G. L. STANBRO & A. D. WAGNER.

ELECTROMAGNETIC TRACTION SYSTEM.

APPLICATION FILED JUNE 7, 1906.

940,487.

Patented Nov. 16, 1909.

3 SHEETS—SHEET 1.

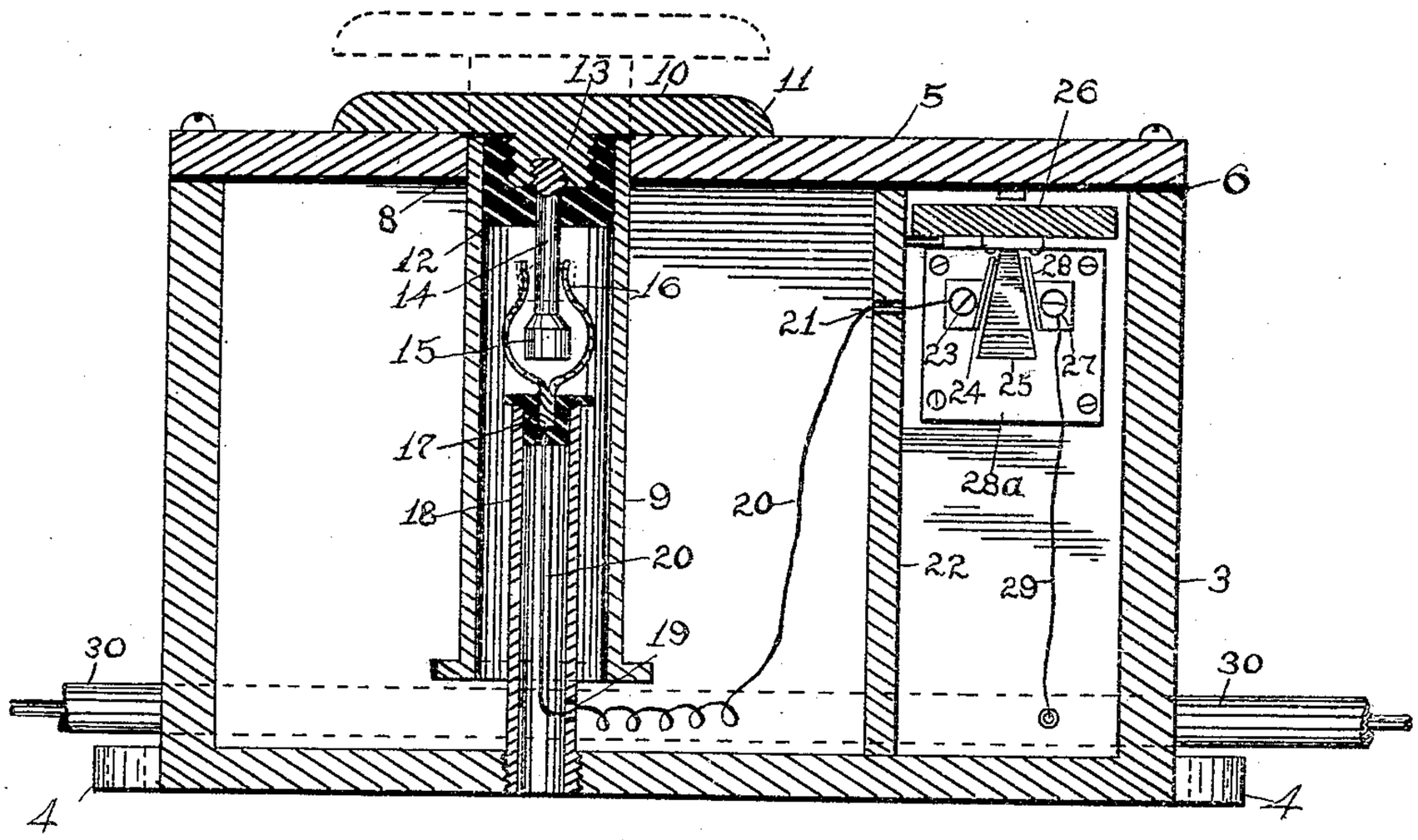

Fig 1

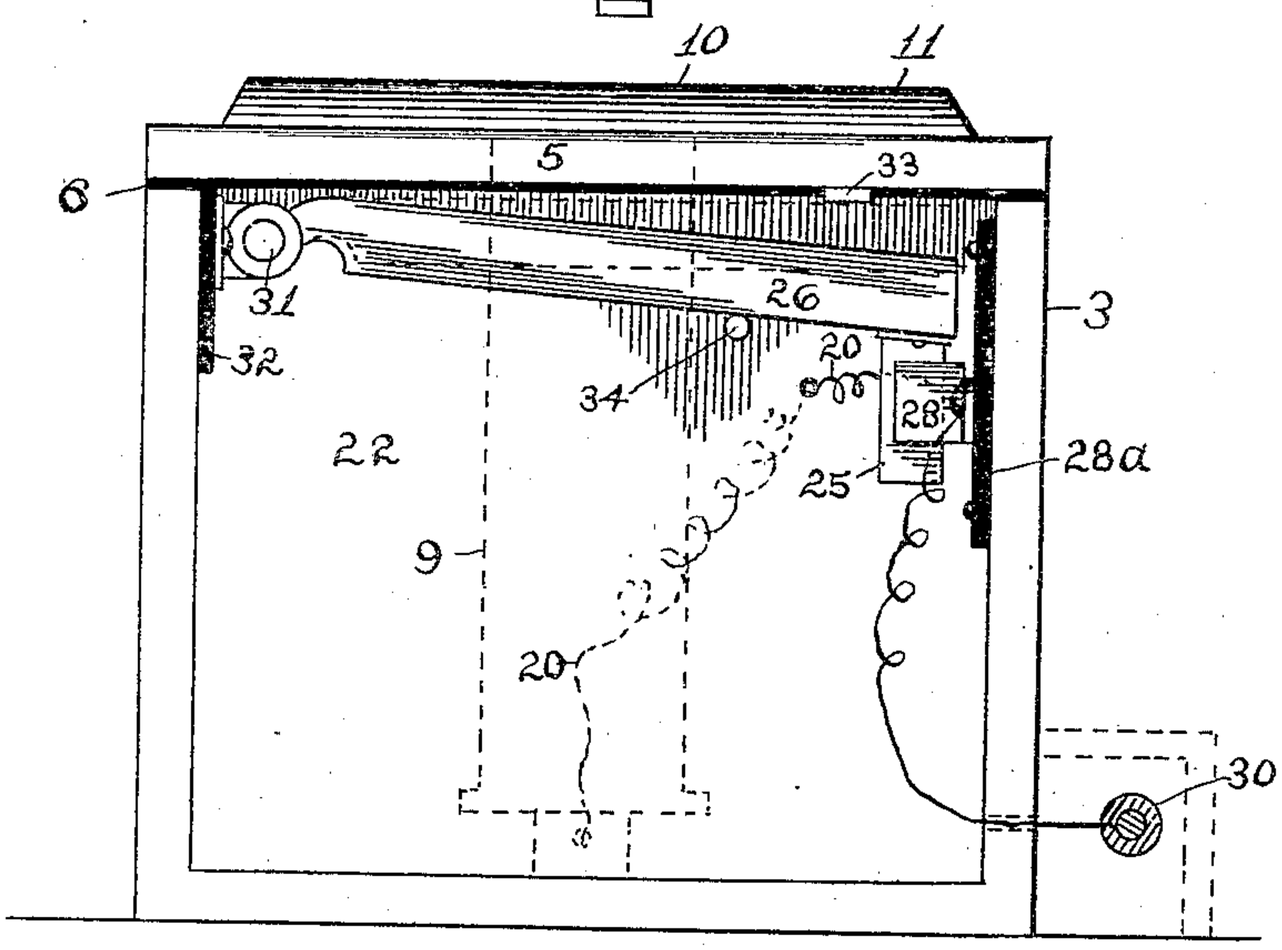

Fig 2

Witnesses

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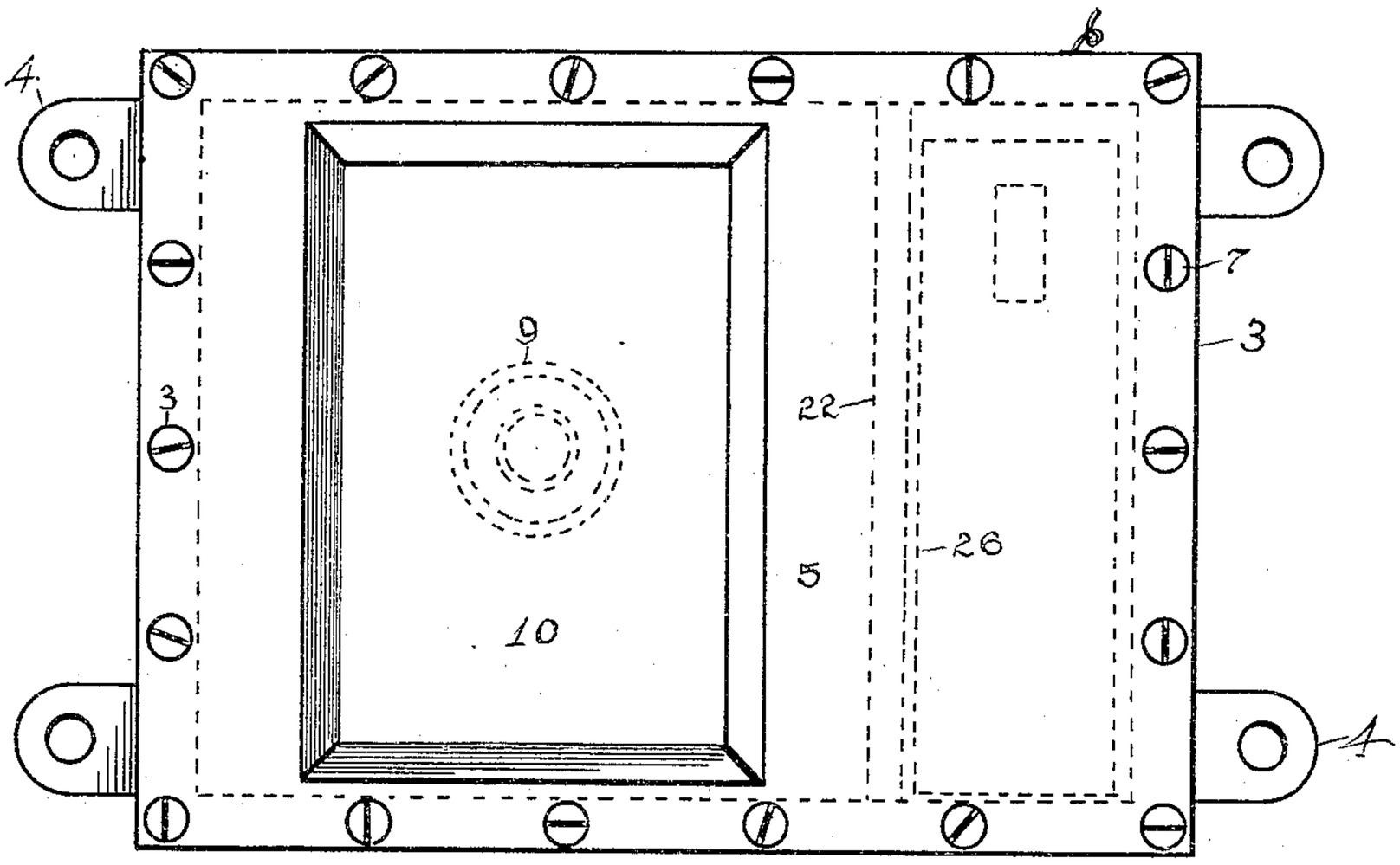

Fig 3

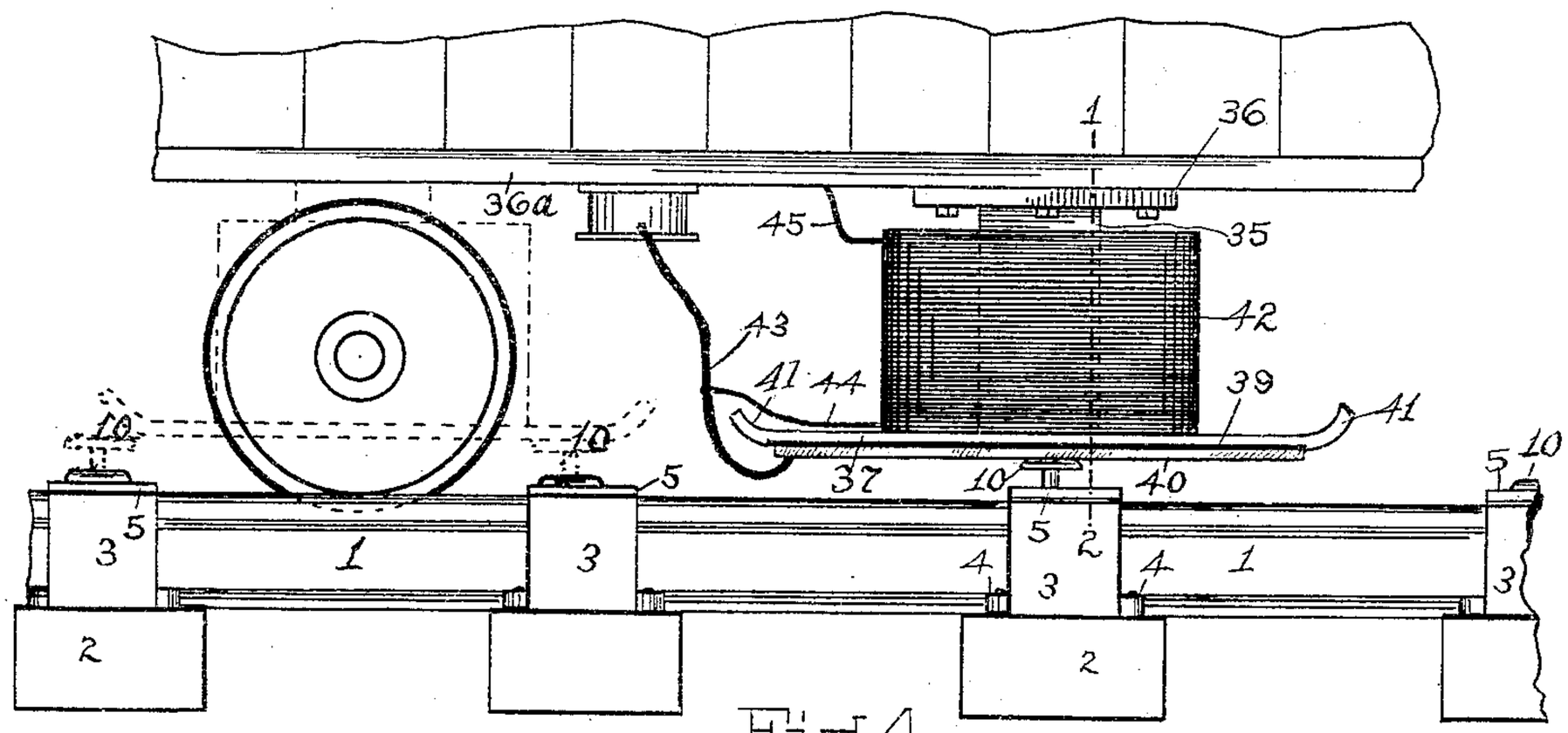

Fig 4

Witnesses

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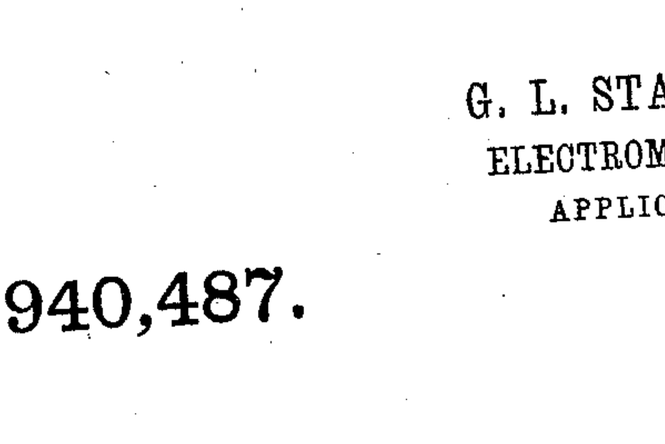
3 SHEETS—SHEET 3

Fig. 7.



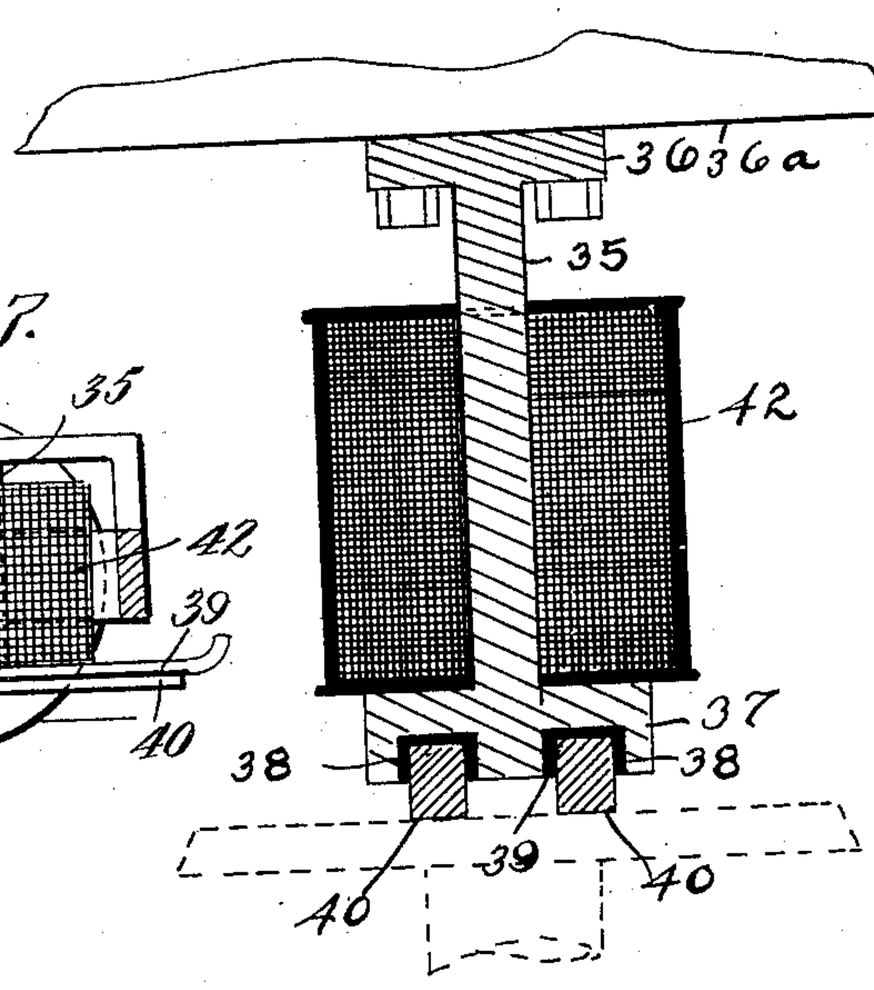


Fig 5

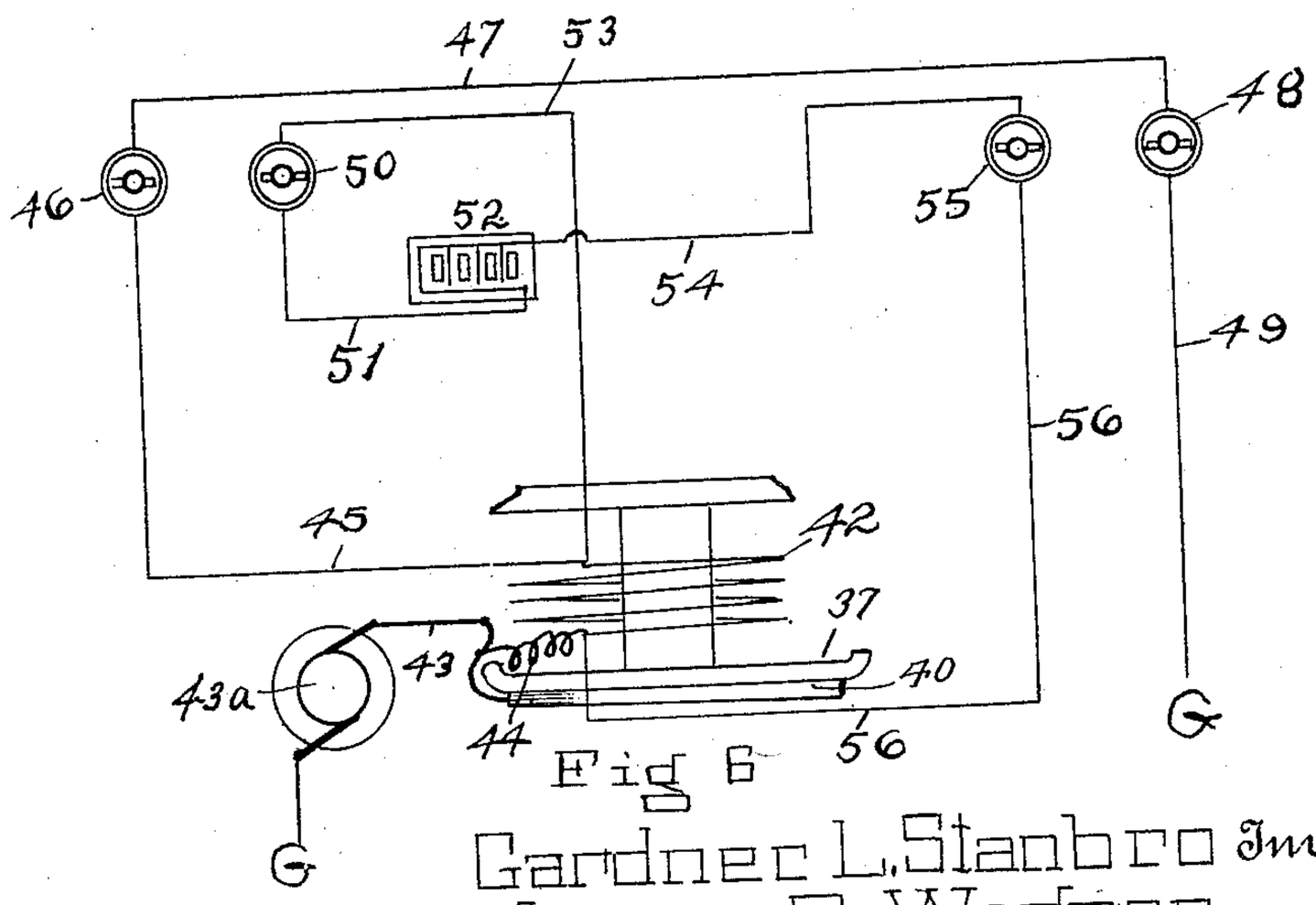


Fig 6

Witnesses
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UNITED STATES PATENT OFFICE.

GARDNER L. STANBRO AND AWREA D. WAGNER, OF NORFOLK, VIRGINIA.

ELECTROMAGNETIC TRACTION SYSTEM.

940,487. Specification of Letters Patent. Patented Nov. 16, 1909.

Application filed June 7, 1906. Serial No. 320,666.

To all whom it may concern:

Be it known that we, GARDNER L. STANBRO and AWREA D. WAGNER, citizens of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Electromagnetic Traction Systems, of which the following is a specification.

Our invention relates to electro-magnetic traction systems.

The object of the invention is to provide a surface contact railway system which will have all the advantages of such a system and adapted for street service in cities as well as suburban traffic. Heretofore such systems have not been successful being only applicable to short lengths of track in factory yards and the like.

Our present invention removes former objections being exceedingly simple, certain and absolutely safe besides its cheapness to install which is a feature not possessed by other systems the cost being about the same as the ordinary overhead trolley lines.

Further objects and advantages will be more fully described herein and particularly pointed out in the claims hereunto appended recourse being had to the accompanying drawings forming a part of this specification in which—

Figure 1 is a sectional elevation of one of the track boxes. Fig. 2 is an end view of one of the track boxes one end of which is removed to show the interior. Fig. 3 is a plan of one of the track boxes. Fig. 4 is a part side elevation of the car, track and the equipment under the car. Fig. 5 is a cross section of the shoe or collector contact and its coil taken on the line 1—2 in Fig. 4. Fig. 6 is a diagram showing the circuits of the magnetic coil and storage batteries.

In the drawings like reference numerals indicate similar parts in all the views.

1 (Fig. 4) are the rails placed upon the ties 2 in the usual manner.

3 are the track boxes and are usually made of cast iron and are for the purpose of inclosing the hereinafter described mechanism. The boxes are preferably located in the center of the track either upon each tie or every other one, as may be required. The boxes are provided with ears or lugs 4 for securing them to the ties and are also provided with movable tops 5 having packing or insulation under them as at 6, (Figs. 1 and 2). The lids or covers may be readily removed to inspect the interior of the boxes by taking out the screws 7, as shown. The cover 5 is provided with a circular perforation 8 for the vertical movement of the tube stem 9 which carries the contact or feeder plate 10 at its upper end. The feeder plate has curved edges 11 in order to permit the contact shoe on the car to pass over it, the curved edges being shown in Figs. 1 and 2. The tube 9 has an insulating plug 12 (Fig. 1) suitably fitted into the bore at its upper end and is provided with a female screw thread into which is screwed the part 13. Screwed into the depending portion 13 of the plate 10 is a pin 14 provided with a head or upset portion 15 and acts as a circuit closer the pin being in electrical connection with the plate through which the car motors are supplied with the current as the car passes over the plate.

16 is a spring contact tongue or clip secured to the insulating bushing 17 which is in turn inserted in the upper portion of the smaller tube 18 and suitably fastened thereto. The tube 18 is screwed into the bottom of the box 3 and is provided with an aperture 19 for the passage of the wire 20 to an auxiliary switch mechanism which will be described hereafter.

The tube 9 acts so as to permit the air to be compressed at its upper portion or end should the interior of the box 3 become filled with water by leakage thus preventing it from reaching the parts 14, 15 and 16 in a manner similar to a caisson used in laying piers for bridges or other submarine work hence the possibility of a short circuit by the water is avoided. Although the boxes are equipped with the device described the packing 6 will be sufficient to keep water or moisture out of the boxes in the ordinary working conditions.

21 is an aperture in the partition or division plate 22 for the series wire 20 one of its ends being connected to the binding post 23 of the contact tongue 24. The partition is usually cast with the boxes 3 and thus forms two independent and water tight compartments as shown in Fig. 1. The tongue or contact blade 24 is disposed at an angle so as to conform to a side of the circuit closer or depending lug 25 on the circuit closing plate 26 the former having a wedge shape, as shown in Fig. 1.

27 is a binding post or screw of a plate

or contact tongue 28 and taken with the one shown at 24 forms a convergent contact medium for the wedge shape lug 25. The plates 24 and 28 are insulated from the box 3 by the insulating pieces 28[a].

29 is a wire from the binding post 27 to the main feeder wire 30 from which the various contacts or switches are supplied with the current.

The plate or auxiliary switch 26 is provided with a hinge joint 31 and is insulated from the box 3 by the plate 32. This plate is lifted by a magnetic shoe carried by the car as is also the plate 10 both being lifted one after the other thus making two connections in the wire 20 either of which will not supply the car if operated independently. By lifting the plate 10 by means other than the car would not cause a passage of the current unless the switch plate 26 is raised which would require a strong magnetic pull through the cover 5 hence the apparatus is safe from outside interference. It is to be noted that wagons and other vehicles may pass over the plate 10 without injury to it. After the car has passed and the magnetic influence necessary to lift both plates has diminished they fall by their own weight to the position shown in Fig. 1. The plate 26 may be made heavy as desired to effect its disengagement from its contacts.

33 is a stop lug to prevent the plate 26 from being lifted too high and the pin 34 holds the plate in the position shown in Fig. 2.

35 (Figs. 4 and 5) is the magnet core having an I shape in cross section taken with the plates 36 by which it is fastened to the car 36[a], the bottom portion 37 forming a shoe or contact. The shoe 37 is provided with grooves or channels 38 lined with insulating material 39 (Fig. 5) and in which are placed bars or collector rods 40, composed of brass or other suitable metal and are disposed along the length of the shoe and their object being to collect the current from the plate 10 and prevent iron and iron from coming in contact with each other and thereby permitting an easy release of the shoe and plate 10 upon leaving other as the car passes over the plate. The rods 40 carry the current to the motors upon making contact with the plate 10 as in Fig. 4. The shoe 37 has turned up or curved ends 41 (Fig. 4) so as to readily engage the curved edges of the surface contact plate 10.

42 is a coil of wire forming an electromagnet with the core 35.

43 is the feed wire from the shoe or preferably from the rods or strips 40 to the car motors 43[a] (Fig. 6).

44 is a wire of conductor from the strips 40 or wire 43 by which the current is supplied to the magnet coil or coils 42, 45 being a wire from the upper end of the coil to a single pole switch 46 (Fig. 6) located on the car.

Fig. 6 shows a diagram of the wiring located in the car by which the coil 42 may be cut in or out also by which the storage battery may be cut in to energize the coil when the car is standing or away from the plates 10. Such control may be carried out from either end of the car. 46 and 50 are snap switches located above the front platform at the end of the car so as to be in easy reach of the motorman and 48 and 55 are similar switches placed at the opposite end of the car. 47 is a wire from the switch 48, 49 being a ground wire from the latter switch. 50 is a switch the wire of which, 51, is connected to one terminal of the storage cell 52 its other terminal being connected to the wire 54 which is in turn connected to the switch 55 and from said switch to the end of the coil 42 by the wire 56. 51 is a wire from a terminal of the battery 52 to the switch 50, 53 being a wire from the switch to the upper end or terminal of the magnet coil 42. As shown, the wire 49 leads from the switch 48 to the ground. The switches 46 and 48 cut off the coil 42 from the current while either switch 50 or 55 connects the current from the coil to the battery so that in working conditions the switches 46 and 48 are normally closed and the switches 50 and 55 are operated so as to control the charging of the battery 52. The return of the current to the generating station is accomplished by the rail as in ordinary trolley systems but if preferred an insulated wire return can be used according to circumstances. The shoe 37 is usually made to come in contact with one plate 10 just as it is leaving another at its opposite end as indicated by dotted lines in Fig. 4, the plate being of a length to reach from one plate to another.

In practice the magnet coil apparatus is usually suspended from a rigid stationary bar or frame riding directly on the car wheel axles to insure the magnet shoe being the same distance from the plates 10 or track as it would not be if hung from the truck frames or car body. The arrangement referred to above is, however, not shown in the drawings.

Having described our invention what we claim and desire to secure by Letters Patent is:

1. A traction system comprising a contact plate for feeding the car, a hollow supporting stem therefor, a normally open switch inclosed by said stem, a second normally open switch connected in series therewith, and magnetic means carried by the car for closing said switches one after the other.

2. An electric railway system comprising a plurality of divided hermetically sealed boxes, switches therein, an exteriorly dis-

posed vertically liftable switch actuating plate, a second interiorly disposed pivoted switch actuating plate, a series wire for both switches, magnetic means carried by the car for lifting one of the said switches through said box in advance of the other for closing the same and completing the circuit and feeding the car through said exteriorly disposed plate.

3. An electric railway system, comprising a car-feeding curved-edge vertically-movable plate, said plate being connected to an up-set circuit closer, a stationary tube, spring contacts at the upper portion of the stationary tube, a set of angularly disposed contact plates, a switch having a wedge-shaped circuit closer in striking alinement with said contact plates in series with the first named contacts, and magnetic means carried by the car for closing and releasing said contacts successively.

4. An electric railway system comprising a multiplicity of track boxes cast with a partition or division plate, switches therein, a removable cover for said boxes, a car feeding contact plate operating from the outside of said cover, a second interiorly disposed contact plate for making a contact for feeding the first named plate from the interior of the box, a series wire connecting both switches, and magnetic means carried by the car for closing the circuit through one switch and then the other for feeding the car.

5. An electrical railway system, comprising a track box having a water tight partition therein to form two compartments, a switch in each compartment, an exteriorly disposed magnetically liftable plate arranged to operate one of said switches, a magnetically operated interiorly disposed plate arranged to operate the other of said switches, and magnetic devices carried by the car arranged to lift said exterior and said interior plates successively, and to hold said plates in their lifted position simultaneously.

6. An electric railway system comprising a magnet core plate having an I shape in cross section, grooves in the lower portion thereof, insulated metal bars in said grooves, a plurality of track plates magnetically operated by said core plate, and a coil for magnetizing the core plate.

7. An electric traction system comprising a core plate having grooves in its bottom portion, a plurality of conducting bars in said grooves insulated from and extending below the surface of said core plate, track contact means for supplying current to the conducting bars, a wire from said bars to the car motors, a coil around said core plate adapted to induce a magnetic influence therein, and independent means for energizing said coil.

8. An electric railway system, comprising a track, and cars adapted to run thereon, a series of boxes arranged along said track, each of said boxes containing a pair of circuit closers, one of said circuit closers having a portion extending without the box, a main feed wire, means carried by a car for operating both of said circuit closers, and a contact shoe arranged to engage the extended portion of one of said circuit closers for supplying current to said car.

9. An electrical railway system, comprising a track, cars adapted to run thereon, a series of boxes arranged along said track, each of said boxes containing a pair of circuit closers connected in series, one of said circuit closers having a portion extending without the box, means carried by a car for operating said circuit closers successively and maintaining them in operation simultaneously, a main feed wire connected with one of said circuit closers, and a contact shoe arranged to engage the extended portion of the other of said circuit closers for supplying current to said car.

In testimony whereof we have hereunto affixed our signatures in the presence of two witnesses.

GARDNER L. STANBRO.
AWREA D. WAGNER.

Witnesses:
WALTER B. BURROW,
V. T. BURROW.