

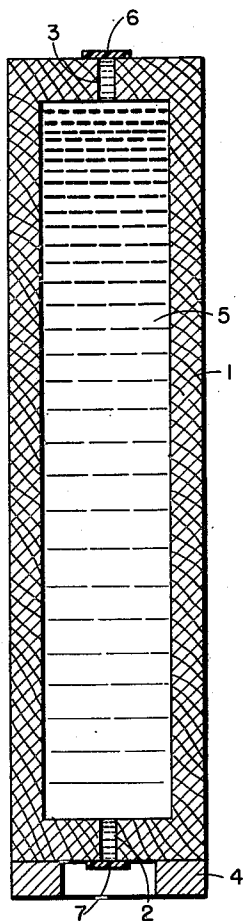
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R. L. TUVE

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SEA MARKER

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INVENTOR.
RICHARD L. TUVE
BY *m. Hayes*
ATTORNEY

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SEA MARKER

Richard L. Tuve, Silver Spring, Md.

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My invention relates to a sea marker and particularly to a method, device and composition for providing a visible sea marker.

It is an object of my invention to provide a method whereby a marking of distinctive color is produced upon the sea.

It is another object of my invention to provide a device for obtaining a stationary sea marker.

It is a further object of my invention to provide a simple device for dispensing the sea marking composition into the water at a desired rate.

It is a further object of my invention to provide a composition for use as a sea marker.

Other objects and advantages of my invention will in part be obvious and in part appear hereinafter.

My invention comprises a method, device and composition for providing a visible sea marker and consists of a method involving the relation of steps, the device embodying features of construction and arrangements of parts adapted to effect such steps, and the composition which possesses the characteristics, properties, and relation of constituents, all as exemplified in the detailed disclosure hereinafter set forth.

In describing my invention, reference will be made to the appended drawing in which the figure is a sectional view of a preferred embodiment of the device of the invention.

The device comprises a container 1 which is fitted with inlet orifice 2, outlet orifice 3, and weight 4. The dimensions of orifices 2 and 3 are dependent upon the length of container 1 and the desired time rate of dispensing the contained sea marking composition 5 into the water. Weight 4 is chosen to provide the filled container with a density of just over 1.

Fluorescent substances are of considerable value in providing visible sea markers which are discernible at long range and are substantially independent of the angle of sight. In order to increase the efficiency of such a marker with respect to quantity of material per unit area and time duration of the fluorescence, I have combined the effects of suspending the fluorescent material in an oil and providing a device which will dispense the suspension into the water in droplet form according to a desired time interval. To illustrate the principle involved, a specific composition will be used in the description of the invention.

Sodium fluorescein in quantity sufficient to produce visible fluorescence when dissolved in water is ground into an extremely fine powder and milled into a hydrocarbon oil such as S. A. E.

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30 lubricating oil, for example, thereby forming a suspension. Particle size of the powder and viscosity and density of the oil will determine the settling properties of the suspension, and therefore the use of from about 1 to about 5 per cent of some anti-settling agent such as copper resinate or magnesium silicate, commonly known as asbestine, may be desirable to prevent agglomeration of the suspension. From about 0.001 to about 1.0 per cent of an organic polar compound such as oleic acid is added to the suspension medium to obtain maximum spreading of the suspension upon the water surface. Thus, a very small quantity of the suspension will cover a large area of water surface when the oil spreads out into a thin layer and provide a substantially uniform concentration of the sodium fluorescein throughout the covered area. Thereby there is produced a uniform fluorescence upon the dissolving of the sodium fluorescein into the water.

Referring to the figure, orifice 3 is sealed with a water-soluble substance 6 such as polyvinyl alcohol or "Carbowax" 4000, the suspension 5 of sodium fluorescein in the oil and oleic acid is poured into the container 1 through inlet 2, which is then sealed with a water-soluble substance 7 such as was used to seal orifice 3. Weight 4 is adjusted to give a density to the filled container of just over 1 and thereby cause it to sink in the water and to maintain it in an upright position. The size of the weight will depend upon its density and the density of the filled container. Orifices 2 and 3 are designed to provide the desired time interval of dispensing the suspension into the water. The size of the orifices will depend upon the length of the container, which dimension determines the rate of the efflux of the marking composition. That is, the length of the container or the difference in levels of the top and bottom when it stands in a vertical position determines the pressure applied to cause the marking composition to flow out. The flow is readily adjusted to a dropwise one.

Let it be assumed for illustration that orifices 2 and 3 are constructed to permit release of the suspension in droplets at ten second intervals and weight 4 permits the container to sink to forty feet in depth. Thus, surface currents will not act upon the device and thereby it will provide a substantially stationary marker by periodic release to the surface of drops of the marking suspension. When the container is placed in the water, it sinks to the desired depth and the water-soluble substance is dissolved away from the orifices 2 and 3, allowing water to enter

orifice 2. Since the marking composition in container 1 is lighter than water and a pressure difference between the top and bottom of the container is produced by virtue of the vertical position it assumes, droplets of the suspension will be forced out through orifice 3 at the desired time interval. The droplet rises to the surface of the water and, upon contact with the water-air interface, immediately spreads over a large area with the aid of the polar compound which acts as a spreading agent. The thus formed very thin layer of oil in which is suspended the sodium fluorescein permits solution of the sodium fluorescein into the water and fluorescence of the surface of the water is produced. The droplet form of suspension substantially prevents dissolution of the water-soluble fluorescent material until it is spread upon the water surface, and each subsequent droplet renews the surface coloration.

Although I have used a specific combination of components to describe my invention, it will be apparent to those skilled in the art that any water-soluble fluorescent material, such as Rhodamine B, Eosine, and complex dyes which are commercially available under trade names such as Rhodamine 6GDN and Brilliant Sulfur Flavine, may be suspended in any water-immiscible liquid, such as lubricating oil, benzene, toluene, and the like, which has a specific gravity lower than that of water, and any convenient polar liquid such as caproic acid, linoleic acid, caprylic acid, and others which are soluble in the chosen water-immiscible liquid may be used to aid in the spreading of the composition. Trade names are used herein because they are more recognizable than are the chemical names. It is also apparent that any convenient means for dispensing the composition may be devised for the particular use for which the marker is to be employed. For example, a metal container may advantageously be used and holes of desired dimensions may be punched in each end to permit release of the sea marking suspension. It is therefore to be understood that my invention is not to be limited other than as defined by the appended claims.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What is claimed is:

A submersible marking device of density slightly greater than one which is weighted at one end to cause it to assume an upright position beneath the surface of a body of water, said device comprising in combination an elongated container having therein a body of a fluid composition of specific gravity less than one which consists essentially of a major proportion of a hydrocarbon lubricating oil in which is dissolved as a spreading agent for the composition from about .001 to about 1% by weight of a fatty acid having from 6 to 18 carbon atoms and in which is suspended an amount of a water-soluble fluorescent dye sufficient to give a visible fluorescence on dissolving the dye in water, said elongated container having end walls, a narrow orifice in each of said end walls communicating with the exterior of said container and water-soluble means closing each of said orifices whereby through the dissolving action of the water surrounding the device when submerged, the water-soluble closing means are removed from the narrow orifices and water entering through the bottom orifice into the container forces the fluorescent fluid composition in dropwise fashion through the orifice at the upper end of the submerged container to rise to the surface of the body of water and there to spread out over the surface and exhibit a visible fluorescent marker.

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