

March 25, 1930.

A. MEISSNER

1,751,939

INSULATION OF ELECTRICAL APPARATUS

Filed July 18, 1929

Fig. 1

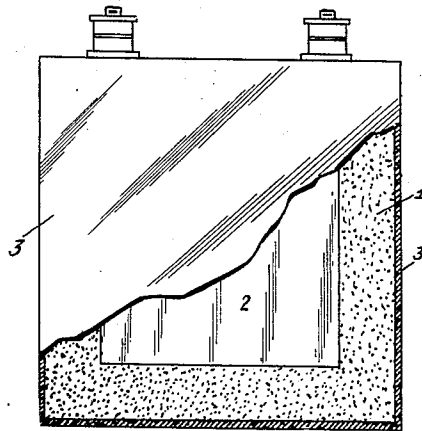
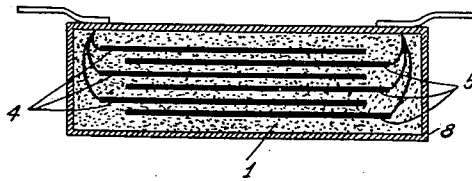


Fig. 2



INVENTOR
ALEXANDER MEISSNER

BY

W. B. Grover
ATTORNEY

UNITED STATES PATENT OFFICE

ALEXANDER MEISSNER, OF BERLIN, GERMANY, ASSIGNOR TO TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE, M. B. H., OF BERLIN, GERMANY, A CORPORATION OF GERMANY

INSULATION OF ELECTRICAL APPARATUS

Application filed July 18, 1929, Serial No. 379,130, and in Germany July 12, 1928.

My present invention relates to insulation for electrical apparatus, and, more particularly, to a novel type of insulation for condensers and transformers.

5 The present invention is based upon a proper understanding of the fact that piezo-electric materials possess a relatively high breakdown strength in so far as all charges, or all ions, which enter into, or show a tendency to enter into, the said bodies are held or bound by the piezo-electric moments of the material, with the result that all chances of flow of current are precluded. Now, piezo-electric bodies are, in the main, so constituted in their natural state, that they are unserviceable for a great variety of technical and practical purposes. For instance, crystalline quartz can not be processed into any desired shape, especially not in large forms as plates or slabs.

Now, according to the present invention, the piezo-electric material is first pulverized, and is disposed in such a state (as a powder) into the spaces to be insulated, especially into the spaces between condenser plates or coats. What is of essential importance, is that all spaces between the constituent particles or grains of the piezo-electric material should be filled up.

30 This is most suitably accomplished by saturating or impregnating the piezo-electric powder with an insulating liquid. For example, the powder can be boiled therein, preferably in vacuo. In lieu of oil, any of the other insulating materials, known in the electrical engineering arts may be employed; for example, those that solidify upon cooling. It is to be observed that pulverulent quartz impregnated with oil, has a breakdown strength two or several times higher than oil alone.

40 Quartz, when employed as a powder, offers a particular advantage also on the ground that it possesses a thermal conductivity from 100 to 300 times greater than oil, so that it comes close to that of metals. Thus if a transformer tank, containing a transformer, is filled with oil-impregnated piezo-electric powder, instead of with plain oil, the heat dissipated in the winding will be carried rapidly to the outside. For this reason, no

special circulating means is required for chilling inside the apparatus. Owing to the high thermal conducting powers of quartz, a substantial simplification in the construction of transformers and a great number of other electrical devices, particularly condensers, is obtained.

In the drawing:

Fig. 1 is a front view, a portion being broken away, of a transformer embodying my invention.

Fig. 2 is a sectional view of a condenser including the invention.

Referring to the figures, Fig. 1 shows a transformer casing 3, wherein the filler 1, consisting of pulverulent quartz and oil, is arranged between the transformer 2 and the casing 3. The smaller the particles of the piezo-electric material, and the more perfect the blending of the powder with the oil, the better the insulating power of the dielectric.

The resultant specific inductive capacity of the compound dielectric would also approach a maximum value, the smaller the grain and the more intimate the mixture. The most efficient mixture for insulation and for conductivity of heat would be one in which the percentage content of powdered material is high compared to the oil content, provided the interstices between the particles of solid material are completely filled by the oil.

In Fig. 2 I have shown a fixed condenser, in which the filler material 7 is disposed between the condenser casing 8 and the various coats or plate 4, 5 of the condenser. The physical state of the filler material 7, in this modification, is as described heretofore.

While I have indicated and described several systems for carrying my invention into effect, it will be apparent to one skilled in the art that my invention is by no means limited to the particular organizations shown and described, but that many modifications in the circuit arrangements, as well as in the apparatus employed, may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim is:

1. An electrical apparatus comprising one or more members housed within said casing

and spaced therefrom, said spaces being subject to electric potential stresses produced by said member or members, there being pulverized piezo-electric material disposed in said spaces, whereby said members are insulated from the casing and one another.

2. In an electrical apparatus, as defined in claim 1, the cavities and air spaces between the particles of the pulverized material being filled up with a liquid insulating material.

3. An electrical apparatus comprising a casing, one or more members to be insulated from the casing and each other, housed within said casing, the spaces between said casing and member or members, being subject to electric potential stresses, said spaces being filled with a pulverized piezo-electric substance having high thermal conductivity.

4. In an electrical apparatus, as defined in claim 3, said pulverized substance including quartz.

5. In an electrical apparatus, as defined in claim 3, the interstices between the particles of the pulverized material being filled with an oil.

ALEXANDER MEISSNER.

DISCLAIMER

1,751,939.—*Alexander Meissner*, Berlin, Germany. INSULATION OF ELECTRICAL APPARATUS. Patent dated March 25, 1930. Disclaimer filed April 27, 1932, by the assignee, *Radio Corporation of America*.

Enters this disclaimer relative to claims 1, 3, and 4 of said Letters Patent, to wit:

"1. An electrical apparatus comprising one or more members housed within said casing and spaced therefrom, said spaces being subject to electric potential stresses produced by said member or members, there being pulverized piezo-electric material disposed in said spaces, whereby said members are insulated from the casing and one another."

"3. An electrical apparatus comprising a casing, one or more members to be insulated from the casing and each other, housed within said casing, the spaces between said casing and member or members, being subject to electric potential stresses, said spaces being filled with a pulverized piezo-electric substance having high thermal conductivity.

"4. In an electrical apparatus, as defined in claim 3, said pulverized substance including quartz."

[*Official Gazette May 17, 1932.*]