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DESCRIPTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

The system of the present invention relates to the deployment of an optoelectronic system above the ground with a tethered helium filled balloon made of plastic foils or similar materials. This invention enables the optoelectronic system to emit, receive and retransmit visible and/or non-visible light information or pattern from an elevated level provided by the lifting properties of the lighter than air helium filled balloon.

2. General Background of the Invention

Optoelectronic display devices such as Light-Emitting Diodes are commonly used to display patterns to capture attention or sometimes used as a light source such as a torch. Infra-red light-emitting diode, however, operates on the non-visible light spectrum and is used to control things such as TV, DVD recorder and other electronic appliances. Photodiodes are sensors of infra-red emission and together with the light-emitting diodes can receive and retransmit non-visible infra-red light information.

A balloon fitted with visible light light-emitting diodes can be used in the field of advertising by highlighting the printed designs on the balloon surface with blinking light or a flashing pattern. In the case of an unmarked and unprinted balloon make in the shape of an animal, the visible light can enhance or beautify the balloon by lighting up the area where the eyes are deemed to be located. When the light-emitting diodes are mounted in an array on the balloon, this invention can display messages in the form of scrolling alpha-numeric characters by lighting up the appropriate light-emitting diodes of the array in a timely manner. A balloon fitted with infra-red light-emitting diodes and photodiodes can be used as a communication or control system by retransmitting a received signal from a transmitter such as a TV remote control to the receiver such as a TV further away. From the elevated position due to lift provided by the lighter than air balloon, the visible information display by the system can be observed and noticed further away thereby enhancing the advertising effect. The elevated optoelectronic system, when operating in the non-visible infra-red light spectrum, extends the effective distance of control and communication between the transmitter and receiver.

The balloon when tethered would provide a bounded area of coverage. The balloon can also be used as a blimp whereby the area of coverage is even greater.

BRIEF SUMMARY OF THE INVENTION

It is, therefore, one object of the present invention to provide the emission of visible light pattern and information by an optoelectronic system from an elevated position above ground level.

It is another object to use the emission of visible light pattern to highlight, enhance and beautify the printed designs on the balloon which the optoelectronic system is mounted on.

It is yet another object to use the emission of visible light pattern to highlight, enhance and beautify the appearance on the unprinted and unmarked balloon which the optoelectronic system in mounted on.

It is a further object of the present invention to provide the emission, reception and retransmission of non-visible light control or communication signals and information from an elevated position above ground level.

It is a still further object of the present invention to provide the elevation of the optoelectronic system above ground level by means of a foil or similar material balloon.

Other objects, features and advantages of the present invention will be readily appreciated as the same becomes better understood by those skilled in the art to which the present invention relates from the subsequent description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates an overall view of the preferred embodiment of the system of the invention in using visible light emitting devices;

FIG. 2 illustrates an overall view of the preferred embodiment of the system of the invention in using non-visible infra-red light sensing and emitting devices;

FIG. 3 illustrates a partial cut away view of the inflated balloon as illustrated in FIG. 1 providing a view of the location of the visible light light-emitting diodes and the control circuit;

FIG. 4 illustrates a partial cut away view of the inflated balloon as illustrated in FIG. 2 providing a view of the location of the infra-red light-emitting diodes, infra-red photodiode sensor and the control circuit;

FIG. 5 illustrates a partial cross-sectional view of the balloon envelope to show how infra-red light-emitting diodes and infra-red photo-diode sensor are mounted;

FIG. 6 illustrates a partial cross-sectional view of the balloon envelope to show how visible light-emitting diodes are mounted;

DETAILED DESCRIPTION OF THE INVENTION

Referring to the view as illustrated in FIG 1, the visible light system 10 would comprise a balloon 19 with an envelope 13 which contained the light-emitting diodes 11 and control circuit 9 of the visible light optoelectronic system, inflated with helium

and tether at the filling spout 14 with a string 15 to the ground at point 18 where the power source 17 is usually located. The balloon 19 can therefore be raised to any height determined by the length of string 15. The visible optoelectronic system comprises of light-emitting diodes 11, control circuit 9 and the power source 17. The balloon 19 has an envelope 13 made from material such as aluminized nylon foil extrusion-coated with polyethylene and is usually joined together using adhesives or other methods to form a seam 12. Such material are, for example, use by Anagram International Inc., of U.S.A. to make their balloons. Alternatively, the material may simply be opaque or glossy plastic material and may be non-metallised. The material is also strong and light density which provides greater lift for a smaller size balloon.

The cabling 16, usually of length comparable to that of string 15, connects the power source 17, control circuit 9 and the light-emitting diodes 11 to distribute power and timing signals. Part of the cabling 16 goes through the balloon seam at point 8. The power source 17 may be AC or DC depending on the control circuit 9 and light-emitting diodes 11 power requirements. The control circuit 9 is not restricted to any particular design and can range from a simple off-the-shelf integrated circuit chip used to control voltage distributed to an array of six light-emitting diodes sequentially to more complicated circuitry so long as it can be fitted to the interior surface of the balloon envelope 13 and not too heavy to prevent the balloon from being airborne. The light-emitting diodes 11 are wired according to the intended functions with connections made to the control circuit 9 and power source 17 respectively.

The partial cut away view of the balloon 19 of system 10 is illustrated in FIG 3 to reveal a typical configuration of the location of light-emitting diodes 11, control circuit 9 and cabling 16 in the interior of balloon 19. The light-emitting diodes 11, cabling 16 and control circuit 9 are mounted and affixed onto the interior surface of envelope 13 by adhesive tape 7 of suitable gluing strength. Other methods may be used to achieve the same desire results of attaching the components to the envelope surface. The visible light pattern or information will be seen from the outside of the balloon 19 when the appropriate member or members of the light-emitting diodes 11 are being lighted up. FIG 6 shows the illustration of the light pattern seen on the balloon are light rays 6 emanating from light-emitting diodes 11 and penetrating through the balloon envelope 13.

In the case of the invention using non-visible infra-red light as illustrated in FIG 2, the non-visible infra-red system 20 is generally similar to system 10 except with the inclusion of the infra-red photodiode sensor 22 and the replacement of light-emitting diodes 11 with infra-red light-emitting diodes 21. The control circuit 39 will have a receiving and decoding function connected to the infra-red photodiode sensor 22 and a transmitting function connected to the infra-red light-emitting diodes 21. Referring to FIG 2, the non-visible infra-red system 20 would comprise a balloon 29 with envelope 23 made from material similar to envelope 13. Balloon 29 also has a seam 35 that is similar to seam 12. Although the cabling 26 goes through the seam 35 at point 38 in the similar way as compare to system 10, it is generally more elaborate with additional connection to the infra-red photodiode sensor 22 and eventually terminates at power source 27. The balloon 29 is tethered at the filling spout 24 to the ground point 28 by the string 25. Obviously, cabling 26 would also be of comparable length to string 25 to enable the balloon 29 to be raised to a height equal to the length of string 25.

The partial cut away view of the balloon 29 of system 20 is illustrated in FIG 4 to reveal a typical configuration of the location of infra-red light-emitting diodes 21, infra-red photodiode sensor 22, control circuit 39 and cabling 26 in the interior of balloon 29. While the control circuit 39 and the cabling can be taped onto the interior surface of envelope 23 with tapes 34, the infra-red light-emitting diodes 21 and infra-red photodiode 22 cannot be done so. Since the material of the balloon 29 generally blocks infra-red light, the infra-red light-emitting diodes 21 and infra-red photodiode sensor 22, therefore, must protrude partially out of the balloon 29. This is illustrated in FIG 5 and shows how they are mounted and affixed onto the surface of the envelope 23. Holes of the size of the diameter of the infra-red light-emitting diodes 21 and infra-red photodiode sensor 22 are cut out at the respective locations from envelope 23 for these items to be mounted and protrude from. The infra-red light-emitting diodes 21 and the connecting part of cabling 26 are held into place in close proximity to the interior surface of envelop 23 by a wall 37. The dimension of wall 37 is such that it is big enough to cover all of infra-red light-emitting diodes 21 and part of cabling 26 effectively. Wall 37 uses the same material as envelope 23 and is bonded around the sides to the interior surface of envelope 23 with suitable adhesives or methods to provide sturdy support and prevent helium gas leaking. The infra-red photodiode sensor 22 is held onto the interior surface of the envelope 23 in the similar way by a wall 36. Wall 36 is also made of the same material as envelope 23.

It is apparent and obvious to those skilled in the art that with the appropriate modifications, light-emitting diodes 11 in system 10 can be mounted in a similar way as the infra-red light-emitting diodes 21 in system 20 to provide another way of illuminating and enhancing the balloon 19.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to the skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

PARTS LIST

The following is a list of suitable parts and materials for the various elements of the preferred embodiment of the present invention.

system 10
system 20
balloon 19
light-emitting diodes 11

infra-red light-emitting diodes 21
infra-red photodiode sensor 22
control circuit 9
control circuit 39
tether string 15
cabling 16
cabling 26
power source 17
power source 27
tape 7
wall 36
wall 37