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**(54) PHOTOLUMINESCENT COVER FOR INDICATOR SIGNS**

PHOTOLUMINESZIERENDE ABDECKUNG FÜR HINWEISSCHILDER

ÉLÉMENT COUVRANT PHOTOLUMINESCENT POUR PANNEAUX INDICATEURS

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**Description****FIELD**

**[0001]** This disclosure generally relates to signage and, more particularly, to photoluminescent covers for indicator signs.

**BACKGROUND**

**[0002]** As an essential part of public health and safety, indicator signs are required by law in various commercial and residential buildings. These signs can be used to indicate many different things, such as a potential hazard or public access, or to direct individuals to exits in case of fire, or other emergency situations.

**[0003]** WO 2015/198154 A2 discloses a conventional photoluminescent display.

**SUMMARY**

**[0004]** An indicator sign according to claim 1 comprises a housing, a graphic displayed on a first surface of the housing, and a cover affixed to the first surface of the housing. An outer surface of the cover comprises a photoluminescent material and the cover comprises one or more void areas that correspond to the graphic such that the graphic is visible through the void areas.

**[0005]** In some embodiments, an adhesive material can be coupled to an inner surface of the cover. In these embodiments, the adhesive material can be configured to affix the cover to the housing.

**[0006]** In some embodiments, the graphic can be illuminated when electrical power is supplied to the housing. In some embodiments, the photoluminescent material can absorb light when exposed to a light source and can emit light after the light source is removed. In some embodiments, the photoluminescent material can emit light such that a negative image of the graphic is visible in the absence of ambient light. In some embodiments, a negative image of the graphic can be visible when electrical power is not supplied to the indicator sign.

**[0007]** In another representative embodiment, a method can comprise orienting a cover with respect to an indicator sign such that one or more void areas in the cover are aligned with a graphic on a front surface of the indicator sign and pressing an inner surface of the cover against the front surface of the indicator sign to affix the cover to the indicator sign. The outer surface of the cover can contain photoluminescent particles that absorb light when exposed to a light source and emit light when the light source is removed.

**[0008]** In some embodiments, the method can further comprise removing one or more cut-outs from the cover. In some embodiments, the method can further comprise affixing one or more inserts to the front surface of the indicator sign in one or more void areas created in the cover when the one or more cut-outs are removed.

**BRIEF DESCRIPTION OF THE DRAWINGS****[0009]**

FIG. 1 is an exploded perspective view of an indicator sign and an exemplary embodiment of a cover.

FIG. 2 is a perspective view of the photoluminescent cover of FIG. 1, pre-cut portions, and optional insert.

FIG. 3 are illustrative examples of common pictographs that the graphic may depict.

FIG. 4 is a perspective view of the resulting combination of the indicator sign and photoluminescent cover.

**DETAILED DESCRIPTION**

**[0010]** Described herein are exemplary embodiments of photoluminescent covers, components thereof, and methods related thereto. The illustrated embodiments are only preferred examples and is not intended to limit the scope, applicability, or configuration of the disclosure in any way. The described embodiments may vary in function and arrangement of the elements described herein without departing from the scope of the disclosure.

**[0011]** The following explanation of terms and abbreviations used herein are meant to provide a better description of the present disclosure and guide those of ordinary skill in the art in the practice of the present disclosure. The terms "includes" and "has" have the same meaning as "comprises," and the terms "including" and "having" have the same meaning as "comprising." Also, the singular terms "a," "and," and "the," mean both the singular and the plural unless the term is qualified to expressly indicate that it only refers to a singular element. That is, if two of a particular element are present, there is also "a" or "an" of such element that is present. In addition, the term "and/or" when used in this disclosure is to be construed to include the conjunctive "and," the disjunctive "or," and both "and" and "or."

**[0012]** As used herein, the term "coupled" means physically, magnetically, chemically, electrically, or otherwise connected or linked, which includes items that are directly coupled and items that are coupled with intermediate elements between the coupled items, unless specifically stated to the contrary. The term "or" refers to a single element of stated alternative elements or a combination of two or more elements, unless the context clearly indicates otherwise. The term "plurality" means two or more of the specified elements.

**[0013]** Indicator signs are required by law in various commercial and residential buildings. Many of these signs are connected to electrical power through an existing AC electrical connection, with most depending on a battery back-up system in case of power outage. The electrical power can be used to illuminate a graphic such

as the word 'EXIT' on an indicator sign. However, in the event of complete electrical power loss, the graphic on an indicator sign may not become illuminated. For example, in cases of power loss, roughly thirty percent of exit signs with a battery back-up fail, while those without a battery back-up are certain to fail. And in the event of power loss, other lights in the building are no longer illuminating the signs. Because of this potential for failure and resulting dangers, a cheap and dependable fail-safe cover is desirable.

**[0014]** The photoluminescent covers disclosed herein can be used to retrofit an existing indicator sign or can be combined with a newly manufactured sign to form a new product. The photoluminescent cover can create a "negative" image of an indicator sign graphic to ensure proper visibility of the graphic without the need for electrical power. Constant maintenance, testing, and the cost of replacing existing indicator signs can place a burden on employers, landlords, and public institutions that use indicator signs. The disclosed photoluminescent cover can provide a more cost-effective and time-effective option in how they proceed in ensuring that public health and safety requirements are met.

**[0015]** FIG. 1 shows an example indicator sign 100, which can be installed in various types of commercial and residential buildings, such as apartment complexes, office buildings, arenas, etc. The indicator sign 100 can comprise an outwardly facing front surface 104 as well as various electrical components such as a battery or light source positioned within an electrical housing and/or frame 106. The surface 104 can comprise a graphic 108 which can include text, pictographs, symbols, etc. In the illustrated example of FIG. 1, the graphic 108 displays the word 'EXIT' to direct individuals to an exit. In other examples, the graphic 108 can contain any other word, phrase or image to identify an exit or a hazard of make any other type of indication (see FIG. 3 for some examples). The graphic 108 can be cut, molded or cast into surface 104, which can comprise a colored translucent backing, allowing an interior light source positioned inside of the housing 106 to illuminate the resulting graphic 108. Alternatively, the indicator sign 100 can be a plate-like structure made of acrylic or glass in which the graphic 108 comprises a solid colored material encased in a transparent face or frame. Alternatively, the sign 100 may have differing physical characteristics such as curvature, shape, forms of illumination, etc. Additionally, the surface 104 of the sign 100 can have additional graphics 110, such as chevrons, arrows, or other indicators. In the illustrated example of FIG. 1, the graphics 110 are arrows or chevrons that indicate the direction of an exit. Typically, only one arrow pointing in a single direction would be present on the surface 104.

**[0016]** Testing and maintaining housing and hardwired connections of an indicator sign such as sign 100 can be time consuming and costly. As such, these tasks are often ignored, which can increase the potential for the indicator sign to fail during power loss. The disclosed

photoluminescent cover can, however, provide an easily installable way of ensuring proper indicator sign illumination without inhibiting the functionality of the sign.

**[0017]** Still referring to FIG. 1, an exemplary photoluminescent cover 200 can comprise an outer surface 202, an inner surface 204, and void areas 206 where there is no material or transparent material present. The void areas 206 can be arranged in a pattern to match the graphic 108 of the indicator sign 100 such that when the cover 200 is affixed to the surface 104, the graphic 108 is visible through the void areas 206. The cover 200 can comprise a rigid or flexible material and a photoluminescent material in the outer surface 202. The photoluminescent material can be evenly distributed over the non-void area of the surface 202 of the cover 200 or distributed in any other manner. An embedded pigment is one example of a photoluminescent material that can be used.

**[0018]** The photoluminescent material can absorb photons from any nearby light source, such as a light emitting diode, fluorescent lighting, white light, a halide lamp, sunlight, light emitted by a bulb inside the indicator sign, etc. After absorbing photons for some time, the photoluminescent material can later emit light once the light source is removed, for example through the process of atomic photoexcitation. This will result in a negative image of the void areas 206 being produced. That is, the photoluminescent material can emit light from the entirety or a substantial portion of the surface 202 of the cover 200 except from the void areas 206, corresponding to the graphic 108. This can allow an image of the graphic 108 to be seen in the dark even when the indicator sign 100 has no electrical power.

**[0019]** Photoluminescent materials can comprise various chemical compounds such as Strontium Aluminate (SrAl), Zinc Sulfide (ZnS), Yttrium Oxide Sulfide ( $Y_2O_2S$ ), etc. These materials can be classified by their visibility and duration of light emission (typically measured in millicandelas per area,  $mcd/m^2$ ) and certain materials can allow the cover 200 to emit light for at least 90 minutes in the absence of ambient light, which meets the required specifications for many applications. Further, the photoluminescent material can be chosen to emit any color or combination of colors to meet any required regulations or to meet customer demands for particular aesthetic qualities.

**[0020]** The photoluminescent cover 200 can comprise a rigid material such as PVC, aluminum, acrylic, and/or a flexible material such as polyester, vinyl, PVC, etc. A rigid or flexible cover 200 can be manufactured by mixing a photoluminescent material into a range of materials used in injection molding, casting, or the production of substrates. Alternatively, the cover can comprise a pre-fabricated photoluminescent substrate and/or a photoluminescent ink, suitable for screen printing, plotter-cutting, die-cutting, thermal transfer printing or any process enabling variations of the photoluminescent graphic 206 to be produced on the first surface 202.

**[0021]** In some examples, the void areas 206 can be

replaced with a transparent material sized and shape to match the graphic 108 such that the graphic is visible through the transparent material. Alternatively, the void areas 206 can comprise of any material not having photoluminescent properties that allows for the graphic 108 of the indicator sign 100 to be seen when the cover 200 is affixed to the surface 104. In some examples, the cover 200 can comprise a braille component and/or an auditory component on the first surface 202 to communicate the same information that the graphic 108 communicates.

**[0022]** The inner surface 204 can comprise any type of material to affix the cover 200 to the surface 104 of the indicator sign 100. For example, a pressure sensitive adhesive can provide a uniform and confined bonding area, allowing for quick surface bonding of the inner surface 204 to the surface 104. An adhesive coupled to the surface 204 can contain a removable liner overlay that allows the cover 200 to be effectively stored and provide a peel and apply adhesive for easy and consistent installation. The adhesive can cover the entire surface area of the inner surface 204 or any portion thereof. Further, the cover 200 can be affixed to the surface 104 through other means, such as clamps, screws, pins, etc.

**[0023]** Referring to FIG. 2, the cover 200 can comprise cut-outs 212 and 214 on either side. These cut-outs can comprise partially pre-cut portions that can either be left attached or easily removed from the cover to create one or more additional void areas. The pre-cut portions 212, 214 can be attached to the cover 200 by a plurality of perforations, one or more tabs, or any other method for allowing the removal of the pre-cut portions 212, 214 and/or allowing the pre-cut portions 212, 214 to stay fastened to the cover 200. The cut-outs 212, 214 can be sized and positioned such that they correspond to graphics 110 on the indicator sign 100 such that when they are removed and the cover 200 is affixed to the sign 100, the graphics are visible through the void areas created by the removal of the cut-out portions. In the illustrated example of FIGS. 1 and 2, the cut-outs can be removed to expose the chevrons 110 on the indicator sign 100.

**[0024]** In typical use, an emergency exit sign will either have one chevron illuminated to indicate the direction of an exit or no chevrons illuminated to indicate that an exit is present below the indicator sign. In examples where an emergency exit has one chevron illuminated, the cut-out 212 or 214 corresponding to the illuminated chevron can be removed to expose that chevron. In examples where an emergency exit has no chevron illuminated, the cut-outs 212, 214 can be left attached to the cover 200. In other examples, both pre-cut portions 212, 214 can be removed to expose graphics 110 on both sides of the indicator sign 100.

**[0025]** Referring back to FIG. 2, one or more inserts 216 can be affixed to the indicator sign 100 in the space where a cut-out 212 and/or 214 was removed. The insert 216 can share the same material or aesthetic qualities as cover 200 having an outer surface with photoluminescent material and an inner surface that can be affixed to

the surface 104 of the indicator sign 100. The insert 216 can have a void area that corresponds to graphic 110 such that graphic 110 is visible through the void area when the insert is affixed to the sign 100.

**[0026]** FIG. 1 illustrates a method for attaching the photoluminescent cover 200 to an indicator sign 100 to form an indicator sign combination 400, as shown in FIG. 4. The indicator sign combination can be formed by first removing pre-cut portions 212 and/or 214 if so desired. The void areas 206 can then be aligned with the graphic 108 and the inner surface 204 of the cover 200 can be placed against the surface 104 of the indicator sign 100 and affixed thereto by an adhesive or other means. If desired, one or more inserts 216 can be similarly affixed to the surface 104 of the indicator sign 100 at the locations where one or more pre-cut portions 212, 214 were removed. The cover 200 can then be left exposed to a nearby light source such that the photoluminescent material on the outer surface 202 of the cover can absorb photons. In the event of an emergency involving the loss of power and lighting, the photoluminescent material can emit light from the surface 202 of the cover 200 thereby creating a negative image of the graphic 108.

**[0027]** The cover 200 can be manufactured in a number of sizes and shapes in order to prevent any overlap or interference with any of the features or housing of the indicator sign 100. If a dependable light source neighbors the combination 400, the battery back-up and future testing of the indicator sign 100 may no longer be required since the cover 200 will be dependably illuminated in an emergency. The indicator sign combination 400 improves on the functionality of indicator signage by providing the public, residents, employees, and others, the information they need at a moment's notice in the event of an emergency, even if the indicator sign 100 fails.

**[0028]** The disclosed cover 200 can have any dimensions, and is not limited to the proportions shown in the drawings. For example, adhesives, films, and rigid materials can have various weights, widths, heights, thicknesses, or lengths. Further, indicator signs can have various widths, heights, or lengths.

**[0029]** The disclosed cover 200 can also have varying adhesive tensile and shear strengths. For example, a cover can comprise removable adhesive such that it can be easily removed from the indicator sign 100 and replaced with a new cover. The disclosed cover can also have additional prismatic or reflective characteristics to provide for further aesthetic or visibility properties.

## Claims

1. An indicator sign (100) comprising:
  - a housing (106);
  - a graphic (108) displayed on a surface (104) of the housing; and
  - a cover (200) affixed to the surface of the hous-

- ing, wherein an outer surface (202) of the cover comprises a photoluminescent material, wherein the cover comprises one or more void areas (206) that correspond to the graphic such that the graphic is visible through the void areas, and wherein the photoluminescent outer surface produces a negative image of the graphic in contrast with the void areas.
- 5
2. The indicator sign of claim 1, wherein an adhesive is coupled to an inner surface (204) of the cover (200), wherein the adhesive is configured to affix the cover to the housing (106), or wherein the graphic (108) is illuminated when electrical power is supplied to the housing.
- 10
3. The indicator sign of claim 1 or 2, wherein the photoluminescent material absorbs light when exposed to a light source and emits light after the light source is removed, or wherein the photoluminescent material emits light such that a negative image of the graphic (108) is visible in the absence of ambient light.
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4. The indicator sign of any one of claims 1 to 3, wherein a negative image of the graphic (108) is visible when electrical power is not supplied to the indicator sign (100).
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5. A method comprising:
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- orienting a cover (200) with respect to an indicator sign (100) such that one or more void areas (206) in the cover are aligned with a graphic (108) on a front surface (104) of the indicator sign; and
- coupling an inner surface (204) of the cover to the front surface of the indicator sign, wherein an outer surface (202) of the cover comprises a photoluminescent material that absorbs light when exposed to a light source and emit light when the light source is removed, wherein the photoluminescent outer surface produces a negative image of the graphic in contrast with the void areas.
- 40
6. The method of claim 5, further comprising removing one or more cut-outs (212, 214) from the cover (200), or further comprising affixing one or more inserts (216) to the front surface (104) of the indicator sign (100) in one or more void areas (206) created in the cover when the one or more cut-outs are removed.
- 50
- Patentansprüche**
- 55
1. Hinweisschild (100), umfassend:
- ein Gehäuse (106);  
eine Grafik (108), die auf einer Oberfläche (104) des Gehäuses angezeigt wird; und  
eine Abdeckung (200), die an der Oberfläche des Gehäuses befestigt ist, wobei eine Außenfläche (202) der Abdeckung ein photolumineszierendes Material umfasst, wobei die Abdeckung einen oder mehrere Hohlräume (206) umfasst, die der Grafik entsprechen, so dass die Grafik durch die Hohlräume sichtbar ist, und wobei die photolumineszierende Außenfläche ein negatives Bild der Grafik in Kontrast zu den Hohlräumen erzeugt.
2. Hinweisschild nach Anspruch 1, wobei ein Klebstoff mit einer Innenfläche (204) der Abdeckung (200) verbunden ist, wobei der Klebstoff dafür konfiguriert ist, die Abdeckung an dem Gehäuse (106) zu befestigen, oder wobei die Grafik (108) beleuchtet wird, wenn das Gehäuse mit Strom versorgt wird.
3. Hinweisschild nach Anspruch 1 oder 2, wobei das photolumineszierende Material Licht absorbiert, wenn einer Lichtquelle ausgesetzt, und Licht emittiert, nachdem die Lichtquelle entfernt wurde, oder wobei das photolumineszierende Material Licht emittiert, so dass ein negatives Bild der Grafik (108) in der Abwesenheit von Umgebungslicht sichtbar ist.
4. Hinweisschild nach einem der Ansprüche 1 bis 3, wobei ein negatives Bild der Grafik (108) sichtbar ist, wenn das Hinweisschild (100) nicht mit Strom versorgt wird.
5. Verfahren, umfassend:
- Orientieren einer Abdeckung (200) in Bezug auf ein Hinweisschild (100), so dass ein oder mehrere Hohlräume (206) in der Abdeckung mit einer Grafik (108) auf einer Vorderfläche (104) des Hinweisschildes ausgerichtet sind; und  
Verbinden einer Innenfläche (204) der Abdeckung mit der Vorderfläche des Hinweisschildes, wobei eine Außenfläche (202) der Abdeckung ein photolumineszierendes Material umfasst, das Licht absorbiert, wenn einer Lichtquelle ausgesetzt, und Licht emittiert, wenn die Lichtquelle entfernt wird, wobei die photolumineszierende Außenfläche ein negatives Bild der Grafik in Kontrast zu den Hohlräumen erzeugt.
6. Verfahren nach Anspruch 5, ferner umfassend das Entfernen einer oder mehrerer Aussparungen (212, 214) von der Abdeckung (200), oder ferner umfassend das Befestigen eines oder mehrerer Einsätze (216) an der Vorderfläche (104) des Hinweisschildes (100) in einem oder mehreren Hohlräumen

(206), die in der Abdeckung entstehen, wenn die eine oder mehrere Aussparungen entfernt werden.

ge négative du graphisme en contraste avec les zones de vide.

## Revendications

1. Panneau indicateur (100) comprenant :
  - un boîtier (106) ;
  - un graphisme (108) affiché sur une surface (104) du boîtier ; et
  - un couvercle (200) fixé à la surface du boîtier, une surface extérieure (202) du couvercle comprenant un matériau photoluminescent, le couvercle comprenant une ou plusieurs zones de vide (206) qui correspondent au graphisme de sorte que le graphisme soit visible à travers les zones de vide, et la surface extérieure photoluminescente produisant une image négative du graphisme en contraste avec les zones de vide.
2. Panneau indicateur selon la revendication 1, dans lequel un adhésif est couplé à une surface intérieure (204) du couvercle (200), dans lequel l'adhésif est configuré pour fixer le couvercle au boîtier (106), ou dans lequel le graphisme (108) est éclairé lorsque le boîtier est alimenté en énergie électrique.
3. Panneau indicateur selon la revendication 1 ou 2, dans lequel le matériau photoluminescent absorbe de la lumière lorsqu'il est exposé à une source de lumière et qui émet de la lumière une fois la source de lumière retirée, ou dans lequel le matériau photoluminescent émet de la lumière de sorte qu'une image négative du graphisme (108) soit visible en l'absence de lumière ambiante.
4. Panneau indicateur selon l'une quelconque des revendications 1 à 3, dans lequel une image négative du graphisme (108) est visible lorsque le panneau indicateur (100) n'est pas alimenté en énergie électrique.
5. Procédé consistant à :
  - orienter un couvercle (200) par rapport à un panneau indicateur (100) de sorte qu'une ou plusieurs zones de vide (206) dans le couvercle soient alignées avec un graphisme (108) sur une surface avant (104) du panneau indicateur ; et
  - coupler une surface intérieure (204) du couvercle à la surface avant du panneau indicateur, une surface extérieure (202) du couvercle comprenant un matériau photoluminescent qui absorbe de la lumière lorsqu'il est exposé à une source de lumière et qui émet de la lumière une fois la source de lumière retirée, la surface extérieure photoluminescente produisant une ima-
6. Procédé selon la revendication 5, consistant en outre à retirer une ou plusieurs découpes (212, 214) du couvercle (200) ou consistant en outre à fixer une ou plusieurs pièces rapportées (216) à la surface avant (104) du panneau indicateur (100) dans une ou plusieurs zones de vide (206) créées dans le couvercle lorsque la ou les découpes sont retirées.

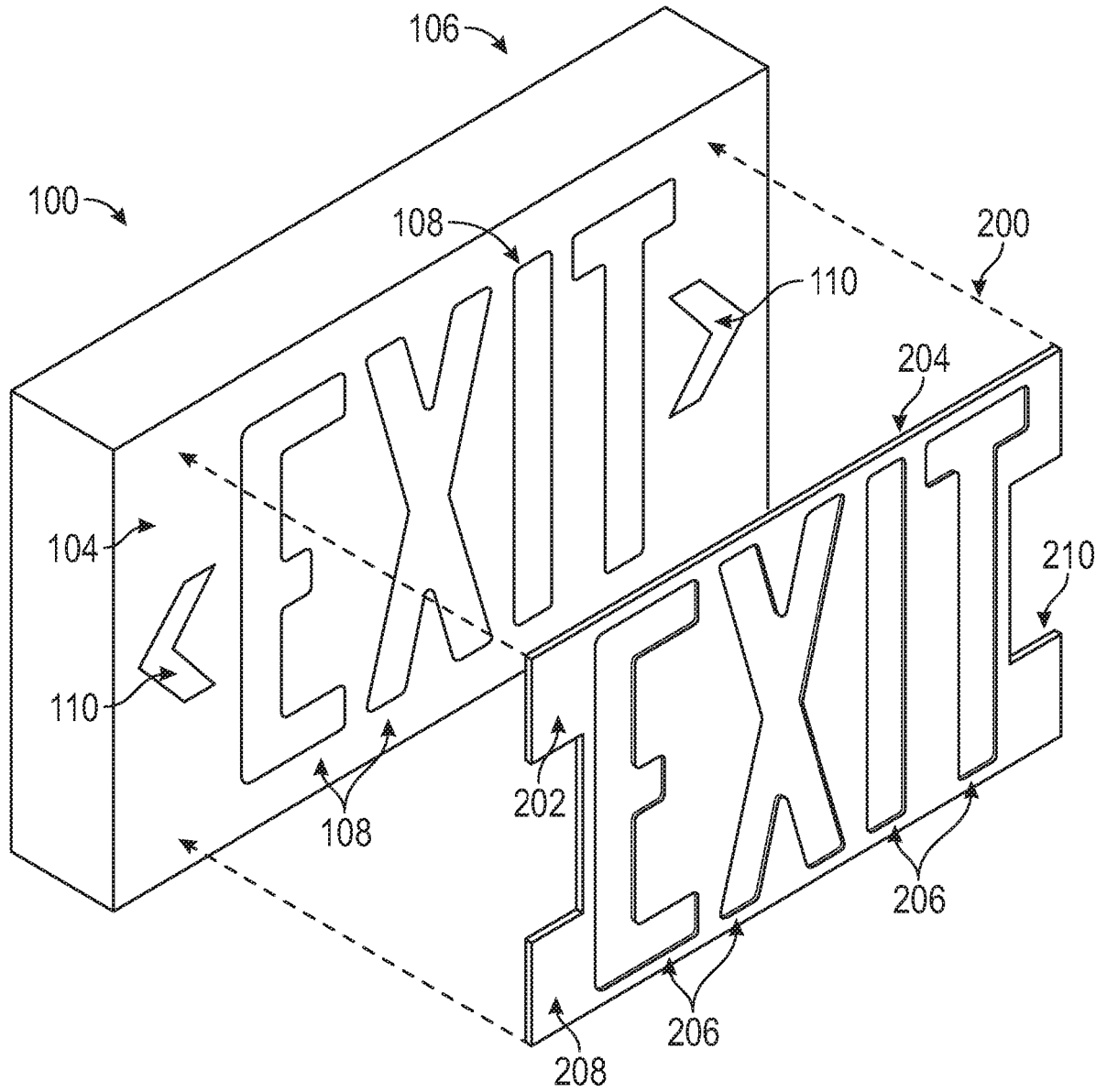


FIG. 1

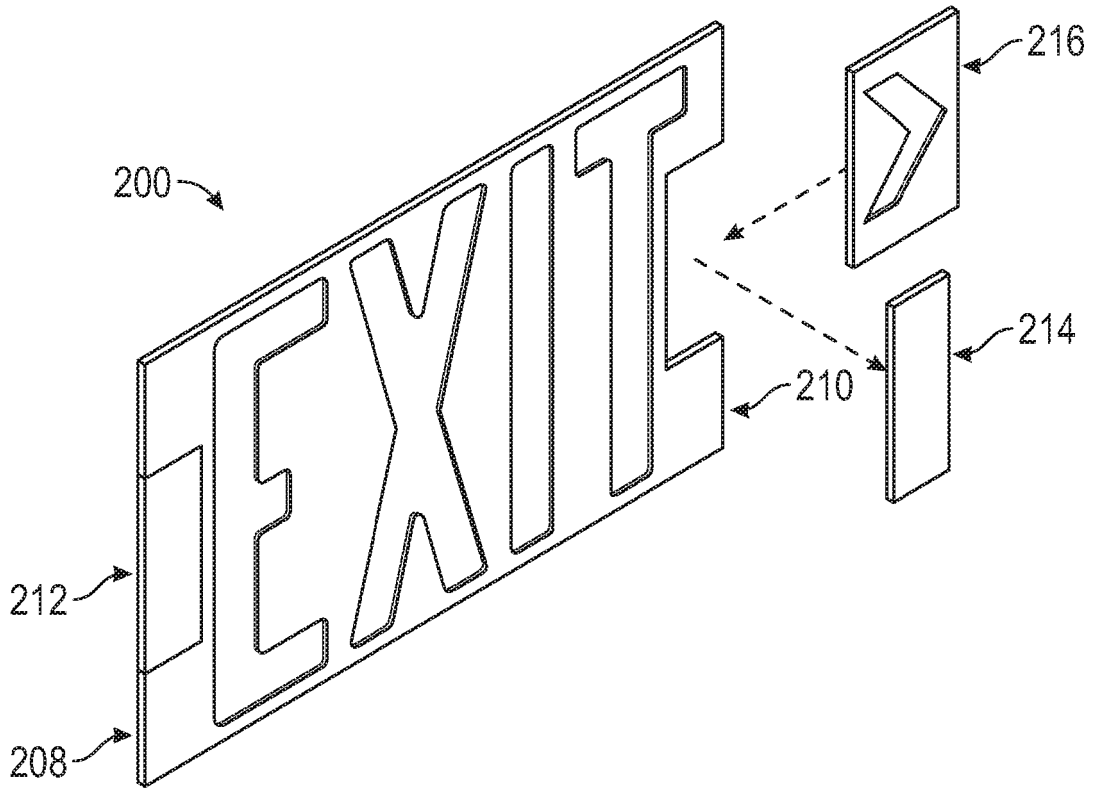


FIG. 2

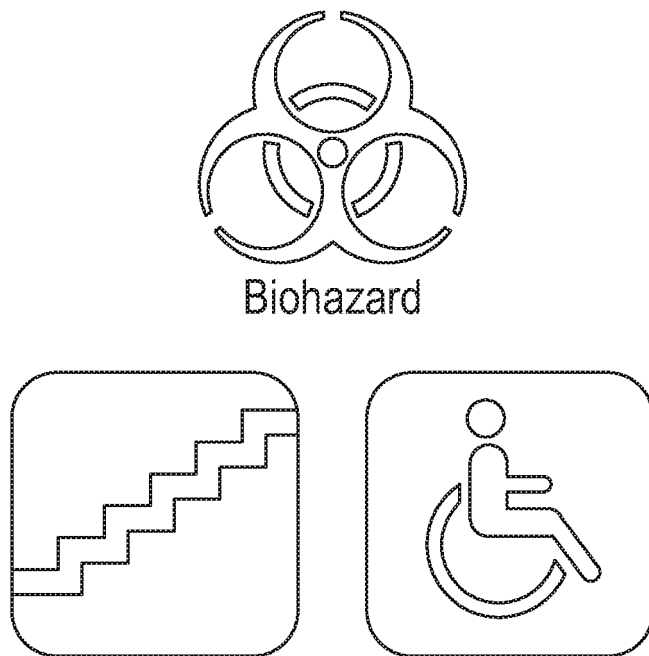


FIG. 3

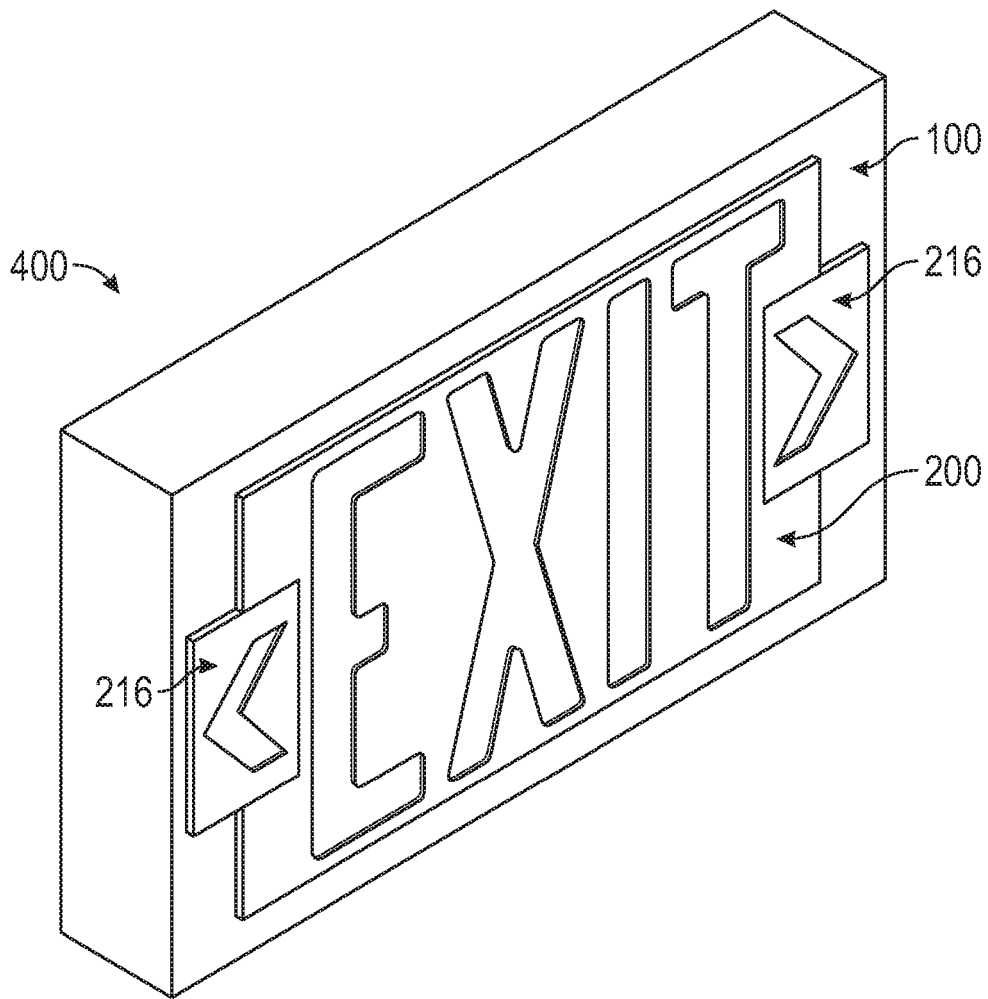


FIG. 4

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- WO 2015198154 A2 [0003]