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STABILIZED MINERAL OIL

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It is the object of the present invention to improve the stability of mineral hydrocarbon oil, and in particular mineral oil which is employed as an insulating and dielectric material.

Mineral oil, which consists substantially of aliphatic and carbocyclic compounds, has many advantageous properties, but even after subjection to the most approved refining treatment is subject to slow chemical changes under the environmental conditions occurring in electrical apparatus. For example, mineral transformer oil is subject to the formation of a sludge which impedes the circulation of the oil. When mineral oil is used for impregnating paper spacers in cables and capacitors, an increase of energy loss (rise of power factor) progressively occurs with elapsed time, the change being especially marked at elevated temperatures.

I have discovered that the chemical stability of mineral oil is markedly improved when the oil is associated with a small amount, ordinarily a fraction of one per cent of tree resin, such as ordinary rosin, or the oxidized form of rosin-like material, or wood pitch, sold commercially under the trade name Vinsol.

The compositions embodying my present invention should be distinguished from mineral oil compositions containing rosin, in which the content of rosin is relatively high, that is, in excess of 10 per cent by weight. The function of such relatively large rosin addition has been to increase the viscosity and tackiness of the oil, for special uses requiring viscous material. Such relatively large additions of rosin, however, do not produce the advantageous properties characterizing the present compositions.

While optimum benefits are produced by the addition to mineral oil of about one-half per cent by weight of rosin, or equivalent tree resin, to some extent beneficial results are obtained when such additions are as low as about one-tenth of one per cent, or as high as about three per cent. More exact figures can not be given as the beneficial results apparently are produced mainly by part of the constituents of the rosin, or equivalent tree resin, which naturally vary in composition.

Illustrative of the benefits of my invention is the improvement in power factor effected in high voltage cables and capacitors containing paper spacers which are impregnated with mineral oil containing rosin, or other tree resin. The operation of such capacitors and cables when rosin is not present is accompanied by a rise in power factor, the rise being particularly marked when the capacitors or cables are elevated above ordinary room temperature under oxidizing conditions. When, however, about five-tenths per cent by weight of rosin, or equivalent tree resin, is dissolved in the mineral oil, capacitors or cables

otherwise similar, impregnated with such solution, continue to operate without rise of power factor.

Unlike oil and rosin compositions heretofore prepared, the compositions of mineral oil and less than three per cent rosin have substantially the same viscosity as the unmodified oil. No evidence of increased tackiness is observable. However, the formation of sludge, which will thicken oil in which it forms, is decreased by the presence of the rosin, or the like, in the specified small amounts. The mineral oil is stabilized, that is, made more resistant to chemical changes, and in particular is made less subject to sludge formation.

I may employ mineral oil having the following physical properties, although I wish it to be understood that this oil is identified merely by way of illustration:

Flash point.....	Not less than 130° C.	20
Burn point.....	Not less than 140° C.	
Viscosity (37.8° C.).....	Not less than 50 seconds Saybolt Universal	
Specific gravity.....	Approximately .875	25
Pour point.....	—40° C., or lower	
Color.....	Not greater than 2, National Petroleum Association Scale	

Mineral oil containing a fractional per cent of rosin, or other suitable tree resin, is well suited for the impregnation of electric cables, especially paper-insulated cables, and as an insulating and cooling agent in electric transformers.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A composition of matter comprising as essential ingredients mineral oil and a wood resin, the proportion of the wood resin by weight being within the limits of about one-tenth to three per cent of the mineral oil.

2. A composition of matter comprising as essential ingredients mineral oil and a wood resin, the proportion of the wood resin by weight being about one-half per cent based on the weight of the mineral oil.

3. A dielectric and insulating material consisting essentially of hydrocarbon oil and containing a fraction of one per cent by weight of rosin.

4. A dielectric material for cables and capacitors comprising paper impregnated with mineral oil containing about one-tenth to three per cent by weight of a tree resin.

5. A dielectric material for cables and capacitors comprising paper impregnated with mineral oil containing about five-tenths per cent by weight of rosin.

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