April 15, 1930. W. DUBILIER 1,754,268

ELECTRICAL CONDENSER

Filed May 17, 1926

Fig. 1

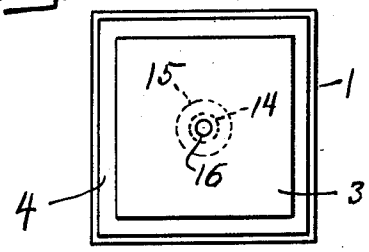


Fig. 3

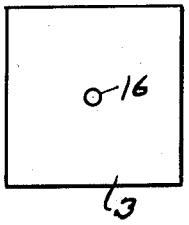


Fig. 4

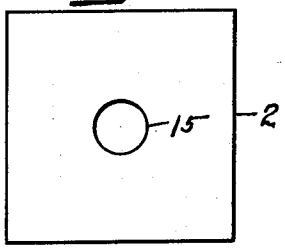


Fig. 2

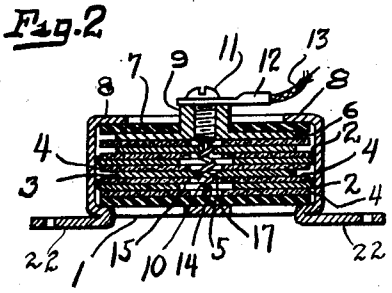


Fig. 5

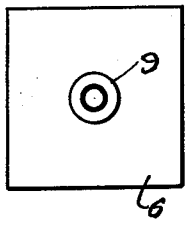


Fig. 6

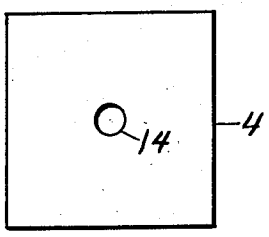


Fig. 7

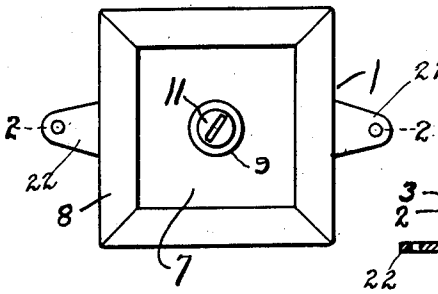


Fig. 8

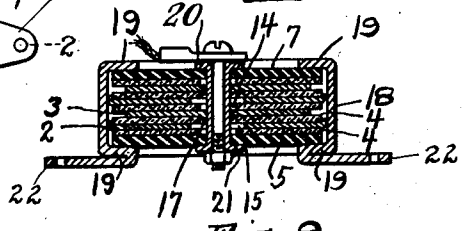
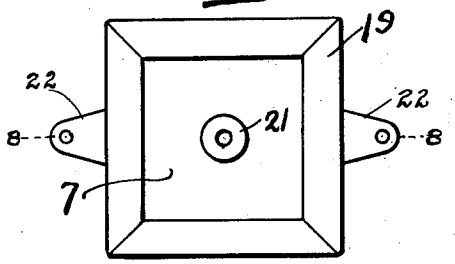


Fig. 9



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UNITED STATES PATENT OFFICE

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ELECTRICAL CONDENSER

Application filed May 17, 1926. Serial No. 109,469.

This invention relates to improvements in electrical condensers; particularly electrical condensers of a type comprising a stack of conductive elements of opposite polarity suitably encased and of a design adapted for quantity production.

An object of the invention is to provide a novel electrical condenser which can be easily and quickly assembled and given a neat and finished appearance, and readily connected in to the circuit in which it is intended to operate.

These and other objects and advantages will be made clear in the following description taken with the drawings in which one or more embodiments of the idea of my invention are presented. But I, of course, reserve the right to make changes in the construction actually shown without departing from the principle of the invention as the same is indicated by the broad and general meanings of the terms in which the appended claims are expressed.

On the drawings:—

Figure 1 is a top plan of a condenser according to my invention in the final stage of completion.

Figure 2 is a cross section of such a condenser in its finished form.

Figure 3 is a top plan of one of the conductive elements of such a condenser.

Figure 4 is a top plan of a similar and larger conductive element.

Figure 5 is a top plan of a compressor member for the stack of the condenser.

Figure 6 is a top plan of one of the sheets or plates of insulation.

Figure 7 is a top view of the condenser as it appears in Figure 2; and

Figures 8 and 9 are views similar to Figures 2 and 7 respectively of a modified form of condenser according to my invention.

The same numerals identify the same parts throughout.

The condenser is made of a case 1 which is preferably of metal in the form of a shallow box. This box receives and encloses the stack or body of the condenser which comprises a number of conductive plates or sheets, such as sheets of metal foil 2 to be of one polarity, and a number of similar sheets of metal foil 3, smaller than the sheets 2, of opposite polarity, the sheets 2 and 3 alternating and being insulated by intervening sheets of dielectric such as mica 4. As shown in Figure 2, the sheets of foil 2, which are of the same contour as the inside of the casing 1, make contact along their outer edges with the inside of this case, because they are slightly larger than the interior dimensions of the case 1; while the sheets of mica 4, though of the same configuration, are slightly smaller than the interior dimensions of the case 1; and the sheets of foil 3 are smaller than both the sheets of foil 2 and the sheets of mica 4, so that the edges of the sheets 3 are spaced away from the inside surfaces of the walls of the casing 1. If the case 1 is square or rectangular, the sheets 2, 3 and 4 are also rectangular, and with the sheets 2, 3 and 4 of the relative sizes mentioned, the edges of the sheets 2 project beyond the edges of the mica sheets 4 in casing 1 and make contact with the casing, while the edges of the sheets 4 project beyond the edges of the sheets 3 but are out of contact with the casing 1.

The sheets 4 have an opening 14 at the center and the sheets 3 have a similar and much smaller opening 16. All of the sheets of foil 2 have an opening 15 at the center, larger than the openings 14 and 16. In some cases the sheets of foil 3 need have no opening 16 in the middle. Hence, if a metallic rivet or the like is pushed through the aligned openings 14, 15 and 16 of the stack containing all the conductive sheets 2, 3 and 4 shown in Figure 2, and this rivet to be of say the same thickness as the width of the opening 16, it will make contact with all of the sheets of foil 3 without engaging the edges of the openings 14 of the mica sheets 4, or the edges of the openings 15 of the larger sheets of metal foil 2. This construction facilitates joining the sheets of metal foil 2 to one side of the electrical circuit as by affixing a conductor to the case 2; and the remaining sheets of metal foil 3 to the opposite side of an electrical circuit merely by connecting a suitable conductor to the rivet or the like which passes

through the middle of the stack and joins the foils 3 together.

When the stack of the condenser is made up, it is inserted into the casing 1; a sheet of insulation 5 being first disposed at the bottom thereof. At the top of the stack is placed a pressure member 6 in the form of a metallic plate and over this pressure member is put a perforated plate of insulation 7. The upper edges or rim of the casing 1 are crimped over and forced down tight against the closure plate 7, so as to envelop the stack of the condenser entirely. The edges 8 of the casing 1 can be pressed down tightly enough to make the condenser practically moisture proof.

The compressor member 6 has a central boss 9 which passes through the opening in the middle of the closure plate 7 and this boss may have a threaded bore therethrough. In Figures 2 and 7 a spring or member 10 is pushed down through the middle of the stack into the space provided by the openings 14 and 15 of the mica plates 4 and metallic foil sheets 2. This spring passes through the foil sheets 3, making contact with the edges of the openings 16; or if these openings are omitted, piercing the smaller sheets of metal foil 3 so as to connect these sheets of metal foil 3 electrically. Through the boss 9 passes a screw 11, engaging the upper end of the spring 10, and this screw may have a head which holds on top of the boss 9 a terminal 12, to which is attached a conductor 13. The condenser can thus easily be connected in circuit by joining the conductor 13 to one side of an electric circuit and the metal case 1 to the other side of such circuit.

The condenser of Figures 8 and 9 is similar to that of Figures 2 and 7, except that in place of the centrally connected device or spring 10 which joins the sheets of metal foils 3 electrically, I utilize a tubular member or rivet 17 which passes through openings in both the bottom plate 5 and closure plate 7. In this type of condenser the casing 1 is replaced by a ring 18, the upper and lower edges of which are turned over or flanged as at 19, to engage the bottom plates 5 and 7 and compress the stack of the condenser between these two plates by gripping the outer surfaces of these two plates securely. The upper end of the rivet is flanged over and expanded as shown at 20, and the lower end of the rivet is flanged over and expanded as shown at 21. This rivet serves in the same way as the spring 10 which may be simply a piece of spirally wound wire, and makes contact with all of the smaller conductive elements 3. To connect this condenser in circuit, one conductor of the circuit is joined to the rivet 17, and the other to the casing 18.

This type of condenser can be readily made in large numbers, as it is only necessary when the metal foil sheets 2, 3 and dielectric 4 are put into the casing 1 or ring 18, that the centers of the openings 14, 15 and 16 register with one another and with the centers in alinement.

The condenser shown in Figures 1, 2 and 7 can have lugs 22 attached to the casing 1 with perforations therein to enable the casing to be mounted, or to serve as terminals for a conductor to enable the casing to be connected to one end of an electric circuit. The lugs 22 can be secured to the casing in any suitable way, or provided by cutting the bottom of the casing and bending the lugs outward. Similar lugs formed in the same way can be provided for the condenser of Figures 8 and 9, as by stamping these lugs out in one piece with the blank of which the casing is made.

Having described my invention, what I believe to be new and desire to secure and protect by Letters Patent of the United States is:—

1. An electrical condenser comprising a closed casing, a stack in said casing consisting of conductive elements having their edges in contact with the casing, conductive elements of different polarity having their edges spaced from the casing, insulation between said elements, a compressor member on said stack, means for enabling connection to be made with the elements of small area through said member, and a closure plate for the stack overlying said member, the adjacent edges of said casing being pressed down into engagement with said closure plate.

2. A condenser comprising a casing having an open top and bottom, a closure plate for the top, and a closure plate for the bottom, a stack and means for exerting pressure thereon between said closure plates, said stack consisting of elements having their edges in contact with the casing, and elements having their edges spaced therefrom, insulation between said elements, and a member passing centrally through said stack and said closure plates and making electrical connection with the plates of relatively small area.

3. An electrical condenser comprising a closed casing, a stack in said casing consisting of conductive elements having their edges in contact with the casing, conductive elements of different polarity having their edges spaced from the casing, insulation between said elements, a compressor member on said stack, means for enabling connection to be made with the elements of small area through said member, and a closure plate for the stack overlying said member, the adjacent edges of said casing being pressed down into engagement with said closure plate, said casing having connector lugs thereon.

4. A condenser comprising a casing having an open top and bottom, a closure plate for the top, and a closure plate for the bottom, a stack and a pressure member for said stack between said closure plates, said stack consisting of elements having their edges in con-

tact with the casing, and elements having their edges spaced therefrom, insulation between said elements, and a member passing centrally through said stack and said closure plates and making electrical connection with the plates of relatively small area, said casing having connector lugs thereon.

In testimony whereof I affix my signature.

WILLIAM DUBILIER.