June 2, 1931. H. C. EDDY 1,807,781

INSULATOR

Filed March 22, 1924

Fig. 1.

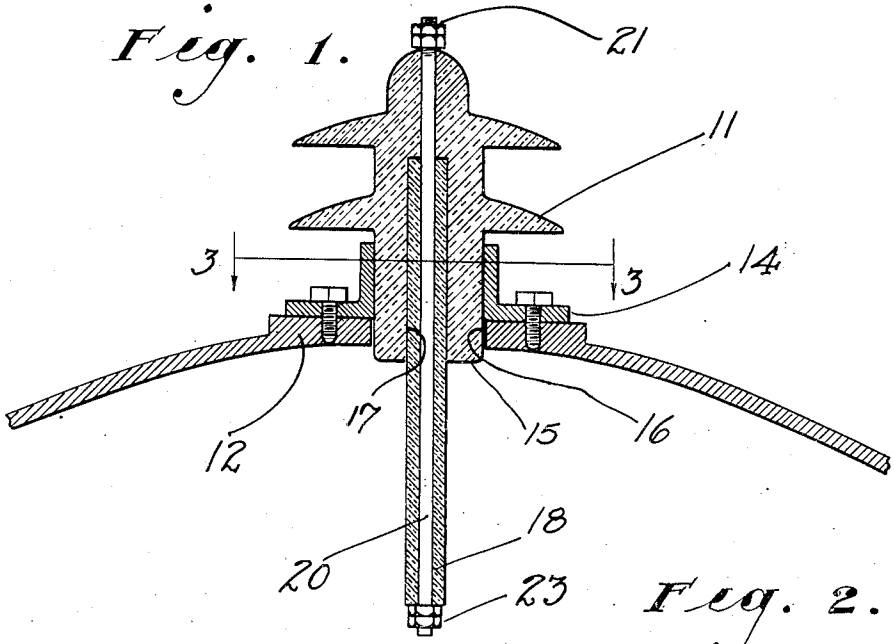


Fig. 2.

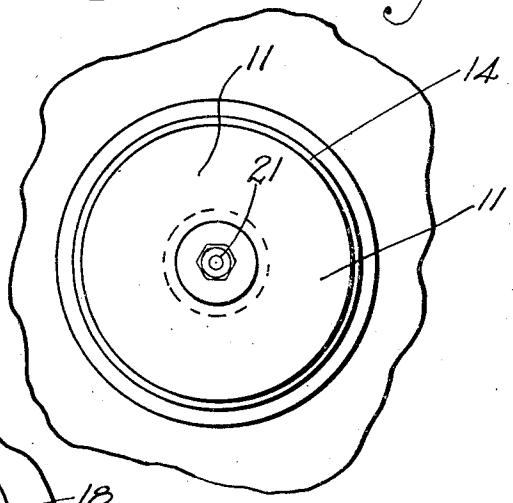
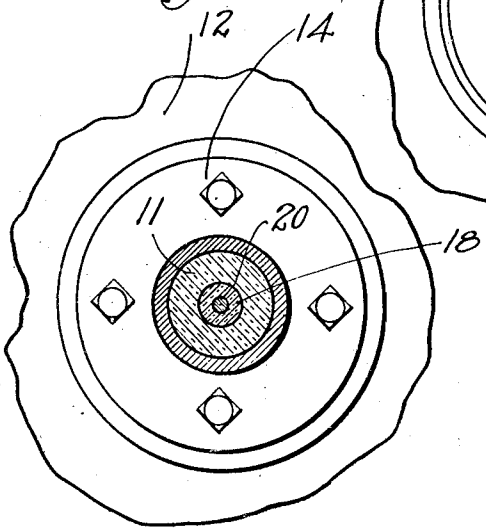


Fig. 3.



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UNITED STATES PATENT OFFICE

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INSULATOR

Application filed March 22, 1924. Serial No. 701,059.

This invention relates to insulators such as those employed on electrical dehydrators.

Dehydrators are used extensively in the oil refining industry, these dehydrators generally comprising a shell or tank in which the electrodes are mounted, one set thereof being insulated from the tank and the other set often having electrical contact therewith. One wire of the electrical circuit may be connected to the tank, supplying current to the electrodes in contact therewith, the other wire being connected to the other set of electrodes. The insulator to which my invention relates may be used to conduct current to the interior of a dehydrating or other tank.

An oil emulsion to be treated may contain considerable water, and the atmosphere in the upper part of the tank may become quite humid. The moisture often collects on the body of the insulator, which has been made either from porcelain or from other insulating material, forming conducting paths and establishing an electrical current over the surface of the body. This current has been found unduly to heat the body member; and, if this member be formed of porcelain, it will tend to expand and crack; and if it be of a material capable of being carbonized such carbonization may result in an increasing flow of current. In either case, insulators may be destroyed, current wasted, and serious fire risks incurred; and it is a primary object of my invention to provide an insulating and conducting organization which will avoid the above disadvantages.

Further objects of the invention and specific advantages thereof will be made evident hereinafter.

Referring to the drawings which are for illustrative purposes only,

Fig. 1 is a vertical section through an insulator embodying the features of my invention.

Fig. 2 is a plan view of Fig. 1.

Fig. 3 is a section taken on a plane represented by the line 3—3 of Fig. 1.

As shown in the drawings, my invention provides an outer insulator body 11, as shown in Fig. 1 which is made from an insulating material such as bakelite, which has considerable mechanical strength. The body 11 is shown as secured to the top of the tank, indicated at 12 by a flanged collar 14, within which said body may fit, as shown. The body 11, whether formed from an organic material, such as synthetic rosin or a phenol condensation product (bakelite), or from a vitreous material such as porcelain, is preferably supported in such manner that the lower end 15 thereof extends slightly through the opening 16 in the tank 12. Seated within a longitudinal socket 17 and extending downwardly from an intermediate point in the body 11, and along the axis thereof, is shown an inner insulator member in the form of a tube 18. This tube is preferably made from quartz, which has advantages including the following: it has high dielectric properties; its thermal expansion is so low that it is not liable to crack by reason of heating; and it cannot carbonize. In other words, quartz has all the desirable qualities of an insulator except mechanical strength,—the lack of which implies that it cannot be exposed or clamped as porcelain and certain organic materials can.

Extending through aligned passages in the body 11 and tube 18 is shown a conductor rod structure, which may serve incidentally to retain the tube 18, whether or not the latter is cast directly within the body 11, against dropping, in case it becomes loose therein. This structure is illustrated as comprising a conductor 20 having nuts threaded on the opposite ends thereof and bearing respectively against the body 11 and the tube 18.

The line from a transformer may be attached to the outer end 21 of the rod 20, and the line to one set of electrodes may be attached to the inner end 23 thereof.

When, as mentioned above, moisture within a tank collects on the exposed surfaces of such an insulator, owing to the fact that the diameter and area of the tube are small, and to the fact that, as shown, it has a long creeping surface, the resistance to the passage of electricity will be much more than in the case of the ordinary insulator; and, because the tube 18 can, without appreciable deteriora-

tion, withstand considerable heat, it will not be damaged by the passage of current thereover. A leakage of current may evaporate moisture and interrupt itself. Such a tube is also non-carbonizing, so that no arc is likely to become established thereover. The inwardly exposed area 15 of the body 11 may be very small and its tendency to deteriorate will be correspondingly small. Even if the part 15 does carbonize, no arc is likely to be maintained or even formed, because of the high resistance of the tube 18. In the event that either body does crack, the tube 18 extends into the body 11 enough to prevent a short-circuit and the rod 18 will retain the parts in their intended relationship.

From the foregoing, it will be seen that by utilizing the qualities of both the porcelain (or bakelite) and the quartz, I am able to provide an insulating or an insulating and conducting organization which will be practically indestructible by the occasional passage of electricity over the surface thereof.

Although I have herein described one complete embodiment of my invention, it will be understood that various features thereof might be independently employed, and also that various modifications might be made by those skilled in the art to which this case relates, without the slightest departure from the spirit and scope of my invention, as the same is indicated above and in the following claims.

I claim as my invention:

1. A device for conducting an electric current through a conducting wall of a tank without electrical contact therewith comprising: an organic body of high dielectric and mechanical strength secured in an opening in said wall; a nonorganic member formed of relatively brittle insulating material secured in said body; and a conductor rod structure passing through both said body and said member and holding said body and said member together, said non-organic member extending into said tank a sufficient distance to prevent any danger of short-circuiting between the inner end of said conductor rod structure and that portion of said tank in which said organic body is secured.

2. A device for conducting an electric current through a conducting wall of a tank wihout electrical contact therewith comprising: an organic body of high dielectric and mechanical strength secured in an opening in said wall; a nonorganic member formed of quartz secured in said body; and a conductor rod structure passing through both said body and said member and holding said body and said member together, said non-organic member extending into said tank a sufficient distance to prevent any danger of short-circuiting between the inner end of said conductor rod structure and that portion of said tank in which said organic body is secured.

3. A device for conducting an electric current through a conducting wall of a tank without electrical contact herewith comprising: an organic body of high dielectric and mechanical strength secured in an opening in said wall, said body having a longitudinal socket therein extending only partially through said body; a non-organic member formed of insulating material and having one end in said socket and the other end projecting a substantial distance beyond said wall of said tank and into said tank, there being aligned passages through said body and said member, said non-organic member extending into said tank a sufficient distance to prevent any danger of short-circuiting between the inner end of said conductor and that portion of said tank in which said organic body is secured; and a conductor passing through said aligned openings.

4. A device for conducting an electric current through a conducting wall of a tank without electrical contact therewith comprising: an organic body of high dielectric and mechanical strength secured in an opening in said wall, said body having a longitudinal socket therein extending only partially through said body; a non-organic member formed of insulating material and having one end in said socket and the other end projecting a substantial distance beyond said wall of said tank and into said tank, there being aligned passages through said body and said member, said non-organic member extending into said tank a sufficient distance to prevent any danger of short-circuiting between the inner end of said conductor and that portion of said tank in which said organic body is secured; a conductor passing through said aligned openings; and means on said conductor for holding said member in said socket.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 17th day of March, 1924.

HAROLD C. EDDY.