A. J. LOGUIN.

RESISTANCE UNIT FOR ELECTRICAL APPARATUS.

APPLICATION FILED APR. 3, 1915.

1,171,059. Patented Feb. 8, 1916.

FIG. 1.

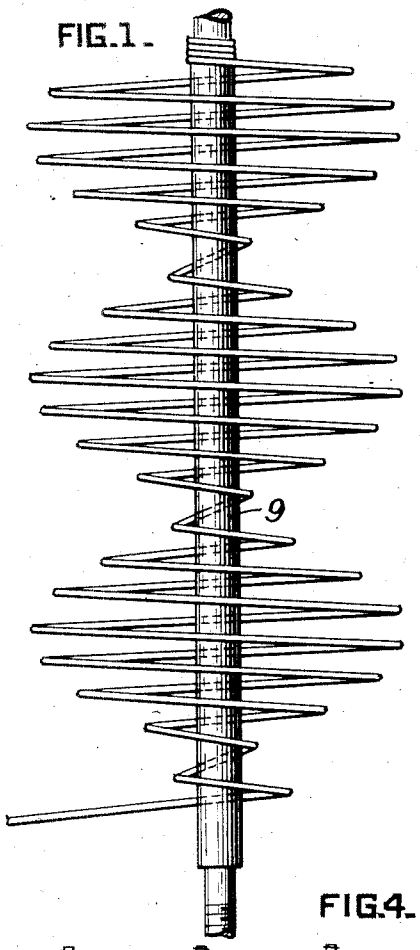


FIG. 2.

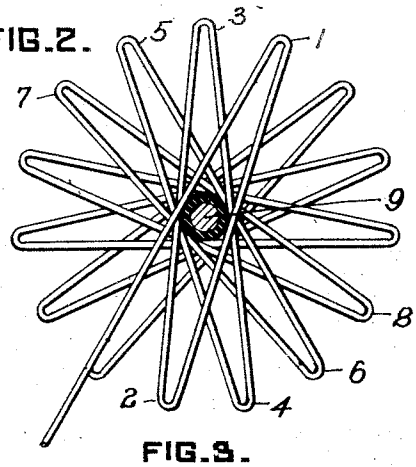


FIG. 3.

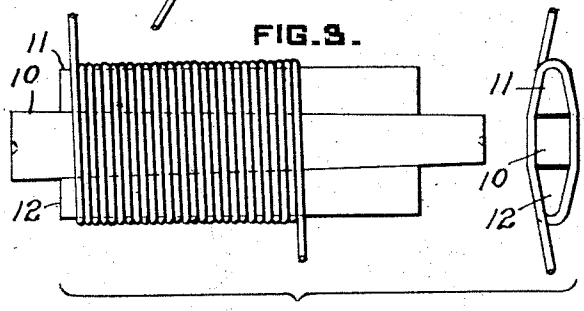


FIG. 4.

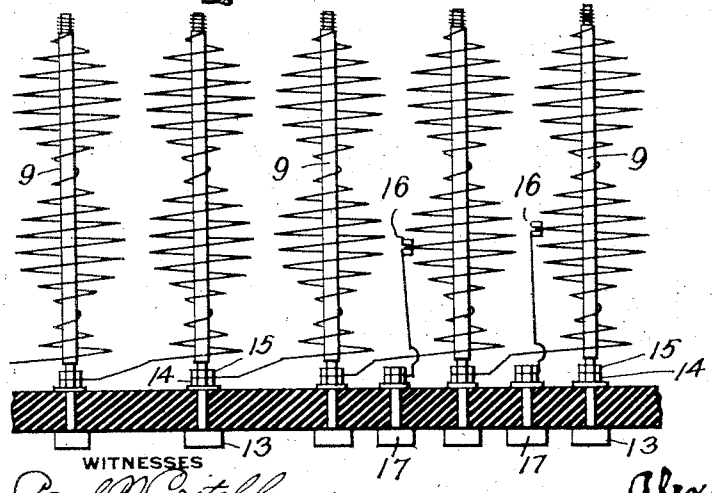
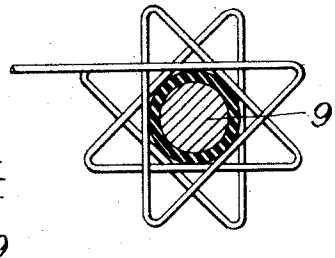


FIG. 5.



WITNESSES

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RESISTANCE UNIT FOR ELECTRICAL APPARATUS.

1,171,059. Specification of Letters Patent. Patented Feb. 8, 1916.

Application filed April 3, 1915. Serial No. 18,937.

To all whom it may concern:

Be it known that I, ALEXANDER J. LOGUIN, residing at Petrograd, Russia, a subject of the Emperor of Russia, have invented or discovered certain new and useful Improvements in Resistance Units for Electrical Apparatus, of which improvements the following is a specification.

My invention relates to improvements in electrical apparatus and, generally stated, consists in a coil formed of an electrical conductor having by virtue of its shape peculiar advantages. This coil is applicable in electrical engineering generally, wherever its advantages are of importance; but, more specifically, it is applicable as a unit in the building of resistance boxes and like pieces of apparatus.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 shows in side elevation a resistance unit of my invention; Fig. 2 shows an end view of the same; Fig. 3 shows in side and end elevation the tools employed in forming and the manner of forming such a coil as is embodied in the resistance unit of Figs. 1 and 2; Fig. 4 shows in longitudinal section through the supporting plate of a resistance box a succession of resistance units such as that of Fig. 1, arranged in operative relative positions; and Fig. 5 is a view corresponding to Fig. 2, and showing in plan a resistance unit whose coil embodies my invention generically but is specifically different from that of Figs. 1 and 2.

The coil which is the essential element of the resistance unit shown in Figs. 1 and 2 is a helix whose convolutions are in plan, not circular, as is usual, but are elongate, consisting of sharp bends 1, 2, 3, 4, etc., alternating with straight or nearly straight portions 1—2, 2—3, 3—4, etc. The succeeding turns of this coil are not arranged in parallelism, as is usual, but are stepped; the homologous parts of the adjacent turns are non-parallel. Compare the portions 1—2 and 3—4 of the coil shown in Fig. 2. Figs. 1 and 2 show an orderly succession of the stepping or non-parallelism of the turns. Fig. 2 shows the outermost portions of the coil lying in a cylindrical surface, and comparison of Figs. 2 and 1 will make plain the fact that in this particular coil these outermost portions (1, 2, 3, 4, etc.) lie in and define two truly helical lines in that cylindrical surface.

A convenient and simple way of forming such a coil is indicated in Fig. 3. A mandrel is provided, consisting of the three parts 10, 11, and 12 which, when the parts are assembled (see the end view) has approximately the shape in cross section which it is desired to reproduce in the turns of the coil. Upon this mandrel the wire is wrapped to form the coil. The view in side elevation shows the wrapping in progress. When the wrapping is completed the mandrel is removed; it will be observed that the central member of the three-part mandrel is made of tapered form to facilitate the knocking down and removal of the mandrel. When the mandrel is removed the resilience of the metal will cause the coil to spring from the truly tubular form in which it was laid down to the expanded form shown in Figs. 1 and 2. It will be understood that elasticity of material and degree and uniformity of tension in winding and the closeness with which the turns are laid upon the mandrel, and even the minute shape of the mandrel itself are variables which may be suited to the end in view.

The characteristics of such a coil as I have now particularly described are advantageous in that danger of short-circuits is greatly reduced, and this point becomes important when dealing with great lengths of light wire, while access of air for ventilation is greatly facilitated. I mean here to indicate certain advantages, not to afford a complete catalogue of advantages under all possible conditions of service.

A unit for a resistance box embodying such a coil as I have described is particularly shown in the drawings. It includes a supporting rod 9, enveloped in insulation throughout its middle part, around which insulating envelop the coil extends. At one end the coil is electrically united with the supporting rod. The other end of the rod may be screw threaded, as shown to receive jam-nuts for making electric connection.

The turns of the coils are shown to be tangent to the envelop of insulating material which surrounds rod 9, and all or some of them may be secured, if desired, to the insulating envelop by asbestos adhesive tape, by fire-proof cement, or by any other preferred means. Or, as will generally be the case, the coil may rest on its core without special securing. The springiness of the structure as a whole may be made to

afford some security, if desired. Manifestly, the coil may be mounted on any proper cylindrical body, and suitably insulated, either by the character of the support or otherwise.

Fig. 4 shows the assembly of such units as I have described in a resistance box. They are mounted on a common slab or plate of insulating material, as slate or marble, each rod 9 being provided with a head 13 and with a nut 14 on its screw-threaded adjacent portion to effect secure mounting. Between the jam-nuts 14 and 15 of each unit is secured the free end of the coil of the adjacent unit. When a series of units is so mounted and connected the supporting rod 9 of the unit at one end of the series and the free end of the coil of the unit at the other end of the series are connected in the circuit in which the apparatus is to be used. Fig. 4 further shows a contact 16, which may be adjustable and applicable to any loop of a coil, and a tap wire leading to a suitable binding-post 17. This detail renders the apparatus as a whole still more flexible to meet service conditions.

I have illustrated the resistance unit applied to a resistance box of one type. Its applicability to a box of the bank or grid type is manifest. In such case both ends of the rod 9 should be threaded and both ends of the wire insulated. The units will be placed between two end plates and will be fastened with nuts to form the bank. The structure so formed has great advantage over cast-iron grids, in respect to weight and radiating ability, and is furthermore more rigid and strong.

In Fig. 5 I have shown that my invention is not limited in the matter of the shape of the turns of the coil to the particular shape shown in Fig. 2. In Fig. 5 the turns are shown to be approximately triangular, and manifestly their essential characteristics are that they are asymmetrical with respect to the axis of the coil as a whole, and, when the succession of coils is considered, they are in their corresponding portions not parallel one with another, but stand in stepped succession.

I claim as my invention:

1. A helically wound conductor for electric current, each turn of the helix being elongate in plan and the succeeding turns being non-parallel to one another.

2. A helically wound conductor for electric current the successive turns of the helix being alike in plan, asymmetrical with respect to the axis of the helix, and the homologous portions of the turns following one another in helical succession.

3. An electric conductor formed into a coil, each turn of said coil being elongate in plan, and the turns succeeding one another in stepped arrangement.

In testimony whereof I have hereunto set my hand.

ALEXANDER J. LOGUIN.

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