

[54] DECORATIVE DISPLAY DEVICE

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[58] Field of Search 40/106.21, 106.22,
40/106.51-106.54, 40

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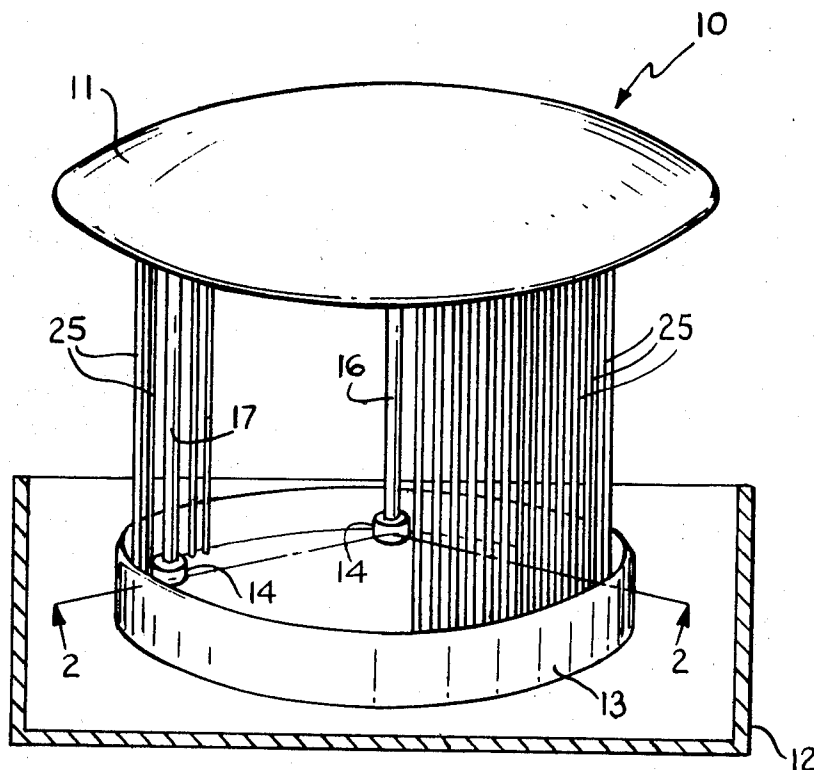
Attorney—Bruns & Jenney

[57] ABSTRACT

A display device is arranged for the continuous passage

of slow-falling droplets of viscous liquid alternating with bubbles of air, down a plurality of transparent tubes from an upper reservoir to a lower reservoir. A pump is arranged to continuously pump liquid from the lower reservoir to the upper reservoir and an overflow conduit from the upper reservoir to the lower reservoir is arranged to maintain a constant level of liquid in the upper reservoir. The transparent tubes have their upper ends in sealed engagement with the upper reservoir and their upper end openings immersed in the liquid. A shorter intermediate tube with a plurality of apertures therethrough is loosely contained in the upper end of each transparent tube and immersed in the liquid and a third tube apertured at its lower end is loosely contained in each intermediate tube, the upper end of each third tube being exposed to atmosphere above the level of the fluid. Fluid flows slowly down between the tubes and entraps bubbles of air drawn down the smaller third tube between droplets of fluid. Colored lights may be directed on the transparent tubes which may be of a variety of colors.

3 Claims, 6 Drawing Figures



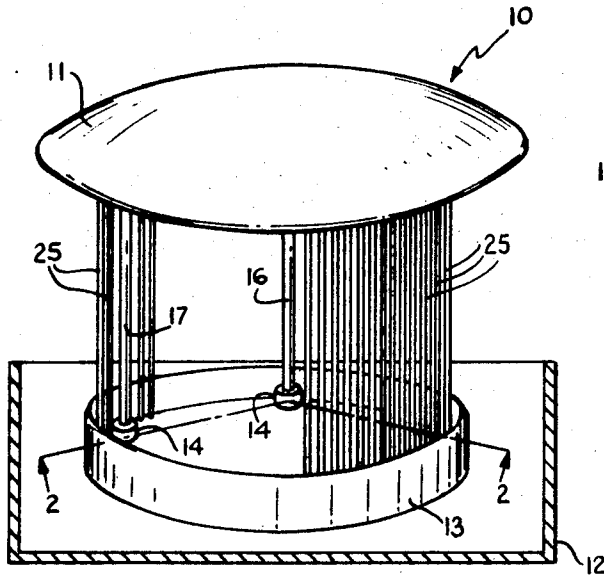


Fig. 1

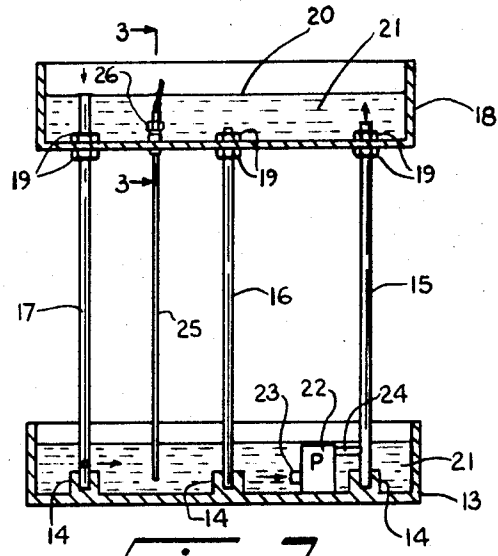


Fig. 2

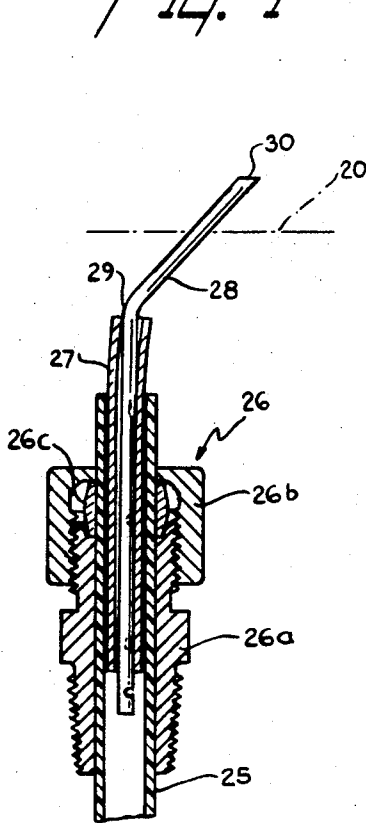


Fig. 3

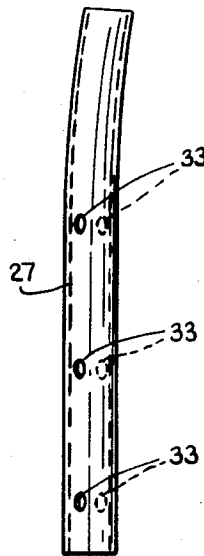


Fig. 4

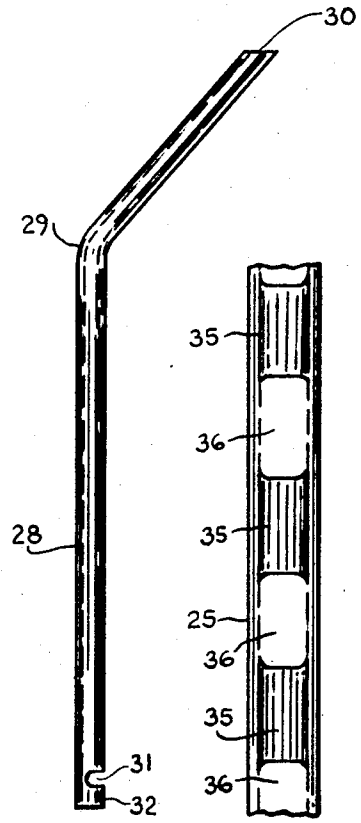


Fig. 5

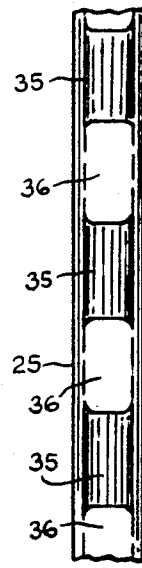


Fig. 6

DECORATIVE DISPLAY DEVICE

BACKGROUND OF THE INVENTION

This invention relates to display devices in which droplets of liquid interspersed with bubbles of air flow down a plurality of transparent tubes while lights play upon the tubes.

Heretofore, similar devices provided spaced droplets moving along a tube. Pump means were utilized to pump the droplets and intervening bubbles of air through the tubes and motor driven valve means were necessary to provide means for alternating the droplets and bubbles.

Similar devices also have been known wherein spaced droplets of a viscous liquid flow down a plurality of vertical threads or strings. A pump is employed in such devices to pump the liquid from a lower reservoir to a finely adjusted and complicated upper distributor head and a finely adjusted constricted portion of the head is provided in the flow path of the liquid to each thread or string to assure the spacing of the droplets on the strings.

Both such types of devices require complicated and expensive parts to achieve the desired visual effect and frequent adjustment of the complicated parts are usually required.

SUMMARY OF THE INVENTION

The present invention contemplates a lower reservoir and an upper reservoir with a pump for constantly supplying liquid to the upper reservoir from the lower one, the upper reservoir having an overflow pipe to maintain a constant level of fluid therein. A plurality of transparent tubes have their upper ends in sealed relation with the upper reservoir and their upper end openings below the fluid level. The lower ends of the tubes may be secured in the lower reservoir or may hang free in the lower reservoir.

To obtain alternate droplets of fluid and air an inner tube is inserted in the upper end of each outer transparent tube. The inner tube extends above the outer tube above the fluid level to supply air and the inner diameter of the inner tube and the space between the inner tube and the outer tube is carefully chosen to obtain the spacing of the droplets falling down to the outer tube. The space between the inner and outer tube may be conveniently constricted by using an intermediate tube between inner and outer tube, the upper opening of the intermediate tube being below the fluid level. A plurality of holes through the intermediate tube may be provided for insuring free passage of the fluid between the tubes.

The transparent tubes are colored and may be many tubes of a variety of colors. The fluid is preferably a viscous fluid for obtaining a slow downward flow of droplets and colored lights may be played on the tubes to enhance the visual effect.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary, diagrammatic, perspective view, partly in section, of a device embodying the invention;

FIG. 2 is a sectional view thereof on the line 2—2 of FIG. 1, with top and base removed;

FIG. 3 is a greatly enlarged sectional view on the line 3—3 of FIG. 2;

FIS. 4 and 5 are further enlarged elevational views of the intermediate and inner tubes, respectively, shown in FIG. 3; and

FIG. 6 is an enlarged fragmentary view of a portion on one of the transparent outer tubes in operation showing droplets of fluid interspersed with bubbles of air.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, the display device may have an ornamental cover 11, here shown as round and dished but which may be of any ornamental shape, and a tray-like base 12, which may contain plants or other decorative material, and contains a lower reservoir 13.

Referring to FIG. 2, upwardly projecting lugs 14 on the floor of reservoir 13 support three upwardly extending support tubes 15, 16 and 17 whose upper ends are in sealed relation with an upper reservoir 18 and secured thereto by nuts 19 or otherwise. The tubes 15 and 16 extend for only a short distance above the floor of reservoir 18 and tube 17 extends for an additional distance, its upper end serving as an overflow exit for conducting liquid above its end back to reservoir 13 and keeping a constant level 20 of liquid 21 in reservoir 18. Liquid 21 may be automotive engine lubricating oil.

Reservoir 13 is also partially full of liquid 21 and a motor driven pump 22 has an intake 23 below the level of liquid in reservoir 13 and an outlet tube 24 connected to the tube 15. The pump 22 may be of the easily obtained and economically priced type used in small fish aquariums and is continually operated to supply liquid 21 to the upper reservoir 18 to maintain its level at 20.

A plurality of transparent tubes 25 are secured to the upper reservoir 18 adjacent the perimeter thereof and hang down into reservoir 13, as indicated by the single tube 25 shown in FIG. 2. Alternatively, the lower ends of tubes 25 may be anchored to the reservoir 13 but with their ends open for the passage of liquid and air bubbles therethrough.

Referring to FIG. 3, each tube 25 is provided with a well known three-part, bushing type, fitting 26 at its upper end, the lower portion 26a of the fitting being provided with pipe threads in sealed engagement with a similarly threaded hole in the floor of reservoir 18. The upper end of the fitting part 26a is threaded and engaged with cooperating internal threads in the cap part 26b for compressing the bushing part 26c in sealed relation with tube 25.

Tubes 25 may be of any transparent material but are preferably of a transparent, substantially rigid, plastic material, such as acetate butate, and all the tubes 25 may be of one color or of different colors. Slightly opaque tubes, classed as translucent tubes may also be used but the transparent tubes are preferred.

Each tube 25 is provided at its upper end with a shorter intermediate tube 27, which may be of brass, slidably inserted in the upper end of the tube 25. The upper end of tube 27 may be slightly bent, as shown, to prevent its falling down into the tube 25 and the upper end openings of tubes 25 and 27 are maintained below the level 20 as indicated by the broken line in FIG. 3.

Inside tube 27 an inner tube 28, also of brass, is provided, with a loose sliding fit in tube 27. Tube 28 may be bent at 29 to keep it from falling down tube 27 and its end opening at 30 is maintained above the level 20,

as shown, so as to admit air to tube 25. The inner tube 28 may terminate within tube 27 or may project down therefrom a short distance, as shown. A slot 31 is cut across the lower end of tube 28 spaced from its end to provide an air outlet and a pendant portion 32 as a fluid droplet collection means, as will appear.

Tubes 25 are 1/4 inch tubes, although this O.D. (outside diameter) dimension may be approximate so long as it is operable with the fitting 26. The I.D. (inside diameter) of each tube 25 is substantially 1/8 inch although, in practice, this dimension is slightly larger. Tube 27 is an 1/8 inch tube and if it is not loosely slideable in tube 25 its O.D. may be reduced by polishing.

The I.D. of tube 27 is about 3/32 inch and the O.D. of tube 28 is 1/16 inch so as to be loosely slideable in tube 27. The I.D. of tube 28 is of the order of 1/64 inch, or slightly less, providing a very restricted passage for air. Both tube 27 and tube 28 are readily obtained sizes. Tubes 25 may readily be obtained manufactured to prescribed O.D. and I.D. dimensions.

It will be apparent that the I.D. of tubes 25 is preferably large so as to maximize the visual effect and that the I.D. of tubes 28 is preferably small to minimize the spacing between droplets of fluid. A single inner tube with a small I.D. such as that of tube 28 and a large O.D. comparable to that of tube 27 could be provided but such a tube would be expensive to provide and the availability of tubes such as 27 and 28 makes the three tube combination preferable.

In operation, liquid 21 flows downward in the passage between tube 25 and tube 27 and in the passage between tube 27 and tube 28, the viscosity of liquid 21 and the small size of the passages making this flow slow. Liquid droplets collect on the portion 32 of the inner tube, the collection being caused by capillary attraction of the liquid with portion 32 and with the inner walls of tube 25. When the droplet reaches a certain size it starts to move downward in tube 25, slowed by the capillary attraction between droplet and tube, it draws air down the tube 28 out of the slot 31 until the slot is closed by the collection of another droplet.

Referring to FIG. 6, a section of a tube 25 is shown with droplets 35 interspersed or separated by air bubbles 36 which slowly fall in the tube 25. When lights are played on the tubes 25, the droplets 35 appear shiny and the air bubbles take on the color of the tube 25.

It will be appreciated that, when there are a plurality of tubes 25, the slowly falling droplets 35, continually spaced by the bubbles 36, take on the aspect of falling water such as in a waterfall.

I claim:

1. A decorative display device comprising a lower reservoir and an upper reservoir, a plurality of elongated support means extending from the lower to the upper reservoir, a continuously operating pump supplying liquid from the lower to the upper reservoir, an overflow opening in the upper reservoir regulating the level of liquid in the upper reservoir and adapted to dis-

charge into the lower reservoir, a plurality of transparent tubes having their upper ends in sealed engagement with the upper reservoir and their upper end openings below the liquid level of the upper reservoir and their lower end openings discharging into the lower reservoir, a shorter inner tube secured within the upper end of each transparent tube and having a constricted inside diameter, the open end of each inner tube projecting above the liquid level of the upper reservoir, the lower end of each inner tube having an air discharge opening narrowly spaced from its end and having a pendant droplet collecting portion below the discharge opening, the space between the outer wall of each inner tube and the inner wall of its associated transparent tube being constricted, whereby, in each transparent tube, liquid from the upper reservoir flows slowly down the constructed space between the tube walls to the droplet collecting portion, collects into a droplet and falls, drawing air into the transparent tube until another droplet collects and falls, thereby forming a continuously falling alternate series of droplets and air bubbles slowly descending in each transparent tube.

2. A decorative display device comprising a lower liquid reservoir and an upper reservoir, a plurality of support tubes extending from the lower to the upper reservoir, a continuously operating pump supplying liquid from the lower reservoir to the upper reservoir through one of the support tubes, another support tube having its upper end forming an overflow opening fixing the liquid level in the upper reservoir and discharging into the lower reservoir, a plurality of transparent tubes having their upper ends in sealed engagement with the upper reservoir and their upper end openings below the liquid level therein and their lower end openings discharging into the lower reservoir, a shorter intermediate tube slideably contained and secured in the upper end of each transparent tube, another shorter inner tube slideably contained and secured in each intermediate tube and having a constricted inside diameter, the upper end of each inner tube projecting above the upper reservoir liquid level, the lower end of each inner tube having an air discharge opening narrowly spaced from its end and having a pendant droplet collecting portion below the discharge opening, whereby, in each transparent tube, liquid from the upper reservoir flows slowly down the spaces contiguous to the inside and outside wall surfaces of the intermediate tube to the droplet collecting portion, collects into a droplet and falls, drawing air into the transparent tube until another droplet collects and falls, thereby forming a continuously falling alternating series of droplets and air bubbles slowly descending in each transparent tube.

3. The decorative display device defined in claim 2 wherein each intermediate tube has a plurality of holes therethrough for providing a free flow of liquid between the spaces contiguous to the intermediate tube wall surfaces.

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