June 26, 1945. J. H. KLONER 2,378,934

ILLUMINATED BUBBLING ORNAMENT

Filed Aug. 5, 1943

Fig. 1.

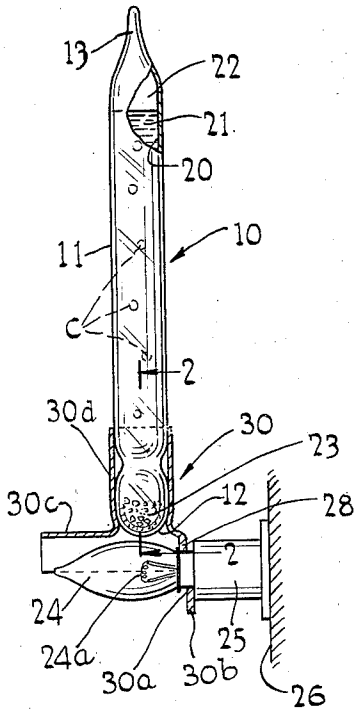


Fig. 2.

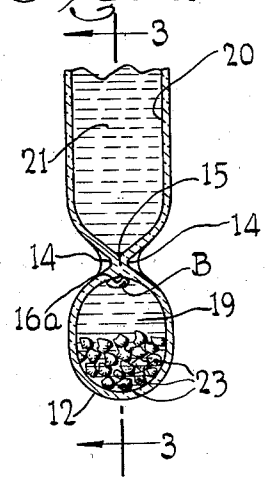


Fig. 3.

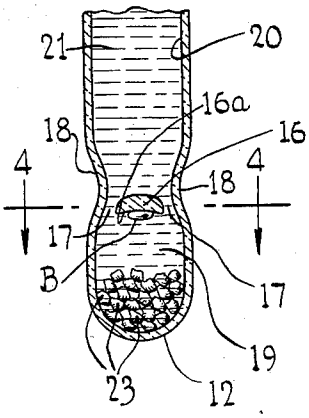


Fig. 4.

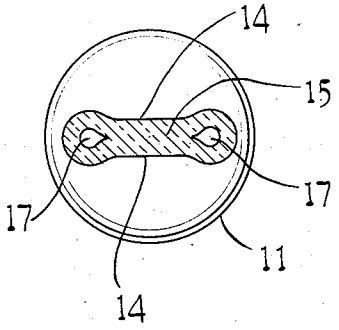
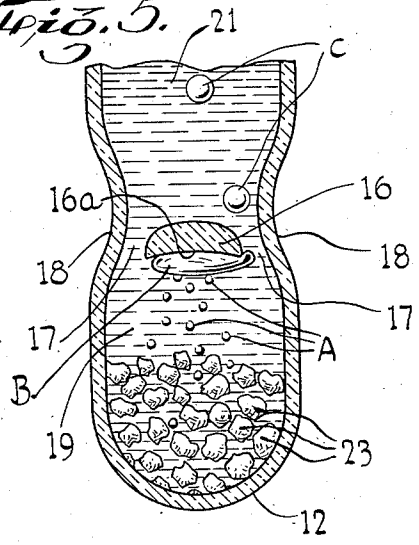


Fig. 5.



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ILLUMINATED BUBBLING ORNAMENT

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17 Claims. (Cl. 40—130)

This invention relates to improvement in bubbling illuminating devices and a method for operating same, and more particularly is directed to devices and a method of the character described which provides continuous streams of bubbles in a body of transparent liquid embodied in the operation and construction of illuminated ornamental and decorative display devices, such as for Chirstmas tree lighting, bubble signs and the like.

Among the objects of the invention is to generally improve devices of the character described and their method of operation in which a simplified construction of few and easily assembled parts are required, which shall be economical to manufacture especially in quantity production, which shall be positive and reliable in operation requiring a minimum of external heat supply, and which shall be practical and efficient to a high degree in use.

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

The invention accordingly consists of features of construction and method, combinations of elements, arrangement of parts and steps in operation which will be exemplified in the constructions and method hereinafter described and of which the scope of the application will indicate in the following claims.

In the accompanying drawing in which one possible illustrative embodiment of the invention is shown

Figure 1 is a side elevational view, partly in section, of the invention embodied in an illuminated bubbling ornament.

Figure 2 is an enlarged detail vertical sectional view taken on line 2—2 in Figure 1.

Figure 3 is another vertical sectional view taken on line 3—3 of Figure 2.

Figure 4 is an enlarged horizontal sectional view taken on the line 4—4 of Figure 3, and

Figure 5 is a view similar to Figure 3, shown on an enlarged scale, illustrating the method embodying the invention in which bubbles are generated, consolidated or merged into a single mass, and then subdivided into a flowing stream of bubbles in a spiralling effect.

Referring in detail to the drawing numeral 10 designates a bubbling ornament constructed to embody the invention, and is seen to include a sealed transparent glass tube body 11 having a closed rounded bottom end 12 and a closed upwardly tapered top end 13, so that in appearance it simulates the outline of a candle in form, shape and size. Opposed wall portions of the tube body 11 adjacent the bottom end 12 are pinched inwardly as at 14—14 until said wall portions meet in abutment or are fused together at 15. The meeting or fusing of said wall portions 15 may provide a domed baffle 16 which terminates within the tube body to provide a pair of spaced apart restricted passages 17—17, as shown in Figs. 3, 4 and 5. The baffle partitions the tube body 11 into a lower bubble generating chamber 19, an upper elongated chamber 20, and in addition provides for an accumulation space for a merged bubble B in the manner hereinafter described.

The tube body 11 contains preferably a readily volatilizable liquid 21 such as ether, wood alcohol or other like products having a relatively normal low boiling point. The liquid 21 may be placed in the tube body 11 through the top end 13 thereof, before fusing the walls thereof to a level short of said top end 13 as shown in Fig. 5. Air may be evacuated from space 22 above the level of the liquid 21 before the top end 13 is hermetically sealed to lower the normal boiling point of liquid 21. Said space 22 constitutes a condensing and heat dissipating means.

The lower or bottom end of the tube body 11 which forms as a bubble generating chamber 19, as shown in Figs. 1, 2, 3 and 5 may contain a porous or other substance having an extensive exposed surface, such for example as loose, broken lava particles 23. Said lava particles 23 may only partially fill the chamber 19 to provide free space to serve as an accumulator under the dome 16a of baffle 16 for streams of bubbles A generated and rising from lava particles 23, as shown in Fig. 5.

In Figure 1 of the drawing, the invention is shown with the bubbling ornament supported by its lower rounded end 12 and disposed in close proximity to a low wattage incandescent electric lamp, such as a miniature bulb 24 mounted horizontally in an electric socket 25 rigidly mounted on to a suitable support 26. For securely retaining the bubble ornament 10 in position over the bulb 24, a suitable connecting holder fitting 30 is provided. The neck of the bulb 24 passes through an opening 30a provided in a depending end wall 30b which may be integral found with one end of a half-round shield 30c of said holder fitting 30. The end wall 30a is constructed and arranged to be engaged between the base of the bulb 24 and the adjacent end of the socket 25 when the bulb 24 is screwed home into the socket 25 to firmly clamp the shield 30c against turning movement from the position shown in Fig. 1. The holder fitting 30 may be made of a molded plastic material and have integral formed therewith an upwardly extending tubular open ended extension 30d. The lower end 12 of the tube body

11, is firmly seated in said tubular extension 30*d* for supporting the bubble ornament 10 in a vertical upstanding position in the manner of a candle. When the extension 30*d* is made of an opaque material, the lower bubble generating chamber 19 is concealed from view, the lower rounded end 12 of the tube body 11 being then disposed directly above the source of heat, which in this instance, is filament 24*a* of the lamp bulb 24.

In practice, assume that the miniature electric lamp 24 is lighted. Heat radiated therefrom, although only to a degree of effective temperature slightly above that of the room atmosphere, acts upon the lava particles 23 in the chamber 19 and causes a continuous flow or stream of relatively small bubbles A to rise from the extensive exposed surface of said particles 23. The under or domed side 16*a* of baffle 16 being in the direct path of the rising bubbles A operates as a trapping barrier and provides the space immediately under the baffle 16 to serve as an accumulator. Thus the minute bubbles A rising from the particles 23 build up against the baffle domed underside 16*a* to form a larger or merged bubble B. When the latter expands and attains a size or spread to extend over either or both of the passages 17—17 it is transformed, that is, portions of the merged bubble B break away and rise through said passages 17—17 and lengthwise up through the chamber 20 in practically uniform sized bubbles C, the cross sectional area, construction and arrangement of passages 17—17 determining the size and flow of the stream of bubbles C being formed. By constructing passages 17—17 as shown in Fig. 5, a spiral movement effect is imparted to bubbles C rising in chamber 20, the side of tube body 11 being pressed inwardly at 18 as shown in Fig. 3, to provide such construction. As each large bubble B is broken down in passing through passages 17—17, the flow of the small bubbles A in a continous stream from the lava particles 23 keeps on building up the bubble B, and in fact helps equalize the flow. Since the lava particles 23 are loose within the chamber 19, they are free to shift their positions relative to the point at which the heat is applied and also relative to each other by reason of any turbulent action which may take place in the lower chamber 19 when heat is suddenly applied to a specific area. Such an arrangement is inducive of a quick starting action for the generation of a stream of bubbles A, and also results in constantly exposing covered surfaces of said particles 23 to the influence of heat applied. When in full operation, a highly activated stream of bubbles C appearing to flow with a spiral movement effect, appears to pass through in the upper chamber 20 which gives the desired illuminated bubbling effect. By reason of the indented portions 18—18, the passages 17—17 are formed to give bubbles C a predetermined flow path with spiral movement effect.

The lighting of bulb 24 to produce the bubbling effect above described illuminates the side wall of the transparent glass body 11 to the top end tip 13 and imparts the appearance of a lighted candle with illuminated ornamental body.

It has been found that the construction and arrangement of the baffle 16 and passages 17—17 are such as to predetermine the size of the bubble C being transformed from bubble mass B, so that changing the area of the passages 17—17 is effective to correspondingly change the size of the bubble C within wide limits.

It should be noted that the invention as above described and shown is extremely sensitive in operation and has been found to start and provide a continuous stream of bubbles C even when the immersed porous lava particles 23 are exposed only to radiant heat from a lighted cigarette provided as the heat source instead of the bulb 24. The device 10 will even feebly operate when the tube end 12 is grasped in the hand and heated thereby. This feature assures reliability of performance with a minimum supply of external heat.

The improved method embodying the invention will now be apparent. The column of volatile liquid 21 within the tube body 11 which is under or less than, atmospheric pressure because of the evacuated space 22 above the level of the liquid 21, has a minimum of external or radiant heat applied, as by means of the bulb 24, to act on the lava particles 23 immersed in the portion of the liquid 21 in chamber 19, at the tube bottom end 12. The extensive surface exposure of said porous lava particles 23 when so heated generates the small size bubbles A which rise up therefrom. The flow of these bubbles A by merging or coalescing within the liquid 21 on the under or domed surface 16*a* of the baffle 16, are accumulated, concentrating into a mass in the form of large bubble B. The latter spreads over said under surface 16*a* until it reaches the passages 17—17 where it breaks off as by a "fission" like action and in passing through, is divided and released in the form of a stream of bubbles C which arise through the column of liquid 21 in chamber 20 with a spiralling flow effect controlled by the pinched construction of tube portions 18—18. Thus it is seen that the flow of generated bubbles A are continuously concentrated into the mass bubble B after which it is divided in a "fission" manner as the mass bubble B enlarges into a flow of the bubble stream C of uniform size in a predetermined path. On reaching the space 22 the bubbles C are cooled, condensed and disappear, the condensed vapors thereof returning to the liquid 21 for replenishing same to continue the bubbling cycle of operations as long as said radiant heat is applied.

It is therefore seen that there is provided an improved device and a method of operation in which the objects of the invention are achieved and which are well adapted to meet all conditions of practical use.

As various possible embodiments may be made in the above invention for use for different purposes and as various changes might be made in the embodiments and method above set forth, it is understood that all the above matters here set forth or shown in the accompanying drawing are to be interpreted as illustrative and not in a limiting sense.

Thus having described my invention, I claim as new and desire to secure by Letters Patent:

1. A method of the character described consisting of producing a flow of relatively small bubbles in a liquid, concentrating the flowing bubbles into a mass by obstructing the flow, and then dividing the mass by restricting the release thereof into a stream of bubbles larger than those first produced for passage through the liquid.

2. The method defined in claim 1 including the step of controlling said dividing of the mass for predetermining the size of bubbles in said stream.

3. In the method of producing a stream of bubbles of the character described, the step of continuously dividing a mass bubble merged from generated smaller bubbles in a liquid by a "fis-

sion" like action to provide a stream of bubbles larger than those first generated.

4. A method of producing bubbles of the character described consisting of heating one end of a volatile liquid column under less than atmospheric pressure to generate relatively small bubbles for rising in said liquid column, merging said bubbles into a single mass bubble midway said liquid column, and subdividing the mass bubble while continuing the formation thereof into a stream of bubbles larger than those first generated for passage through the liquid column beyond said midway.

5. The method of producing bubbles of the character described consisting of heating a volatile liquid column under less than atmospheric pressure with a minimum of external heat in which there is immersed an extensive surface exposed vaporizing means adjacent the heating source to generate bubbles for rising in said liquid column, merging said generated bubble into a mass bubble within the liquid, and releasing bubbles larger than those first generated in a stream from said mass bubble as a source for passage through said liquid column.

6. The method of producing bubbles defined in claim 5 including the step of controlling the releasing of said bubble stream to produce a flow of substantially uniform sized bubbles.

7. A method of the character described consisting of generating a flow of bubbles in a liquid, transforming said bubbles into a coalescing mass, and then regenerating a stream of bubbles larger than those first generated from said mass while continuing the formation thereof.

8. In an illuminated bubbling device of the character described, a column of volatile liquid under reduced atmospheric pressure, means for applying heat externally to an end of said liquid column to a degree just above the normal temperature of said liquid column for generating bubbles in an upward stream, means in the path of the generated bubble stream to cause a coalescence for forming a bubble mass in a predetermined portion of the liquid column, and means carried by said coalescence means for releasing bubbles from said mass in a stream for passing through the liquid column.

9. In an illuminated bubbling device of the character described, a column of volatile liquid under reduced atmospheric pressure, means for applying heat externally to an end of said liquid column to a degree just above the normal temperature of said liquid, means immersed in said liquid column end adjacent to the heating means for generating bubbles in an upward stream, means in the path of the generated bubbles stream to cause a coalescence for forming a bubble mass in a predetermined portion of the liquid column, and means positioned adjacent said coalescence means for disassociating said bubble mass into a stream of bubbles flowing through the liquid, said last mentioned means being constructed and arranged to control the uniformity of size of the bubbles in said flowing stream.

10. A bubbling device of the character described having means for generating flowing bubbles in a liquid and including an accumulator means for merging the bubble flow generated in the liquid into an enlarged bubble mass, and subdividing means cooperating with the accumulator means for transforming said mass by a "fission" like action into a stream of bubbles larger than those first generated.

11. The bubbling device defined in claim 10 in which said subdividing means controls the size of the bubbles of said flowing stream.

12. A bubble ornament comprising a sealed transparent body having a lower chamber and an upper chamber connected together by a restricted passage, a volatile liquid filling the lower chamber and partially filling the upper chamber, the unfilled portion of said upper chamber being under reduced atmospheric pressure, a porous element having an extensive exposed surface immersed in the liquid of said lower chamber, the porous element in the lower chamber being adapted to be subjected to radiant heat for generating bubbles to rise in the liquid of said lower chamber, and means spaced above the porous element for trapping the generated bubbles within said lower chamber to form a single merged bubble and for releasing from the merged bubble through said passage in a flowing stream of bubbles through the liquid of the upper chamber.

13. A bubble ornament as set forth in claim 12 in which said means therein includes a perforated baffle formed from the tube body.

14. A bubble ornament comprising a transparent tube body containing a liquid, a baffle within the tube body adjacent the lower end thereof dividing the tube body into a lower bubble generating chamber and an upper chamber, said baffle having a concaved underside and formed with spaced apart passages therein establishing communication between the two chambers, and a porous element disposed below said baffle within the lower bubble generating chamber adapted to be subjected to a minimum of radiant heat for generating a multiplicity of minute bubbles rising from said element and becoming trapped beneath said baffle to form a single large bubble which on expanding passes upwardly through at least one of the passages as a flowing stream of intermediate size bubbles into said upper chamber.

15. A bubble ornament as set forth in claim 14 in which passages are shaped to cause said flowing stream of passing bubbles to give a spiralling effect on passing through the upper chamber.

16. A bubble ornament comprising a transparent tube body of substantially uniform diameter throughout its length having a liquid therein, a porous element disposed at the bottom of the tube body, a baffle within the tube body above the porous body having a plurality of passages therein, said element and baffle being so constructed and arranged that upon the application of minimum radiant heat will cause minute bubbles to rise from said element and become trapped beneath the baffle whereby a large bubble is formed thereunder which on being released through at least one of said passages rises upwardly as a flowing stream of bubbles in the liquid of the tube body.

17. A bubbling device for continuously generating a flow of bubbles in a lower portion of an elongated column of volatile liquid of the character described including means positioned in the path of flow for retarding same and permitting merger of said flow into an expanding mass bubble above said portion, said retarding means having a passage therethrough to permit parts of said mass bubble to pass in a flowing stream of bubbles larger in size than those first generated in the liquid into the column above said retarding means.

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