

No. 640,050.

Patented Dec. 26, 1899.

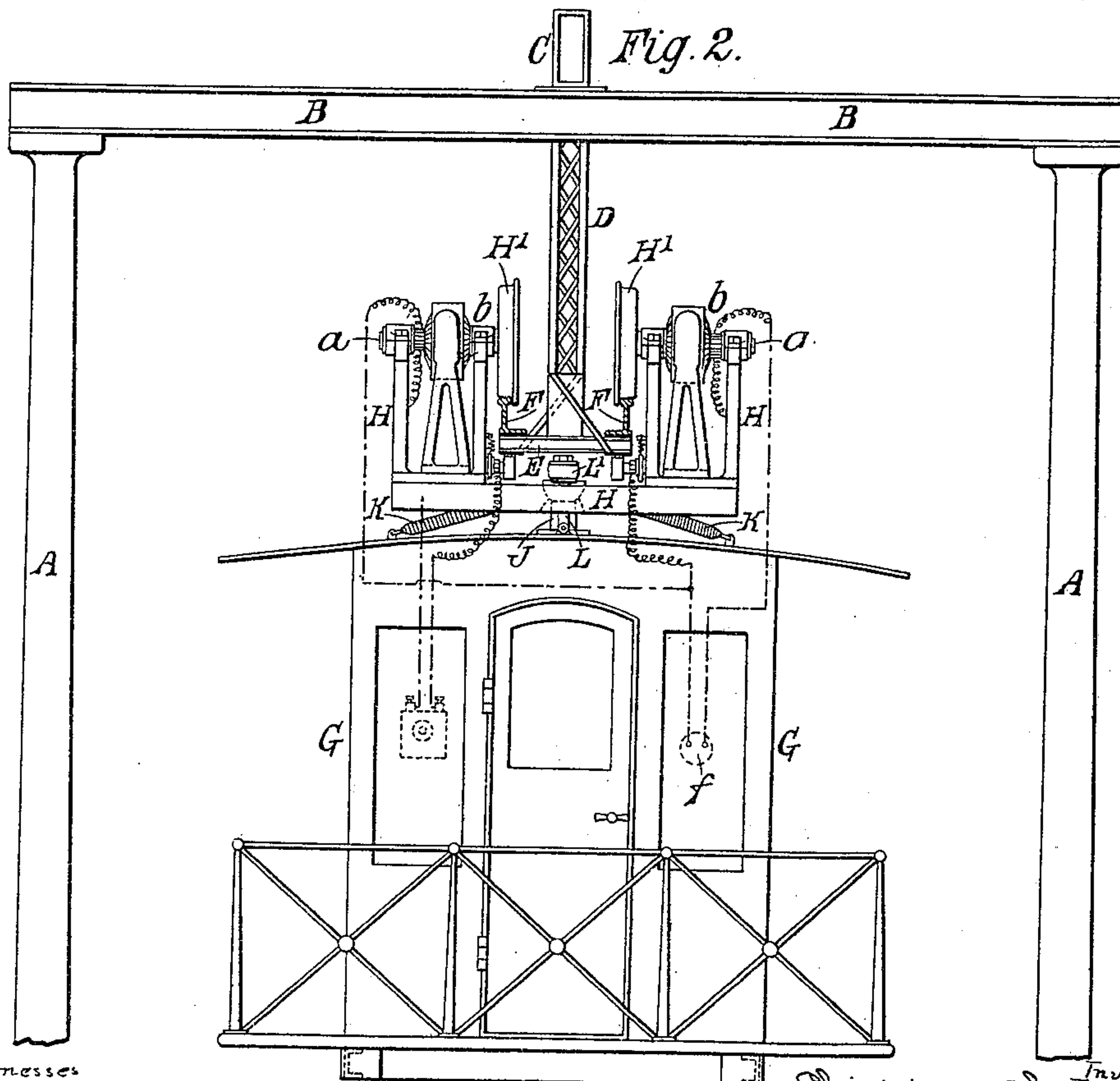
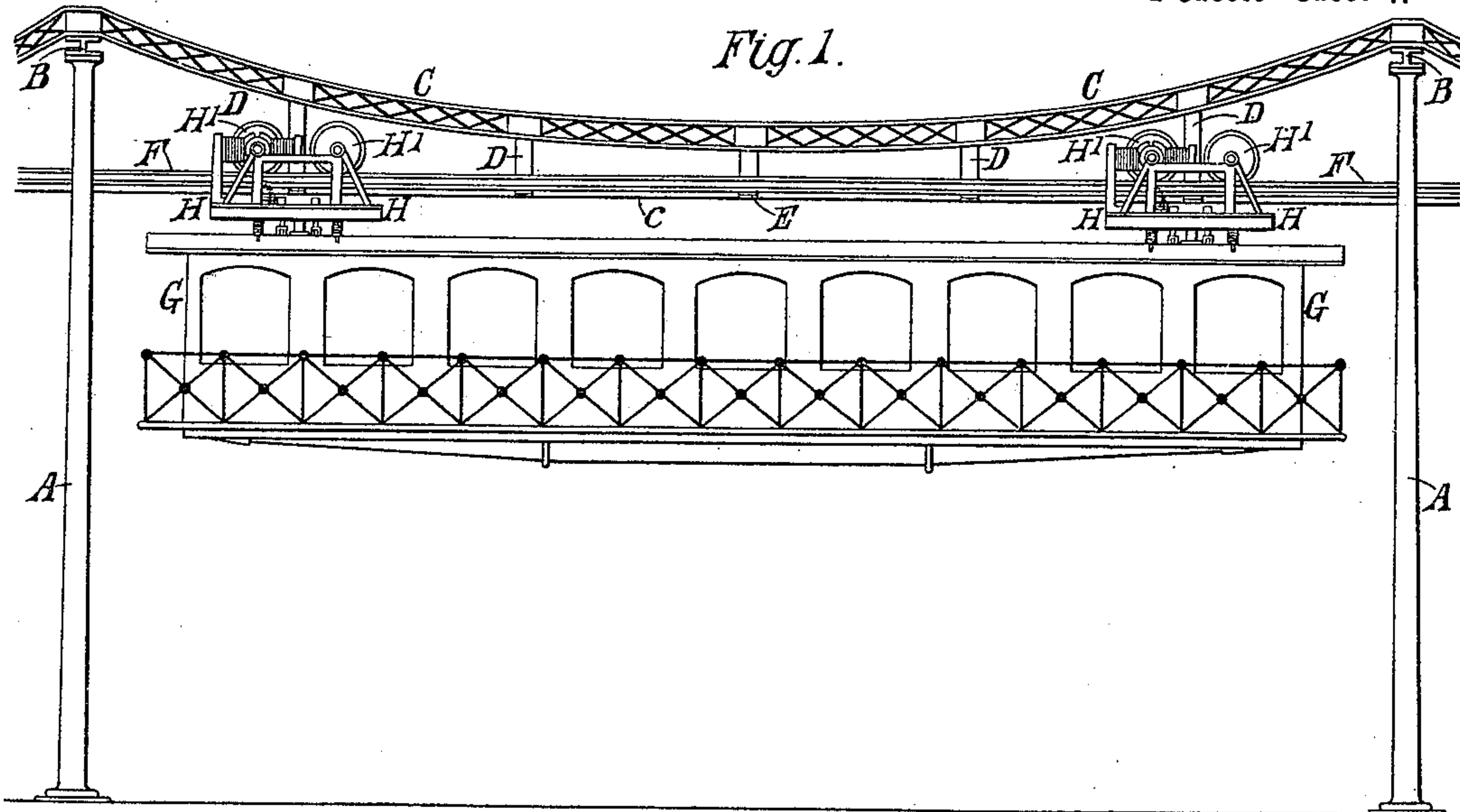
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SUSPENSION RAILWAY AND CAR OR CARRIAGE THEREFOR.

(Application filed Jan. 16, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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Fig. 3.

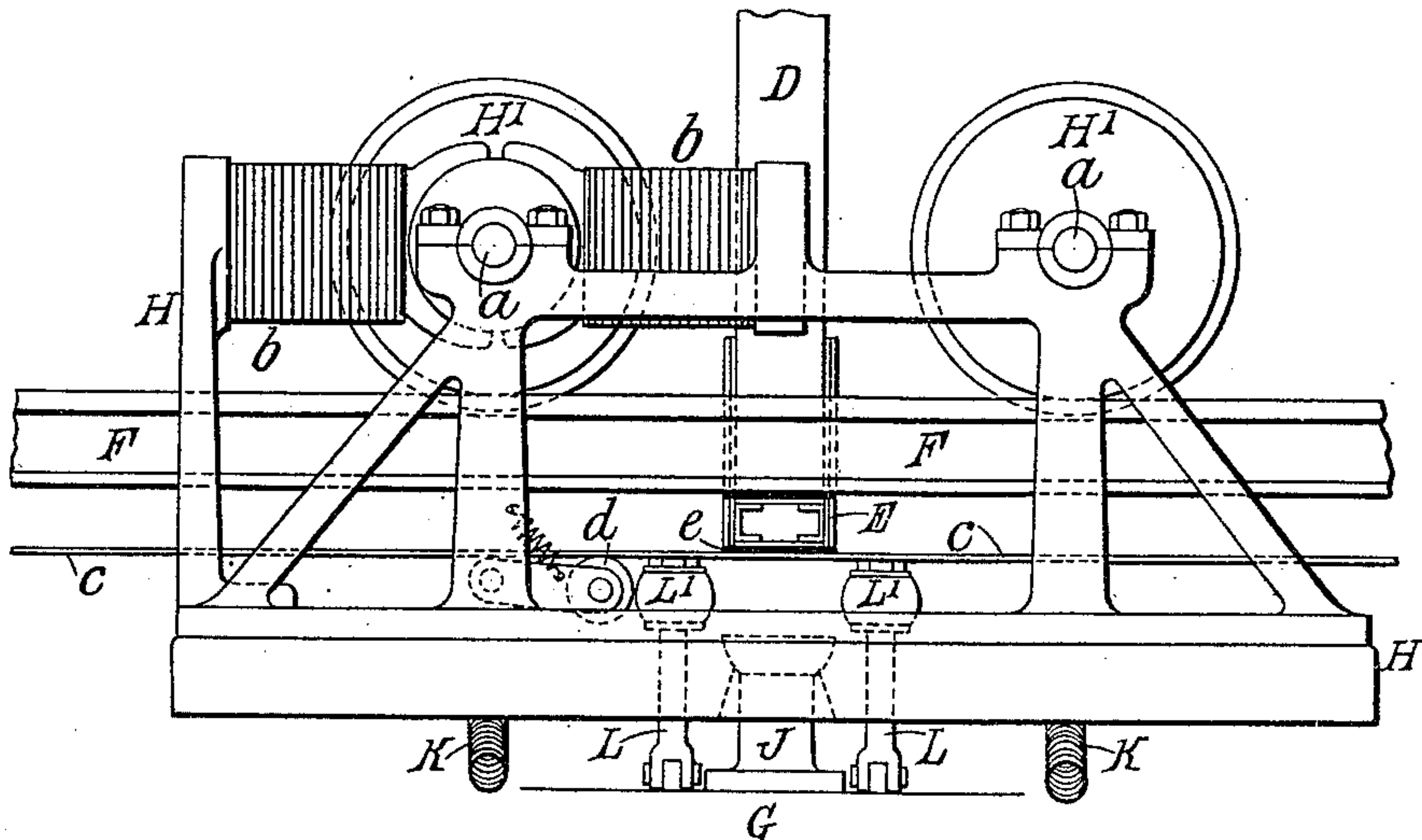
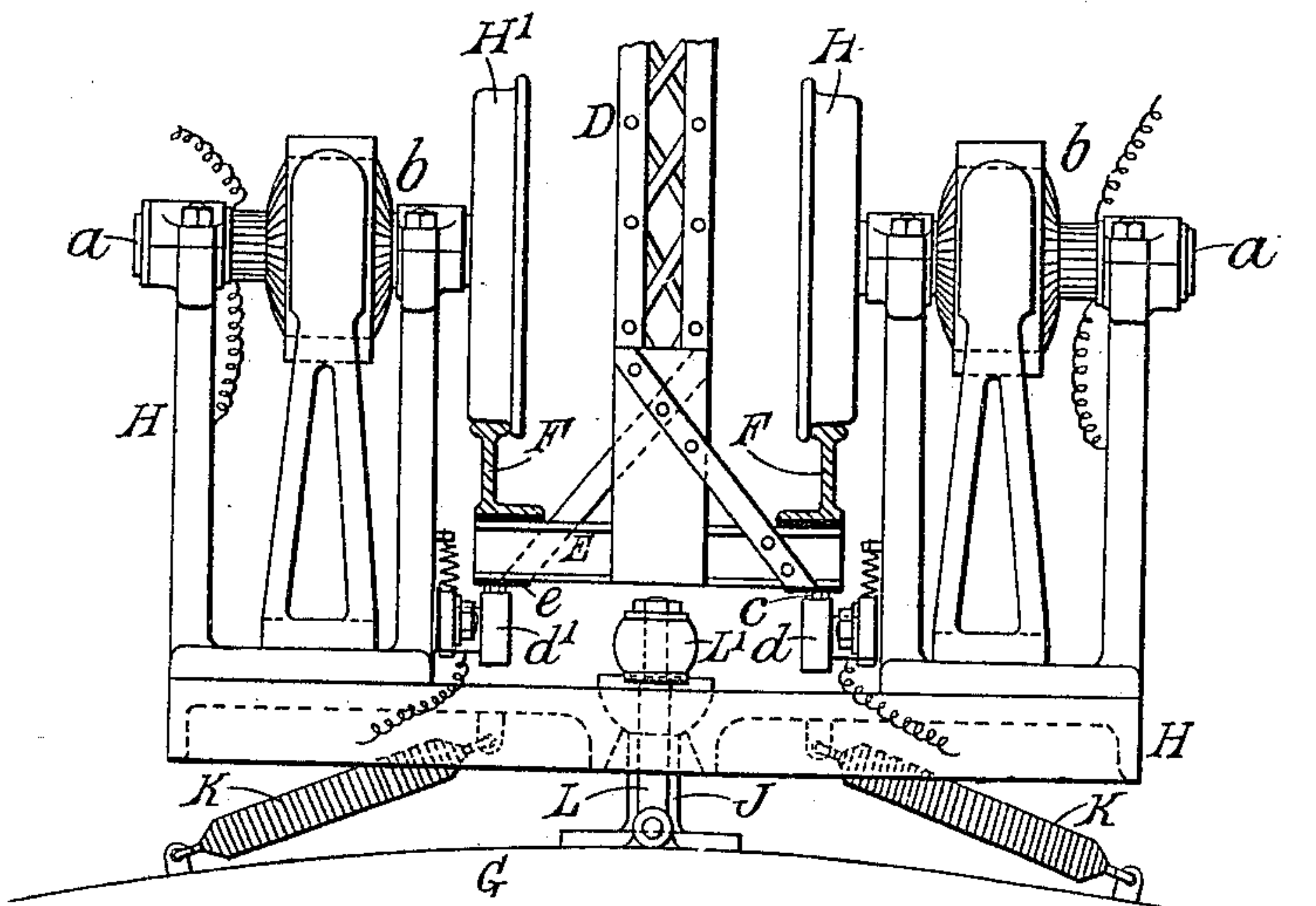


Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

CHRISTIAN VON THAL, OF ST. PETERSBURG, RUSSIA, AND ROMAIN WEISS,  
OF SURESNES, FRANCE.

## SUSPENSION-RAILWAY AND CAR OR CARRIAGE THEREFOR.

SPECIFICATION forming part of Letters Patent No. 640,050, dated December 26, 1899.

Application filed January 16, 1899. Serial No. 702,307. (No model.)

*To all whom it may concern:*

Be it known that we, CHRISTIAN VON THAL, civil engineer, a subject of the Emperor of Russia, residing at St. Petersburg, Russia, and  
5 ROMAIN WEISS, engineer, a citizen of the French Republic, residing at Suresnes, near Paris, France, have invented certain new and useful Improvements in Suspension-Railways and in Cars or Carriages Therefor, of which  
10 the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a part of our improved suspension-railway, showing a car  
15 suspended therefrom. Fig. 2 is a transverse section of the said railway drawn to an enlarged scale, showing also an end elevation of the car and one of its supporting-bogies. Fig. 3 is a side elevation, and Fig. 4 an end  
20 elevation, both drawn to a further enlarged scale, showing one of the supporting-bogies of the car.

Like letters of reference indicate corresponding parts throughout the drawings.

25 Our invention is designed to provide an improved electric suspension-railway on which cars or carriages for either passengers or goods can be caused to travel with safety at a high velocity and with but little vibration and  
30 noise and can be easily controlled either by the conductor or from the generating or other station.

The object of our said invention is to provide a more direct connection than heretofore between the car and the car-trucks, and  
35 thus reduce the weight of the moving parts and at the same time to permit lateral swinging of the car through a small angle, while preventing undue swinging thereof.

40 Hitherto the car has been suspended through the medium of vertical rods and springs from transverse beams, which in turn are suspended from the car-trucks by the swiveling connections. This arrangement  
45 not only makes the moving parts unnecessarily heavy, but also involves the use of many parts and connections, which are liable to wear and to increase the vibration and

noise occasioned when traveling. Now by our invention we reduce the number of parts 50 and diminish the liability to wear and to vibration and consequent noise.

To this end our said invention partly consists in the combination of car trucks or bogies adapted to run upon overhead rails, a car 55 or carriage and king-bolts or pivots secured directly to said car or carriage and suspended from said trucks or bogies, respectively, so that the said car or carriage is free to swing laterally through a small angle, and said 60 trucks or bogies can turn relatively to said car or carriage when traveling around a curve.

Our said invention also partly consists in the combination of car trucks or bogies adapted to run upon overhead rails, a car or carriage, king-bolts or swinging pivots rigidly 65 secured directly to said car or carriage and mounted in spherical bearings in said trucks or bogies, respectively, and springs directly connecting said car or carriage to said trucks 70 or bogies on both sides of said king-bolts or pivots, whereby the lateral swinging of said car or carriage is controlled, so as to prevent undue swinging thereof, and our said invention further consists in the various combinations hereinafter described, and pointed 75 out in the claims.

A A are supports which may consist, for example, of columns or of old rails bolted or riveted together and which are firmly fixed 80 in the ground in any well-known manner and are rigidly connected together in pairs by cross beams or girders B. Upon these cross-girders are supported the suspension-girders C, from which depend tension-supports D, 85 provided with cross-beams E, whereon the rails F are laid and secured. If desired, suitable provision is made whereby the said tension-supports can be lengthened or shortened to adjust the rails to the proper level. 90

G is the car, which is made as light as is practicable, having regard to the load which it is to carry. This car is suspended at each end from a truck or bogie H, mounted on two pairs of wheels H', that run upon the rails F. 95 The car G has rigidly secured directly to it



two strong pivot-pins or king-bolts J, one near each end of the said car. Each of these pivots or king-bolts J has a head which is made in the form of a zone of a sphere and rests in a correspondingly-shaped seat in the bogie-frame H', so that the car can swing laterally and the bogies can turn or swivel relatively to the car sufficiently to accommodate themselves to curves in the railway. To prevent excessive swinging of the car, it is also directly connected to the bogies through the medium of springs K, located on opposite sides of the pivots or king-bolts J, and for this purpose spiral springs or india-rubber springs are preferably used.

If deemed desirable, we provide supplementary suspension-rods L, provided with india-rubber cushions or springs L' and so arranged that should the central pivot-pin or king-bolt break they will come into action and efficiently support the car. These suspension-rods L are pivoted to the car one in advance and the other in rear of each swiveling bolt or king-bolt J, so that they will not interfere with the turning of the car-truck relatively to the car. The cushions or springs L' prevent or diminish shocks or jars when the said suspension-rods come into action.

The wheels H' are fixed upon separate axles *a* so that they can rotate independently of each other, and in the arrangement shown two of the wheels of each bogie are driven by means of electric motors *b*, the armatures of which are fixed, respectively, on the axles of the said wheels or on shafts connected therewith by suitable gearing. The said axles are, as above stated, preferably made tubular and mounted in ball-bearings.

If desired, two or more of the aforesaid cars or carriages are coupled together, in which case suitable couplings and buffers are provided.

The electric current is supplied to the motors *b* from a suitable generating-station through an insulated conductor *c*, Figs. 3 and 4, secured to the cross-beams E beneath one of the rails F and through one or both of the rails themselves, which are also insulated, a suitable roller *d*, carried by a spring-arm, being provided to establish a rolling contact with the conductor *c*. A similar insulated conductor *e* and roller *d'* are also provided beneath the other rail F to permit of telegraphic or telephonic communication between the car and either or any of the stations. A switch *f* is provided in the conductor's compartment of the car G for each motor-circuit, and another switch controlling the motor-circuits is provided at the generating-station or at any of the other stations. The train can therefore be put in motion or stopped either by the conductor or by an operator at one of the stations. When the latter method is adopted, collisions are easily avoidable, as the operator at the said station, being provided with an in-

dicator, will know the position of the cars or trains on the line at any time.

We prefer to use acoustic or audible signals—such, for example, as bells or telephones—in the conductor's compartment operated from the stations.

We also provide one or more automatic electric brakes which will be applied to one or more of the wheels of the trucks or bogies as soon as the motor-circuit is interrupted. Consequently should an axle be broken the electric brake will immediately be applied, so as to arrest or retard the motion of the train.

The shifting of the cars or carriages from one line to another is effected by means of a kind of carrier-bridge suitably suspended so that it can turn about a vertical axis. The turn-tables are also suitably suspended.

Our improved cars can be made on a small scale for use in carrying letters, parcels, and the like.

What we claim is—

1. The combination, with trucks or bogies adapted to travel upon overhead rails, and a car or carriage, of king-bolts or pivots rigidly secured at their lower ends directly to the central part of the end portions of the car-top and at their upper ends pivotally suspended from the trucks or bogies, and bolts or rods arranged around the said king-bolts or pivots and connecting said trucks with said car, substantially as described.

2. The combination, with two trucks or bogies adapted to travel upon overhead rails, and a car or carriage, of king-bolts or pivots swiveled at their upper ends, respectively, to the trucks or bogies and rigidly secured at their lower ends to the car-top, bolts or rods arranged around the said king-bolts or pivots and connecting said trucks with said car, and springs or cushions between said bolts or rods and the surfaces on which they bear, substantially as described.

3. The combination of trucks or bogies adapted to run upon overhead rails, a car or carriage, king-bolts or pivots rigidly secured directly to said car or carriage and mounted in spherical bearings in said trucks or bogies respectively, suspension-rods arranged around said king-bolts or pivots and yieldingly connecting said trucks or bogies to the car, and springs directly connecting said car or carriage to said trucks or bogies on both sides of said pivots, whereby the lateral swinging of said car or carriage is controlled, substantially as hereinbefore described.

4. The combination of electrically-propelled trucks or bogies having their wheels mounted upon separate or independent axles and adapted to run upon overhead rails, a car or carriage, king-bolts or pivots directly connecting said car or carriage to said trucks or bogies, suspension-rods arranged around said king-bolts or pivots and yieldingly connecting said trucks or bogies to the car, and springs



directly connecting said car or carriage to said trucks or bogies on opposite sides of said pivots, substantially as, and for the purposes, hereinbefore described.

- 5 5. The combination with two trucks or bogies adapted to travel on overhead rails, and a car susceptible of swinging laterally, of king-bolts or pivots secured at their lower ends directly to the central part of the end  
10 portions of the car-top and respectively suspended from the central parts of the trucks or bogies, and suspension-rods depending from the trucks or bogies and pivotally secured at their lower ends to the car-top in  
15 front and rear of said pivots with their axes

coincident with the axes of the pivots, substantially as described.

In testimony whereof we have hereunto set our hands in presence of two witnesses.

CHRISTIAN VON THAL.  
ROMAIN WEISS.

Witnesses to the signature of Christian von Thal:

DAVID YOUNG,  
ALEXANDER W. ALLEN.

Witnesses to the signature of Romain Weiss:

PAUL DEMENY,  
EDWARD P. MACLEAN.