US 20050180146A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0180146 A1**

VanderSchuit (43) **Pub. Date: Aug. 18, 2005**

(54) **MOOD-ENHANCING ILLUMINATION APPARATUS**

(76) Inventor: **Carl R. VanderSchuit**, San Diego, CA (US)

Correspondence Address:
HARNESS, DICKEY, & PIERCE, P.L.C
7700 BONHOMME, STE 400
ST. LOUIS, MO 63105 (US)

(21) Appl. No.: **11/098,678**

(22) Filed: **Apr. 4, 2005**

Related U.S. Application Data

(63) Continuation-in-part of application No. 10/341,239, filed on Jan. 13, 2003, now Pat. No. 6,874,909.

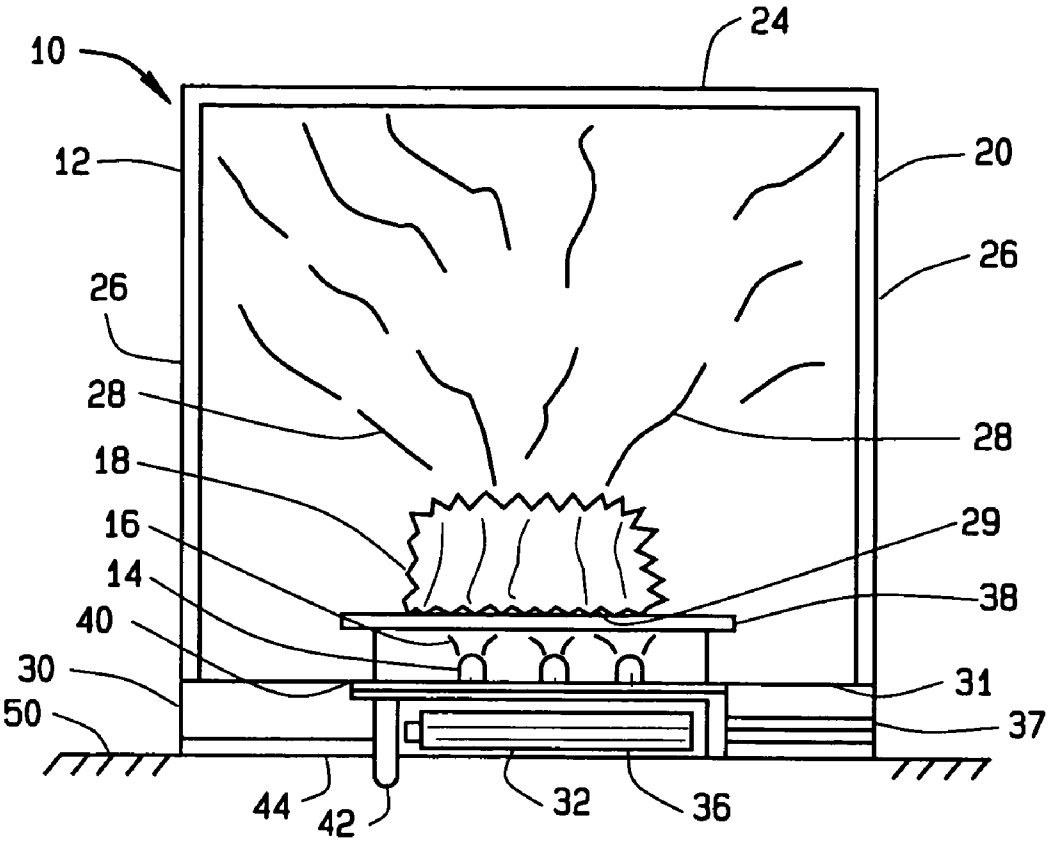
Publication Classification

(51) **Int. Cl.**[7] **A47B 23/06**

(52) **U.S. Cl.** **362/367**

(57) **ABSTRACT**

An illumination apparatus includes a housing having an outer perimeter and at least one opening having a periphery. The illumination apparatus also includes at least one light source and at least one light-altering device. The light source is adjacent one of the periphery and the outer perimeter. The light-altering device is adjacent the other one of the periphery and the outer perimeter, for receiving and altering light from the light source. The illumination apparatus can be positioned relative to another component such that at least a portion of the another component is within the opening.



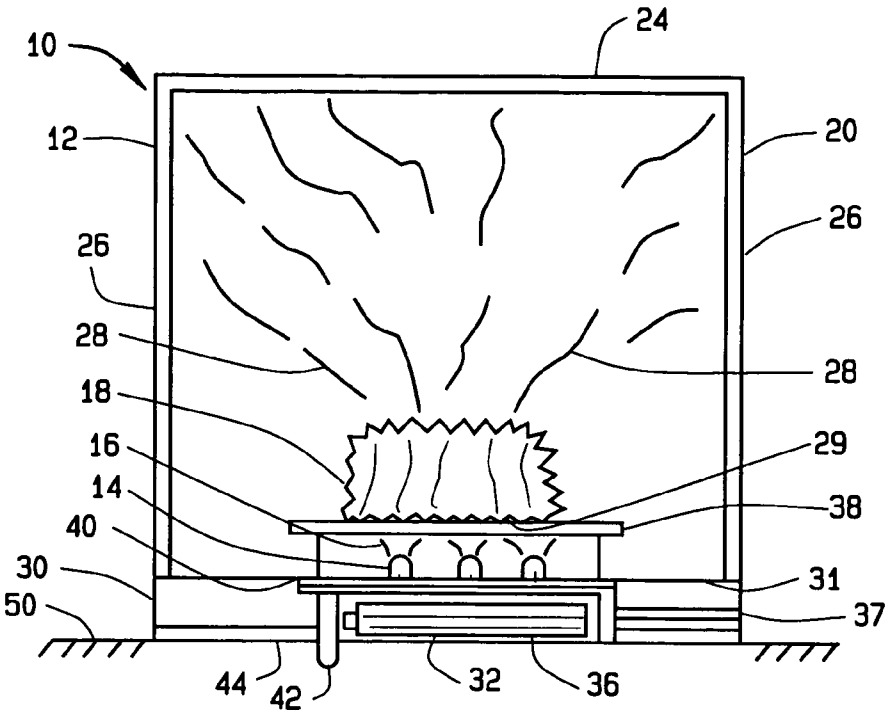


FIG. 1

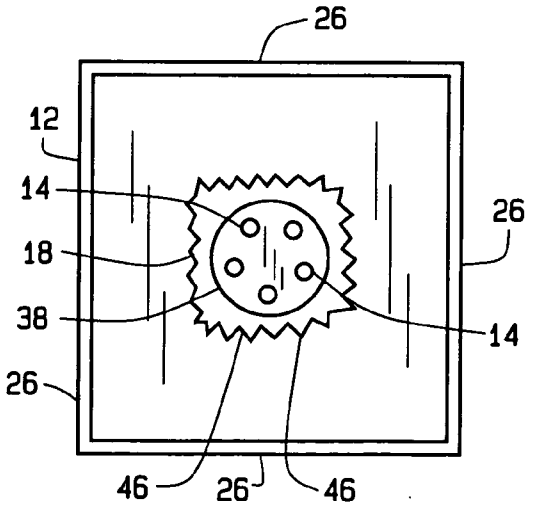


FIG. 2

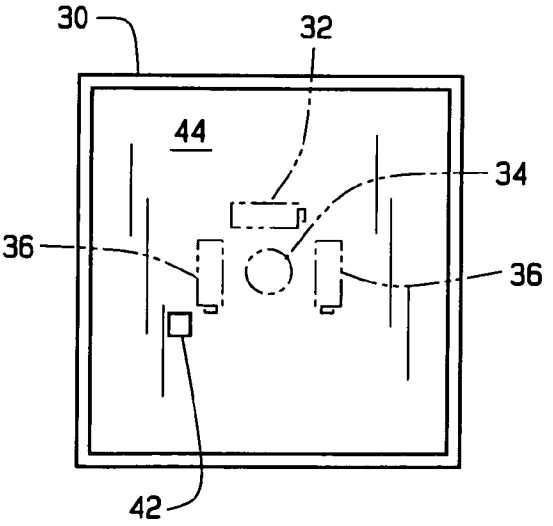


FIG. 3

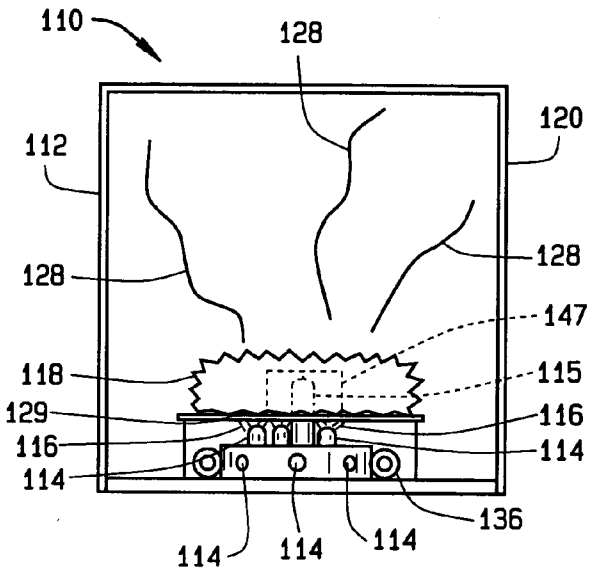


FIG. 4

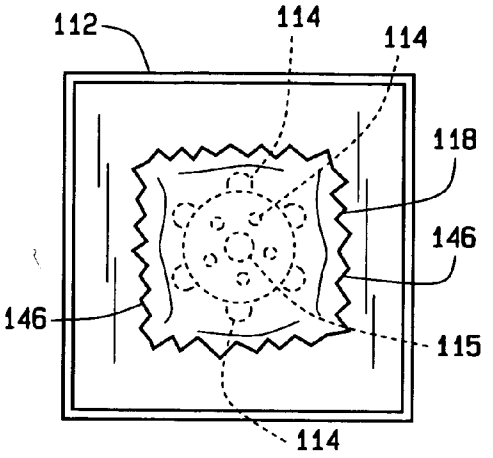


FIG. 5

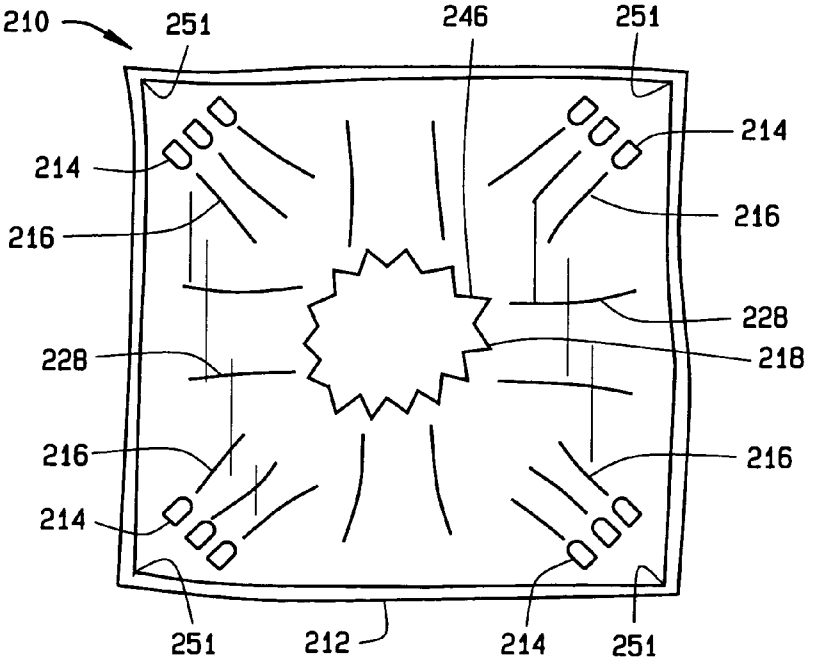


FIG. 6

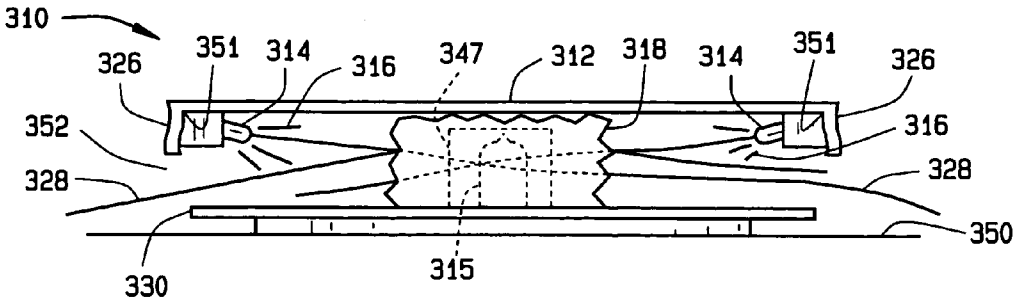


FIG. 7

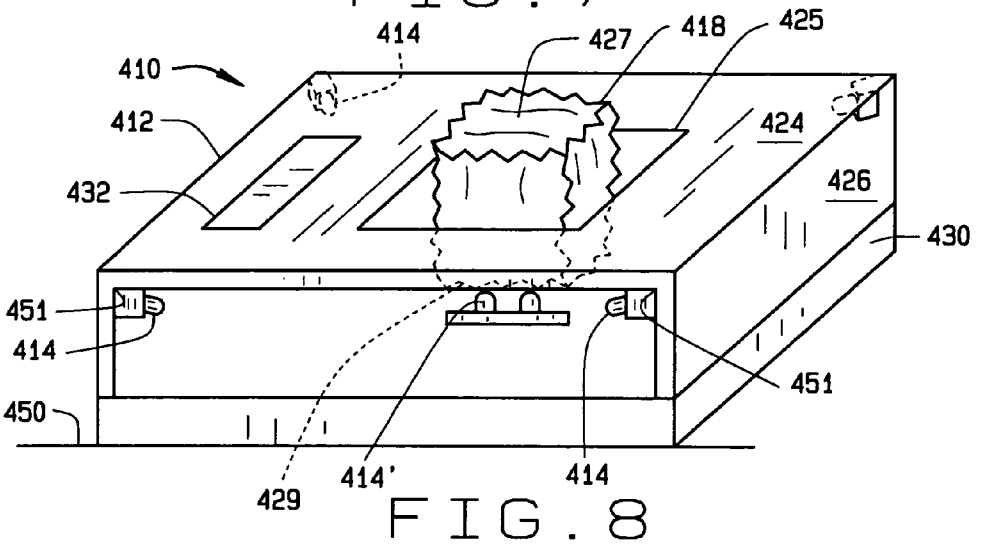


FIG. 8

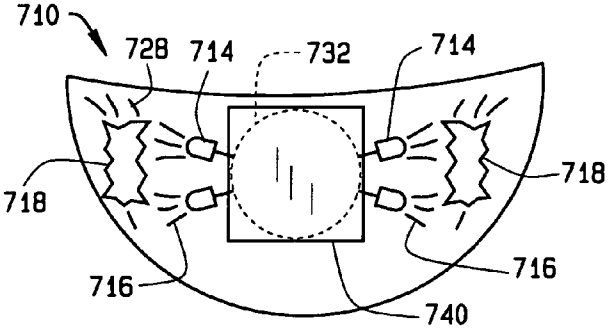


FIG. 11

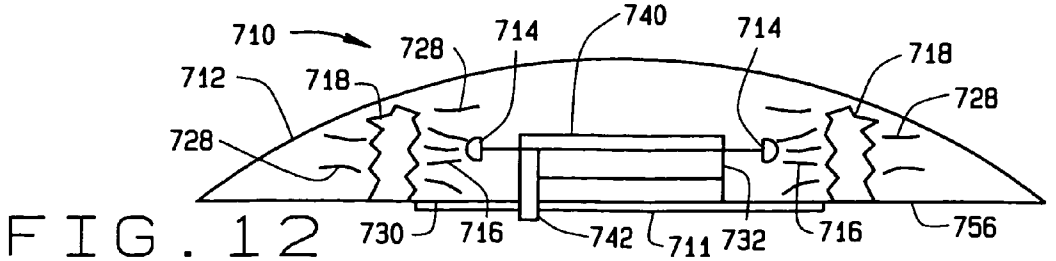


FIG. 12

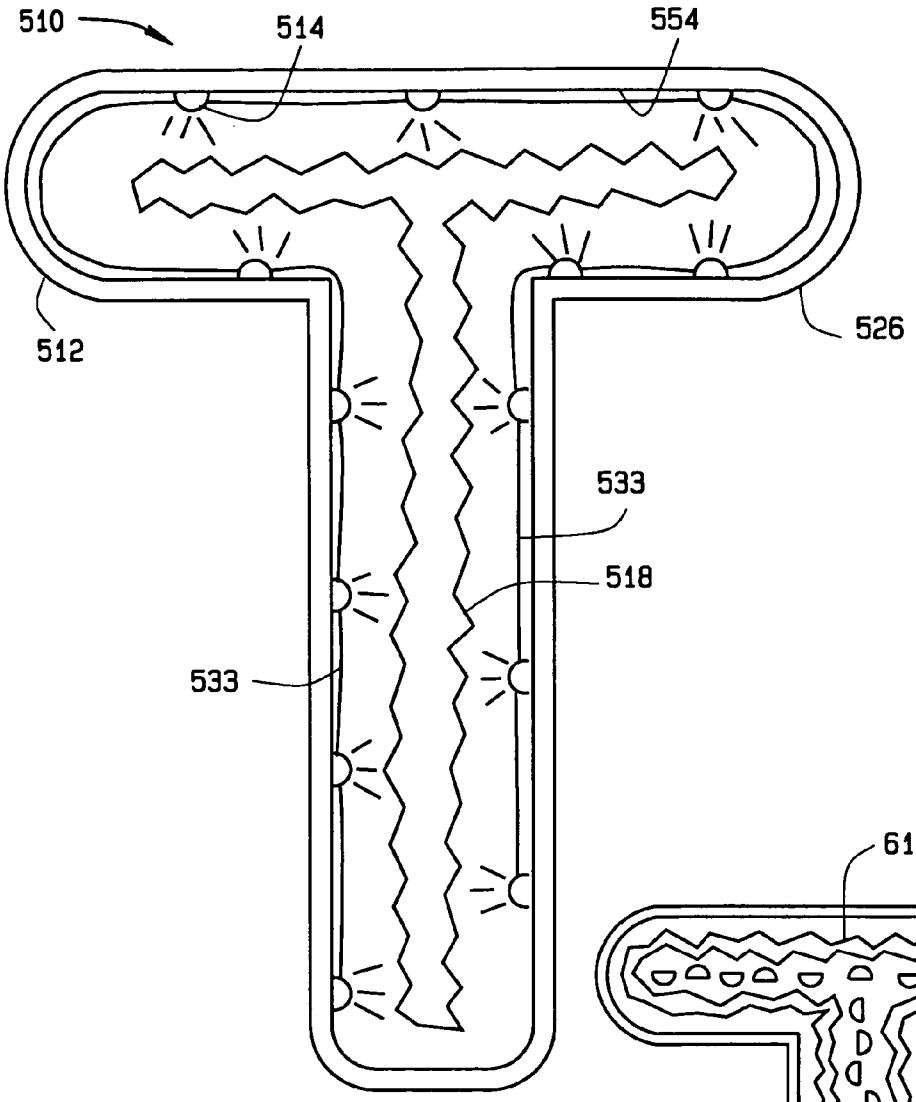


FIG. 9

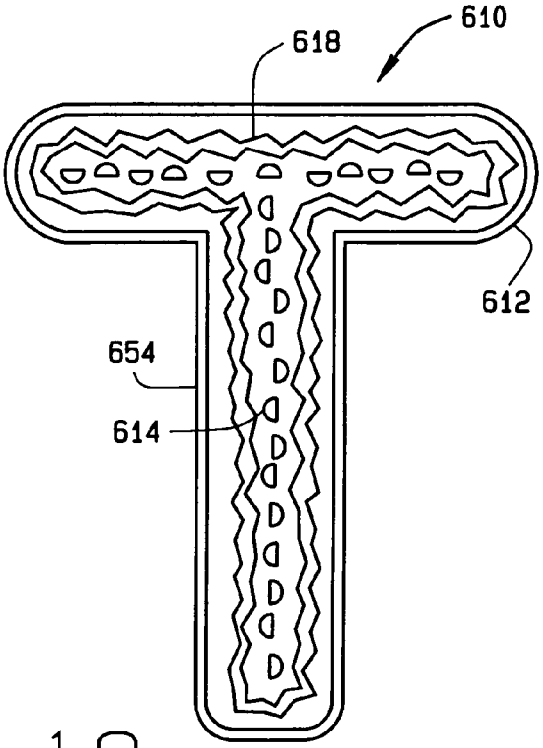


FIG. 10

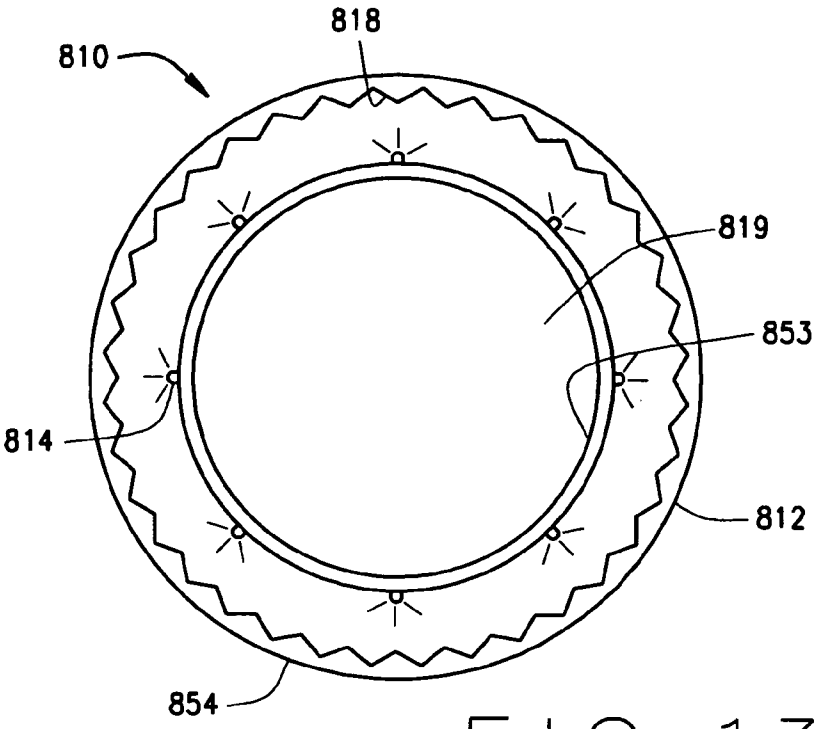


FIG. 13

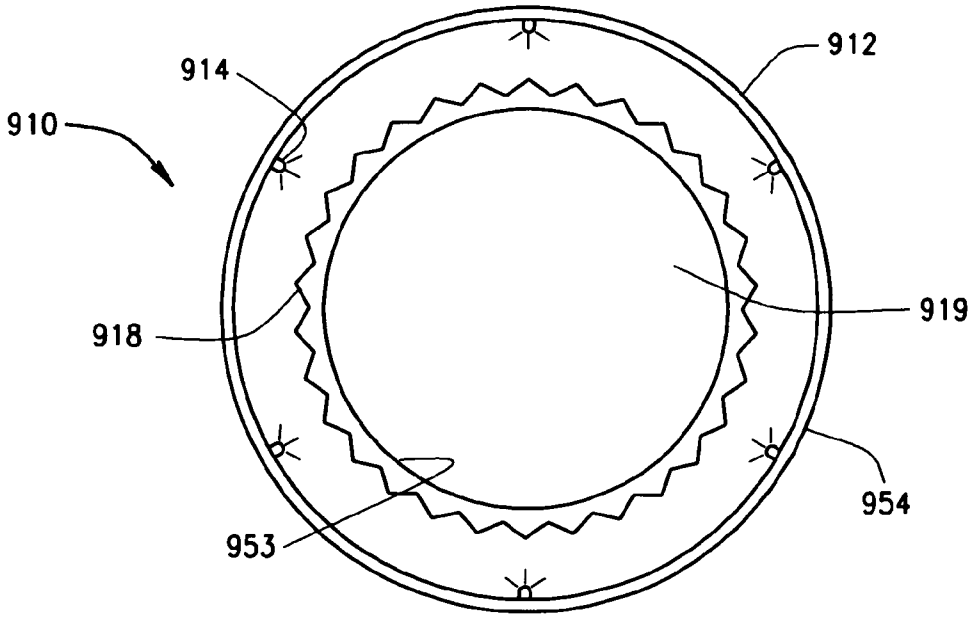


FIG. 14

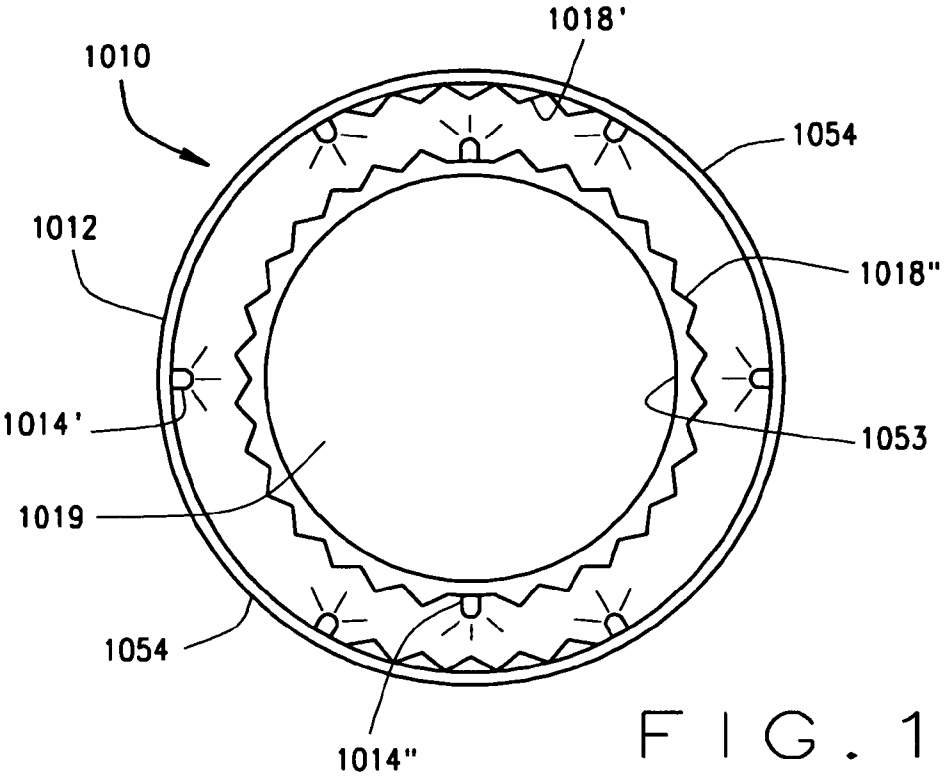

1018'
1010
1054
1012
1018"
1014'
1053
1019
1054
1014"

FIG. 15

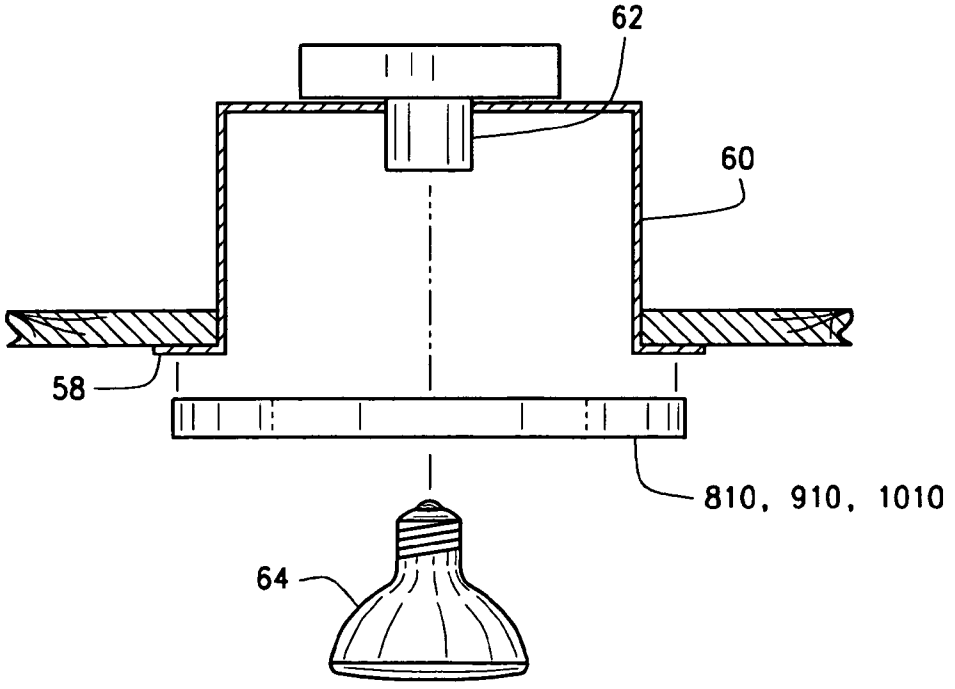

62
60
58
810, 910, 1010
64

FIG. 16

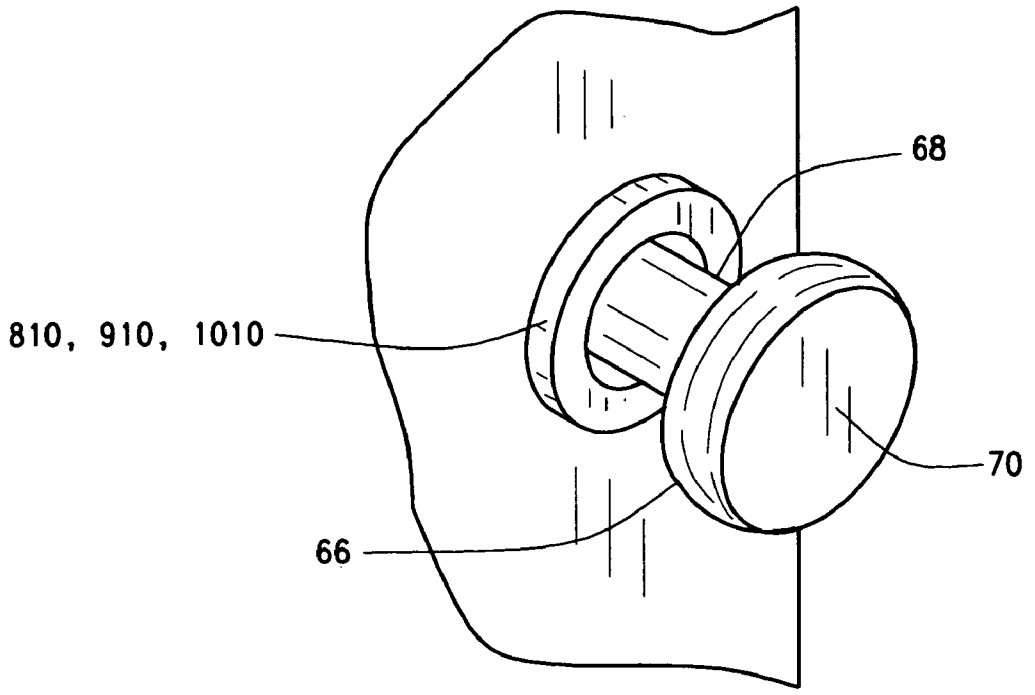


FIG. 17

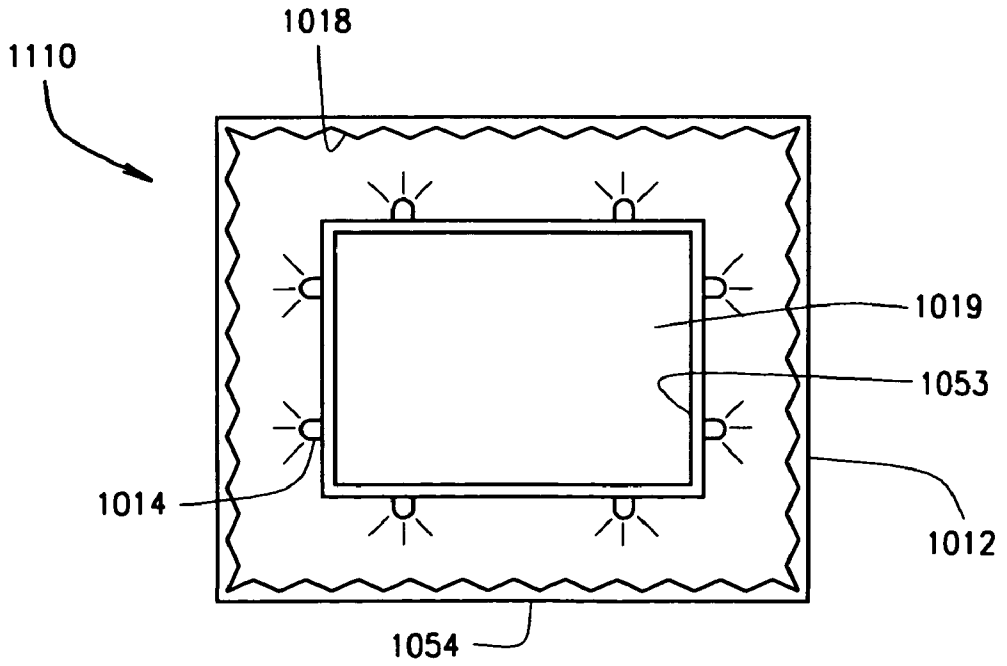


FIG. 18

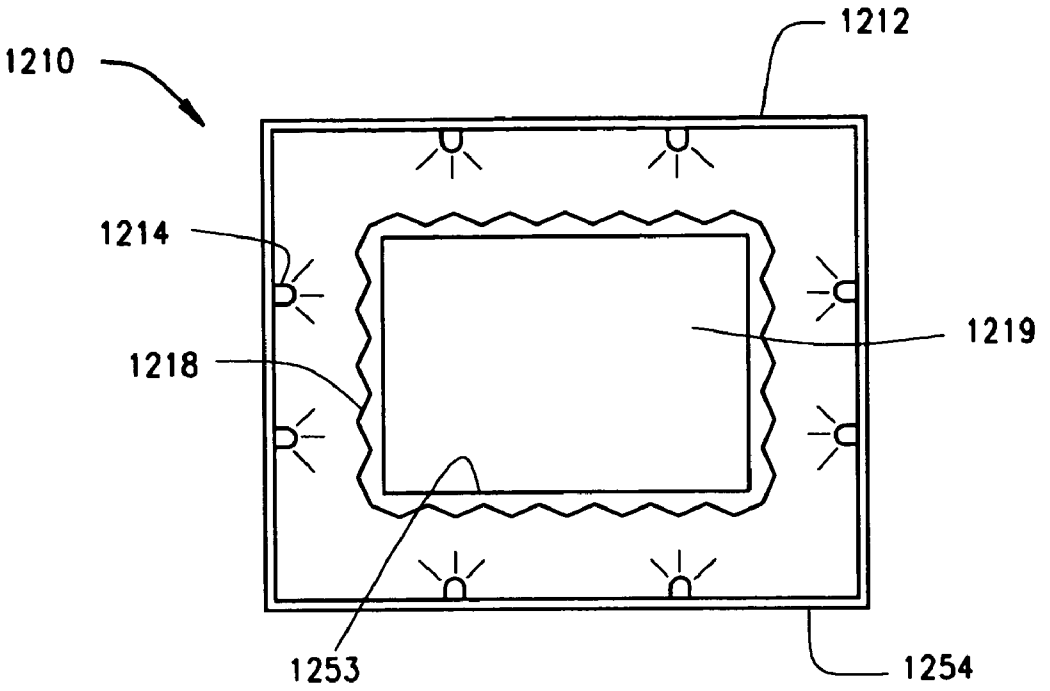

1210
1212
1214
1218
1219
1253
1254

FIG. 19

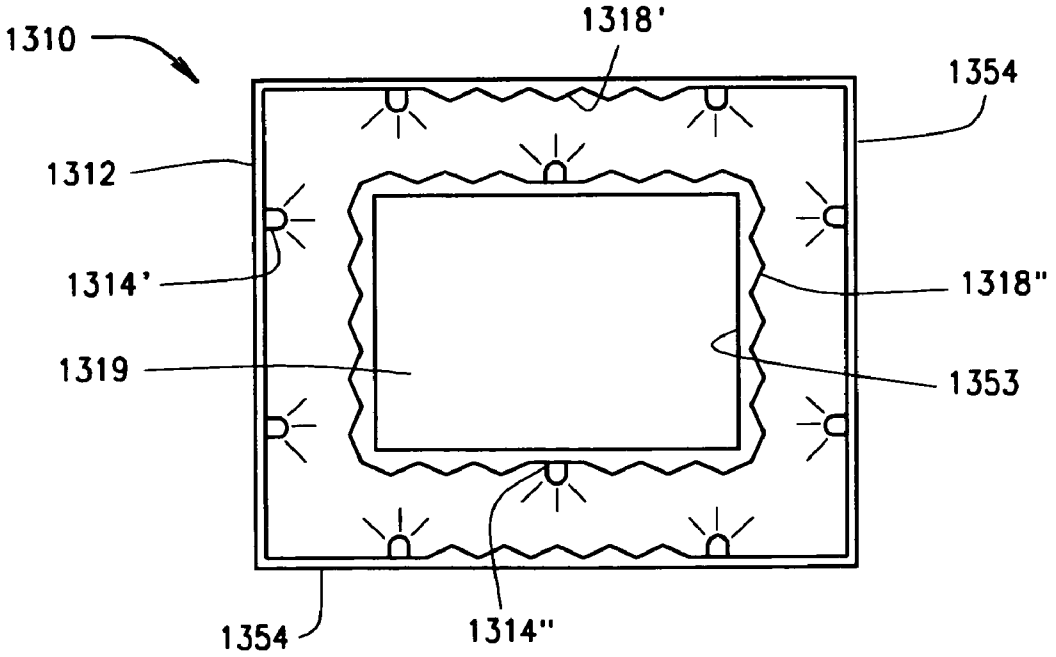

1310
1318'
1354
1312
1314'
1318"
1319
1353
1354
1314"

FIG. 20

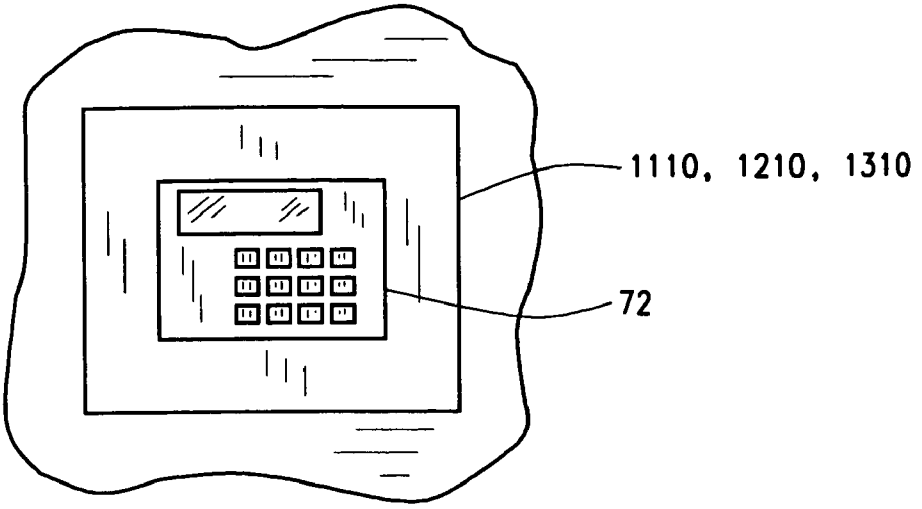


FIG. 21

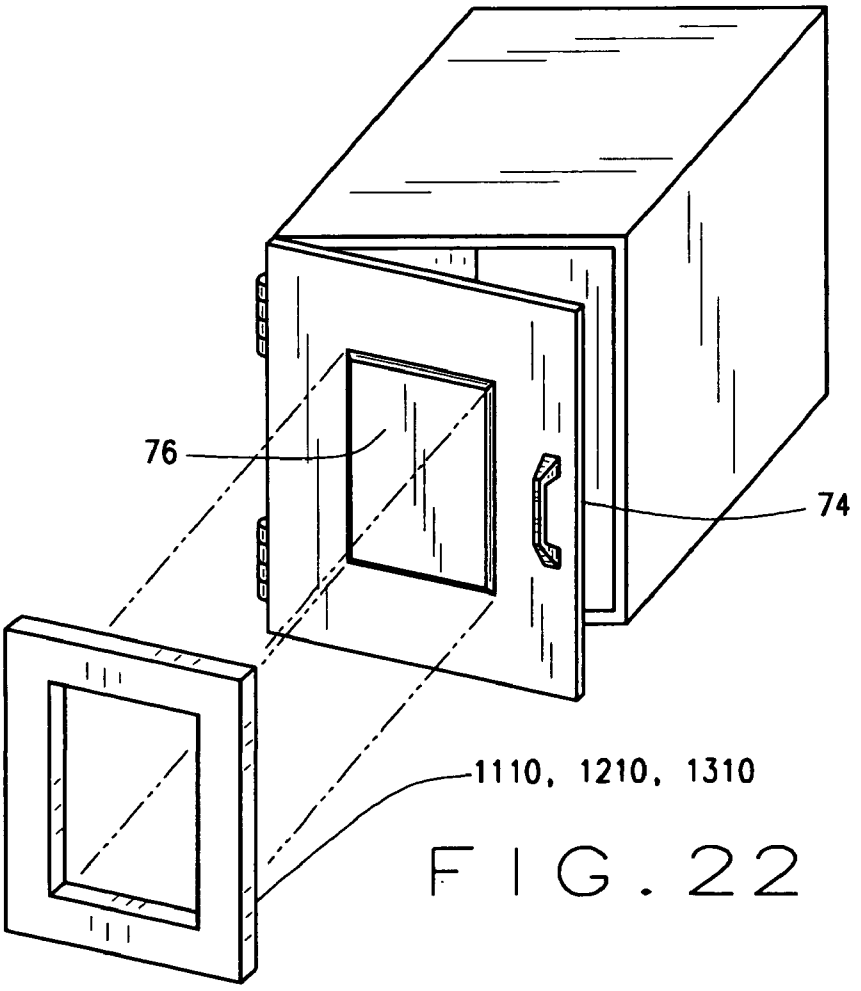


FIG. 22

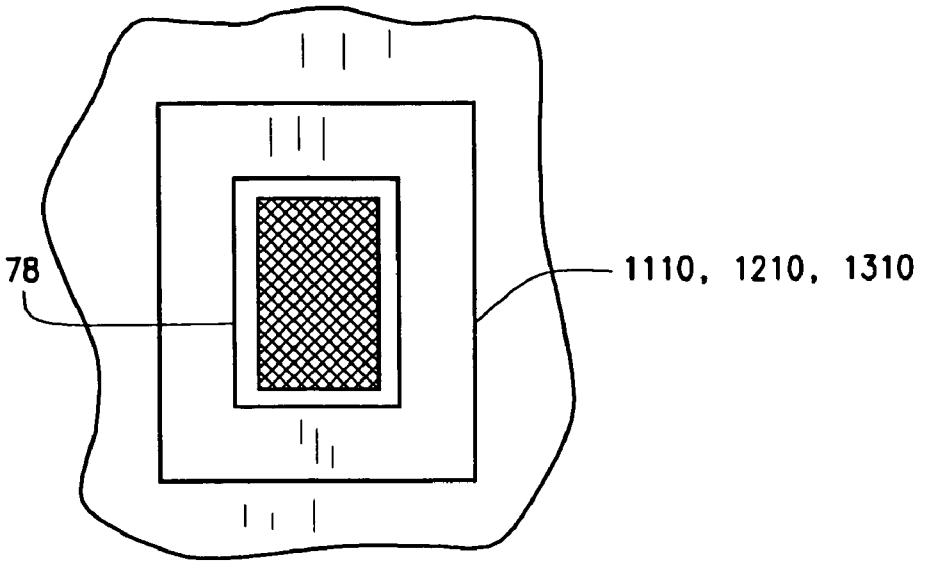


FIG. 23

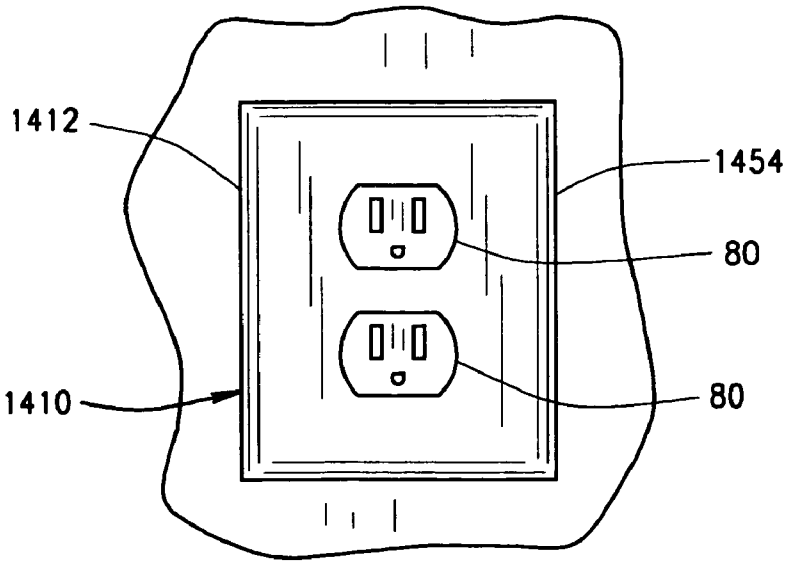


FIG. 24

MOOD-ENHANCING ILLUMINATION APPARATUS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation-in-part of co-pending application Ser. No. 10/341,239, filed Jan. 13, 2003, the entire disclosure of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates generally to light sources and more particularly to illumination apparatus that provide mood lighting or atmospheric-enhancing illumination, such as visually pleasing light effects and patterns.

BACKGROUND OF THE INVENTION

[0003] Illumination devices, such as lava lamps, have been used for many years to provide atmospheric-enhancing illumination or mood lighting. Even today, there still exists a continuing demand and need for illumination devices that provide visually-pleasing illumination effects and light patterns.

[0004] In addition, jewelry, hair ornaments, and other accessory items are being provided with light sources, such as light-emitting diodes, that draw attention to the accessory item and its user. However, the inventor has recognized that these light sources are typically positioned to emit light outwardly from the accessory item without illuminating the accessory item itself, which would provide a more stimulating and pleasing visual effect.

SUMMARY OF THE INVENTION

[0005] According to one aspect of the invention, an illumination apparatus includes a housing having an outer perimeter and at least one opening having a periphery. The illumination apparatus also includes at least one light source and at least one light-altering device. The light source is adjacent one of the periphery and the outer perimeter. The light-altering device is adjacent the other one of the periphery and the outer perimeter, for receiving and altering light from the light source. The illumination apparatus can be positioned relative to another component such that at least a portion of the another component is within the opening.

[0006] According to another aspect of the invention, an illumination apparatus includes a housing configured in a generally annular shape having a central opening. The illumination apparatus also includes at least one light source, and at least one light-altering device having a surface having a plurality of facets. The light-altering device is positioned relative to the housing and the light source for receiving and altering light from the light source. The illumination apparatus can be positioned relative to another component such that at least a portion of the another component is within the opening.

[0007] In another aspect, the invention provides method of using an illumination apparatus having at least one opening, at least one light source, and at least one light-altering device positioned relative to the housing and the light source for receiving and altering light from the light source. In one embodiment, the method generally includes positioning the illumination apparatus relative to another component such that at least a portion of the another component is within the opening.

[0008] Further areas of applicability of the present invention will become apparent from the detailed description provided hereinafter. It should be understood that the detailed description and specific examples below, while indicating exemplary embodiments of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present invention will be more fully understood from the detailed description and the accompanying drawings, wherein:

[0010] **FIG. 1** is a side view of an illumination apparatus according to one embodiment of the present invention;

[0011] **FIG. 2** is a top view of the illumination apparatus shown in **FIG. 1**;

[0012] **FIG. 3** is a bottom view of the illumination apparatus shown in **FIG. 1**;

[0013] **FIG. 4** is a side view of an illumination apparatus according to another embodiment of the present invention;

[0014] **FIG. 5** is a top view of the illumination apparatus shown in **FIG. 4**;

[0015] **FIG. 6** is a top view of an illumination apparatus configured to illuminate a support surface according to another embodiment of the present invention;

[0016] **FIG. 7** is a side view of an illumination apparatus configured to illuminate a support surface according to another embodiment of the present invention;

[0017] **FIG. 8** is a perspective view of an illumination apparatus configured to illuminate a support surface and to illuminate a housing portion positioned opposite the support surface according to another embodiment of the present invention;

[0018] **FIG. 9** is a top view of an illumination apparatus configured in a shape of a letter "T" according to another embodiment of the present invention;

[0019] **FIG. 10** is a top view of an illumination apparatus configured in a shape of a letter "T" according to another embodiment of the present invention;

[0020] **FIG. 11** is a top view of an illuminatable accessory device according to another embodiment of the present invention;

[0021] **FIG. 12** is a side view of the illumination apparatus shown in **FIG. 11**;

[0022] **FIG. 13** is a view of an illumination apparatus according to another embodiment of the present invention;

[0023] **FIG. 14** is a view of an illumination apparatus according to another embodiment of the present invention;

[0024] **FIG. 15** is a view of an illumination apparatus according to another embodiment of the present invention;

[0025] **FIG. 16** is an exploded view of an illumination apparatus being used with a recessed ceiling light fixture according to another embodiment of the present invention;

[0026] **FIG. 17** is a perspective view of an illumination apparatus being used with a doorknob according to another embodiment of the present invention;

[0027] **FIG. 18** is a view of an illumination apparatus according to another embodiment of the present invention;

[0028] **FIG. 19** is a view of an illumination apparatus according to another embodiment of the present invention;

[0029] **FIG. 20** is a view of an illumination apparatus according to another embodiment of the present invention;

[0030] **FIG. 21** is a view of an illumination apparatus being used with a faceplate according to another embodiment of the present invention;

[0031] **FIG. 22** is a view of an illumination apparatus being used with a cabinet door according to another embodiment of the present invention;

[0032] **FIG. 23** is a view of an illumination apparatus being used with a front speaker panel according to another embodiment of the present invention; and

[0033] **FIG. 24** is a view of an illumination apparatus being used with electrical wall outlets according to another embodiment of the present invention.

[0034] Corresponding reference characters indicate corresponding features throughout the drawings.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0035] The following description of various embodiments is merely exemplary in nature and is in no way intended to limit the invention, its applications, or uses.

[0036] Referring to **FIG. 1**, there is shown an illumination apparatus, generally indicated by reference number **10**, according to one embodiment of the present invention. As shown in **FIG. 1**, the illumination apparatus **10** includes a housing **12**, at least one light source **14**, and a light-altering device **18**. The light-altering device **18** is positioned relative to the housing **12** and the light source **14** for receiving and altering light **16** from the light source **14** such that the altered light **28** illuminates at least a portion of the housing **12**, such as the upper portion **20** of the housing **12**. Alternatively, or additionally, the light-altering device **18** may be positioned relative to the housing **12** and the light source **14** such that the altered light **28** illuminates at least a portion of a surface **50** supporting the illumination apparatus **10**, such as a wall, ceiling, floor, tabletop, walkway, clothing, a surface of a mobile platform, etc. During operation, the light-altering device **18** refracts, reflects, diffracts, and/or disperses the light **16** such that the altered light **28** illuminates the portion(s) of the housing **12** and/or the support surface **50** with mood-enhancing light patterns and effects.

[0037] In the exemplary embodiment shown in **FIGS. 1 through 3**, the housing **12** is substantially cube-shaped and decorated to resemble an ice cube or ice berg. It is to be understood, however, that the housing **12** may comprise any of a wide range of other shapes including, but not limited to, fruits, tear drops, rain drops, alphanumeric characters, pyramids, etc. By way of example, and as explained in greater detail below, **FIGS. 9 and 10** illustrate apparatus **510** and **610** shaped as the letter "T".

[0038] A wide range of materials may be used for the housing **12** including, but not limited to, acrylics, glasses, plastics, among others. The surfaces of the housing **12** may be transparent, translucent, opaque, reflective, or a combination thereof. In the exemplary embodiment shown in **FIGS. 1 through 3**, the housing surface **24** positioned opposite the support surface **50** is transparent, whereas the housing side surfaces **26** are translucent or frosted to diffuse or soften the altered light **28**.

[0039] To allow ready access to the light source **14**, the light-altering device **18** and/or the interior of the housing **12**, the illumination apparatus **10** further includes a readily removable base assembly **30**. The base assembly **30** may be attached to the housing **12** using a suitable fastening system or method (e.g., an interference fit, adhesives, threaded members, resilient ribs, among others). By way of example only, the housing **12** includes an open end **31** sized to be received over and supported by the base assembly **30**. Several inwardly extending resilient knobs or protuberances (not shown) are positioned on the housing side surfaces **26** adjacent the open end **31**. When the housing **12** is fitted over the base assembly **30**, the knobs engage the base assembly **30** to create an interference or friction fit between the housing **12** and the base assembly **30**. Alternatively, the base assembly **30** and housing **12** can be formed as a single unit.

[0040] Depending on the particular application in which the illumination apparatus **10** is to be used, the illumination apparatus **10** may be configured for placement upon a horizontal support surface, such as a tabletop or desktop. Alternatively, the illumination apparatus **10** can be configured to be mounted on a wall, retrofitted to (e.g., mounted and electrically connected to) an existing wall or ceiling junction box, or attached to a surface of a mobile platform, such as an automobile.

[0041] The base assembly **30** further includes a power source **32** switchably connected to the light source **14**. In the illustrated embodiment, the power source **32** comprises batteries **36** and an AC adapter port **37** to allow the illumination apparatus **10** to receive power through an electrical cord connected with a standard wall outlet. It should be noted, however, that the power source **32** contemplates any suitable means of providing energy to the light source **14** including, but not limited to, renewable batteries, rechargeable batteries, disposable batteries, and other suitable power sources that may be either external or internal to the illumination apparatus **10**. If rechargeable, the power source may be rechargeable by solar, magnetic, electrical, and chemical means, and the like or any combination thereof. Accordingly, the power source mechanism should not be limited to the power source mechanisms described and shown herein.

[0042] In the exemplary embodiment of **FIG. 1**, the base assembly **30** also includes an actuator system for rotating the light-altering device **18** with respect to the light source **14**. The actuator system includes a turntable **38** having a transparent support surface for supporting the light-altering device **18**. The turntable **38** is coupled to a motor **34** that when energized rotates the turntable **38** and the light-altering

device **18** thereon. Alternatively, the actuator system could instead be used to rotate the light source **14** relative to the light-altering device **18**.

[**0043**] The light source **14** in the exemplary embodiment **10** comprises a plurality of variously colored light-emitting diodes positioned adjacent an end portion **29** of the light-altering device **18**. Alternatively, any suitable light source may be employed including but not limited to fiber optics, halogen, incandescent, laser, fluorescent, magnetic, and the like.

[**0044**] The operation of the light source **14** and the actuator system (i.e., motor **34** and turntable **38**) are controlled by a controller in accordance with user input. In one embodiment, the controller includes an integrated circuit/circuit board assembly **40** (i.e., a integrated circuit board mounted on a circuit board) and a switch **42**. The switch **42**, for example, may allow the user to select from a plurality of predetermined rotational speeds for the turntable **38**. Or for example, the switch **42** may allow the user to select from among various display modes for the light source **14**. Such display modes may include an off mode, a mode during which the light-emitting diodes blink in a predetermined sequence, and a mode during which the light-emitting diodes pulsate to sounds. The sounds may be produced by the apparatus **10** itself (e.g., via a speaker built-in to the apparatus **10**) or a source external to the apparatus **10** (e.g., ambient sounds).

[**0045**] In the illustrated embodiment, the switch **42** comprises a push button switch disposed on a bottom portion **44** of the base assembly **30**. However, and depending on the application in which the illumination apparatus **10** will be used, the switch **42** may comprise any one of a wide range of other suitable switch means. For example, the switch **42** may be provided on a cord extending from the base assembly **30**. Or for example, the controller may be configured for use with an infrared remote control. In a further embodiment, the switch **42** may be disposed adjacent a lower portion of a flexible surface of the housing **12** such that application of pressure to the flexible surface causes the switch **42** to change setting.

[**0046**] The light-altering device **18** will now be described in more detail. As shown in **FIG. 1**, the light-altering device **18** is positioned on the turntable **38**, which, in turn, is positioned above the light-emitting diodes **14**. The light-altering device **18** and the light-emitting diodes **14** are positioned within the housing **12** at a substantially central location relative to the housing **12**. The light-altering device **18** alters the light **16** from the light source **14** such that the upper portion **20** of the housing **12** is illuminated with the altered light **28**. The altered light **28** is directed upwards through the transparent housing surface **24** and outwards through the translucent housing side surfaces **26**, thus providing the room in which the illumination apparatus **10** is being used with mood-enhancing light patterns and effects. Alternatively, the light-altering device and the housing may be integrally formed as a single component. For example, the light-altering device may comprise an internal faceted surface of the housing.

[**0047**] The light-altering device **18** in the exemplary embodiment of **FIGS. 1 through 3** comprises facets **46**. Although not limited to any particular material, the light-altering device **18** may comprise a transparent material such as polished acrylic material, glass, plastic, crystal, among others. Alternatively, the light-altering device **18** may comprise a translucent or reflective material.

[**0048**] The light-altering device **18** can have a variety of shapes. In the illustrated embodiment, the light-altering device **18** is shaped in a substantially similar manner as the housing **12** (e.g., cube-shaped as in **FIGS. 1 and 2**, shaped as the letter "T" in **FIG. 9**). In other embodiments, the light-altering device may be substantially spherical, pyramidal, prismatic, among other shapes depending on the application for which the illumination apparatus **10** will be used.

[**0049**] The illumination apparatus **10** may further include one or more indicia positioned to receive the light **16** from the light source **14** and/or to receive the altered light **28** from the light-altering device **18**. The indicia may be at least partially opaque, translucent, or a combination thereof such that the light **16** and/or the altered light **28** produces a silhouette of the indicia that is displayed to a user. The indicia may include any of a wide range of symbols, characters, shapes, words, logos, combinations thereof, etc.

[**0050**] Depending on the particular placement of the indicia, the illumination apparatus **10** may display the silhouette within the housing **12** and/or on a surface external to the housing **12**, such as the support surface **50**. In exemplary embodiments, the indicia is disposed on an interior surface of the housing **12**, suspended within the hollow interior of the housing **12**, and/or disposed on an external surface of the light-altering device **18**.

[**0051**] Referring to **FIGS. 4 and 5**, there is shown an illumination apparatus **110** according to another exemplary embodiment of the present invention. The illumination apparatus **110** includes a housing **112**, at least one light source **114** for emitting light **116**, and a light-altering device **118** positioned to receive the light **116** from the light source **114**. The light-altering device **118** is positioned relative to the housing **112** and the light source **114** for receiving and altering the light **116** from the light source **114** such that the altered light **128** illuminates at least an upper portion **120** of the housing **112**. The light-altering device **118** refracts, reflects, diffracts, and/or disperses the light **116** such that the altered light **128** illuminates the upper housing portion **120** with mood-enhancing light patterns and effects.

[**0052**] As shown in **FIGS. 4 and 5**, the illumination apparatus **110** also includes at least one other light source **115** for providing ambient lighting (such as for reading) much like a conventional lamp or light fixture. The illumination apparatus **110** may be configured such that the light sources **114** and **115** operate independent from one another. Accordingly, a user may turn on or off either one or both the light sources **114** and **115**, depending on the illumination effect desired.

[**0053**] In the illustrated embodiment, the light source **114** comprises a plurality of light-emitting diodes positioned adjacent the end portion **129** of the light-altering device **118**, which includes a plurality of facets **146**. The light-altering device **118** is disposed at a centrally located position within the housing **112**. The light source **115** comprises an incandescent light disposed at least partially within a hollow interior or cavity **147** defined by the light-altering device **118**.

[0054] **FIGS. 6 and 7** illustrate exemplary embodiments of an illumination apparatus **210**, **310** configured to illuminate at least a portion of the surface supporting the apparatus **210**, **310**. The light-altering device **218**, **318** is disposed at a substantially central location relative to the housing **212**, **312** and the light source **214**, **314** comprises at least one light-emitting diode positioned in each corner **251**, **351** of the housing **212**, **312**. Each light-emitting diode is oriented to emit light towards the light-altering device **218**, **318** and the surface **350** supporting the apparatus **210**, **310**. During operation, the light-altering device **218** refracts, reflects, diffracts, and/or disperses the light **216**, **316** such that the altered light **228**, **328** illuminates the surface **350** supporting the apparatus **210**, **310** with mood-enhancing light patterns and effects.

[0055] In the exemplary embodiment shown in **FIG. 7**, the housing side surfaces **326** are truncated such that a gap **352** is defined between the housing **312** and the mounting plate **330**. Accordingly, the altered light **328** passes through the gap **352** and then illuminates the support surface **350**. It should be noted that although the apparatus **310** is shown supported by a floor or tabletop, the apparatus **310** can also be mounted to a wall or ceiling.

[0056] With further reference to **FIG. 7**, the illumination apparatus **310** further includes an optional light source **315** for providing normal lighting conditions. In the illustrated embodiment, the light source **315** comprises an incandescent light disposed at least partially within a hollow interior or cavity **347** defined by the light-altering device **318**, with the light-altering device **318** disposed substantially around the optional light source **315**.

[0057] In **FIG. 8**, there is shown an illumination apparatus **410** configured to illuminate at least the surface **450** supporting the apparatus **410** in accordance with another embodiment of the present invention. As shown, the light-altering device **418** is disposed at a substantially central location within the housing **412**, and the light source **414** comprises at least one light-emitting diode positioned in each corner **451** of the housing **412**. Each light-emitting diode **414** is oriented to emit light towards the light-altering device **418** and the support surface **450**. During operation, the altered light travels outward from the light-altering device **418** and toward the surface **450**. The altered light then passes through the substantially transparent housing side surfaces **426** to illuminate the support surface **450** with a pleasing light pattern or effect.

[0058] To further enhance the illumination effect provided by the apparatus **410**, the housing surface **424** opposed the support surface **450** is opaque. The housing surface **424** also defines an opening **425** through which an end portion **427** of the light-altering device **418** extends. In addition, the light source **414** may further include optional light-emitting diodes **414'** positioned adjacent the other end portion **429** of the light-altering device **418**.

[0059] As before with the apparatus **10** shown in **FIG. 1**, the illumination apparatus **410** in the illustrated embodiment includes a base assembly **430** removably attached to the housing **412**. The base assembly **430** may further include the optional light-emitting diodes **414'**, an actuator system for rotating the light-altering device **418** relative to the optional light-emitting diodes **414'**, and a power source **432** (e.g., batteries, etc.) switchably connected to the light-emitting diodes **414**, **414'** and the actuator system. In the illustrated embodiment, the power source **432** includes a solar cell disposed on the housing surface **424**, although other suitable means of providing energy to the light sources and the actuator system may be employed.

[0060] The operation of the light-emitting diodes **414**, **41'** and the actuator system may be controlled by a controller in accordance with user input similar to the manner described for the first embodiment **10**. For example, the controller may allow the user to choose to have the various light-emitting diodes **414** and **414'** blink, activate/deactivate at different times, or to pulsate in accordance with sound from a source external and/or internal to the apparatus **410**.

[0061] Referring now to **FIGS. 9 and 10**, there are shown exemplary embodiments of the illumination apparatus **510** an **610**, respectively, that are configured for use as signage. In the illustrated embodiments, the apparatus **510** and **610** are formed in the shape of the letter "T". In other embodiments, the housing may be shaped as words, numbers, messages, signs, etc.

[0062] As shown in **FIG. 9**, the light source **514** includes a plurality of light-emitting diodes electrically connected to one another by a way of a electrically-conducting wire **533** or other suitable electrical conductor. The light-emitting diodes are spaced along the perimeter **554** of the housing **512** as defined by the sides **526** of the housing **512**. The sides **526** of the housing **512** may be either opaque, translucent, transparent, reflective, or a combination thereof. The surface positioned opposite the surface supporting the apparatus **510** may be either transparent, translucent, or a combination thereof. In addition, the light-altering device **518** is centrally located within the housing **512** and is shaped in a manner similar to that of the housing perimeter **554**, which in the illustrated embodiment is the letter "T". Alternatively, one or more light-altering devices may instead be positioned on or be integrally formed with a housing surface that is either positioned opposite or attached to the support surface. In such an alternative embodiment, the light source is oriented for directing light into the light-altering device.

[0063] In the exemplary embodiment shown in **FIG. 10**, the light-altering device **618** is disposed along the perimeter **654** of the housing **612**. The light-emitting diodes **614** are disposed at a substantially central location of the housing **612**, with the light-altering device **618** disposed substantially around the light-emitting diodes **614**.

[0064] Referring to **FIGS. 11 and 12**, there is shown an illumination apparatus **710** configured for use as an illuminating and portable accessory item. In the illustrated embodiment, the illumination apparatus **710** includes an attachment device (e.g., adhesive **711**, clip, magnets, pins, other suitable attachment devices, etc.) for attaching the illumination apparatus **710** to a user, thus allowing the illumination apparatus **710** to be used, for example, as a jewelry, a hair ornament, an illuminating sticker, among other accessory items. Alternatively, the illumination apparatus **710** may also be attached to an automobile hood or other mobile platform surface, for example, to illuminate an automobile emblem or logo.

[0065] The illumination apparatus **710** includes a plurality of light-emitting diodes **714** and a light-altering device **718**. The light-altering device **718** is positioned relative to the

housing **712** and the light-emitting diodes **714** for receiving and altering the light **716** from the light-emitting diodes **714** such that the altered light **728** illuminates at least a portion of the housing **712**. Thus, illuminating the accessory item. During operation, the light-altering device **718** refracts, reflects, diffracts, and/or disperses the light **716** (e.g., direction of travel, wavelength, color, phase, etc.) such that the altered light **728** illuminates the portion of the housing **712** with mood-enhancing light patterns and effects. Alternatively, the light-altering device and the housing may be integrally formed as a single component, with the light-altering device comprising an internal faceted surface of the housing.

[**0066**] In the illustrated embodiment, the power source **732** comprises a watch battery. In addition, a rear surface **756** of the base assembly **730** is provided with a suitable adhesive **711** that allows the illumination apparatus **710** to be used as a sticker. The illumination apparatus **710** further includes a controller, such as an integrated circuit/circuit board assembly **740** and a switch **742**. The switch **742** allows the user to select from among a plurality of operating modes for the illumination apparatus **710**. Alternatively, the controller may include a touch-sensitive switch that when touched by a user activates the illumination apparatus.

[**0067**] **FIGS. 13-15** and **18-20** illustrate various illumination apparatus **810**, **910**, **1010**, **1110**, **1210**, **1310** according to additional embodiments of the invention. As shown, each illumination apparatus includes a housing **812**, **912**, **1012**, **1112**, **1212**, **1312**, at least one light source **814**, **914**, **1014**, **1114**, **1214**, **1314**, and at least one light-altering device **818**, **918**, **1018**, **1118**, **1218**, **1318**.

[**0068**] In the particular illustrated embodiments of **FIGS. 13-15**, each housing **812**, **912**, **1012** includes a generally circular shape with a circular opening **819**, **919**, **1019**. For the particular illustrated embodiments of **FIGS. 18-20**, each housing **1112**, **1212**, **1312** includes a generally rectangular shape with a rectangular opening **1119**, **1219**, **1319**.

[**0069**] In alternative embodiments, however, the housing and/or the opening can include other suitable shapes, such as octagonal, hexagonal, ovular, alphanumeric characters, u-shaped, c-shaped, names, logos, etc. Accordingly, embodiments of the invention should not be limited to only circular or rectangular shaped housings and openings.

[**0070**] In addition, the housing and the opening need not be the same shape. Further, the size and shape of the housing and opening therethrough can vary depending, for example, on the particular application and size and shape of the component (or portion thereof) that will ultimately be positioned within the opening. By way of example only, an illumination apparatus of the present invention can be used with recessed ceiling lighting fixtures or cans (**FIG. 16**), doorknobs (**FIG. 17**), ceiling fans, appliance knobs, cabinetry handles and knobs, smoke detectors, underwater swimming pool lights and/or filters, faceplates (e.g., burglar alarm system punch-code faceplates (**FIG. 21**), wall outlets (**FIG. 24**), light switches, etc.) cabinet doors (**FIG. 22**), speaker panels (**FIG. 23**), heating and air conditioning vents, clocks, furniture, tableware, plates, dishes, clothing, furniture, jewelry, among other suitable uses.

[**0071**] A wide range of materials may be used for any one of the housings **812**, **912**, **1012**, **1112**, **1212**, **1312** including, but not limited to, acrylics, glasses, plastics, combinations thereof, among others. In addition, the housing surfaces may be transparent, translucent, opaque, reflective, partially light-transmissive, or combinations thereof. For example, one or more housing surfaces can be translucent or frosted to diffuse or soften light.

[**0072**] A wide range of materials can be used for any one of the light-altering devices **818**, **918**, **1018**, **1118**, **1218**, **1318** including polished acrylic materials, glasses, plastics, crystals, transparent materials, translucent materials, reflective materials, combinations thereof, among others. In the illustrated embodiments of **FIGS. 13-20**, the light-altering devices include facets. In further embodiments, a light-altering device can be an integral portion of the housing such that the light-altering device and the housing are monolithically formed as a single component. For example, one embodiment includes a housing having one or more internal faceted surfaces as a light-altering device.

[**0073**] In the embodiments **810** and **1110** shown in respectively in **FIGS. 13 and 18**, LEDs **814**, **1114** are disposed along the opening's periphery **853**, **1153**. The light-altering device **818**, **1118** is disposed along the housing's outer perimeter **854**, **1154**.

[**0074**] In the embodiments **910** and **1210** shown respectively in **FIGS. 14 and 19**, LEDs **914**, **1214** are disposed along the housing's outer perimeter **954**, **1254**. The light-altering device **918**, **1218** is disposed along the opening's periphery **953**, **1253**. In

[**0075**] In the embodiments **1010** and **1310** shown respectively in **FIGS. 15 and 19**, LEDs **1014'**, **1314'** are disposed along the housing's outer perimeter **1054**, **1354**, and LEDs **1014"**, **1314"** are disposed along the opening's periphery **1053**, **1353**. In addition, a light-altering device **1018'**, **1318'** is disposed along the housing's outer perimeter **1054**, **1354**, and a light-altering device **1018"**, **1318"** is disposed along the opening's periphery **1053**, **1353**.

[**0076**] **FIGS. 16, 17**, and **21-24** illustrate exemplary uses for an illumination apparatus of the present invention. For example, **FIG. 16** illustrates an illumination apparatus (e.g., **810**, **910**, **1010**) being used with a recessed ceiling light fixture. As shown, the illumination apparatus **810**, **910**, **1010** can be removably or fixedly attached to a lip **58** of a recessed ceiling lighting fixture or can **60**. Any of a wide range of attachment methods may be used to attach the illumination apparatus to the lip **58**, such as adhesives, magnets, mechanical fasteners, Velcro hook and loop fasteners, etc.

[**0077**] The fixture **60** includes a socket **62** for receiving a light bulb **64**, such as halogen light bulb, incandescent bulb, or other light bulb type. The light bulb **64** can be engaged to the socket **62** before, while, or after the illumination apparatus **810**, **910**, **1010** is attached the lip **58**. At least a portion of the light bulb **64** will be positioned within the opening **819**, **919**, **1019** of the illumination apparatus. The housing **812**, **912**, **1012** of the illumination apparatus can be configured (e.g., shaped and sized) for any of a wide range of lighting fixtures and light bulbs. By way of example, the housing can be sized such that it is larger, smaller, or about equal to the size of the lip **58**.

[**0078**] **FIG. 17** illustrates an illumination apparatus (e.g., **810**, **910**, **1010**) being used with a doorknob **66**. As shown, the illumination apparatus **810**, **910**, **1010** is positioned

generally around the stem **68** of the doorknob **66**. The illumination apparatus **810**, **910**, **1010** can be removably or fixedly attached to the doorknob stem **68** in various ways (e.g., adhesives, magnets, friction or interference fit, etc.). Alternatively, the illumination apparatus **810**, **910**, **1010** may be rotatably about the doorknob stem **68**. The housing **812**, **912**, **1012** of the illumination apparatus can be configured (e.g., shaped and sized) for any of a wide range of doorknob types. For example, the housing can be sized such that its opening **819**, **919**, **1019** creates a friction fit with the doorknob stem, and such that its outer diameter **854**, **954**, **1054** is larger, smaller, or about equal to the handle portion **70**.

[**0079**] **FIG. 21** illustrates an illumination apparatus (e.g., **1110**, **1210**, **1310**) being used with a burglar alarm entry-code faceplate **72**. As shown, the illumination apparatus **1110**, **1210**, **1310** is positioned generally around the faceplate **72**. The illumination apparatus **1110**, **1210**, **1310** can be removably or fixedly attached to the faceplate **72** in a various ways (e.g., adhesives, magnets, friction or interference fit, etc.). The housing **1112**, **1212**, **1312** of the illumination apparatus can be configured (e.g., shaped and sized) for any of a wide range of faceplate types.

[**0080**] **FIG. 22** illustrates an illumination apparatus (e.g., **1110**, **1210**, **1310**) being used with a cabinet door **74**. As shown, the illumination apparatus **1110**, **1210**, **1310** is positioned generally around a peripheral edge portion **76** on the front of the cabinet door **74**. The illumination apparatus **1110**, **1210**, **1310** can be removably or fixedly attached to the cabinet door **74** using various methods (e.g., adhesives, friction or interference fit, etc.). The housing **1112**, **1212**, **1312** of the illumination apparatus can be configured (e.g., shaped and sized) for a particular type of cabinet door for which the illumination apparatus **1110**, **1210**, **1310** is going to be used.

[**0081**] **FIG. 23** illustrates an illumination apparatus (e.g., **1110**, **1210**, **1310**) being used with a speaker panel **78**, such as a recessed speaker panel in a ceiling, or a front speaker panel of a box. As shown, the illumination apparatus **1110**, **1210**, **1310** is positioned generally around the speaker panel **78**. The illumination apparatus **1110**, **1210**, **1310** can be removably or fixedly attached to the speaker panel **78** using any suitable means (e.g., adhesives, friction or interference fit, etc.). The housing **1112**, **1212**, **1312** of the illumination apparatus can be configured (e.g., shaped and sized) for any of a wide range of speaker types.

[**0082**] In the illustrated embodiments of **FIGS. 13-15** and **18-20**, each housing has only one opening therethrough. In alternative embodiments, however, an illumination apparatus may include a housing having a plurality of openings therethrough.

[**0083**] Various embodiments include an illumination apparatus configured for use as a wall faceplate, for example, for an electrical outlet (**FIG. 24**), phone jack, light switch, thermostat, etc. For example, **FIG. 24** illustrates one embodiment of an illumination apparatus **1410** that is configured for use as a wall faceplate for two electrical outlets **80**. In this example, the illumination apparatus **1410** includes a housing **1412** with a generally rectangular outer perimeter **1454**. The housing **1412** includes two openings for receiving the two electrical outlets **80** therethough. The housing **1412** is sized consistent with a standard wall faceplate for a double outlet. LEDs can be positioned along at least a portion of the housing's outer perimeter **1454**, at least a portion of the periphery of either or both openings, or combinations thereof. In addition, a light-altering device can be positioned along at least a portion of the housing's outer perimeter **1454**, at least a portion of the periphery of either or both openings, or combinations thereof.

[**0084**] The particular number of openings (i.e., one or more) and their shape and size can depend, for example, on the particular requirements for the wall faceplate. For example, another embodiment includes an illumination apparatus configured for use as a light switch faceplate. In this particular embodiment, the illumination apparatus includes a generally rectangular housing with only one rectangular opening therethrough.

[**0085**] In some implementations, an illumination apparatus of the present invention may take the place of an existing faceplate. Alternatively, an illumination apparatus of the present invention may be instead be positioned over and attached to the existing faceplate. As yet another example, an illumination apparatus of the present invention may be positioned generally around an existing faceplate such that a peripheral edge of the faceplate is received within an opening defined by the housing of the illumination apparatus.

[**0086**] As another exemplary use, any one of the various embodiments of the present invention can be positioned within a speaker box. In which case, the illumination apparatus can produce light that illuminates for illuminating (e.g., backlighting) a front panel of the speaker box.

[**0087**] In various embodiments of the invention, an illumination apparatus can be configured such that it is substantially fluid-tight or waterproof for underwater use. In such embodiments, a waterproof illumination apparatus may be positioned within (e.g., thrown into the water, attached to the pool bottom, side surface, or ladder, etc.) in order to provide a pleasing light pattern or effect. In one implementation, a waterproof illumination apparatus is positioned and attached to an existing lighting fixture in the swimming pool. In another implementation, one or more waterproof illumination apparatus can be used for recreational purposes in which the waterproof illumination apparatus are thrown into the pool for later retrieval by a swimmer. In one embodiment, a waterproof illumination apparatus is negatively buoyant such that the apparatus sinks. In another embodiment, a waterproof illumination apparatus is positively buoyant such that the apparatus floats. In yet another embodiment, a waterproof illumination apparatus has a buoyancy such that the apparatus is suspended between a top surface of the water and the bottom of the pool.

[**0088**] In various embodiments of the invention, an illumination apparatus can include a light-altering device that is an integral portion of the housing such that the light-altering device and the housing are monolithically formed as a single component. For example, one embodiment includes a housing having one or more internal faceted surfaces forming the light-altering device.

[**0089**] In any of the various embodiments illustrated in **FIGS. 1 through 24**, the illumination apparatus can include any suitable means of providing energy to the light sources, such as an AC adapter port to allow the illumination appa-

ratus to receive power through an electrical cord connected with a standard wall outlet, renewable batteries, rechargeable batteries, disposable batteries, power cells, solar cells, watch batteries, and other suitable power sources. If rechargeable, such power sources could be rechargeable by solar, magnetic, electrical, and chemical means, and the like or any combination thereof.

[0090] In various embodiments of the invention, an illumination apparatus can include one or more indicia that are highlighted (e.g., illuminated, backlit, etc.) by light from a light source. This indicia can include a wide range of graphic images, graphic elements, graphic images, designs, artwork, distinctive marks, identifying symbols, company logos, company contact information, text, alphanumeric characters, advertisements, trademarks, trade names, service marks, sports teams insignias, names, monograms, photographs, among others.

[0091] Various embodiments include a light-altering material having indicia configured to receive light from the light source such that the light produces a representation of the indicia onto a surface external to and adjacent the illumination apparatus. In one particular embodiment, an illumination apparatus includes LEDs that are positioned about one-fourth inch from a bottom surface of the illumination apparatus. The LEDs are positioned to direct light at a generally downward angle towards indicia provided (e.g., etched, marked onto, etc.) onto a light-altering material (e.g., acetate, etc.). The indicia can be distorted such the indicia appears clear and undistorted when projected onto the support surface. By way of example only, the light-altering material **818**, **1018** in **FIGS. 13 and 18**, respectively, may include indicia spaced around the outer perimeter such that when the LEDs **814**, **1014** are activated, the light projects the indicia onto the support surface generally around but a spaced-distance away from the housing's outer perimeter **854**, **1054**. This can have particular commercial appeal for advertising such as when the indicia forms a company logo or other advertisement.

[0092] In any of the various embodiments illustrated in **FIGS. 1 through 24**, the illumination apparatus can be configured for use as a portable accessory item. In addition, the illumination apparatus can also include one or more user attachment devices (e.g., adhesives, clips, magnets, pins, other suitable attachment devices, etc.) for attaching the illumination apparatus to a user, for example to allow the illumination apparatus to be used as jewelry, a hair ornament, an illuminating sticker, among other accessory items. Alternatively, the illumination apparatus may also be attached to an automobile hood or other mobile platform surface, for example, to illuminate an automobile emblem or logo.

[0093] In various embodiments of the invention, an illumination apparatus may include a controller for controlling operation of the light source(s) in accordance with user input to provide such features as blinking, strobing and/or color changes. The controller can include an integrated circuit/printed circuit assembly (e.g., integrated circuits in a printed circuit assembly) and at least one switch. The switch may, for example, allow the user to select from among various display modes for the light sources, such as an off-light mode, an on-light mode, a mode in which each of the light sources simultaneously emit steady or non-flashing light, a mode in which the light sources emit light intermittently, a mode in which the various light sources illuminate or blink at different times in accordance with a predetermined sequence or order, a mode in which the light sources emit light that phases between or blends colors, a mode in which the light sources emit light randomly, a mode in which the light sources pulsate to sounds, and/or a mode combining one or more of the foregoing. Such sounds may be produced by the illumination apparatus itself (e.g., via a speaker built-in to the illumination apparatus) or a source external to the illumination apparatus (e.g., ambient sounds). In some embodiments, sounds can cause synchronized pulsation of the light sources of two or more different illumination apparatus, thus providing a pleasing light pattern or effect.

[0094] The controller can also include a plurality of switches each of which can be used to control the operation of an individual light source or group of light sources. For example, the controller may include a first switch for activating and deactivating LEDs that emit white light, and a second switch for activating and deactivating the LEDs that emit blue light.

[0095] Additionally, an illumination apparatus of the present invention can include a push-button switch for switchably connecting the light source to the power source. The switch can be positioned within the illumination apparatus and be coupled to an externally flexible surface portion of the illumination apparatus such that application of external pressure upon the externally flexible surface portion activates the switch, thereby causing operation of the light source. The external pressure may, for example, be applied by the user squeezing the illumination apparatus at the externally flexible surface portion. The switch may also allow the user to cycle through various display modes or select a particular color for the light by successively squeezing the illumination apparatus at about the externally flexible surface portion. Additionally, the switch may also allow the user to dim or brighten the intensity of the light, for example, by holding down the switch with continuously applied pressure to the illumination apparatus at about the externally flexible surface portion.

[0096] Alternatively, an illumination apparatus can include other suitable switching means. For example, the switch may be provided on a cord extending from an illumination apparatus. Or for example, an illumination apparatus may include a controller configured for use with an infrared remote control. As yet another example, an illumination apparatus can include electrical terminals for switchably connecting the light source to the power source. For example, the electrical terminals can be located such that a user's hand upon grasping the item completes the circuit for power delivery to the light source from the power source.

[0097] The description of the invention is merely exemplary in nature and is in no way intended to limit the invention, its application, or uses. Thus, variations that do not depart from the substance of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.

What is claimed:

1. An illumination apparatus comprising a housing including an outer perimeter and at least one opening having a periphery, at least one light source adjacent one of the

periphery and the outer perimeter, and at least one light-altering device adjacent the other one of said periphery and said outer perimeter, for receiving and altering light from the light source.

2. The illumination apparatus of claim 1, wherein the light-altering device includes a surface having a plurality of facets.

3. The illumination apparatus of claim 1, wherein the light-altering device alters the light by at least one of refracting, reflecting, diffracting, and dispersing.

4. The illumination apparatus of claim 1, wherein the light source comprises a plurality of light-emitting diodes positioned along at least a portion of the housing's outer perimeter, and wherein the light-altering device is positioned along at least a portion of the opening's periphery.

5. The illumination apparatus of claim 1, wherein the light source comprises a plurality of light-emitting diodes positioned along at least a portion of the opening's periphery, and wherein the light-altering device is positioned along at least a portion of the housing's outer perimeter.

6. The illumination apparatus of claim 1, wherein the light source comprises at least one light-emitting diode positioned adjacent the opening's periphery, and at least one other light-emitting diode positioned adjacent the housing's outer perimeter, and wherein the light-altering device includes a first light-altering device positioned along at least a portion of the opening's periphery, and a second light-altering device positioned along at least a portion of the housing's outer perimeter.

7. The illumination apparatus of claim 1, wherein the outer perimeter of the housing is generally circular, and wherein the periphery of the opening is generally circular.

8. The illumination apparatus of claim 1, wherein the outer perimeter of the housing is generally rectangular, and wherein the periphery of the opening is generally rectangular.

9. The illumination apparatus of claim 1, wherein the light-altering device includes indicia configured to receive light from the light source such that the light produces a representation of the indicia onto an external surface adjacent the illumination apparatus.

10. The illumination apparatus of claim 1, wherein the housing is substantially fluid-tight and the light source is positioned within the housing such that the illumination apparatus is usable underwater.

11. The illumination apparatus of claim 1, wherein the housing includes an internal faceted surface, and wherein the light-altering device comprises the internal faceted surface of the housing.

12. An illumination apparatus comprising a housing configured in a generally annular shape having a central opening, at least one light source, and at least one light-altering device including a surface having a plurality of facets positioned relative to the housing and the light source for receiving and altering light from the light source.

13. The illumination apparatus of claim 12, wherein the at least one light source comprises at least one light-emitting diode positioned adjacent one of a periphery of the opening and an outer perimeter of the housing, and wherein the at least one light-altering device includes at least one faceted surface adjacent the other one of said periphery and said outer perimeter.

14. The illumination apparatus of claim 12, wherein an outer perimeter of the housing is generally circular, and wherein a periphery of the opening is generally circular.

15. The illumination apparatus of claim 12, wherein an outer perimeter of the housing is generally rectangular, and wherein a periphery of the opening is generally rectangular.

16. The illumination apparatus of claim 12, wherein the light-altering device includes indicia configured to receive light from the light source such that the light produces a representation of the indicia onto an external surface adjacent the illumination apparatus.

17. The illumination apparatus of claim 12, wherein the housing is substantially fluid-tight and the light source is positioned within the housing such that the illumination apparatus is usable underwater.

18. The illumination apparatus of claim 12, wherein the housing includes an internal faceted surface, and wherein the light-altering device comprises the internal faceted surface of the housing.

19. A method of using an illumination apparatus having a housing including at least one opening, at least one light source, and at least one light-altering device positioned relative to the housing and the light source for receiving and altering light from the light source, the method comprising positioning the illumination apparatus relative to another component such that at least a portion of the another component is within the opening.

20. The method of claim 19, wherein positioning the illumination apparatus includes positioning the illumination apparatus against a lip of a recessed lighting fixture, and substantially aligning the opening with an opening defined by the lip.

* * * * *