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[54] ELECTRIC STEAM GENERATOR

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[52] **U.S. Cl.** **219/272,** 219/274, 219/317, 219/333

[51] **Int. Cl.**.....**F22b 1/28**

[58] **Field of Search**.....219/271, 272, 274, 275, 333, 219/362, 363, 365, 317, 322, 327; 137/341; 261/142; 236/52

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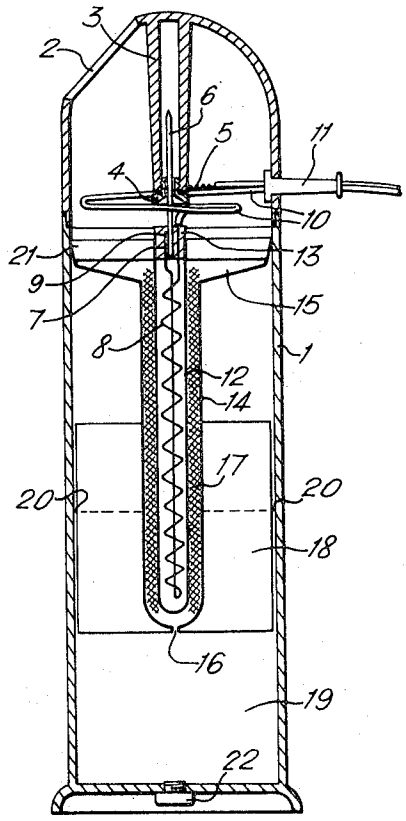
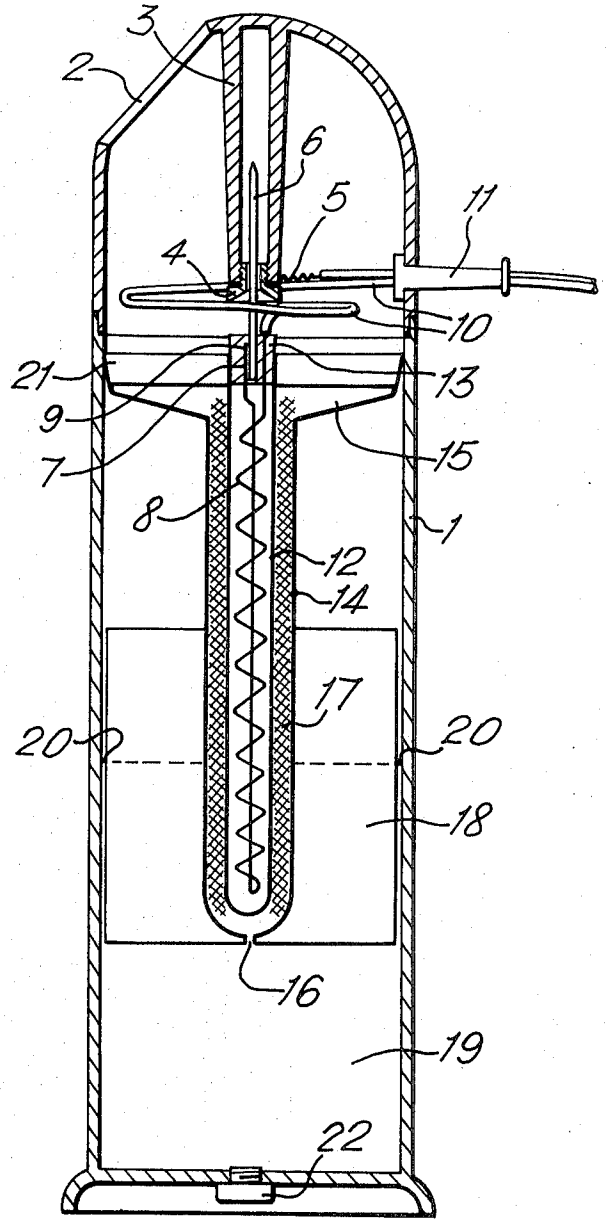
[57] **ABSTRACT**

An electric steam generator comprises a cylindrical receptacle, containing heating means having a spaced double walled jacket receiving a wick therebetween and open at the top to admit liquid to the wick for vaporization. The heating means comprises a heating wire on the inside of the jacket and is mounted on a float functioning as a piston in the receptacle. An electric terminal ring is fixed on the upper part of the receptacle and a conductor pin is connected to one end of the heating wire and extends upwardly through said terminal ring in sliding contact with the inner wall of said ring to feed current to said heating wire, while it leaves the terminal ring to brake the current when the liquid has vaporized and the float reaches the bottom of the receptacle.

4 Claims, 1 Drawing Figure

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ELECTRIC STEAM GENERATOR

The present invention relates to an electric steam generator which has a very rapid start. It concerns more particularly various devices which cooperate to produce rapidly a steam or vapor which is susceptible of finding application in different fields, such as beauty care, medical treatments, decontamination of rooms, household and industrial uses.

The generator of this invention consists of a receptacle which is open at the top and which may contain a liquid to be vaporized and on which floats an assembly which consists of an insulated and sealed-in electrical heating wire, surrounded by a wick which in turn is enclosed by a jacket that is perforated at the base by a calibrated opening, and a float surrounds this jacket. An essential feature of the invention consists in extending one end of the heating wire by means of a vertical rod which slides in or against one of the input terminals of the electrical current in such a manner that when the level of the liquid has come down sufficiently, the float having reached the bottom of the receptacle, the electrical contact is automatically disconnected when the rod descends below the terminal.

In the annexed drawing a steam generator according to the invention showing the above mentioned essential feature or improvement has been illustrated.

In the single FIGURE of this drawing the cylindrical receptacle 1 presents at its upper part an opening 2 through which the liquid is introduced, and an inner vertical arm 3 which is hollow. A conductor element 4 is threaded to the inside wall at the lower extremity of this arm and constitutes a terminal for the current input wire 5. The terminal 4 has a conical entrance for receiving a conductor pin 6 which slides freely on the inside of the terminal 4 in such a manner that the electrical contact is assured by the least rocking movement.

The pin 6 is in contact at 7 with one end of the heating wire 8. The other end of the wire 8 is in contact at 9 with the second current input wire 10. The two current input wires pass from the receptacle 1 through the protective sleeve 11.

The electrical wire 8 is insulated on the inside of a stainless steel tube 12 whose lower extremity is closed, for example by welding, and whose upper extremity is plugged hermetically by a sealing cork 13, from which start rod 6 and insulated wire 10.

The heating wire 8 is itself contained in a second stainless steel tube 14 which presents at its upper part a large conical collar or flange 15 and at its base a calibrated opening 16. A wick 17 of a material such as glass fiber is disposed between the two tubes 12 and 14.

The tube 14 is secured by any suitable means on the inside of a float 18 of foam rubber and is of cylindrical shape so as to constitute a piston on the inside of receptacle 1. The level of the liquid 19 is shown at 20. The conical flange 15 of tube 14 is provided with an elastic circular band 21 which is very flexible so as not to hinder the sliding movement of the piston.

The receptacle 1 has an opening at its base which is closed by a threaded plug 22. It is formed of two assembled parts, either by threading or by glueing at 23, so as to permit the mounting of the inner parts.

For proper functioning of the apparatus it is important that the wick is impregnated with liquid. For this purpose a suitable liquid is introduced through the

opening 2. This liquid flows slowly through the wick and finally through the opening 16. The float 18 is pushed upwardly by the liquid and an equilibrium is established at the floating level 20. The apparatus is now ready to function.

In operation the current is connected and the resistance wire 8 and the sealed tube 12 are heated very rapidly. The steam produced in this manner mounts in the wick and is mixed with liquid which is taken along, and which the heating tube 12 continues to convert into steam. If liquid is projected beyond the wick it drops back into the flange 15 and is vaporized again. In an apparatus of the size shown in the drawing, with a resistance of only 130 watt, the steam comes out abundantly from opening 2 in less than one minute.

As the vaporization takes place the cool liquid enters the tube 12 through the calibrated opening 16 to replace the vaporized liquid. The float descends progressively. When it reaches the bottom of receptacle 1 the pin 6 will automatically have left the terminal 4 and the current will be disconnected.

In the upper part of the apparatus a condensation is produced on the walls. This condensation slides along the walls and is directed into the flange 15 by the elastic membrane 21. In this manner no hot water reaches the lower part of the apparatus. It is heated only slightly by the heating system contained on the inside of tube 12 due to the insulation effect produced above by the air and below by the float of insulating elastomer foam material. An apparatus such as the one shown in the drawing in the normal size, may be held in the hand at the bottom during the entire duration of the vaporizing action without uncomfortable heating. The user may thus direct the vapor jet exactly where he desires.

The opening 22 permits on the one hand to introduce the liquid more rapidly than through the top if this is desired. In that case the opening 2 can be temporarily closed. It permits also to clean the calibrated opening 16 and proceed with the general detartarizing by leaving this opening 22 open and introducing acidulated water through opening 2.

One may provide for opening 2 not only a plug, but also outlet ferrules and tubes of various design depending on the use one desires to make of the steam. With a hermetically sealed tube one may obtain a steamunder pressure. A safety valve would be added in that case in the upper part of receptacle 1.

The sliding contact device allows to dispense generally with adding a thermostat to the apparatus.

The apparatus described and illustrated may obviously be modified relative to its shape and details while retaining the various essential elements which cooperate in the desired result.

This steam generator finds application each time one desires to produce steam for utilization either in precise locations or in the general surrounding. As example one can cite local utilizations such as beauty care, steam bath for the face, either by successive displacements of the contact area on the face, or a general face bath by placing a towel on the head, inhalations, medical care by local application on a specific part of the body. All the surface treatments by steam, removal by steam, detaching wall paper by steam, cleaning by steam and the like. As applications in the general surrounding one can mention air humidifiers and cleansing operations.

In most utilizations the liquid employed will be water to which an appropriate product is added. It is a remarkable feature of the receptacle and an essential quality of this type of vaporization that as the liquid remains cool or lukewarm in the bottom of the receptacle the content of the steam in the active product will remain constant during the entire duration of vaporization.

Large size apparatus of this type could also be used in the industry to produce steam whenever it appears interesting to obtain rapidly steam such as for a clothes pressing shop, or when it is desired to obtain steam which is charged with treating agents which have a content that remains constant, for example in the chemical industry.

What is claimed is:

1. Electric steam generator consisting of a receptacle having a steam jet opening at the top and containing a liquid to be vaporized, electric water heating means mounted on a float in said receptacle and susceptible of floating on said liquid, electric current supply means disposed in said receptacle and having one terminal connected to said electric water heating means, and a conductor connected to said electric heating means and disposed in sliding contact with the other terminal of said current supply means, said conductor breaking contact with said other terminal as said electric heating means descends on said float in said receptacle beyond a predetermined level.

2. Electric steam generator according to claim 1, wherein said electric water heating means comprises an elongate tubular heating element containing an electric heating wire and having spaced double walls containing a wick, the outer wall of said tubular heating element having a calibrated opening at its lower extremity to admit liquid to be vaporized.

3. Electric steam generator according to claim 2, wherein the float carrying said electric heating means functions as a piston in said receptacle and that the tubular heating element widens at the top into a flange terminating in an elastic band which assures a very flexible joint with the inner wall of the receptacle.

4. Electric steam generator according to claim 3, wherein said conductor is connected to one end of the heating element and consists of a pin which slides in a stationary terminal mounted in a depending arm at the upper part of the receptacle, the length of said pin being such that when the float reaches the end of its travel at the bottom of the receptacle the pin will have moved out of contact with said terminal.

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