April 15, 1969 H. ROER 3,438,197

ORNAMENTAL TIMERS

Filed Sept. 9, 1966 Sheet 1 of 2

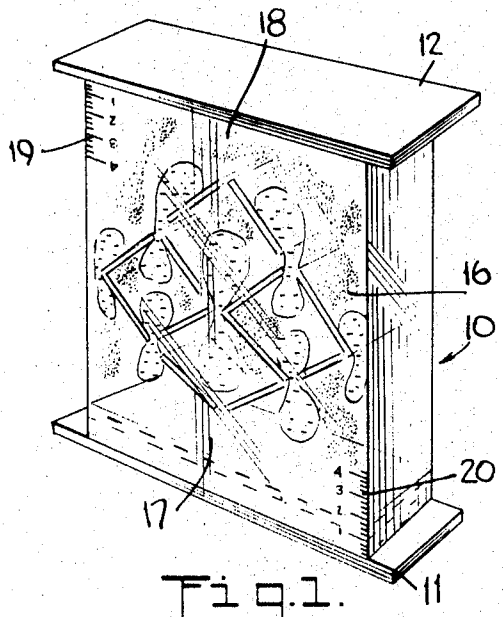


Fig. 1.

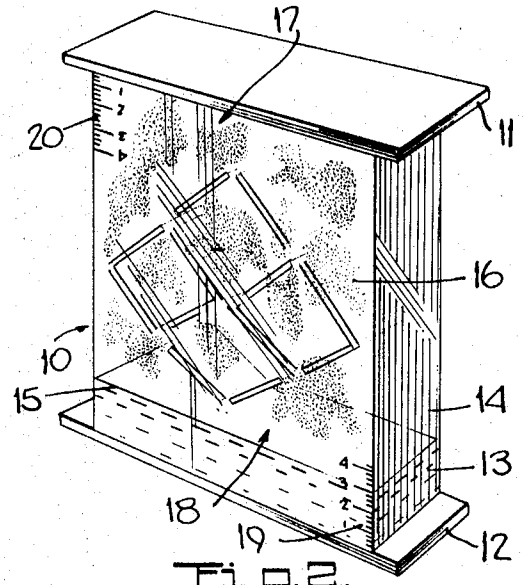


Fig. 2.

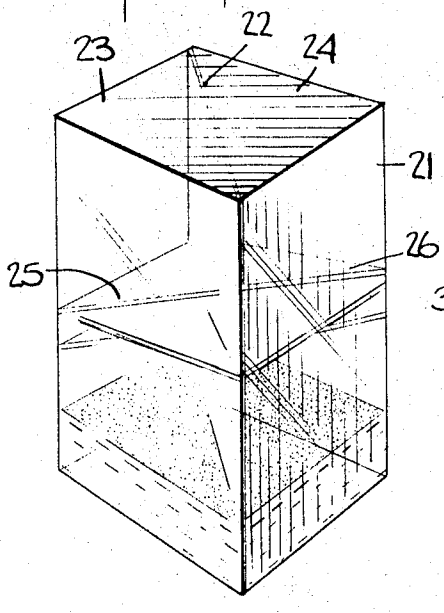


Fig. 3.

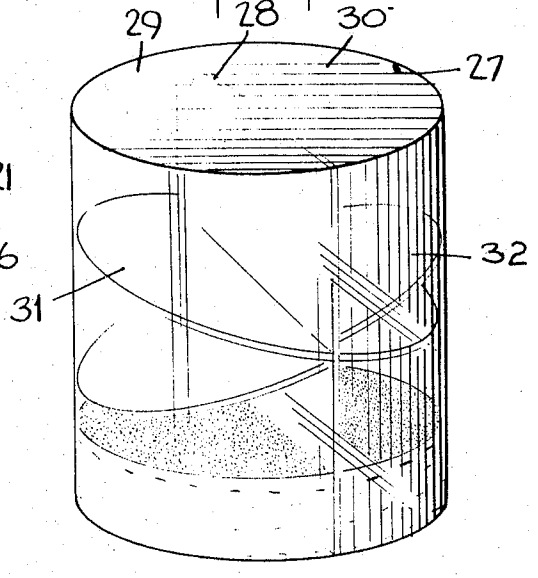


Fig. 4.

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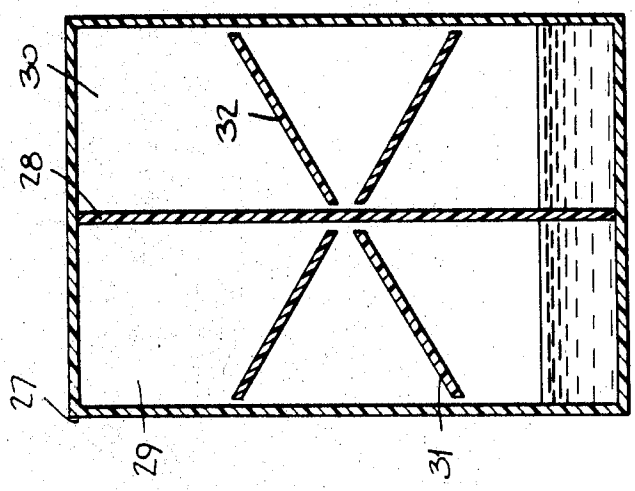


Fig. 7.

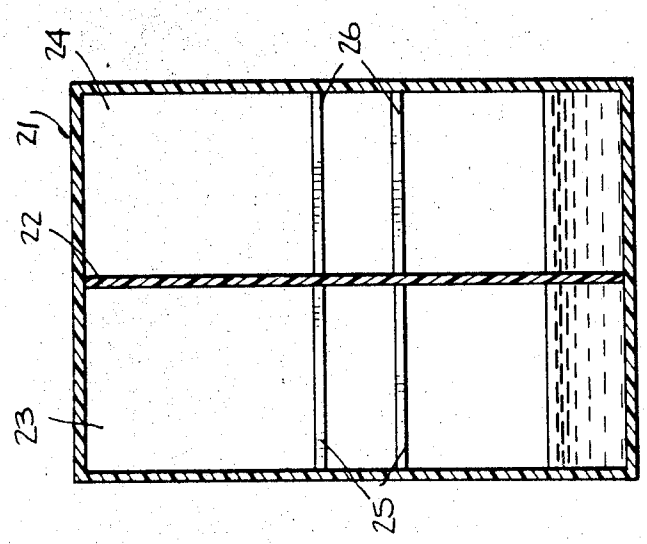


Fig. 8

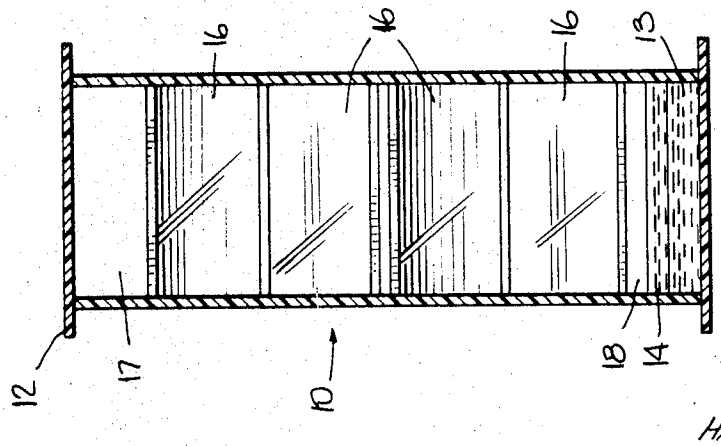


Fig. 9.

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3,438,197

ORNAMENTAL TIMERS

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U.S. Cl. 58—144 5 Claims

ABSTRACT OF THE DISCLOSURE

A gravity-flow liquid timer having a plurality of obstructing vanes mounted within a transparent housing and two differently colored liquids having different specific gravities filling the housing in a predetermined ratio. The housing is capable of being turned upside-down so that the liquids are broken up by the vanes into globules which will settle in a predetermined period of time.

This invention relates generally to gravity-flow liquid timing devices, and more particularly to devices in which the flow of timing liquid in globular form from an upper to a lower compartment through a multichannel passage, produces kinetic color patterns which are aesthetically pleasing and enjoyable.

One of the oldest timing devices is the hourglass, wherein the passage of time is indicated by the measured flow of sand through a constriction between two compartments. Hourglasses are still popular, for the visible flow of sand is fascinating to watch. Another primitive form of timer makes use of the controlled flow of liquid, the height of the liquid in a reservoir determining the elapsed time. But the more common type of timer in current use, particularly for relatively brief intervals of an hour or less, uses a spring-operated motor regulated by a balance wheel and escapement. Thus in timing household cooking operations, it is the usual practice to use mechanical timers which may be set to a desired interval. Such timers are of practical value, but have little aesthetic appeal.

Accordingly, it is the main object of this invention to provide a nonmechanical, gravity-flow liquid timer whose operation is also a source of aesthetic pleasure.

A significant feature of the invention resides in the fact that the measured interval is determined by the flow of liquid through obstructions that break the liquid into globules which assume a highly decorative varying kinetic pattern, the timer acting in effect as a liquid mobile.

More specifically, it is an object of the invention to provide a timer of the above type, wherein two differently colored non-miscible liquids having disparate specific gravities are contained in a transparent casing separated by vanes or other obstructions, into an upper and lower compartment having a constricted multichannel passage therebetween, whereby when the position of the casing is turned upside down, the heavier liquid flows in globular form through said channels from the upper to the lower compartment at a predetermined rate.

Also an object of the invention is to provide a gravity-flow liquid timer which may be manufactured and sold at low cost, and which has ornamental as well as practical value.

For a better understanding of the invention, as well as other objects and further features thereof, reference is made to the following detailed description to be read in conjunction with the accompanying drawing, wherein:

FIG. 1 is a perspective view of a timer in accordance with the invention shown in kinetic condition;

FIG. 2 is a perspective view of the same timer shown in the static condition;

FIG. 3 shows another embodiment of the invention;

FIG. 4 illustrates still another embodiment of the invention;

FIG. 5 is a vertical cross-section taken through the center of FIG. 1;

FIG. 6 is a vertical cross-section taken through the center of FIG. 3; and

FIG. 7 is a vertical cross-section taken through the center of FIG. 4.

Referring now to the drawing, and more particularly to FIGS. 1 and 2, one preferred embodiment of a timer in accordance with the invention is there shown, the timer comprising a box-like rectangular casing **10**, one of whose ends is enclosed by a base plate **11** sealed to the edges thereof, the other by a base plate **12**. The casing and base plates are formed of transparent material, such as glass, Plexiglas, polystyrene, or any other suitable material. The structure is such that the casing may occupy a stable upright position on either of the base plates, this being necessary since in use the device is repeatedly turned upside-down.

The interior casing **10** is entirely filled with two non-miscible liquids **13** and **14** having different specific gravities. Since these liquids are incapable of mixing into a single homogeneous phase, they are, as shown in FIG. 2, separated from each other in the static condition, the heavier liquid **13** resting on the bottom of the casing, with the lighter liquid **14** thereabove. The lighter liquid may be an oil, such as Dow Corning Silicon Fluid No. 200, and is preferably relatively viscous in nature to impede the flow of the heavier fluid. The heavier liquid may be water or any other fluid which will not mix with the lighter liquid. The walls of the casing may be coated with a transparent layer, such as a Teflon, silicone or other water repellent film which will prevent adhesion of liquid thereto.

The heavier liquid may have a brightly colored dye added thereto, or its natural color may be retained, whereas the lighter liquid is differently colored, so that as shown in FIG. 2, a distinct and visible line of demarcation **15** exists therebetween in the static state. The preferred volume ratio of the heavier to the lighter liquid is preferably in the order of 3 to 5, to 1, although other ratios may be used.

Mounted within the casing and perpendicular to the walls thereof, are a plurality of vanes **16** or other obstructions, the vanes being formed of transparent material and being arranged in various configurations in the central area of the casing effectively to divide the casing into an upper compartment **17** and a lower compartment **18**. In FIG. 1, the vanes are disposed in two open-diamond configurations, having a channel going therethrough to permit the downward flow of the heavier liquid, with the spaces between the two diamonds and the spaces between the walls of the casing and the diamonds forming additional channels. Vanes disposed above and below the diamonds in a V-shaped configuration define additional channels. Thus a multichannel passage is formed between the upper and lower compartments.

Inscribed on the front wall of casing **10** adjacent the upper left corner and adjacent the lower right corner, are indicia **19** and **20** respectively, graduated in timing intervals, such as minutes. The operation of the timer is as follows:

FIG. 2 shows the timer in the static state, with all of the heavier liquid **13** at the bottom of the casing. To initiate a timing interval, the timer is turned upside-down so that now the casing rests on base plate **11**, as shown in FIG. 1. The heavier liquid **13**, which is then momentarily at the top of the casing, now proceeds to work its way by gravity flow through the viscous lighter liquid **11** and through the multiple channels formed by vanes **16**, into the lower compartment **18** at a rate determined by the geometry of the obstructing vanes and the relative spe-

cific gravities, viscosity and frictional properties of the two liquids.

The vanes not only provide channel constrictions but they also serve to deflect the flow of the heavier liquid from their normal downward path. As a consequence, the heavier liquid in the course of its downward passage does not flow in continuous streams, but is broken into distinct globules which change shape and size in the course of the downward movement. This creates a decorative pattern which is kinetic in nature, being made up of moving colored globules of varying form.

The globules displace the lighter liquid and are deposited in the lower compartment **18**, thereby forming a pool whose height progressively increases with time. The level of the pool slowly rises, and since it has a distinct coloration, the elapsed time may be read by observing this level against the associated timing indicia. For example, if it takes five minutes for the heavier liquid to complete its passage and to settle in the pool, the calibration of the indicia is made such that the highest value is five minutes, with lesser increment therebelow. A timer of this type could be used to time the boiling of eggs, or to time the cooking of food requiring a particular number of minutes. Obviously, the timer may be constructed to operate for longer intervals. Of significance is the fact that the user of the timer not only has the benefit of the functional aspects of this device, but has the pleasure of enjoying its operation in terms of an aesthetic experience.

The invention is by no means liimted to the particular vane arrangement shown, for a large range of other vale configurations is possible to obtain diverse ornamental effects. Because the entire casing is transparent, the mobile liquid effects may be enhanced by means of lights to illuminate the timer and to heighten the color effects.

Another embodiment working on essentially the same principles, is shown in FIG. 3. In this instance, the casing **21**, which has a rectangular cross-section, is divided by a diagonally-disposed partition **22**, into two identical triangular sections **23** and **24**, within each of which is an array of vanes **25** and **26**, acting to obstruct the flow of the heavier liquid and to produce the desired ornamental effects in the associated section. A similar arrangement is shown in FIG. 4, wherein a tubular casing **27** is divided by a diametrically disposed partition **28** into two semicylindrical sections **29** and **30** having vanes **31** and **32** therein. In both embodiments, the two liquids in one section may be in one set of colors and those in the other, in a contrasting set of colors, to provide more intricate and interesting color effects. The transparent casing may also be in color, if desired.

In coloring the two liquids, it is important that the dye for one be insoluble in the other. Let us consider for example, yellow oil and blue water as the liquid combination. To this end, the oil is dyed with an oil soluble yellow dye which is insoluble in water, whereas the water is dyed with a water-soluble dye, such as methylene blue, which

is insoluble in oil. Thus dyes with selective solubility must be used.

When therefore the liquid of one color flows through the other in the course of a timing operation within a transparent container, while there is no bleeding dyes from one liquid to another, there is nevertheless an additive color reaction to produce other hues, until such time as the liquids separate. Accordingly, the dye colors should be primary colors, such as red and blue, to produce secondary colors and thereby enhance the decorative color effect. Multicolor effects can be obtained with three, rather than two liquids of different specific gravities. For example, in addition to water having a specific gravity of 1.00, one may use an oil, having a specific gravity of 0.98 and a second oil having a specific gravity of 0.94, thereby producing three distinct liquid layers within the timer.

What I claim is:

1. A gravity-flow liquid timer producing kinetic color effects, comprising:

(a) a transparent enclosed housing capable of being turned upside-down.

(b) two differently colored liquids filling said housing, in a predetermined ratio, said liquids having disparate specific gravities and being nonmiscible, the lighter liquid being more viscous whereby when the housing is turned upsidedown, the heavier liquid then momentarily at the top of the housing flows downwardly to displace the lighter liquid, and

(c) a plurality of obstructing vanes mounted within said housing at an intermediate position therein and dividing said housing into upper and lower compartments which communicate through a multichannel passage defined by said vanes, said chanels causing the descending heavier liquid passing through the more viscous lighter liquid to break up into globules which change shape and size to provide kinetic color effects.

2. A timer as set forth in claim **1**, wherein said housing is in the form of a rectangular casing whose ends are enclosed by base plates sealed to the edges thereof.

3. A timer as set forth in claim **1**, wherein said vanes are of transparent material.

4. A timer, as set forth in claim **1**, wherein the internal wall of said housing is coated with a material preventing liquid adhesion thereto.

5. A timer as set forth in claim **1** wherein each liquid is colored by a soluble dye which is insoluble in the other liquid.

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J. F. GONZALES, *Assistant Examiner.*