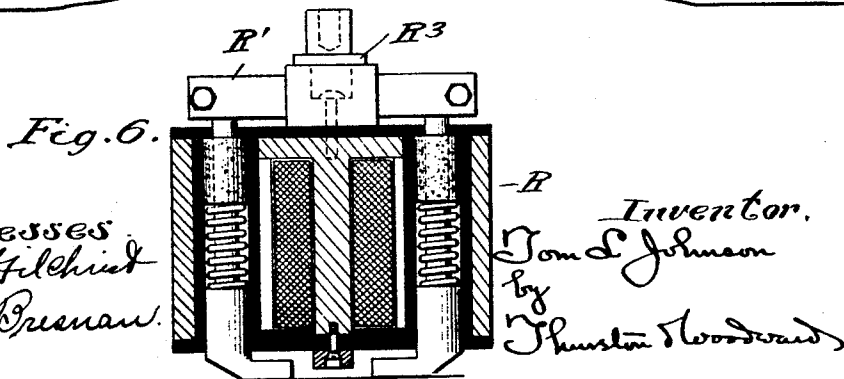
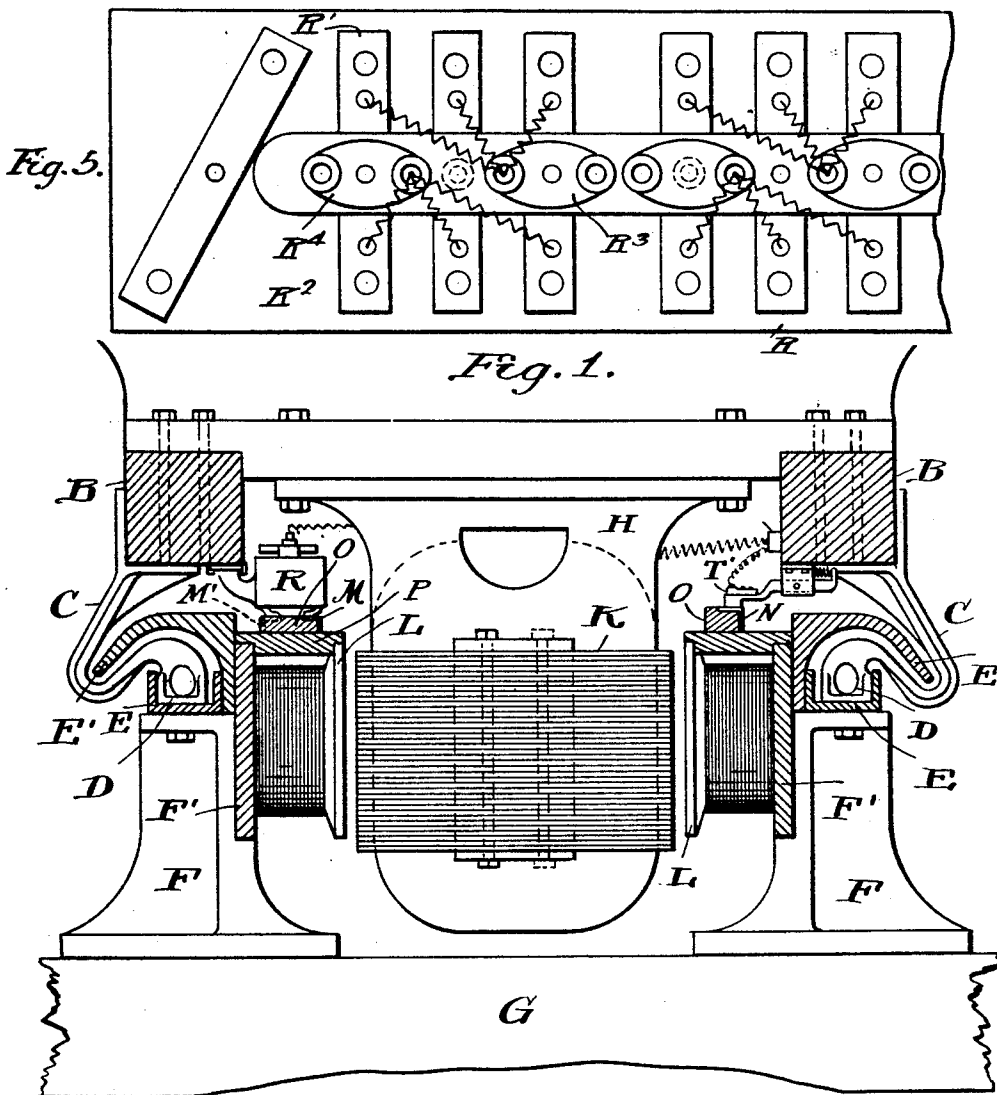


T. L. JOHNSON, DEC'D.
M. J. JOHNSON, ADMINISTRATRIX.
HIGH SPEED RAILWAY.
APPLICATION FILED AUG. 23, 1905.

1,123,306.

Patented Jan. 5, 1915.

4 SHEETS-SHEET 1.



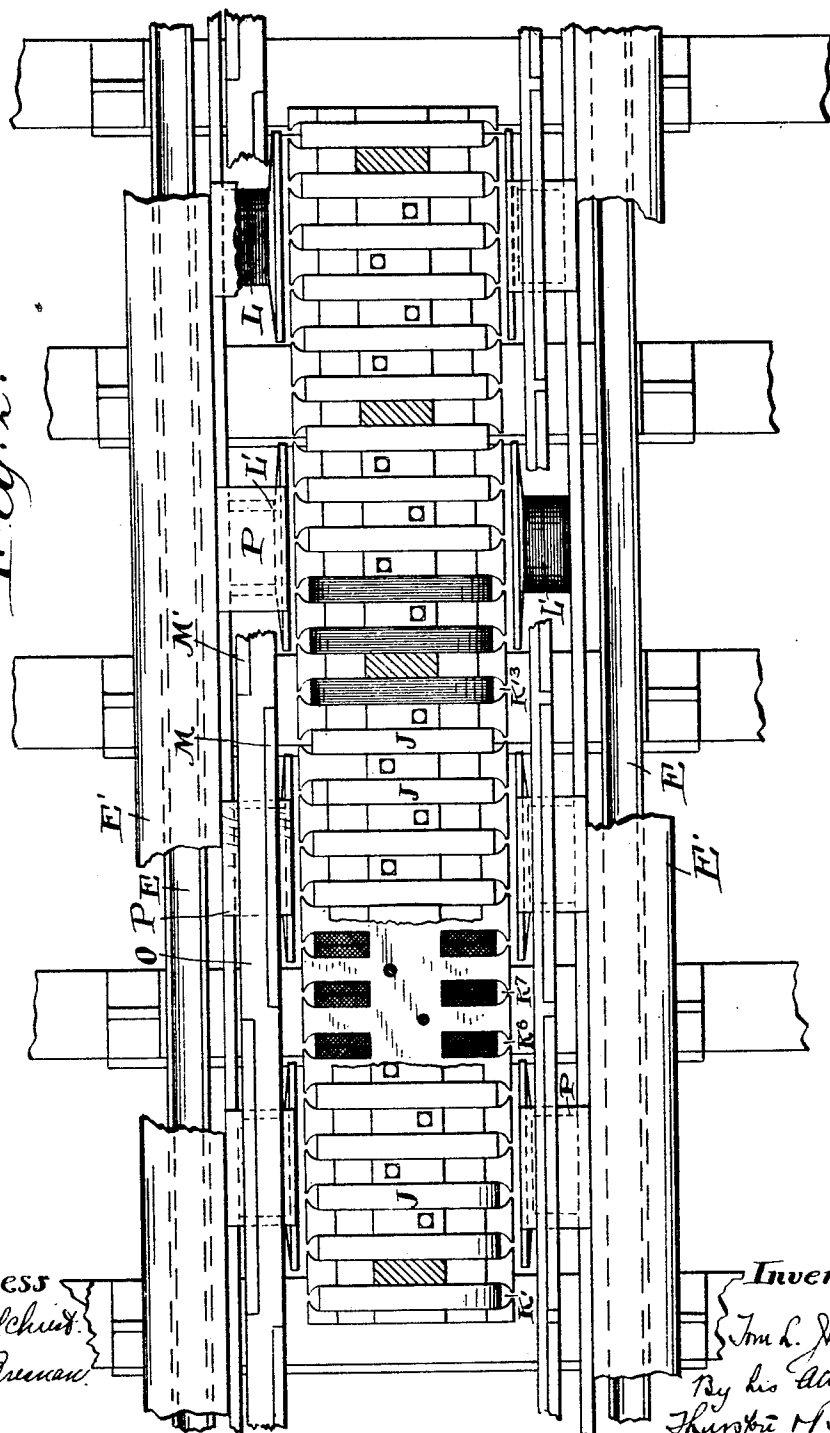
T. L. JOHNSON, DEC'D.
M. J. JOHNSON, ADMINISTRATRIX.
HIGH SPEED RAILWAY.
APPLICATION FILED AUG. 23, 1905.

1,123,306.

Patented Jan. 5, 1915.

4 SHEETS SHEET 2.

Fig. 2.



Witness
E. B. Gilchrist
H. L. Brennan

Inventor
T. L. Johnson
By his Attorneys,
Thurston & Bates

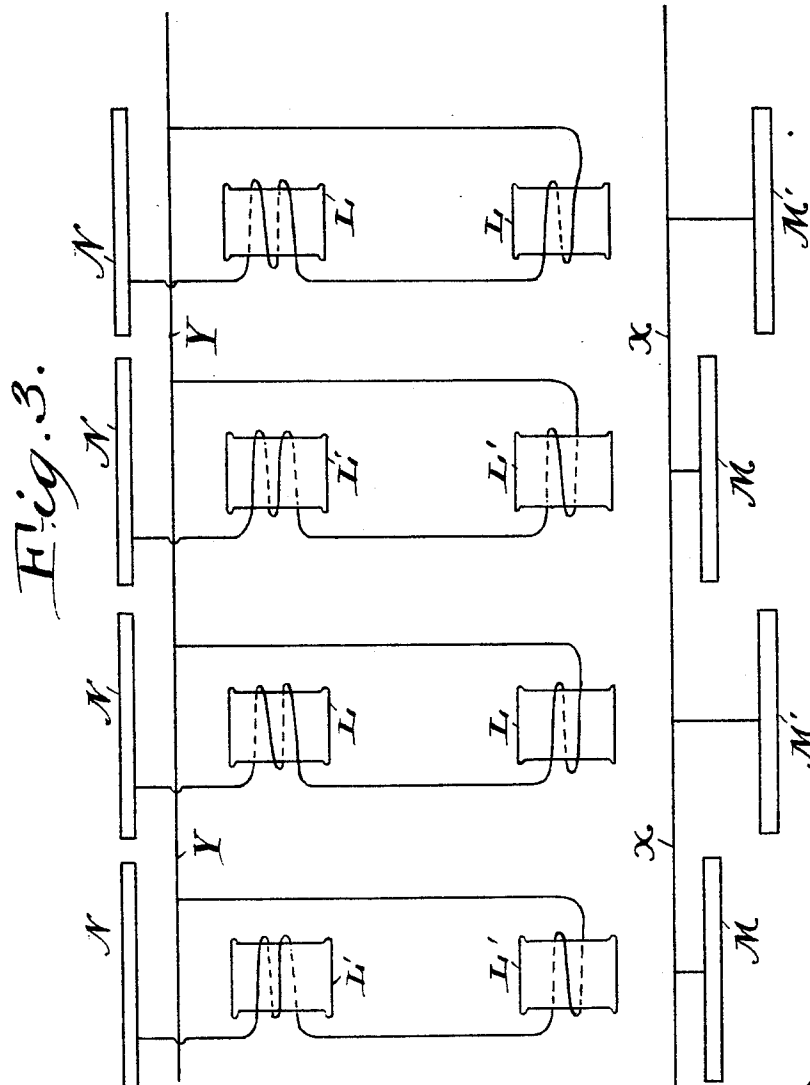
...IVE POWER,
...DIRECT.

T. L. JOHNSON, DEC'D.
M. J. JOHNSON, ADMINISTRATRIX.
HIGH SPEED RAILWAY.
APPLICATION FILED AUG. 23, 1905.

1,123,306.

Patented Jan. 5, 1915.

4 SHEETS-SHEET 3.



Witnesses:
E. B. Gilchrist
N. L. Brennan.

Inventor.
T. L. Johnson
By his Attorneys,
Thurston & Bates.

M. J. JOHNSON, ADMINISTRATRIX

HIGH SPEED RAILWAY.

APPLICATION FILED AUG. 23, 1905.

1,123,306.

Patented Jan. 5, 1915.

4 SHEETS--SHEET 4.



Witnesses.
E. B. Gilchrist
N. L. Brennan.

Inventor,
 John L. Johnson,
 by his Attorneys,
 Thurston & Dale

UNITED STATES PATENT OFFICE.

TOM L. JOHNSON, OF CLEVELAND, OHIO; MARGARET J. JOHNSON ADMINISTRATRIX OF SAID TOM L. JOHNSON, DECEASED.

HIGH-SPEED RAILWAY.

1,123,306.

Specification of Letters Patent.

Patented Jan. 5, 1915.

Application filed August 23, 1905. Serial No. 275,399.

To all whom it may concern:

Be it known that I, TOM L. JOHNSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in High-Speed Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

In high speed traction systems a limit to the practical rate of speed is fixed by the fact that at a certain point the centrifugal force developed by rapidly rotating parts becomes a dangerous and destructive factor. To eliminate this factor from the problem, I have designed and constructed a traction system in which the conveyer is devoid of moving parts and which may be broadly described as a sliding electric railway.

In carrying out my invention, I provide along the trackway a series of electro-magnets and equip the car or conveyer with an electro-magnetic construction, which acts after the manner of an armature with regard to the field developed by the track magnets.

In the practical operation of a railway of this sort, I have found it desirable to so arrange the field magnets that the magnetic pull will have no downward component, since the existence of such a component increases the friction of the sliding parts and brings additional strain to bear upon the supporting members. In order to avoid these results I have designed a construction in which there is no downward pull and which may even be arranged so as to develop an upward lift and thereby decrease the normal friction and materially assist in increasing the speed of the car.

The structure which I have adopted comprises a car supported by shoes which slide in a trough-like track, the latter being provided with a suitable lubricant. Installed along the trackway on each side thereof are placed horizontally disposed electro-magnets occurring in pairs,—the polarity of both the members of a pair being the same, but alternating in character with each successive pair. Hung from the car and adapted to pass between the opposite rows of track magnets is a suitably wound armature adapted to cooperate with the track magnets in moving the car along. The relative location of the track or field magnets

and the armature on the car is so determined as to eliminate any downward component in the magnetic pull, and, as above indicated, the armature may be swung sufficiently low, or the field magnets be sufficiently elevated to create an upward component so that a lifting effect shall be obtained.

Referring to the accompanying drawings, Figure 1 is an end elevation, partly in section showing the relative location of the several parts of the motor devices; Fig. 2 is a plan view of the armature and track, partly broken away and partly in section; Fig. 3 is a diagrammatic plan showing the winding of the track or field magnets; Fig. 4 is a diagram illustrating the method of winding the armature carried by the car; Fig. 5 is a plan of a portion of the collecting and commutating brushes; and Fig. 6 is a cross section of the same.

In the various figures, A represents the car body supported on any suitable bed frame, B, which in turn is supported by goose-neck sliding shoes C, having heads D, adapted to freely move in trough-shaped tracks E.

The tracks E are provided with an overlapping projecting cover E' adapted to prevent the access of dirt, water, snow and the like.

Supporting the track E, are chairs F,—those opposite each other being preferably connected by a yoke G.

Beneath the car are supporting frames H, carrying the armature K, which latter is a laminated structure composed of several superposed thin plates lying face to face, and provided with a number of projections on each side throughout their length affording spaces K', K², K³, etc., having therein armature windings J J, to be subsequently described with more detail. When properly wound, these projections on the armature will form pole pieces which cooperate with the field magnets L L' to move the car.

Carried by the chairs F, and immediately supported by plates F', are the field magnets L L', disposed in such manner that their poles are practically level with, or in certain cases slightly above the level of, the armature K.

L designates magnets of the same polarity and L' magnets of polarity opposite thereto.

It will be seen that I have arranged the magnets in opposite pairs along the trackway, each pair presenting a pole of the same character to the car armature as it passes between them. This arrangement of the magnets is desirable for the purpose of balancing the side pull.

For the purpose of feeding the current to the car and through the armature coils, there are provided contact rails M, M' and N,—the rails M and M' being connected—for example with the positive feed X, and the rails N being connected with the return Y. These contact rails are in sections, separated and insulated from each other, the sections being of a length a little less than the distance between the track magnets. They are properly supported on non-conducting material,—preferably strips of wood O, supported upon blocks P, which in turn are carried by the several track magnets L L'. The sections N are placed in alinement along the trackway. The sections M M' are placed opposite the sections N, but only the alternate sections are in line with each other. This arrangement of the rails M M' is for the purpose of feeding the current alternately to two sets of collecting commutating brushes, that are arranged to pass thereover.

Carried by a bracket supported from the car, are a series of commutating collecting brushes R adapted to slide over the contact rails M M'. These brushes are divided into several independent groups of six brushes each, of which three R' R' R' are placed on one side and adapted to ride over the rails M, and three R² R² R² are placed on the opposite side and adapted to ride over the rails M'. Each group is provided with means for creating a magnetic flux designed to blow out the sparks which tend to form when contact is broken, but I will not describe the detail structure of this arrangement since it forms no part of the subject of the present application and claims, and is not necessary to the complete understanding of the invention claimed.

The current from the three brushes R' R' R' on one side of each group is led to a collecting box R³, while the current from the brushes R² R² R² on the opposite side of each group is led to a second collecting box R⁴. From these collecting boxes, the current is carried up into the car and through the coils about the armature, out to a bus bar T, from which it is led to several contact shoes T' which ride over the return contact rails N.

Referring to the diagrams in Figs. 3 and 4, it will be seen that the two wires leading from the first group of collecting brushes are each wound about the core of the car armature in the space K' between the first two pole pieces, but the two wires are

wound in directions opposite to each other and the separate coils are of course suitably insulated. From this first space K', these two wires are led a distance along the core and again wound thereabout, allowing a sufficient number of spaces to intervene to receive the wires from the several groups of collecting brushes, which in the present instance are six in number, thus forming succeeding groups of coils along the armature. The winding of each wire in the second group is in a direction reverse to that in the first group in each instance. The wires are then led along the same number of spaces, and their direction again reversed, and so on throughout the length of the armature. From the last winding the wires are led to the bus bar T. The wires from the second, third and each succeeding group of collecting brushes are wound in a manner similar to those from the first group.

Referring to Fig. 3 particularly, it will be seen that the contact rails M M' are each connected directly to a single wire, the positive feed X, while the sections N are connected each through a pair of track magnets L L or L' L' to the return Y. From the above construction, it follows that the direction of the current through the armature coils is constantly changing as the car advances, by reason of the fact that the commutating brushes, first on one side R', and then on the other R², come in engagement with the rail sections connected to the feed wire.

Simultaneously with the passage of the current through the car armature, the current passes down through the bus bar and the return contact rails, energizing the track magnets. As the car moves, and the current is collected alternately by opposite sides of the commutating brushes, and transmitted to the coils about the armature in reverse directions, the several groups of pole pieces change in the character of their polarity, and this change is effected in such manner as to cause their polarity to be opposite that of the track magnets which they approach, neutral thereto while between them, and similar thereto when passed. Thus through the operation of the commutating system and the alteration in the polarity of the track magnets, although the pole pieces on the armature constantly change the actual character of their magnetization they retain the same relative character with regard to the track magnets so that there is a continuous attraction forward.

This motor system is devoid of rotating parts of any kind, and in fact of parts having any motion except that relative to the track, and is, when combined with the sliding track, capable of attaining an exceptionally great speed; and particularly is this

possible by reason of the fact that the track or field magnets are so disposed with regard to the armature on the car that there is no downward component of the magnetic pull, which might increase the friction, or add to the strain of the supporting parts, and the sidewise components are balanced by the opposing magnets of each pair.

Having described my invention, I claim:—

1. A traction system comprising a track and a car supported thereon, propelling means comprising electro-magnets arranged along the trackway, and an armature carried by the car, the part on the trackway being displaced vertically relative to the part on the car so as to give an upward pull to the part on the car simultaneously with its forward movement.

2. A traction system comprising a track, a car mounted thereon, electro-magnets disposed along the trackway, an armature carried by the car mounted to cooperate with said magnets to produce a forward movement and the electro magnets being displaced vertically relative to the armature so as to simultaneously lessen the friction on the supporting bearings.

3. A traction system comprising a track, a car mounted thereon, an armature carried by the car, electro-magnets positioned along the track said magnets being arranged in pairs adapted to be simultaneously excited and presenting like poles to the armature, each successive pair having a polarity opposite to that of its predecessor, and said magnets being arranged slightly above the armature so as to give an upward pull to the part on the car simultaneously with its forward movement.

4. A traction system comprising a track, electromagnets arranged along the track, a car provided with a coil-wound armature having poles adapted to cooperate with the magnets, a feeder system, a collecting and commutating system for causing the energization by current from the feeder system of the armature and the successive energization of the magnets, as the car moves along the track, and for reversing the polarity of the armature poles as the latter pass the magnets, said collector and commutating system being connected to the feeder system and comprising parts arranged along the track and connected to the magnets, and cooperating parts on the car connected to the armature coils, the said electromagnets being arranged on opposite sides of the path of movement of the armature.

5. A traction system comprising a track, electromagnets arranged in pairs along the track, an armature having a plurality of

pairs of poles and coils for energizing the same, a feeder system, collecting and commutating devices for successively energizing by current from the feeder system the magnets as the car moves along the track, for energizing also the armature, and for reversing the polarity of the armature poles as the latter pass the magnets, said collecting and commutating devices including parts arranged along the track and connected to the magnets and to the feeder system, and parts on the car which cooperate with the parts along the track and are connected to the coils of the armature, the electromagnets of each pair being spaced apart and located on opposite sides of the path of movement of the armature, so that the armature may pass between the same.

6. A traction system comprising a track, a car adapted to move along the same, electromagnets disposed along the track, an armature carried by the car and mounted to cooperate with said magnets to produce a forward movement, the electromagnets being displaced vertically relative to the armature so as to create an upward pull on the armature and said electromagnets being located on opposite sides of the path of movement of the armature.

7. A traction system comprising a track, a car adapted to move along the same, an armature carried by the car, electromagnets positioned along the track, said magnets being arranged in pairs adapted to be simultaneously excited and presenting like poles to the armature, each successive pair having a polarity opposite to that of its predecessor and said electromagnets being arranged slightly above the armature so as to give a simultaneous forward and upward magnetic pull and being arranged also on opposite sides of the armature so that the side pull will be neutralized.

8. A traction system comprising a track, a car adapted to move along the same, electromagnets arranged along the track in two rows and having laterally projecting poles, a coil wound armature carried by the car and having a path of movement between the poles of the two rows of electromagnets, a feeder system, and collecting and commutating devices for successively energizing the electromagnets and for energizing the armature of the car.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

TOM L. JOHNSON.

Witnesses:

FRED C. ALBER,
W. L. MCGARRELL.