

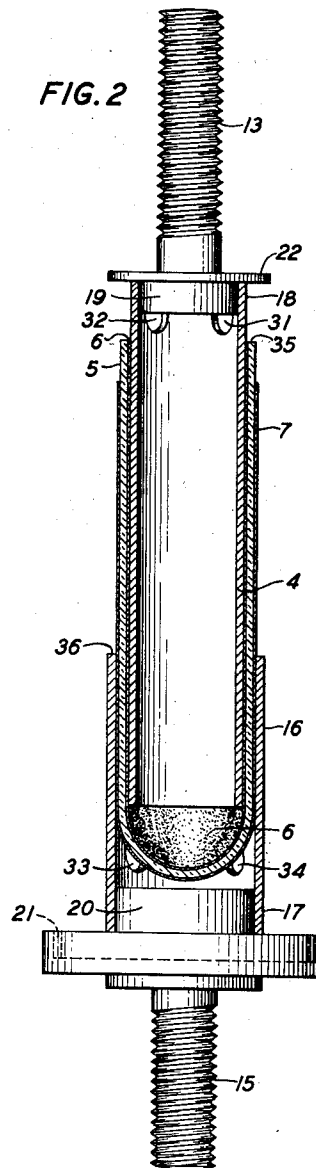
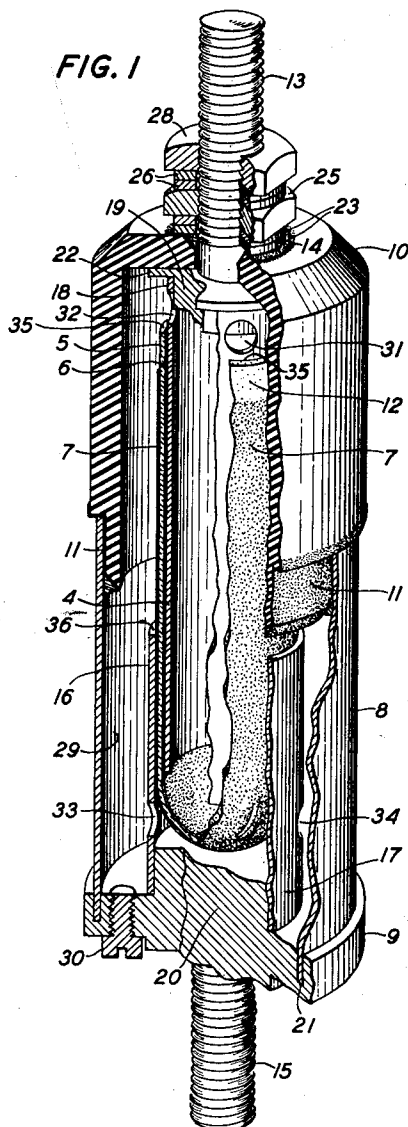
Sept. 6, 1938.

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2,129,008

CONDENSER

Filed May 20, 1936



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2,129,008

CONDENSER

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Application May 20, 1936, Serial No. 80,779

1 Claim. (Cl. 175-41)

This invention relates to electrical condensers and more particularly to condensers having dielectrics with conducting surfaces intimately associated thereon.

In such condensers, particularly in the case of high frequency-high potential condensers, it is desirable to avoid excessive electrical resistance in the conducting elements and to make adequate provision for heat dispersion. Also in the event that the dielectric member is made of fragile material, it is important that the dielectric member be supported so as to minimize the effect of vibration and shock.

An object, therefore, of the present invention is a condenser with a dielectric and intimately associated conducting surface thereon having improved means for conducting heat therefrom.

Another object of the invention is an improved structure whereby the dielectric member is supported in a container by members which act to lessen the possibility of damage to the unit by vibration or violent shock.

A further object of the invention is an improved method of current distribution to the intimately associated conducting surfaces on the dielectric whereby high current densities in the thin conducting surfaces are prevented.

A still further object of the invention is a high voltage-high frequency condenser which can be operated at relatively high atmospheric temperatures without deterioration of the condenser.

In accordance with the present invention, these and other objects are attained by mounting a condenser unit comprising a dielectric member having conducting coatings thereon on supporting members which contact the thin conducting surfaces over a substantial portion of their area and which resiliently support the unit and serve to conduct heat away from the unit, as well as electrical conductors therefor.

These and other objects of the invention will be made clearly understood from the accompanying drawing and detailed description, in which

Fig. 1 is a view of a condenser unit mounted in its casing; and

Fig. 2 is a view of a condenser unit associated with its terminal members before it is installed in the casing.

The condenser unit shown in Fig. 1 comprises a dielectric tube 5 having a conducting coating 6 on its inside surface and a second conducting coating 7 on its outside surface. While quartz is preferred as the dielectric material for the tube, the use of other ceramic materials, such as glass and porcelain, are contemplated by the inven-

tion. The unit is mounted in a metal container 8 having a metal base 9 and a cylindrical insulating cover 10 on the opposite end thereof. This cover may be of "Isolantite" or any other suitable insulating material. This insulating cover 10 5 may be soldered to the metal can at 11. A terminal 13, which is connected to the inner conducting coating 6 by means of the metal cylinder 4, extends through the insulating cover 10 and is soldered thereto at 14. The terminal 15 10 connecting the outside coating is integral with the base 9. A thin metal cylinder 4 is fitted inside the dielectric tube 5 in such a manner that it is in contact with the inner conducting coating 6 for substantially its whole area and is soldered thereto at 35. A second thin metal cylinder 16 15 is fitted over the outside conducting coating 7 and is also in contact therewith and is soldered thereto at 36. These cylinders, which are in contact with the respective terminals, serve to distribute current to the metal coated surfaces of the dielectric tube in such a manner as to avoid high current density in these surfaces and, therefore, prevent high energy loss and heating of the condenser. The ends 17 and 18 of the respective 25 metal cylinders extend beyond the dielectric tube and engage the extensions 19 and 20 of the terminal members 13 and 15. Since in the preferred form these cylinders are of thin metal, they also serve to hold the dielectric tube, which is preferably very thin, resiliently in the casing. This prevents vibrations and shocks from cracking the tube. The cylinders also serve to conduct heat from the metal coated dielectric to exposed parts of the condenser where it is dissipated. 35

The construction of the condenser unit will be more clearly understood by referring to Fig. 2, which is a cross-sectional view of the unit without the enclosing casing. In this drawing, the dielectric tube is shown at 5 coated with a conducting surface 6 on its inside and a conducting surface 7 on its outside. The thin metal cylinder 4 is fitted inside the tube in contact with the conducting surface 6 and is soldered thereto at 35. The second thin metal cylinder 16 is fitted over the exterior conducting coating 7 for a portion 45 of its surface and is soldered thereto at 36. The inner metal cylinder 4 extends out of the dielectric tube as shown at 18 and the extension 19 of the terminal 13 is fitted tightly therein. Similarly the outer metal cylinder 16 extends beyond the lower end of the dielectric tube 5 as shown at 17 and the extension 20 of the integral container base 9 and terminal 15 is fitted therein. 50

The base 9 contains a circular groove 21 there- 55

in in which, as shown in Fig. 1, the circular metal container 8 is fitted and soldered thereto. As stated above, the upper end of the metal container 8 is closed by the insulating cylinder 10.

5 In addition to being soldered at 14 to the insulating cover, the terminal 13 is further held in position by the washers 23 and the nut 25. Additional washers 26 cooperating with nut 25 may be employed to fasten electrical connections to this terminal. The space 28 between the casing and the cylindrical surfaces forming the condenser unit may be filled with any suitable condenser insulating compound, such as halowax, paraffin, petrolatum or chlorinated diphenyl.

10 for example, by a vacuum process. However, in some cases it may be desirable to leave this space vacant, in which case the outside of the concentric unit may be coated with a protective coating of an insulating varnish, or the like. Such an insulating coating will reduce corona discharge by preventing moisture from being adsorbed on the dielectric member. If the space 29 is filled with insulating compound it is introduced within the casing through an aperture

15 made by removing screw 30 from the base 9. The air in the interior of the tubular unit is evacuated through the holes 31 and 32 in the extension 18 of the inner metal cylinder 4. The insulating compound is, therefore, free to flow into the interior of the unit through these holes. The holes 33 and 34 are made in the outer metal cylinder so that there will not be an air pressure pocket within the unit when the container is evacuated. If the unit is not to be vacuum impregnated but only varnished, the holes 31, 32, 33 and 34 may be omitted.

20 The dielectric tube may be coated with the

thin conducting coatings by any suitable process known in the art, such as spraying chemical precipitation baking, etc. While various metals or alloys might be used for this coating, silver has been found to be very satisfactory. The capacity of the unit at the stage shown in Fig. 2 may be adjusted by removing portions of the outer silver coating as shown at 12 prior to installing the unit in the casing.

Although a hollow tubular dielectric member 10 is preferred, it is, of course, obvious that other forms of dielectrics may be used, for example, solid dielectrics with conducting coatings on opposite sides thereof which are supported by resilient mounting members.

A particular advantage of the condenser having only insulating varnish over the concentric condenser unit is that there are no materials in the condenser which will deteriorate at high temperatures of the order of 100° C. It is thus possible, for example, to construct a high voltage-high frequency condenser operating at a voltage of about 2000 volts and a frequency of about 6 megacycles for operation at high atmospheric temperatures.

What is claimed is:

In an electrical condenser mounted in a casing, a condenser unit comprising a metal coated dielectric tube, a pair of terminals therefor, a thin metal cylinder inside said tube and in contact therewith and another thin metal cylinder outside said tube and in contact therewith, and means including said thin metal cylinders for resiliently mounting said unit in the casing and for making contact between the metal coatings and said terminal members.

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