Oct. 14 , 1924. 1,511,276

A. FROHNE

RESISTANCE COIL

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Fig. 1.

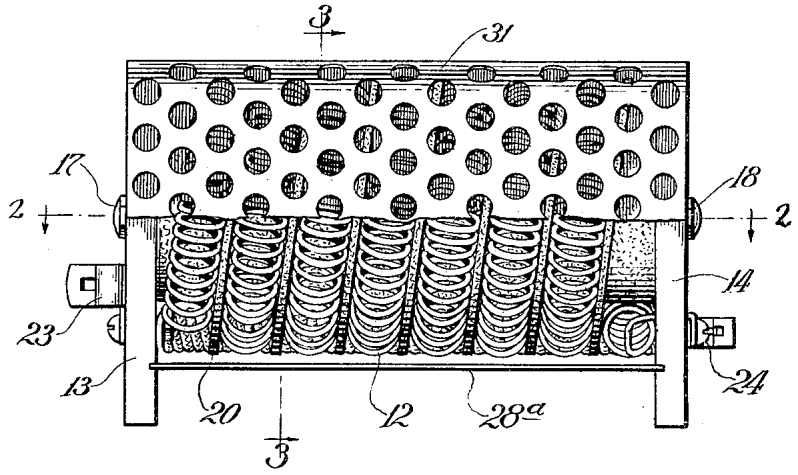

Fig. 2.

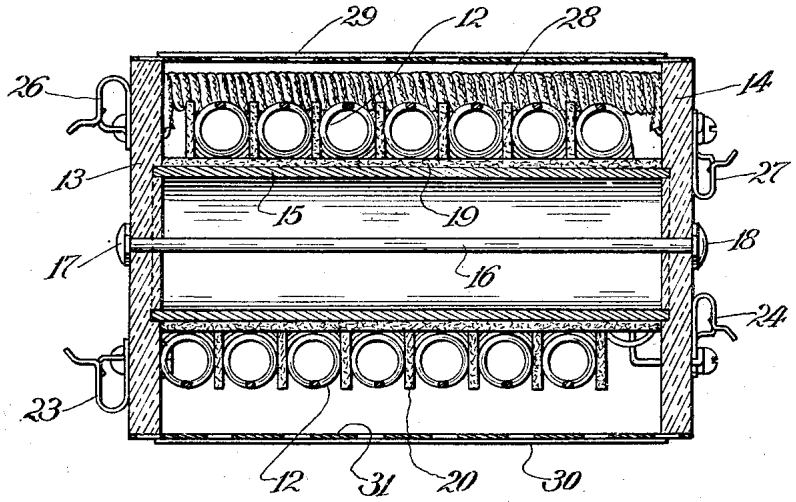

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Fig. 3.

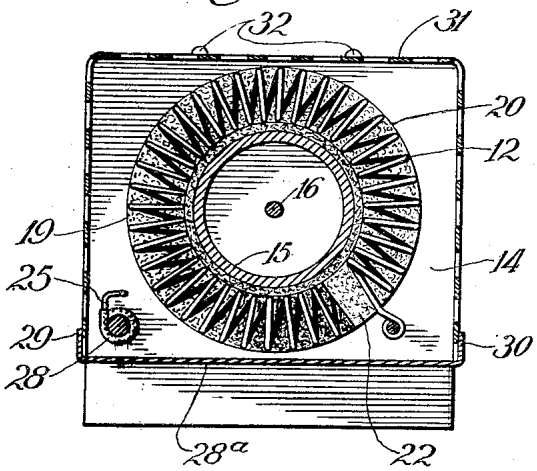


Fig. 4.

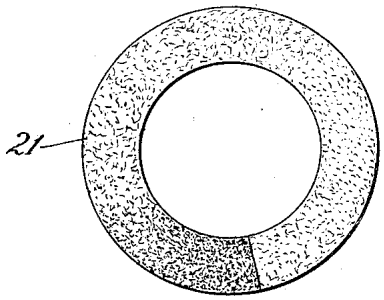


Fig. 5.

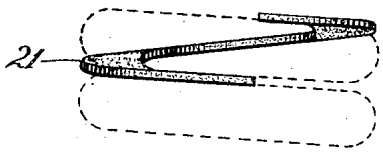
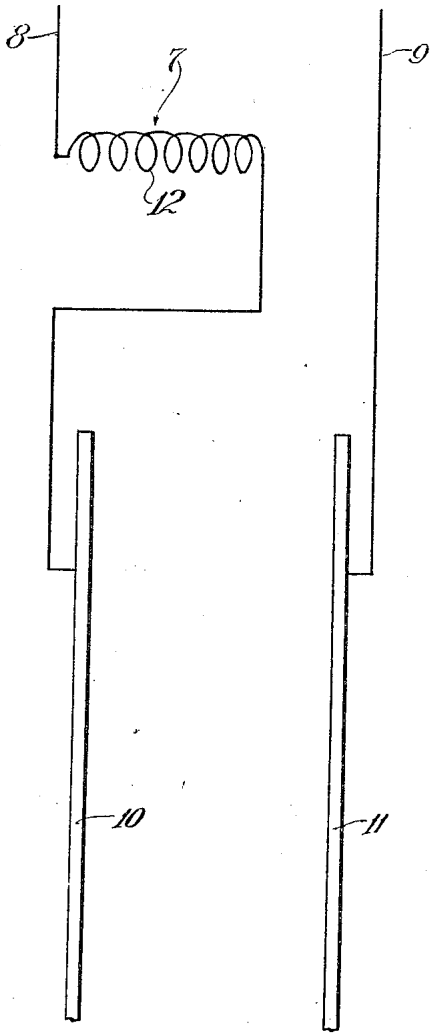


Fig. 6.



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Patented Oct. 14, 1924. 1,511,276

UNITED STATES PATENT OFFICE.

ALBIN FROHNE, OF CHICAGO, ILLINOIS, ASSIGNOR TO AMERICAN FLYER MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

RESISTANCE COIL.

Application filed January 20, 1922. Serial No. 530,510.

To all whom it may concern:

Be it known that I, ALBIN FROHNE, a citizen of Germany, having declared my intention of becoming a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Resistance Coils, of which the following is a specification.

This invention has to do with certain improvements in resistance coils for use in connection with toy electric railroads in particular. While the resistance coil herein disclosed is especially intended for use in connection with the supply of current for toy electric railroads, still it will appear that the construction herein disclosed may also be used to advantage for many other purposes. Nevertheless, since the present coil is especially intended to meet certain of the conditions in the operation of toy electric railroads, I have chosen to illustrate and describe its use particularly in this connection.

One of the objects of the present invention is to provide a resistance coil construction intended for use particularly on circuits of relatively low voltage such as thirty-two volts, which is the voltage usually delivered by so-called farm lighting units, and which resistance coil is particularly intended for use in connection with the amount of current ordinarily required for the operation of toy electric railroads.

Another object of the invention is to provide a resistance coil construction which shall be very rugged and substantial and well able to stand up under a rather difficult service to which it will frequently be subjected when used in connection with toy railroads. In this connection, another object is to provide a very simple form of construction and one which can be very cheaply manufactured from a relatively small number of parts.

Another feature of the invention relates to the manner in which the coil of resistance wire is supported, so that the various convolutions shall be effectively insulated from each other. In this connection, an object is to provide a very simple arrangement for supporting and insulating the convolutions of the coil, and to provide such a construction that use may be made of such material as sheet asbestos, etc.

Other objects and uses of the invention will appear from a detailed description of the same, which consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings:

Figure 1 shows a side view of a resistance coil embodying the features of the present invention, the lower portion of the coil cover being broken away so as to show the interior construction;

Fig. 2 shows a horizontal longitudinal section taken on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 shows a vertical cross section taken on the line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 shows a face view of one of the spiral insulating segments;

Fig. 5 shows a bottom edge view corresponding to Fig. 4; and

Fig. 6 shows a simple wiring diagram of one application of the use of the present coil.

Referring first to the diagram of Fig. 6, the resistance coil in its entirety is designated by the numeral 7. The thirty-two volt supply lines are shown at 8 and 9 respectively. The two electric rails of the toy railroad are shown at 10 and 11 respectively. A coil 12 is placed in series with the circuit so that the current delivered through the rails passes through the resistance coil in full volume. The supply terminal 9 is directly connected to the rail 11, whereas the coil 12 is placed between the supply terminal 8 and the rail 10.

The coil itself comprises a spool consisting of the end blocks 13 and 14 together with the hub tube 15. The end blocks are preferably made of fiber or other relatively strong insulating material. The hub tube 15 may be of brass or other metal. A rod 16 is passed through the center of the tube 15, its heads 17 and 18 bearing against the end blocks 13 and 14 respectively. If desired, this rod may be threaded and one or both of the end heads may take the form of a nut. Furthermore, the end portions of the tube 15 are preferably counter sunk into circular recesses in the end blocks 13 and 14, as shown in Fig. 2.

The outer surface of the tube 15 is covered with a sheet of asbestos cloth or fiber 19 which serves to insulate the tube 15 while

at the same time protecting it materially from the heat of the resistance coil.

The resistance coil 12 consists of a wire of suitable resistance material twisted into helical form so that it assumes the appearance of a spring, which spring is then wrapped around the insulated tube 19 in the manner readily apparent from Figs. 1, 2 and 3 commencing at one end of the spool and running towards the other end. In this way, the resistance wire is placed on the spool in the form of a series of convolutions. The ends of the wires are thus brought close to the end blocks 13 and 14 respectively.

The convolutions of the coil are separated from each other by a spiral layer of insulating material 20. This spiral layer of insulating material consists of a series of circular sections 21 such as are shown in Figs. 4 and 5. These may be spread out into spiral form. The end portions of consecutive rings may then be overlapped a slight amount as is clearly shown at the point 22 in Fig. 3, so that together a series of these rings is built up into a continuous spiral of insulating material laid in between the convolutions of the coil.

The ends of the coil are brought out to the terminal members 23 and 24 located on the end blocks 13 and 14 respectively, as shown in Figs. 1 and 2. As a matter of convenience, another wire 25 is run directly through the coil between the end blocks 13 and 14 and between the end terminals 26 and 27. This wire 25 is covered with a layer of insulating material 28 in the form of a rope of asbestos or otherwise. When the wire is run through the device in this manner, the terminals 23 and 26 may be connected directly to the supply lines 8 and 9, and the terminals 24 and 27 may be connected to the electric rails of the railroad.

In order to protect the coil and to give the rheostat a finished appearance, I have provided a bottom plate 28^a extending between the end plates 13 and 14. The edge portions 29 and 30 of this plate 28^a are turned upwardly as shown in Fig. 3. I have also provided a perforated cover plate 31 which extends over the top and down at the sides of the coil to reach the flanges 29 and 30 as shown in Fig. 3. The ends of the plate 28^a may be counter sunk into the end of blocks 13 and 14 as shown in Fig. 1. The cover plate 31 may be held in place by screws or pins 32.

While I have herein shown and described only a single embodiment of the features of my present invention, still I do not limit myself to the same except as I may do so in the claims.

I claim:

1. A resistance coil comprising in combination a pair of end members of fibrous electrically insulating material, a tubular hub extending between the central portions of the inner faces of said end members, means for drawing the end members rigidly against the hub, a layer of insulating material on the hub, a spiral resistance element of electrical resistance wire coiled around the hub, end terminals on the end members in electrical connection with the ends of said wire, and a series of rings of electrically insulating material laid in continuous fashion between the convolutions aforesaid and serving to electrically separate them from each other, substantially as described.

2. A resistance coil comprising in combination a pair of end members of the inner faces of electrically insulating material, a tubular hub extending between the central portions of the inner faces of said end members, means for drawing the end members rigidly against the hub, a layer of insulating material on the hub, a spiral resistance element of electrical resistance wire coiled around the hub, end terminals on the end members in electrical connection with the ends of said wire, and a band of electrically insulating material laid in continuous fashion between the convolutions aforesaid and serving to electrically separate them from each other, substantially as described.

3. A resistance coil comprising in combination a pair of ends members of electrically insulating material, a hub extending between the central portions of the inner faces of said end members, means for drawing the end members rigidly against the hub, a spiral resistance element of electrical resistance wire coiled around the hub, end terminals on the end members in electrical connection with the ends of said wire, a layer of electrically insulating material laid in continuous fashion between the convolutions aforesaid and serving to electrically insulate them from each other, and a sheet metal cover surrounding the resistance element and secured to the end members and provided with perforations for the ready transfer of heat, substantially as described.

ALBIN FROHNE.