Nov. 9, 1948. C. PERSAK 2,453,455

VAPORIZER

Filed July 21, 1947

Fig. 1.

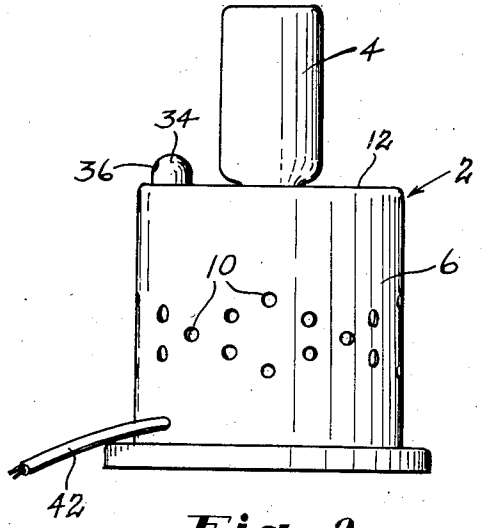


Fig. 2.

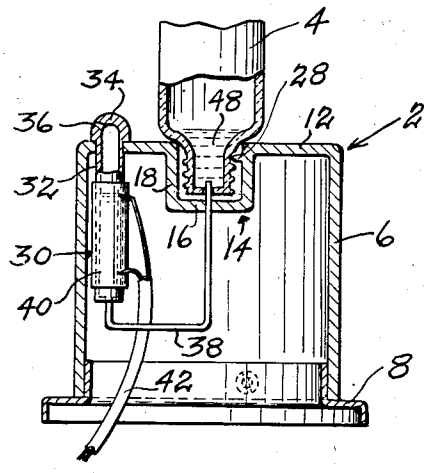


Fig. 5.

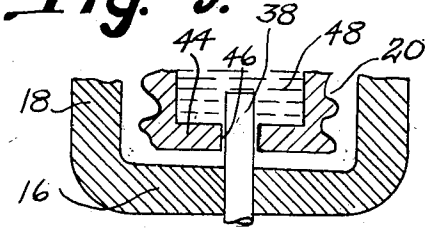


Fig. 3.

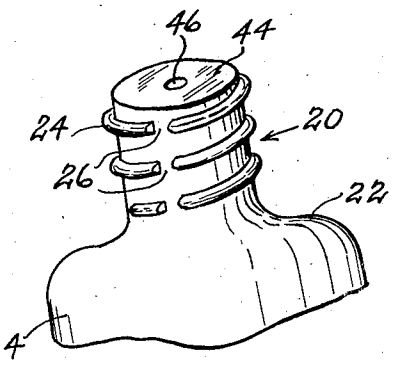
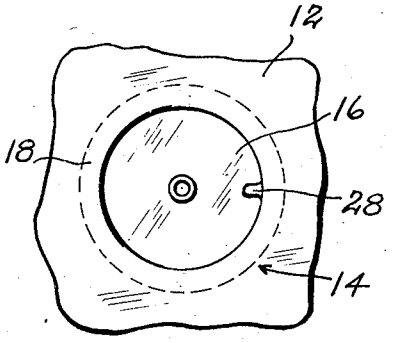


Fig. 4.



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VAPORIZER

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6 Claims. (Cl. 219—38)

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This invention relates to a vaporizer, and has reference more particularly to vaporizing apparatus for evaporating liquids and discharging the vapors thereof into the atmosphere.

One of the objects of the invention is the provision of an improved vaporizing apparatus of the type indicated which is simple in its construction and easy to operate and maintain.

A further object of the invention resides in the provision in such vaporizer of a simple means for feeding the liquid to be vaporized to the vaporizer element, whereby such feeding takes place automatically.

A still further object of the invention is the provision in such vaporizer of an improved connection between the supply container and the means feeding liquid to the vaporizer element, whereby such supply container is readily replaceable in the vaporizer without the danger of escape of liquid therefrom.

These and further objects of the invention will be more readily apparent in the following description of the preferred embodiment thereof shown in the accompanying drawings in which:

Figure 1 is a view in side elevation of such vaporizer with the supply container mounted thereon;

Figure 2 is a view in vertical section through such vaporizer;

Figure 3 is a view in perspective of the neck end of the liquid supply container;

Figure 4 is a view in plan of the portion of the vaporizer at the liquid supply container receiving well therein; and

Figure 5 is a fragmentary view in vertical cross section through the vaporizer at the bottom of the liquid container receiving well thereof.

The vaporizer of the present invention is capable of use for evaporating various types of liquid such as medicinal, perfuming, disinfecting, and similar liquids, but it will be described particularly in connection with its use for the vaporizing of medicinal liquid so that the vapor thereof may be inhaled, as in the treatment of colds and other similar ailments.

In the drawing, the vaporizer is designated generally by the reference character 2, the bottle 4 constituting the liquid supply container being shown mounted thereon in inverted position. The vaporizer, which is generally in the shape of a cylinder, has upstanding cylindrical walls 6 to the bottom of which a base 8 is attached. The side walls are provided with a series of holes 10 to allow the access of air to the interior of the vaporizer to prevent its overheating. The vaporizer is provided with a top 12, which is provided with a centrally located well 14 for the reception of the neck of bottle 4. The bottom of such well is designated 16, and the side walls thereof, 18. Well 14 is made of sufficient depth that it receives the neck of bottle 4 so that, when the bottle is supported by contact of its shoulder 22 with the upper inner edge of wall 18, the outer end of the bottle neck is spaced at least slightly from the upper surface of bottom wall 16 of the well.

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To prevent the use of liquid supply containers with the vaporizer other than those designed therefor, the vaporizer and the bottle are designed so that they interfit in a unique manner. In the embodiment shown this is accomplished by providing the lands of the threads 24 on the bottle neck 20 with aligned discontinuities 26, and by providing a radial projection in the form of pin 28 on the inner surface of well 14. The pin is of such radial length as to prevent the insertion in the well of a bottle having ordinary continuous threads on its neck. When bottle 4 has been inserted into the well with discontinuities 26 aligned with pin 28 the bottle may, if desired, be locked in the well by giving it a partial turn.

The evaporator element or vaporizing chamber of the vaporizer, shown generally at 30, is composed of a vertically disposed tube 32 supported on the top 12 of the vaporizer as shown, the upper end of which is enlarged at 34 to form a shoulder which rests upon the upper surface of the top 12 of the vaporizer. End 34 is provided with an aperture 36 constituting the jet from which the vapor emerges. Tube 32 is supplied with liquid to be vaporized through the much smaller tube 38 which is bent into the form of a U, one leg of the U connecting with the bottom of tube 32 and the other, longer leg, being tightly fitted in the bottom 16 of well 14 through which it projects a sufficient distance to extend upwardly into the neck of the supply bottle, as shown. Such end of tube 38 is located on a level somewhat above the bottom of tube 32, and preferably approximately midway of the length of tube 32. Heat for vaporizing the liquid and the vaporizer element 30 is provided by an electric heating unit, shown generally at 40, in the form of an insulated spirally wound resistance supplied with electric current through cable 42.

The neck 20 of bottle 4 is provided at its outer end with a partial closure 44 through which is provided the small central opening 46, so located as to receive the upper end of pipe 38 project-

ing up into the well. The diameter of hole 46 is so chosen with reference to the viscosity of the liquid 48 contained in the bottle 4 that little, if any, of such liquid escapes when the bottle containing such liquid is held upside down. The diameter of the hole is further chosen so that it is slightly larger than the outer diameter of the portion of tube 38 which projects upwardly into the well. Such relationship is shown in Figure 5.

The relationship which must be observed between the viscosity of the liquid to be vaporized, the diameter of the hole 46 in the bottle, and the outer diameter of tube 38 projecting upwardly into the hole, in the device of the invention, will be illustrated by the following example. The liquid to be vaporized, a medicinal preparation consisting largely of oil, had a viscosity of 30–35 Saybolt seconds at 100° F. At such temperature, a maximum diameter of $\frac{5}{16}$'' for hole 46 was possible without losing liquid from the bottle containing it, held upside down, and having hole 46 unobstructed. It is preferred ordinarily, however, to use a hole 46 of a diameter somewhat less than such value. The tube 38, in that portion entering hole 46, should, in such example, have an outer diameter from .005 to .0156'' less than that of the hole 46, which gives the following ranges of sizes for hole 46 when tube 38 is one of the small commercially available sizes.

[Liquid viscosity, 30–35 Saybolt seconds at 100° F.]

Outer Diameter of Tube 38, inches	.125	.188	.250	.297–.308
Diameter of Hole 46, inches	.130–.141	.193–.203	.255–.266	.313

The thus described device functions as follows: Assuming that the system consisting of tube 32 and tube 38 is entirely empty, a bottle containing liquid 48 is inserted in the well, as shown in Figure 2. Such insertion involves downward motion of the body of liquid 48, which is sufficient to force liquid down tube 38 and up into tube 32 to a height approximating the upper end of tube 38 within well 14, at which time the system reaches equilibrium and liquid ceases to flow from the bottle. When the vaporizer element is operated by energizing the heating element 40, liquid constantly escapes from the surface thereof in tube 32 and emerges as vapor from aperture 36. Atmospheric pressure exerted on that portion of the body of liquid 48 which is exposed by the annular aperture existing between hole 46 and pipe 38 progressively forces sufficient liquid from the bottle down through the tube 38 to maintain the liquid level in tube 32 substantially constant. Such relationship is maintained until all of liquid 48 has been fed from the bottle and vaporized.

I have fully described and illustrated a preferred embodiment of the vaporizer of my invention. It is to be understood that the invention is capable of considerable variation as to details, and that, accordingly, the scope of the invention is defined by the accompanying claims.

I claim as new the following:

1. A vaporizer comprising in combination a vaporizing chamber, means to heat the chamber to vaporize the liquid therein, means to discharge such vapor from the chamber, and means to feed liquid to be vaporized into the chamber comprising a small diameter tube of generally U shape, the first leg of the U being connected to the bottom of the chamber and the second leg of the U projecting to a height on a level between the top and somewhat above the bottom of the vaporizing chamber, a supply container mounted above such second leg of the small U tube, such supply container having in its bottom an aperture slightly larger than the outer diameter of such U tube, the upper end of the second leg of the U tube projecting into the body of the supply container through said aperture.

2. A vaporizer comprising in combination an upright vaporizing chamber, means to heat the chamber to vaporize the liquid therein, means to discharge such vapor from the chamber, and means to feed liquid to be vaporized into the chamber comprising a small diameter tube of generally U shape, the first leg of the U being connected to the bottom of the chamber and the second leg of the U projecting to a height on a level between the top and somewhat above the bottom of the vaporizing chamber, a supply container in the form of an inverted replaceable bottle mounted above such second leg of the small U tube, such supply container having in its bottom, as so mounted, an aperture slightly larger than the outer diameter of such U tube, the upper end of the second leg of the U tube projecting into the body of the supply container through said aperture.

3. A vaporizer comprising in combination an upright vaporizing chamber in the form of a tube, means to heat the chamber to vaporize the liquid therein, means to discharge such vapor from the chamber, and means to feed liquid to be vaporized into the chamber comprising a small diameter tube of generally U shape, the first leg of the U being connected to the bottom of the chamber and the second leg of the U projecting to a height on a level approximately midway between the top and bottom of the vaporizing chamber, a supply container in the form of an inverted replaceable bottle mounted above such second leg of the small U tube, such supply container having in its bottom, as so mounted, an aperture slightly larger than the outer diameter of such U tube, the upper end of the second leg of the U tube projecting into the body of the supply container through said aperture, the U tube having inner and outer diameters materially less than those of the vaporizing chamber.

4. A vaporizer comprising in combination an upright vaporizing chamber in the form of a tube, means to heat the chamber to vaporize the liquid therein, means to discharge such vapor from the chamber, and means to feed liquid to be vaporized into the chamber comprising a small diameter tube of generally U shape, the first leg of the U being connected to the bottom of the chamber and the second leg of the U projecting to a height on a level between the top and somewhat above the bottom of the vaporizing chamber, a supply container in the form of an inverted replaceable bottle having a neck mounted above such second leg of the small U tube, such supply container having in its bottom, as so mounted, an aperture slightly larger than the outer diameter of such U tube, the upper end of the second leg of the U tube projecting into the body of the supply container through said aperture, the U tube having inner and outer diameters materially less than such respective diameters of the vaporizing chamber, the supply container being supported in such relationship by a supporting means embracing the bottle neck and engaging the shoulder of the bottle, a pin projecting radially inwardly from the bottle neck embracing support, the bottle neck having a longitudinally directed recess in which such pin is received.

5. A vaporizer comprising in combination an upright outer casing containing therein an upright vaporizing chamber in the form of a tube, means to heat the chamber to vaporize the liquid therein, means to discharge such vapor from the chamber, such means comprising the upper end of the chamber projecting through the casing, and means to feed liquid to be vaporized into the chamber comprising a small diameter tube of generally U shape, the first leg of the U being connected to the bottom of the chamber and the second leg of the U projecting to a height on a level approximately midway between the top and bottom of the vaporizing chamber, the top of the vaporizer casing being provided with a well, the second leg of the U tube projecting upwardly through the bottom of such well, a supply container in the form of an inverted replaceable bottle having a neck received in and supported by the well, such bottle having in its bottom, as so mounted, an aperture slightly larger than the outer diameter of such U tube, the upper end of the second leg of the U tube projecting into the neck of the bottle through said aperture, the U tube having inner and outer diameters materially less than such respective diameters of the vaporizer chamber, the bottle neck having threads thereon, the threads having at least one series of vertically aligned discontinuities, and a pin projecting radially inwardly of the bottle neck receiving well, so that the bottle may be inserted into the well only when the discontinuities in its thread are vertically aligned with such pin.

6. A vaporizer for liquids having a viscosity of from 30 to 35 Saybolt seconds at 100° F. comprising in combination an upright vaporizing chamber in the form of a tube, means to heat the chamber to vaporize the liquid therein, means to discharge such vapor from the chamber, and means to feed liquid to be vaporized into the chamber comprising a small diameter tube of generally U shape, said small diameter tube having an outer diameter of from .125 to .308 inch, the first leg of the U being connected to the bottom of the chamber and the second leg of the U projecting to a height on a level approximately midway between the top and bottom of the vaporizing chamber, a supply container in the form of an inverted replaceable bottle mounted above such second leg of the small diameter U tube, such supply container having in its bottom, as so mounted, an aperture slightly larger than the outer diameter of such U tube, the aperture in the bottom of the container exceeding the outer diameter of the small diameter tube by from .005 to .0156 inch, the upper end of the second leg of the U tube projecting into the body of the supply container through said aperture, the U tube having inner and outer diameters materially less than those of the vaporizing chamber.

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