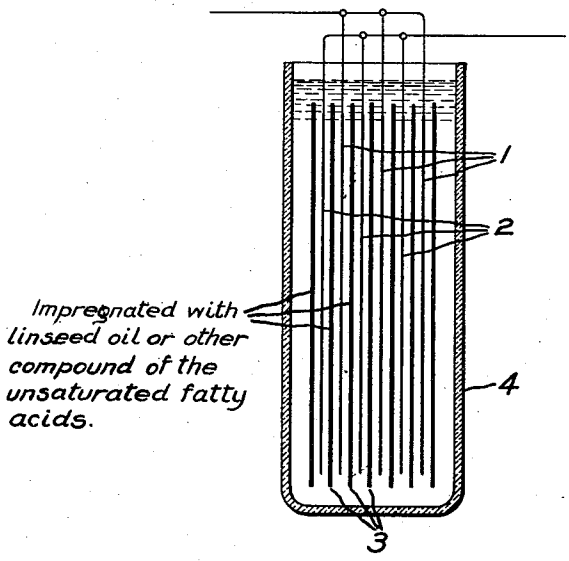
March 9, 1926. 1,576,096

W. P. DAVEY

ELECTRIC CONDENSER

Filed April 22, 1924



Inventor
Wheeler P. Davey
by Alexander D. Lewis
His Attorney

Patented Mar. 9, 1926. 1,576,096

UNITED STATES PATENT OFFICE.

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ELECTRIC CONDENSER.

Application filed April 22, 1924. Serial No. 708,248.

To all whom it may concern:

Be it known that I, WHEELER P. DAVEY, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Condensers, of which the following is a specification.

My invention relates to electrical condensers and particularly to the dielectric thereof. Static condensers heretofore constructed using a dielectric comprising paper impregnated with a mineral oil have been found to require very careful handling especially during the process of impregnation in order that the finished product could be relied upon to withstand its rated voltage without breakdown. Because of the exacting requirements incident to the materials employed, the manufacture of static condensers upon a large scale has been attended with many difficulties.

An object of my invention is to provide an improved dielectric for such condensers which will reduce or obviate the difficulties heretofore encountered and in general greatly facilitates the successful manufacture of condensers.

The single figure of the drawing is a diagrammatic representation of a static condenser involving my invention.

In accordance with my invention I employ as the dielectric or plate spacing element a non-conducting layer which, for example, may be cellulose containing a compound of the unsaturated fatty acids, as for example a glyceride represented by linseed oil, China wood oil or castor oil. I have obtained excellent results using as the dielectric several layers of a good quality of bond paper of about one-half mil. in thickness which were afterward impregnated with purified linseed oil. Experiments have shown that the impregnating material for good results should be in a comparatively high state of purification and I have found purified oils such as mentioned above to exhibit characteristics which make them especially desirable for use as dielectric material for condensers. For instance, the conductivity of a sample of purified and dried linseed oil was found to be of the same order of magnitude as that of the best mineral oil, and its dielectric constant to be about 60% higher than that of mineral oil, such for example as that known as transil oil. The dielectric constant of the paper impregnated in the purified linseed oil was found to be about 30% higher than that of similar paper impregnated with transil oil.

The good results obtained in condenser manufacture where the dielectric comprises paper impregnated with a compound of an unsaturated fatty acid are probably due not only to the above-mentioned characteristics but to the fact that such substances are by nature hydrophillic, that is, they spread on water or on moist surfaces. This property is believed to account in a large measure for the superior results obtained with such substances over those which do not spread on water. It is a fact well known to those skilled in the art that paper such as that used in the manufacture of condensers, cables, and the like is only with difficulty freed from the last traces of water. When such paper is treated with a water spreading oil, the oil acts as though it imprisoned the residual water in the paper so that it is unable to affect the conductivity of the insulator as a whole.

The above-mentioned water spreading property is not confined to the glycerides of the fatty acids as this property is possessed also by the various soaps of the fatty acids. The water spreading properties of soaps of the alkali metals are already well known. Recent experiments have shown that this effect is not limited to the so-called water soluble soaps, for copper oleate will spread on water to a film substantially one molecule thick.

Mention was made above of the necessity of using oils in a purified state, the removal of water from the oil being of primary importance. It is well known that animal and vegetable oils may be purified by chemical treatment and that colloidal matter may be removed by filtering through such clarifying materials as fuller's earth, filtering carbon, etc., and that they may be further refined and dried by suitable heat treatment.

A condenser having a dielectric involving my invention may be built up of alternate layers of conductor and dielectric in the usual manner either by piling up the layers to form a stack or by rolling up continuous strips of the same. The dielectric layers which may be paper are preferably allowed

to remain somewhat loose better to enable air and moisture therein to be withdrawn and the pile or roll thus formed may then be subjected to treatment in a vacuum tank. While subjected to the vacuum and preferably at an elevated temperature the impregnating oil may be admitted to the tank and the pressure restored. The condenser elements may then be securely clamped together and immersed in a permanent receptacle containing the impregnating or other suitable oil.

Referring to the drawing, which is purely diagrammatic in character, the conducting layers 1 of one polarity are shown spaced from the conducting layers 2 of the opposite polarity by layers of dielectric 3 which in accordance with my invention contains or is impregnated with linseed oil or other compound of the unsaturated fatty acids. The whole is shown immersed in a receptacle 4 containing an insulating liquid which preferably is the same as that comprised in the dielectric.

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

1. A condenser comprising a plurality of conducting layers and spacing of solid material therebetween containing a compound of the unsaturated fatty acids.

2. A condenser comprising a plurality of conducting layers and spacing of solid material therebetween containing a glyceride of the unsaturated fatty acids.

3. A condenser comprising a plurality of conducting layers and a dielectric therebetween comprising a solid non-conducting material impregnated with a glyceride of the unsaturated fatty acids.

4. A condenser comprising a plurality of conducting layers separated from each other by layers of solid cellulose material impregnated with a glyceride of the unsaturated fatty acids.

5. A condenser comprising a series of conducting layers, and a series of dielectric layers alternating with said conducting layers, said dielectric layers comprising sheets of paper impregnated with linseed oil.

6. A condenser comprising spaced conducting elements and a solid dielectric therebetween impregnated with linseed oil.

In witness whereof, I have hereunto set my hand this 21st day of April, 1924.

WHEELER P. DAVEY.