



(No Model.)

2 Sheets—Sheet 2.

M. WHELESS.  
ELECTRIC RAILWAY SUPPLY SYSTEM.

No. 524,773.

Patented Aug. 21, 1894.

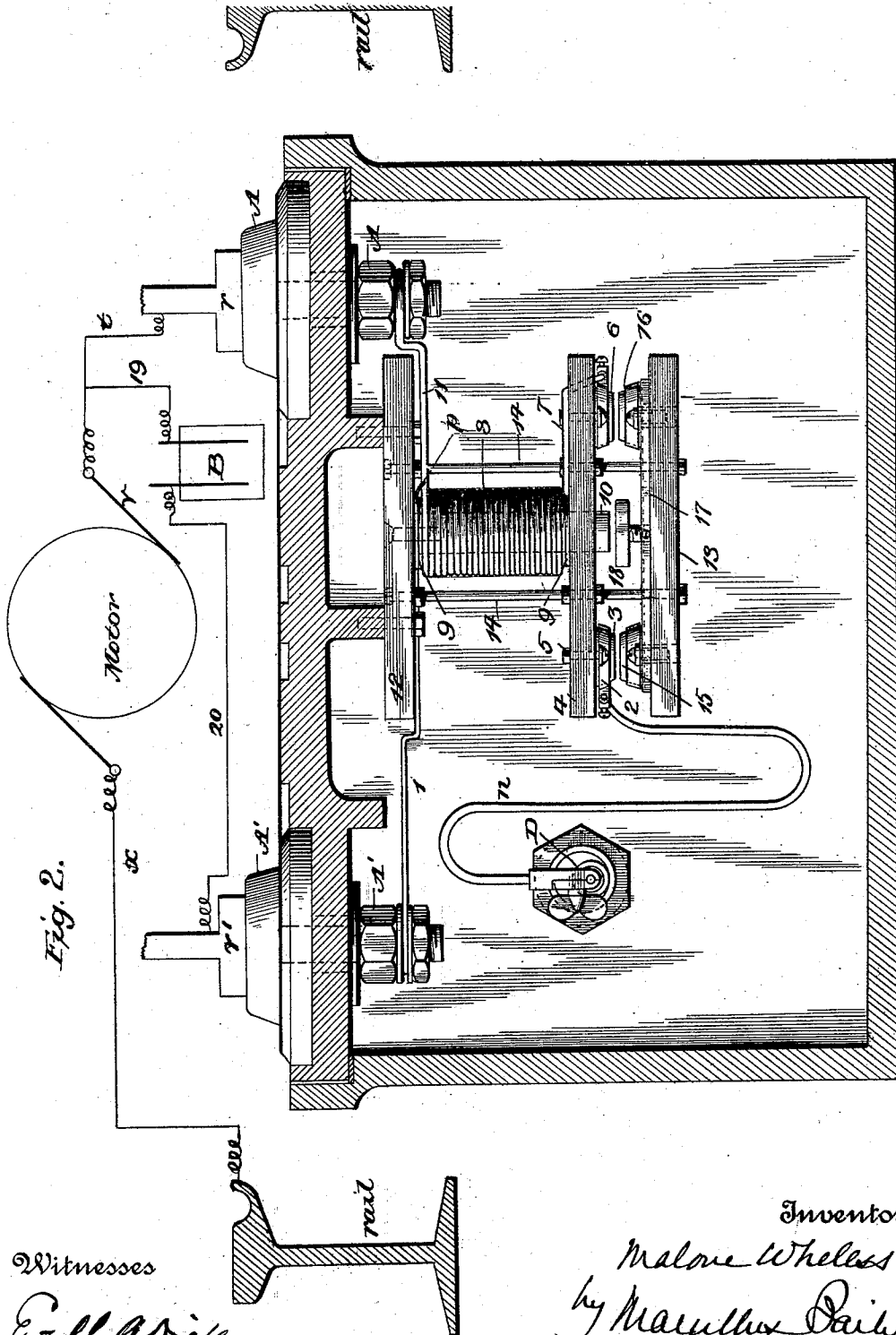


Fig. 2.

Witnesses

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# UNITED STATES PATENT OFFICE.

MALONE WHELESS, OF WASHINGTON, DISTRICT OF COLUMBIA.

## ELECTRIC-RAILWAY SUPPLY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 524,773, dated August 21, 1894.

Application filed July 7, 1894. Serial No. 516,830. (No model.)

*To all whom it may concern:*

Be it known that I, MALONE WHELESS, of Washington city, in the District of Columbia, have invented certain new and useful Improvements in Electric-Railway Systems, of which the following is a specification.

It is my object in this improvement in electric street railway systems to dispense with either the overhead or the underground trolley and the expensive construction incident to carrying conductors in an open subway or conduit under the latter system, and at the same time to attain an equally efficient propulsion of electric cars as is obtained by the overhead trolley system.

My invention involves the use of contact pins which are the terminal of feeders from the main cable and which are placed at intervals in the track or roadway upon which the car runs—these contacts being successively met by a shoe on the car through which the current is led to the motor. Each feeder connection has in it normally open contacts which are controlled by a pick-up magnet located at that point—this pick-up magnet although located in the track being energized from a source of electrical supply on the car through suitable circuit connections. The invention however can best be explained and understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the car truck and frame, together with a vertical longitudinal section of the track instrumentalities for operating in connection therewith. Fig. 2 is a cross section of one of the track boxes, showing also the shoes on the car for operating in connection therewith, and a diagram of the circuit connections on the car; in this figure there is also a sectional representation of the track rails on which the car runs.

The particular mechanical construction of the parts about to be described may vary from that shown in the drawings; but that which is there illustrated I believe to be on the whole the best adapted for practical purposes.

Boxes H are set in the track at such intervals apart, that, as shown in Fig. 1, the shoe

r on the car will reach the track terminals or contact pins of the one box by the time it leaves the contact pins of the other. Each box is made preferably of iron, is hermetically sealed, and carries in it the devices through which current is supplied to the motor on the car.

An insulated lead covered cable D is laid the entire length of the route in a terra cotta or other suitable main and enters and passes through the boxes as shown in Fig. 1, the joints between it and the boxes being sealed and water-proof, and from the cable is led off a feeder *n* for each box. This feeder is attached to a metallic holder 2 which clamps a carbon block 3, the latter being held securely to a slate or other non-conducting slab 4 by a bolt 5. On the opposite end of the slab is a similar carbon contact block 6 mounted and fastened to the slab in the same way, and from the latter leads a wire 7 to the external coil 8 on the soft iron core 10 of the pick-up magnet-coil 8 communicating at its other end by wire 11 with the track terminal A as shown in Fig. 2. The pick-up magnet is secured to a slate or other non-conducting slab 12 attached to the under side of the top or cover of the box. It has two insulated coils, the external coil 8 already referred to and an internal coil 9. The internal coil is connected at one end to a wire 1 which leads to the terminal A' and at its other end it communicates with wire 11 at say the point *p*, Fig. 2. The pins or track terminals A A' which are insulated from the box project up through the box cover or top and rest by their heads upon a concrete or other suitable non-conducting base. These terminals are intended to cooperate with the two shoes *r r'* with which the car is provided—one for each terminal. The energizing circuit for the pick-up magnet is completed through terminals A, A' and the feeder or motor circuit is completed through the terminal A.

Below slab 4 is still another non-conducting slab 13. Both slabs are suspended from the top slab 12 by rods 14 upon which rods the slab 13 can move up and down to and from the contacts on slab 4. Upon slab 13

are carbon contacts 15, 16 placed opposite to the contacts 3, 6 of slab 4, and having a metallic connection 17. And between the contacts 15, 16, and just under the soft iron core 10 of the pick-up magnet (the lower end of which core projects down through the slab 4) is the iron armature 18 which also is fastened to slab 13.

The contacts 3, 6, 15, 16, are those contacts through which the connection between the feeder and the track terminal A is established. They are normally open, and they are controlled by the pick-up magnet, which when energized attracts its armature and thus closes the contacts.

It will be noted that all of the working parts of each box are arranged in or on and carried by the cover, so that by removing the latter all of the working parts will thereby be removed bodily and together.

The car carries the two contact shoes  $r$ ,  $r'$  which are insulated from each other and from the truck or car frame. That shoe  $r$  which co-operates with the track terminal A is connected to the terminal  $v$  of the car motor by wire  $t$  (Fig. 2); from the other terminal of the motor the circuit leads through the body and wheels of the truck to the rail in the customary way as typified at  $x$ . That shoe  $r'$  which co-operates with the track terminal A' is connected by wire 20 to a source of electrical supply as for example the primary or storage cell B, the other pole of which is connected by wire 19 to the other shoe  $r$ .

Whenever the shoes  $r$ ,  $r'$  meet a pair of track terminals A, A', an energizing circuit from the cell B through the coil 9 of the pick-up magnet will be closed—this circuit being from one pole of battery, wire 20, shoe  $r'$ , track terminal A', wire 1, coil 9, wire 11, track terminal A, shoe  $r$ , wire  $t$ , 19, to other pole of battery. The result of closing this circuit is to energize the pick-up magnet, which thereupon attracts its armature and thus closes the contacts controlled by it in the feeder connection, and as the shoe  $r$  at this time is on its track terminal A the motor circuit is closed—this circuit being from cable through feeder  $n$ , contacts 3, 15, 17, 6, 16, wire 7, coil 8, wire 11, track terminal A, shoe  $r$ , wire  $t$ , motor wire  $x$  to track rail.

In Fig. 1 the car has just left one box and has reached another; in the box just quitted the contacts in the feeder connection are open, in the other they are closed.

I prefer to provide the pick-up magnet with the additional coil 8 in the motor circuit; but manifestly this coil might be dispensed with, and the wire 7 might lead directly to track terminal A. So too, in case the coil 8 be retained then a long shoe  $r'$  will not be needed. All that would be required would be a contact on the car to meet the terminal A' long enough to energize the pick-up magnet and cause it to close the contacts controlled by

it. In that case the coil 8 would thereafter serve to energize the pick-up magnet and thus hold the contacts 3, 15, &c., closed so long as the shoe  $r$  remained on the terminal A appropriate to those contacts. But, as before said, and for the sake of greater safety, I prefer the arrangement illustrated in the drawings.

The track boxes for protecting the working parts have no significance electrically. The electrical instrumentalities essential to my system are the series of track terminals for the energizing and motor circuits respectively; normally open contacts in the feeder connections; armatures for closing said contacts, a pick-up magnet for controlling each armature circuit, connections for said magnet including a source of electrical supply on the car; and contact shoes on the car whereby the energizing and motor circuits are closed through the successive track terminals over which the car passes.

What I claim, therefore, and desire to secure by Letters Patent, is—

1. An electrical railway system comprising a car provided with a pair of shoes insulated from each other and from the body of the car a source of electrical supply having its opposite poles connected to said shoes respectively, and a motor connected by one of its poles to one of said shoes only, and having its opposite pole connected to one of the track rails, in combination with track terminal pins in pairs held in boxes set at such intervals apart that the contact shoes on the car will reach one pair before they leave the other, a cable and feeder therefrom connected to those track terminals through which the motor circuit is completed, normally open contacts in each feeder connection, an armature for closing said contacts, a pick-up magnet for each armature, having its energizing coil connected to its appropriate pair of track terminal pins whereby when the car shoes meet a pair of track terminals a circuit including the pick-up magnet of those terminals, and the source of electrical supply on the car will be closed, with the result of energizing the pick-up magnet and thus closing the normally open contacts in the feeder connection appropriate to the track terminals on which the car shoes rest, substantially as hereinbefore set forth.

2. The combination of the box, the insulated track terminals A, A', held in and projecting through the cover of the box the cable D, the feeder connection between the cable and track terminal A, the normally open contacts in said feeder connection, the armature for closing said contacts, and the pick-up magnet secured to and carried by the box cover and having its energizing coil connected to the terminals A, A', respectively, substantially as and for the purposes hereinbefore set forth.

3. The combination of the box, the insulated track terminals A, A', the cable, the feeder connection between the cable and terminal A, normally open contacts in said feeder connection, the armature for closing said contacts, and the pick-up magnet provided with two coils or windings, the one 9 connected to the terminals A, A', the other 8 included in

the feeder connection, substantially as and for the purposes hereinbefore set forth. 10  
In testimony whereof I affix my signature in presence of two witnesses.

MALONE WHELESS.

Witnesses:

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EWELL A. DICK.