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H. I. DANZIGER

1,990,819

ELECTROSTATIC CONDENSER

Filed Oct. 28, 1933

Fig. 1

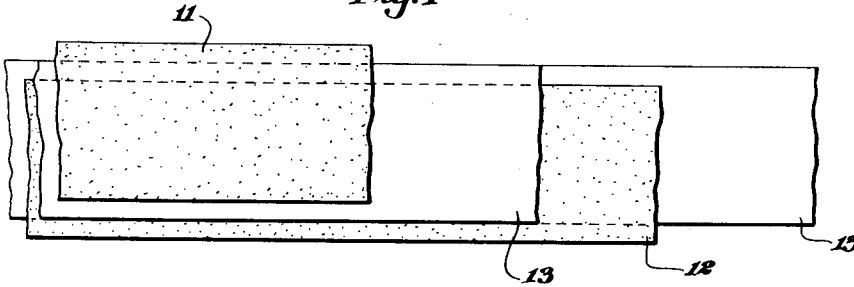


Fig. 2

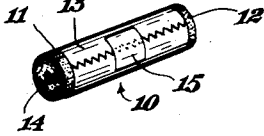


Fig. 3

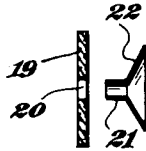


Fig. 4

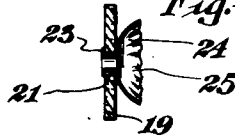


Fig. 5

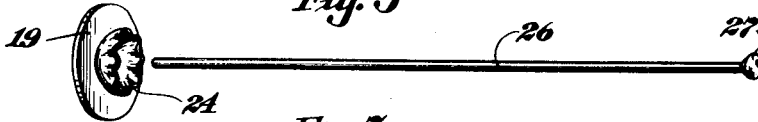


Fig. 7

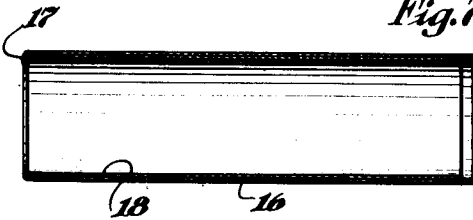


Fig. 6

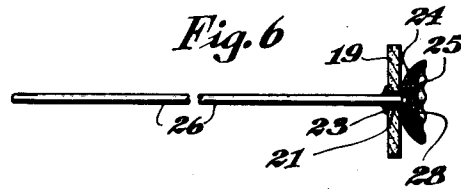


Fig. 8

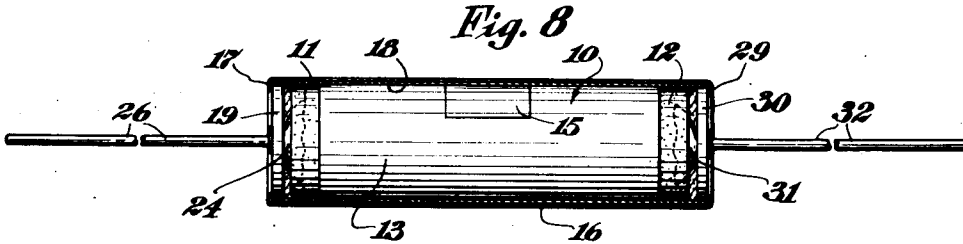
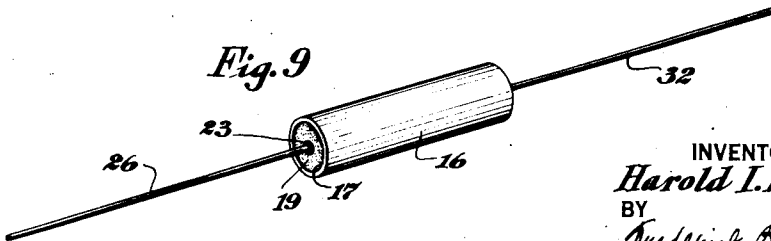


Fig. 9



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ELECTROSTATIC CONDENSER

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8 Claims. (Cl. 175-41)

My present invention relates generally to electrical apparatus, and has particular reference to electrostatic condensers of the wound body type.

5 It is a general object of my invention to provide an improved and simplified manner of associating a wound condenser body with a container and with certain connector members to provide a simplified and compact commercial condenser assembly.

10 While I have herein illustrated and shall hereinafter describe my invention as it may be applied to the mounting of a wound condenser body of the paper dielectric type, nevertheless it will be understood that my invention is not restricted to this particular type of condenser body.

15 Briefly, my invention resides in a novel and unique association of a wound body having opposite terminal ends with a tubular container which snugly accommodates the body and which is provided with an improved type of closure discs at the opposite ends of the container, each disc being associated in a novel way with connector members of special characteristics.

20 As will be more fully appreciated after this specification has been read, the general objects of my invention include the provision of a device of great simplicity, capable of economical manufacture, of exceptional compactness and good appearance, and with enhanced facilities for using the device in a variety of types of electrical circuits and hook-ups.

25 I achieve the foregoing objects, and such other objects as may hereinafter appear or be pointed out, in the manner illustratively exemplified in the accompanying drawing wherein—

30 Figure 1 is a fragmentary plan view of the elements of a wound condenser body of the paper dielectric type;

35 Figure 2 is a perspective view of a wound condenser body of this type;

40 Figure 3 is an exploded view, in cross-section, of the present type of closure disc and eyelet;

45 Figure 4 is a cross-sectional view through a closure disc with the eyelet secured therein;

Figure 5 is an exploded perspective view of a closure disc about to be associated with a connector member of the present type;

50 Figure 6 is a cross-sectional view of the ultimate association of the parts of Figure 5;

Figure 7 is a cross-sectional longitudinal view of a tubular container of the present character;

55 Figure 8 is a longitudinal cross-sectional view through a completed condenser device; and

Figure 9 is a perspective view of a completed device.

The wound condenser body of Figure 2, designated generally by the reference numeral 10, is formed by interwinding a plurality of strips in the manner shown in Figure 1. These strips may, for example, consist of two strips 11 and 12 of metallic foil and intermediate strips 13 of paper or similar insulating material. The strip 11 is laterally positioned with respect to the paper strips 13, so that the outer marginal edge projects beyond the paper strips; and the strip 12 is laterally positioned in the opposite direction, so that the outer marginal edge projects beyond the opposite edges of the paper strips 13.

The winding procedure is preferably accomplished on a winding machine, whereby a body of the character illustrated in Figure 2 ultimately results. In this body, which is substantially cylindrical, and which will usually embody a longitudinal opening 14 formed by the mandrel upon which the body is wound, the superposed edges of the foil strip 11 will project from one end and the superposed edges of the other foil strip 12 will project from the opposite end. At the completion of the winding, a few extra turns of the paper layers 13 are wound around the body, whereby the major portion of the exposed surface of the body is paper. A sticker or the like 15 is usually applied to hold the strips in rolled condition. The bundle of foil layers 11 projecting from one end of the body constitutes what may be designated one "terminal end" of the body; and the bundle of exposed layers 12 projecting from the opposite end may be termed a complementary or opposite "terminal end" of the body; it being understood that these terminal ends are insulated from each other by the paper layers 13 and that the assembly constitutes an electrical condenser whose plates are the foil strips 11 and 12 and whose dielectric is constituted at least in part by the paper layers 13.

The body of Figure 2 is usually and preferably subjected to suitable heat and vacuum treatment to expel all extraneous air and moisture, and is then impregnated with a suitable dielectric material, such as wax or paraffin.

In carrying out my present invention, the body of Figure 2 is adapted to be snugly inserted into a tubular container 16 (Figure 7) which is preferably cylindrical and composed of metal. Prior to the association of the parts, the container 16 has the edge 17 at one end spun in-

wardly, and is provided with a tubular or cylindrical liner 18 of paper or the like.

The sealing of the opposite ends of the present container is accomplished by means of closure discs of special character, with which connector members are associated in the manner most clearly illustrated in Figures 3-6. The closure disc 19 illustrated in Figure 3 is substantially circular in shape and is provided with the central opening 20. In a preferred construction, i. e., where the container 16 is of metal, this disc is composed of suitable insulating material such as fiber or the like. Into the opening 20 I pass the stem 21 of an eyelet which is initially of substantially the shape illustrated in Figure 3, one end of the eyelet having a flaring portion 22. The eyelet may be composed of any suitable or desired metal. After the stem 21 has been passed through the opening 20, its end 23 is spun into the condition of Figure 4, and the conical or tapered wall 22 is spun into the form of a cup-shaped portion 24. In accordance with my invention, the free edge 25 of this cup-shaped portion is ruffled or otherwise rendered irregular to destroy its smoothness.

The eyelet having thus been permanently secured into association with the closure disc 19, it is ready to be associated with the connector member of the present invention, which is shown most clearly in Figure 5. This member comprises a substantial length of ductile and non-resilient wire 26 having an enlarged head 27. This connector member may be, for example, about two to four inches in length, and the enlarged head 27 is of the general character of the head that would appear on a large pin.

The connector member is inserted through the eyelet in the manner illustrated in Figures 5 and 6, so that the enlarged head 27 accommodates itself within the cup-shaped portion 24. A mass of solder 28, or any other suitable binding medium, is then applied to the assembly to anchor the head 27 firmly within the cup-shaped portion 24 and to provide a unitary assembly in which the connector member 26 is in permanent electrical connection with the eyelet, and, more especially, with the cup-shaped portion 24.

It will be understood that in the production of the present device, two assemblies of the character illustrated in Figure 6 are provided, one closure disc being adapted to be secured in one end of the container 16, and the other closure disc being adapted to be secured to the opposite end, thereby affording a seal for the container.

In constructing the present device, the assembly of Figure 6 is inserted into the right hand end of the container 16 of Figure 7, and pushed toward the left end until the closure disc 19 abuts against the spun edge 17 of the container. The body 10 of Figure 2 having been suitably heat-treated, subjected to vacuum, and impregnated, is then inserted into the right hand end of the container 16, until one of its terminal ends abuts firmly against the cup-shaped portion 24. The body is forced well into the container, so that the ruffled edge 25 of the cup-shaped portion bites well into the contiguous terminal end of the wound condenser body. It is the ruffling of this edge which provides for a firm and permanent electrical connection between the connector member 26 and the corresponding end of the wound body in a manner whereby relative rotation of the connector mem-

ber with respect to the body is efficiently prevented.

Preferably, though not necessarily, the partial assembly is then dipped into molten wax or the like, whereby the wax is permitted to flow into the container and to permeate well through the condenser body, thereby filling in all possible voids. Thereupon, the counterpart of the assembly of Figure 6 is inserted into the open end of the container, as illustrated in Figure 8, and the assembly is completed by spinning the opposite end 29 of the container around the closure disc 30. Prior to and during this spinning operation, the disc 30 is pressed firmly against the right hand end of the enclosed condenser body, whereby the cup-shaped portion 31 (constructed in the same manner as hereinbefore described in connection with Figures 3-6), is caused to bite firmly and securely into permanent and immovable contacting engagement with the contiguous terminal end of the wound body. In Figure 8, I have illustratively shown the connector 26 and the cup-shaped portion 24 in intimate electrical and physical contact with the terminal end 11 of the body of Figure 2; and I have shown the corresponding opposite cup-shaped portion 31 engaging in firm electrical and physical contact with the opposite terminal end 12 of the condenser body. The closure disc 30 carries a connector member 32 identical in character with the connector member 26 hereinbefore described.

The resultant product, ready for marketing and for assembly with any desired electrical apparatus with which it is to be used, is illustrated most clearly in Figure 9. It is characterized by exceptional compactness and lightness of weight, coupled with good appearance, and with an unusual adaptability for connection purposes. The connectors 26 and 32 being of substantial length, and being of ductile metal, are readily bent, cut, crimped, soldered, or otherwise secured, for both attachment purposes and for electrical contact purposes, with those portions of the electrical apparatus or hook-up with which the condenser is to be employed.

Each of the connector members has its inner end in firm electrical connection with one of the terminal ends of the enclosed condenser body, and these opposite terminals of the condenser are efficiently and reliable insulated from each other by virtue of the insulating character of the closure discs of the container.

Under certain circumstances, it may be desirable to hold the closure discs in place by means other than the spinning of the container ends, as illustratively shown at 17 and 29, and it will be understood that my invention is not necessarily restricted to any such specific details. Furthermore, it may sometimes be desirable to form the tubular container of insulating material, in which case the liner 18 is not required, and the closure discs may under such circumstances be composed of metal. With such a construction, however, the ease with which the closure discs are securely mounted in the opposite ends of the container may not be as great as in the preferred construction herein illustrated.

It will also be understood that the wound condenser body need not necessarily be of the paper dielectric type, but may, for example, be constituted of the wound body of a so-called "dry" electrolytic condenser. In such an event, the foil strips 11 and 12 of Figure 1 are re-

placed by electrolytically-coated strips of film-able material, such as aluminum; and the paper layers 13 are replaced by absorbent spacers, such as cheesecloth or the like; the impregnation of the body, and especially of the spacers, being accomplished by means of a pasty electrolyte of wellknown character rather than by a dielectric material such as wax.

The characterizing features of a condenser body of the present type are that it be formed by the winding of individual strips or layers, and that its construction provides for the disposition, at opposite ends, of opposite and complementary terminal ends of the condenser. It is for this general type of wound condenser body that the present invention is primarily designed, whereby an efficient, compact, and economically manufactured commercial article results.

One of the outstanding advantages of the present construction and mode of assembly of parts lies in the ability to perform many of the steps of assembly by means of automatic machinery or by machines which, though not entirely automatic, permit the several steps of assembly to be carried out in rapid succession, in large quantities, and at little expense. For example, the closure discs may be fed from one hopper, the eyelets from another, the connector members from another, and so on; and a rotating table or the like provides for the efficient carrying out, in succession, of the steps of eyeletting the closure disc, threading the connector member through the eyelet, soldering the member into position, inserting the assembly into the container, etc. My invention is, however, not restricted to any particular mode of manufacturing process, nor to any specific type of machinery, but its adaptability to commercial practice is herein mentioned to more fully explain the commercial advantages and novel features of the invention.

In general, it will be obvious that changes in the details, herein described and illustrated for the purpose of explaining the nature of my invention, may be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claims. It is, therefore, intended that these details be interpreted as illustrative, and not in a limiting sense.

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

1. In an electrostatic condenser, a tubular container, a wound condenser body snugly accommodated in said container and having opposite terminal ends lying closely adjacent to the opposite ends of said container, a closure disc secured in each end of the container to seal the latter, a metallic eyelet carried by each disc and having an enlarged inner portion bearing against the contiguous end of the enclosed condenser body, and a connector member carried by each disc and extending outwardly through each eyelet and comprising a ductile metal wire of substantial length with its inner end in electrical contact with the contiguous end of the enclosed condenser body.

2. In an electrostatic condenser, a tubular container, a wound condenser body snugly accommodated in said container and having opposite terminal ends lying closely adjacent to the opposite ends of said container, a closure disc secured in each end of the container to seal the latter, a metallic eyelet carried by each disc and

having a cup-shaped inner portion bearing against the contiguous end of the enclosed condenser body, and a connector member carried by and extending outwardly through each eyelet, said member comprising a ductile metal wire of substantial length.

3. In an electrostatic condenser, a tubular container, a wound condenser body snugly accommodated in said container and having opposite terminal ends lying closely adjacent to the opposite ends of said container, a closure disc secured in each end of the container to seal the latter, a metallic eyelet carried by each disc and having a cup-shaped inner portion bearing against the contiguous end of the enclosed condenser body, and a connector member carried by and extending outwardly through each eyelet, said member comprising a ductile metal wire of substantial length having its inner end firmly anchored in said cup-shaped eyelet portion.

4. In an electrostatic condenser, a tubular container, a wound condenser body snugly accommodated in said container and having opposite terminal ends lying closely adjacent to the opposite ends of said container, a closure disc secured in each end of the container to seal the latter, a metallic eyelet carried by each disc and having a cup-shaped inner portion bearing against the contiguous end of the enclosed condenser body, and a connector member carried by and extending outwardly through each eyelet, said member comprising a ductile metal wire of substantial length having an enlarged inner end firmly anchored by solder within the cup-shaped eyelet portion.

5. In an electrostatic condenser, a tubular container, a wound condenser body snugly accommodated in said container and having opposite terminal ends lying closely adjacent to the opposite ends of said container, a closure disc secured in each end of the container to seal the latter, a metallic eyelet carried by each disc and having a cup-shaped inner portion with a ruffled edge bearing against the contiguous end of the enclosed condenser body, and a connector member carried by and extending outwardly through each eyelet.

6. In an electrostatic condenser, a tubular container, a wound condenser body snugly accommodated in said container and having opposite terminal ends lying closely adjacent to the opposite ends of said container, a closure disc secured in each end of the container to seal the latter, a metallic eyelet carried by each disc and having a cup-shaped inner portion with a ruffled edge bearing against the contiguous end of the enclosed condenser body, and a connector member carried by and extending outwardly through each eyelet, said member comprising a wire whose inner end is firmly anchored in said cup-shaped eyelet portion.

7. In an electrostatic condenser, a tubular container, a wound condenser body snugly accommodated in said container and having opposite terminal ends lying closely adjacent to the opposite ends of said container, a closure disc secured in each end of the container to seal the latter, a metallic eyelet carried by each disc and having a cup-shaped inner portion with a ruffled edge bearing against the contiguous end of the enclosed condenser body, and a connector member carried by and extending outwardly through each eyelet, said member comprising a ductile wire of substantial length having an en-

larged inner end soldered into firm anchorage within said cup-shaped eyelet portion.

8. In an electrostatic condenser, a tubular metallic container, an insulating liner therein, a
5 wound condenser body snugly accommodated in said container and having opposite terminal ends lying closely adjacent to the opposite ends of said container, an insulating closure disc secured in each end of the container to seal the
10 latter, a metallic eyelet carried by each disc and

having an enlarged inner portion bearing against the contiguous end of the enclosed condenser body, and a connector member carried by and projecting outwardly from the center of each disc through said eyelet, said member comprising a metal wire of substantial length having its inner end in electrical contact with the contiguous end of the enclosed condenser body.

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