

June 28, 1949.

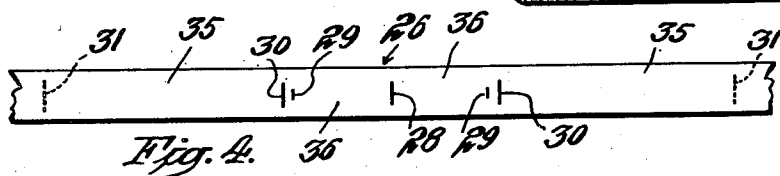
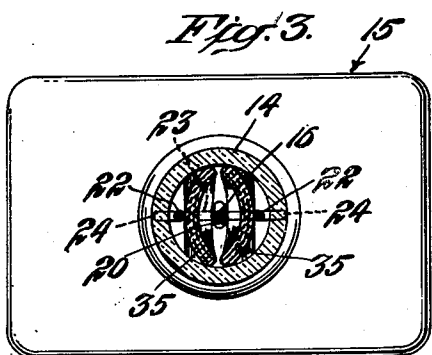
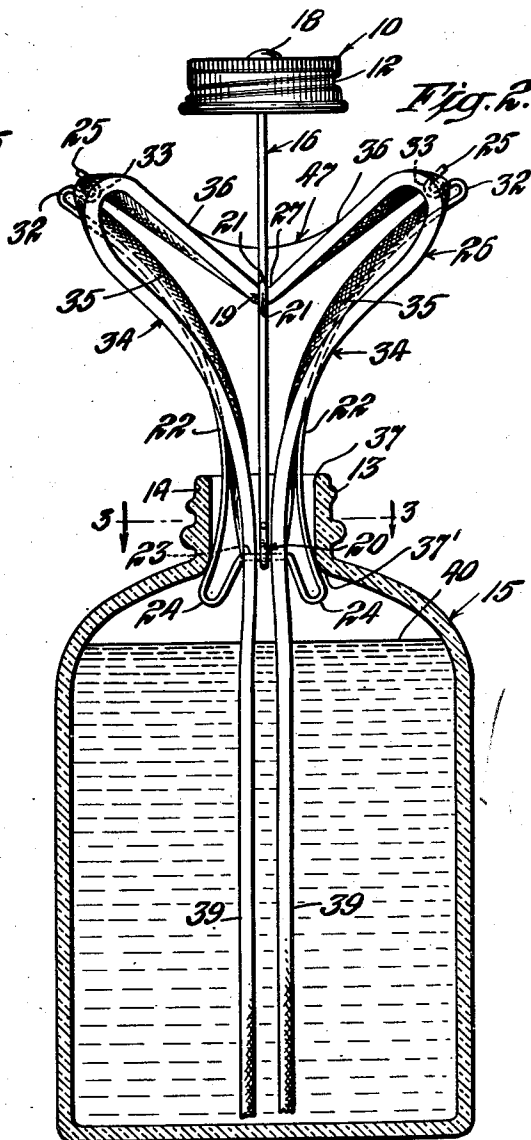
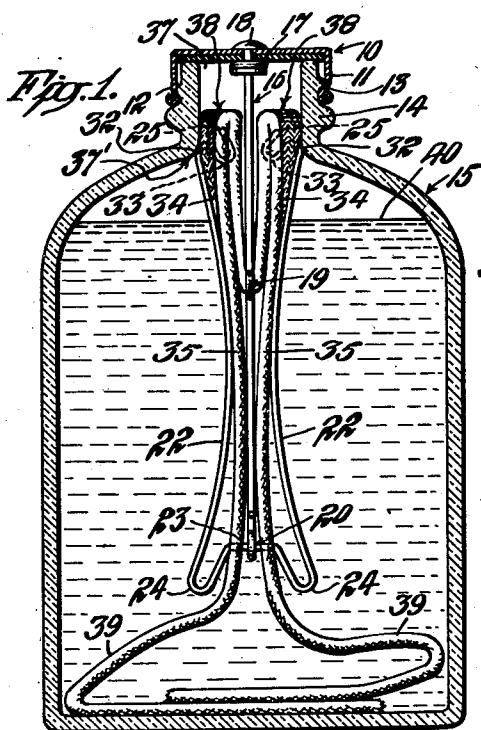
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2,474,607

LIQUID DIFFUSER

Filed June 13, 1946

2 Sheets-Sheet 1



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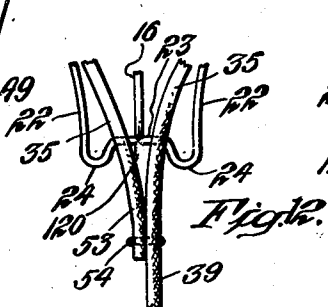
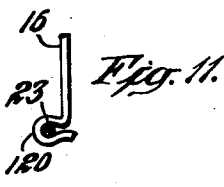
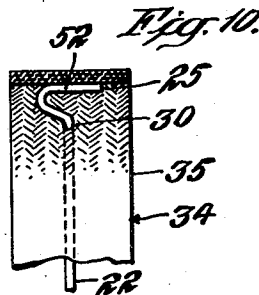
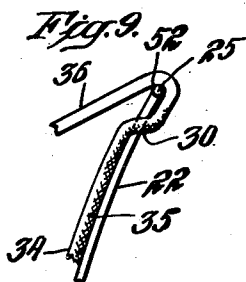
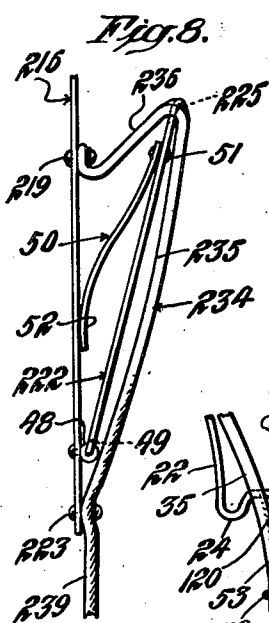
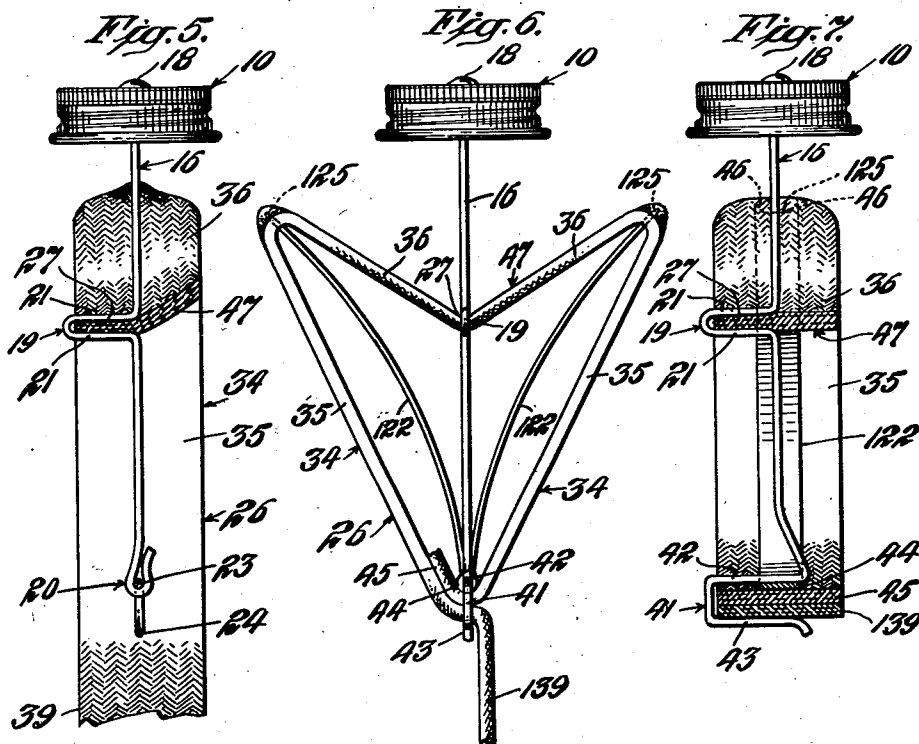
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LIQUID DIFFUSER

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2 Sheets-Sheet 2



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2,474,607

LIQUID DIFFUSER

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Application June 13, 1946, Serial No. 676,521

14 Claims. (Cl. 299—20)

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The present invention relates to liquid diffusers and, more particularly, to such devices adapted to disperse vapors from liquids into the atmosphere by controlled evaporation. The present application covers an improvement of the apparatus described and claimed in our co-pending abandoned applications Serial No. 556,704, filed October 2, 1944, and Serial No. 608,470, filed August 2, 1945.

A general object of the invention is the provision of such liquid diffuser which is readily and economically constructed and assembled, easily manually manipulated to obtain quite precise adjustment or control of the rate of evaporation of contained liquid material, provides for automatic manipulation to efficiently diffusive position of an evaporative porous body (e. g. a body of porous material which when saturated with liquid will permit vaporization and diffusion of such liquid therefrom in vapor phase into the surrounding atmosphere) as such porous body and support means are manually withdrawn from a liquid-containing vessel, permits ready opening and closing of the vessel, and which is adapted to efficient dispensation of liquids such as air fresheners from vessels such as bottles.

A more specific object of the invention is to provide such a device characterized by a bottle, or the like, for holding a quantity of evaporable liquid and withdrawable stem means supporting evaporative porous body means, such as wicking, or the like, in such manner as to permit ready adjustment during withdrawal to any of a plurality of desired positions there to remain for exposure of a predetermined length of evaporative porous body for efficiently controlled rate of evaporation, the stem means with the evaporative porous body carried thereby being readily returnable to the bottle to permit effective closure of the latter when termination of diffusion is desired.

Another object of the invention is to provide in such device such stem and evaporative porous body assembly as will assure operation of the latter in a manner so that a bottom portion of the assembly may efficiently serve as a limiting stop in the withdrawal of the assembly from the vessel, and, during withdrawal, an automatic action which may be considered as flaring of the evaporative porous body means to insure effective exposure of surfaces for efficient diffusion of vapor into the surrounding atmosphere.

A further object of the invention is to provide such diffuser wherein stem means, projecting down into a bottle when the latter is closed, may

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be easily withdrawn to free for lateral movement biased spring arms which will flare out above the bottle mouth loops of wicking to assure therefrom efficient evaporation of liquid saturating the same, which liquid may be drawn from a quantity thereof confined in the bottle.

Still another object of the invention is to provide structural embodiments of the device which are readily constructed and allow efficient use and operation thereof.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is an elevational view, with parts in section, of one embodiment of the present invention comprising an assembly including a bottle closure, stem means supported by the closure and evaporative porous body means mounted on the stem means, with the assembly shown mounted in a bottle containing evaporable liquid, all parts being in their relative positions when the bottle is closed;

Fig. 2 is a view similar to that of Fig. 1 and of the structure shown therein, but with the closure shown in side elevation and with the stem, evaporative porous body and closure raised or withdrawn from the bottle to a diffusing position;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a reduced scale plan view, with parts broken away, of a strip of wicking which may be employed in the embodiment of Figs. 1, 2 and 3, showing markings thereon adapted as guides for the proper mounting of the wicking in that embodiment;

Fig. 5 is a side elevational view, with parts in section and broken away, of the cap, stem and wicking assembly shown in Fig. 2;

Fig. 6 is a front elevational view of a modified form of the cap, stem and wicking assembly of the present invention;

Fig. 7 is a view similar to Fig. 5 of the structure shown in Fig. 6;

Fig. 8 is a front elevational view, with parts

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broken away, of a further modified form of the stem and wicking assembly of the present invention;

Fig. 9 is a front elevational view, with parts broken away, of a modified form of the means employed in Fig. 2 to secure or anchor the ends of the spring arms to the wicking;

Fig. 10 is a side elevational view, with parts in section and broken away, of the structure shown in Fig. 9;

Fig. 11 is a side elevational view, with parts in section and broken away, of modified means employable in the embodiment of Figs. 1, 2 and 3 for anchoring the spring arms to the stem; and

Fig. 12 is a front elevational view, with parts broken away, of an embodiment of the invention similar to that shown in Figs. 1 to 5, inclusive, modified in the lower portion of the stem and wicking assembly in accordance with the teachings of Fig. 11 and including a variation of the wicking structure.

Referring to the drawings, like numerals identify like parts throughout. A vessel closure 10, which may be a stopper or a cap and the like as desired, preferably comprises a cap having a skirt 11 provided with a screw thread 12 adapted to engage with an external thread 13 on a neck 14 of a vessel or bottle 15. The closure or cap 10 is provided with elongated stem means 16 mounted thereto and suspending therefrom in any suitable manner, such as by forming a laterally extending eyelet 17 in the top end of stem 16 and fastening that eyelet by means of a rivet or bolt 18 to the cap 10.

In the embodiment shown in Figs. 1 to 5, inclusive, the stem means 16 is preferably made from relatively rigid metallic wire, preferably about sixty-five one-thousandths of an inch (0.065 in.) in diameter, having a reverse bend 19 therein to provide an upper anchoring means and having its lower end bent back upon itself to provide an eye or loop 20 as best seen in Fig. 5. The reverse bend 19 provides a pair of laterally extending spaced-apart elements 21 between which the wicking or any suitable evaporative porous body is to be clamped and the eye 20 provides a downwardly facing abutment spaced an appreciable longitudinal distance down the stem from the anchoring means at 19.

A pair of spring arms 22, 22 are provided which may form the side portions of a V-shaped structure made from any suitable stock, such as resilient rod-like material, such as steel wire. Such wire may be stainless steel wire about five one-hundredths of an inch (0.05 in.) in diameter. As shown in the embodiment of Figs. 1 and 2, the arms 22, 22 are mounted on the stem means 16 preferably by providing a mid-portion of the V-shaped structure with a relatively short laterally extending section 23 merging at its ends in downwardly projecting reverse bends 24, 24 to serve as wicking stops, with those reverse bends in turn merging with the arms 22, 22. The laterally extending section 23 is threaded through the eye 20 to secure the arms 22, 22 to the stem 16. Since the arms 22, 22 are preferably made from spring wire, they are spring-biased due to the resiliency of the material and the preliminary shaping which disposes them divergently with respect to the stem 16. Such preliminary shaping is somewhat similar to that shown in Fig. 2 except that spring arms 22, 22 will have their top ends 25, 25 spread apart farther than there-in shown.

Preferably an evaporative porous body is pro-

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vided by a length of wicking 26 which is substantially medially clamped at 27 in the reverse bend 19 between the laterally extending portions 21, 21 of stem 16. Such strip 26 of wicking as shown in Fig. 4 may be provided with a mark 28 to guide a workman in the placement of the wicking in the reverse bend 19. Each end portion of the wicking may also be provided with marks 29 and 30 located relatively close together and an appreciable distance on either side of the mid-mark 28. The reverse side of the strip of wicking may be provided with marks 31, 31 a still greater distance away from the mid-mark 28.

To mount such strip of wicking 26 on the stem and arm assembly of Figs. 1, 2 and 5 a worker first may pierce an end 25 of an arm 22 through the wicking at mark 31 and then work the wicking down along the arm and about the reverse bend 24 to the lateral section 23 until the wicking is located adjacent the eye 20 for anchorage of the wicking to the stem 16. As shown in Figs. 1 and 2 an end 25 of each arm 22 is provided with two reverse bends 32 and 33 so that the latter may serve as a hook. In the second assembly step the arm end 25 will be pierced through the wicking, first at mark 30 and then at mark 29, so as to anchor the wicking to the end of the arm in the manner shown in Fig. 2.

It will be noted from Figs. 1, 2 and 4 that the distance between mid-mark 28 and either of lower anchorage marks 31, 31 is considerably greater than the distance between top anchorage means provided by reverse stem bend 19 and lower anchorage means provided by stem eye 20 and lateral section 23. As a result in the assembly of the wicking on the stem 16 and arms 22, 22 two loops 34, 34 are provided on opposite sides of stem and the portion 35 of each loop 34, between piercing mark 31 and piercing mark 30, is located on the inside of spring arm 22 between the latter and the stem. The portion 36 of each loop 34 between mid-mark 28 and marks 29 and 30 is of appreciable length and constitutes a lateral wicking portion for limiting flaring action of arm 22 as shown in Fig. 2.

Preferably, in the embodiment shown in Figs. 1 and 2, a certain relationship between the relative positions, shapes and dimensions of the various parts of the wicking and stem assembly and the bottle and its neck are provided. For example, neck 14, between its mouth 37 and the throat 37' thereof, is of appreciable length with the mouth and the internal walls of the neck of a certain diameter. The overall lateral dimension of the stem and wicking assembly in the vicinity of the lower anchorage means is appreciably greater than the internal diameter of the neck 14 and mouth 37. For example, downwardly extending reverse bends 24, 24 are, in the initial construction, of an overall lateral dimension wider than the internal diameters of the neck and mouth. As a result, the stem 16 with its spring arms 22, 22 may be mounted into the bottle by squeezing the reverse bends 24, 24 toward each other and then pushing them down through the bottle neck into the bottle where they are permitted to spring laterally outward to their approximate initial positions as shown in Fig. 2. As a result the reverse bends 24, 24 provide an efficient stop means limiting stem withdrawal from the bottle with all but abnormal pull on the stem.

As to the relative dimensioning, it will be

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further noted from Fig. 1 that the stem 16 is of such length as to reach an appreciable distance down into the bottle 15 but considerably short of the bottom of the latter so that the downwardly projecting wicking stops 24, 24 will not engage the bottle bottom to interfere with proper seating of the cap 10. The arms 22, 22 are of such length as to have their top ends 25, 25 or reverse bends 32, 32 located within the neck 14 or above its throat 37' when the cap 10 is seated in bottle-closing position shown in Fig. 1, so that the stem and wicking assembly may be readily withdrawn up through the neck when the cap 10 is unscrewed. The side loops 34, 34 of wicking are of such length as to dispose their top bends 38, 38, when folded flat along the stem as shown in Fig. 1, within the neck 14 between its mouth 37 and throat 37', also to permit ready withdrawal of the stem and wicking assembly from the bottle. Of course the top ends 25, 25 of arms 22, 22 and wick top bends 38, 38 must not extend up beyond a certain point as they must be free to pass beneath the bottom edge of cap skirt 11 when the stem assembly is withdrawn from the bottle. Clearance to permit the desired flaring action must be provided as is indicated in the drawings.

Preferably the spring arms 22, 22 are of such length and the reverse stem bend 19, constituting the top anchoring means, is so located that the top ends 25, 25 of the arms extend an appreciable distance above the top anchoring means when the arms and wicking are folded against the stem 16 as in Fig. 1. This proportioning is preferred so as to have a greater length of wicking in each loop 34, 34 than might be possible if the anchoring means 19 were higher.

Each loop of wicking 34, 34 is preferably provided with a depending wick 39 connected thereto to reach down into the bottle 15 so as to draw up by capillary action liquid from a quantity 40 thereof in the bottle 15. Each depending wick 39 is preferably connected to its loop 34 by being made integral with the wicking thereof. In other words, each length of wicking of the two on opposite sides of mid-mark 28 is of sufficient length as to provide the loop 34 in desired dimension and its depending wick 39 of such length as to extend substantially to the bottom of the bottle when the stem and wicking assembly is withdrawn to the maximum diffusing position shown in Fig. 2.

In operation of the embodiment of the apparatus of the present invention shown in Figs. 1 to 5 inclusive, efficient diffusion of liquid from the quantity 40 thereof in the bottle 15 may be accomplished in the following manner. It will be understood that the liquid in the bottle may be of any suitable type, such as an air freshener, e. g., the product of Paschal U. S. Patent No. 2,326,672 of August 10, 1943, and in such case varying conditions may make desirable adjustment or alteration of the rate of diffusion. Such diffusion and variation of the rate thereof will be accomplished by withdrawal of the stem and wicking assembly up through the bottle neck 14 and adjustment of the former to a proper diffusing position. When diffusion of evaporable liquid in the bottle 15 is desired the cap 10 will be unscrewed from the bottle neck 14 and the stem and wicking assembly then withdrawn up through the neck by pulling upwardly on the cap. As this is done with withdrawal of the stem 16 and wicking loops 34, 34 up through the neck, the spring arms 22, 22 ride along the inner walls

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of the bottle neck and, due to their spring-biasing, will tend to apply lateral force to the bottle neck which will provide considerable frictional resistance to sliding action, so that the stem and wicking assembly will remain in any adjusted position to which it may be withdrawn.

The maximum diffusing position shown in Fig. 2 is attained by lifting the cap 10 with withdrawal of the stem and wicking assembly up through neck 14 until the wicking stops 24, 24, which together are wider than the internal diameter of the bottle neck 14, jam up against the throat 37' of the latter. Thus when the stem and wicking assembly are withdrawn gently such stop means will always be effective to limit maximum withdrawal from the bottle. However, the stem and wicking assembly may be completely withdrawn from the bottle if desired, such as for the purpose of washing or changing the wicking, by applying sufficient excessive pull upon the stem and wicking assembly as to cause the neck 14 and its throat 37' temporarily to constrict the stop means portion of the stem and wicking assembly, e. g., constrict the reverse bends 24, 24 or force them toward each other sufficiently to permit passage thereof up through the neck and the mouth.

As the stem and wicking assembly is lifted and the top portions of the wicking loops 34, 34 and top ends 25, 25 of spring arms 22, 22 are freed above the neck 14 and bottle mouth 37 the spring arms are permitted to diverge laterally away from the stem 16 to carry with them the wicking loops and thus flare them laterally outward. This flaring action becomes increasingly greater as the stem and wicking assembly is withdrawn through the bottle neck an increasingly greater distance, until the relative positions shown in Fig. 2 are reached. In such maximum diffusing position shown in Fig. 2 the portions 36, 36 of wicking loops 34, 34 are stretched tautly by the biased spring arms 22, 22 and the latter are limited in their diverging action by the former. However, it will be noted that both faces of each of the wicking loops 34, 34 are exposed freely to the surrounding atmosphere so as to obtain maximum efficiency in evaporation of liquid therefrom, i. e., effective diffusion into the surrounding atmosphere of vapor from the evaporable liquid saturating the wicking and received by the latter from the bottle, by capillary action and/or direct contact.

It will be obvious that the rate of diffusion may be precisely adjusted by the extent of withdrawal of the stem and wicking assembly up from the bottle neck and that the greater the withdrawal the greater the rate of diffusion. As previously pointed out, the biasing of the spring arms to diverging positions due to their inherent resiliency and preliminary shaping will provide the lateral force and drag of the arms against the inner walls of the neck necessary to cause the stem and wicking assembly to be held or clamped in any position to which the assembly is withdrawn short of the maximum position shown in Fig. 2.

Although it is preferred to provide the stem and wicking assembly with the depending wicks 39, 39, connected thereto either by making them as integral parts of the loops 34, 34 or by affixing separate pieces thereto, it is believed to be obvious that no such depending wicks need be employed for efficient use of the diffusing apparatus shown in Figs. 1 to 5, inclusive.

For example, with depending wicks 39, 39

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omitted the wicking in loops 34, 34 will be wetted when the stem and wicking assembly is in the closed position shown in Fig. 1. Then upon withdrawal of the stem and wicking assembly to a diffusing position, such as that shown in Fig. 2, portions of the wetted loops 34, 34 exposed to the surrounding atmosphere above the bottle neck 14 and its mouth 37 will deliver vapor from the liquid saturating the exposed wicking into the atmosphere at least for a limited time. The supply of liquid in the exposed wicking may be replenished as desired by pushing the stem and wicking assembly down into the bottle for contact between the liquid and the wicking, either by dipping the latter into the liquid or by shaking the liquid up into contact with the wicking. It is believed to be obvious that, with the bottle of the embodiment shown in Figs. 1 and 2 substantially full of liquid, even short depending wicks connected to the wicking loops 34, 34 would provide for continuous diffusion into the atmosphere of vapor from the liquid saturating the exposed wicking as in Fig. 2. Also it is apparent that with a substantial body of liquid in the bottle bottom portions of the wicking loops 34, 34 might be brought down into contact with the liquid without the employment of depending wicks connected thereto while providing for substantial exposure in diffusing position of the wicking loops above the bottle mouth.

As shown in Figs. 6 and 7, a modified form of the structure may comprise stem 16 having the reverse bend 19 to serve as a top anchoring means and its bottom end provided with a reverse bend 41 including lateral portions 42 and 43. In this modification the spring arms 122, 122 are formed from a relatively flat strip of material, such as spring steel, bent substantially to the form shown in Fig. 6 with its mid-portion shaped to provide a loop or eye 44 receiving lateral portion 42 of stem 16. The length of wicking 26 is clamped at 27 between the lateral portions 21, 21 of reverse bend 19 and the wicking loops 34, 34 are then formed by training the wicking over the ends 125, 125 of the arms 122, 122 and then down beneath lateral portion 42 of reverse bend 41 and the eye 44 of the arm structure so that the two layers of wicking will be clamped between that structure and lateral portion 43 of reverse bend 41.

It will be noted from Fig. 6 that in such structure, if desired, one end 45 of the wicking may be just sufficiently long enough to loop beneath the lateral portion 42 of reverse bend 41 while the other end 139 may be extended to form a depending wick similar to depending wick 39 of the modification shown in Figs. 1 and 2. With the bottom portions of both wicking loops 34, 34 in contact at reverse bend 41 both wicking loops will be supplied or wetted with liquid in the bottle even though the surface of the liquid be lower than the bottoms of the wicking loops. The depending wick 139, which is connected to both loops by being made integral with the wicking of one loop and in contact with the wicking of the other loop, will draw the evaporable liquid up by capillary action into the wicking of both loops thus maintaining saturation thereof.

It will be noted that in the structure of Figs. 6 and 7, preferably the top ends of the arms 122, 122 are provided with laterally spaced teeth 46, 46 to engage into the wicking for secure anchorage of the latter, although such teeth, or variations thereof, are not essential. In any case, with the spring arms 122, 122 diverged to positions

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similar to those indicated in Fig. 6, the wicking loops 34, 34 are flared for functioning similar to the flared loops of the modification shown in Fig. 2 when the stem and wicking assembly of Figs. 6 and 7 are employed in a liquid-containing bottle in substitution for the stem and wicking assembly of Figs. 1 and 2. If desired, in making such substitution similar precautions may be taken with regard to relative dimensioning of the parts and elements.

With regard to the embodiment and modification shown in Figs. 1 to 5, inclusive, and in Figs. 6 and 7, it will be noted that different degrees of flaring are illustrated although the flaring action is generally the same. For example, in Fig. 2 the spring-biasing of the arms 22, 22 and their shapes are such as to stretch the lateral portions 36, 36 of the loops 34, 34 quite tautly so that transverse portion 47 of the wicking which is not clamped by the top anchoring means 19 is curved upwardly by the tensing pull of the arms as also shown in Fig. 5. In the embodiment shown in Figs. 6 and 7, however, the shape of the arms 122, 122 and the spring-biasing thereof has been intentionally modified for purposes of illustration so as to apply less tensing force to the lateral portions 36, 36 of the wicking loops 34, 34. As a result the unclamped lateral portion 47 of the wicking is disposed substantially in the same planes as the clamped portions thereof, but of course the same general flaring action is employed. It is believed to be obvious that with less tensing pull the disposition of the lateral portions 36, 36 of the wicking 26 of the embodiment of Figs. 1 to 5, inclusive, may be similar to that shown in the modification of Figs. 6 and 7; or, conversely, such disposition as proposed in the embodiment of Figs. 1 to 5, inclusive, may be accomplished in the structure of Figs. 6 and 7 by so proportioning the parts as to provide for greater tensing pull.

In Fig. 8 are shown parts of a further modification of the stem and wicking assembly of the present invention. As proposed therein, the stem 216 may comprise a flat narrow strip of metal which has anchored thereto a loop of wicking 234 by means of a top anchoring rivet 219 and a bottom anchoring rivet 223. The wick may be extended below the bottom anchoring rivet 223 to provide a depending wick 239. A spring-biased arm 222 may comprise a flat elongated strip of metal which may be hinged to the stem 216 by any suitable means, such as an eyelet 48, received in a hole 49 in the bottom end of arm 222. Such hinged arm may be formed of relatively stiff material having little or no inherent resiliency and the spring-biasing may be attained by mounting a curved spring leaf 50 on such arm, such as by securing one end at 51 to the arm by a rivet with the other end at 52 riding freely against a face of the flat stem 216. The upper end 225 of the arm 222 may engage into the wicking loop in any suitable manner, such as that proposed in Fig. 7, with the portion 236 of the wicking loop limiting the lateral divergence of the arm 222 under the influence of the biasing spring 50. Obviously other types of biasing springs may be employed, such as a leaf spring fastened to the stem 216 and riding against a face of the arm 222, or helical spring structure interposed between the stem and arm.

As proposed in Fig. 8, the invention may be embodied in a stem and wicking assembly when only one loop of wicking is provided on a side of the stem and it is believed obvious that in the

embodiments of Figs. 1 to 5, inclusive, and Figs. 6 and 7 such structures may be simplified by omitting one of the wicking loops 34, 34, or may be modified by providing the wicking loops from separate pieces of wicking having their ends anchored to the stem at the top anchoring means in any suitable manner. Further, it is to be understood that the wicking loop 234 and spring-biased arm structure 222 shown in Fig. 8 may be duplicated on the opposite sides of the stem 216 by anchoring a lateral length 236 of an additional strip of wicking to the stem 216 beneath the head of the rivet 219 and anchoring its other portion 235 to the stem beneath the head of the rivet 223. In such case another spring-biased arm 222 will be provided on the opposite side of the stem 216, preferably with the employment of an additional pivoting eye 48.

As shown in Figs. 9 and 10, the embodiment of the invention shown in Figs. 1 to 5, inclusive, may be simplified by bending the upper end 25 of each arm 22 laterally to provide a transverse supporting finger 52. In such case the end 25 of either spring arm 22 is pierced through the wicking loop 34 at point 30 so that transversely extending finger 52 will engage the inner surface of the wicking substantially at point 29 to define longitudinal portion 35 and lateral portion 36 of the wicking loop.

As shown in Fig. 11 the eye on the bottom end of the stem 16 may be provided in the form of a snap hook 120 to receive the lateral section 23 of the spring arm structure. With employment of a closed eye 20, as in Figs. 1 to 5, inclusive, the mounting of spring arm structure to the stem may require a tedious threading of one of the arms from its top end 25 through the eye past the return bends 33 and 32 and stop bend 24. With the employment of the snap eye 120, in the form of a hook as proposed in Fig. 11, the spring arms may be easily mounted to the stem 16 by snapping the lateral section 23 of the mid-portion into the eye or hook 120.

When it is desired to employ a depending wick structure which will always reach down into the bottle to the vicinity of the bottom thereof regardless of the position of the stem and wicking assembly, such depending wick structure may, as proposed in Fig. 12, be simplified for economy in wicking material by fastening one short end 53 of the wicking to the elongated depending end 39 in any suitable manner such as by a clamp or clip 54. Accordingly, liquid drawn up by capillary action in wick 39 will wet the one wicking loop 34 which has its portion 35 made integral therewith, and will also wet the other loop of wicking through its short end 53 which is in face contact with the depending wick 39.

As to materials, the embodiments of the invention shown are well adapted to the employment of woven wicking, such as that commonly employed in oil lamps, but obviously other porous wicking such as felt, etc., may be employed. Further, although spring-biasing of the arms for flaring the wicking may be economically provided by forming them from spring metallic material such as spring steel, it is believed to be obvious that other suitable materials may be employed such as resilient drawn or molded plastics and, in structures where resiliency of the flaring arm material is not depended on for biasing, such as in Fig. 8, any suitable material which may have little, if any, resiliency may be employed. However, precaution should be taken in the selection

of materials to avoid using such as may be attacked by the liquid to be bottled and diffused.

It will thus be seen that the objects set forth above and those made apparent from the preceding description, among others, are efficiently attained in accordance with the present invention and, since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described our invention, what we claim as new and desired to secure by Letters Patent is:

1. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located a certain longitudinal distance apart, a length of wicking anchored to said stem means on one side thereof by said upper and lower anchoring means appreciably longer than the distance between said anchoring means to provide a loop, and flaring means connected at a lower portion thereof to said stem means and having a free upper portion spring-biased laterally away from said stem means and engaging said wicking loop to flare the latter laterally away from said stem means when said upper free flaring portion is permitted to move laterally away from said stem means above the vessel mouth upon withdrawal of said stem means.

2. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located a certain longitudinal distance apart, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper and lower anchoring means, each of said lengths of wicking being appreciably longer than the distance between said anchoring means to provide a loop, and a pair of flaring arms on opposite sides of said stem means each connected at a lower portion thereof to said stem means and having a free upper portion spring-biased laterally away from said stem means, said free upper portion of each of said arms being engaged with the wicking loop adjacent thereto to flare said wicking loops laterally away from said stem means in opposite directions when said flaring portions of said arms are permitted to move laterally away from said stem means in opposite directions above the vessel mouth upon withdrawal of said stem means.

3. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located a certain longitudinal distance apart, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper and lower anchoring means, each of said lengths of wicking being appreciably longer than the distance between said anchoring means to provide a loop, and a pair of flaring spring arms

of resilient material on opposite sides of said stem means anchored to said stem means in the vicinity of their lower portions, said spring arms having upper free portions biased laterally away from said stem means on opposite sides of the later by the resiliency of the arms material, said free upper portion of each of said arms being engaged with the wicking loop adjacent thereto so that said arms will flare said wicking loops laterally away from said stem means in opposite directions when said flaring portions of said arms are permitted to move laterally away from said stem means in opposite directions above the vessel mouth upon withdrawal of said stem means.

4. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located a certain longitudinal distance apart, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper and lower anchoring means, each of said lengths of wicking being appreciably longer than the distance between said anchoring means to provide a loop, and a pair of flaring spring arms on opposite sides of said stem means connected together at lower portions thereof as integral parts of a single piece of elongated resilient material with said arms anchored to said stem means in the vicinity of said lower portions, said spring arms having upper free portions biased laterally away from said stem means on opposite sides of the latter by the resiliency of the arms material, said free upper portion of each of said arms being engaged with the wicking loop adjacent thereto so that said arms will flare said wicking loops laterally away from said stem means in opposite directions when said flaring portions of said arms are permitted to move laterally away from said stem means in opposite directions above the vessel mouth upon withdrawal of said stem means.

5. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located a certain longitudinal distance apart, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper and lower anchoring means, each of said lengths of wicking being appreciably longer than the distance between said anchoring means to provide a loop, and a pair of flaring spring arms on opposite sides of said stem means connected together at lower portions thereof as integral parts of a single piece of elongated resilient material with said arms anchored to said stem means in the vicinity of said lower portions, said spring arms having upper free portions biased laterally away from said stem means on opposite sides of the latter by the resiliency of the arms material, said spring arms having their major portions located on the outsides of said loops to ride against vessel structure at its mouth upon stem means withdrawal and having their upper portions anchored to adjacent portions of said loops to flare the latter laterally away from said stem means in opposite directions when such action is permitted above the vessel mouth upon stem means withdrawal.

6. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located a certain longitudinal dis-

tance apart, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper and lower anchoring means, each of said lengths of wicking being appreciably longer than the distance between said anchoring means to provide a loop, and a pair of flaring spring arms on opposite sides of said stem means connected together at lower portions thereof by an anchoring portion anchored to said stem means, said anchoring portion and the lower portions of said arms being normally of an overall lateral dimension greater than the width of the vessel mouth to constitute stop means limiting stem means withdrawal when other than abnormal stop means-deforming pull is applied to said stem means, said spring arms having upper free portions biased laterally away from said stem means on opposite sides of the latter by the resiliency of the arms material, said free upper portion of each of said arms being engaged with the wicking loop adjacent thereto to flare said wicking loops laterally away from said stem means in opposite directions when said flaring portions of said arms are permitted to move laterally away from said stem means in opposite directions above the vessel mouth upon withdrawal of said stem means.

7. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located a certain longitudinal distance apart, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper and lower anchoring means, each of said lengths of wicking being appreciably longer than the distance between said anchoring means to provide a loop, a pair of flaring arms on opposite sides of said stem means each connected at a lower portion thereof to said stem means and having a free upper portion spring-biased laterally away from said stem means, said free upper portion of each of said arms being engaged with the wicking loop adjacent thereto to flare said wicking loops away from said stem means in opposite directions when said flaring portions of said arms are permitted to move laterally away from said stem means in opposite directions above the vessel mouth upon withdrawal of said stem means, and stop means in the vicinity of the lower portions of said arms comprising thereat portions of said arms spread apart to an overall lateral dimension greater than the width of the vessel mouth to limit stem means withdrawal when other than abnormal stop means-deforming pull is applied to said stem means.

8. A liquid diffuser comprising, in combination, a vessel having an elongated neck providing a mouth at the outward end thereof and a throat at the inward end thereof, a removable closure for the mouth, stem means mounted on said closure and extending down through said mouth and neck into said vessel, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper and lower anchoring means, each of said lengths of wicking being appreciably longer than the distance between said anchoring means to provide a loop, and a pair of flaring arms on opposite sides of said stem means each connected at a lower portion thereof to said stem means and having a free upper portion spring-biased laterally away from said stem means, said free upper portion of each of said arms being engaged with the wicking loop adjacent thereto to flare said wicking loops away from

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said stem means in opposite directions when said flaring portions of said arms are permitted to move laterally away from said stem means in opposite directions above the vessel mouth upon withdrawal of said stem means, the top ends of said flaring free portions of said arms and top bends in said loops extending upwardly a limited distance along said stem means when folded thereagainst so as to assure location of those top ends and bends in the neck between its throat and mouth when said closure is seated on the neck in mouth-closing position.

9. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located an appreciable longitudinal distance apart, an elongated piece of relatively stiff resilient material bent into a V-shaped structure with its mid-portion serving as an anchorage section and connected to said stem means by said lower anchoring means, the side portions of said V-shaped structure extending upwardly on opposite sides of said stem means to serve as spring arms which tend to diverge away from said stem means under biasing due to the pre-set shape of the resilient elongated piece, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper anchoring means and by said mid-portion of said elongated piece, each of said lengths of wicking being appreciably longer than the distance between said upper anchoring means and said anchoring mid-portion to provide a pair of loops, and upper spring arm ends with one engaging one of said loops and the other engaging the other of said loops to flare them laterally away from said stem means in opposite directions when said arms are permitted to spring away from said stem means in opposite directions above the vessel mouth upon withdrawal of said stem means.

10. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper and lower anchoring means on said stem means located an appreciable longitudinal distance apart, an elongated piece of relatively stiff resilient material bent into a V-shaped structure with its mid-portion serving as an anchorage section and connected to said stem means by said lower anchoring means, the side portions of said V-shaped structure extending upwardly on opposite sides of said stem means to serve as spring arms diverging away from said stem means under biasing due to the pre-set shape of the resilient elongated piece, a pair of lengths of wicking anchored to said stem means on opposite sides thereof by said upper anchoring means and by said mid-portion of said elongated piece, each of said lengths of wicking being appreciably longer than the distance between said upper anchoring means and said anchoring mid-portion to provide a pair of loops, and upper spring arm ends with one engaging one of said loops an appreciable distance away from said upper anchoring means and the other of said spring arm ends engaging the other of said loops a similar distance away from said upper anchoring means, the lengths of said loops between said upper anchoring means and said arm ends limiting lateral springing movement of said arms away from said stem means above the vessel mouth upon withdrawal of said stem means, the portions of said loops between said lower anchoring mid-portion and said upper spring arm ends being disposed

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on the insides of said arms between the latter and said stem means to permit said arms to ride against inner vessel walls upon stem means withdrawal.

11. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper anchoring means on said stem means and lower downwardly facing abutment means on said stem means located an appreciable distance below said upper anchoring means, an elongated piece of relatively stiff resilient rod-like material bent into a V-shaped structure with its mid-portion fastened against said abutment means and extending laterally on opposite sides of said stem means, the side portions of said V-shaped structure beyond said mid-portion extending upwardly on opposite sides of said stem means and divergingly away from the latter when unconfined to serve as biased spring arms when confined by vessel structure along said stem means, an elongated strip of wicking medially anchored to said stem means by said upper anchoring means with both wicking portions on opposite sides of said stem means looped down to said mid-portion to provide two lengths of wicking each appreciably longer than the distance between said top anchoring means and said mid-portion of said V-shaped structure, said laterally extending portions of said mid-portion on opposite sides of said stem means being pierced through said lengths of wicking to anchor them to said stem means thereby forming two loops of wicking, and means on the upper ends of said spring arms engaged into said loops of wicking appreciable distances away from said upper anchoring means with those portions of said arms between their upper wicking-engaging means and the lower piercing lateral portions of said mid-portion being disposed exteriorly of the portions of said wicking loops extending therebetween.

12. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper anchoring means on said stem means and lower downwardly facing abutment means on said stem means located an appreciable distance below said upper anchoring means, an elongated piece of relatively stiff resilient rod-like material bent into a V-shaped structure with its mid-portion fastened against said abutment means and extending laterally on opposite sides of said stem means, the side portions of said V-shaped structure beyond said mid-portion extending upwardly on opposite sides of said stem means and divergingly away from the latter when unconfined to serve as biased spring arms when confined by vessel structure along said stem means, an elongated strip of wicking medially anchored to said stem means by said upper anchoring means with both wicking portions on opposite sides of said stem means looped down to said mid-portion to provide two lengths of wicking each appreciably longer than the distance between said top anchoring means and said mid-portion of said V-shaped structure, said laterally extending portions of said mid-portion on opposite sides of said stem means being pierced through said lengths of wicking to anchor them to said stem means thereby forming two loops of wicking, means on the upper ends of said spring arms engaged into said loops of wicking appreciable distances away from said upper anchoring means with those portions of said arms between their upper wicking-engaging means and the

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lower piercing lateral portions of said mid-portion being disposed exteriorly of the portions of said wicking loops extending therebetween, and projecting means on the lateral portions of said mid-portion on the outsides of the pierced bottom ends of said loops to prevent slippage of the latter up said arms.

13. A liquid diffuser comprising, in combination, a vessel having a mouth, elongated stem means extending down through the mouth into said vessel, upper anchoring means on said stem means and lower downwardly facing abutment means on said stem means located an appreciable distance below said upper anchoring means, an elongated piece of relatively stiff resilient rod-like material bent into a V-shaped structure with its mid-portion fastened against said abutment means and extending laterally on opposite sides of said stem means, the side portions of said V-shaped structure beyond said mid-portion extending upwardly on opposite sides of said stem means and divergingly away from the latter when unconfined to serve as biased spring arms when confined by vessel structure along said stem means, an elongated strip of wicking medially anchored to said stem means by said upper anchoring means with both wicking portions on opposite sides of said stem means looped down to said mid-portion to provide two lengths of wicking each appreciably longer than the distance between said top anchoring means and said mid-portion of said V-shaped structure, said laterally extending portions of said mid-portion on opposite sides of said stem means being pierced through said lengths of wicking to anchor them to said stem means thereby forming two loops of wicking, means on the upper ends of said spring arms engaged into said loops of wicking appreciable distances away from said upper anchoring means with those portions of said arms between their upper wicking-engaging means and the lower piercing lateral portions of said mid-portion being disposed exteriorly of the portions of said wicking loops extending therebetween, and projecting means on the lateral portions of said mid-portion on the outsides of the pierced bottom ends of said loops to prevent slippage of the latter up said arms, said mid-portion and associated structure thereat being of an overall lateral dimension greater than the width of the vessel mouth to serve as stop means limiting stem means withdrawal when other than abnormal stop means-deforming pull is applied to said stem means.

14. A liquid diffuser comprising, in combination, a vessel having an elongated neck providing a mouth at the outward end thereof and a throat at the inward end thereof, a removable closure for the mouth, an elongated relatively stiff wire stem mounted on said closure and extending down through said mouth and neck into said vessel, upper wicking-anchoring means on said stem comprising a laterally extending reverse bend therein located an appreciable distance up from the bottom end of said stem, an eye at the bottom end of said stem formed by bending the latter into a loop, an elongated piece of spring wire bent into a generally V-shaped structure with its mid-portion comprising a relatively short laterally extending section merging at both ends into downwardly extending reverse

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bends providing laterally spaced-apart wicking stops, said mid-portion extending through said eye for anchorage of said V-shaped structure to said stem with said wicking stops being disposed on opposite sides of said stem, the side portions of said V-shaped structure beyond said wicking stops extending upwardly on opposite sides of said stem and divergingly away from the latter when unconfined to serve as biased spring arms when confined by vessel structure along said stem with the top ends of said arms extending an appreciable distance above said upper anchoring means, an elongated strip of wicking medially clamped in said reverse stem bend constituting said upper anchoring means with both wicking portions on opposite sides of said stem looped down toward said eye to provide two lengths of wicking each appreciably longer than the distance between said stem reverse bend and its bottom eye, said laterally extending section of said mid-portion being pierced through said lengths of wicking on opposite sides of said stem to form two loops of wicking each anchored at its bottom to said stem between the latter and one of said wicking stops, and means on the top ends of said spring arms pierced into said loops of wicking to attach them thereto with the portions of said arms between said points of piercing at said stem eye and at the top ends of said arms being on the outsides of said wicking loops, said top ends of said arms being thus attached to said wicking loops at appreciable distances away from the point of wicking anchorage by said reverse stem bend to permit limited lateral spreading of said arms and simultaneous flaring of said loops above the vessel mouth upon stem withdrawal, said strip of wicking having at least one depending wick connected thereto of a length sufficient to reach down into said vessel with submergence in liquid in the vessel when said stem is withdrawn to an evaporative position, said wicking stops being laterally spaced-apart a distance sufficient to provide said V-shaped structure thereat with an overall lateral dimension greater than the width of the throat of said neck to serve as stop means limiting stem withdrawal when other than abnormal structure-deforming pull is applied to said stem, the top ends of said spring arms and top bends in said wicking loops extending upwardly a limited distance along said stem when folded thereagainst so as to assure location of those top ends and bends in the neck between its throat and mouth when said closure is seated on the neck in mouth-closing position.

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