July 15, 1969 J. BALKIN 3,455,509

FOUNTAIN

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Fig. 1

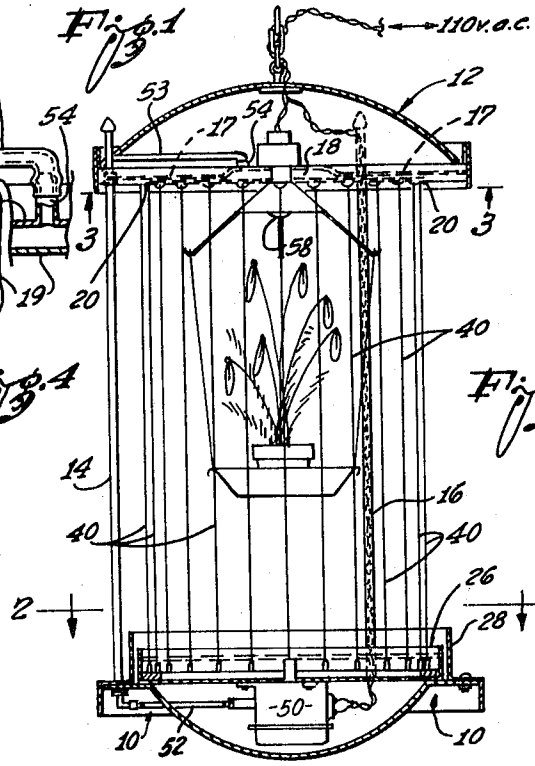


Fig. 4

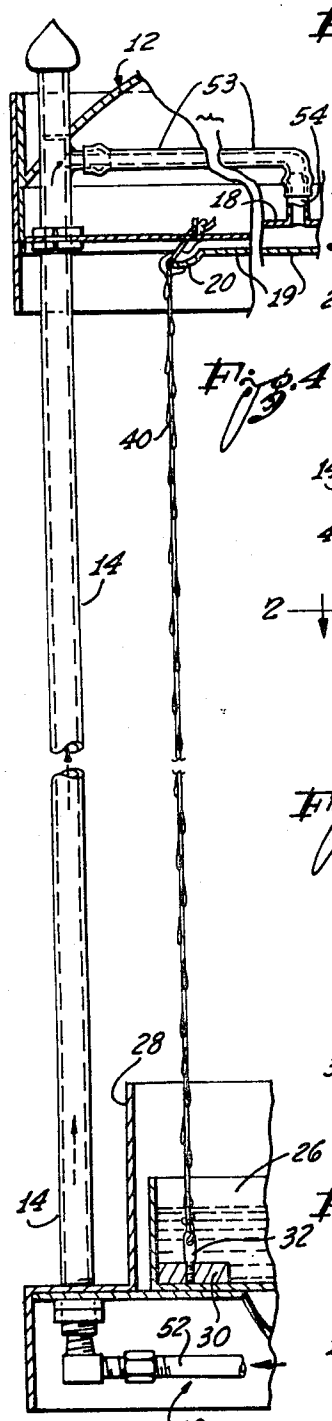


Fig. 5

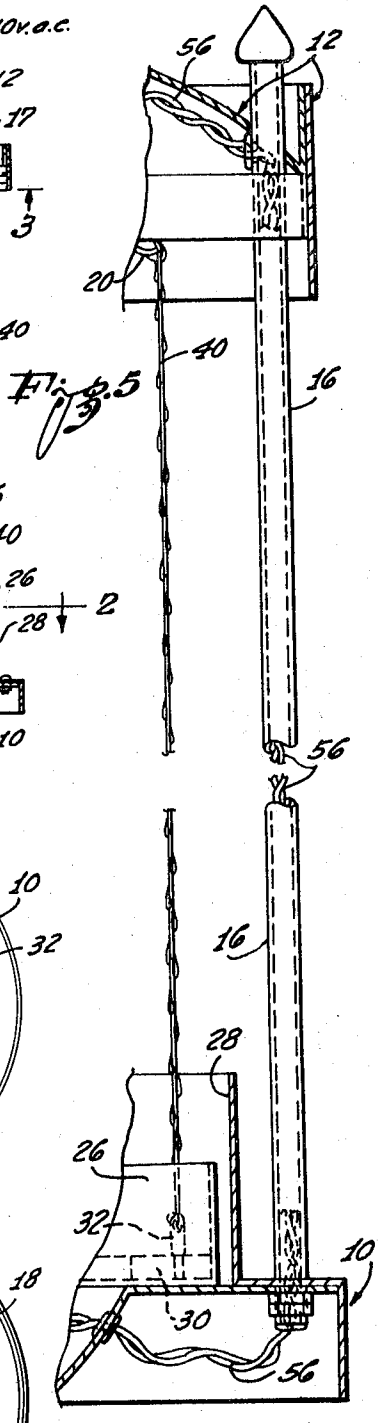


Fig. 2

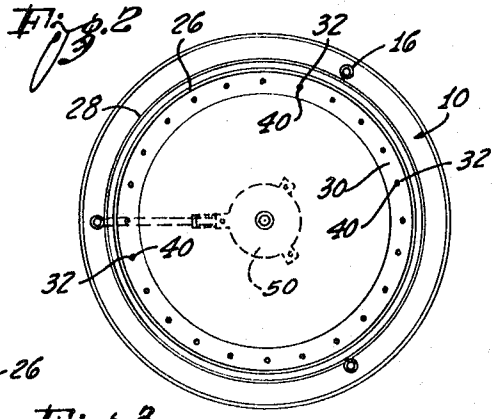


Fig. 3

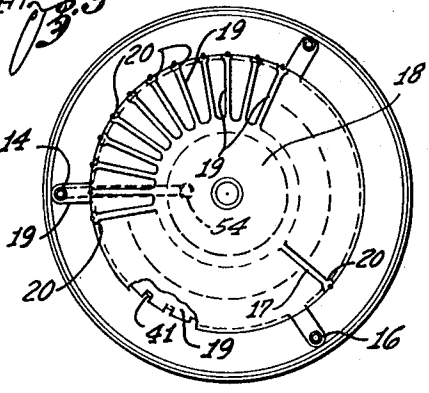
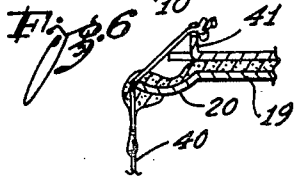


Fig. 6



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Fig. 7

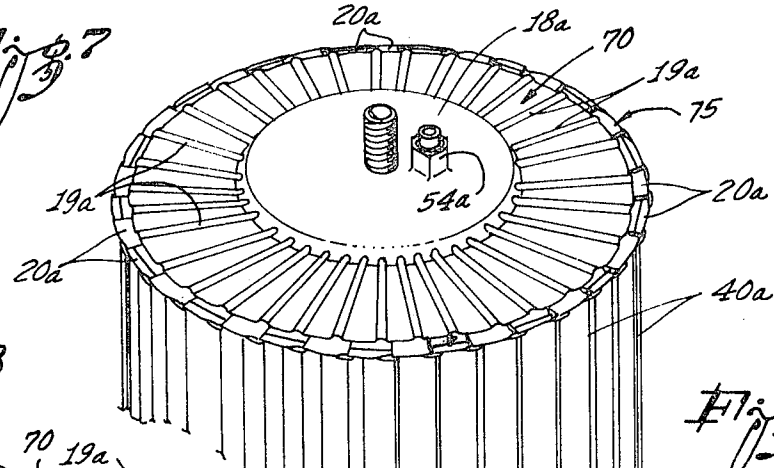


Fig. 8

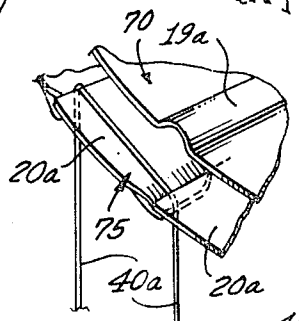
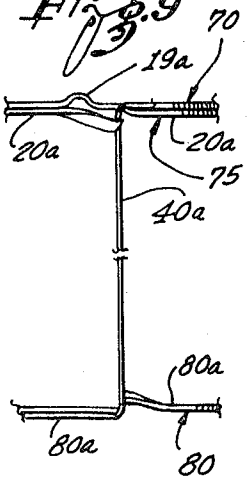
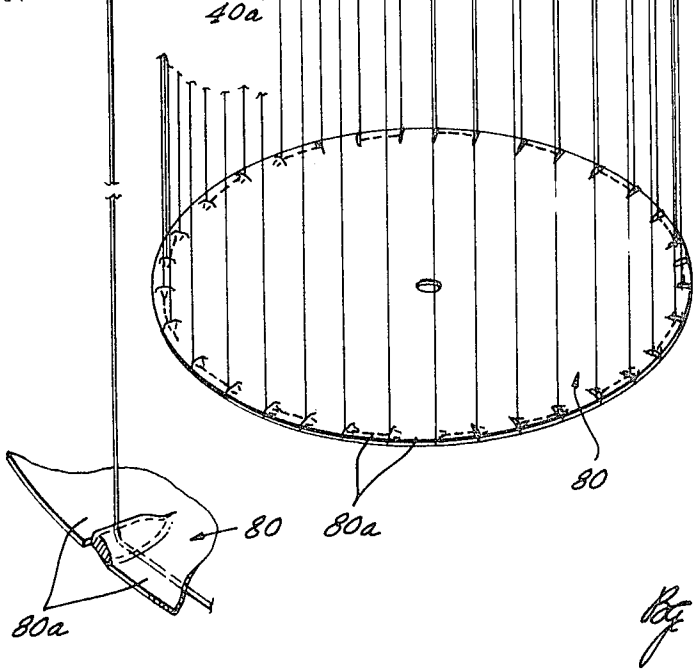


Fig. 9





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United States Patent Office 3,455,509 Patented July 15, 1969

3,455,509

FOUNTAIN

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Filed July 26, 1967, Ser. No. 656,140
Int. Cl. B05c 5/02; F21p 7/00
U.S. Cl. 239—18 8 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates generally to fountains, and it relates more particularly to a self-contained unit which creates the impression of falling droplets, the unit having any desired configuration.

BACKGROUND OF THE INVENTION

The improved fountain of the invention is constructed to create the impression of delicate, silently-falling, droplets of fluid. The motion is continuous. The paths of the droplets can be arranged in a cylindrical cage-like configuration, so as to enclose a central object. Alternately, the paths of the droplets can be arranged in a uniplanar relationship, so that the unit may be used, for example, as a room divider, or the like.

The fountain to be described includes a plurality of taut cords (composed, for example, of nylon). These cords extend vertically in a spaced and parallel relationship between the top and the bottom of the unit. As mentioned, the cords can be disposed to circumscribe a cylindrical shape in a cage-like configuration. Alternately, the cords can be disposed, as noted, in a uniplanar relationship, or in any other desired configuration.

By a continuous pumping action, to be described, a clear, transparent oil, or other suitable viscous fluid, is circulated to a first manifold at the top of the unit from which a number of capillary tubes or passages extend. The cords are connected to the edges of, or immediately under, respective troughs which are positioned at the end of each capillary tube. The selected fluid has a surface tension and wettability such that it forms itself into droplets, as it flows over the edge of each trough and runs down the cords. This creates a silent, soothing, fascinating, rhythmic effect on the observer.

The pump itself may be any suitable type, and it may be actuated by the usual 110 volt alternating current receptacle. The entire unit is trouble free, and it requires a minimum of maintenance.

The fountain of the invention can be constructed in any desired size or shape, as noted above. It may be used in the home, lobby, hall, restaurant, or the like, so as to create atmosphere and decor in the establishment.

Moreover, the fountain of the invention may be used commercially, as an advertising display, with the paths of the droplets surrounding the products being advertised, or forming a foreground or backdrop for the product.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a side sectional view showing a unit embodying the invention, and constituting one embodiment of the invention;

FIGURE 2 is a cross-sectional view of the unit of FIGURE 1, substantially on the line 2—2, and looking down toward the bottom of the unit, showing the lower manifold;

FIGURE 3 is a cross-sectional view, substantially on the lines 3—3, and looking up at the underside of the top of the unit, showing the upper manifold and radial capillary tubes of the unit;

FIGURE 4 is a fragmentary side sectional view of the unit on an enlarged scale with respect to FIGURES 1–3, and showing various operating components of the unit;

FIGURE 5 is, likewise, a fragmentary side sectional view of the unit, showing, likewise, on an enlarged scale with respect to FIGURES 1–3, other operating components of the unit;

FIGURE 6 is a fragmentary enlarged section showing the trough at the end of the capillary tube of the upper manifold;

FIGURE 7 is a perspective of a presently preferred embodiment of the unit;

FIGURE 8 is a partial perspective of the embodiment of FIGURE 7 showing how the cords are supported in the unit; and

FIGURE 9 is a fragmentary elevation view of the embodiment of FIGURE 7 also showing how the cords are supported.

DESCRIPTION OF ONE EMBODIMENT OF THE INVENTION

At the outset, it should be reiterated that the representation of the invention shown in the accompanying drawing represents but one embodiment. It will be better comprehended, as the description proceeds, that the fountain unit of the invention may take on any of a wide variety of shapes and sizes, without departing from the concept of the invention.

In the unit shown in the drawing, a base member **10** is provided together with a top member **12**. The base member and top member are separated from one another by means of a plurality of upright tubular support members, such as the members **14** and **16**. The vertical tubular support members **14** and **16** are attached to the base **10** and to the top **12** in any appropriate manner.

A manifold **18** is supported in the top member **12**. The manifold **18** has a plurality of radial capillary tubes **19** extending therefrom (FIGURE 3). A slanted trough **20** is formed integral with each of the tubes **19** and is located at the end thereof, as best shown in FIGURES 4 and 6.

A tank **26** is supported on the base member **10** directly under the top member **12**. The tank **26** forms a sump or lower manifold for the fluid circulated through the unit as will be described. A cylindrical shaped shield **28** is also mounted on the base member **10**, the shield **28** surrounding and screening the tank **26** so as to enhance the decorative aspects of the assembly.

An annular ring **30** is mounted on the bottom of the tank **26**, and it extends around the periphery of the tank. The ring **30** has a plurality of tapped holes, or punched slots, formed in it, these being respectively aligned with the edges of the troughs **20** at the ends of the capillary tubes **19** at the upper end of the unit.

A plurality of eye brackets **32**, or slots, are mounted or formed in the ring **30**. A plurality of cord-like members **40** extend from the ends of the respective capillary tubes **19** across the edges of the corresponding troughs **20** (FIGURE 6), and down to the corresponding eye brackets **32**. These cords, in the embodiment shown in FIGURE 1, are vertical, and are spaced and parallel to one another, so as to define a cylindrical cage-like unit.

Each of the cord-like members **40** may be composed, for example, of nylon. These cords, in each instance, are looped through an integral bracket **41** on the corresponding capillary tube **19** and through the corresponding eye bracket **32** in the ring **30** in the lower manifold. The cords **40** are knotted, as shown, so that each one extends in a taut condition between the end of a tube **19** at the top **12** and a corresponding eye bracket **32** in the tank **26** at the bottom **10**.

A pump **50** is mounted, for example, in the base **10**. The inlet of the pump is coupled to the interior of the sump tank **26**. A tubular member **52** composed, for ex-

ample, of plastic, couples the outlet of the pump to the tubular member **14**. The tubular member **14** serves an additional function of returning the fluid pumped by the pump **50** to the manifold **18** in the top member **12**. The latter connection is made, for example, through tubular member **53** (FIGURE 4) to a fitting **54** on the manifold **18**.

Electric energizing leads **56** for the pump motor may be brought down through the tubular member **16**. These leads may also be used to energize an electric lamp **58**, the lamp forming part of a display **60** suspended within the confines of the cord-like members **40** from the top **12**.

A liquid, with an appropriate viscosity and surface tension may be placed in the tank **26** of the lower manifold. The liquid, for example, may be transparent hydraulic or transformer oil. The apparatus described above serves to distribute and regulate small quantities of the viscous liquid to various locations by the capillary and surface tension principle.

The apparatus, as described, includes the upper manifold **18** to which a number of capillary tubes or passages **14** are connected. The capillary tubes, in the illustrated embodiment, extend radially outwardly from the manifold. The flow area and length of the individual capillary tubes **19** are selected so that a desired flow rate can be maintained in each passage with a substantial pressure head being established in the enclosed manifold **18** by the pump **50**.

The use of relatively long capillary tubes **19** with respect to the diameter of the manifold **18** offers a high "laminar" flow resistance to the liquid and creates sufficiently high back pressure so that variations in the static levels of the flow discharge points will not appreciably affect the flow rates.

The metered flow of the viscous liquid through each of the capillary passages **19** discharges into a corresponding trough **20**. The trough is sloped slightly (FIGURE 6), so that the liquid can gradually creep to the outer edge of the trough.

As shown in FIGURE 6, the liquid will adhere to the bottom surface of the trough **20** by the surface tension of the liquid, and this holds the liquid in the form of a drop until the drop reaches a sufficient size that the gravity force exceeds the surface tension force and causes the drop to fall away from the bottom surface of the trough.

As the drop grows in size, it touches and clings to the adjacent cord **40**. When the drop becomes large enough to break away from the bottom surface of the trough **20**, it runs down along the cord by the clinging action of the surface tension of the liquid. Because of the intermittent drop formation, it creates an impressive array of liquid globules falling down each of the cords.

In design, it is therefore necessary to place each cord no further away from the corresponding trough than the size of the liquid drop. In order to create the maximum liquid globulation effect, liquids of high surface tension and high wettability are preferred.

An additional purpose for the individual troughs is to form the liquid into globules immediately upon contact of the liquid with the corresponding cord. Without the surface tension effect of the troughs, the liquid will not form into globules until it has fallen a certain distance along the cord so as to achieve a sufficiently high velocity to become a globule, as is the practice in the prior art type of apparatus. This creates undesirable irregularities in the size and flow of the globules in the prior art type of apparatus.

As mentioned above, the actual unit of the invention may take on a wide variety of shapes and sizes, and it may be used in conjunction with a wide variety of lamps, lanterns, lighting and other fixtures. The actual concept embodied by the apparatus of the invention is that of providing a distribution system whereby in continuously moving series of globules or droplets move along a plurality of separate paths, so as to provide a display for the purposes described above.

In the representation shown in FIGURES 7, 8 and 9, only those portions of the modified embodiment different from those described above are shown. As mentioned above, the embodiment of FIGURES 7–9 is presently preferred, mainly because of the ease with which the units incorporating its concepts can be fabricated.

In the latter embodiment, the manifold **18***a* is formed of a pair of plates **70** and **75** which are welded, or otherwise joined together, in facing and mutual engaging relationship. The plate **70** is configured to define the radial capillary tubes **19***a*. The outer edge of the plate **75** (which extends radially beyond the outer edge of the plate **70**) is formed with a plurality of radial slots; and corresponding configured segments **20***a* extend between the slots, as shown, to constitute the troughs of the unit.

The lower plate of the previous embodiment is replaced in the embodiment of FIGURES 7–9 with a disc **80**. The disc **80** has radial slots at its periphery which form a plurality of segments appropriate for supporting the cord **40***a*.

In the latter embodiment, the cords **40***a* are formed by threading a continuous cord between the troughs **20***a* in the upper plate **75** and the segments **80***a* in the lower disc **80**. The fluid is introduced into the manifold **18***a* through a fitting **54***a*, and the action of the latter embodiment proceeds in a manner similar to that described above in conjunction with the previous embodiment.

Therefore, it will be appreciated that while particular embodiments of the invention have been shown and described, modifications may be made. It is intended in the following claims to cover all modifications which come within the scope of the invention.

What is claimed is:

1. An ornamental unit including: a base member; a top member defining a closed manifold and a plurality of capillary passages extending outwardly from said manifold in a generally horizontal plane; support bracket means extending between said base member and said top member for vertically separating said top member from said base member and for supporting said top member over said base member as a unitary assembly; a plurality of cord-like members extending essentially vertically between the ends of respective ones of said capillary passages in said top member and said base member; and means for introducing a viscous fluid of a particular surface tension under pressure to said manifold means to establish a pressure head in said manifold means so as to cause the viscous fluid to be distributed through said capillary passages and to run down said cord-like members as an array of liquid globules.

2. The unit defined in claim **1**, and which includes a tank supported on said base member for receiving said fluid from said cord-like members; tubular return means extending upwardly from said tank to said manifold; and a pump coupled to said tubular return means for circulating the fluid from said tank to said manifold so as to establish said pressure head in said manifold.

3. The unit defined in claim **1**, in which said top member comprises a pair of disc-like plates attached to one another in mutual engaging coaxial relationship, to form said manifold and said capillary passages.

4. The unit defined in claim **1**, in which said base member includes a disc having radial slots at the periphery thereof for receiving said cord-like members.

5. The unit defined in claim **1**, and in which said top member defines a plurality of troughs positioned at the ends of respective ones of said capillary passages, and in which each of said cord-like members is positioned in the vicinity of corresponding ones of said troughs.

6. The unit defined in claim **5**, in which said troughs are formed integral with said top member.

7. The unit defined in claim 1, in which said top member and said base member each has a circular configuration, and in which said cord-like members extend vertically between said top member and said base member and are spaced and parallel to one another so as to provide a cylindrical shape to the unit.

8. The unit defined in claim 7, in which said top member and said base member each has radial slots around the peripheral edges thereof, and in which said cord-like members are formed as a continuous cord threaded through the aforesaid slots.

References Cited

UNITED STATES PATENTS

1,044,969	11/1912	Arndt	239—17
2,526,546	10/1950	Dowsing	239—17
3,174,688	3/1965	Chatten	239—20

FOREIGN PATENTS

510,510	1/1955	Italy.

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U.S. Cl. X.R.

239—20