

(No Model.)

A. ROSENHOLZ.

SWITCH FOR UNDERGROUND ELECTRIC RAILWAYS.

No. 551,145.

Patented Dec. 10, 1895.

Fig. 1.

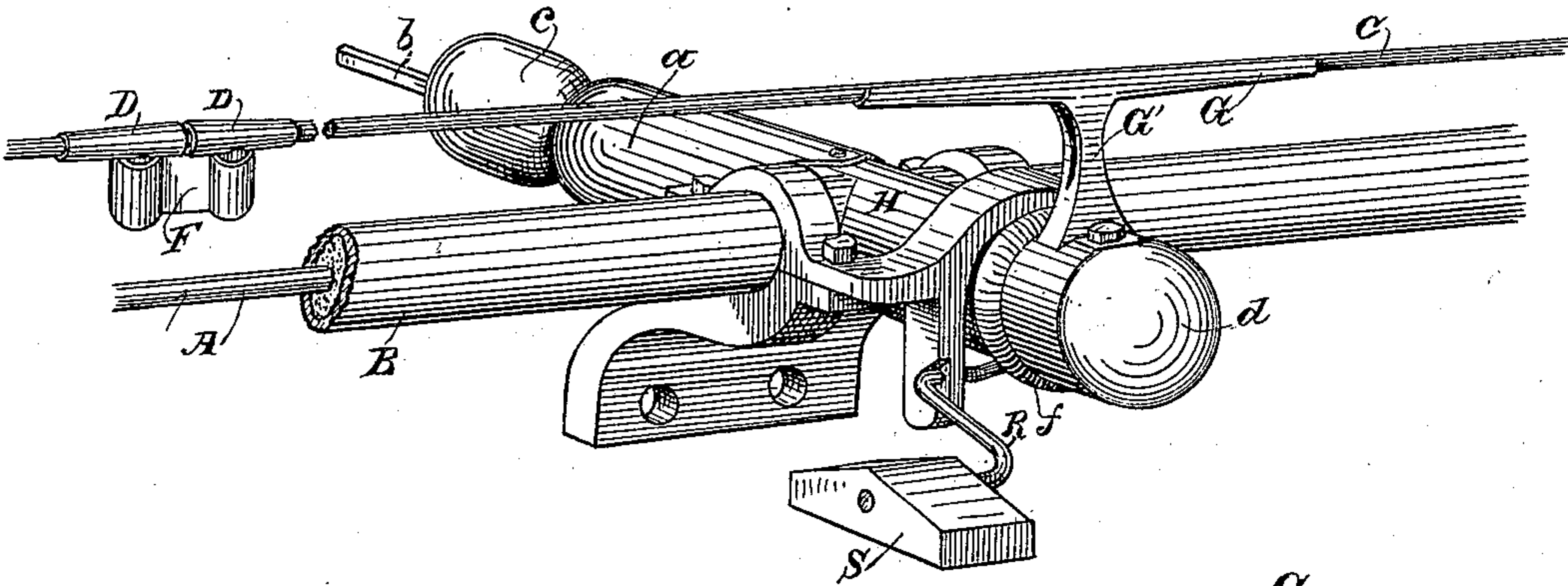


Fig. 2.

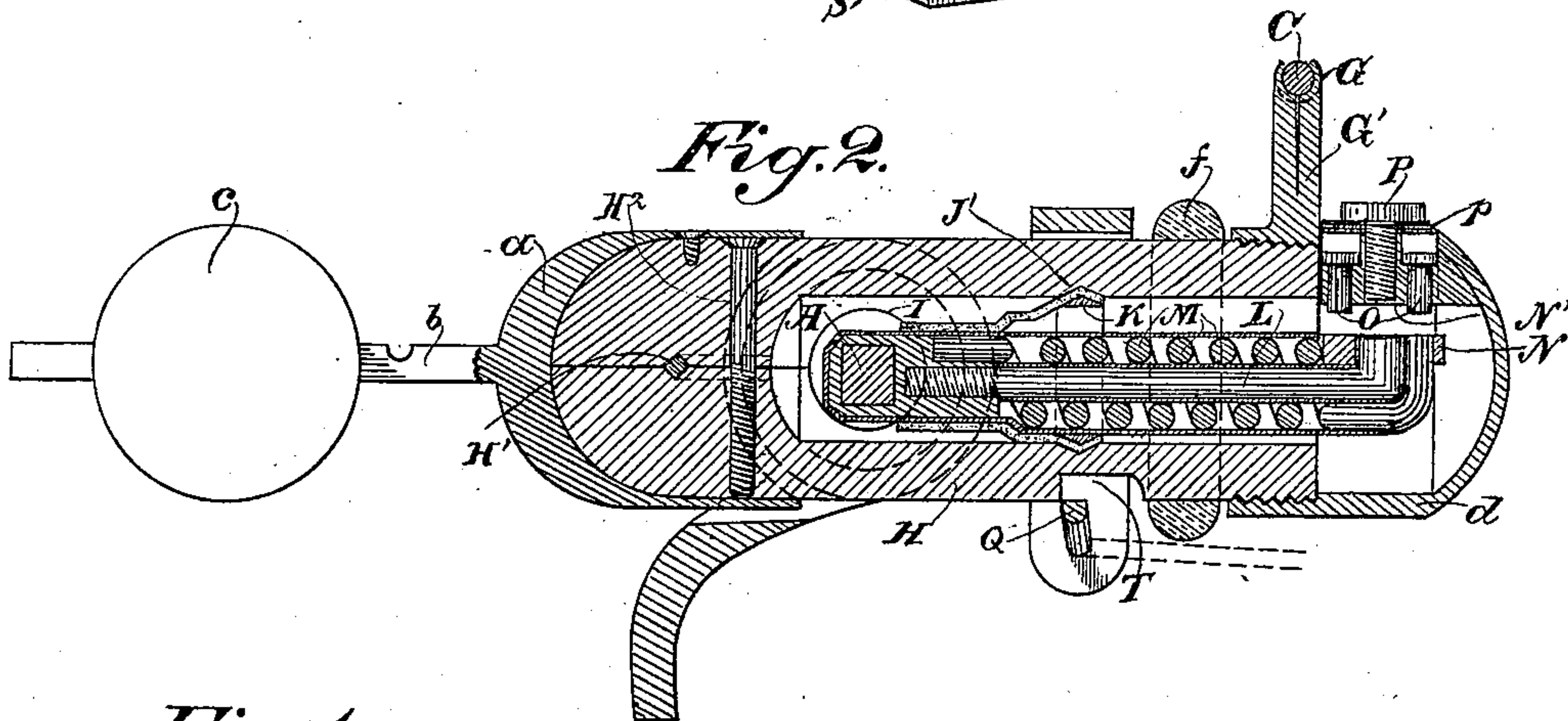


Fig. 4.

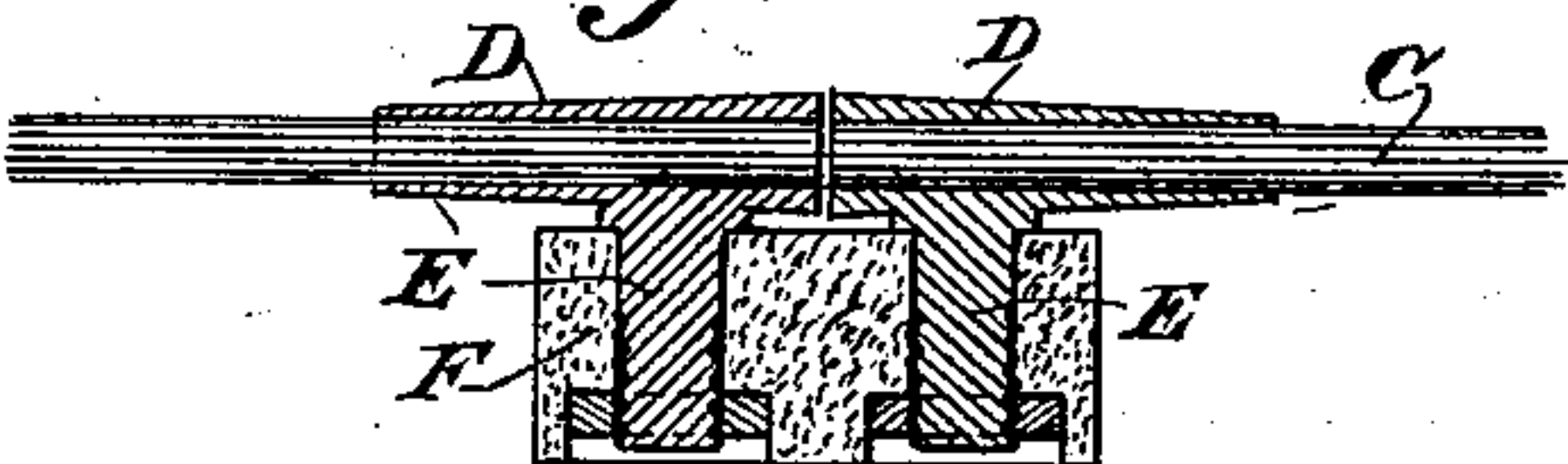
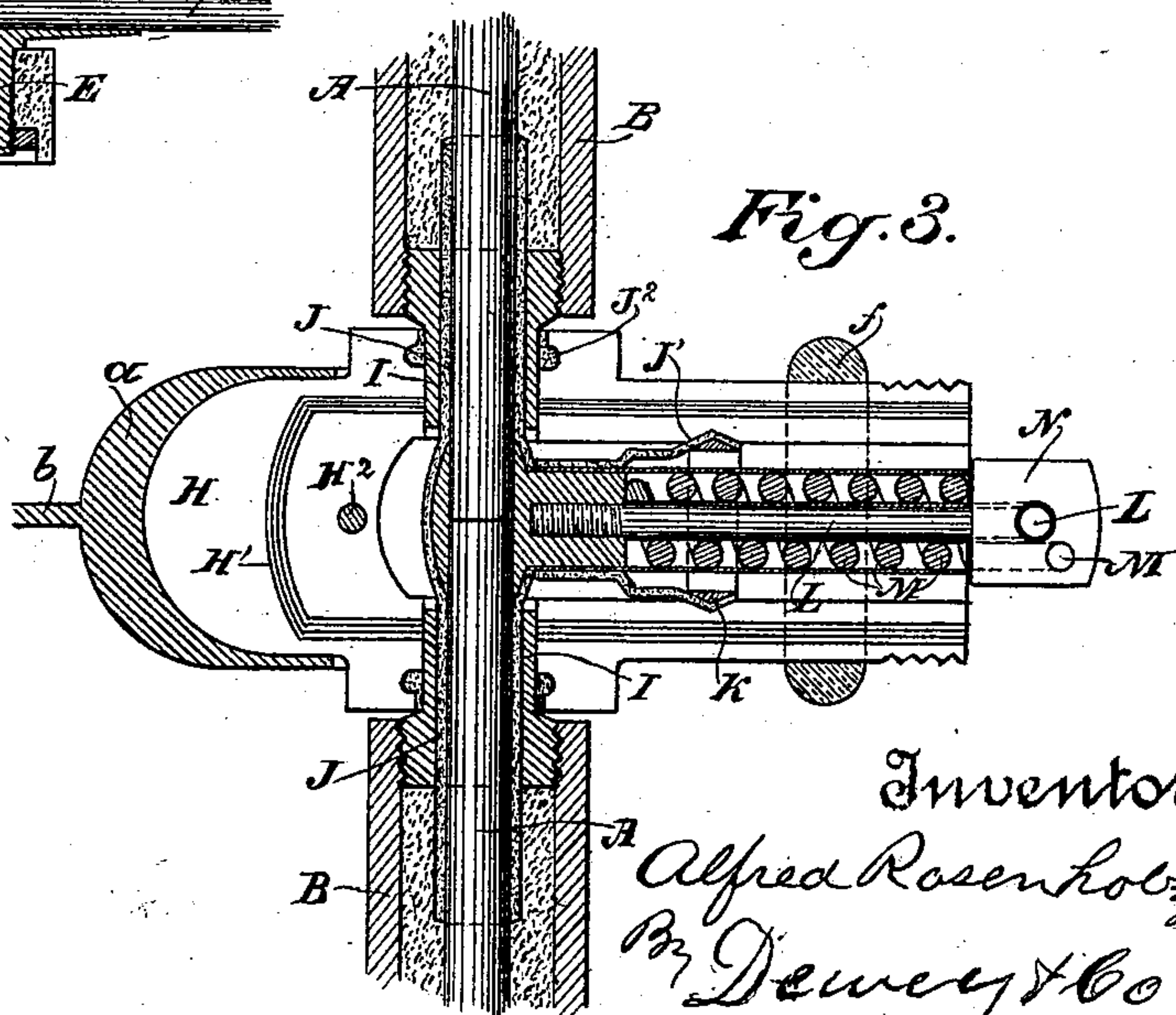


Fig. 3.



Witnesses,
J. H. Morse
J. F. Elsheck

Inventor,
A Alfred Rosenholz
B Dewey & Co
attys

UNITED STATES PATENT OFFICE.

ALFRED ROSENHOLZ, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO SAMUEL J. CLARKE AND HARVEY S. BROWN, OF SAME PLACE.

SWITCH FOR UNDERGROUND ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 551,145, dated December 10, 1895.

Application filed April 12, 1895. Serial No. 545,491. (No model.)

To all whom it may concern:

Be it known that I, ALFRED ROSENHOLZ, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Switches for Underground Electric Railways; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a switch which is especially adapted for use upon underground electric railways.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a perspective exterior view of my device. Fig. 2 is a longitudinal vertical section of the switch mechanism, showing the interior. Fig. 3 is a horizontal section of the same, showing its connection with the main conductor. Fig. 4 shows the manner of supporting the adjacent separated ends of the trolley-wire.

The object of my present invention is to provide an automatic means for cutting off the electric current in case the tube within which the parts are arranged becomes flooded with water, and also to provide certain improvements in the details of construction.

The main features of my present construction are essentially the same as shown in Letters Patent No. 535,297, issued to me March 5, 1895.

A is the main conducting-wire along which the current of electricity passes from the source of supply. This wire is embedded in a non-conducting coating of cement, and is further inclosed by an exterior tube B suitably supported parallel with the trolley-wire C, through which latter connection is made to the car by means of a trolley (not here shown) adapted to travel upon the wire C. The trolley-wire is made in sections, as plainly shown in Fig. 4, the ends approaching each other closely, but being separated by a sufficient space or insulation to cut off any passage of the current from one to the other. Each of the meeting ends of C C is fixed in a sleeve D, and these sleeves have shanks E, which extend into an insulating substance F, where they are suitably secured, and the wires held

in proper relation with each other. Each section of the trolley-wire C is supported in a sleeve G, which is fixed to or formed with a standard G', this standard being fixed to and supported from the casing H of the switch mechanism.

I have found that a very convenient way of securing the wires C is to split the standard G' and to make the portion G segmental, and sufficiently more than half of a cylinder, so that the upper edges will inclose the wire, and when the sides of G' are sprung together the wire will be retained in its position where it may also be soldered or otherwise secured.

The case H projects at right angles from the conducting-wire A and is journaled about it so that it has a slight up-and-down tilting motion about its journals. The casing H is preferably made in two halves. These halves have grooves or channels made in them, as shown at H', and these channels are adapted to receive a packing which makes a hermetical joint when the two halves are closed together. This construction makes it convenient for placing the casing about the interior core and conducting-wire. When the two are closed together, the cap *a* is fitted over and secured upon one end, this cap having an arm or extension *b*, which carries the counter-balance-weight *c*, by which the casing is tilted to its normal position and contact broken as soon as the trolley has passed. Upon the other end is a cap *d*, which is adapted to screw upon that end of the casing, and thus the two parts of the casing are held firmly together and the interior is hermetically sealed against any entrance of moisture. The whole is then coated with any suitable non-conducting covering which may be employed for the purpose, and by which any possible escape of the electric current will be practically prevented. I have also shown a non-conducting ring *f* surrounding the casing H near the standard G', which assists in preventing any loss of electricity in case of dampness.

The journals of the casing H are secured in the ends of the inclosing pipes B, and extend into the casing, as shown at I, Fig. 3. Within these journals is a sufficiently flexible insulating material J which surrounds the conducting wire A extending a short

distance into the pipes B so as to form a good joint with the insulating material contained within the pipes and surrounding the conductor. These insulating sleeves J are so formed within the casing H of the switch as to extend at right angles with the conductor A and surround the iron core which projects at right angles with the conductor and is inclosed within the casing H. This extension of the insulators J is formed as shown at J', and within it is an elastic ring K over which it fits and which forces it outward within the casing H so that a perfect joint and insulation is made at this point.

The core L is surrounded by a coil of wire, (shown at M,) so that when the current of electricity passes through the surrounding coil it produces a magnetic action which insures the contact of the conductors while the trolley is passing. The core has its end turned up, as shown, terminating within the plate N, which is stationary.

N' is the opposing contact-plate movable with the casing H, in the end of which it is fixed.

The operation is as follows: When the trolley passes along the wire C it presses upon the standard G' and forces the outer end of the casing H downward, tilting it about its journals I until the plates N and N' are brought into contact. The plate N forms the termination with which the core and the coil M are connected, and the plate N' is connected with the tilting case H and situated above the plate N. When these two form contact it will be manifest that the current from the conductor A will pass through the coil, thence through the standard G' into the trolley-wire C and thence to the car. In order to insure a perfect contact at this point, I have shown loose bolts O fitting in holes in the plates N', so that their ends project a little below the surface of this plate. These bolts have heads fitting in corresponding chambers above, which prevent their dropping down, and all of the bolts are secured in place by a washer and a screw P, which screws into the plate N', and a packing *p* prevents any moisture from getting in at this point. It will be seen that when the casing H is tilted downward, the plate N being fixed to and supported from the conductor A, the plate N' will be brought into contact with N, and the circle of loose bolts O projecting below the face of this plate will insure a contact even if the faces of the plates are not absolutely parallel. In some cases difficulty may arise from the flooding of the conduit within which these parts are situated, and if, in such case, the case H be tilted so as to form contact between the plates N and N', a great loss of the current from the conductor A would ensue. I have, therefore, shown a crank-arm Q journaled beneath the tilting case H, and this crank-arm has an arm or extension R, which carries a float S. When no water is in the tube or conduit, the float S

will drop, and the crank-arm will coincide with a slot or opening T made in the lower part of the casing H, as is well shown in Fig. 2. When in this position it offers no obstruction to the tilting of the casing H under the ordinary conditions of travel of the cars. If, however, the tube should become flooded, the water will raise the float and turn the crank-arm Q until it stands beneath the casing H in such a manner as to prevent the latter being tilted. This locks it and prevents any contact between the plates N and N', and no loss of electricity can occur during the submergence of the parts, the packing of all the joints being sufficiently perfect to prevent any entrance of water.

To further insure the apparatus against the effects of moisture and leakage of the electric current, the open space at the junction of the core and the main conductor may be filled with any suitable non-conducting or oleaginous packing exterior to the flexible sheath which surrounds the conductor and core at this point.

The journal or bearing about which the casing oscillates may be plain, formed with a ring or collar, as shown at J², or it may consist of any of the well-known forms of anti-frictional bearings.

The two parts of the casing H may be secured together by screws or bolts, as shown at H², in addition to the caps at the ends previously described, and either one or both of the caps may also be secured in a similar manner, if desired.

The contact-plate N' is preferably formed as a part of the cap *d*, but it may be made separately and secured therein if desired.

The effect of the coil M which surrounds the core L is to temporarily magnetize it while the electric current is passing, and this acts to hold the contact-plates together as long as the magnet is energized. Whenever the current is cut off, this force ceases and the action of the counterbalance-weight will separate the contact-plates, and as the current has ceased to flow before they are separated, no sparking will take place.

The connection of the core with the conductor may be polygonal, or otherwise so formed as to hold the core rigidly in position. By the construction here shown I am able to complete the whole switch and its connections in the shop with a short length of the main conductor A and inclosing tube B, so that all parts may be accurately made and fitted. When taken to the place where they are to be used, the ends of the main conductor are joined to the section connected with the switch a few inches from the yoke, and the exterior inclosing tube and covering completed, and the non-conducting material poured in in a melted state, or otherwise applied.

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

1. A distributing switch for electric con-

duits consisting of a stationary magnetic core projecting at right angles with the main conductor, a sealed insulated casing inclosing the core and movable with relation thereto about the main conductor, a trolley wire supported from the movable end of the casing and connected with a contact plate adjacent to the free end of the core, movable pins fitted within said contact plate, with their lower ends projecting and forming contact with the core plate when the casing is depressed.

2. A tilting casing having the magnetic core projecting from the main conductor with a contact plate at its outer end, a trolley wire supported from the movable end of the casing connected with a contact plate fixed therein, vertically movable pins fitting in holes in the contact plate, with their lower ends projecting so as to form contact with the core plate, and a screw having a head or washer of large diameter covering the chambers in which the pins are movable with a packing fitting beneath its head to form a water tight joint.

3. A distributing switch for electric conduits consisting of a stationary magnetic core or conductor projecting at right angles with the main conductor, a sealed insulating casing fulcrumed and turnable about the main conductor and inclosing the core, and a continuous flexible insulating jacket surrounding the conductor, with its ends extending into the insulating material in which the conductor is embedded and having its central portion continued so as to surround the core and form a joint within the casing.

4. A distributing switch for electric conduits consisting of a magnetic core or conductor projecting at right angles with the main conductor, a sealed insulating casing fulcrumed and turnable about the main conductor, said casing being made in halves adapted to fit together having packing fitting in grooves between the meeting edges of the halves, and caps fitting over the ends serving

to clamp the sections together, and contact plates within the casing whereby electrical communication is effected between the main conductor and an exterior conductor carried upon the casing.

5. A distributing switch for electric conduits consisting of a magnetic core or conductor projecting at right angles with the main conductor, a sealed insulating casing fulcrumed and turnable about the main conductor and inclosing the core, a trolley wire supported from the movable end of the casing and connecting with the contact plate adjacent to the free end of the core and movable with the casing, a locking arm whereby the tilting of the casing is prevented, and a float connected with said locking arm adapted to throw it into engagement to lock the casing whenever the float is raised by a body of water around it.

6. A distributing switch for electric conduits, consisting of a magnetic core or conductor projecting from the main conductor, a sealed casing therefor fulcrumed and turnable about the main conductor, journals or bearings upon which the casing is movable, a flexible insulating sheath or jacket inclosing the conductor and core and an exterior filling or packing surrounding the sheath.

7. A distributing switch for electric conduits consisting of a stationary magnetic core projecting from the main conductor, a sealed casing therefor, fulcrumed and turnable in journals or bearings about the main conductor, a flexible insulating sheath or jacket surrounding the junction of the main conductor and core, and a ring and groove joint at the termination of the sheath within the casing.

In witness whereof I have hereunto set my hand.

ALFRED ROSENHOLZ.

Witnesses:

S. H. NOURSE,
H. F. ASCHECK.