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M. R. HOLLIHAN

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AMUSEMENT DEVICE

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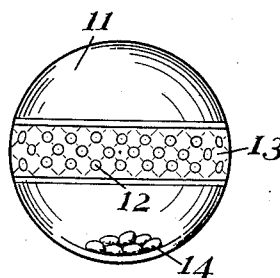
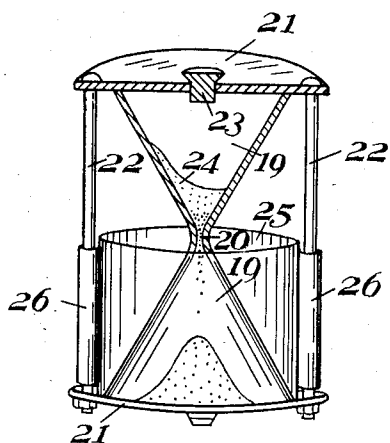
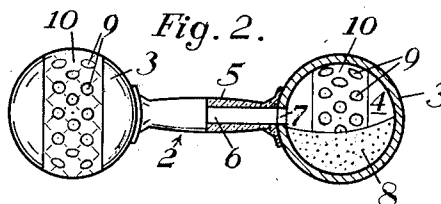
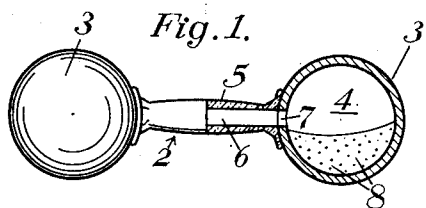


Fig. 3.

Fig. 5.

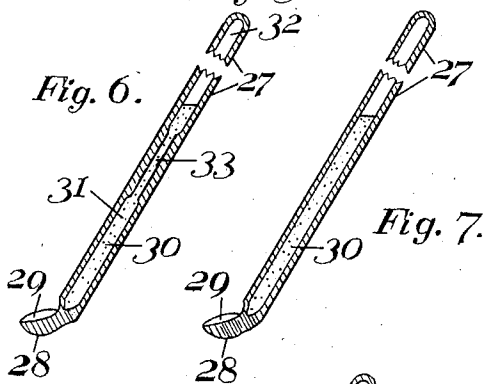


Fig. 6.

Fig. 7.

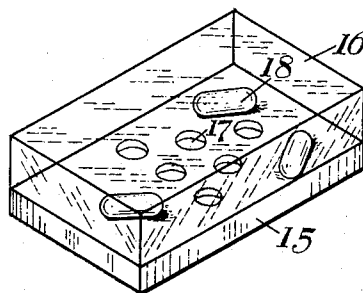
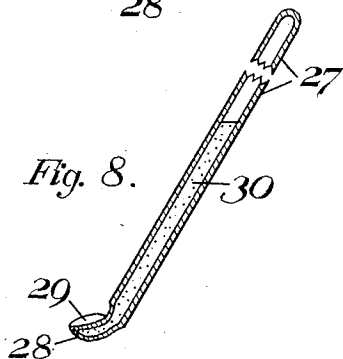


Fig. 4.

Fig. 8.



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AMUSEMENT DEVICE

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This invention relates to luminescent devices and it is particularly concerned with manipulable devices, such as amusement devices, timepieces, stirring devices and toys adapted to hold a person's interest in the dark as well as in the light.

The primary object of the invention is to provide a luminescent device or article that is not only appealing to a child or adult in the light but holds a person's interest even in the dark because of its luminosity. Another object is to provide a luminescent toy comprising luminescent particles or objects protected within a light-transmitting envelope that is simple and durable in construction and aspect and yet yields an ever-changing pattern when moved or manipulated in simple fashion. A further object is to provide a toy having parts made of, or coated with, a luminescent material fixedly or movably mounted in a hollow light-transmitting envelope in such a manner as to be permanently attractive in appearance and durable in construction. A further object is to provide a toy of this type which is free of any poisoning danger to a child or infant when placed in the mouth. Another object is to provide a luminescent stirring rod for bar, home, or laboratory use. Another object is to provide a luminescent hourglass for use in measuring time in a dark room. These and other objects and advantages of the invention will be apparent from the drawing and the description thereof hereinafter.

In the drawing, which is illustrative of the invention,

Figure 1 is a face view of one embodiment, with half in section,

Figure 2 is a face view of another embodiment, with half in section,

Figure 3 is a face view of another embodiment,

Figure 4 is an isometric view of another embodiment,

Figure 5 is a pictorial view of another embodiment, the upper half in section,

Figure 6 is a sectional view of another embodiment,

Figure 7 is a sectional view of another embodiment, and

Figure 8 is a sectional view of another embodiment.

Figure 1 shows a child's rattle or teething implement. It comprises a light-transmitting closed envelope 2 in the form of a dumbbell made up of two hollow end members 3 of a light-transmitting material which may have any desired shape, such as that of a cube, pyramid, cylinder, cone, polyhedron, prism, parallelopiped or sphere (as actually shown). Each member 3 has a hollow chamber 4 and they are joined together by a connecting piece 5 which has a hollow bore 6 and may be opaque, but preferably is translucent or transparent. The end

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members 3 have openings 7 in registry with the bore 6 to provide an intercommunicating channel between the end members. Within the envelope, there is provided a quantity of phosphorescent particles or granules 8, at least some of which, and all if desired, are of sufficiently small size to pass freely through the passage 6. Some of the particles may be of a non-luminous character and some or all of these particles may be too large to pass through the passage 6. In this embodiment, printed or other designs may also be present as shown in Figure 2. It is preferred to make the envelope in this embodiment of a rigid material, though an elastic material is also attractive because of the ability to distort the dumbbell into numerous shapes and also to pinch the member 5 to interrupt the flow of luminous particles from one end chamber to the other when they are held one above the other. The envelope is preferably made entirely of a clear, colorless or colored, transparent material, though it may also be somewhat diffusing, particularly in selected areas, such as that of the connecting piece 5. The end members 3 as well as the connecting member 5 may be of contrasting appearance, for example, because of being made of different colors. The envelope may be made of any suitable material of flexible, elastic, or rigid character. Any suitable plastic material may be used such as regenerated cellulose, cellulose derivatives, such as the acetate or ethyl ether, vinyl resins, such as copolymers of vinyl chloride and vinyl acetate or acrylonitrile, polyacrylonitrile, nylons, polyvinyl chloride, polyvinylidene chloride, polystyrene, rubber hydrochloride, natural rubber, thermosetting resins, such as urea formaldehyde or melamine formaldehyde resins. These plastic materials may contain external plasticizers, if desired. Glass may be used, but the plastics are preferred because of their non-shattering character.

Figure 2 is the same as Figure 1 except for the ornamentation of each end member 3. While this ornamentation may be of any pattern whatsoever, it is representatively shown as comprising a number of colored pits 9 within the members 3 and an annular band 10 encircling each member about an axis extending longitudinally through the connecting member 5. The pits may be colored in any suitable way, such as by the application of a coating of paint, lacquer, or varnish, but it is preferable that the color effect be derived from phosphorescent material in such coating or secured in the pits by a suitable adhesive. The band 10 may be formed of a colored section of material integrally united with the other portions of the members 3 of a contrasting color. Alternatively, these ornamental bands may be formed inside or outside the members 3 by application of an appro-

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propiately colored paint, varnish, lacquer, or the like. The bands may be opaque, but are preferably light-transmitting. In one form of this invention, the bands themselves may be colorless and the other portions of the members 3 may be colored and either transparent, translucent, or opaque. The design 10 may be made of a phosphorescent paint of a color the same as or contrasting with that of the loose particles of luminous material 8 and the color of the pits 9 may be the same as that of design 10 or of the material 8 or it may be of still another color. The particles 8 may be a phosphorescent material having a single color or various colors in an amorphous or crystalline state in the presence or absence of impurities which act as activators. Gravel, dried beans, or similar granular masses may be coated with a paint or lacquer containing the phosphorescent material to obtain greater distribution of a given amount of phosphorescent material. Alternatively, the particles 8 may comprise a mixture of such an amorphous or crystalline phosphorescent material with non-luminous particles, either of amorphous or crystalline character. Especially interesting effects are obtained by mixing the luminescent particles with transparent, colorless or colored crystals or mixtures thereof.

Figure 3 shows an envelope 11 the internal surface of which has numerous indentations, pits or recesses 12 which may be scattered over the entire surface or, as shown, over one or more pre-selected portions thereof. The pits may be regularly or irregularly distributed and the pitted areas may be irregular or follow a regular pattern. Phosphorescent material may be adhesively mounted or deposited in the pits. As specifically shown the envelope 11 is of transparent material having two clear, nearly hemispherical segments separated by an ornamental band 13 (similar to the band 10 of Figure 2) in which the pits 12 are regularly disposed. The envelope also contains luminous or non-luminous pebbles or particles 14. The particles 14 may comprise a mixture of luminous and non-luminous particles. The nearly hemispherical segments may be colorless or colored, the same or differently, and the band 13 may be clear or of the same or contrasting color with respect to either or both segments. By depositing the phosphorescent material in pits, such material, which may take the form of a single large crystal, is protected from the rubbing and abrasive action of the particles, pebbles, or the like 14.

When the envelope in this embodiment (Figure 3) is of a thin sheet of non-resilient flexible material, it may be manipulated and distorted quite freely. When of an elastic material, distortion is more difficult but still feasible and accompanied by fascinating effects. In addition, it can be used as a bouncing ball or balloon even in the dark. When of a rigid material, manipulation by rolling or shaking yields interesting effects. By proper selection of granule size and material, the shaking may either be substantially noiseless or accompanied by a distinct rattling to add further interest.

Figure 4 shows a manipulative toy of the "cootie" type comprising a closed envelope formed by a base 15, preferably of opaque but pleasingly colored material, such as wood, plastic, or heavy cardboard, and a transparent box-like cover 16 of a fairly rigid material, e. g., plastic, glass, or the like, fastened to the base, as by being adhesively secured to the sides thereof. The

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cover is preferably colorless though it can be colored if desired. The base 15 is provided with recesses or depressions 17 adapted to receive the ends of the freely rolling or movable elements or "cooties" 18 when the toy is properly manipulated. Phosphorescent material is deposited in the recesses 17 and adhered therein by an adhesive, varnish, paint, or the like. The "cooties" 18 are either coated with phosphorescent material of the same or different color as that in recesses 17 or they may be transparent capsules containing particles or granules of such phosphorescent materials.

In Figure 5 an hourglass is shown comprising a transparent envelope having two conical chambers 19, one above the other, connected by an intercommunicating passage 20. The envelope may be held in a frame comprising end plates 21 connected by two or more tie-rods or posts 22. A removable plug or stopper 23 may be provided in an opening in one of the plates 21 to permit of the introduction of more or less particulate material 24 some or all of which is phosphorescent. This embodiment is useful not only as a toy but also as a bona fide device for timing, either in the light or dark, such as in photographic dark rooms, the particles being in such case all of phosphorescent material and substantially the same size to assure accuracy and reproducibility of the period required for flowing of the particles from one chamber to the other. Optionally, there may be provided a cylindrical shield or screen 25 of light absorbing or opaque character which may carry guides 26 adapted to have a sliding fit around posts 22. The screen 25 is half the height of the envelope in order to mask or cut off light emitted radially outwardly from the lower of the conical chambers. When the hourglass is inverted, the screen is slid to its lower position.

Figures 6 to 8 show cocktail stirrers formed of a transparent or translucent tube 27 terminating in a foot 28 having a flat or slightly concave upper surface 29 adapted to lift the cherry, olive, or the like from the bottom of the cocktail glass. The tubes form closed envelopes which contain particles or granules 30 some or all of which are of phosphorescent material. When some only of the particles are phosphorescent, the remainder are non-luminous, but may be: opaque, translucent, or transparent; and colorless or colored uniformly or irregularly; and highly reflective or not. The phosphorescent particles in the tubes may all emit the same color or they may severally emit various colors; and non-luminous particles therein may also be of the same color as the color emitted by the phosphorescent particles, or of a different color or of several different colors. The particles may be adhered to the inside wall of the tube 27 or they may be loosely disposed therein. The tube may be completely or only partially full, as desired. When only partly full, interesting effects may be obtained by tilting the rod to cause the particles to move back and forth therein.

One of the best ways of making this stirrer is to cut a desired length of light-transmitting tubing of glass or plastic, insert the luminous material after whatever blowing of the foot desired is completed, and finally sealing the ends. If desired, the entire inside surface of the tubing may be coated with the luminous material.

The hollow chamber within the tube 27 may be of substantially uniform diameter and extend throughout the body of the stirrer tube as in

Figure 7, or even into the foot as in Figure 8. Still another variation is shown in Figure 6 in which the tube comprises two or more chambers 31, 32, etc., each adjacent pair being connected by a bore or passage 33 of reduced diameter as compared to that of chambers 31, 32, etc. Some or all of the particles 30 are of sufficiently small size to pass freely through the passage 33 between the several chambers. Interesting effects can be obtained by providing a mixture of phosphorescent particles emitting various colors with or without non-luminous particles.

A stock of such stirring rods may be stored, after cleaning, in proximity to a suitable source of excitation light so that when the rod is withdrawn for use it immediately emits light and provides a source of interest and amusement in a darkened room while also providing a warning sign or indication of the exact position of a glass, whether full or empty, that has been set down and might otherwise be knocked over. A relatively short excitation period of a few minutes is adequate to produce light emission during the entire period required for the consumption of the cocktail or other drink, and may even serve for several drinks, although a freshly excited rod may easily be provided for each drink, as desired.

In all embodiments, it is preferred to use crystals of as large a size as is consistent with the structure and dimensions of the envelope and or any intercommunicating passage through which it is desired that the particles or selected ones thereof pass. When the envelope is necessarily of rather small size, and this is especially true of the stirring rods, for example, it is desirable to use crystals that have been fired to the proper initial size and need no comminution to reduce them to a size that will enable them to readily fit within the envelope. Such comminution reduces the brilliance and severe comminution may even destroy the luminescence entirely. This is another reason for mounting the luminescent crystals (either in the envelope or in a movable object therein) in recesses sufficiently deep to protect the crystals from impact against the envelope or by movable objects within the envelope, particularly if such envelope or objects respectively are harder and less frangible than the phosphorescent crystals.

The individual particles or granules may also be protectively coated with a lacquer, varnish, or resin, such as by dropping the phosphorescent particles through a fine spray or mist of the coating material formed in a heated atmosphere by an atomizer and then allowing further descent of the discrete coated particles below the mist into a cooling atmosphere to set the coating before the coated granules finally come to rest in a heap, so that they remain as discrete particles.

In all embodiments the envelope may be completely clear and transparent, colorless or of any color desired. Or it may be translucent. It may be clear in parts and translucent or opaque in other parts regularly or irregularly arranged with respect to the clear part or parts. The diffusing or opacifying material may be distributed through the thickness of the envelope or coated on the outside or inside surfaces, and such material may be itself a phosphorescent material, or it may be mixed with such a luminous material. The envelope is preferably sealed so as to exclude moisture and to prevent escape of gases such as hydrogen sulfide. This increases the life of many of the phosphorescent materials. For example, calcium sulfide is extremely sensi-

tive to moisture and various forms of strontium sulfide, which are extremely valuable because of their brilliance and persistence of luminescence, decompose with development of hydrogen sulfide. The entrapment of this gas is desirable not only because of its toxicity but in order to establish an equilibrium to retard the decomposition. In any event, the sealing is preferably done while normal atmospheric pressure prevails within the envelope being closed. A dry gas, such as air, carbon dioxide, nitrogen, hydrogen, or helium may be present in the envelope during this sealing.

Also, the luminous objects, particles and so on, may have a single color or a variegated color in any of the embodiments, and they may be mixed with non-luminous objects, particles, and so on. Whenever an object is provided with a coating of phosphorescent material, that coating may be protected with a subsequently applied tough, transparent coating of a clear lacquer, colorless or colored. For the luminous effects, any phosphorescent material may be used, such as zinc sulfide, calcium sulfide, barium silicate, strontium sulfide, and magnesium tungstate.

The envelope of the present invention is adapted to be hermetically sealed, and, if desired it may be evacuated before sealing or an inert gas may be introduced. It is preferred to have atmospheric pressure or approximately that within the envelope to reduce the liability to breakage and particularly to avoid the explosions which occur when evacuated vessels are broken. By so enclosing the phosphorescent material, it is protected from loss or deterioration and the larger crystals having correspondingly greater brilliance and intensity may be enclosed loosely within the envelope or lightly adhered to a coating on the inside surface of the envelope.

The present invention thus provides a manipulable toy or other object that is attractive and interesting to the child or adult not only in daylight but also in the dark. Any of the toys of this invention can be presented to the child on going to bed at night and provides an absorbing subject for the child to manipulate. The capacity of ever-changeability on manipulation assures rapt absorption until the child is lost in sleep. The gradual dimming in the dark of the brilliance of the phosphorescent components of the toy is conducive to gradual relaxation and surrender to sleep in an entirely natural fashion. In all of the embodiments, a special handle may be provided to facilitate manipulation and to prevent interference of the manipulator's hand with the luminous pattern. If desired, however, the handle may be omitted.

Besides serving as toys, many of the embodiments of this invention can also serve as ornamental objects, such as Christmas tree ornaments. The embodiment of Figure 3 is particularly useful for this purpose and when so used, the movable particles 14 may be omitted and instead, a phosphorescent material may be adhered to a smooth inside or outside surface thereof over which it may be distributed uniformly throughout or in regular or irregular patterns.

It is to be understood that changes and variations may be made without departing from the spirit and scope of this invention as defined in the appended claims.

I claim:

1. A fascinating device intended for ornamental or amusement purposes comprising a translucent to transparent hollow envelope enclosing

a hollow chamber, a phosphorescent material enclosed therein and only partially filling the hollow chamber, and means comprising a transparent coating on the material for protecting the phosphorescent material against physical disintegration.

2. A device according to claim 1 in which the envelope is a stirring rod.

3. A device according to claim 1 in which the phosphorescent material is adhered to the inside surface of the envelope, and all parts of the device are fixedly secured together.

4. A device according to claim 1 in which particles of the phosphorescent material are movable within the envelope, and such particles are individually protected by a tough, transparent coating from disintegration caused by impact forces resulting from manipulation of the device.

5. A toy in accordance with claim 1 in the form of a spherical envelope containing some of the phosphorescent material loosely therein.

6. A fascinating device intended for ornamental or amusement purposes comprising a translucent to transparent hollow envelope enclosing a hollow chamber, a phosphorescent material enclosed therein and only partially filling the hollow chamber, and means for protecting the phosphorescent material against physical disintegration, the phosphorescent material being deposited and adhered to recesses formed in the inside surface of the envelope and all parts of the device being fixedly secured together.

7. A fascinating device intended for ornamental or amusement purposes comprising a translucent to transparent hollow envelope enclosing a hollow chamber, a phosphorescent material enclosed therein and only partially filling the hollow chamber, and means for protecting the phosphorescent material against physical disintegration, some particles of the phosphorescent material being deposited in fixed position in recesses in the inside surface of the envelope and other particles thereof being loosely contained in the envelope.

8. A fascinating device intended for ornamental or amusement purposes comprising a translucent to transparent hollow envelope enclosing a hollow chamber, a phosphorescent material enclosed therein and only partially filling the hollow chamber, and means for protecting the phosphorescent material against physical disintegration, some particles of the phosphorescent material being deposited in fixed position in recesses in the inside surface of the envelope, other particles thereof being loosely contained in the envelope, and additional particles of non-luminous material being loosely contained in the envelope.

9. A device comprising a hollow envelope having a transparent wall and enclosing two chambers connected by a narrow passage, a phosphorescent material enclosed therein and only partially filling the space within the envelope, at least some of the particles of said phosphorescent material being of a size less than the diameter of the narrow passage, and means comprising a transparent coating on the material for protecting the phosphorescent material against physical disintegration.

10. A device according to claim 9 in which the envelope is in the form of a child's rattle and contains a gas at atmospheric pressure.

11. A device according to claim 9 which also

contains particles of a size larger than the diameter of the narrow passage.

12. A device according to claim 9 in which the envelope is in the form of an hourglass, said device being provided at each end with a base adapted to support the chambers in superposition.

13. A "cootie" game device comprising an envelope having a base and a transparent cover enclosing a chamber therebetween, recesses in the base in communication with the chamber, particles of phosphorescent material deposited in fixed position in the recesses, means for protecting said phosphorescent material against physical disintegration, and at least one rollable element in the chamber.

14. A device comprising a translucent to transparent, hermetically sealed, hollow envelope enclosing a hollow chamber, a phosphorescent material enclosed therein and only partially filling the hollow chamber, said chamber containing a gas at substantially atmospheric pressure therein, and means comprising a transparent coating on the material for protecting the phosphorescent material against physical disintegration.

15. A device according to claim 14 in which particles of the phosphorescent material are movable within the envelope, and such particles are protected by a tough, transparent coating from disintegration caused by impact forces resulting from manipulation of the device.

16. A device as defined in claim 14 in which the gas is an inert gas.

17. A device as defined in claim 14 in which the gas comprises hydrogen sulfide.

18. A device as defined in claim 14 in which the gas comprises hydrogen sulfide and is free of moisture.

19. A device comprising a translucent to transparent, hermetically sealed, hollow envelope enclosing a hollow chamber, a phosphorescent material enclosed therein and only partially filling the hollow chamber, said chamber containing a gas at substantially atmospheric pressure therein, and means for protecting the phosphorescent material against physical disintegration, the phosphorescent material being deposited and adhered to recesses formed in the inside surface of the envelope, and all parts of the device being fixedly secured together.

20. A device comprising a translucent to transparent, hermetically sealed, hollow envelope enclosing a hollow chamber, a phosphorescent material enclosed therein and only partially filling the hollow chamber, said chamber containing a gas at substantially atmospheric pressure therein, and means for protecting the phosphorescent material against physical disintegration, some particles of the phosphorescent material being deposited in fixed position in recesses in the inside surface of the envelope and other particles thereof being loosely contained in the envelope.

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