

(No Model.)

3 Sheets—Sheet 1.

M. WHELESS.

ELECTRIC RAILWAY CLOSED CIRCUIT SYSTEM.

No. 435,471.

Patented Sept. 2, 1890.

Fig. 1.

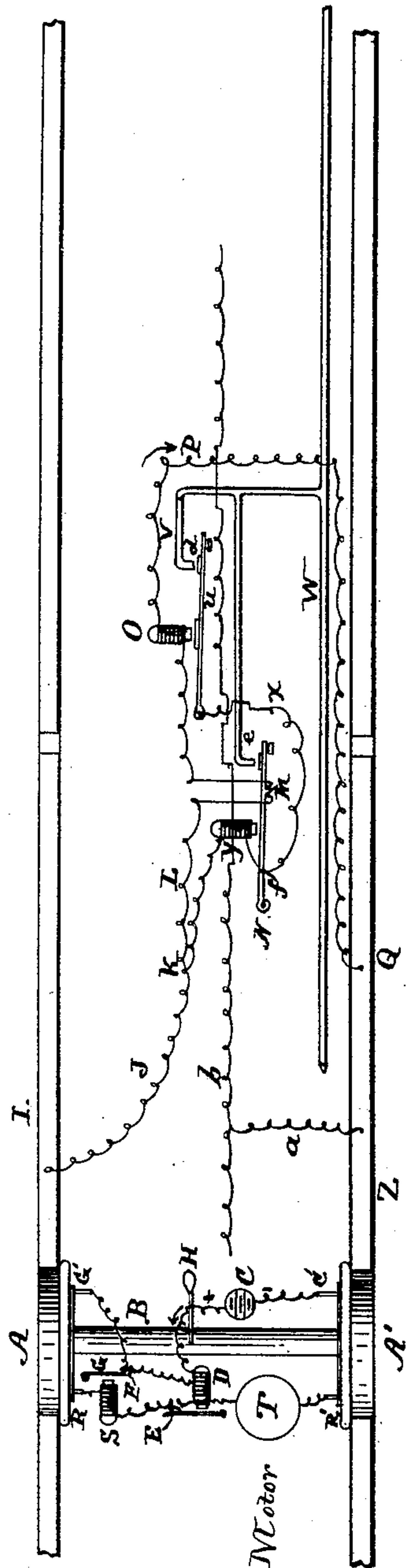
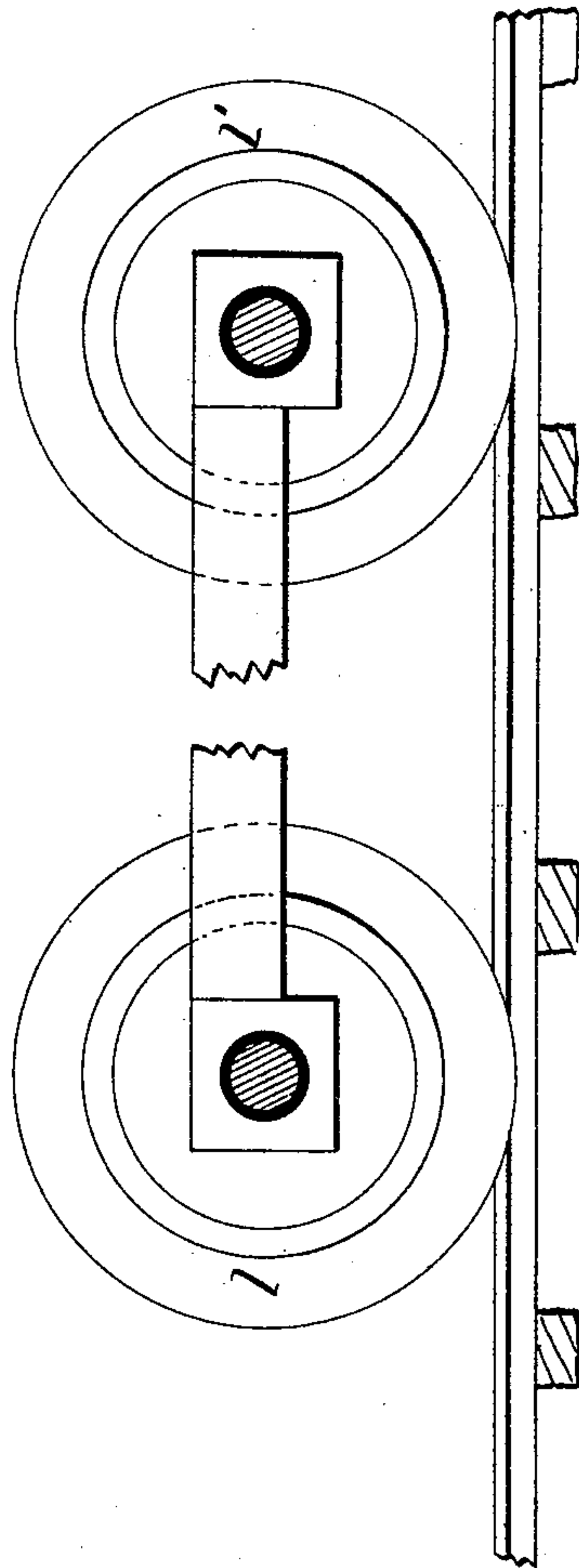


Fig. 2.



Witnesses

W. H. Wheatley
Thos. W. Boulton

Inventor

Malon. Wheeler

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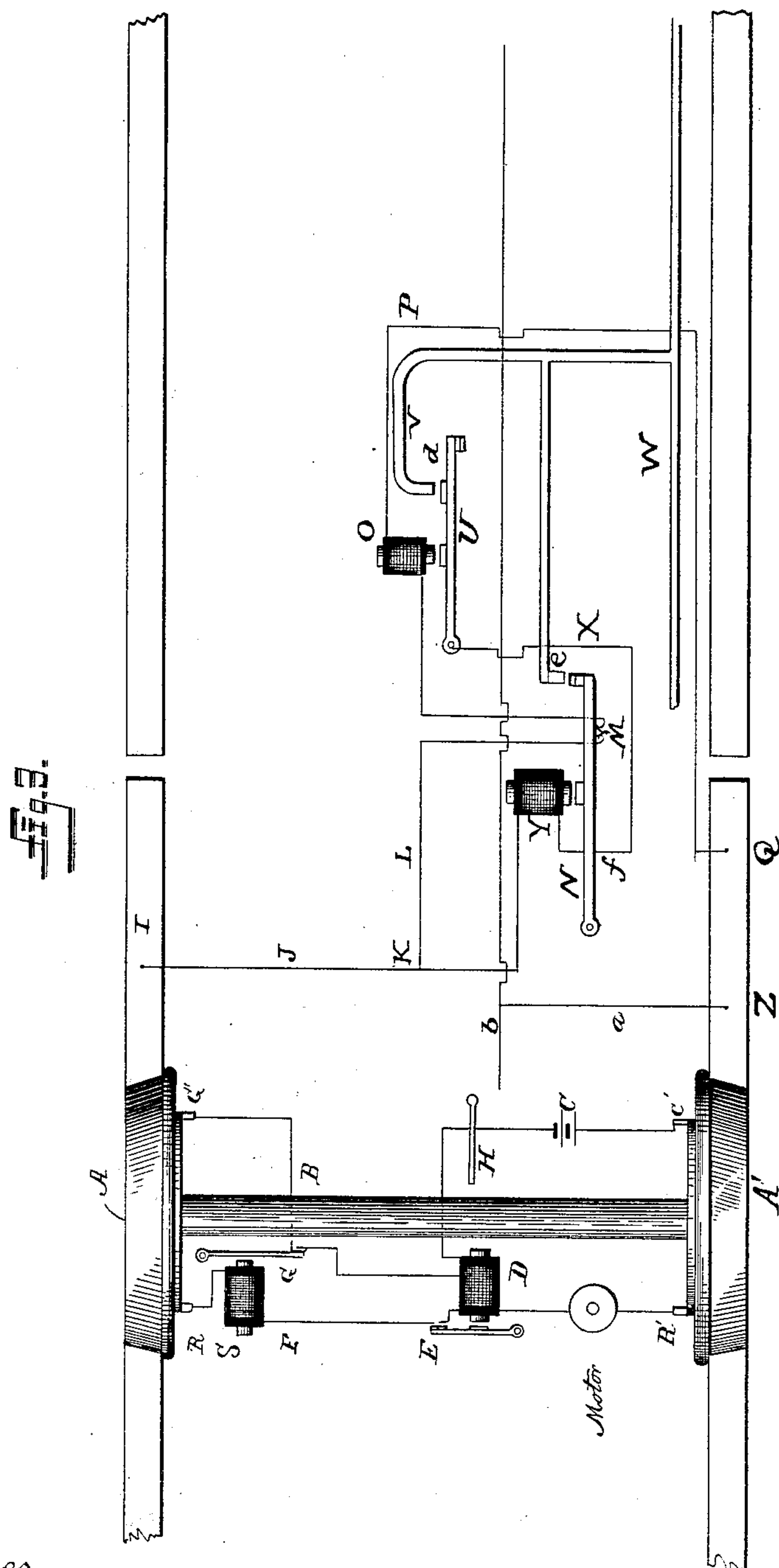
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C. H. Adeley

Inventor,
Malone Wheeler,
By his Attorneys
W. H. Singleton

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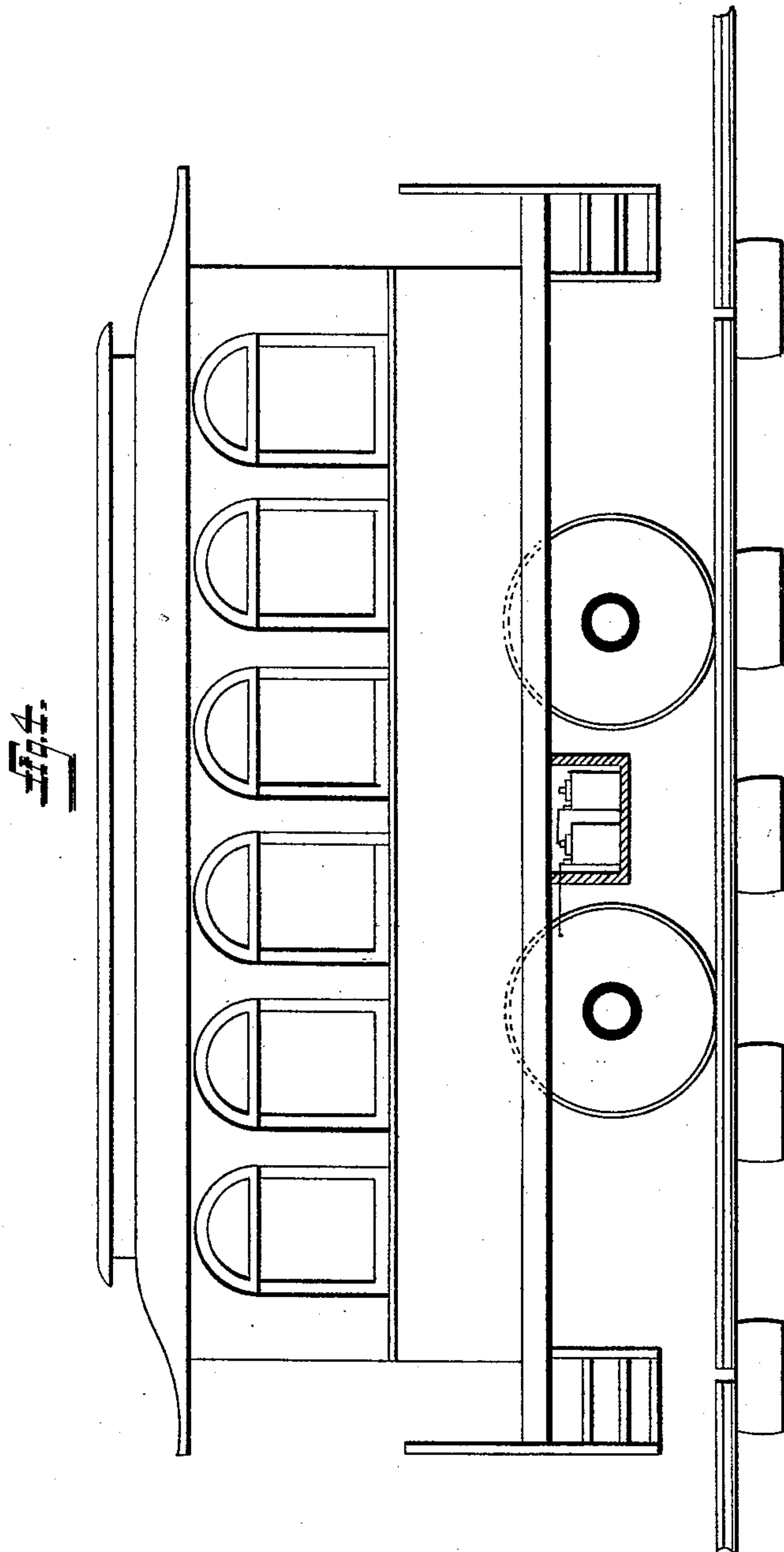
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Malone Wheelless,
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UNITED STATES PATENT OFFICE.

MALONE WHELESS, OF NASHVILLE, TENNESSEE, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE WHELESS ELECTRIC RAILWAY COMPANY, OF ALEXANDRIA, VIRGINIA.

ELECTRIC-RAILWAY CLOSED-CIRCUIT SYSTEM.

SPECIFICATION forming part of Letters Patent No. 435,471, dated September 2, 1890.

Application filed October 23, 1889. Serial No. 327,906. (No model.)

To all whom it may concern:

Be it known that I, MALONE WHELESS, a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Electric-Railway Closed-Conduit Systems; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a plan view of the electric connections and the method of using them in the propulsion of my electric-railway car. Fig. 2 is a side elevation of the truck-wheels, showing the attachment of the copper disks $l\ l'$ to inner flanges of wheels $A\ A'$, against which the brushes $R\ G'$ and $R'\ C'$ play. Fig. 3 is an enlarged plan view of the system, showing the detail parts in their due relation to one another. Fig. 4 is a side view of a car used with this system.

The present invention relates to electric-railway-circuit systems, more particularly to that class styled "closed," wherein the cars are operated in "multiple."

$A\ A'$ are wheels of the truck fastened to each other by the axle B , which bears in a hub, and the axle is electrically insulated from the metal of the wheel. This is done for the reason (hereinafter shown) that the current which is taken from the wheel cannot pass from one wheel to another through the axle. This borne in mind, the propulsion of the car is as follows:

C is a battery carried in a convenient place on the car, one pole of which is made to rest against the wheel A' at the brush C' , the other pole of the battery passing around the magnet D , thence through the metallic plug F , fastened to the armature G , thence to the brush G' , which is in contact with the wheel A . It is to be particularly noticed that this battery-line is plugged by the armature G when said armature rests in its normal condition, as shown.

Now when the battery-circuit is closed by a convenient switch H the current travels from the positive line in the direction of the arrow through the route indicated until it reaches the rail I , whence it traverses the line J to the point K , where it takes the direction L , crosses through the metallic plug M , fastened to bottom of the armature N , thence around the magnet O , down the line P to the rail Q , thence into the wheel A' , through the brush c' to the other pole of the battery.

It will be observed that two brushes similar to those described rest against the wheels at R and R' . To the ends of these brushes are attached the two ends of the motor-line, which we will suppose to start from the brush R , pass around the magnet S , through the metallic plug at the armature E into the motor T , and into the wheel A' . The continuation of this circuit will not be shown until after the purpose of the local battery on the car is made clear. The route of the local battery is shown as indicated. When the battery is closed, the magnets O and D , which are in the local circuit, are vitalized simultaneously, the magnet O closing the main line by attracting the armature U against a stem V of the main line W , and drawing the current from the main line through the armature U into the wire X , around the magnet Y , through the line $K\ J$, into the rail I , thence to the wheel A , from the wheel into the brush R , around the magnet S , through the plug E , into the motor T , to the brush R' , into the wheel A' , to the rail Z , thence down the line a to the ground-line b , whence it traverses to the negative pole of the generator.

When the magnets O and D , being simultaneously vitalized, perform the respective functions of O , closing the main line in the trap at the point d , which vitalizes the motor-line magnet Y , which magnet cuts the local line at M by drawing up the armature to the bottom of which is attached the metallic plug M , now simultaneous with the vitalizing of the magnet O (which lets in the motor-current) occurs the vitalization of the magnet D , which closes the motor-line at E , and the motor-line being closed at E the mo-

tor-magnet S is vitalized, which in turn draws to itself the armature G and cuts the local line at F, thereby compelling the generator-current to pass through the motor instead of partly circuiting the local battery C. The magnet D is in the motor-line as well as in the local circuit. Hence when the local is cut at the magnet S the armature E does not fall open.

10 If the local line L were not opened after the magnet O had drawn up the metallic conducting-armature U to the main-line stem V, the generator-current would pass out the armature around the line X, thence up to K, and from the point K instead of going to the rail I and thence to the motor it would leave the line at K and take the line L around the local magnet O through the line P to Q on the rail Z, and would ground itself through A and the uncovered wire B; but the fact that the line L is opened by the drawing up of the armature N leaves the generator-current no alternative but to pursue the course through the line J into wheel A, and thence through the motor to the other rail Z, whence it finds a grounding through the line a.

The line W is a covered wire through which the generator-current passes in a closed conduit, and is tapped by the armatures N and U. The line X is metallically fastened to the metallic conducting-armature N, so that when the armature drops back to its normal condition by the cutting of the line L (by the drawing up of the armature N) the current which flows from the main line e can pass into the armature N and out at the metallic connection f around the magnet Y, and thence through the motor, as already indicated.

It may be borne in mind that the motor-circuit is by the nature of the invention broken every time that the motor passes onto a new section of track; but if this motor-circuit is open the battery-circuit is automatically closed by the dropping of the armature G, and then the propulsion process is repeated, as previously explained.

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

1. A car provided with one pair of supporting-wheels electrically insulated from their axle, a battery located in the car, the line of said battery on the car having a break and containing a magnet and in contact with the insulated pair of wheels, two lines of conductors consisting of sections insulated from one another, each wheel of said pair bearing on a line of conductors, a wire connecting each two opposite sections of the line of conductors, said wire containing a magnet and being broken, another wire connected to the last-mentioned wire and having a magnet, the armature of which is in the circuit of the wire and closes the break in the former wire and containing an armature which is affected by the magnet of the former wire, a power-line having a contact place in juxtaposition with the last-mentioned armature, and another contact place in juxtaposition with the former armature, a return-wire of the main circuit connected to each section of the line of conductors on the negative side, a motor located on the car, the line of which is in contact with the pair of insulated wheels, said line having a break which is closed by the armature of the magnet of the battery-line on the car, and a magnet the armature of which closes the break on the battery-line, as set forth.

2. In an electric-railway-conduit system, the combination of a power-line, a motor-line on a car normally out of electrical connection with the power-line, and a local circuit, part of which, including the source of electricity, is on the car, part of the electrical fitting of the local circuit being in the power and motor lines, and conversely, whereby when the local circuit is closed the motor-line is electrically connected to the power-line and the local is immediately broken, as set forth.

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

MALONE WHELESS.

Witnesses:

S. A. TERRY,
S. E. WHEATLEY.