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SEPARATING DEVICE FOR CIRCUIT INTERRUPTERS.

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My invention relates to liquid-insulating electrical devices and more particularly to separating devices used in connection therewith.

One object of my invention is to provide liquid-insulated electrical devices with a device for separating suspended particles of liquid from the escaping gases.

Another object of my invention is to provide a separating device having means for absorbing small particles of suspended liquid from the gases which pass there-through.

It is also an object of my invention to provide a separating device having the required mechanical details for performing the aforementioned objects.

In liquid insulated electrical devices, it is customary to provide the casing with venting means for permitting breathing, and for preventing the formation of dangerous pressures. These venting means are frequently made in the form of separating devices in order that any arc gases which may be generated in the apparatus will be cooled and prevented from mingling with the air under such conditions that violent explosions may occur. During the passage of gases to and from the casing through such vent, it has been found that a certain amount of liquid is wasted by reason of small particles of liquid becoming suspended in the gases and thrown out of the casing, while dust and moisture are drawn into the casing. I propose to prevent the loss of liquid by providing a suitable absorbent material which is sufficiently porous to permit the passage of a portion of the gases, but is impervious to the passage of the small particles of suspended liquid. I also prevent a certain amount of this waste by arranging certain layers of absorbent material in such manner that the liquid bearing gases impinge thereon and move along the surfaces thereof, whereby they deposit the suspended particles of liquid which are absorbed by the absorbing material. The absorbent material similarly strains and purifies the incoming gases.

The liquid which has become thus caught is allowed to drain back into the casing under the influence of the force of gravity by proper design of the separator structure.

In the accompanying drawings,

Figure 1 is a fragmentary view, in elevation, of the casing of an electrical device equipped with a separator.

Fig. 2 is a longitudinal sectional view of my improved separator device.

Fig. 3 is a plan view, partially in section, of the separator, and

Fig. 4 is a sectional view of the separator device taken along the line IV—IV of Fig. 2.

In the several figures of the drawing, similar reference numerals indicate like parts.

In the preferred form of my invention a liquid-insulated electrical device, such as a transformer or circuit interrupter, is placed in a tank 1 which is provided with a cover 2, suitable electrical connections 3, and a suitable mechanical connection 4. The cover member 2 is provided with a vent 5 into which is fitted a separating device 6 which embodies my invention.

The separating device 6 comprises an outer casing 7 to which is attached a cover 8 by suitable means, such as bolts 9 which are threaded into an extension 11 on the casing 7. The cover 8 does not tightly fit the casing 7, but is arranged to provide a tortuous path 12 between the interior of the casing and the atmosphere through the vents 13.

Within the casing 7, there is placed a lining 14 of suitable absorbent material, such as felt. It is to be understood that the use of the term "felt" as used in this application is intended to cover any and all types of absorbent material which may be used for a similar purpose. A suitable winding 15 of a binding material, such as wire netting, is associated with the lining 14 in order to preserve the shape thereof.

Within the lining 14, there is placed an inner casing 16 whose sides are provided with perforations 17, in the form of slots extending substantially the entire length thereof.

The casing 16 is divided into a number of small chambers by a plurality of baffles 18 which are arranged throughout the entire length thereof. The baffles 18 are each provided with a perforation 19, which is preferably located in the center thereof. Between each pair of baffles 18 there is

placed a layer 21 of absorbent material which is free to move relatively to its confining baffle members. The base of the separating device is provided with a suitable opening 22 in which is threaded a connector 23, the latter being adapted to fit into the vent 5 in the cover member 2.

In the event of the occurrence of an excessive pressure of gas within the tank 1 from any cause, such as the operation of a circuit interrupter or differences in pressure caused by seasonal temperature changes, the gases tend to escape through the separating device 6. Upon leaving the tank 2, the gases pass through connector 23 and the opening 22 into the separating device 6. The gases tend to rise through the several baffle members as is shown by the arrows in Fig. 2.

After passing the opening 19 in the bottom of the casing 16, the gases encounter the first absorbing member 21. A small amount of the gases passes through the absorbent material, but by far the greater quantity lifts the material 21 away from the opening 19, as is shown in the dot and dash position in Fig. 2, thereby permitting the gases to escape upwardly, through opening 19 in the adjacent baffle member 18. The same operation is repeated during the passage of the gases through the successive baffle members 18. A certain portion of the liquid suspended in the gas mixture is blown against each of the absorbing members 21 and held thereby. By causing the gases to change their direction in passing along the face of each of the absorbing members 21, a greater portion of the gas is exposed to such absorbing surfaces and the velocity of the gas is proportionally decreased, both of these factors serving to facilitate the absorption of a larger percentage of the liquid by members 21.

A certain portion of the gases escape from between the baffle members through the perforations 17 and impinge upon, and move along, the surface of the lining 14 which absorbs the suspended particles of liquid. By providing a sufficient number of baffles 18 and absorbing members 21 together with a sufficient exposed surface area of the lining 14, it is possible to remove practically all of the suspended particles of liquid in the escaping gas. The particles of liquid which have been trapped in the several absorbing members collect and slowly drip

back into the tank 1 under the influence of the force of gravity.

In the event that the directional movement of the gases traversing the muffler 6 is from the atmosphere to the tank 1, the absorbing members 21 fit snugly over the openings 19 in the baffle members 18 and the lining 14 tends to fit the casing 16 whereby the incoming gas is cleaned from suspended particles of dust and moisture.

It will be obvious to those skilled in the art that various modifications may be made in the arrangement of details shown in the accompanying drawings, as for example, the lining 14 may be omitted, or the perforations may be omitted from the surface of the casing 16. The binding member 15 may also be omitted, if desired.

I have, accordingly, provided means for separating the suspended particles of liquid from an escaping body of gas without materially interfering with the escape of such gas or creating a material back pressure. It will be observed that my invention is particularly applicable to that class of electrical apparatus which is immersed in a liquid and which is subjected to the accumulation of a volume of gas within the housing for the apparatus.

I claim as my invention:

1. In a separating structure, a casing, a lining therefor comprising an absorbent material, an inner casing provided with a perforated surface, perforated baffle members mounted in said casing, and cushions of absorbent material associated with said baffle members.

2. In a separating structure, a casing, a lining therefor comprising an absorbent material, an inner casing provided with a perforated surface, perforated baffle members mounted in said casing, and cushions of absorbent material associated with said baffle plates and adapted for movement relatively to the perforations therein.

3. In a separating structure, a casing, an inner casing provided with a perforated surface, perforated baffle members mounted in said casing, and cushions of absorbing material associated with said baffle plates and adapted for movement relative to the perforations therein.

In testimony whereof, I have hereunto subscribed my name this 19th day of May, 1923.

THOMAS STENSEN PUKERUD.