Aug. 5, 1952 M. J. MAGUTH 2,606,276

VAPORIZER

Filed April 27, 1950 2 SHEETS—SHEET 1

Fig. 1

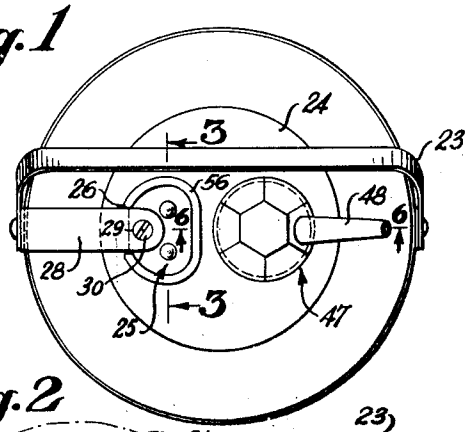


Fig. 2

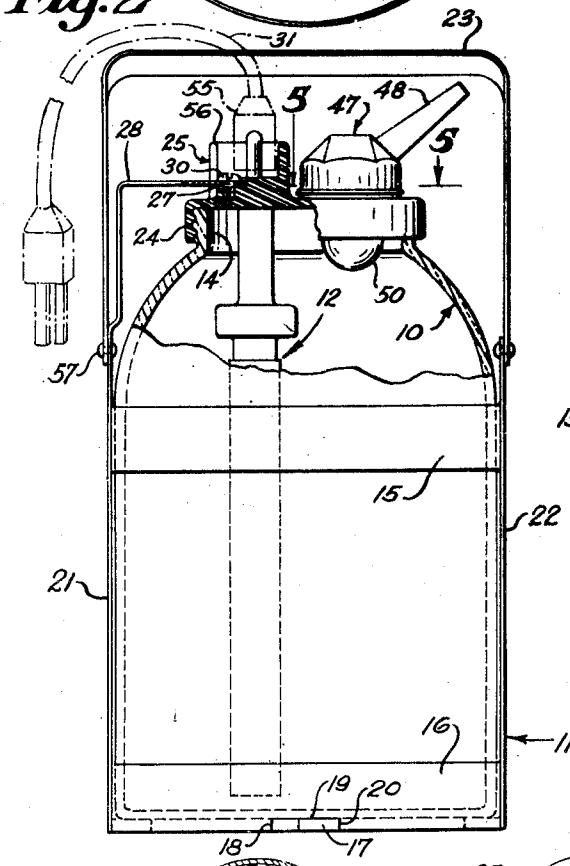


Fig. 3

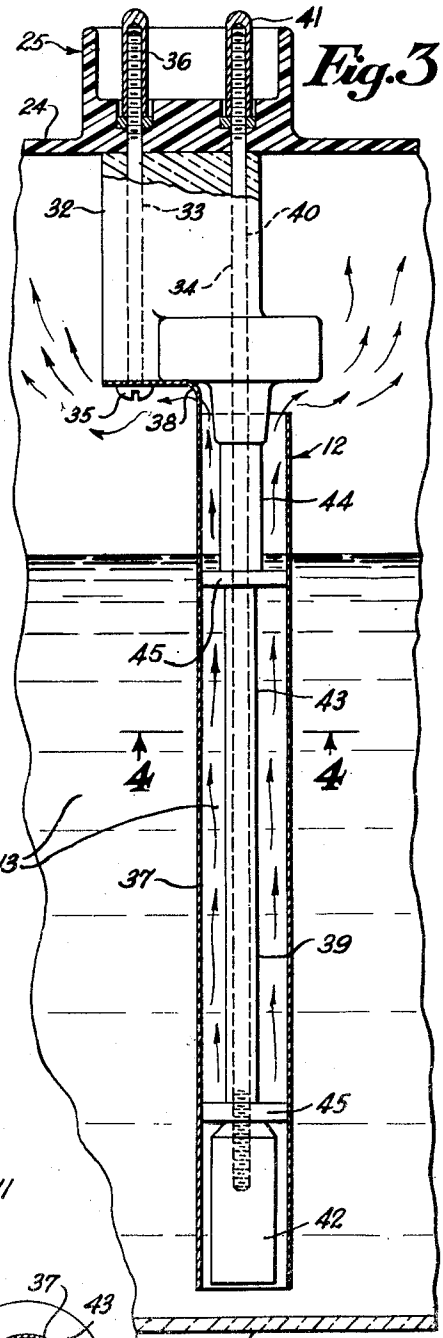


Fig. 5

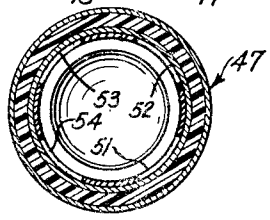
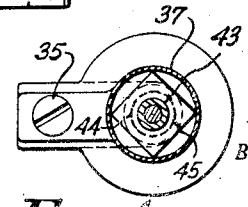


Fig. 4



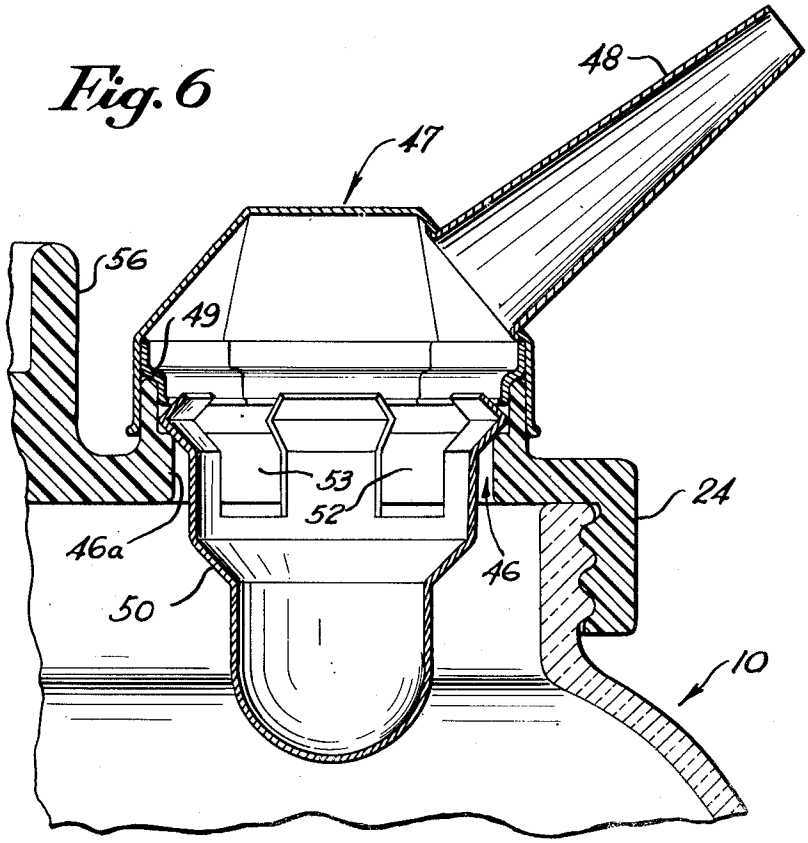
INVENTOR.
MICHAEL J. MAGUTH
BY
ATTORNEYS

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Fig. 6



INVENTOR
MICHAEL J. MAGUTH
BY Richards & Geier
ATTORNEYS

Patented Aug. 5, 1952

2,606,276

UNITED STATES PATENT OFFICE

2,606,276

VAPORIZER

Michael J. Maguth, Carlstadt, N. J.

Application April 27, 1950, Serial No. 158,561

8 Claims. (Cl. 219—40)

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This invention relates to a device for vaporizing liquids.

It is an object of the instant invention to increase the speed of vaporization over known methods.

A further object is to increase the efficiency of vaporizers as compared with known similar devices.

Another object is to provide a vaporizer readily installed in any desired location.

Still another object is to provide a vaporizer in which the hazards of operation have been minimized.

Other objects of the instant invention will become apparent in the course of the following specification.

In the accomplishment of these objectives, the vaporizing device is constituted of a container for the liquid, a carrier for the container, and an electrically operated heating unit removably immersed in the liquid. The heating unit is formed with an outer element constituting one side of an electrical circuit and in which is inserted and spaced therefrom an inner element so designed and positioned in the outer element that the liquid acting as an electrical conductor between the elements is quickly raised to a high temperature at the bottom of the tube causing it to rise therein and near the top to mingle with preheated liquid at the top of the tube and pick up additional heat for transformation into the gaseous state. In this way vaporization of the liquid has been made substantially instantaneous, the electrical input has been decreased from an initial requirement of around 5 amperes to approximately 2.5 amperes after the operation has been started. By using the liquid as a link in the electrical circuit, the liquid is completely vaporized which automatically breaks the electrical circuit.

The invention will appear more clearly when taken in connection with the accompanying drawing showing by way of example a preferred embodiment of the inventive idea.

In the drawings:

Figure 1 is a top view of the vaporizer constructed in accordance with the principles of this invention;

Figure 2 is an elevational view of the vaporizer shown in Figure 1 with a portion broken away the more clearly to show the closure construction;

Figure 3 is a sectional view along 3—3 of Figure 1, but on an enlarged scale;

Figure 4 is a sectional plan view along 4—4 of Figure 3;

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Figure 5 is a sectional view along 5—5 of Figure 2, enlarged; and

Figure 6 is a sectional view along 6—6 of Figure 1, also enlarged.

Referring now in greater detail to the drawings where like reference numerals indicate like parts, reference numeral 10 (Fig. 2) indicates the container, 11 the carrier for the container, 12 the electrical heating unit, and 13 (Fig. 3) the liquid to be vaporized.

The container 10 may be made of glass having an externally threaded top opening 14. The glass, of course, may be of the heat resistant type or even other material than glass could be used since, as later shown, the vaporizer is fully automatic and requires no special servicing.

Around the outer surface of and supporting the container 10 is the carrier 11 formed with the spaced horizontal bands 15 and 16. The bottom band 16 is provided along the lower edge with similar internally directed prongs 17 which may be integrally formed portions slit along the edges 18 and 19 (Fig. 2) and the slitted portion bent inwardly along the line 20 to form substantial supports upon which the container 10 rests. Interconnected between the spaced bands 15 and 16 are the vertical strips 21 and 22 which may be fastened to the horizontal bands by welding or other suitable means. The vertical strips 21 and 22 are extended above the upper horizontal band 15, as most clearly shown in Figure 2, for the pivotal attachment of a handle member 23.

Coacting with the externally threaded top opening 14 of the container 10 is a closure 24 formed from any suitable material and having an internally threaded downwardly turned rim.

On the top of the closure 24 is an integrally or otherwise formed electrical socket 25 and through the closure a vaporizing outlet 46 most clearly shown in Figure 6.

Unlike the usual two terminal socket, the socket 25 is provided with an upwardly directed flange 56 having an opening 26 (Fig. 1) on the side opposite the vaporizing outlet 46 and in the bottom and coacting with the opening 26 a recessed portion 27 (Fig. 2) extending inwardly substantially to the base of the terminals for the releasable attachment of a guard 28. The guard 28 is a right angle member (Figs. 1 and 2) provided with an opening 29 in one end and a similar opening in the opposite end. The end of the guard 28 having the opening designated by reference numeral 29 is fitted into the recessed portion 27 of the socket 25 which has a threaded hole formed therein for a screw 30 passed first

through the opening 29 of the guard and then threaded into the hole. A pivot pin 57 or equivalent is passed through the opposite end of the guard 23 and the extended end of the vertical strip 21 so that when assembled with the closure 24 as shown in Figure 2, the closure can be removed only after the plug 55 of the conductor 31 and the guard 28 have been removed. It will be noted that the pivot pin 57 may also be used for attaching the handle member 23. Of course, the guard 28 could be an integrally formed part of the vertical strip 21.

Under the closure 24 and below the electrical socket 25 is an electrical insulator 32 (Fig. 3) in which are the spaced vertical openings 33 and 34, the openings being aligned with similar terminal openings through the bottom of the socket 25. Through the opening 33 and aligned terminal opening in the socket 25, a screw 35 is inserted, the screw being threaded on the upwardly directed end for the attachment of the terminal post 36.

On the bottom of the insulator 32 is the electrical heating unit 12 constituted of an outer element 37 made of a hollow tube of stainless steel or the like and open at both ends. An integrally formed portion 38 of the tube is turned outwardly and drilled so that the screw 35 may be first inserted through the bent portion of the tube prior to being inserted through the insulator and socket for holding the outer element 37 securely against the bottom of the insulator 32 and downwardly directed as illustrated. The outer element 37 terminates interiorly of the bottom of the container 10 as illustrated.

The electrical heating unit 12 is further constituted of an inner element 39. The inner element 39 is formed of an electrically conductive bar 40 of circular cross section and of sufficient length to extend from the bottom of the outer element 37 through the opening 34 in the insulator 32 and the aligned terminal opening in the socket 25 and thereabove. The bar 40 is threaded at both ends, at the top for the attachment of the terminal post 41 and at the bottom for the attachment of the carbon or similar member 42 of high electrical resistivity. Above the carbon member 42 and with the bar 40 passing longitudinally therethrough is a cylindrical sleeve 43 of electrically nonconductive material which terminates substantially below the bottom of the insulator 32. Directly above the cylindrical sleeve 43 is a second carbon member 44 similar to the previously mentioned carbon member 42, the bar 40 being passed longitudinally through the second carbon member 44. Separating the first carbon member 42 and the sleeve 43 and the sleeve 43 and second carbon member 44 are the similar square washers 45 of mica or other suitable material, the length of the washers along a side being such that the inner element 39 is always suitably spaced from the inner surface of the outer element 37 and electrically insulated therefrom in the absence of the liquid 13.

The vaporizing outlet 46 is provided with an upwardly directed rim 46a formed integral with the closure 24 and over which is releasably attached by slip fitting or otherwise a cap 47. The cap 47 may be a dome shaped structure, as illustrated, with open bottom and having an outlet nozzle 48 through one side. On the inside of the cap 47 and around the open bottom is a downwardly directed skirt 49 forming a sleeve for slip fitting over the rim 46a. A downwardly directed base member 50 with open top and dome-like form may be snapped into a recess around the inner surface of the rim 46a from the top as shown in Figure 6 and through the walls of which the openings 51, 52, 53, and 54 are formed for the passage of the vaporized liquid.

In operation:

Suppose that the vaporizer 10 is empty and that it be desired to vaporize a liquid 13, for example, water. By removing cap 47 the liquid may be poured through the opening 46. The base member 50 may also be removed for faster filling if desired. After filling to the level required, the base member 50 and the cap 47 are replaced and the plug 55 connected to the terminals in a known manner. While either A. C. or D. C. current can be used, for illustration, suppose that D. C. is used and that the current is flowing downwardly around the screw 33 and the outer element 37 and thence through the liquid 13 to the carbon member 42 at the bottom and the carbon member 44 at the top of the inner element 39 and thence to the terminal post 41 to the opposite side of the D. C. supply. The resistance to the passage of the current through the liquid 13 and carbon member 42 will raise the temperature of the liquid and cause it to rise to the top of the outer element 37 as shown by the arrows in Figure 3. At the top of the outer element 37, the preheated liquid picks up more heat from the current flowing between the element 37 and carbon member 44 via the liquid 13 turning it quickly into a gas which passes upwardly into the cap 47 and out of the nozzle 48. As the liquid between the inner and outer elements of the heating unit 12 is dispelled in gaseous formed, additional liquid fills the space through the open bottom by seeking its own level. With this device there is a continuous operation until all the liquid in the container is evaporated.

It will be understood that the invention is not limited to the exact disclosure herein described but may lend itself to a variety of expressions within the scope of the appended claims.

What is claimed is:

1. In a vaporizer having a container and a liquid for the container; an electrical heating unit for the liquid, the unit comprising an outer hollow element of electrically conductive material open at both ends, an inner element of electrically conductive material disposed in the outer element and spaced therefrom, the inner element comprising at least two electrically connected and spaced apart members of high resistivity, means for electrically connecting the inner element to one pole of an electrical supply and the outer element to the opposite pole, and means for immersing the unit in the liquid, the liquid closing the circuit between the outer element and the members of high resistivity on the inner element.

2. In a vaporizer having a container, a liquid for the container, and an outlet with upwardly directed rim in the top of the container; a cap with a downwardly directed rim and open bottom for the outlet, a downwardly directed skirt disposed around the inner surface of the downwardly directed rim and adapted to form a sleeve coacting with the upwardly directed rim of the outlet, an outlet nozzle disposed in the cap, and a downwardly directed base member with open top removably disposed in the upwardly directed rim, the base member having circumferentially spaced openings formed therethrough adjacent the open top.

3. In a vaporizer having a container and an opening in the top of the container; a carrier

for the container, the carrier comprising a band horizontally disposed around the container at the top, a second band horizontally disposed around the container at the bottom, a portion of the bottom of the second band being slit along two intersecting lines at spaced intervals and turned inwardly, two vertical strips disposed between the horizontal bands, the vertical strips being spaced 180° apart and extended upwardly above the horizontal band at the top, and a handle member pivotally disposed between the extended ends of the vertical strips and rotatable over the opening in the top of the container.

4. A vaporizer comprising a container, the container having an externally threaded opening in the top; a carrier for the container, a handle member for the carrier, means pivotally connecting the handle member to the carrier and adapted to rotate the handle member over the opening in the top of the container; a closure for the opening in the top of the container, the closure having an internally threaded downwardly directed flange coacting with the externally threaded opening in the top of the container, the closure further having an electrical socket and a vaporizing outlet formed therein, the socket having two terminal post openings formed therein in a plane perpendicular to a vertical plane through the pivotal mounting means of the handle member when the closure is attached to the container, a terminal post disposed through each of the openings, means electrically insulating the terminal posts from each other; the vaporizer further comprising a heating unit for the liquid, the heating unit comprising a hollow outer element of electrically conductive material open at both ends, means attaching one end of the outer element to the bottom of the closure and electrically to one of the terminal posts of the socket, an inner element of electrically conductive material disposed in the outer element, means electrically insulating the inner element from the outer element, means electrically connecting one end of the inner element to the second terminal post of the socket, and a cap releasably disposed over the vaporizing outlet in the closure.

5. A vaporizer according to claim 4, in which the inner element disposed in the outer element comprises an electrically conductive elongated rod of circular cross section threaded at both ends, one of the threaded ends being passed upwardly through the second opening in the socket and extended upwardly therein, an internally threaded terminal post screwed over the upwardly extended end of the rod, a carbon member for the opposite end of the rod, the carbon member having a tapped opening in one end coacting with the other threaded end of the rod, a hollow tubular electrical insulator disposed around the rod and above the carbon member, and a second carbon member for the top of the rod, the second carbon member having a longitudinal opening formed therethrough and adapted for the insertion of the rod therethrough.

6. A vaporizer according to claim 4, in which the means electrically insulating the inner element from the outer element comprises at least one square washer of electrically insulating material for the rod of the inner element, the diagonal of the washer having a length substantially equal to the inside diameter of the outer element and a central opening adapted for the insertion of the rod therethrough.

7. A vaporizer according to claim 4, in which the vaporizing outlet is characterized by having a downwardly directed dome-like base member with open top removably disposed therein, the base member having at least one opening formed therethrough.

8. A vaporizer according to claim 4, in which the socket is characterized by having an upwardly directed flange formed around the terminal post openings, the flange having an opening formed therein on the side opposite the vaporizing outlet, the socket further having a recess formed in the base coacting with the opening in the flange, a right angle guard disposed through the opening in the flange, means securing one end of the guard to the pivotal mounting means of the handle member, and means removably securing the opposite end in the recess.

MICHAEL J. MAGUTH.

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