United States Patent

Olivieri

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[54] **DISPLAY DEVICE**

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[52] **U.S. Cl.** **40/106.22**

[51] **Int. Cl.** **G09f 13/24**

[58] **Field of Search** 40/106.21, 106.22, 106.23

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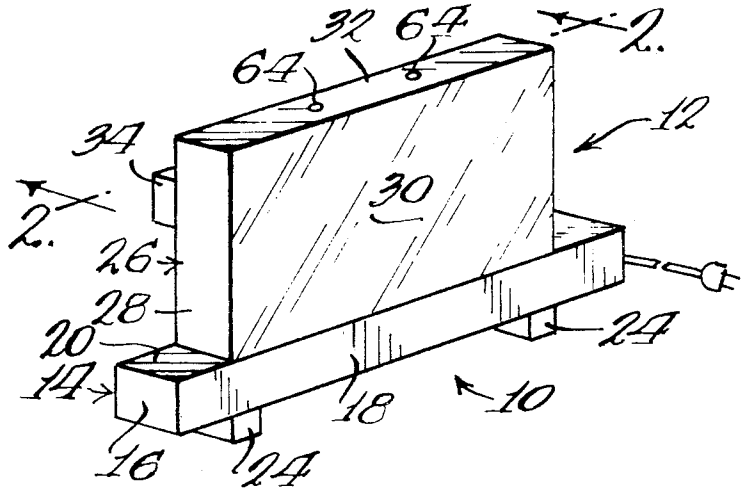
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Assistant Examiner—Richard Carter
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[57] **ABSTRACT**

A display device for producing a constantly changing, completely random multi-colored effect is disclosed herein. The display device includes wall means dividing a fluid compartment into a plurality of juxtaposed chambers having highly viscous fluid therein, and means are provided in the lower portion of each chamber for generating bubbles of air within the fluid. Each of the fluids has a different color, and the walls within the chambers have sufficient light transmissibility, so that when a light source illuminates one side of the display device, the air bubbles passing upwardly through the chambers will create the desired visual effect.

11 Claims, 4 Drawing Figures



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Fig. 1.

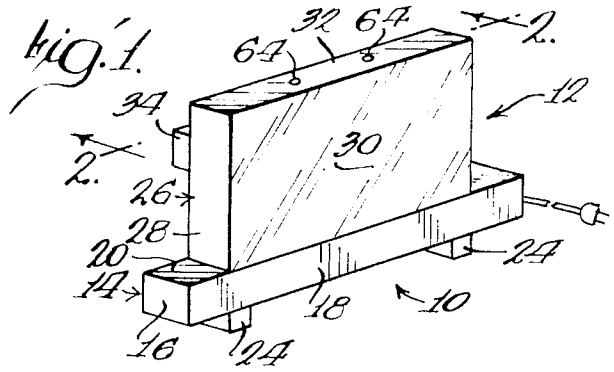


Fig. 2.

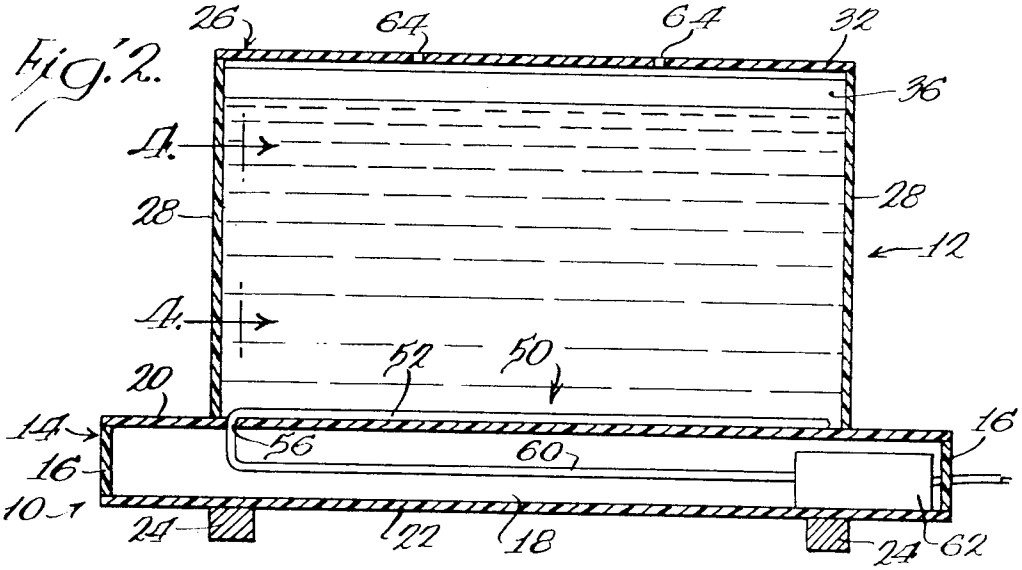


Fig. 3.

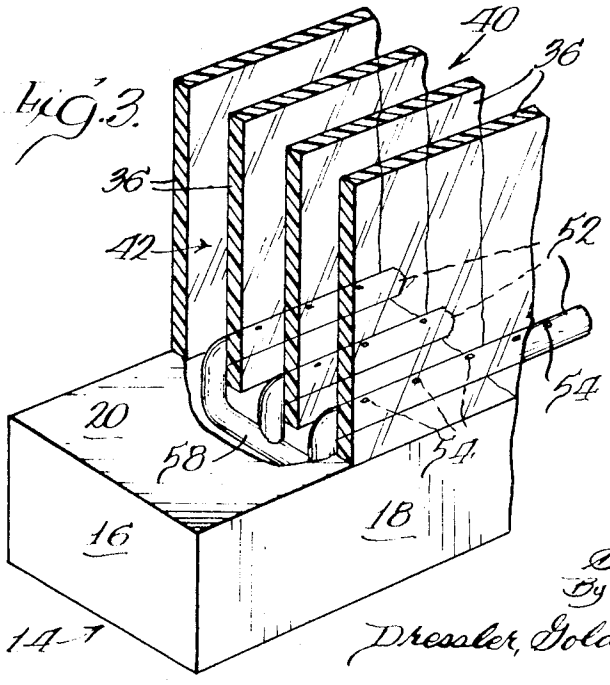
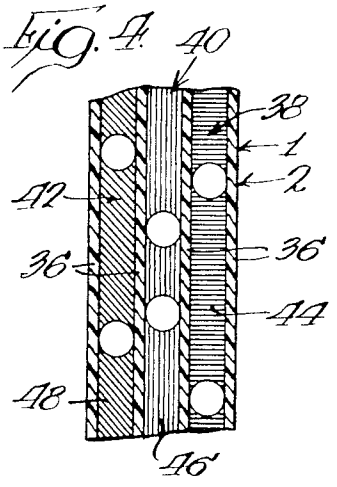


Fig. 4



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DISPLAY DEVICE

BACKGROUND OF THE INVENTION

In the past many different types of display devices have been employed to create a desired visual effect, and such devices have found wide acceptance in residential and commercial establishments. Prior art devices which are in common use are characterized by being somewhat limited in the type of visual effect they can produce, and also such devices are typically relatively expensive to manufacture and maintain.

BRIEF SUMMARY OF THE INVENTION

The display device of the present invention provides an arrangement for producing a constantly changing visual effect on a completely random and unpredictable basis, and utilizes readily available materials so as to be extremely simple and inexpensive. In a preferred arrangement, a fluid compartment is divided into a plurality of juxtaposed chambers by transparent walls, and each fluid chamber is provided with a viscous fluid of different color. Perforated tubes are provided at the lower end of each chamber, and are connected to a common air pump for producing bubbles that rise slowly through each chamber. The walls that divide the fluid compartment are spaced sufficiently closely to one another, so that as the bubbles rise slowly in the liquid within each compartment; the bubbles will be in contact with the walls, and certain bubbles in adjacent chambers will be in alignment with one another so that an individual viewing the display device from one side will see a constantly changing color pattern.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front perspective view of the display device of the present invention;

FIG. **2** is an enlarged cross sectional view taken generally along line **2—2** of FIG. **1**;

FIG. **3** is an enlarged fragmentary perspective view illustrating the interior of the fluid compartment; and

FIG. **4** is a sectional view taken generally along line **4—4** of FIG. **2**.

DETAILED DESCRIPTION

While this invention is susceptible of embodiment in many different forms, there is shown in the drawing and will herein be described in detail a preferred embodiment of the invention, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawing, the display device is illustrated in its entirety at **10**, and includes an upper viewing portion **12** and a lower base or mounting portion **14**.

Base **14** is a generally box-like member that includes side walls **16**, front and back walls **18**, a top wall **20** and a bottom wall **22**. In the illustrated embodiment, spaced mounting feet **24** are provided adjacent opposite ends of base **14** to support the display device **10** upon a horizontal surface.

The viewing portion **12** includes means defining a downwardly open box-like enclosure **26** having end walls **28**, front and back walls **30**, and a top wall **32**. The lower ends of walls **28** and **30** are positioned in fluid tight sealing relationship with the top wall **20** of base **14**. The front and rear walls **30** have sufficient light transmissibility to be at least translucent, the entire enclosure **26** being preferably formed of a transparent material, such as glass or a clear plastic. The front wall of the enclosure means **26** provides a viewing area, as will hereinafter appear, and the rear wall of the enclosure means **26** provides an illuminating area. A light source **34**, such as a fluorescent or incandescent bulb, may be mounted directly upon the rear wall of the enclosure **26**, or in certain instances the light source may be completely separate therefrom. Under certain circumstances, a pigmented or even a black light source may be used, depending on the desired visual effect.

A plurality (**4**) of spaced parallel rectangular plates **36** are provided within enclosure **26**, and the lower ends of plates **26** are positioned in fluid tight relationship on the top wall **20** of base **14**. The ends of walls **36** are positioned in fluid tight relationship with the end walls **28** of the enclosure means **26**. Walls **36** have sufficient light transmissibility to be at least translucent, and the walls **36** are preferably transparent and maybe glass or a clear plastic material. Walls **36** cooperate to divide the fluid compartment within enclosure **26** into a plurality of juxtaposed chambers **38**, **40** and **42**.

A highly viscous liquid is provided within each chamber, and the liquids are provided with different colorants to provide different colored bodies of liquids **44**, **46** and **48**, in chambers **38**, **40** and **42**, respectively. In an illustrative embodiment of the invention, the walls **36** are separated from one another by approximately one-eighth inch, and the chambers **38**, **40** and **42** have therewithin a petroleum derived lubricant of the polyisobutylene type having a viscosity of approximately 550 CPS at 220° F. Such a product is commercially available as STP Oil Treatment from STP Corporation, 125 Oakton, Des Plaines, Illinois. It should be understood that the present invention is not limited to any specific liquid medium, and any liquid (such as glycerine, mineral oil or water) that will retain a die or colorant will be satisfactory for the purposes of the present invention. If less viscous fluid is used, the spacing between walls **36** must be less; for example, with glycerine or mineral oil as the fluid medium the spacing between walls **36** will be approximately one thirty-second inch, while with water as the fluid medium the spacing between walls **36** will be approximately one sixty-fourth inch. As is illustrated by the sectioning in FIG. **4**, the liquid **44** has been dyed blue, with the liquid **46** being dyed red and the liquid **48** being dyed green.

Means **50** is provided for generating gas bubbles at the lower end of each of chambers **38**, **40** and **42** and said means is defined by a length of small diameter tubing **52** that is secured to the top wall **20** of base **14** within each of the chambers. Each length of tubing **52** is provided with a plurality of longitudinally spaced perforations **54**, which may be on the order of magnitude of the diameter of a common straight pin. The ends of the lengths of tubing **52** extend downwardly through openings **56** in the top wall **20** of base **14**, and are connected to a transversely extending further length of tubing **58** (FIG. **3**) which is connected to a

source of pressurized air 62 by a length of tubing 60 that extends longitudinally within base 14. The air source 62 may be a common diaphragm pump which is commercially available. Instead of merely having perforations 54 in tubes 52, ball type check valves may be provided at each perforation, with the balls being movable off of the valve seat in response to pressure generated by air source 62, and with the balls moving into fluid tight sealing relationship with the valve seats in the absence of pressure. This latter arrangement has particular utility when a low viscosity liquid is provided in chambers 38, 40 and 42.

In use, the air bubbles generated by tubes 52 will rise slowly in the viscous liquid within chambers 38, 40 and 42. The walls 36 terminate short of the top wall 32 of enclosure 26 to provide a common zone where air can pass to exhaust openings 64 in top 32. With a fluid of the type mentioned above within the chambers 38, 40 and 42, the bubbles that are generated by tubes 52 will have an average size that is sufficient to contact the chamber walls 36, although even smaller diameter bubbles will be sufficient to significantly alter the visual effect to an individual observing the viewing area 30.

Referring now to FIG. 4, a myriad of different colors will be presented to an observer viewing the display device. For example, when a bubble passes through the zone marked by arrow 1, the bubble in chamber 42 will provide a gap in the green liquid, so that the viewer will observe a color combination of red and blue due to the colored liquids 44 and 46. In a similar manner, when a bubble passes through a zone marked by arrow 2, the bubble within chamber 38 will produce a gap in the blue liquid 44, and the observer will see a color combination of red and green. When bubbles are aligned in all three chambers, the viewer can see through the display device 10 and the light source will shine therethrough. The random occurrence, size, shape and location of the bubbles produce almost every imaginable shade of color on a totally random and unpredictable basis.

While the display device has been illustrated herein as being comprised of rectangularly shaped planar members, it is believed apparent that a similar effect can be created with cylindrical or spherical members.

What is claimed is:

1. A display device comprising: means defining a compartment having a viewing area; front and back wall means within the compartment and dividing the same into at least two liquid tight, coextensive chambers juxtaposed one behind the other, the viewing area of said compartment and said wall means being transmissive of light; a column of colored liquid within each chamber, each liquid being transmissive of light and the liquid in each chamber being of a different color; and means for generating independent gaps in the liquid in each of the chambers comprising means at the lower end of each of said chambers for introducing gas bubbles of random occurrence, size, shape and location, each of said gaps contacting said front and back wall means of its respective chamber to eliminate the color of the liquid in the chamber thereat and thereby present different and changing color combinations to an observer looking along lines of sight through the viewing area of said display device as said gaps move into and out of alignment with one another.

2. A display device as set forth in claim 1, in which said bubble-introducing means establishes a plurality of side-by-side gas bubbles in a single line generally parallel to said chamber defining wall means at the base of each of said columns.

3. A display device as set forth in claim 1, in which said compartment defining means further includes an illuminated area opposite said viewing area and wherein a light source is provided adjacent said illuminated area for illuminating said chambers.

4. A display device as set forth in claim 1, in which said wall means include planar front and back walls parallel with one another.

5. A display device as set forth in claim 1, in which said wall means define at least three parallel chambers.

6. A display device as set forth in claim 5, in which said wall means are flat.

7. A display device as set forth in claim 1, in which said bubble introducing means includes a tube at the lower end of each chamber, each tube having a plurality of longitudinally spaced openings therein.

8. A display device as set forth in claim 7, wherein said gap generating means includes a single gas pumping means and each of said tubes is connected to said single gas pumping means.

9. A method of displaying a constantly changing color pattern in a viewing area, comprising the steps of: providing at least two differently colored light-transmissive liquid columns juxtaposed one behind the other, each liquid column being confined between light transmissive front and back spaced apart surfaces and each liquid column being coextensive at least with said viewing area; generating independent gaps in said columns by introducing gas bubbles at spaced locations at the lower end of each of said columns so that the gaps generated by said bubbles have random occurrence, size, shape and location, each of said gaps contacting its said front and back spaced apart surfaces to displace the liquid and to eliminate the color of the liquid thereat and thereby present different and changing color combinations to an observer looking along lines of sight through said viewing area as said gaps move into and out of alignment with one another.

10. A method as set forth in claim 9 wherein three differently colored liquid columns are provided in juxtaposed relationship, with gaps being generated in each of said columns so that various color combinations are produced for viewing, including mixtures of the colors of all three liquids, including combinations of two of the liquids, including the individual colors of the three columns, and further including an absence of the colors of the three columns.

11. A method as set forth in claim 9 comprising the further step of illuminating said liquid column on the side opposite said viewing area.

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