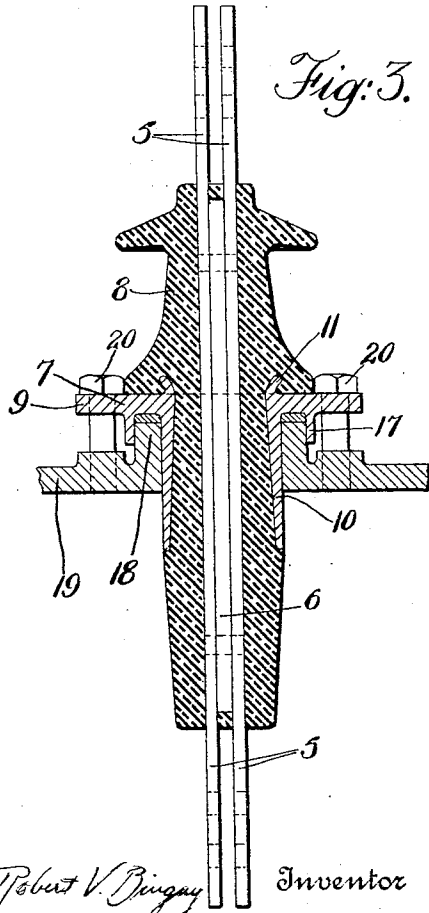
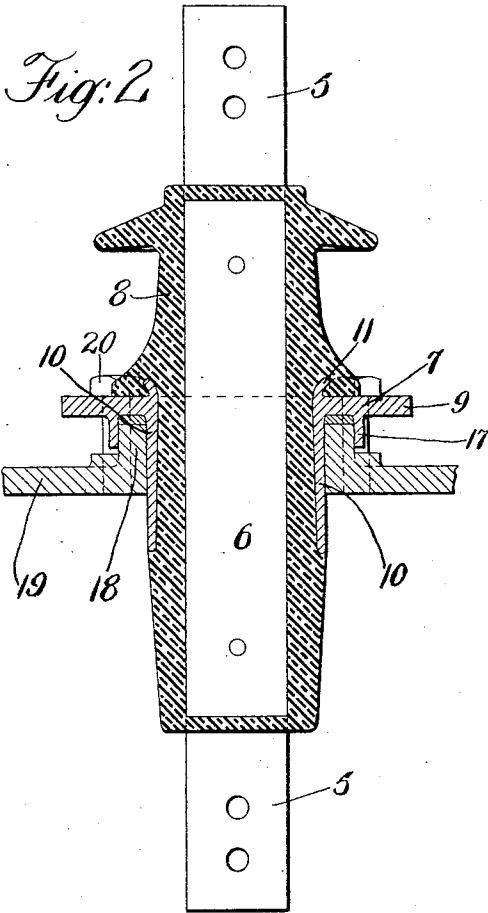
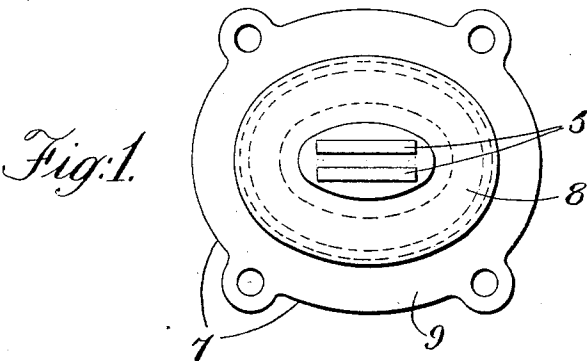


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R. V. BINGAY
ELECTRIC CONNECTER
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Robert V. Bingay Inventor
By *James* Attorneys
Edwards, Sager & Bower

UNITED STATES PATENT OFFICE.

ROBERT V. BINGAY, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO PITTSBURGH TRANSFORMER COMPANY, A CORPORATION OF PENNSYLVANIA.

ELECTRIC CONNECTER.

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This invention relates to bus bar or heavy current leads and particularly to such leads as those of transformers, where the current is passed through the transformer casing, the inner lower ends of such leads being connected to wires from the coils and the upper outer ends to the supply or distribution circuits. The object of the invention is to provide such leads or terminals which will be simple and rugged in construction, well insulated from the casing and affording a large contact area for attachment of the connecting conductors, and will be dust and water proof and air-tight.

In prior leads the conductors have been insulated from the ground by means of an insulating bushing having a central aperture of considerably larger diameter than the conductor which is to pass through it. The space between the conductor and the inner wall of the insulator is usually filled with a cement to hold the conductor in position. It has proven difficult to obtain a uniform filling of this space, and bubbles are created, and confined air spaces, causing marked concentration of electrical stress at certain points and heating up of the insulator with resultant breakdowns. It has therefore been necessary to employ insulating bushings of considerably larger size than the voltage requirement and at correspondingly greater cost. Further objections to prior leads are the difficulty and expense of providing them with end contact castings which must be separately machined and threaded onto each end of the lead for attachment to the connecting conductors.

The structure of this invention makes it possible to provide each lead as an integral strip having the desired contact ends without extra parts or machining; no cementing or fitting of the lead in its bushing is required and the parts are so formed that all portions of the insulation are subjected to equal electrical tension without dangerous areas of stress concentration.

Other objects and advantages of the invention will appear in the following description of specific embodiments taken with the accompanying drawings in which—

Fig. 1 is a plan view of a transformer lead and bushing illustrating one embodiment of the invention, and

Figs. 2 and 3 are vertical sections through

the same illustrating the parts in place on the transformer.

In the embodiment of the invention illustrated in Figs. 1 to 3 a pair of flat drawn copper bars 5 are provided with a short intermediate spacer strip 6 also of drawn copper. The three bars are fastened together as shown and positioned centrally in the bushing support 7 while the insulator 8 in plastic state is pressed and molded into the shape shown and then hardened to hold the bars in place in the bushing and provide the necessary extensions above and below to avoid surface leakage.

The bushing support 7 is of brass or other non-magnetic material to avoid magnetic flux effects, heating and unequal electrical stresses likely to be set up in magnetic material by heavy alternating currents in the adjacent conductor and this support 7 has a disk body 9 and central tubular portion 10 with a rounded upper end. This central tubular portion not only affords good mechanical connection with the insulator but also enlarges the ground area many fold and distributes the capacity stress, thus permitting the employment of a much thinner insulation section and resulting in a safer, more compact and unitary device. The bushing support 7 and insulator 8 are preferably oval or elliptical in section and this shaping taken with the perfectly homogeneous composition of the pressed and molded insulation gives substantially even distribution of stresses. The insulator and supporting parts may therefore be made relatively smaller without danger of rupture and with consequent saving in sizes of all the related parts. The molding of the insulator in place also provides a ruggedly strong construction in which the parts are all dust proof and water proof and firmly and durably secured together and any desired form or section of conductor may be used.

The leads 5 and filler 6 may, therefore, be of flat drawn copper bars cut to desired length from standard stock in very simple manner. Their assembly in the bushing requires little machining and their ends afford perfectly smooth contact surfaces of great area in comparison with the cross section of the leads. In the embodiment shown in Figs. 1 to 3 the spaced leads 5 provide four contact surfaces at each end and slight flex-

ure of the spaced flat strips permits all surfaces to be simultaneously brought into tight engagement with the connecting conductors. The spacing of the leads by copper strip 6 also gives a greater conducting cross section within the insulator reducing internal heating and permitting the leads themselves to be of thinner stock.

In the embodiment shown in Figs. 1 to 3 each bushing support 7 of a series is provided with a ring flange 17 for positioning on a flange 18 of the transformer top 19 as shown and the bushing support 7 is fastened in place by bolts 20 between disk 9 and bosses on the top 19.

While the invention has been illustrated in connection with specific embodiments it is not confined thereto but is intended to cover such modifications thereof as fall within the scope of the appended claims.

What I claim is:

1. An insulated lead structure comprising a bushing support formed by a body portion and an oval tubular portion extending therefrom, the body portion being adapted to be detachably secured to a transformer casing and the tubular portion extending there-through, a conductor comprising a plurality of flat bars spaced apart by a flat metal member of high conductivity passing centrally through said tubular portion and parallel to the long axis of said oval, and an insulator of homogeneous material molded in contact with the walls of said tubular portion and with said conductor so as to support said conductor from said bushing support.

2. In an insulated lead structure, the combination of a bushing of nonmagnetic metal having a body portion adapted to receive clamping means and an inner tubular portion, a conductor comprising a metallic bar of elongated rectangular cross section having increased cross section where surrounded by the bushing passing centrally through said tubular portion, and homogeneous insulating material molded and pressed into contact with said conductor and said tubular portion so as to support the conductor, said tubular portion being so formed as to relieve and distribute the electrostatic stress in said insulating material around said conductor.

3. In an insulated lead structure the combination of a support comprising a nonmagnetic plate adapted to be detachably secured to the exterior of a casing and a tubular portion adapted to extend through the casing, a conductor passing centrally through the tubular portion, and a homogeneous insulating material molded and pressed into contact with the walls of said tubular portion and with said conductor so

as to support said conductor from said support, the said conductor having increased cross section where surrounded by the support so that the current density and heating are reduced where the conductor surfaces are not exposed.

4. In an insulated lead structure the combination of a support comprising a nonmagnetic plate adapted to be detachably secured to the exterior of a casing and a tubular portion adapted to extend through the casing, a conductor passing centrally through the tubular portion, and a homogeneous insulating material molded and pressed into contact with the walls of said tubular portion and with said conductor so as to support said conductor from said support, the said conductor having increased cross section where surrounded by the support so that the current density and heating are reduced where the conductor surfaces are not exposed, the said conductor comprising a plurality of flat bars spaced apart by a flat metal member of high conductivity substantially equal in length to that part of the lead which is surrounded by insulating material.

5. In an insulated lead structure the combination of a bushing support of nonmagnetic metal comprising a tubular depending portion of elongated cross section and a body portion having an outwardly extending flange adapted to receive clamping means, a seating portion, a conductor comprising a bar of elongated rectangular cross section formed from a plurality of flat bars spaced apart by a flat metal member passing centrally through said tubular portion, and homogeneous insulating material molded and pressed into contact with said conductor and said tubular portion so as to support the conductor on the support.

6. In an insulated lead structure the combination of a bushing support of nonmagnetic material comprising a tubular depending portion of oval cross section and a body portion having an outwardly extending flange adapted to receive clamping means, a conductor comprising a metallic bar of elongated rectangular cross section passing centrally through said tubular portion, and homogeneous insulating material molded and pressed into contact with said conductor and said tubular portion so as to support the conductor on the support, the said conductor having increased cross section where surrounded by the bushing support so that the current density and heating are reduced where the conductor surfaces are not exposed.

ROBERT V. BINGAY.