THREE-DIMENSIONAL PHOTOGRAPH ENHANCED DISPLAY SYSTEM

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ABSTRACT

Techniques for displaying three-dimensional photograph for a substantially enhanced three-dimensional visual result and clarity are disclosed. Although there are several ways to view a three-dimensional photograph, the invention herein provides a particularly thin, light weight, economical, long life, convenient, flexible, having uniform illumination with the right amount of back light suitable for viewing three-dimensional photographs and produces a substantially enhanced three-dimensional visual effect and clarity of the object or objects depicted in the three-dimensional photograph. According to one aspect of these techniques, an electroluminescent lighting for the back lit on the display panel is provided and energized either by battery, rechargeable battery or AC adapter. The display panel includes a lenticular sheet, a three-dimensional photograph and a back lit lighting source, specifically, an electroluminescent lighting sheet and an inverter energizing said lighting sheet. The display system has a piece of glass placed in front of the lenticular sheet so that there is no feeling or sight of using a lenticular sheet for three-dimensional viewing.
FIG. 1  Perspective view

- Photo mounting device
- Glass
- Picture mat
- 3D photo
FIG. 2 Rear elevational view
FIG. 3 Composition Diagram
FIG. 4  Top Plan View

FIG. 5  Bottom Plan View
FIG. 6A  Left elevational view when support stand not deployed.

FIG. 6B  Left elevational view when support stand deployed.
FIG. 7A  Right elevational view when support stand not deployed.

FIG. 7B  Right elevational view when support stand deployed.
THREE-DIMENSIONAL PHOTOGRAPH ENHANCED DISPLAY SYSTEM

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention
[0002] The present invention relates to the area of displaying a three-dimensional photograph for viewing for a substantially enhanced three-dimensional visual result and clarity.
[0003] 2. Description of the Related Art
[0004] Studies show that people take and view two-dimensional photographs from prints or images displayed on computer monitor or video displaying or projecting electronic devices.
[0005] Studies also show that three-dimensional photographs can be taken with various methods. For example, it can be taken with a single camera with multiple lens or a single camera with a single lens by shifting the camera’s position or angle to shoot the object to obtain a stereovision effect. Some use multiple cameras shooting the object from different positions or angles. Yet some use graphic software to change a two-dimensional photograph into a three-dimensional photograph.
[0006] Studies also show that people generally do not use any three-dimensional photograph display panel to enhance the three-dimensional visual effect in a three-dimensional photograph and clarity when viewing a three-dimensional photograph.
[0007] Studies also show that front illumination on a three-dimensional photograph does not enhance the three-dimensional visual effect for a deeper depth effect or clarity.
[0008] Studies also show that back light using light bulb does not produce a uniform illumination over the entire surface of a three-dimensional photograph and has a short life span and generates too much heat.
[0009] Studies also show that back light using fluorescent lamp requires AC power. However, it produces too much of illumination for average viewing of a three-dimensional photograph, especially in a residential or office lighting environment and does not produce a uniform illumination over the entire surface of the three-dimensional photograph. Studies show that people tend not to look at a photograph for a long time when it is too bright.
[0010] Studies also show that back light using Light Emitting Diode (LED) may or may not require power from an AC adapter. However, the cost of LED back light source is more expensive than that of illumination by fluorescent lamp or light bulb.
[0011] Studies also show that back light using Organic Light Emitting Diode (OLED) may or may not require power from AC adapter. Generally, the cost of OLED back light source is a lot more expensive and is not in mass production and readily available in the market at this time.
[0012] Studies show that consumers like to view three-dimensional photographs for more realistic three-dimensional visual result and satisfaction for its aesthetic and realistic appeal. Accordingly there is a great need for solutions to provide for an enhanced display system for viewing a three-dimensional photograph.
[0013] Studies also show that consumers like to view three-dimensional photographs without an AC adapter wiring attached to a device which displays the three-dimensional photograph. Accordingly, there is a great need for solutions to provide for an enhanced display system which back light source produces the right amount of illumination uniformly over the entire surface of a three-dimensional photograph yet requires only a small amount of battery voltage to eliminate the AC wiring for aesthetic purpose.
[0014] Studies show that consumers may like to display and view three-dimensional photographs on a flexible surface. Accordingly there is a great need for solutions powering a flexible light source.
[0015] Studies show that consumers may like to display and view three-dimensional photographs on a device that is thin, light weight, long life, economical with an efficient and uniform back light light source. Accordingly, there is a great need for solutions to provide for an enhanced display system with said characteristics.
[0016] Studies show that there is a great need for solutions for a more uniform back lit light source giving an appropriate amount of illumination for the displaying and viewing of three-dimensional photographs for a substantially enhanced three-dimensional visual result and clarity.

SUMMARY OF THE INVENTION

[0017] This section is for the purpose of summarizing some aspects of the present invention and to briefly introduce some preferred embodiments. Simplifications or omissions in this section as well as in the abstract and the title may be made to avoid obscuring the purpose of this section, the abstract and the title. Such simplifications or omissions are not intended to limit the scope of the present invention.
[0018] The invention pertains to a display system that is economical, thin, light weight, long life, efficient and flexible for the display and viewing a three-dimensional photograph with just the right amount of back light illumination uniformly over the entire surface of a three-dimensional photograph to substantially enhance its three-dimensional visual effect and clarity without AC wiring for the back lit light source.
[0019] The display system includes a three-dimensional photograph, specifically, a three-dimensional photograph converted from an ordinary two-dimensional photograph by graphic software. The display system consists of a display panel which includes a lenticular len or sheet of predetermined size and lines per inch specification placed directly and vertically over a three-dimensional photograph. Said display panel also includes a lenticular len or sheet and an electroluminescent lighting sheet of predetermined size. Said display system also includes a photo mounting device, generally, a picture frame of predetermined size, shape or material, configured to mount a piece of glass, a layer or multiple layers of picture mat, said lenticular len or sheet, a three-dimensional photograph and said electroluminescent lighting (EL) sheet of predetermined size. Said EL sheet is energized by an inverter powered either by battery or rechargeable battery or an AC adapter. Said AC adapter can be disconnected from the display panel when not in use. The display system also includes a battery charging device which can be disconnected from the display panel when the battery is not being charged. Said inverter may also be switched on or off by a wire or wireless remote power switch device. As a result, a three-dimensional photograph can be displayed in said back lit display panel, whether or not it is energized by the battery or the AC adapter. It will substantially enhance the three-dimensional visual result to add more depth effect and clarity in the three-dimensional photograph when said back lit display panel is energized.
The display panel is for displaying the three-dimensional photograph for viewing. In one embodiment, the display panel consists of a lenticular len or sheet and an electroluminescent lighting sheet and a three-dimensional photograph is sandwiched between said lenticular len and said electroluminescent lighting sheet with the lighting surface facing the back of said photograph. In one embodiment, the display panel is mounted on a photo mounting device, generally, a picture frame. In one embodiment, a piece of glass is placed directly over a layer or multiple layers of picture mat, which placed directly over said lenticular len. In one embodiment, the front of said three-dimensional photograph is laminated or mounted to the non-ribbed surface of said lenticular sheet. The layer or multiple layers of picture mat is to add more depth effect when viewing said three-dimensional photograph. In one embodiment, an inverter for the electroluminescent lighting sheet is placed behind said lighting sheet or the photo mounting device. In one embodiment, there is a compartment to house said inverter, said battery or rechargeable battery and said switch, which is installed behind electroluminescent lighting sheet or the photo mounting device. When said display system is hung on a wall or placed on a flat surface, such as a desk or a table, a three-dimensional photograph mounted on the photo mounting device, with the display panel facing forward, said three-dimensional photograph may be conveniently viewed by viewers in front of the display panel. For a uniform distribution of light, energy efficient consideration, cost consideration, light weight, thin, longevity, flexibility and appropriate amount of illumination, said display panel is normally back lit by an electroluminescent lighting sheet. In one embodiment, said three-dimensional photograph can be viewed with said back electroluminescent lighting source energized for a substantially enhanced three-dimensional visual effect for added depth effect and clarity. In one embodiment, the display panel need not be energized for viewing. In one embodiment, said lenticular len, three-dimensional photograph and electroluminescent lighting sheet is backed by a support sheet made of various predetermined materials to hold and secure said display panel in place with said photo mounting device. In one embodiment, said photo mounting device has a hanging device and a support device in the rear for either hanging on a wall or placed steadily on a flat surface. In one embodiment, a piece of glass is placed directly over a layer or multiple layers of picture mat so that the ribbed surface of said lenticular sheet cannot be touched or seen. In one embodiment, a support stand is provided to support and stabilize said display system when it is placed on a flat or not-so-flat surface.

One of the objects, features, advantages, benefits of the present invention is to provide a substantially thin, light weight, flexible, convenient, long life, efficient, economical and a uniform distribution of back lit light source solution to view a three-dimensional photograph with substantially enhanced three-dimensional visual result to add deeper depth effect and clarity to said three-dimensional photograph. It can be achieved without the feeling or sight of using a lenticular sheet for viewing said three-dimensional photograph by adding a piece of glass in front of said lenticular sheet. The solution employs a battery powered electroluminescent back lit light source placed behind said three-dimensional photograph within a photo mounting device, generally a picture frame.

Other objects, features, advantages, benefits of the invention will become more apparent from the following detailed description of a preferred embodiment, which proceeds with reference to the accompanying drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

**FIG. 1** shows the perspective view of the display system.

**FIG. 2** shows the rear elevational view of the display system.

**FIG. 3** shows the composition diagram of the display system.

**FIG. 4** shows the top plan view of the display system.

**FIG. 5** shows the bottom plan view of the display system.

**FIG. 6A** shows the left side elevational view of the display system when the support stand is not deployed and **FIG. 6B** deployed.

**FIG. 7A** shows the right side elevational view of the display system when the support stand is not deployed and **FIG. 7B** deployed.

**DETAILED DESCRIPTION OF THE INVENTION**

The invention pertains to a display system configured to display three-dimensional photographs for a substantially enhanced three-dimensional visual effect and clarity. The display system includes a photo mounting device, generally, a picture frame, a piece of glass, a layer or multiple layers of picture mat and a display panel configured to display a three-dimensional photograph. Said display panel includes a lenticular sheet and a back lit lighting element, generally, an electroluminescent lighting sheet ("EL"). The display system also includes an inverter to energize said EL sheet, a battery or rechargeable battery to power said inverter, a battery charging device, an AC adapter and a wire or wireless remote power switch. As a result, when the EL sheet is energized, a substantially enhanced three-dimensional visual result of a three-dimensional photograph with more depth effect and clarity can be displayed in said display panel.

The detailed description of the invention is presented largely in terms of procedures, steps, diagrams and other symbolic representations that directly or indirectly resemble the assembly of the three-dimensional display system. These process descriptions and representations are typically used by those skilled in the art to most effectively convey the substance of their work to others skilled in the art. Reference herein to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment can be included in at least one embodiment of the invention. The appearances of the phrase "in one embodiment" in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments.

Referring now to the drawings, **FIG. 1** shows the perspective view of the display system.

Referring now to the drawings, **FIG. 1** shows a piece of glass for protection of the picture mat, the lenticular sheet, the three-dimensional photograph and the EL sheet and with-
out the feeling and sight of the presence of said lenticular sheet for an enhanced three-dimensional viewing.

[0035] Referring now to the drawings, FIG. 1 shows a layer of picture mat of a predetermined thickness, which is provided to substantially enhance the depth effect of the three-dimensional photograph. In one embodiment, there may be multiple layers of picture mat for more enhancement of depth effect.

[0036] Referring now to the drawings, FIG. 2 shows the rear view of the display system. In one embodiment, it shows a hanging device or hole for hanging the system on a wall. It also shows a support sheet in the back of the system. In one embodiment, it shows a supporting stand, when it is deployed, supports the system for placing on a flat surface, such as a table, a desk or a credenza. It also shows a power connector and a compartment for inverter/battery/rechargeable battery/switch.

[0037] Referring now to the drawings, FIG. 3 shows the composition diagram of the display system.

[0038] The display panel consists of a photo mounting frame 301, a piece of glass 302, a layer or multiple layers of photo or picture mat 303, a lenticular sheet 304, a three-dimensional photograph 305, which can be replaced with another three-dimensional photograph from time to time, an EL sheet 306, a back support sheet 307 and a support stand 309.

[0039] The EL sheet 306 is provided to substantially enhance the three-dimensional depth effect by adding feeling of more depth and clarity when it is energized.

[0040] The display system consists of a compartment 308 which house the inverter for the EL sheet 306 and the battery or rechargeable battery and a switch.

[0041] The display panel is energized by battery or rechargeable battery which can be recharged by a battery charging device 310 and can be disconnected from the display system when the battery is not being charged.

[0042] Alternatively, the display panel may be energized by an AC adapter 311, which can be disconnected from the display system when AC is not in use.

[0043] Referring now to the drawings, FIG. 4 and 5 respectively show the top and bottom plan view of the display system.

[0044] Referring now to the drawings, FIG. 6A shows the left elevational view of the display system when the support stand is not being deployed and 6B deployed.

[0045] Referring now to the drawings, FIG. 7A shows the right elevational view of the support stand 203 is not being deployed and 7B deployed.

[0046] In one embodiment, the compartment for said inverter, said battery or rechargeable battery, and said power switch can be installed anywhere in the back of the photo mounting device.

[0047] The present invention has been described in sufficient detail with a certain degree of particularity. It is understood to those skilled in the art that the present disclosure of embodiments has been made by way of examples only and that numerous changes in the arrangement and combination of parts may be resorted without departing from the spirit and scope of the invention as claimed. While the embodiments discussed herein may appear to include some limitations as to the presentation of the information units, in terms of the format and arrangement, the invention has applicability well beyond such embodiment, which can be appreciated by those skilled in the art. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing description of embodiments.

1 claim:

1. A system for displaying a three-dimensional photograph for a substantially enhanced three-dimensional visual result for more depth effect and clarity, the system comprising of:
   a. a photo mounting device, generally, a picture frame, a piece of glass, a layer or multiple layers of picture mat, a lenticular lens or sheet, a three-dimensional photograph, an electroluminescent lighting sheet, an inverter to drive said lighting sheet, one or more battery or rechargeable battery, a wire or wireless power switch, a battery charging device and an AC power adapter.

2. The system as recited in claim 1, wherein it consists of a display panel.

3. The system as recited in claim 2, wherein the display panel consists of a lenticular sheet with its ribbed surface facing forward, an electroluminescent lighting sheet of predetermined color, with its light surface facing the back of a three-dimensional photograph. Thus, the three-dimensional photograph is laminated or mounted facing forward between said lenticular sheet and said electroluminescent lighting sheet, whereby when said electroluminescent lighting sheet is energized, a substantially enhanced three-dimensional visual result of said photograph can be viewed with more depth and clarity.

4. The system as recited in claim 1, wherein the display system may consist of a piece of glass placed directly over a layer or multiple layers of picture mat or a lenticular sheet so that the ribbed surface of said lenticular sheet cannot be touched or seen to give a feeling of absence of said lenticular sheet for a substantially enhanced three-dimensional viewing.

5. The system as recited in claim 1, wherein the display system consists of a compartment installed on the back of a photo mounting device to house a switch, an inverter and one or more battery or rechargeable battery to energize said inverter and said electroluminescent lighting sheet.

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