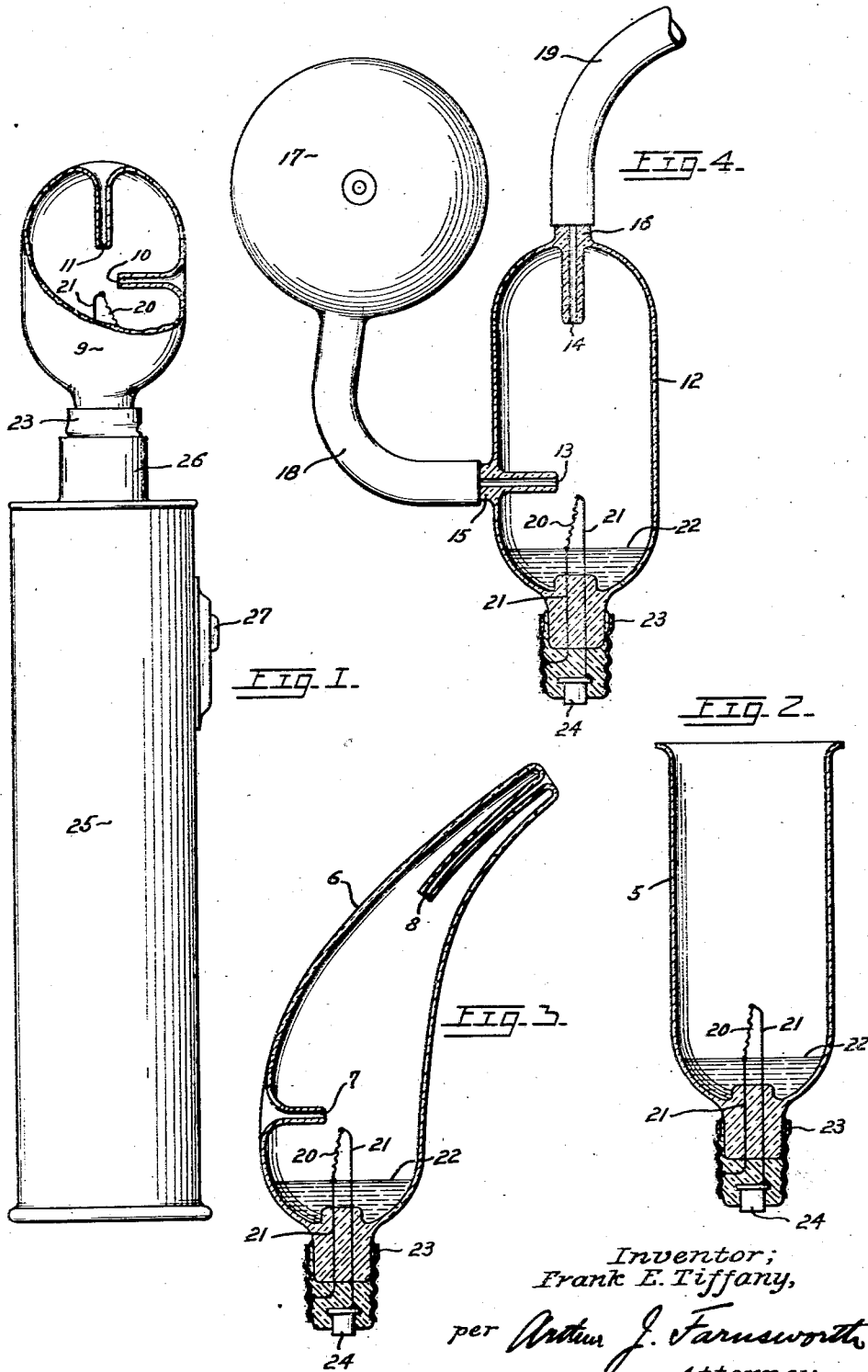


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THERAPEUTIC APPARATUS
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THERAPEUTIC APPARATUS

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In this specification, and the accompanying drawing, I shall describe and show preferred forms of my invention, and specifically mention certain of its more important objects. I do not limit myself to the forms disclosed however, since various changes and adaptations may be made therein without departing from the essence of my invention as hereinafter claimed, and objects and advantages, other than those specifically mentioned, are included within its scope.

My invention relates to therapeutic apparatus that is adapted for transforming volatile liquid medicaments into vapors, or into mists of exceedingly fine particles; and for applying these vapors or mists to organic parts that are to be treated. The principal objects of my invention include; first, to provide an improved method for vaporizing liquid medicaments by means of small electric currents; second, to furnish apparatus that is particularly well adapted for applying freshly vaporized medicaments to various organic surfaces; third, to supply very simple and convenient apparatus for the aforesaid purposes; and, fourth, to accomplish the above stated objects by means of relatively inexpensive devices.

My objects are attained in the manner illustrated in the accompanying drawing, in which—
Figure 1 is an elevation of a typical form of my invention, one of the parts being shown broken away in order the better to show the construction;

Figure 2 is an elevation in central section of what may be considered to be the generic form of the principal element of my invention;

Figure 3 is a central section in elevation of a specific form of the principal element of my invention; and

Figure 4 is another modified form of the principal element of the invention, in elevation and central section.

Similar reference numerals refer to similar parts throughout the several views.

I have discovered that when volatile liquids in relatively small quantities are protected from rapid cooling, such as might occur by draughts, they may be vaporized by means of a hot filament in close proximity to the surface of the liquid. This principle is utilized in this invention, in the various forms in which it may be employed. I therefore provide a vaporizing vessel of suitable form for holding a relatively small supply of fluid at the bottom; and containing an electrical conducting filament slightly above the bottom, so as to be close to the surface of the liquid contained therein. The vessel itself, aside from embodying these features, may be of any form that best adapts it to the special use for which it is intended.

The simplest kind of vaporizing vessel for this purpose, which may be considered as the generic form of the principal element of my invention, may take the shape of an open-mouth vase, similar to a short test tube, such as is shown at 5 in Fig. 2. This form of the invention is adapted for liberating vaporized medicaments or other vapors, directly into a room for impregnating the atmosphere thereof, as for fumigating purposes.

A specific form of vaporizing vessel is shown at 6 in Fig. 3. In this case the vessel is substantially closed, but is provided with an inlet orifice 7 near the bottom and above the surface of the liquid, and an outlet orifice 8 near the top and considerably spaced from the inlet orifice. The heated vapors naturally rise, and will tend to flow in a continuous stream from the outlet orifice; and, in doing this, will draw air from the outside atmosphere into the vessel through the inlet orifice. In other words, this form of vessel operates by natural draught, caused by the rising of the heated vapors, according to well known laws of physics. To secure a continuous and sufficient flow of vapors under natural draught, it is desirable to have the container relatively long vertically, and the two orifices should be considerably spaced. The vessel around the outlet may be variously shaped, to accommodate itself to the special purposes for which it is to be used. Thus the form shown in Fig. 3 is adapted for applying medicated vapors to the inside of the ear, or to membranes deep in the throat, or for insertion into the nostrils.

A second specific form of vaporizing vessel is shown at 9 in Fig. 1. In this form the inlet orifice 10 is near the bottom as before. The outlet orifice 11 is above it, but may be close thereto. The whole vessel, therefore, may be shorter than the form shown in Fig. 3. The vessels of Figs. 1 and 3 are intended for inhalation purposes, the vapors being withdrawn from the vessel into the mouth, by drawing in the breath.

A third specific form of vaporizing vessel is shown at 12 in Fig. 4. This form is similar to that shown in Fig. 1, but the inlet orifice 13, and the outlet orifice 14, communicate with exterior nozzles 15 and 16 respectively, the nozzles being adapted for being inserted in the end of rubber tubes. This form of the invention is adapted for what may be termed forced-draught operation, the vapors being expelled from the vessel from time to time, by forcing air thereinto. Thus, a compressible rubber bulb 17 may be connected by a short length of tubing 18 to intake nozzle 15; and, similarly, a rubber tube 19 may be attached to outlet nozzle 16, and have a suitably shaped and proportioned tube at its free extremity. The latter nozzle (not shown) may be made

of any desired shape and size for insertion into small passages, such as sinuses, and the flexibility of tubing 19 facilitates treatment in this manner. Owing to the frequent necessity of requiring relatively long tubing at 19, natural draught cannot be depended upon, and forced circulation, by means of operating the rubber bulb 17, will be required.

Whatever form of vaporizing vessel is used contains an electrical conducting filament 20, slightly spaced from the bottom, and below the inlet orifice. The filament is supported by conductors 21, passing through and sealed into the base of the vessel which is constructed in the form of a terminal plug adapted to be plugged into a co-operating terminal socket, such as the socket terminal of an ordinary flashlight or other battery-containing kit as shown in Fig. 1

Volatile liquids may be introduced into the vaporizing vessels through the outlet or inlet orifices, and these orifices preferably should be in the form of tubes extending into the vessel as illustrated, to prevent the escape of contained liquid when the vessel is tipped or inverted during manipulation. The amount of liquid in the vessels in no case should be greater than sufficient to reach to the lower end of the filament when the vessels are in their upright positions. Thus, the maximum liquid level should be as indicated by reference numeral 22.

I prefer to mount the vaporizing vessels upon uniform screw bases or plug terminals 23, similar to those employed in the well known type of electric light bulb, so that the vessels may be interchangeably used in suitable screw sockets, for establishing an electrical circuit through their filaments. One of the conductors 21 in each case, may be soldered to the inner surface of the screw base 23, and the other conductor be soldered to the inner surface of an axial conducting button 24.

Filaments 20 should be of very fine wire of non-corrodible and non-oxidizable material, such as pure platinum. I have found that small currents at low voltage may be utilized for heating such filaments sufficiently to vaporize volatile liquids in close proximity thereto, and have made practical utilization of voltages as low as two volts for this purpose. Thus, it is entirely feasible to employ a portable source of electricity, such as an ordinary flashlight battery of the type indicated at 25. This may have a screw socket 26 at one end, into which the plug terminal of any desired type of vaporizing vessel is screwed. Such batteries are commonly supplied with suitable switch means, as the thumb-button indicated at 27.

Another method of operating the device would be by means of a socket and flexible electrical cord, connected to a suitable low voltage source of electricity such as a storage battery.

Where it is desired to use an ordinary light circuit as the source of electricity, it usually will be necessary to reduce the voltage by means of a small transformer, or else to employ resistance in series with the filament. However, it is possible to use filaments adapted for the full voltage of ordinary light circuits, if they are made of material of relatively high resistance, and of relatively great mechanical strength.

As will be seen by referring to the drawing the electrical conductors 21, extend through the liquid to be volatilized, with portions thereof, including the filament 20, located just above the

As a result of this arrangement, when the circuit is completed through the conductors and filament to cause them to become heated, the liquid surrounding the conductors, or one of them, will become volatilized immediately and a geyser or fountain-like stream or streams of vapor will be projected upwardly from the filament-conductors into the vessel. Volatilization of the liquid in the manner stated is, therefore, practically instantaneous. The vapor will collect in the vessel from which it may be withdrawn by inhalation or otherwise as heretofore described. When the vessel becomes filled or partially filled with vapor the current through the conductors is cut off, as by the switch 27, and further vaporization ceases so long as the switch is open. After the vapor has been removed from the vessel by inhalation or otherwise, the operation may be repeated and this may be done as often as the exigencies of the case may require.

Obviously my invention may be utilized in a great variety of forms, adapted for treating many inaccessible parts of the body. All such forms require the general arrangements described, are contemplated by me, and are within the scope of my invention. Naturally, also, the proportions and size of the parts may be changed at will; and, if desired, the outlet orifices of the vaporizing vessels may be made considerably larger than the inlet orifices to facilitate the withdrawal of the enclosed vapors, particularly in the case of vessels that depend upon natural draught.

It will be apparent that my invention affords means for applying freshly vaporized medicaments directly to ordinarily inaccessible tissues, in a manner that is not possible with devices known to the prior art.

Having thus fully described my invention, I claim:

1. A vaporizer of the class described, comprising a vessel having an outlet open to the atmosphere and a closed bottom adapted to receive a vaporizable medicament, and electric conductors having portions thereof extending thru and above that portion of the interior of the vessel adapted to receive the medicament so that portions of the conductors will be submerged in the medicament and other portions will extend above the level thereof, the construction being such that when an electric circuit is completed thru the conductors to heat the same and the medicament immediately surrounding them, a geyser-like stream of vapor will be formed and projected upwardly within the vessel.

2. A vaporizer of the class described comprising a vessel having an outlet at its upper end open to the atmosphere, a closed bottom adapted to receive a vaporizable medicament and an inlet adjacent the bottom of the vessel, and electric conductors having portions thereof extending thru and above that portion of the interior of the vessel adapted to contain the medicament so that portions of the conductors will be submerged in the medicament and other portions will extend above the level thereof, the construction being such that when an electric circuit is completed thru the conductors to heat the same and the medicament immediately surrounding them, a geyser-like stream of vapor will be formed and projected upwardly within the vessel.

3. A therapeutic vaporizing unit adapted to be plugged into a conventional socket terminal of an electric circuit, comprising a plug terminal having two insulated circuit contacts, a vessel

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closed bottom to receive a medicament, said vessel carried by the plug, and conductors constituting a heating element extending thru the plug and into that portion of the vessel adapted to contain the medicament to be partially submerged therein, said conductors being adapted to become heated upon completion of an electric circuit therethrough and thus cause the medicament to become vaporized at the conductors and projected upwardly into the vessel in a geyser-like vapor stream.

4. A vaporizing unit of the class described, comprising a vessel having its upper end adapted to conform and be applied to a nasal passage and having an opening in said end, said vessel having a closed bottom adapted to receive a vaporizable medicament, and electric conductors having portions thereof extending through and above that portion of the interior of the vessel adapted to receive the medicament so that portions of the conductors will be submerged in the medicament and other portions will be located above the level thereof, and means for connecting the conductors to a source of electrical energy, the construction being such that when an electric circuit is completed through the conductors to heat the same and the medicament immediately surrounding them, a geyser-like stream of vapor will be formed and projected upwardly within the vessel.

5. A therapeutic vaporizing unit adapted to be plugged into a conventional socket terminal of an electric circuit, comprising a plug terminal having two insulated circuit contacts, a vessel having an outlet open to the atmosphere and a closed bottom to receive a medicament mounted upon said plug, and conductors extending through the plug and into that portion of the vessel containing the medicament to be partially submerged therein, and terminating in a filament near the bottom of the vessel, said filament and conductors being adapted to become heated upon completion of an electric circuit therethrough and thus vaporize the medicament located in the vessel.

6. A therapeutic vaporizer of the class described, comprising a vessel having an outlet at its upper end open to the atmosphere and a closed bottom adapted to receive a medicament, a terminal plug permanently attached to the bottom of said vessel and having conductors extending through that portion of the vessel adapted to contain the medicament and terminating in a filament slightly above the bottom of the vessel, said terminal plug being adapted to be plugged into a conventional terminal socket of an electric circuit and carrying contacts to complete the circuit through the filament, whereby a medicament located in the bottom of the vessel will become vaporized upon heating of the conductors and said vapors projected upwardly in a geyser-like stream.

7. As a new article of manufacture, a vaporizer for therapeutic use, comprising a plug terminal having two contacts adapted to be co-operatively associated with a conventional socket terminal of an electric circuit, a vessel having an inlet and an outlet open to the atmosphere, said vessel permanently attached to said plug terminal and adapted to contain a medicament in the lower portion thereof, and conductors leading from the plug terminal and extending through that portion of the bottom of the vessel adapted to contain the medicament and terminating above the level thereof, whereby when said conductors

become heated the medicament located therein will be vaporized and projected upwardly in a geyser-like stream.

8. As a new article of manufacture, a vaporizing unit for therapeutic use, comprising a plug terminal adapted to be plugged into a conventional socket terminal of an electrical circuit, a vessel for a medicament mounted upon said plug and having inlet and outlet openings open to the atmosphere, and filament wires extending from the plug through the bottom of the vessel and terminating therein for the purpose specified, portions of the filament wires extending from the plug being located in that part of the vessel adapted to contain the medicament and other portions extending above the level thereof.

9. As a new article of manufacture, a vaporizing unit for therapeutic use, comprising a plug terminal adapted to be plugged into a conventional terminal socket of an electrical circuit, a vessel for a medicament mounted upon said plug and having an outlet for vapors at its upper portion and an air inlet near its lower end, and electrical heating wires extending from the plug through the bottom of the vessel into the space therein adapted to contain the medicament and terminating above the level thereof for the purpose specified.

10. As a new article of manufacture, a vaporizing unit for therapeutic use, comprising a plug terminal adapted to be plugged into a conventional terminal socket of an electrical circuit, a vessel for a medicament mounted upon the upper end of said plug and having an outlet for vapors at its upper portion and an air inlet near its lower end, said inlet and outlet each including a tube extending into the vessel from the wall thereof, and heat conducting wires extending from the plug through that portion of the vessel adapted to receive the medicament and terminating therein above the medicament for the purpose specified.

11. As a new article of manufacture, a therapeutic vaporizer comprising a portable source of electrical energy having a conventional socket terminal, a vessel to receive a medicament, said vessel having an outlet open to the atmosphere, and an electric plug terminal adapted to be co-operatively associated with the said socket terminal and to the upper end of which the said vessel is permanently attached, and heat conducting wires carried by the plug having portions thereof extending through that portion of the vessel near the bottom thereof adapted to receive the medicament, and to be partially submerged therein.

12. As a new article of manufacture and in combination with a portable casing having an electric battery cell and a conventional socket terminal, of an electric plug terminal adapted to be removably inserted in the said socket, said terminal having two contacts, a vessel for a medicament permanently attached to the upper end of the plug, said vessel having an outlet open to the atmosphere, and said plug carrying conductors extending through that portion of the bottom of the vessel in which the medicament is to be placed, and portions extending above the level of the medicament, and a manually operable switch carried by the casing and adapted to make and break the circuit at will leading from the battery through the plug terminal and the said filament.

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