Sept. 7, 1926.

1,599,245

A. PORNIN

ELECTRICAL APPARATUS

Filed Jan. 20, 1923

Fig. 1.

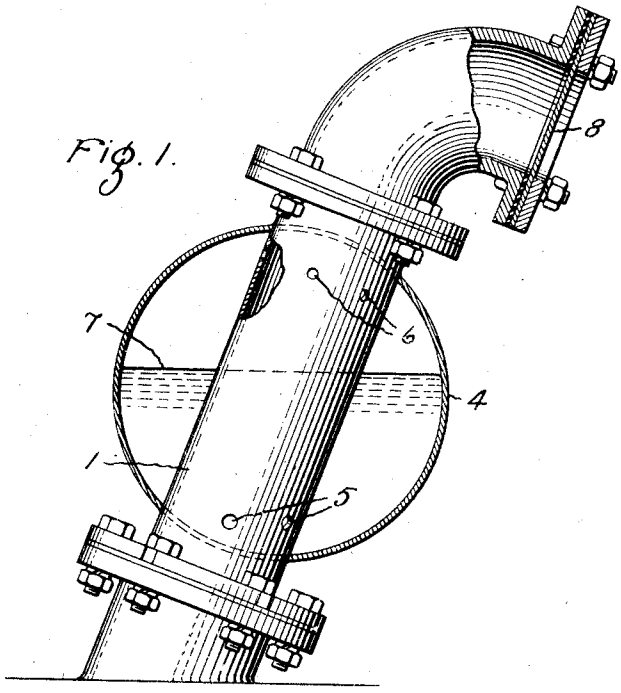
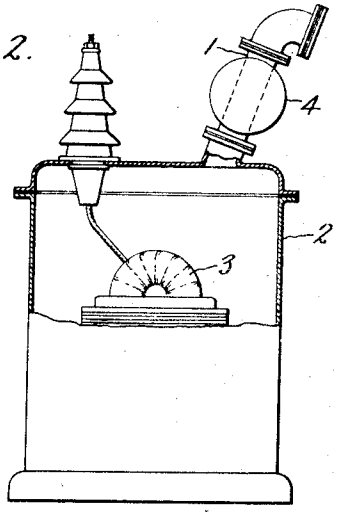


Fig. 2.



Inventor:
Andre Pornin,
by Alexander S. Lent
His Attorney.

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UNITED STATES PATENT OFFICE.

ANDRÉ PORNIN, OF PARIS, FRANCE, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A A CORPORATION OF NEW YORK.

ELECTRICAL APPARATUS.

Application filed January 20, 1923, Serial No. 613,841, and in France March 2, 1922.

My invention relates to encased electrical apparatus and more particularly to an improved arrangement of expansion chamber or conservator and pressure relief device for electrical apparatus immersed in insulating fluid such as oil in an enclosing casing. The invention is of particular advantage in connection with encased oil immersed transformers. One of the objects of the invention is to provide a simple and compact arrangement of expansion chamber and pressure relief device with a resultant economy in space and in the cost of labor and material. Another object of the invention is to provide a construction such that a single opening into the casing of the electrical apparatus will suffice for both expansion chamber and pressure relief device, thus minimizing the chances for leakage of oil from the casing. A still further object is to exclude moisture and sediment from the casing of the apparatus. Other objects and advantages will appear.

One embodiment of the invention is disclosed in the accompanying drawing in which Fig. 1 is a view, partly in section, of a preferred form of construction and Fig. 2 is a view, partly in section, of the combined expansion chamber and pressure relief device of Fig. 1 mounted on the casing of an oil immersed transformer.

Like reference characters refer to similar parts in both figures of the drawing.

In the form of invention shown in the drawing, a pipe 1 extends above and communicates with the casing 2 of a transformer 3. An expansion chamber or conservator 4 surrounds an intermediate portion of the pipe 1 and the space within the pipe 1 communicates with the surrounding space inside the expansion chamber through openings 5 and 6 in the side of the pipe. The transformer 3 is immersed in a body of suitable insulating liquid such as oil which fills the casing 2 and partially fills the pipe 1 and expansion chamber 4 to a suitable level 7 as indicated in Fig. 1. As the insulating liquid in the casing 2 expands and contracts under the influence of changes in temperature, the level 7 of the liquid in the pipe 1 and expansion chamber 4 will rise and fall. The openings 5 are below and the openings 6 are above the level 7 of the liquid so that the level in the pipe is always the same as in the expansion chamber and the pressure of the air in both compartments is equalized at all times. This is of advantage in preventing or reducing condensation of moisture within the pipe 1 as a result of an increase in the pressure of the air therein. The openings 5 are located sufficiently above the bottom of the expansion chamber 4 to prevent passage into the pipe 1 and casing 2 of any moisture or sediment which may settle in the expansion chamber.

The upper end of the pipe 1 is closed by a thin diaphragm 8 to exclude air, moisture and other matter which would affect the dielectric strength of the insulating liquid if allowed to enter. The size of the pipe 1 is such that upon the occurrence of excessive pressure such as may be caused by a short-circuit in the transformer, the diaphragm may be ruptured and, by relieving such pressure, prevent damage to other parts of the apparatus. The openings 5 and 6 are preferably only large enough to accommodate the normally slight flow of air and oil between the expansion chamber and the pressure relief pipe. The positions and limited sizes of the openings 5 and 6 are such that in case of sudden pressure within the casing 2 due to short-circuit or other disturbance within the transformer, gases and oil may be expelled through the relief pipe without causing damage by excessive pressures in the expansion chamber.

One of the functions of the relief pipe 1 is to provide communication between the casing 2 and the expansion chamber 4 so that a single opening into the casing is sufficient. The chance for oil leakage is thus a minimum.

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

1. The combination with a casing enclosing electrical apparatus, of a pressure relief pipe communicating with said casing, a rupturable diaphragm closing the outer end of said pressure relief pipe, an expansion chamber surrounding said pipe, there being an opening in the side of said pipe to provide communication between the expansion chamber and the interior of the pipe, and insulating liquid within said casing and ex-

tending into said relief pipe and through said side opening into said expansion chamber.

2. The combination with a casing enclosing electrical apparatus, of a pressure relief pipe communicating with said casing, an expansion chamber, and insulating liquid within said casing and partially filling said relief pipe and expansion chamber, there being communication independent of said casing between the expansion chamber and relief pipe both above and below the level of the liquid therein.

In witness whereof, I have hereunto set my hand this 5th day of January, 1923.

ANDRÉ PORNIN.