July 12, 1938.

N. LAWNER ET AL

2,123,509

ELECTRIC VAPORIZER

Filed Sept. 5, 1935

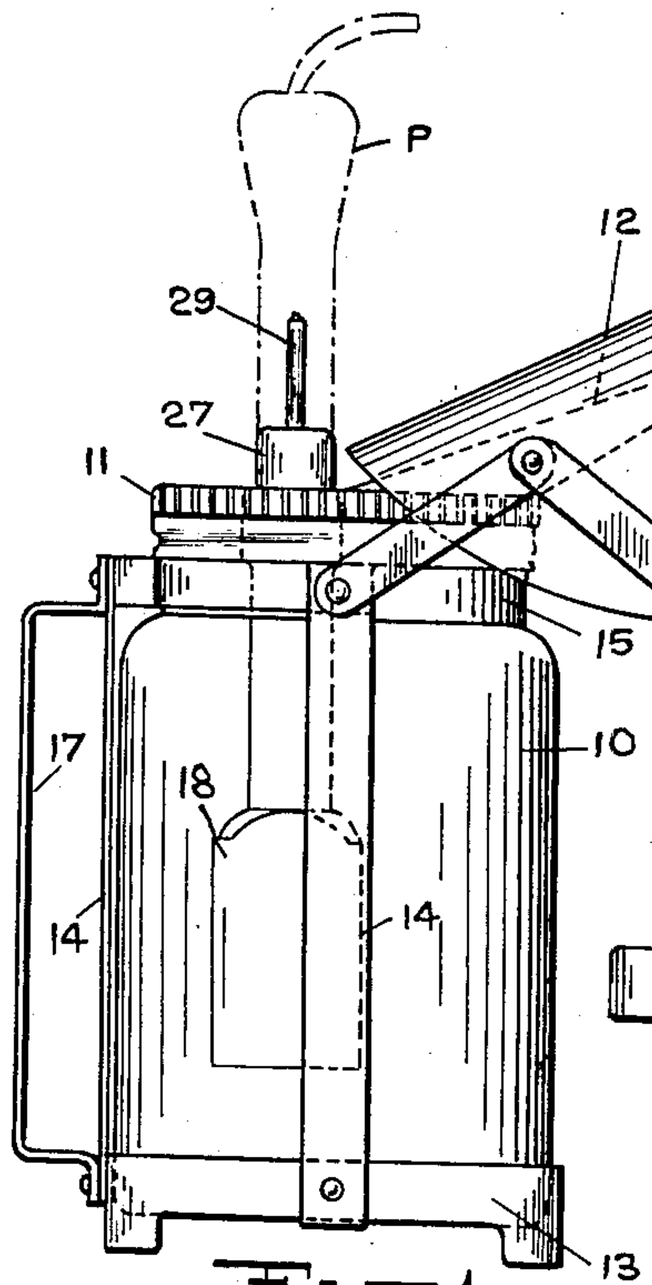

Fig-1

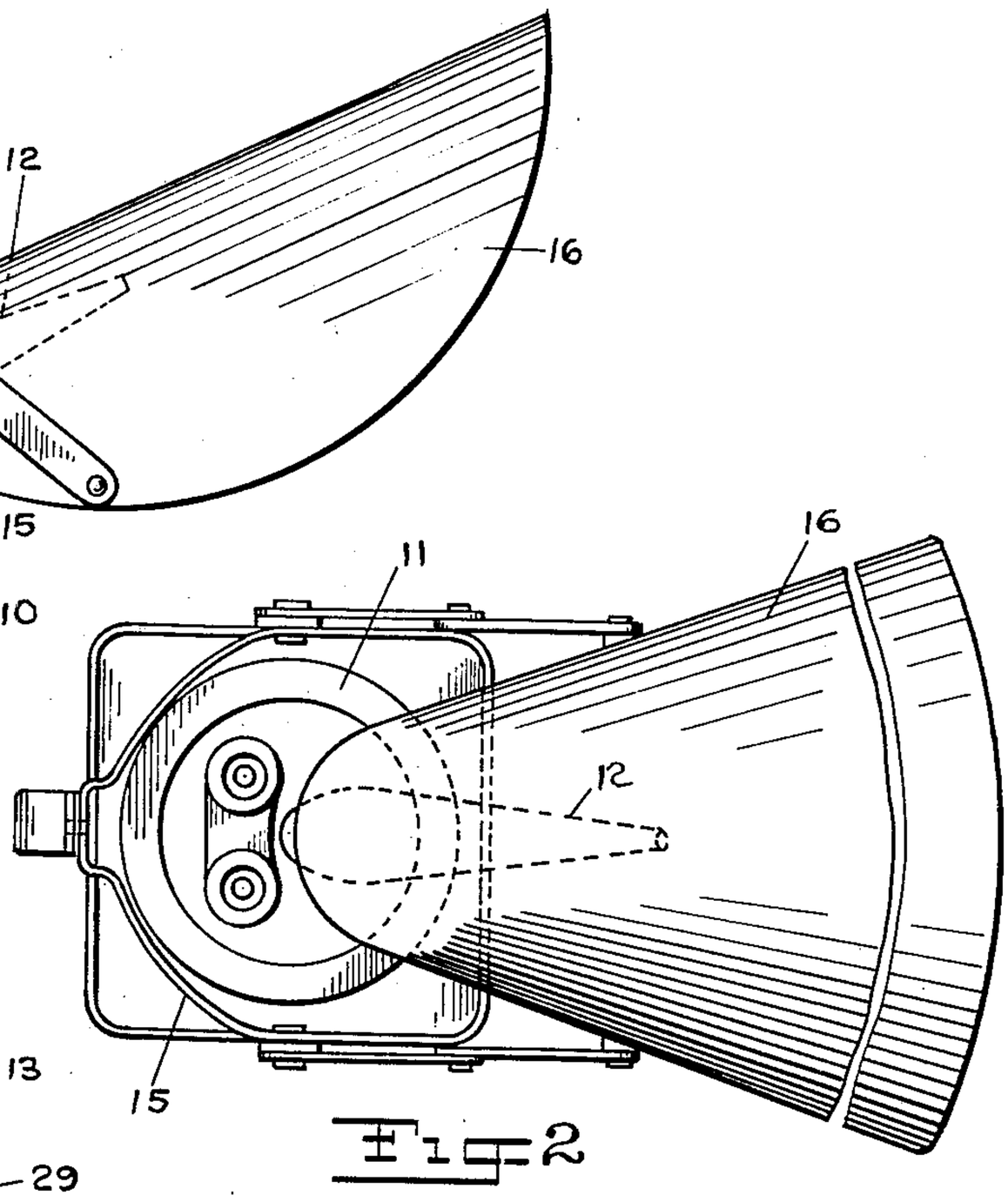

Fig-2

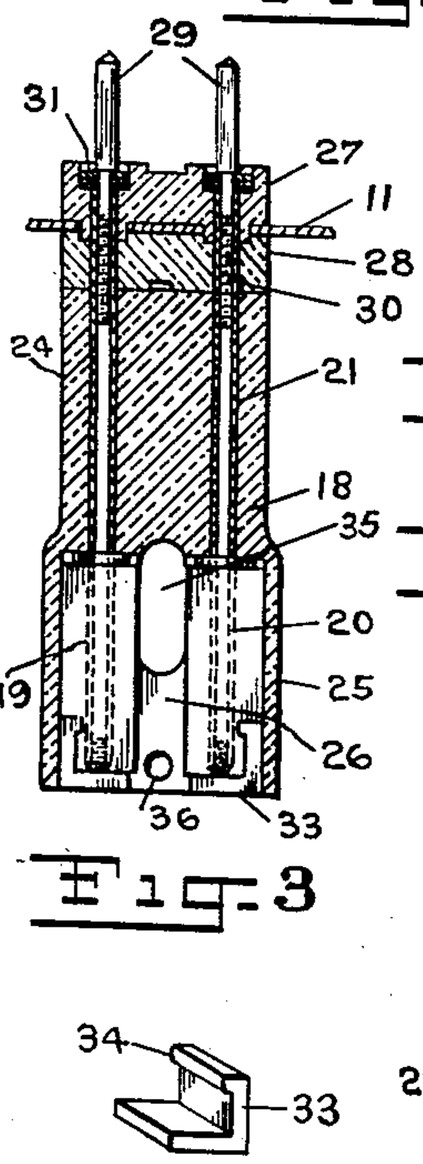

Fig-3

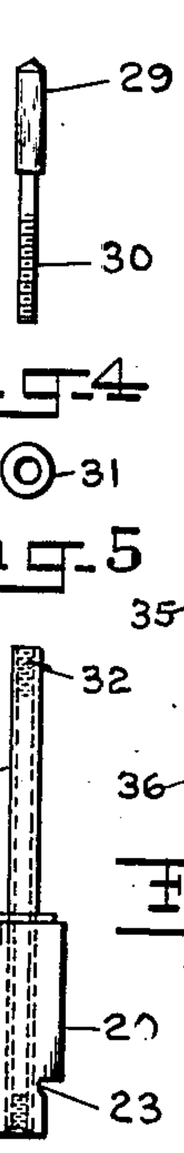

Fig-4

Fig-5

Fig-6

Fig-7

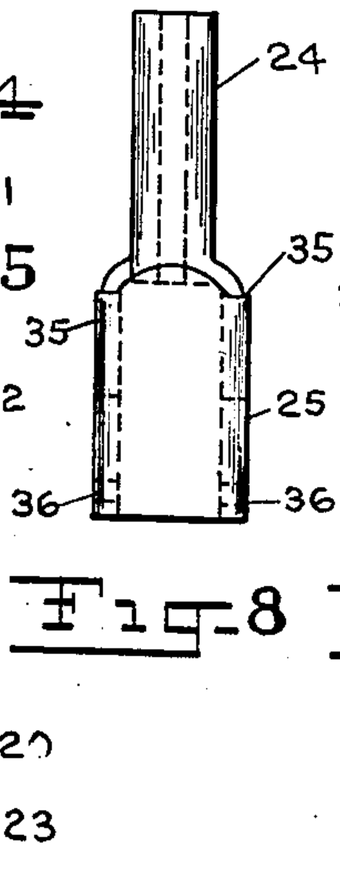

Fig-8

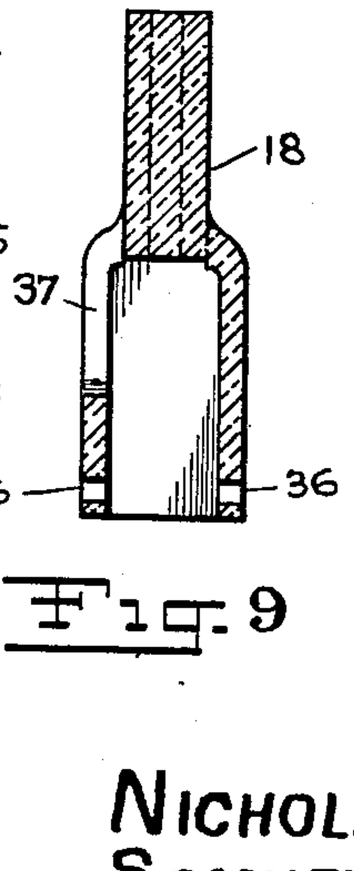

Fig-9

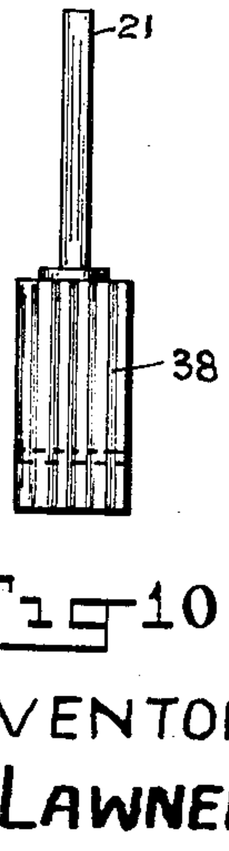

Fig-10

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ELECTRIC VAPORIZER

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Application September 5, 1935, Serial No. 39,282

17 Claims. (Cl. 219—40)

Our invention relates to electric vaporizers of the type shown and described in the earlier patent to Nicholas Lawner and Samuel Duberstein, #1,913,124.

The primary object of our present invention is to construct a vaporizer of this character so that the electrodes of the same are protectively contained within a unitary insulating structure. This feature of the invention enables the user of the vaporizer to remove the cover member containing the electrical parts of the device from the receptacle, in which the electrically conductive vaporizable fluid is located, without obtaining a shock. As a consequence, it is possible for the user of the device to refill the receptacle without the necessity of previously removing the electric plug from the top of the cover in order to break the electric circuit to the same.

A further object of the invention is to provide the electrodes of the device with vertical extension pieces which form a means for securing the insulating member, protecting said electrodes, against the bottom of the cover of the device, the electrodes proper constituting one end of this connection.

Another object is to construct an exhaust outlet from the unitary insulating member, which is preferably made of porcelain, that directs the passage of the fluid and vapor issuing therefrom away from the spout located on the cover of the device, to cause more efficient circulation of the liquid contents within the receptacle and to prevent the formation of froth, which is liable to be blown out of the spout.

A further object of the invention is to construct the electrodes so that the portion of the same along which the fluid passes is corrugated in order to obtain a larger effective heating area for the electrodes and, consequently, attain a heat transferring element that is more efficient in operation.

With these and other objects in view, our invention consists in the novel construction, arrangement and combination of parts, as will be hereinafter more fully disclosed in connection with the detailed description of the same as illustrated in the accompanying drawing.

Referring to the drawing, Fig. 1 is a side elevation of the preferred form of vaporizer constructed in accordance with our invention;

Fig. 2 is a plan view of the device, as shown in Fig. 1.

Fig. 3 is a vertical section of the insulated heating elements of our vaporizer.

Fig. 4 is a detail side elevation of one of the electric terminal members located above the cover of the device;

Fig. 5 is a detail plan view of one of the lock washers employed in the device;

Fig. 6 is a detail perspective view of one of the insulating elements utilized in the bottom portion of the electrical part of the device;

Fig. 7 is a detail side elevation of one of the electrodes;

Fig. 8 is a detail side elevation of the unitary insulating member employed in this form of the invention;

Fig. 9 is a detail vertical cross section showing a modified form of the unitary insulating member employed in the device, and

Fig. 10 is a detail front elevation illustrating a modification in the construction of the electrodes.

The vaporizer constructed in accordance with the present inventive concepts, as embodied in the drawing and particularly in Figs. 1 to 5, inclusive, thereof, comprises a receptacle, or jar, 10, adapted to contain the fluid to be vaporized, having a removably threaded, or otherwise secured cover, or cap, 11 fastened to the upper portion of the same. A suitable base 13, extension posts 14 and bracing member 15 are situated about the receptacle 10 and serve as a support for a pivotally positionable vapor directing shield 16. The cover portion 11 of the device includes a spout 12 from which the vapor produced within the receptacle issues during the operation of the same. A handle 17 is included in the construction, so that the device may readily be carried about. Thus far, the construction of the device is similar to that described in the patent hereinbefore referred to.

In carrying out the objects of the present invention, the electric heating element of the device includes a unitary insulating member 18, which protectively encloses the electrodes 19 and 20 therein. The electrodes have electrically conductive vertical extension pieces 21 preferably secured thereto, as indicated at 22 in Fig. 7 of the drawing. The lower end of each of the electrodes is constructed to include a notched portion as designated at 23, the purpose of which will be hereinafter described.

The insulating member 18 is preferably made of a material such as porcelain or bakelite and the upper or narrower end 24 of the same is provided with two vertical openings, which receive the extension pieces 21 of the respective electrodes. The lower portion 25, of the member 18, is considerably larger in cross section than the end 24, and is hollowed out so that the elec-

trodes are entirely contained within the same, as clearly shown in Fig. 3 of the drawing. In a mounted position within the insulating member 18 the electrodes are oppositely disposed and provide a passageway 26 therebetween through which the fluid in the receptacle 10 flows during the operation of the device.

The cover 11 of the vaporizer is constructed to include openings by means of which adjoining insulating members 27 and 28, situated above and below the same respectively, connect in a manner to prevent the passage of any electrical current through the same. The insulating members 27 and 28 are provided with aligned vertical openings which are contiguous in relation to the openings located in the upper portion of the insulating member 18, when these members are secured in connected relationship. An electric terminal connection 29 includes a screw threaded extension piece 30, as indicated in detail in Fig. 4 of the drawing. In assembling the electrical parts of the vaporizer, a number of spacing and lock washers, such as indicated at 31 are employed. The upper end of the extension pieces 21 of the electrodes are internally threaded as designated at 32, the same receiving the screw threaded end of the terminal 29. From the above description, it will be understood that the unitary insulating member 18 is firmly secured into position abutting the insulator 28 below the cover 11 of the device by reason of the extension pieces 21 of the electrodes 19 and 20. It will also be understood that the electrodes proper, with their extensions, may be freely withdrawn from the insulator 18 when the terminals 29 are unscrewed from their holding position with the same.

Angle insulating pieces 33, Fig. 6, are utilized to cover the lower portions of the respective electrodes when the device is assembled in connected relation and ready for use, the pieces having lugs 34, which fit into the notched portion 23 located in the electrodes 19 and 20 for this purpose. The bottom of the unitary insulating member 18 is open, so that the fluid to be vaporized may pass in an upward direction to reach the passageway 26 between the electrodes. A slotted opening 35 is situated in the side surface of the insulator between the electrodes and at a position along the upper portion of the same, this opening forming an outlet or exhaust for the fluid passing through the heating element of the vaporizer so that the same may return to the receptacle 10 either in a vaporous state or in a heated liquid condition. A small vent 36 is also provided in the lower portion of the unitary insulating member 18 to assist in the circulation of the fluid contents of the receptacle through the narrow passageway between the electrodes of the device.

In the modification of the invention, shown in Fig. 9, I utilize the same construction for the unitary protective insulating member, but provide, in this instance, a single exhaust slot as designated at 37 in the drawing, which slot is situated on the opposing side of the device to the outlet or spout 12 from the same. By preventing the direct passageway of the fluid issuing from the exhaust area of the heating element of the device towards the spout, and by directing the same away from the spout, a more efficient circulation of the liquid or fluid contents of the receptacle is attained and the possibility of liquid or froth emanating from the spout is decreased.

With reference to Fig. 10, a modification of the form of electrode is illustrated in which the same includes a vertical corrugated area along which the fluid to be vaporized passes. The vertically arranged corrugations on the electrode are designated at 37 in the drawing. Because of this particular construction, a larger heating area is exposed to the liquid and the vaporizer consequently functions with greater rapidity and will operate with most tap water without the addition of salt.

Inasmuch as the inventive concepts herein disclosed may be embodied in other desired forms, various modifications of the illustrated improvements may occur to those skilled in the art and may be made without departing from the scope and purview of the invention, as claimed.

What we claim is:

1. In a vaporizer, the combination of a receptacle for the fluid to be vaporized, a cover for the receptacle including thereon a vapor directing spout, and a heating element for the device having electric terminals above the cover for engagement by a detachable plug, and further including electrodes below the cover, a unitary or one piece insulating member enclosing the same, and electrically conductive means, connecting the electrodes and terminals, for supporting the insulating member and electrodes below the cover of the receptacle.

2. In a vaporizer, the combination of a receptacle for the fluid to be vaporized, a cover for the receptacle including thereon a vapor directing spout, an electrical heating element comprising electrodes, a unitary or one piece insulating member protectively containing said electrodes and shielding the same on all sides, means for securing the insulating member in position below the cover through said electrodes, and separable insulating blocks for the bottom of said electrodes.

3. A device of the class described having a heating element which includes electrodes of generally rectangular horizontal section and having corrugations on their inwardly facing surfaces, a unitary or one piece insulator protectively enclosing said electrodes, but having an opening therein extending upwardly from the bottom between the electrodes and connected with a lateral opening communicating with the space between said inwardly facing surfaces of said electrodes, and means in association with the electrodes for securing the same and the insulator in position on the device.

4. A heating receptacle for aqueous solutions having a pair of spaced electrodes having substantially parallel adjacent surfaces, a unitary or one piece porcelain enclosure for the same having a lower hollow portion open at the bottom in which said electrodes are placed, laterally spaced bores extending upwardly therethrough, a cover for the receptacle, and fastening means adapted to extend through said electrodes, enclosure and cap to suspend said enclosure and electrodes from said cap.

5. A heating receptacle as claimed in claim 4, in which insulating blocks are secured to the lower ends of each electrode, whereby the electrodes are closed at the bottom as well as the sides and top.

6. An electric vaporizer comprising a receptacle for the fluid to be vaporized, a cover for the receptacle, and a heating element for the device having electric terminals above the cover and spaced rectangular electrodes within the receptacle connected to the terminals and having inwardly facing surfaces corrugated in the direction of circulation of the fluid, a unitary or one

piece insulating member enclosing the electrodes at the top and the three outsides, but leaving the inside surfaces exposed to the circulating water, and detachable means for protecting the bottom of the electrodes.

7. An electric vaporizer having a heating element secured to the cover of the receptacle containing the fluid to be vaporized, said heating element comprising electric terminals above the cover having downwardly extending threaded shanks, and a unitary insulating member containing and enclosing electrodes below the cover, said electrodes having internally threaded conductive extension pieces therefrom for receiving the screw threaded shanks of the electric terminals.

8. A device of the character described having an electric heating element comprising electrodes, conductive extension pieces for the electrodes, a unitary insulating member protectively containing and enclosing said electrodes and extension pieces on all sides, electric terminals having end portions having a threaded connection with the extension pieces for securing the electrodes and insulating member in position with respect to the cover of the device, and detachable means for protecting the bottom of the electrodes.

9. An electric vaporizer comprising a receptacle for the fluid to be vaporized, a cover for the receptacle having thereon a vapor directing spout, a heating element for the device including spaced electrodes, an insulating enclosure therefor having means for controlling the passage of the fluid through the enclosure and past the heating elements so that the fluid issues therefrom only in a direction substantially diametrically away from the spout on the cover.

10. An electric vaporizer comprising a receptacle for the fluid to be vaporized, a cover for the receptacle having thereon a vapor directing spout, a heating element for the device including spaced electrodes, an insulating shield for said electrodes open at the bottom and an exhaust port in the body of said shield which opens only on the side opposite said spout, thereby directing the passage of the fluid and vapor issuing therefrom away from the spout on the cover.

11. An electric vaporizer having a heating element which includes electrodes, an open bottom unitary insulating member protectively inclosing said electrodes, means in association with the electrodes for securing the same and the insulating member in position on the device, and separable insulating blocks for covering the lower portions of the electrodes fastened thereto by means of an internal notched connection.

12. An electric vaporizer having a heating element which includes electrodes, an open bottom unitary or one piece insulating member protectively inclosing said electrodes, means in association with the electrodes for securing the same and the insulating member in position on the device, and separable insulating blocks for covering the lower portions of the electrodes and said securing means, but without closing the bottom of said member.

13. Heating elements for heating water in a receptacle by the passage of alternating current therethrough, comprising spaced carbon blocks adapted to be immersed in the water, a one-piece porcelain shield for said blocks, open at the bottom, and having a narrow lateral opening between said electrodes, and an angle piece for covering the bottom of each block and having a lug at its upper end adapted to engage a notch in the electrode to hold the piece in place.

14. An electric vaporizer as claimed in claim 6, having detachable insulating blocks covering the bottom of each electrode, but without closing the bottom of said member.

15. In an electric vaporizer, the combination with a receptacle for the fluid to be vaporized, a cover for the receptacle having a vapor outlet, a pair of spaced electrodes, a unitary one piece porcelain shield having a hollow interior open at the bottom to receive said electrodes, and a pair of electric terminals above the cover, each having a threaded shank extending therethrough to electrically communicate with and support the electrodes and draw said electrodes upwardly against the top of the hollow interior of said shield to also support said shield, said shield also having a lateral opening to the interior above the bottom to permit free circulation of the fluid.

16. In a vaporizer, the combination of a receptacle for the fluid to be vaporized, a cover for the receptacle including thereon a vapor directing spout, an electrical heating element comprising electrodes, a unitary or one piece insulating member protectively containing said electrodes and shielding the same on all sides, but open at the bottom and having a transverse passage above the bottom to permit free circulation of the fluid, and means for detachably securing the insulating member in position below the cover through said electrodes.

17. An electric vaporizer having a heating element secured to the cover of the receptacle containing the fluid to be vaporized, said heating element comprising electric terminals above the cover having downwardly extending threaded shanks, and a unitary insulating member containing and enclosing electrodes below the cover, said electrodes having internally threaded parts for receiving the threaded shanks of the electric terminals, whereby said shield and electrodes are clamped against the bottom of said cover.

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