

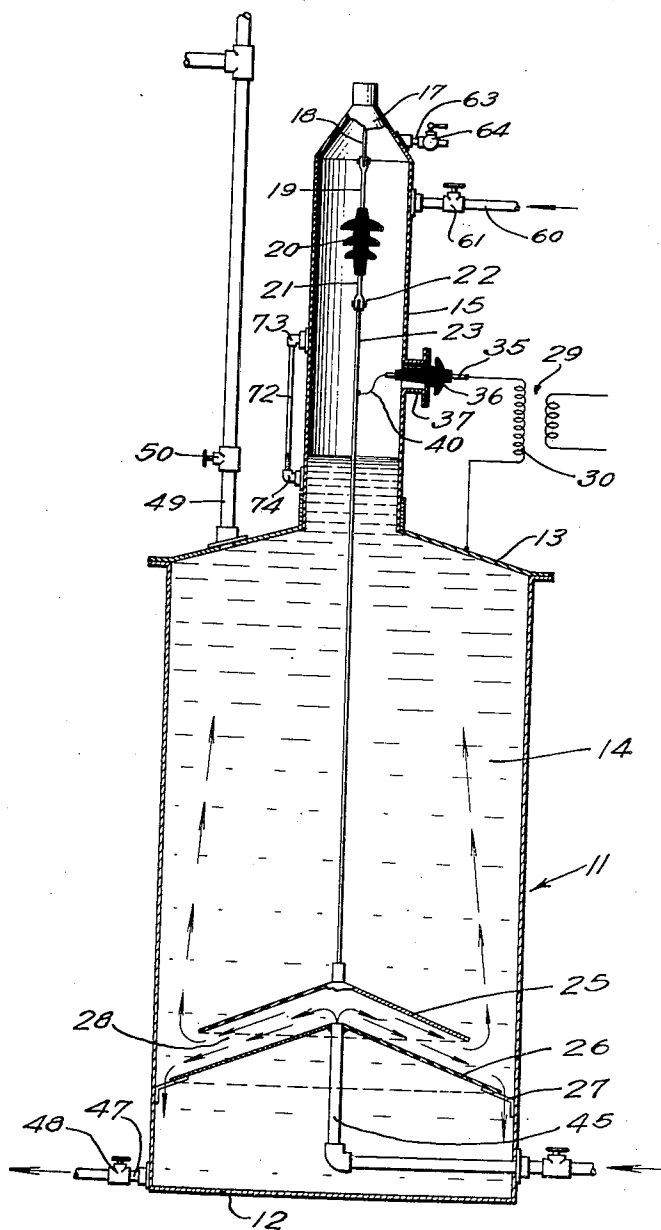
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BUSHING FOR DEHYDRATORS

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BUSHING FOR DEHYDRATORS

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My invention relates to the dehydrator art, and more particularly to a novel method and apparatus for preventing electrical break-down of an insulator used in an electric dehydrator.

5 In breaking a petroleum emulsion by the electrical process, this emulsion is subjected to an electric field set up between a pair of electrodes. This electric field is of an alternating character and the magnitude thereof is very high, often
10 exceeding ten thousand volts per inch. It is desirable to position such electrodes in a closed tank so that treatment may be carried on under pressure, and it thus becomes necessary to conduct a high potential current through the wall of a tank and provide insulation enough at this point to prevent danger of short-circuiting between the high potential conductor and the tank. This is usually accomplished by surrounding the conductor with a suitable bushing or insulator.

The ordinary oil-well emulsion contains suspended particles of water and also a material amount of foreign matter. It has been found that if that portion of the insulator which extends inside the tank is subjected to such an emulsion, or if the water or foreign particles entrained in the emulsion are allowed to collect thereon, a conducting film will be formed on the insulator through which leakage currents will pass. These leakage currents either increase in magnitude to
30 such an extent that they short-circuit the conductor and the tank, or exert a heating effect on the insulator which is very detrimental, inasmuch as this insulator is usually formed of porcelain or similar material.

35 It is an object of this invention to prevent the accumulation of water or foreign matter on the surface of an insulator by surrounding at least a portion of this insulator with a body of non-inflammable gas.

40 It is a further object of this invention to provide an apparatus wherein this gas may be conveniently introduced and withdrawn.

45 The use of a non-inflammable gas is very desirable inasmuch as it precludes any possibility of explosion. The preferred gas is carbon dioxide, due both to its cheapness and its effectiveness.

50 It is a further object of the invention to provide a method of preventing electrical break-down in an electrical insulator by surrounding at least a portion of this insulator with carbon dioxide.

55 In accomplishing these objects I prefer to surround the insulator with a cylindrical shell open at its lower end so that the liquid in the

dehydrator tank may have access thereto. Inasmuch as this liquid is usually under pressure, there is a tendency for the liquid level to rise in the cylindrical shell. This is prevented by the gas which is introduced therein, this gas being introduced in sufficient amount to keep the liquid level below the insulator.

It is another object of this invention to provide a method of ascertaining the liquid level.

60 It is a further object of the invention to provide a novel apparatus whereby the non-inflammable gas may be renewed from time to time.

Further objects and advantages will be made evident hereinafter.

70 In the drawing, I have illustrated one embodiment of my invention without intention of limiting myself to this particular embodiment which is shown merely for illustrative purposes.

Referring to this drawing, I have illustrated a dehydrator including a tank 11, providing a bottom 12 and a dome 13 which form a substantially enclosed treating chamber 14.

80 Secured to and extending upward from the dome 13 is a sleeve member 15 which is in open communication at its lower end with the treating chamber 14, the upper end of this sleeve member being closed by a cap 17. Supported by this cap is a rod 18 to which is pivoted a pin 19 secured in the upper end of an insulator 20, there being a similar pin 21 secured in the lower end of the insulator. The pin is also provided at its lower end with a pivot means 22 which supports a rod 23 extending downward through the sleeve member 15 and supporting a live electrode 25 at its lower end.

90 Spaced a distance below the live electrode 25 is a correspondingly shaped grounded electrode 26 which is supported on brackets 27. These electrodes may be of any particular configuration, the conical form illustrated being shown merely for illustrative purposes. These electrodes define a treating space 28 in which a high potential electric field is set up by means of a transformer 29 including a secondary 30, one terminal of this secondary being connected to the tank 11, the other terminal being connected to a rod 35 extending through an insulator 36 mounted in a collar 37 of the sleeve member 15, the inner end of the rod 35 being connected to the rod 23 by a conductor 40.

100 The emulsion to be treated is introduced into the treating space 28 through a pipe 45 from a suitable pumping means not shown. While in this field the emulsion is so treated that the constituent phases thereof will gravitationally separate
110

arate when subsequently allowed to settle in the tank 11. Thus, it is possible to withdraw the water phase of the emulsion through a pipe 47 communicating with the lower end of the tank 5 11 and including a valve 48 therein and to withdraw the dry oil from a pipe 49 communicating with the upper end of the tank 11 and providing a valve 50 therein. The degree to which the valves 48 and 50 are opened determines the 10 pressure in the tank 11 as does also the pressure of the pumping means which forces the emulsion into the tank. This pressure tends to force the liquid upward in the sleeve member 15 and ordinarily this level would rise to the top of the 15 sleeve member if the interior thereof were suitably vented to allow the escape of air. Such a rise in the liquid level would, however, be undesirable due to the fact that it would bring a certain amount of water and foreign particles into 20 contact with the external surface of the insulators 20 and 36.

To prevent any such rise of the liquid level, I provide a gas supply pipe 60 communicating with the interior of the sleeve member at a point 25 near the upper end thereof, this pipe being also connected to a source of non-inflammable gas, preferably carbon dioxide. A valve 61 is connected to the gas supply pipe 60 for controlling the flow of this gas into the sleeve member. A 30 suitable gas draw-off means 63 also communicates with the interior of the sleeve member preferably at a point above the point where the gas is discharged from the gas supply pipe 60, this draw-off means including a valve 64. By 35 opening the valve 64, the valve 61 being closed, the liquid level rises in the sleeve member 15, and if the draw-off means 63 is positioned close to the upper end of the cap 17, the gas may be entirely removed from the interior of the sleeve 40 member. After this is done, the valve 64 is closed and the valve 61 opened to permit carbon dioxide to be supplied to the interior of this sleeve member in a manner to force the liquid level therein downward. This operation is repeated until it 45 is certain that the atmosphere inside the sleeve member is substantially pure carbon dioxide thus preventing any danger of explosion due to inflammable gas particles which may be expelled from the emulsion during dehydration and which 50 sometimes contaminate the carbon dioxide atmosphere around the insulator.

The level of the liquid in this sleeve member is ascertained by a level-indicating means in the form of a gauge glass 72 connected to elbows 73 55 and 74 which respectively communicate with the interior of the sleeve member. By watching the level in the gauge glass it is possible for the op-

erator to prevent the liquid level from rising to such a point that it would contact the insulators 36 or 20.

It should thus be apparent that my invention 80 permits the use of smaller insulators and prevents short-circuiting of these insulators due to water or foreign particles which would otherwise collect on the surface thereof. Furthermore, the insulators have a much longer life inasmuch as 85 no leakage currents take place along the surface thereof.

The use of non-inflammable gas is also important to the invention for it prevents any danger 90 of explosion, and the use of carbon dioxide is desirable both from the standpoint of cheapness and availability.

I claim as my invention:

1. A method of preventing electrical breakdown of an insulator situated in a chamber of an electric dehydrator and into which an oil containing water particles normally tends to rise, 95 which method includes the steps of: introducing carbon dioxide into said chamber; maintaining the pressure on said carbon dioxide at a sufficient value to prevent said liquid from coming into 100 contact with said insulator; and flushing out said chamber from time to time with a fresh supply of carbon dioxide to remove any foreign gas given off from said oil and rising into said chamber.

2. In combination in an electric dehydrator: 105 a tank containing a liquid; a sleeve member entrapping a body of non-explosive gas therein and communicating at its lower end with said liquid so that said liquid normally tends to rise in said chamber and compress said entrapped body of 110 gas; an insulator in said sleeve member and entirely surrounded by said gas; conductor means depending from said insulator and extending downward into said liquid; an insulating bushing extending through the walls of said sleeve 115 member and into said gas whereby the inner end of said bushing is surrounded by said gas; and conductor means extending through said bushing and electrically connected to said first-named 120 conductor means.

3. A method of preventing electrical breakdown of an insulator situated in a chamber of an electric dehydrator, which method includes the steps of: introducing carbon dioxide gas into 125 said chamber; electrically treating an emulsion at a position below said insulator whereby a gas is liberated, said gas moving into said chamber and being of lower density than said carbon dioxide gas to rise therethrough to the upper end of said chamber; and periodically withdrawing 130 gas from the upper end of said chamber.

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