# United States Patent

**Balteau**

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[54] **MAGNETIC STIRRER FOR CONDUCTING DIELECTRIC TESTS ON INSULATING OILS**


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[51] **Int. Cl.** ..... **B01f 7/16**

[58] **Field of Search** ..... 259/107, 108, 5–8, 259/16, 21–24, 32–34, 40–44, 64–67, DIG. 46



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[57] **ABSTRACT**

In a container for conducting dielectric tests on insulating oils, there is provided a stirring means consisting of a removable displaceable element equipped with a permanent magnet accommodated in the receptacle of said container and moved by a magnetic control means located outside said receptacle.


**5 Claims, 2 Drawing Figures**

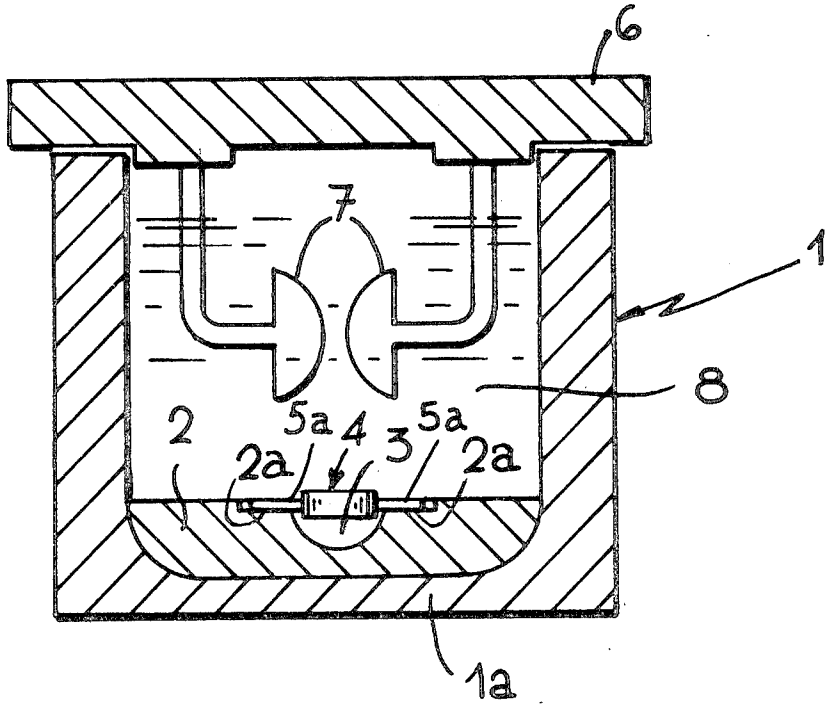


FIG. 1

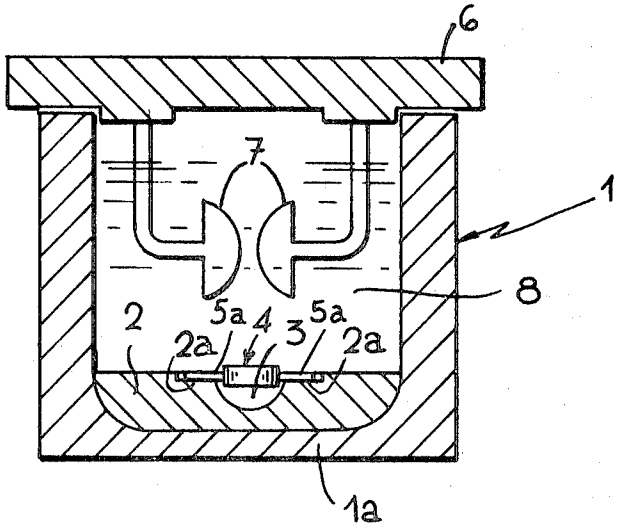
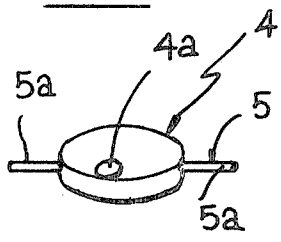



FIG. 2

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# MAGNETIC STIRRER FOR CONDUCTING DIELECTRIC TESTS ON INSULATING OILS

This invention relates to a container equipped with a stirrer for stirring the liquid accommodated in the container. More particularly, the invention relates to a container suitable for conducting dielectric tests on insulating oils.

It is known that the oils used in certain electrical apparatus must have insulating properties which are determined by subjecting the oils to standardized dielectric tests.

To do this, a sample of oil to be tested is introduced into a container in which two electrodes are situated at a precisely regulated distance apart from one another. A voltage is applied between these two electrodes, being progressively increased until a spark is formed between the electrodes. The tests are repeated several times in succession and the results obtained are interpreted to give the value of the dielectric strength.

During each test, the oil is carbonized to a certain extent through the passage of the spark or the electric arc, resulting in the formation of residues and gas bubbles through which measurements taken during subsequent tests are in danger of being falsified. To avoid this disadvantage, the oil has to be suitably stirred or agitated to bring fresh oil between the electrodes.

Various systems have already been used for this purpose. In one known system, the container itself is agitated, in a second known system the electrodes are displaced while in a third known system the oil is suitably agitated by mechanical means such as a turbine or a propeller equipped with a mechanical control system driven by outside means.

It is also known that various chemical substances can be mixed by means of small cylinders of a magnetic metal covered with an enamel resistant to the action of chemicals which are rotated by a powerful magnet arranged beneath the container accommodating the product to be mixed, being driven by a motor.

Although these systems generally provide for adequate stirring, they do have various disadvantages. Firstly, they often give rise to the formation of bubbles during agitation. The parts near the electrodes are troublesome because they can disturb the test conditions. Finally, they are sometimes difficult to dismantle and clean so that the impurities and residues from the tests remain in the container.

The object of the present invention is to provide a container for conducting dielectric tests on insulating oils, comprising stirring means which do not disturb the test conditions and which consist of elements without deep cavities. These elements are made from the same material as the container and can readily be removed to allow quick and complete cleaning.

This object is achieved by a container according to the invention which is distinguished by the fact that the stirring means consists of a removable displaceable element equipped with a permanent magnet accommodated in the receptacle of the container and moved by a magnetic control means situated outside the receptacle of the container.

According to one aspect of the invention, the displaceable element is in the form of a rotatable circular plate provided with a shaft and equipped with a permanent magnet controlled by the magnetic control means. In this way, control can be effected by means of an electromagnet situated beneath the bowl of oil which does not have any moving parts. The pulsating current required for control can be supplied by means of a transistorized oscillator, while speed can be regulated very simply as required by acting on the characteristics of the control current.



According to another aspect of the invention, the ends of the shaft of the rotatable plate are supported by two bearings provided in the support accommodated in the bottom of the container. These two bearings comprise semicylindrical recesses at the periphery of said cavity.

In addition, the support for the rotating plate can alternatively be arranged directly in the bottom of the container receptacle which thus comprises a cavity for the plate, or inserted and arranged on the bottom of the container.

Other features of the invention will be apparent from the following description of the accompanying drawings which relate to one purely exemplary embodiment of the invention.

FIG. 1 is a diagrammatic vertical axial section through a container according to the invention; while

FIG. 2 is a view on a different scale of the rotating plate.

As can be seen, the container in question has a receptacle 1 of cylindrical form covered by a closure 6 from which depend two electrodes 7. This receptacle has a base 1*a* on which a support 2 with a cavity 3 is arranged. This cavity accommodates a plate 4 which is a portion with a flat circular surface. This plate is provided with an element 4*a* in the form of a permanent magnet provided with a shaft 5 whose two ends or trunnions 5*a* are carried by the two bearings 2*a* consisting of two semicylindrical recesses.

Outside the cylindrical receptacle 1 there is a known magnetic control means (not shown) which generates a rotating or pulsating magnetic field. This known device is advantageously in the form of an electromagnet situated at some distance beneath the container so that no large metal parts are able to exert any influence during the tests.

The magnetic field acts on the permanent magnet 4*a* and rotates the plate 4 accommodated in the cavity 3 which agitates the oil 8 accommodated in the container.

What I claim is:

1. A magnetic stirrer comprising a receptacle for conducting dielectric tests on insulating oils comprising a support at the bottom of said receptacle, a rounded cavity provided in said support, a circular rotating plate accommodated in said cavity, and a magnetic element on said plate so as to rotate said plate in a magnetic driving field.

2. A magnetic stirrer according to claim 8 characterized in that the circular rotating plate is provided with a shaft the ends of which are carried by two bearings in said support.

3. A magnetic stirrer according to claim 9 characterized in that said two bearings consist of two semicylindrical recesses at the periphery of said cavity in said support.

4. A magnetic stirrer according to claim 8 characterized in that said support is constituted directly by a thick bottom of said receptacle.

5. A magnetic stirrer according to claim 8 characterized in that said support comprises a thick element inserted and located on the bottom of said receptacle.

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