

UNITED STATES PATENT OFFICE.

ROBERT FRIESE, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO SIEMENS-SCHUCKERTWERKE, G. M. B. H., OF BERLIN, GERMANY, A CORPORATION OF GERMANY.

PROCESS OF REGENERATING OIL USED FOR ELECTRICAL PURPOSES.

1,103,499.

Specification of Letters Patent.

Patented July 14, 1914.

No Drawing.

Application filed April 1, 1913. Serial No. 758,246.

To all whom it may concern:

Be it known that I, ROBERT FRIESE, a citizen of the German Empire, and residing at Charlottenburg, near Berlin, Germany, have invented a certain new and useful Improved Process of Regenerating Oil Used for Electrical Purposes, of which the following is a specification.

The subject-matter of my invention is a process of rendering oil used as transformer oil or the like usable again for electrical purposes.

Electrical apparatus, such as transformers, resistances, switches and the like, subjected to high tensions are frequently placed in an oil-bath, for the purpose of insulating and cooling them better than would otherwise be the case. Both these ends can be attained only when a sufficiently large quantity of oil is employed, so that the oil frequently represents a not inconsiderable part of the entire value of the apparatus. In economical respects it is therefore very unsatisfactory that the oil-filling loses its good properties more and more in the course of time when the apparatus is in use, and even if the oil becomes entirely unusable possibly only after a long period, the substitution of the used oil by fresh nevertheless causes an appreciable loss apart from the fact that the reliability of the apparatus is diminished during a long time. The specially purified mineral oil frequently employed for the purposes in question loses its light clear color, darkens, becomes more and more turbid and viscous, and solid constituents are precipitated and settle as muddy or solid matter, thereby more and more diminishing and finally negating the efficacy of the oil. The reasons for the change in the oil in consequence of the electrical apparatus being used cannot as yet be exactly stated. There is, however, great need for a process by means of which the oil can be regenerated, thus giving back to it all those properties which are necessary for electrical apparatus, it being unimportant whether changes are thereby made in the oil which render it of little value for other purposes or not.

A primary object of my invention is to provide such a process which meets this want. To this end, the oil to be regenerated removed from the electrical apparatus is

mixed with a sufficient quantity of acetone and agitated for some time. The emulsion thereby produced is then left to stand, its constituents of different specific gravity gradually separate, and after some time two clearly defined portions of the liquid can be observed; that at the top is the lighter acetone which can be readily poured off and contains in solution those noxious constituents of the oil whose presence was the reason of the oil being impaired, whereas the lower larger portion of the liquid is the regenerated oil containing, it is true, a considerable percentage of acetone. As this percentage of acetone renders the oil readily inflammable it must be removed therefrom before the oil is again employed in electrical apparatus. It can however be very readily removed from the oil by distillation and be recovered without material loss by condensation. In the same manner the acetone can for the most part be recovered also from the upper portion of the liquid consisting of acetone and the injurious constituents of the oil dissolved in it.

The described process is of peculiar economic value because it can be readily carried into practice, is very effective and in spite of the not inconsiderable price of acetone, is also very economical on account of its being possible almost completely to recover the acetone.

The following practical example will illustrate the carrying out of my invention: 40 cm³ of acetone are added to 100 cm³ of used oil, of which about 20 cm³ of the acetone goes into the oil, while the remaining 20 cm³ of acetone, which contains the impurities to be removed, separates from the oil-acetone mixture mechanically in a layer and can be removed therefrom. The acetone remaining in the oil can be separated and recovered by distillation.

Besides acetone, other solvents, *e. g.* methyl alcohol, have proved to be effective in a similar manner as acetone. Their action is however so much weaker than that of acetone that they are not of much importance in practice.

I claim:—

A process of regenerating oil used as transformer oil or the like for electrical purposes, consisting in mixing the used oil with acetone, in leaving the mixture thereby ob-

tained at rest whereupon its constituents of
different specific gravity separate in two
superposed layers, in removing the upper
layer containing acetone and noxious con-
5stituents of the used oil, and in distilling
off from the lower layer the residue of ace-
tone remaining therein.

In testimony whereof, I have signed my
name to this specification in the presence of
two witnesses.

ROBERT FRIESE.

Witnesses:

WOLDEMAR HAUPT,

HENRY HASPER.