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TETRACHLORO FLUOROTOLUENE

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FIG. 1

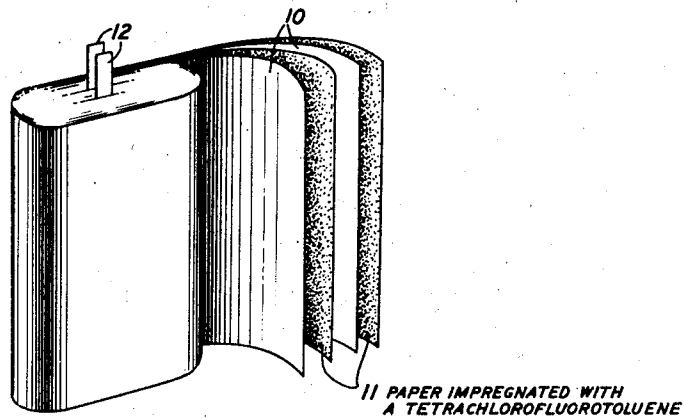


FIG. 2



FIG. 3



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TETRACHLORO FLUOROTOLUENE

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5 Claims. (Cl. 260—650)

This invention relates to compositions of matter and more particularly to tetrachloro fluorotoluenes.

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 large numbers and any reduction in their size without appreciable diminution in their functional characteristics results in material economies.

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

Another object is to utilize in electrical apparatus materials having high dielectric constants and desirable physical and electrical properties.

In accordance with this invention tetrachloro fluorotoluenes are employed as dielectric materials for use in electrical apparatus, such as condensers. They are solids under temperate conditions to which condensers are ordinarily subjected. They have high dielectric constants and retain these high dielectric constants at high frequencies and at unusually low temperatures. They are non-hygroscopic, are chemically stable, do not undergo electrolytic changes, and do not decompose or break down under conditions of use in electrical apparatus. Further, the tetrachloro fluorotoluenes 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. The tetrachloro fluorotoluenes are tetrachloro ortho-fluorotoluene, tetrachloro meta-fluorotoluene and tetrachloro para-fluorotoluene.

The tetrachloro fluorotoluenes are best prepared by chlorinating their respective fluorotoluenes. For example, tetrachloro meta-fluorotoluene is produced by chlorinating meta-fluorotoluene. This chlorination proceeds less rapidly than the chlorination of toluene itself. But by the use of iron powder or antimony pentachloride or both as catalysts in carbon tetrachloride solution chlorination to the level of four chlorine atoms may be obtained. The resulting product is fractionally distilled and the desired material obtained in the fraction boiling at about 269 de-

grees C. It is further purified by crystallization from a solvent, such as benzene or cyclohexane. It crystallizes in white needles, melting at 146 degrees C. The dielectric constant of tetrachloro fluorotoluene is 5.8 at 20° C.

Another method of preparing the tetrachloro fluorotoluenes is to nitrate the appropriate tetrachloro toluene, reduce the nitro group to the amino group, replace the amino group with a fluorine atom either by diazotizing in the presence of hydrofluoric acid or pyrolysis of the diazonium borofluoride.

Tetrachloro ortho-fluorotoluene, tetrachloro meta-fluorotoluene or tetrachloro para-fluorotoluene may be employed either alone or together with another dielectric in electrical apparatus, as dielectric guides as shown in U. S. Patent 2,129,711, granted to G. C. Southworth on September 13, 1938.

The manner of utilizing a tetrachloro fluorotoluene in condensers is shown in the accompanying drawing in which:

Fig. 1 is a perspective view of a condenser in which the dielectric is a tetrachloro fluorotoluene; and

Figs. 2 and 3 are cross-sectional views of capacitances including a tetrachloro fluorotoluene as the dielectric.

In Fig. 1 sheets of a porous dielectric 11, such as paper, are impregnated with a tetrachloro fluorotoluene such as tetrachloro meta-fluorotoluene. 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 roll type condenser. Two metallic strips 12 are electrically connected to the electrodes 10 to form the terminals of the condenser. Alternately the tetrachloro fluorotoluene may be applied as 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 coating 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. A tetrachlorofluorotoluene.
2. Tetrachloro-ortho-fluorotoluene.
3. Tetrachloro-meta-fluorotoluene.
4. Tetrachloro-para-fluorotoluene.
5. The method of preparing a tetrachlorofluorotoluene which comprises chlorinating a monofluorotoluene in the presence of antimony pentachloride as a catalyst until a tetrachlorofluorotoluene is formed.

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