

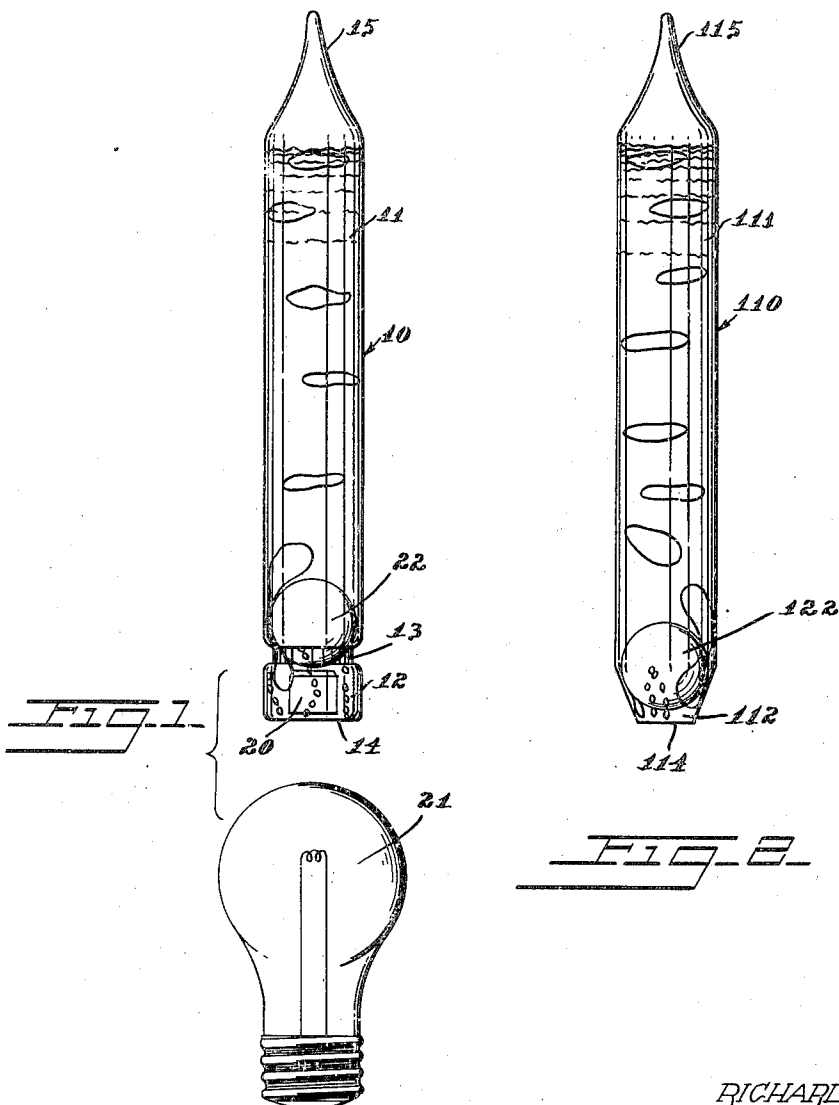
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VALVED BUBBLE TUBE

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VALVED BUBBLE TUBE

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My present invention relates to ornamental bubble devices and primarily to an ornamental bubbling tube or candlestick in which the body of the tube comprises an evacuated transparent or translucent tube containing a low boiling point liquid such as alcohol dissolved in water or benzol.

Heretofore ornamental bubble devices utilizing low boiling point liquid in an evacuated tube have been utilized for various display purposes and decorative effects. Such tubes have been mounted in display holders and containers. Other types shown generally in Patents Nos. 2,162,897, 2,031,416, and 2,031,409 have comprised a holder or mounting device, a source of heat or light and a separate bubble device or tube. The base or mounting for the display device provided means for holding a suitable heat or light source and means for supporting the bubble tube so that its lower end was in proximity to the heat or light source.

In bubbling tubes of this character, it is desirable first to concentrate the heat in a localized area, preferably at the lower end of the tube, so that the tube will start to bubble rapidly without the necessity for waiting for the entire volume of liquid to become heated and, second, to control the size of the bubbles so that instead of an occasional large size bubble a stream of small bubbles will form at the bottom of the tube and rise.

Various methods have been utilized for this purpose, including constricted areas at the lower end of the tube primarily to control bubble size, as well as to localize a volume of liquid which will be heated more rapidly and, therefore, begin to bubble sooner; porous materials or masses in the bottom of the tube, and various types of material which will act as so-called starters and have the combined effect of localizing relatively small volumes of liquid to produce early bubbling and restricting the size of the bubbles.

My present invention is directed to a novel and entirely different valve type arrangement for the combined purpose of localizing a relatively small volume of liquid which will be rapidly heated and for dividing the bubbles into a stream of small bubbles rather than occasional large bubbles.

The primary object of my invention, therefore, is the provision of an automatically operated

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valve at the lower end of the bubble tube enclosing or defining a small volume of the liquid and controlling automatically the size of the bubbles released from the small volume of liquid to rise through the upper end of the tube.

Another and more specific object of my invention is the provision of a ball valve adjacent the lower end of the tube seated in a constricted portion of the tube and spaced above the lower end.

Another object of my invention comprises the division of the tube into a lower smaller chamber and an upper larger chamber by an annular constriction and seating a valve, preferably of the ball type, in the annular constriction.

The lower chamber defined by the annular constriction and by the ball valve seated therein provides a localized small volume of liquid which may be rapidly heated.

When the bubbles are formed, they seek to escape by rising upwardly against the ball, thereby lifting the ball slightly to permit escape of the bubbles past the ball valve into the upper fluid filled chamber.

The large size bubble, thus formed beneath the ball valve escapes around the small annular space or arcuate space created by the lifting of the ball by the pressure of the bubble. This small annular or arcuate space squeezes the large bubble, dividing it into a plurality of small bubbles so that instead of a single large bubble rising occasionally through the liquid a stream of smaller bubbles rise.

Another object of my invention is the conformation of the lower end of the bubble tube to act as a valve seat without necessarily utilizing an annular indentation or constriction for this purpose but depending on various types of shaping of the lower end of the chamber as, for instance, by shaping the lower end of the chamber in frusto-conical form.

The foregoing and many other objects of my invention will become apparent in the following description and drawings in which:

Figure 1 is an elevation of one form which my novel bubble tube may take.

Fig. 2 is an elevation of an alternate form which my novel bubble tube may take.

Referring now to Figure 1, I have here shown a bubble tube in the form of an ornamental

candlestick having an upper chamber 11 and a lower chamber 12 defined by an annular recess or indentation 13 adjacent the bottom 14 of the tube.

The top 15 of the tube 10 may be shaped to simulate a candlestick. Various types of ornamental arrangements of the tube as suggested in the patents above-mentioned may be provided where desired.

The chambers 11 and 12 of the tube 10 are filled with a liquid having a suitable low boiling point, such as alcohol dissolved in water or benzol, and the tube 10 is evacuated.

A porous mass 20 may be placed in the lower chamber 12. This porous mass may be of any suitable porous material which would produce a multiplicity of minute volumes of liquid which will reach a boiling point very quickly when subjected to the heat of the light bulb 21 over which the tube 10 is positioned.

Actually, because of the small volume of the chamber 12, the porous mass 20, which may be of a type well known in the art, is not necessary since it will only be required to heat up the small volume of liquid in chamber 12 to produce the bubbling action.

The inclusion of the porous mass 20 will, however, permit practically immediate starting of the bubbling action when the heat source comprising light bulb 21 is turned on.

The chamber 12 is closed by the ball 22 which may be a glass ball or of other suitable material, the said ball 22 seating in the annular recess or constriction 13 and closing off the chamber 12.

When bubbles are formed in the chamber 12, they may be formed in large size bubbles or may collect as large size bubbles below the ball valve 22. When a sufficiently large bubble has collected so that the upper pressure thereof is enough to lift the ball 22, the ball 22 will either be raised up slightly or will be tilted or rocked slightly to one side to permit the large bubble to escape upwardly.

The large bubble will squeeze past the small annular or arcuate space thus created, being divided by this small annular or arcuate space into a plurality of small bubbles so that instead of a single large bubble a multiplicity of small bubbles will rise in chamber 11.

The action I have found is essentially that the large bubble in chamber 12 pushes up or rolls up the ball 22 on one side of the indentation 13 sufficiently to permit a very small portion of the large bubble in chamber 12 to escape.

The ball 22 falls back and when the large bubble increases in size once more, it again pushes up the ball 22 sufficiently to permit a small portion thereof to escape.

This action is so rapid, however, that a constant stream of small bubbles is rising in chamber 11, the rate being such that from four to eight bubbles are rising one after the other in the tube 10 of the order of three inches long.

Instead of a porous mass in the lower chamber 20, an appropriate starting material such as a coating of sugar may be placed on the surface of the ball 22 to concentrate the heat in small volumes of water and promote the rapid starting of the bubbles.

The fluid in the tube 10 may be appropriately colored so that the light from bulb 21 conducted therethrough will produce an appropriately pleasing effect.

The same principle that is herein described in connection with Figure 1 may be applied to various shapes or conformations of the bubble tube.

Thus, as shown in Figure 2, the bubble tube 110 having the top 115 and the base 114 may have an upper chamber 111 and a lower tapered frustro-conical chamber 112 so arranged that the ball 122 will seat against the sides of chamber 112 without touching the bottom 114.

The operation here is identical with that previously described in Figure 1.

A porous mass may be included in chamber 112 or the surface of the ball 122 may be appropriately coated. It is essential of course, that ball 22 of Figure 1 or ball 122 of Figure 2 be of a greater density than the liquid in chambers 111 and 112 or chambers 11 and 12 so that it will seat against the upper end of the lower chamber and contain the large bubbles formed in the lower chamber until they develop sufficient pressure to lift the ball or push it aside and thereby permit a small portion of the bubble to escape.

Various other shapes may, of course, be provided in order to provide an upper chamber and a lower chamber and a valve seat between the upper and lower chambers.

The valve opening need not necessarily be circular but may have any other appropriate shape, and the valve member 22 or 122 need not necessarily be spherical but may also have any appropriate shape in order to seat properly in the constricted area which defines the lower chamber.

By this means, therefore, a continuous bubbling action is provided whereby the large bubbles generated at the lower end of the bubble tube are controlled and divided into a stream of rapidly rising small bubbles.

In the foregoing I have described my invention solely in connection with specific illustrative embodiments thereof. Since many variations and modifications of my invention will now be obvious to those skilled in the art, I prefer to be bound not by the specific disclosures herein contained but only by the appended claims.

I claim:

1. An ornamental bubbling device comprising a tube of light transmitting material having a lower chamber and an upper chamber; said chambers being evacuated and filled with a low boiling point liquid; a valve seat between said lower chamber and said upper chamber; and an upwardly displaceable spherical valve member resting on said valve seat.

2. An ornamental bubbling device comprising a tube of light transmitting material having a lower chamber and an upper chamber; said chambers being evacuated and filled with a low boiling point liquid; an annular valve seat between said lower chamber and said upper chamber; and an upwardly displaceable spherical valve member resting on said valve seat.

3. An ornamental bubbling device comprising a tube of light transmitting material having a lower chamber and an upper chamber; said chambers being evacuated and filled with a low boiling point liquid; an annular ledge in the interior of the tube defining the lower and the upper chamber and forming a valve seat between said lower chamber and said upper chamber; and an upwardly displaceable valve member resting on said valve seat.

4. An ornamental bubbling device comprising a tube of light transmitting material having a lower chamber and an upper chamber; said chambers being evacuated and filled with a low boiling point liquid; an annular ledge in the interior of the tube defining the lower and the upper chamber and forming a valve seat between said lower chamber and said upper chamber; and

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an upwardly displaceable spherical valve member resting on said valve seat.

5. An ornamental bubbling device comprising a tube of light transmitting material having a lower chamber and an upper chamber; said chambers being evacuated and filled with a low boiling point liquid; said tube having a reduced internal diameter adjacent its lower end defining a valve seat; and an upwardly displaceable valve member resting on a portion of said reduced diameter and cooperating therewith to define the lower and the upper chamber.

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