

No. 843,418.

PATENTED FEB. 5, 1907.

H. ROMANOFF.

SINGLE RAIL ELECTRIC OVERHEAD RAILWAY WITH SUSPENDED VEHICLE.

APPLICATION FILED JUNE 1, 1905.

7 SHEETS--SHEET 1

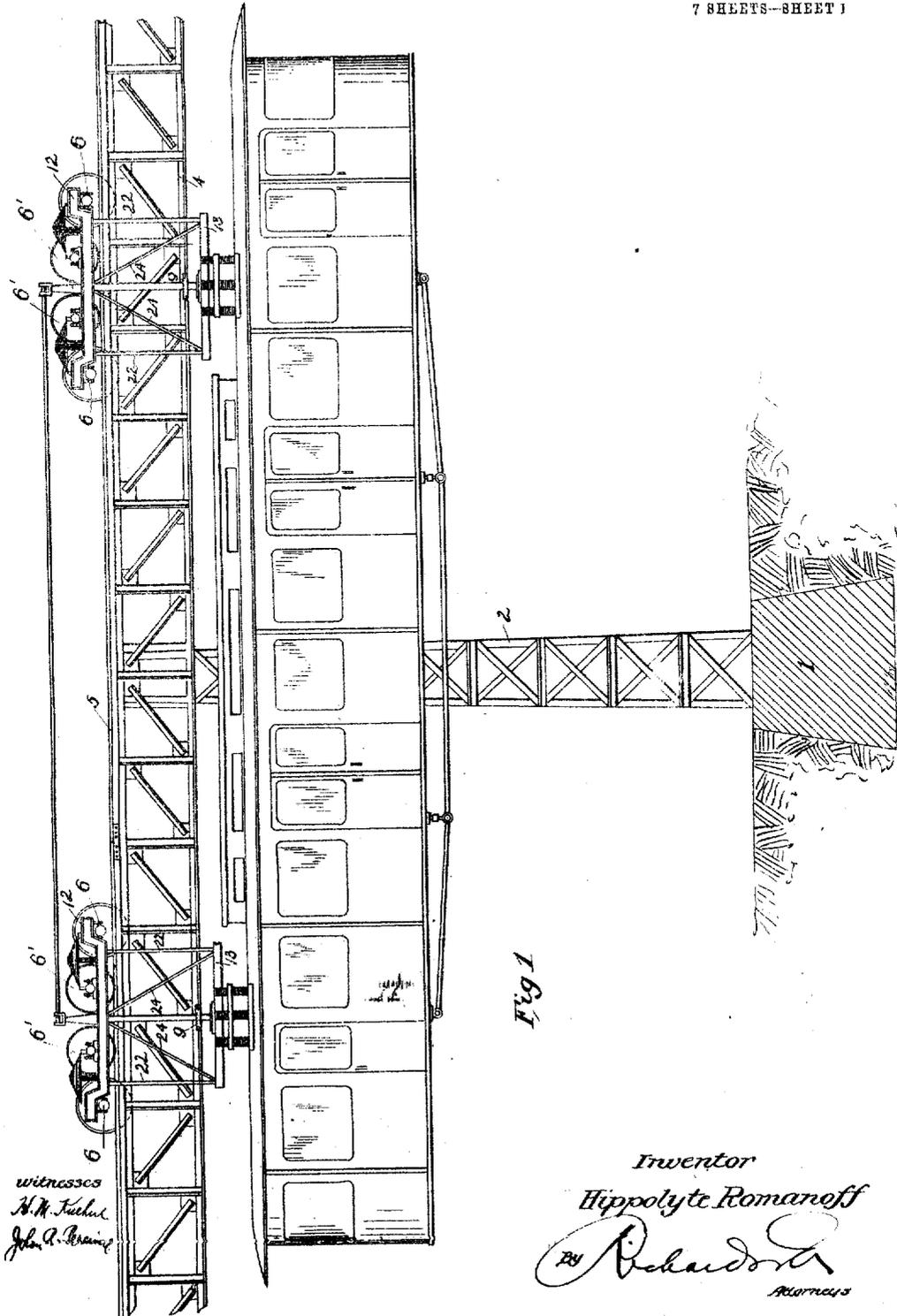


Fig 1

witnesses
H. M. Fuchel
John R. Brown

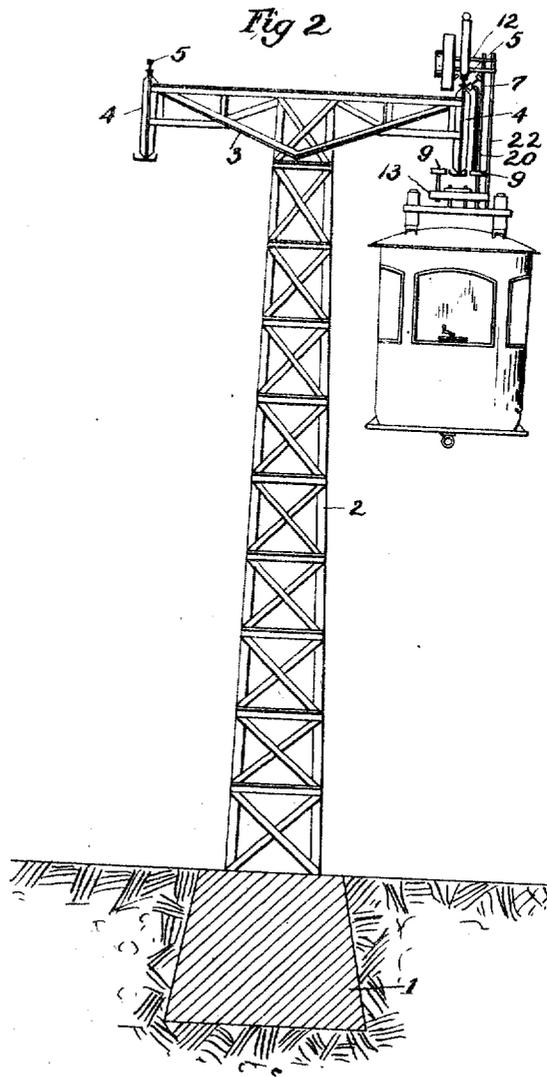
Inventor
Hippolyte Romanoff
By Richard A. ...
Attorneys

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7 SHEETS—SHEET 2.



Witnesses
N. M. Fisher
John A. Perowal

Inventor
Hippolyte Romanoff
By Richard A. ...
Attorneys

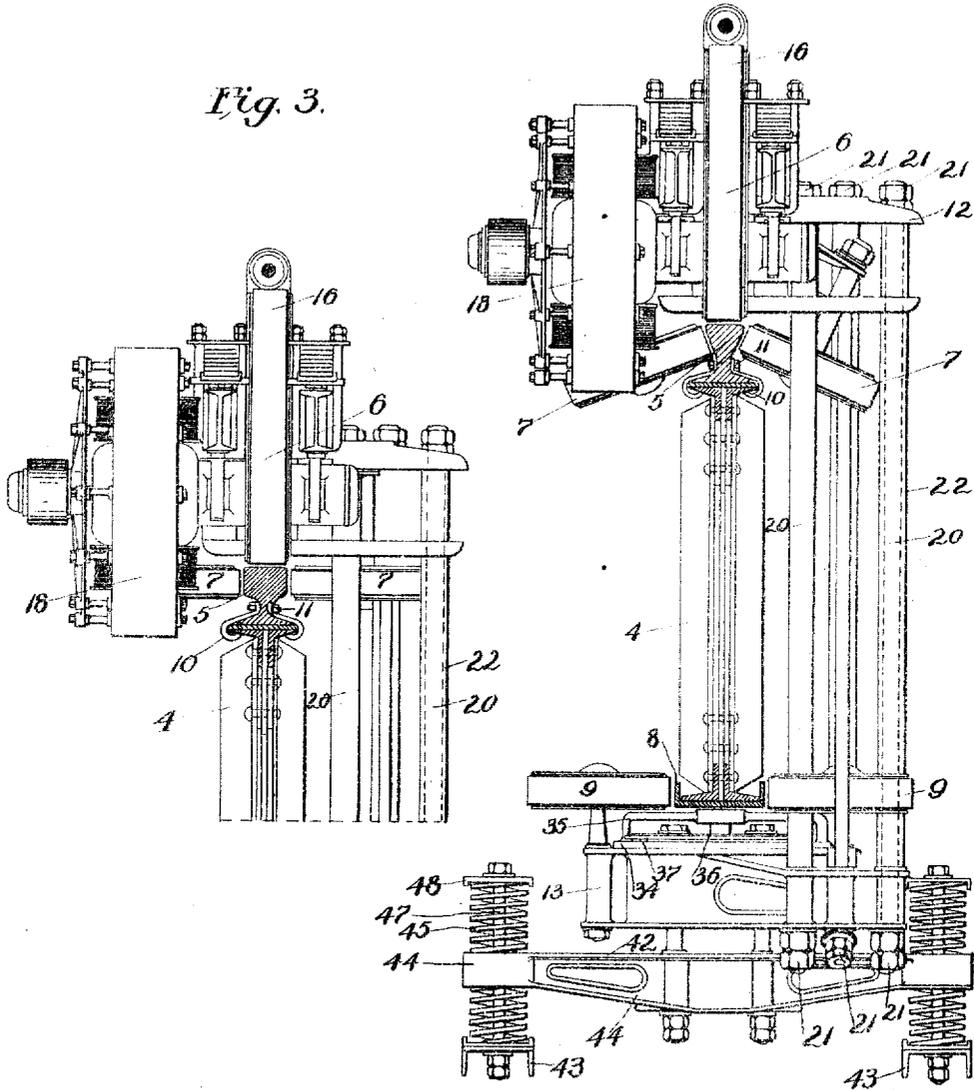
H. ROMANOFF.

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Fig. 4.

Fig. 3.



Witnesses:

Wm. Kichel
John A. Pennington

Inventor:

Hippolyte Romanoff

BY Richard
Attorneys

H. ROMANOFF.

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7 SHEETS—SHEET 4

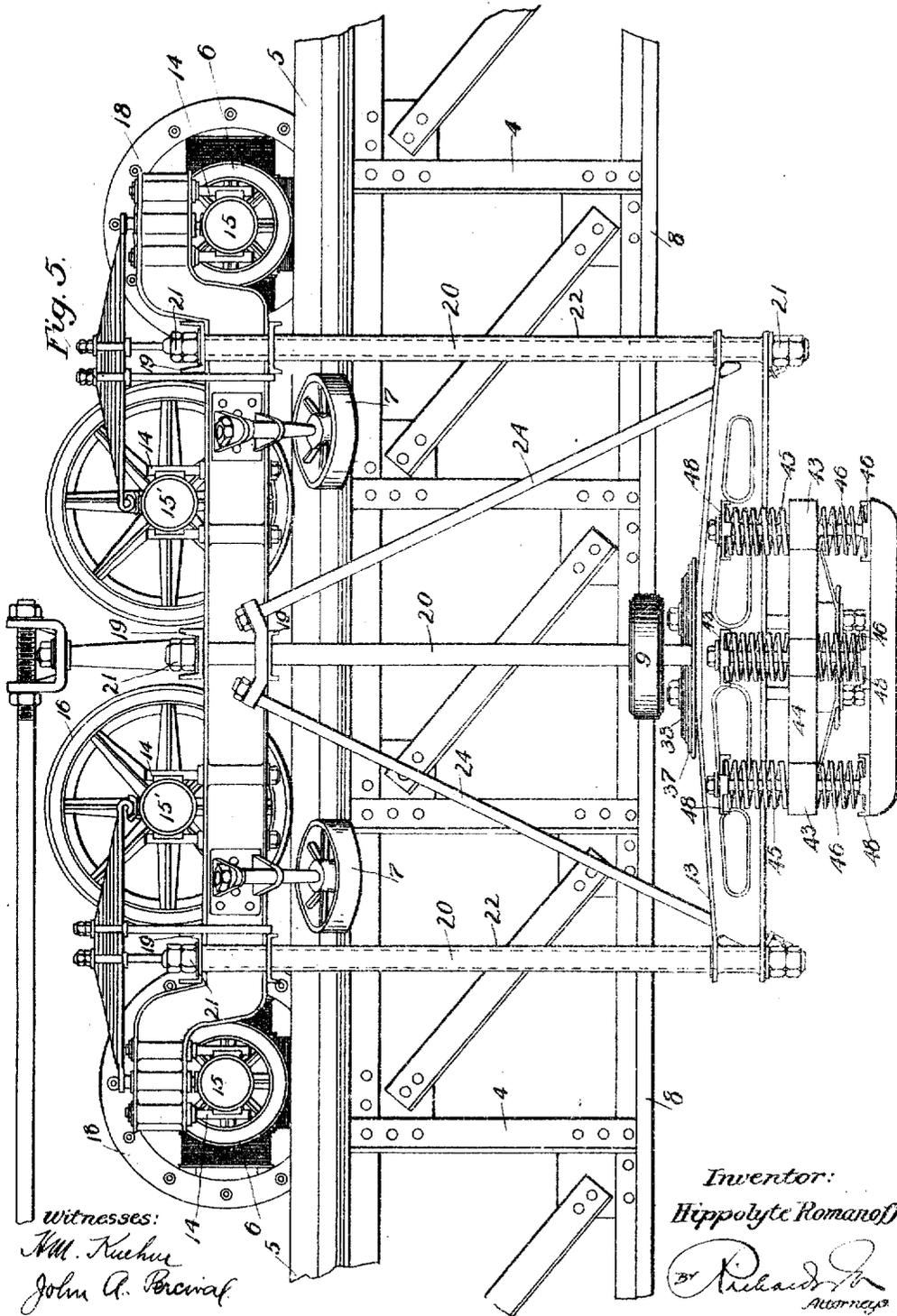


Fig. 5.

Witnesses:
 Wm. Kuhn
 John A. Percival

Inventor:
 Hippolyte Romanoff
 By Richard H. [Signature]
 Attorneys

H. ROMANOFF.
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Fig. 7.

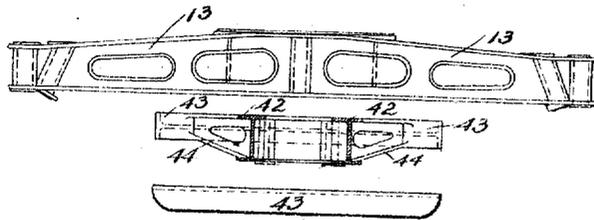


Fig. 6.

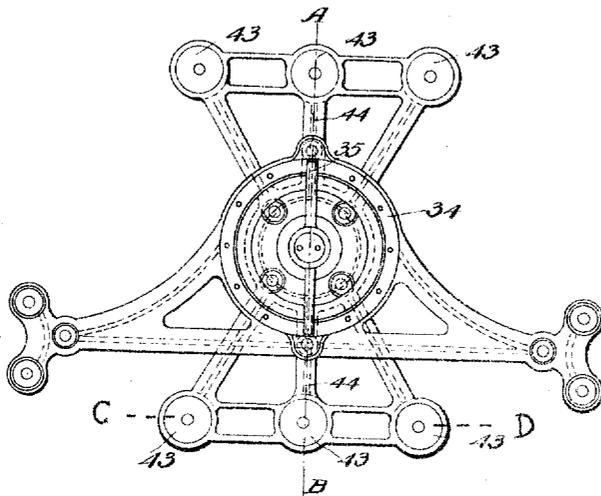
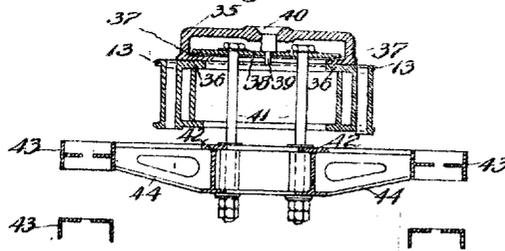


Fig. 8.



Witnesses:
Wm. Kuehn
John A. Percival

Inventor:
Hippolyte Romanoff
Richardson
 Attorneys

H. ROMANOFF.

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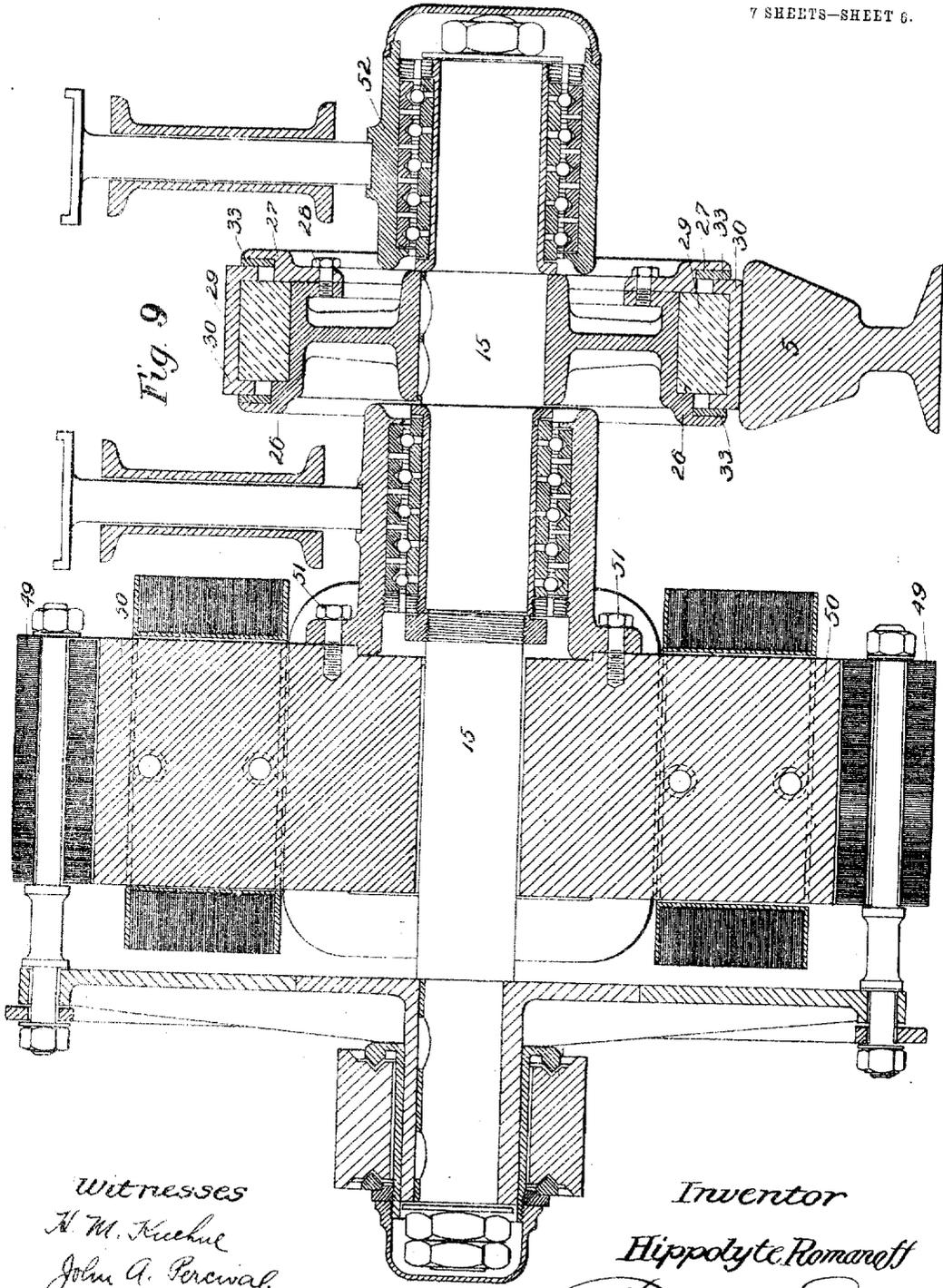


Fig. 9

Witnesses
 H. M. Kuehne
 John A. Perewal.

Inventor
 Hippolyte Romanoff
 By Richardson
 Attorneys

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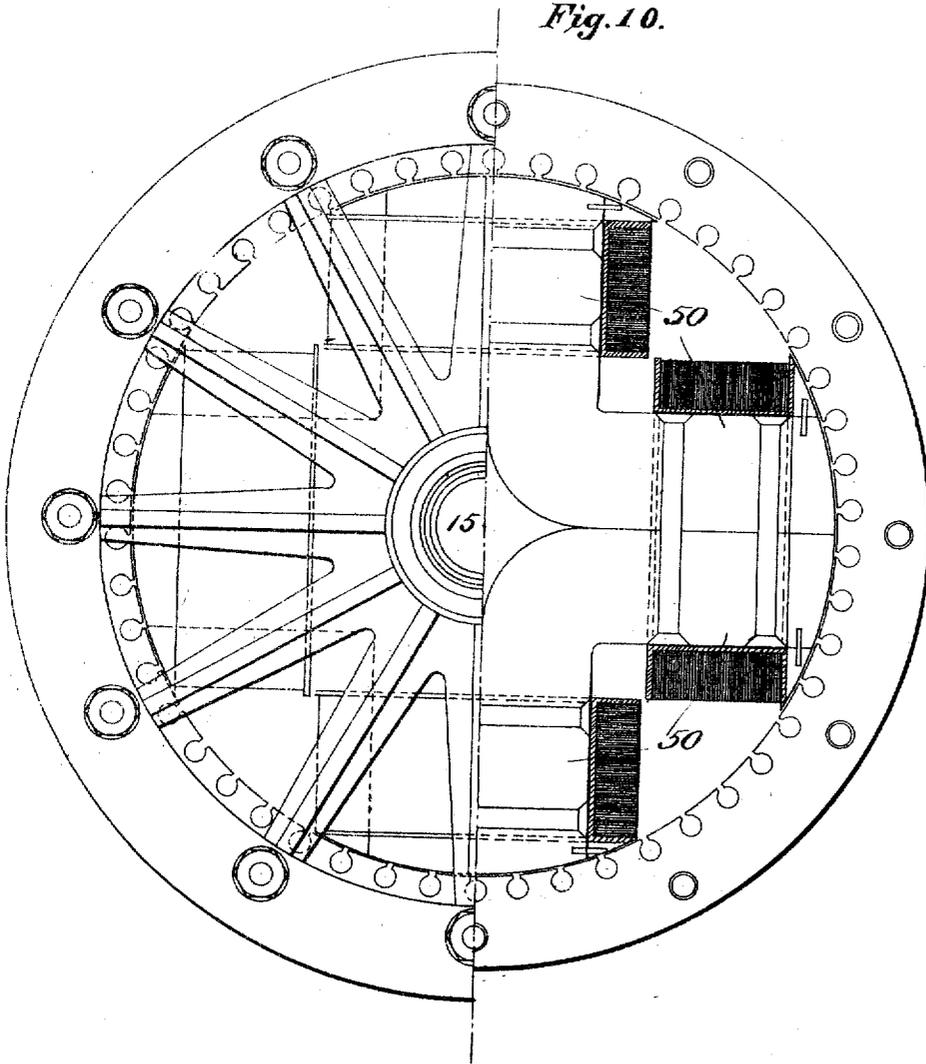
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7 SHEETS—SHEET 7.

Fig. 10.



Witnesses
H. M. Kuehl
John A. Percival.

Inventor
Hippolyte Romanoff
By *Rubinson*
Attorneys

UNITED STATES PATENT OFFICE.

HIPPOLYTE ROMANOFF, OF ST. PETERSBURG, RUSSIA.

SINGLE-RAIL ELECTRIC OVERHEAD RAILWAY WITH SUSPENDED VEHICLE.

No. 843,418.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed June 1, 1905. Serial No. 283,314.

To all whom it may concern:

Be it known that I, HIPPOLYTE ROMANOFF, a subject of the Emperor of Russia, and a resident of St. Petersburg, Russia, (my post-office address being 22 Fontanka, St. Petersburg,) have invented certain new and useful Improvements in Single-Rail Electric Overhead Railways with Suspended Vehicles, of which the following is a specification.

This invention relates to an improved construction in electric single-rail overhead railways with suspended vehicles.

The invention has for its object to obtain in railways of this kind the greatest possible security against derailment. This is effected by the peculiar construction of the wheel-frames and the manner in which the vehicles are suspended, so that the rolling-stock can only become derailed on the simultaneous fracture of several parts of the movable wheel-frames. At the same time the propulsion of the wheel-frames is effected by a comparatively small propelling force, as the running-wheels have no flanges and are constructed with special elastic tires, whereby the detrimental friction of the wheel-tire against the rail is prevented and the concussions are reduced. Lastly, the electromotor employed is of such construction that for operating the same only a comparatively small amount of electrical energy is required, so that the weight of the motor can be kept comparatively small.

The improved construction is shown on the accompanying drawings.

Figure 1 shows a side view of the overhead-railway with the suspended vehicle. Fig. 2, an end view thereof; Fig. 3, an end view of part of the wheel-frame; Fig. 4, the same view of the wheel-frame, but with an altered inclined arrangement of the guide-rollers; Fig. 5, a side view of the wheel-frame; Fig. 6, a plan view of the frame carrying the vehicle; Fig. 7, a section on line C D, Fig. 6; Fig. 8, a section on line A B, Fig. 6; Fig. 9, a longitudinal section of the electromotor; Fig. 10, a cross-section of the same.

The railway rests, by means of standards 2, upon the foundation 1 and consists of transverse bearers 3 and of longitudinal girders 4 fixed to the latter. On the upper flange of the girder is fixed the rail 5, Figs. 3 and 4. On the top of the rail 5 run the driving-wheels 16 and running-wheels 16' of the wheel-frame and at the sides thereof the horizontal or inclined guide-rollers 7, which serve to prevent

the derailing of the wheel-frames. To the bottom flange of the girder 4 is riveted a trough-shaped beam 8, the side flanges of which serve as guides for the lower horizontal side rollers 9 of the wheel-frame. The rail 5 is fixed to the girder by means of clamps 10 and bolts 11 and together with the bottom beam 8 greatly increases the strength and safety of the girder.

The vehicle is suspended from two wheel-frames, each of which consists of an upper frame 12, Figs. 3, 4, and 5, and a lower frame 13. The upper frame 12 is carried by the bearings 14, in which the axles 15' of the running-wheel 16 and the axles 15 of the motor-wheels 6 run. Each axle 15 15' has two bearings 14. In the construction shown each wheel-frame contains four axles 15 and 15'. On the axles 15 are fixed the electromotors 18. The wheel-frame could, however, be provided with a different number of axles and wheels according to circumstances. To the upper frame 12 are riveted at top and at bottom between the wheels trough-shaped steel beams 19 with openings for the passage of the steel bars 20.

The lower frame 13 constitutes a box-shaped frame and also has openings for the passage of the lower ends of the bars 20, which are secured by screw-nuts 21, as are also the upper ends. The bars 20, Fig. 5, are so arranged that some of them are situated near to the rail-girder, while others are situated farther away. The object of this is to render the entire system strong and light as the vehicle suspended from the lower frame tends to bend asunder the wheel-frame, which is of an open-loop shape, so that the bars nearer the rail-girder are subject to a tensional strain, while those situated farther away are subjected to compression. On this account the bars situated farther away from the girder are made of smaller diameter and inclosed in steel tubes 22, which serve as distance-pieces and struts between the upper and lower frames. For reducing the action upon the bars 20, caused by the lateral strains, diagonal ties are provided, lying in the same plane with the bars 20 and subject to a tensional strain. In the construction shown each wheel-frame has three bars 20 and two struts 22, each bar and strut being so calculated as to be capable of supporting the weight of the vehicle and its load, so that the wheel-frame can support a multiple of the actual load.

For maintaining the equilibrium of the wheel-frame upon the line of rail in the absence of flanges on the wheels the upper and lower frames are provided with lateral rollers 7 and 9, which bear, respectively, upon the side surfaces of the rail 5 and of the trough-shaped beam 8. There may be a greater or less number of the side rollers 7 and 9, according to circumstances. In the construction shown the wheel-frame has four rollers 7 and two rollers 9.

By replacing the flanges of the wheels by means of horizontal or inclined rollers 7 and 9 an arrangement is provided by means of which the line of railway is gripped at three points. The possibility of derailing of the wheel-frame without the simultaneous fracture of several of its parts is therefore done away with. In addition, as already mentioned, the frictional resistance caused by the ordinary flanged wheels is obviated.

The suspension arrangement of the vehicle is constructed as follows: On the lower frame 13, Figs. 7 and 8, of the wheel-frame is riveted a bearing-ring 34 with yoke-piece 35. The rings 34 have a circular groove 36, in which run steel balls 37. Upon the ring 34 lies a turn-table 38, which also has a circular groove corresponding to the groove 36. In the middle of the turn-table 38 is formed an opening through which passes the pin 39 of a screw-bolt 40, screwed into the yoke 35. From the turn-table 38 is suspended, by means of bolts 41, a spring-frame 42, which has at its ends box-shaped beams 43, that are connected to the frame by means of ribs 44. The spring-support of the frame 42 is effected by means of the helical springs 45 and 46, which bear against the box-beam 43 and are compressed, by means of bolts 47, with washers 48. The upper springs 45 are made stronger than the lower regulating-springs 46. To the side surfaces of the beam 43 are fixed, by means of the bolts, (not shown on the drawings,) steel rods, from which the vehicle is directly suspended.

For the propulsion of the wheel-frames electromotors are employed, as shown at Figs. 9 and 10, the armature 49 of which is fixed directly upon the axle of the driving-

wheel. The electromagnets 50 are situated within the armature and are fixed by bolts 51 to the bearings of the driving-wheel axles. The electromotor has the peculiarity that the armature 49 has a considerably greater diameter than the driving-wheel, so that the peripheral velocity of the mass of the armature exceeds that of the driving-wheel when running. The mass of the armature can therefore be comparatively small for a certain propelling power, and consequently the electromotor is of less weight than with other constructions. In addition the armature requires a less amount of energy for propelling the vehicle in consequence of its greater turning moment. Lastly, the direct action of the electromotor upon the wheels without transmission-gear enables a very economical consumption of energy to be attained.

I claim as my invention—

1. In a suspended railway-vehicle for single-rail railways, a wheel-frame consisting of upper and lower frames connected together by tie-bars and struts, such as 20, 22, of which the tie-bars 20 are situated nearer to the vertical plane passing through the rail and the middle of the vehicle, than the struts 22, so that the load on the wheel-frame shall put a tension on the tie-bars and a compression upon the struts, substantially as described.

2. In a wheel-frame for a suspended single-rail railway-vehicle, a turn-table such as 38 bearing with antifric-tion-balls upon a ring riveted to the under frame 13 and having a central opening, through which passes the pin 39 of a bolt 40 fixed to the yoke 35 formed in one with the said ring, a box-shaped frame 42 with box-shaped beam 43 being suspended from the turn-table by means of bolts from which beam are suspended with spring action the suspension-rods of the carriage-body, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HIPPOLYTE ROMANOFF.

Witnesses:

N. D. FOMIN,
N. TSCHENOLOFF.