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ELECTRICAL CONDENSER

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2 Claims. (Cl. 175—41)

Our present invention relates to electrical condensers and our object is to provide improved electrical condensers in which the insulating material used to separate the conducting strips or portions is formed of, or comprises a composition which we have discovered to be particularly well adapted for the purpose in question. The said composition, comprising one of a group of substances to be hereinafter described or a mixture of two or more of the same, when used in the manner indicated, possesses desirable properties, such as high dielectric strength as well as other useful properties to a remarkable degree. The composition referred to may be briefly described as a sulfone being free from groups inducing solubility in water.

These products exhibit a dielectric constant of up to about 25 and more, particularly in the liquid phase, the electric loss being within reasonable limits. In consequence thereof condensers made in accordance with our invention are of increased capacity for given dimensions so that they may be made smaller for a given capacity, and hence cheaper.

A condenser made in accordance with our invention comprises alternate layers of a conductor and an insulating separator, as is common, each alternate conductor being electrically connected to form one terminal and the intermediate conductors being connected to form the other terminal. Within our invention condensers may be constructed in any of the well-known forms, and the conducting elements may be of any suitable material used for the purpose. Our improvement is due, as stated, to the advantages of the novel insulating material used between the conducting members of the condensers, it being immaterial in which manner the dielectricum has been interposed between the conductor members. Preferably the conductors are separated by a porous material such as paper or fabric which before construction or during construction of the condenser has been impregnated with the insulating material in molten or fluid condition.

The sulfones of the character described may contain various substituents without departing from the sense of our invention. Suitable substituents are alkyl groups, halogen atoms, nitrogroups, aminogroups or cyanogroups. Care must be taken, however, that such sulfonic acid or carboxylic acid groups as would induce solubility in water are not contained in the molecule, it being understood that esters are not excluded from our invention. The sulfones combine with the said favorable electric properties the advantage of being easily technically accessible. Furthermore, many of the sulfones have a high melting point and are uniform, well defined products. In case liquid condition is required this may be assured either by a suitable choice of the substituents or by mixing different sulfones among themselves or with suitable other compounds.

In the following there are given the figures obtained by testing some of our insulating materials, it being understood that our invention is in no way limited to the specific compounds and compositions hereinafter referred to:

The dimethyl-diphenyl sulfone obtainable from benzene sulfochloride and xylene shows at room-temperature a dielectric constant of 25 and an electric loss of 0.1126. At 18° C. the dielectric constant of a mixture of 2 parts by weight of this sulfone with 1 part by weight of a dichlorodiphenylsulfone, obtainable by chlorinating diphenyl-sulfone, is 26.6, the electric loss being 0.1253. On condensing 3.4-dichlorobenzene sulfochloride with toluene a product is obtained which possesses at room-temperature a dielectric constant of 20 and an electric loss of 0.0107. As products which are liquid within all temperature ranges to which such condensers are normally exposed there may be mentioned the products of the condensation of the sulfochloride of a technical xylene with toluene and the products of the condensation of toluene-sulfochloride with a technical xylene. They show at room-temperature a dielectric constant of about 25, the electric loss being about 0.010. As a product with a melting point above 150° C. which is frequently desired for special purposes, there may be mentioned the sulfone obtainable from 3.4-dichlorobenzene sulfochloride and 1.2-dichlorobenzene, the dielectric constant of which is about [illegible] at the electric loss of 0.0044 at 18° C. By condensing benzene sulfochloride with technical isopropylnaphthalene and subjecting the product thus obtained, which has a boiling point of 210–270° at 12 mm., to an after-treatment with fuller's earth and alkalies an oily insulating material is obtained which at 20° C. has a dielectric constant of 11.5 at an electric loss of 0.0065. Examples for suitable water insoluble aliphatic sulfones are dibutylsulfone and dioctadecylsulfone.

We claim:

1. Electrical condensers comprising electrically conducting members separated by insulating members essentially comprising normally liquid sulfones which are free from groups inducing solubility in water and which possess a dielectric constant of at least 11.5 at 20° C.

2. Electrical condensers comprising electrically conducting members separated by insulating members essentially comprising a mixture of normally liquid sulfones which are free from groups inducing solubility in water and which have a dielectric constant of at least 11.5 at 20° C.

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