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PENTAMETHYL FLUOROBENZENE

Filed Dec. 6, 1938

FIG. 1

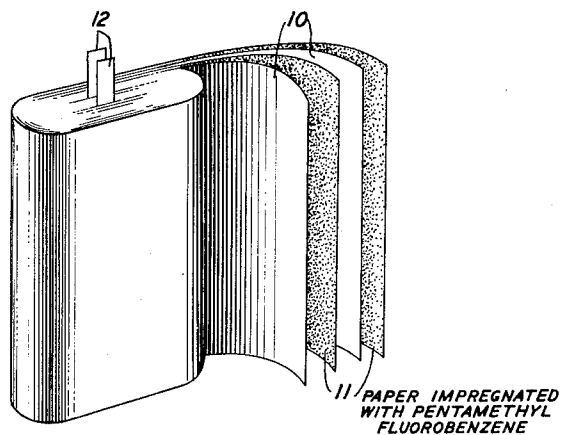


FIG. 2

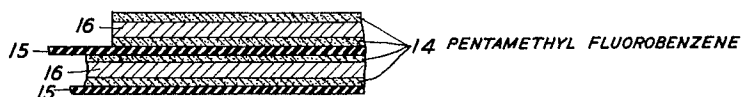


FIG. 3



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## UNITED STATES PATENT OFFICE

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## PENTAMETHYL FLUOROBENZENE

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Application December 6, 1938, Serial No. 244,170

4 Claims. (Cl. 260—650)

This invention relates to a composition of matter, and more particularly to pentamethyl fluorobenzene.

In telephone exchanges, particularly in urban centers, space is at a premium and any substantial reduction in the size of apparatus is of paramount importance. Then, too, in mobile bodies, such as airplanes, weight and space are factors which dictate the reduction of communication apparatus employed therein to the minimum in size necessary for successful operation. In both telephone and communication systems condensers are used in relatively great numbers and any reduction in their size without appreciable diminution in their functional characteristics results in material economy.

An object of this invention is to reduce substantially the size of apparatus employed in electrical systems.

Another object of this invention is to utilize in electrical apparatus a material having a high dielectric constant and desirable physical and electrical properties.

In accordance with this invention pentamethyl fluorobenzene is employed as a dielectric, either alone or in conjunction with other dielectrics such as paper. It has a melting point of 59° C., which would insure its remaining in the solid state at the average temperature to which dielectrics are ordinarily subjected. It is chemically stable, does not undergo electrolytic changes, and does not decompose or break down under conditions of use in electrical apparatus. Pentamethyl fluorobenzene may be employed with other dielectrics which possess molecular rotation in the solid state, as disclosed in W. A. Yager Patent 2,319,838, issued May 25, 1943, and in the copending application of B. S. Biggs, S. O. Morgan and A. H. White, Serial No. 244,171, filed December 6, 1938.

It has a dielectric constant at 20° C. of 3.5 and at -195° C. of 2.8. Its dipole moment is 1.7 Debyes. It retains the high dielectric constant at high frequencies and at unusually low temperatures.

Pentamethyl fluorobenzene is prepared by the methylation of fluorobenzene, fluorotoluene, or any of the various fluoro polymethyl benzenes, and fractionally distilling the product formed. The methylation is accomplished by employing methylating agents, such as methyl chloride in the presence of anhydrous aluminum chloride or a similarly functioning catalyst. Pentamethyl fluorobenzene boils at 238° C. Further purification

of the product is obtained by recrystallization from a solvent, such as alcohol or petroleum ether. The product crystallizes in white plates, melting at 59° C.

Alternately pentamethyl fluorobenzene is prepared by diazotizing pentamethyl aminobenzene in the presence of hydrofluoric acid or through pyrolysis of the diazonium borofluoride.

Pentamethyl fluorobenzene may be employed in wave guides, such as that disclosed in U. S. 2,129,711, granted to G. C. Southworth on September 13, 1938, electrical condensers or any other environment in which a material having a high dielectric constant is desired.

The manner of utilizing pentamethyl fluorobenzene in condensers is shown in the accompanying drawing in which:

Fig. 1 is a perspective view of a condenser in which the dielectric is pentamethyl fluorobenzene;

Figs. 2 and 3 are cross-sectional views of capacitances including pentamethyl fluorobenzene as dielectric.

In Fig. 1 sheets of a porous dielectric 11, such as paper, are impregnated with pentamethyl fluorobenzene. Interposed between the sheets of the dielectric are a pair of conducting sheets 10. Both the dielectric and foils are wound in a well-known manner to form a condenser. Two metallic strips 12 are electrically connected to the electrodes 10 to form the terminals of the condenser. Alternately the pentamethyl fluorobenzene may be a coating 14 on a metal foil 16 as shown in Figs. 2 and 3. A strip of another dielectric 15 may be positioned between the coatings 14 as shown in Fig. 2 and the coated foils piled alternately in a well-known manner to form a condenser.

What is claimed is:

1. Pentamethyl fluorobenzene.
2. The method of preparing pentamethyl fluorobenzene by methylating a mono-fluorobenzene.
3. A method of preparing pentamethyl fluorobenzene which comprises methylating a mono-fluorobenzene, fractionally distilling the products formed, and purifying by recrystallization the fraction obtained at approximately 238° C.
4. The method of preparing pentamethyl fluorobenzene which comprises treating para-fluorotoluene with methyl chloride in the presence of aluminum chloride.

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