

(No Model.)

J. F. SMITH.
UNDERGROUND ELECTRIC RAILWAY.

No. 538,357.

Patented Apr. 30, 1895.

Fig: 1.

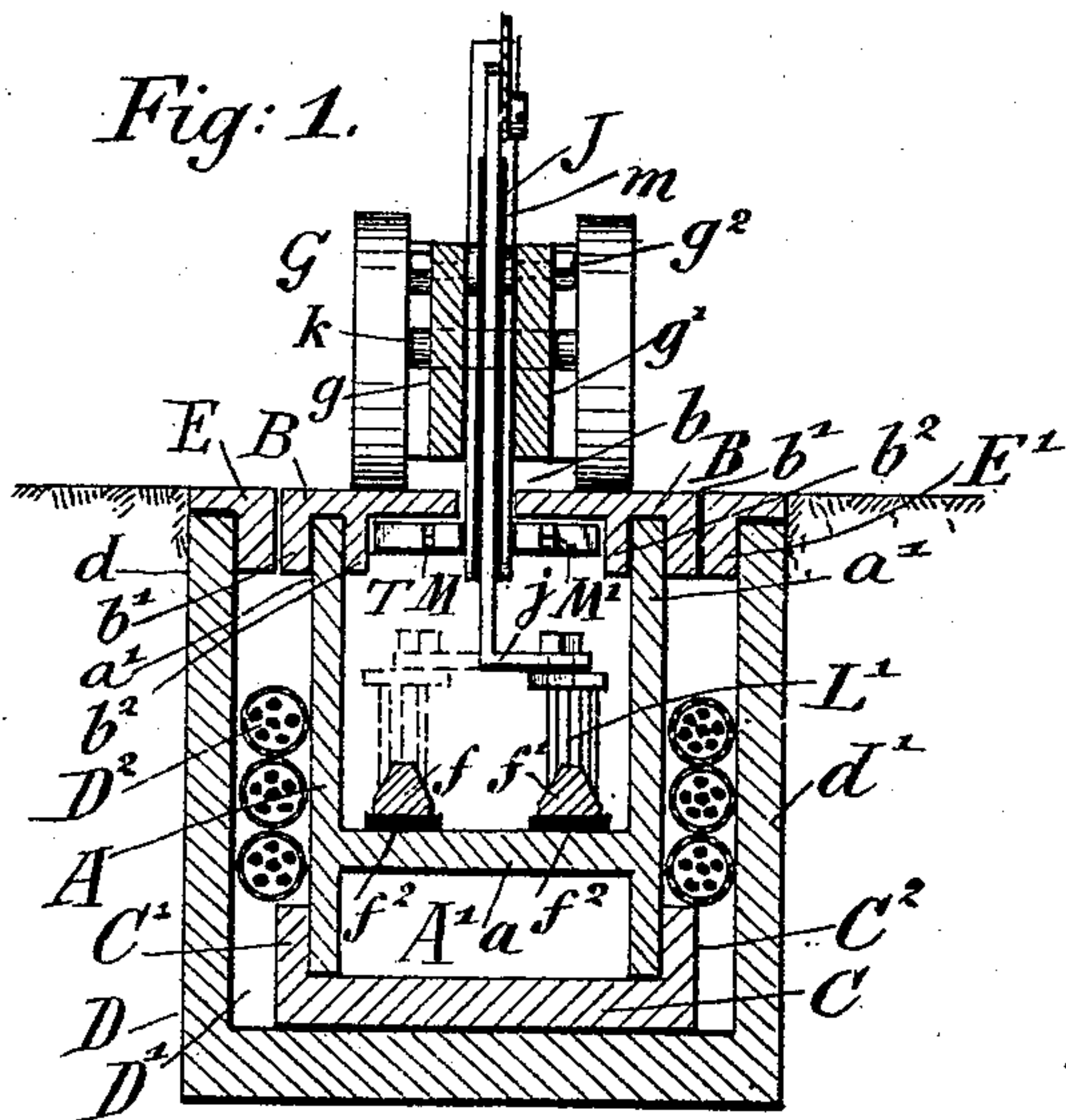


Fig: 2.

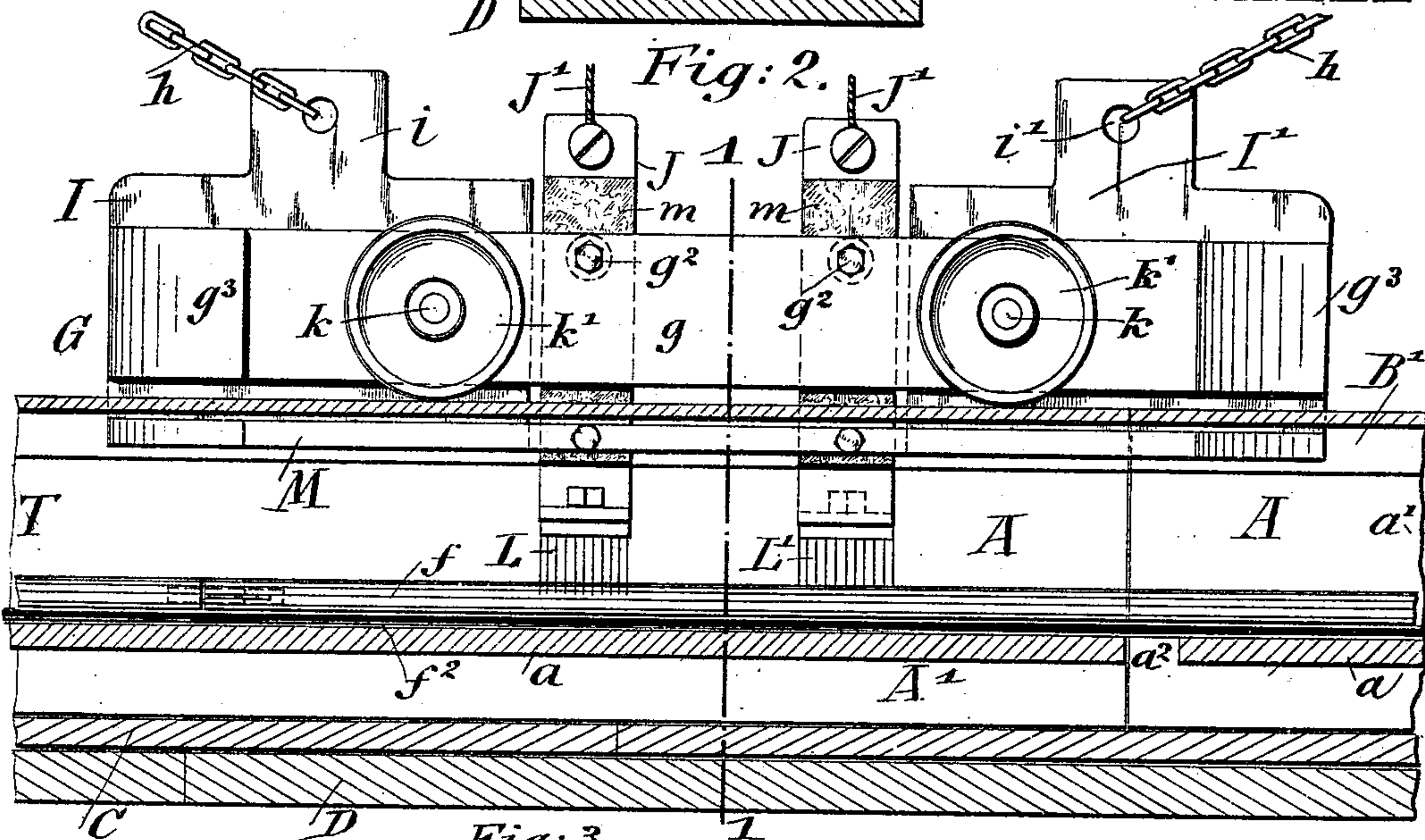


Fig: 3.

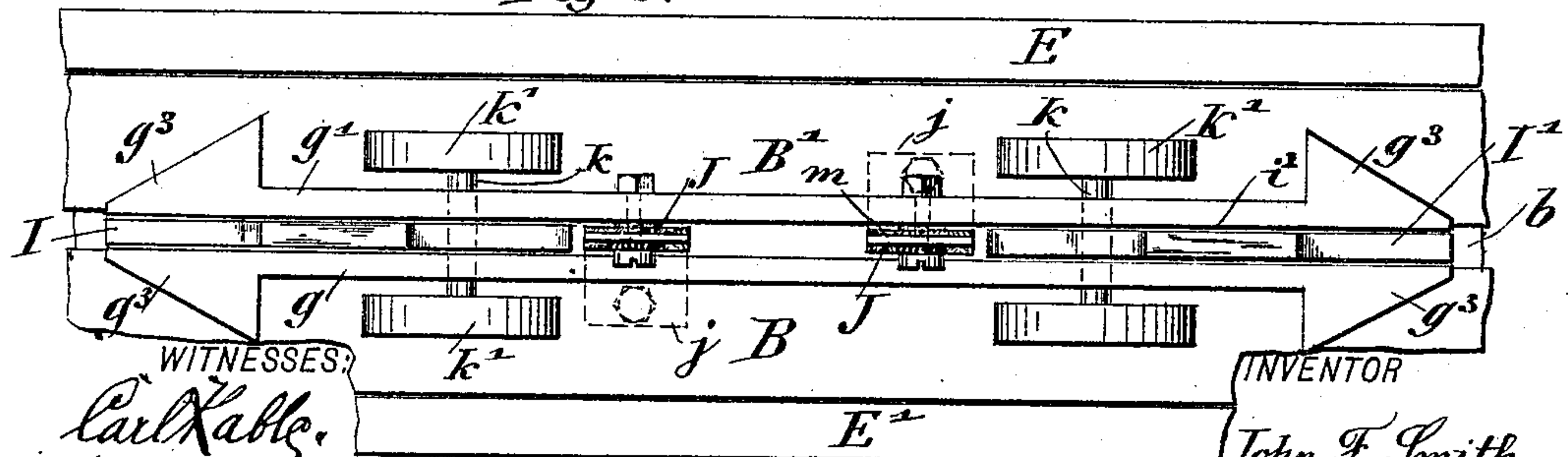
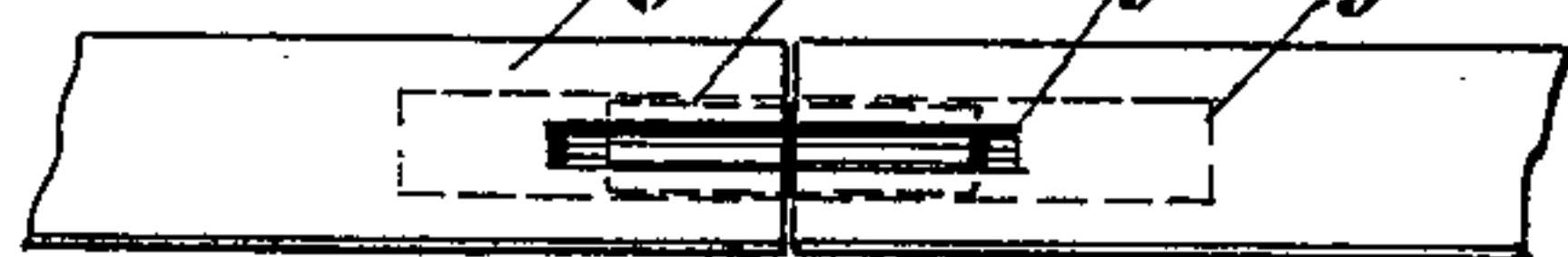


Fig: 4.



WITNESSES:
Carl Kable,
H. H. Brennan

INVENTOR

John F. Smith

BY

Looney & Paeguer
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN F. SMITH, OF NEW YORK, N. Y.

UNDERGROUND ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 538,357, dated April 30, 1895.

Application filed August 15, 1894. Serial No. 520,373. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. SMITH, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Underground Electric Railways, of which the following is a specification.

My invention relates to an underground electric-railway and the objects of the same are to provide a substantial and durable structure or conduit, for carrying the conducting-wires of the road as well as to provide means for carrying underground cables for telegraphic, telephonic, for carrying current to distant sections of the road, and the like purposes.

A further object of my invention is to provide an effective medium for taking the current from the conducting wires and transmitting it to the motor on the car.

My invention consists of a conduit which comprises a suitable number of H-shaped sections arranged end to end, the trough formed by the upper part of the H-shaped sections containing the conducting-wires, which are triangular in cross-section, and the lower part of the H-shaped sections providing a water-way for the purpose of conducting drainage water from the upper part of the conduit into the sewers, the webs of the sections being separated a suitable distance apart to provide spaces to permit the water to fall into the water-way. Placed on the upper edges of the side-walls of the H-shaped sections and extending longitudinally of the track, are a pair of slot-rails which are spaced at the proper distance apart so as to furnish the slot, and which are each provided with a pair of parallel flanges, into the spaces between which the upper edges of the side-walls are inserted and held either by friction or by any other suitable means.

The invention also consists of a carriage suspended from the car-body in such a manner as not to partake of the oscillations of the same, which runs upon the slot-rails and which carries the brushes which take the current from the conducting-wires, said brushes being supported in the trough at the upper part of the H-shaped sections by means of shanks which extend through the slot and

are in turn supported from the carriage. The carriage is provided with wheels and the upper part of the same just above the slot is provided at both ends with deflectors which diverge from both sides of the slot and are adapted to remove small obstructions which are in the way of the carriage, said carriage being further provided below the slot with guards that extend longitudinally of the same at both sides of the slot, and which prevent accidental removal of the parts supported by the carriage from the conduit.

My invention also consists of the construction and combination of parts and details as will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a cross-section of the conduit and the carriage on line 1 1 of Fig. 2. Fig. 2 is a longitudinal section of the conduit, carriage being shown in side elevation. Fig. 3 is a plan view of the carriage and a portion of the conduit; and Fig. 4 is a detail view showing the joint of two adjacent sections of conducting-wire.

Similar letters of reference indicate corresponding parts.

The conduit of my improved underground electric-railway consists in the main of a suitable number of H-shaped sections A which are preferably made of rolled iron or steel, and the webs a of which end short of the ends of the side-walls a' , a' , thus providing openings a^2 along the line, so that any water may be conducted from the trough formed by the upper part of the H-shaped sections into the water-way A' below the webs a . This water-way A' leads to the sewer or any other outlet for the water in the conduit. The slot-rails B, B', consist of flat plates which are spaced a suitable distance apart so as to provide the slot b , said plates each having on their under sides a pair of parallel flanges b' , b^2 , the spaces between which flanges receive the upper edges of the side-walls a' , a' , of the H-shaped sections A, which are held thereto by means of friction, as shown, or as is evident without illustration, by means of bolts or other fastenings. The slot-rails B, B', are also preferably formed of rolled iron or steel.

The H-shaped sections which form the main part of the conduit in connection with

the slot-rails are seated at their lower edges between the flanges C' , C^2 , at each side of the supporting-plates C which form the bottom of the water-way A' , and the joints of which alternate with the joints of the H-shaped sections A , so that the respective joints do not come opposite each other.

In case it is desired to furnish means for running under-ground electric cables in the conduit, which may be used for taking current to remote or distant sections of the road or as main feed-cables, the conduit is provided with an exterior shell composed of U-shaped sections D , which are made wide enough to provide side-spaces D' between the side-plates d , d' of the U-shaped sections for the passage of the cables, such as D^2 . Resting upon the upper edges of the side-plates d , d' , of the U-shaped sections, are angle-irons E , E' , in the inner angles of which the edges of the side-plates enter, while the backs of the angle-irons abut against the outer flanges b' , b' , of the slot irons B , B' , so that the spaces at these points are closed. The angle-irons E , E' , may, if desired, be secured to the side-plates of the U-shaped sections D by means of suitable removable fastenings, not shown, so that said angle-irons may be taken up and access to the cables can be had.

The conducting-wires f , f' , which are arranged in the trough in the upper part of the H-shaped sections A , A , are supported on the webs a of said sections, so as to be insulated therefrom by means of glass strips f^2 , which abut end to end. These conducting-wires are substantially triangular in cross-section, the angles being preferably flattened as shown. The object of this form of wire is to cause water, dirt, &c., to be thrown off of the wires by reason of the inclined sides thereof, so that no obstruction is possible thereon and so that the conducting-qualities thereof cannot be interfered with.

As shown in Fig. 4, the sections of which the conducting-wires are made up are connected by means of a dowel-pin f^3 which fits tightly into the longitudinal sockets f^4 in the ends of the abutting sections, said sockets being of such length that by means of a suitable tool which may be projected through side slots f^5 the mechanical connection may be established or broken on pushing the pin in the proper direction.

One of the conducting wires is a positive and the other a negative, so that the positive wire supplies the current to the motor on the car while the negative wire takes the current back to the power house, and thereby a complete circuit is formed.

Running upon the slot irons B , B' , is a carriage G which is suspended from the car-body as indicated by dotted lines in Fig. 2, by means of outwardly extending chains or other connections h , which are firmly attached to the car-body and are connected with the framework of the carriage, so as to prevent relative longitudinal movement of the latter. The

framework of the carriage comprises longitudinal metallic bars g , g' , between which are secured by means of fastenings g^2 which pass through said bars, upwardly-extending plates I , I' , at the upper edges of which are lugs i which are provided with suitable openings i' , in which the suspending chains h are inserted.

The pair of axles k extends transversely through the framework and are provided at their outer ends with wheels k' , k' , which run upon the upper surfaces of the slot-rails B , B' , when the car is moving. Suspended by means of their shanks between the said bars g , g' , and secured thereto by suitable fastenings g^2 , is a pair of L-shaped copper or other suitable conducting strips J , the feet j of which are turned in opposite directions within the trough T of the conduit and support in contact with the respective conducting wires f , f' , the copper brushes L , L' , the lower ends of which are cut to conform with the contour of the conducting-wires, so that the brushes will always be in proper contact with the conducting-wires for taking current. The shanks of the conducting-strips J are insulated from the metal work of the carriage by means of mica or other suitable insulation m , while the upper ends thereof are connected, by the wires J' , J' , with the motor carried by the car, (not shown.) For the purpose of clearing the slot, the ends of the bars g , g' , are each provided with a deflector g^3 , and these deflectors are so arranged that they diverge from the slot, so that any obstructions in the way will be deflected to one side as the same are struck by the carriage.

Secured to the plates I , I' , which also extend through the slot of the conduit together with the conducting-strips J , are a pair of guards M , M' , which are arranged on both sides of said plates below the slot and underneath the slot-rails, so that should the car be derailed, the carriage G will be prevented from being displaced by means of said guards.

The advantages of my invention are, first, the construction of the elementary parts of the conduit is so simple and practically indestructible, that the same can be built by common laborers, as no fastenings are required for the reason that all the parts fit snugly and tightly together, and also the conduit is thereby enabled to bear the weight of the heaviest trucks without injury; second, all water and snow fall into the water-way A' and are conducted away, any accumulated dirt being readily removed by flushing, and, third, the carriage of the contacts is comparatively isolated therefrom, so that the car may be run on an ordinary track without removing the parts carried by said carriage from the conduit.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The herein-described conduit, consisting of H-shaped sections arranged end to end,

and slot-rails provided with parallel flanges which receive between them the upper edges of said sections, substantially as set forth.

2. The herein-described conduit, consisting of **H**-shaped sections arranged end to end, the webs of which end short of the joints so as to provide outlet-spaces, supporting-plates also arranged end to end and provided with parallel side flanges, between which the lower edges of said sections are received, and slot-rails applied to the upper edges of said sections, substantially as set forth.

3. The herein-described conduit, consisting of **U**-shaped outer sections, **H**-shaped sections arranged in the same between and separated from the side-plates thereof, slot-rails applied to the upper edges of the **H**-shaped sections, and angle-irons applied to the upper edges of the **U**-shaped sections and abutting against the slot-rails, substantially as set forth.

4. A carriage for the contact-brushes of an underground electric railway, the same con-

sisting of a frame provided with wheels, guards at the bottom of said frame adapted to extend under the slot-rails, and chains attached to each end of the frame, and adapted to be secured to the car, substantially as set forth.

5. A carriage for the contact-brushes of an underground electric-railway, the same consisting of a frame provided with wheels, and comprising longitudinal bars, having angular deflectors at the ends, and plates fastened between said bars and having upwardly-extending portions provided with means for attaching the carriage to a car, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOHN F. SMITH.

Witnesses:

GEO. S. WHELOCK,
K. R. BRENNAN.