mountain railroads, if the springs F do not cause the traction-wheels to grip the track enough to propel the train the levers g are actuated by screwing the hand-wheel k, thus drawing the actuating-rod J downward to force the pins G upward against the sashes B' B'', and thus force the traction-wheels C' C''' upward against the bottom of the rail to grip the rail firmly between the upper and lower traction-wheels, and thus secure great traction-power with a motor of light weight, thus greatly increasing the efficiency and economy of the motor, for where the weight of the motor is used to produce the traction between the drive-wheels and the track there is necessarily a great amount of power lost in propelling the additional weight of the motor up the incline, and by producing a traction upon a rail situated between two opposing sets of drivers any amount of traction desired may be produced irrespective of the weight of the motor, which may be of the lightest form possible, thus avoiding the loss of power from propelling heavy machinery and enabling the motor to haul a load up an incline which could not be ascended by a single-traction motor depending upon the force of gravity for friction between the driver and the rails.

I prefer to employ a tubular truss-track, with the rails situated one above the other and supported above the ground, as illustrated in Fig. 1; but it is obvious that my motor can be adapted to run upon an ordinary T-rail by arranging the traction-wheels to bear upon each side of the head of the rail. The modifications necessary to adapt the motor for such track will readily suggest themselves to those versed in the art and does not require illustration.

It is obvious that other means may be employed for actuating the sashes to press the traction-wheels more forcibly upon the rail and also for actuating the traction-wheels and the brake, and I do not limit myself to the exact construction shown.

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

1. The combination of the C-shaped brackets provided with the sash-groove on the inner side, the sashes situated, respectively, at

the top and the bottom of such bracket, the traction-wheel and sprocket-wheel journaled to the sash, and the sprocket-chain connected with suitable means for driving the same
5 and arranged about the sprocket-wheels to drive the upper and lower traction-wheels in opposite directions.

2. The combination of the C-shaped brackets provided with the groove on the inner
10 side, the sashes situated, respectively, at the

top and the bottom of such bracket and provided with the shaft journaled thereon and provided with the traction-wheel, the spring arranged to press the two sashes toward each other, and operative means for rotating the
15 traction-wheels.

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