

L. G. JOHNSTONE.  
THIRD RAIL FOR ELECTRIC RAILWAYS.  
APPLICATION FILED JUNE 9, 1903.

NO MODEL.

Fig:1.

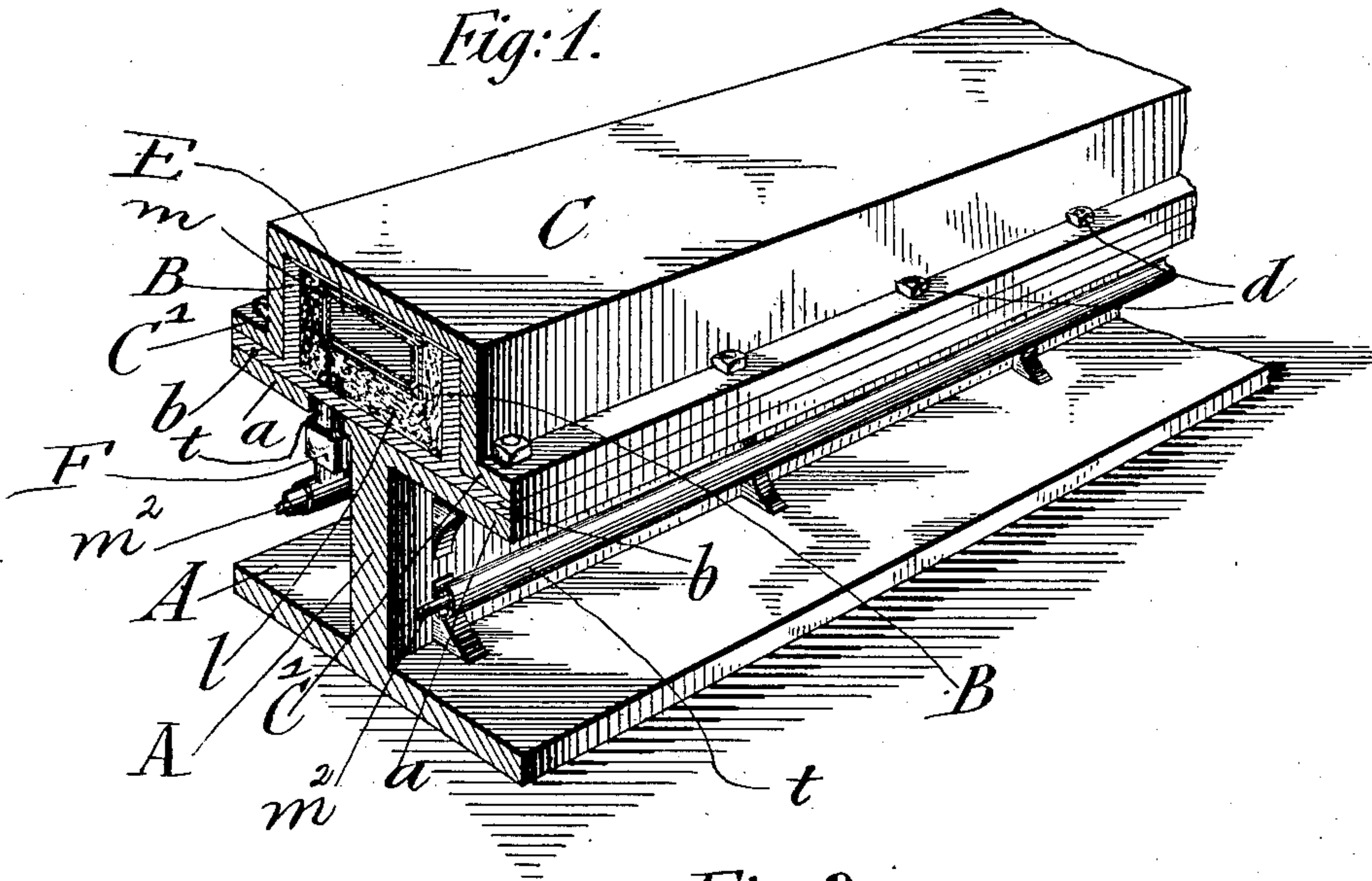
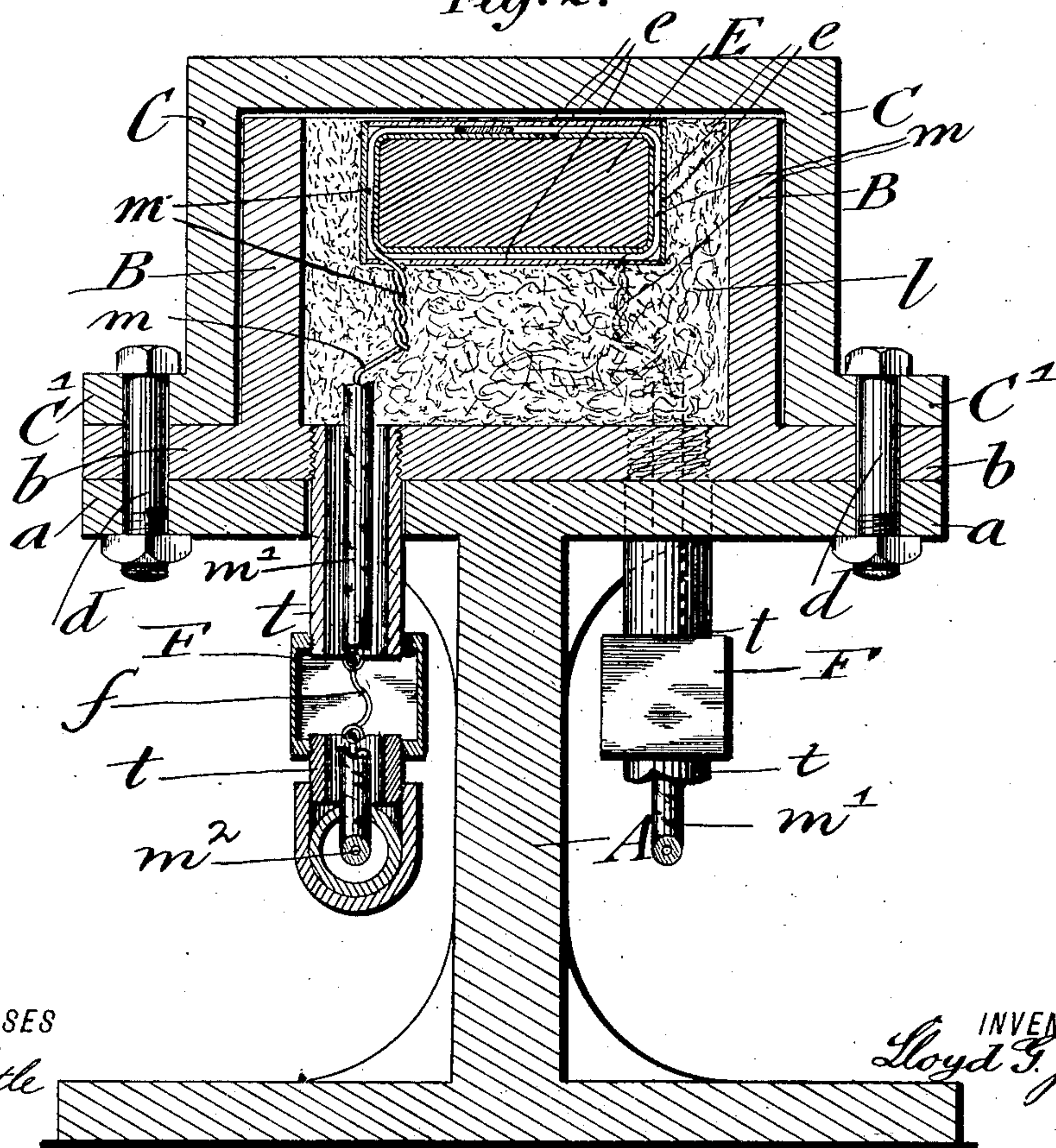


Fig:2.



WITNESSES

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# UNITED STATES PATENT OFFICE.

LLOYD G. JOHNSTONE, OF NEW YORK, N. Y.

## THIRD RAIL FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 737,935, dated September 1, 1903.

Application filed June 9, 1903. Serial No. 160,712. (No model.)

*To all whom it may concern:*

Be it known that I, LLOYD G. JOHNSTONE, a citizen of the United States, residing in New York, borough of Manhattan, and State of New York, have invented certain new and useful Improvements in Third Rails for Electric Railways, of which the following is a specification.

This invention is intended to furnish an improved third rail for electric railways by which the same can be kept clear of ice, snow, and sleet during the winter season without any covering-hood or other protective device by utilizing the heating effect of a branch current that is supplied to the third rail from the station, so that the melting of the ice, snow, sleet, &c., settling on the top of the rail is accomplished in a very effective and reliable manner, and thereby the contact of the shoe with the third rail kept up without interruption; and for this purpose the invention consists of a third rail which comprises a support, a U-shaped portion open at its upper end supported thereon and provided with flanges, and an inverted-U-shaped portion, also provided with flanges, attached to the flanges of the upright U-shaped portion and to the support and covering the open part of the U-shaped portion, the interior of said U-shaped portion being provided with a wire-wound core embedded in a layer of insulating material and connected by conductors with a source of electric power supplied from the station, so as to produce the heating up of the wires wound on the core and the adjacent covering of the rail.

The invention consists, further, of certain details of construction and combinations of parts, which will be fully described herein-after and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a perspective view of a portion of my improved third rail for electric railways, and Fig. 2 is a vertical transverse section of Fig. 1 drawn on a larger scale.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a support for the third rail of an electric railway, which support is preferably made of I-shaped cross-section and attached to the cross-ties of the railway in the usual manner.

On the support A is attached a means for heating the same, which consists of a lower upright U-shaped portion B, provided with flanges *b*, and an outer inverted-U-shaped portion C, provided with flanges C', adapted to cover the open lower U-shaped portion B. The flanges *b* and C' of the U-shaped portions B and C, respectively, are of about the same width as the flanges or upper part of the support A and are fastened to the same by suitable bolts *d*, as shown clearly in Fig. 2. In the lower portion is arranged a core-coil E, preferably of soft iron, which is embedded in a filling of suitable non-conducting material, preferably asbestos fibers. The core E is surrounded by a metallic conductor *m*, preferably iron or German silver, wound around the core E for the entire length and separated from the non-conducting layer of filling by means of mica plates *e*, as shown in Fig. 2. The wire-wound core E is preferably made in sections of suitable length, corresponding either to the lengths of the rail-sections or parts thereof, each of which is provided with a switch for connecting in or cutting out each individual length of rail. The conductor wound on the core is connected with a special generator or supply of electricity at the station by conducting-wires, which run along the support A on suitable supports. For this purpose each rail-section is provided at either end with a tube *t*, passing through the lower part of the third rail, as shown in Fig. 2, which tube *t* serves for guiding the insulated ends *m'* of the wire *m*, wound on the core E, from the interior of the third rail to the exterior. At the exterior the ends *m'* are connected with the supply-conductors *m*<sup>2</sup>, which run along the sides of the rails, as shown in Fig. 1. Each rail-section is provided with a section of wire-wound core, the ends of which wire pass through the tubes at either end of the rail-section and are connected to the supply-conductors. Hence each section is independent of the other and may be removed or replaced with facility. Each rail-section is provided with suitable fuses *f*, as shown in Fig. 2, arranged in fuse-boxes F.

Whenever there should be a formation of ice, snow, or sleet on the outer covering or top portion C of the third rail, the current at the central station is thrown in by a switch,



so that the current passes through the wire *m*, wound on the core *E* of the rail, which wire is heated up to incandescence, so that the heat of the same will prevent the formation of ice or  
 5 a deposit of snow or sleet on the top surface of the covering portion without requiring any clearing or other mechanical devices for the third rail, which are liable to wear away the rail or injure the same. Rails provided  
 10 with my improved heating means always present the top surface of the rail in good condition for a reliable contact with the contact-shoe gliding over the same.

The improved construction of the third rail  
 15 permits the sending of a current through the wire wound at the interior of the third rail whenever required in the winter season, so that the coil wound around the core-rail is heated, and thereby the adjacent top surface  
 20 of the third rail likewise heated up, by which the formation of ice, sleet, &c., on the rail is prevented and a reliable contact with the current-transmitting shoe is obtained.

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

1. A third rail for electric railways, consisting of a supporting-rail, means thereon capable of being heated, and conductors connecting said heating means with a source of  
 30 electric power, substantially as set forth.

2. A third rail for electric railways, consisting of a supporting-rail, a wire-wound core supported thereon, and conductors connecting the ends of the wire wound on the  
 35 core with a source of electric power, substantially as set forth.

3. A third rail for electric railways, consisting of a section of a supporting-rail, a wire-wound core supported thereon but insulated therefrom, tubes at the ends of each rail-section for the ends of the wire wound on the  
 40 core, and conductors connecting the ends of the wires passing through the tubes with a source of electric power, substantially as set forth.  
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4. A third rail for electric railways, consisting of a lower **U**-shaped portion open at its upper end, a covering portion of inverted-

**U** shape, means for connecting said portions  
 50 together, an insulated core-rail located in the lower portion adjacent to the upper portion, and a conducting-wire wound around said core-rail and connected with a source of electric power, substantially as set forth. 55

5. A third rail for electric railways, consisting of a suitable support, a lower portion having a **U**-shaped cross-section open at its upper end, an upper covering portion of inverted-**U** shape, a core-rail in the lower portion, insulating material placed around the  
 60 core-rail, and a wire conductor wound around the core-rail and connected with a source of electric power so as to produce the heating up of the wire and adjacent part of the covering  
 65 portion, substantially as set forth.

6. A third rail for electric railways, consisting of a lower portion of **U**-shaped cross-section, an upper portion of inverted-**U** shape, both portions being provided with flanges at  
 70 the ends, means for connecting the **U**-shaped portions at the flanges, a core-rail, an insulating-filling for said core-rail at the interior of the lower portion, a conductor wound around the core-rail, and conductors connecting said  
 75 conductor with a source of electric power, substantially as set forth.

7. A third rail for electric railways, consisting of a suitable support, a lower portion of **U**-shaped cross-section thereon, an upper  
 80 portion of inverted-**U** shape, both portions being provided with flanges at the ends, means for connecting the **U**-shaped portions at the flanges and to the support, a core-rail, an insulating-filling for said core-rail at the interior of the lower portion, a conductor wound  
 85 around the core-rail, sheets of insulating material placed around the conductor-wound core-rail, conductors connecting said conductor with a source of electric power, substantially as set forth. 90

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

LLOYD G. JOHNSTONE.

Witnesses:

PAUL GOEPEL,  
 JACOB ARENS.