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(72) Inventors:
• **VENK, Sridharan**
I-31100 Treviso (IT)
• **PASQUALINI, Dina**
I-33100 Udine (IT)
• **GOBBO, Manuel**
I-31022 Preganziol (Treviso) (IT)
• **GANZER, Enrico**
I-31033 Castelfranco Veneto (Treviso) (IT)

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(71) Applicants:
• **OSRAM GmbH**
80807 München (DE)
• **Osram S.p.A. - Societa' Riunite Osram Edison Clerici**
20126 Milano (IT)
Designated Contracting States:
IT

(74) Representative: **Bosotti, Luciano**
Buzzi, Notaro & Antonielli d'Oulx S.r.l.
Via Maria Vittoria, 18
10123 Torino (IT)

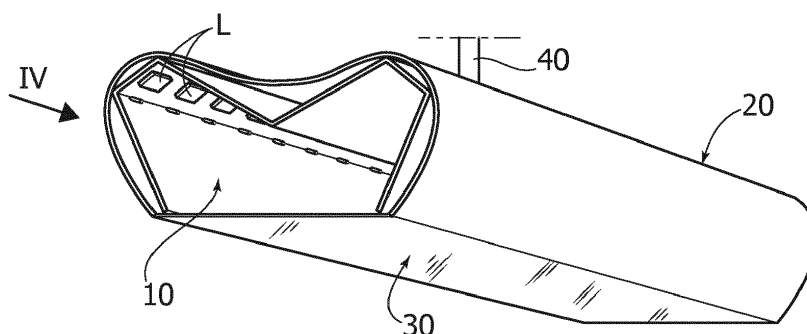
(54) **A LIGHTING DEVICE AND CORRESPONDING METHOD**

(57) A lighting device (10) includes:
- a channel-shaped housing (20), e.g. of an extruded plastic material, extending in a longitudinal direction and having a mouth portion (30) for emitting light radiation,
- a light radiation source module (10) arranged in said housing (20), said light radiation source module (10) including a laminar support member bent to a channel shape and opening towards the mouth portion (30) of the

housing (20).

The laminar support member is bent at one or more bending lines extending in the longitudinal direction of housing (20), thus partitioning the laminar support member in a plurality of stripes, with the provision of at least one stripe with electrically-powered light radiation sources (L), e.g. LED sources, arranged therealong.

FIG. 5



Description

Technical Field

[0001] The present description relates to lighting devices.

[0002] One or more embodiments may refer to lighting devices employing electrically-powered solid-state lighting sources, e.g. LED sources.

Technological Background

[0003] In the field of lighting devices efforts are being made to implement compact lighting devices, adapted to take advantage of the benefits of solid state light radiation sources, e.g. LED modules including flexible support structures.

[0004] Moreover, the desire is felt to reduce the number of mechanical components, while simplifying the installation procedure and improving the emitted light distribution.

[0005] Said factors are particularly meaningful in the industrial and commercial field, e.g. for the lighting of commercial premises.

[0006] In these contexts, in order to obtain a higher lighting flexibility, a combined use of lenses may be envisaged in order to originate beams of different widths (e.g. very wide beams together with medium-width beams).

[0007] This solution may involve rather high costs and may exhibit critical aspects as regards lighting distribution.

[0008] We may refer to the case, which may occur in commercial premises such as shops or supermarkets, of the lighting of shelves on both sides of an aisle. The lighting distribution may either be close to a lambertian distribution, with a significant light loss towards the floor, or may be an extreme situation, wherein lighting is practically focused only on the shelves, while it is very low on the floor.

[0009] The use has also been proposed of light radiation sources pointing upwards, with associated reflectors which send light back downwards, e.g. via wing-shaped reflective surfaces.

[0010] Such a solution may involve the use either of a high number of mid-powered lighting sources (e.g. LED sources) or of high-powered lighting sources.

[0011] Beside leading to the generation of a massive amount of heat in use, such solutions may be difficult to implement if the application simply requires a lighting of the shelves located on the sides of an aisle.

[0012] Moreover, the loss of flux due to the indirect projection of light radiation may lead to an inefficient energy management, and therefore to rather high running costs.

[0013] In this case, again, the light distribution may be similar to lambertian, with a considerable portion of the light radiation being uselessly directed to the floor.

Object and Summary

[0014] One or more embodiments aim at overcoming the previously described drawbacks and critical issues.

[0015] According to one or more embodiments, said object may be achieved thanks to a lighting device having the features specifically set forth in the claims that follow.

[0016] One or more embodiments may also concern a corresponding method.

[0017] The claims are an integral part of the technical teaching provided herein with reference to the embodiments.

[0018] One or more embodiments lead to the achievement of one or more of the following advantages:

- flexibility of use, e.g. as regards the possibility of obtaining several types of light distribution by using one single flexible laminar support member, the optional possibility being given of further shaping the light emission by taking advantage of the optical properties of an exit window, i.e. a cover of light permeable material extending over the mouth portion of the lighting device housing;
- reduction of the number of components, e.g. the possibility being given of integrating a housing, a cover and mounting features into one single component;
- simplification of assembling procedures, the possibility being given of mounting a light engine by sliding it within a respective housing, without the need of fixing operations such as the use of screws;
- reduction and simplification of the optical elements which may be used for lighting tasks: in one or more embodiments, a given lighting distribution may be achieved by sizing and/or shaping the elements which form a bendable laminar support member, optionally by acting on the light radiation exit window as well;
- possibility of increasing optical efficiency by using a cover layer or a solder mask having reflective properties, the consequent possibility being given of omitting additional optical elements such as lenses or reflectors;
- easy shaping the light engine, the shaping operation being adapted to be performed directly by the installer or the end user at the installation site;
- customizable lengths, according to the application needs;
- possibility of stocking and shipping the light radiation source module in a flat condition, the shaping being carried out only when the module is inserted into the housing, with a consequent reduction in storage, shipping and handling costs.

Brief Description of the Figures

[0019] One or more embodiments will now be described, by way of non-limiting example only, with reference to the annexed Figures, wherein:

- Figure 1 shows a light engine which may be used in one or more embodiments;
- Figure 2 is a section along line II-II of Figure 1;
- Figures 3 and 4, wherein Figure 4 is a front view along arrow IV of Figure 3, exemplify possible uses of the light engine of Figures 1 and 2;
- Figure 5 exemplifies a lighting device according to embodiments;
- Figure 6 is a front view approximately corresponding to arrow VI of Figure 5;
- Figure 7 is a view of the portion of Figure 6 denoted by arrow VII, shown in an enlarged scale;
- Figures 8 and 9 show elements adapted to be comprised in a lighting device according to one or more embodiments;
- Figure 10 shows possible features of a component of a lighting device according to one or more embodiments;
- Figure 11 shows a lighting device according to one or more embodiments, viewed in cross section;
- Figure 12 is a perspective view of a housing which may be used in a lighting device according to Figure 11; and
- Figure 13 exemplifies, according to a view substantially corresponding to Figure 11, a lighting device according to one or more embodiments.

[0020] It will be appreciated that, for simplicity and clarity of illustration, the views of the various Figures may not be drawn to the same scale.

Detailed Description

[0021] In the following description, various specific details are given to provide a thorough understanding of embodiments according to the present specification. One or more embodiments may be practiced without one or several specific details, or with other methods, components, materials, etc. In other instances, well-known structures, materials, and operations are not shown or described in detail to avoid obscuring various aspects of the embodiments. Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, the possible appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments.

[0022] The headings provided herein are for convenience only, and therefore do not interpret the extent of protection or scope of the embodiments.

[0023] In the Figures, reference 10 denotes a light engine employing electrically-powered light radiation sources.

[0024] In one or more embodiments, the use is envisaged of solid-state light radiation sources, such as LED sources.

[0025] In one or more embodiments, the light radiation sources L may be arranged onto a laminar support 12 substantially similar to a Printed Circuit Board (PCB): in one or more embodiments, the latter may be a flexible laminar support, e.g. of the type currently named Flexible Printed Circuit Assembly (FPCA).

[0026] In one or more embodiments, laminar support 12 may include a layered structure having e.g. a base layer, an electrically conductive (e.g. copper) layer and a cover layer.

[0027] In one or more embodiments, as exemplified in Figure 2, support 12 may include a core layer 1200 of a metal material (e.g. copper), on the opposed faces whereof there may be applied, e.g. with the interposition of adhesive layers, a base layer 1204 and a cover or coating layer 1206.

[0028] In one or more embodiments, base layer 1204 may include polymer materials (e.g. polyethylene - PE, polyethylene terephthalate - PET, polyimide - PI, ...), while cover layer 1206 may include polymer materials (e.g. PE, PET, PI, ...), a solder mask (e.g. of acrylic or polymer materials) or combinations thereof.

[0029] In one or more embodiments, support member 12 may have a reduced thickness (e.g. several tens or hundreds of micron; 1 micron = 10^{-6} m), being therefore flexible.

[0030] The light radiation sources arranged on support 12 may have any shape (rectangular, square, circular, ...), they may be of different types (discrete components, CoB components), and/or or they may be arranged in any layout.

[0031] In one or more embodiments, as exemplified herein, sources L may be arranged on support 12 in linear arrays (i.e. in rows): viewing the device 10 in a cross section, therefore, support 12 may exhibit stripes or bands coextensive with the aligning direction of the LEDs, which may include:

- "functional" or "active" stripes or bands 121, whereon LEDs L are arranged, and
- so to say "passive" stripes (also named "wings" in the following) wherein LEDs L are absent.

[0032] In one or more embodiments, passive stripes or wings 122 may be passive because, although they may include electrically conductive metal layers (e.g. copper layers), they may be completely deprived of lines for transferring electrical signals, ground lines or supply lines.

[0033] On the contrary, these elements are adapted to be present in the active stripes or bands 121, which may also include corresponding connectors (not visible in the Figures), e.g. wago connectors.

[0034] It will be appreciated, however, that the possible alternation, as exemplified herein, of active/passive

stripes or bands 121, 122 is not a mandatory feature of the embodiments.

[0035] In one or more embodiments, the stripes or bands 121, 122 may be mutually separated by bending lines 14, adapted to be distributed according to different patterns.

[0036] For example, stripes or bands 121, 122 may have the same width in the direction of the transverse axis of module 10 (a horizontally-oriented axis according to the view of Figure 1), or they may have different widths.

[0037] For example, Figure 1 refers, by way of non-limiting example only, to a module 10 comprising five bending lines 14, so that module 10 is partitioned in six stripes or bands 121, 122, two of which are active (121) and four passive (122), and which are arranged symmetrically to a central bending line 14.

[0038] As further exemplified, e.g. in Figure 4, widths a, b, c. of the stripes/bands may be chosen so that a pair of passive stripes 122 (free from sources L), which encompass an active stripe 121 therebetween (carrying sources L), may have lengths "b" and "c" which are greater than width "a" of active stripe 121.

[0039] In one or more embodiments, the sizes both of active or "functional" stripes or bands 121 and of passive stripes or bands or wings 122 may be chosen according to the specific application requirements.

[0040] Moreover, as previously stated, the possible alternation of active stripes or bands 121 and of passive stripes or bands 122 is not a mandatory feature of the embodiments.

[0041] Therefore, the various details given in the present detailed description have a merely exemplary, non-limiting function: indeed, one or more embodiments may envisage the use of materials and/or of thicknesses/sizes/shapes different from what stated herein by way of example only.

[0042] Laminar structures such as in module 10 exemplified herein may be bent once or several times throughout their section or in a portion thereof, e.g. via a thermoforming method, through plastic deformation or through a plastic deformation triggered by changes in the laminar structure (e.g. plastic deformation may be triggered by cuts into the laminar structure, in order to prevent a tendency of the system to relax after bending).

[0043] In one or more embodiments, in order to create bending lines 14 between stripes or bands 121, 122, different solutions may be resorted to.

[0044] In one or more embodiments, said lines may be implemented essentially as creasing lines, i.e. as rows of holes 140 extending through substrate 12.

[0045] In one or more embodiments, said holes may be blind or through holes, e.g. of an elongate shape (eyelet-shaped) in the direction of the respective bending line.

[0046] For example, in one or more embodiments, such holes may extend not only through core layer 1200, but also through:

- cover layer 1206,

- base layer 1204, and
- both base layer 1204 and cover layer 1206, according to the solution exemplified in Figure 2.

[0047] In one or more embodiments, so-called "kiss-cuts" may be resorted to, i.e. shallow slots which only extend through base layer 1204 and/or cover layer 1206, without reaching core layer 1200.

[0048] The choice of a solution may depend on different factors, such as the specific features and/or the thicknesses of the materials employed.

[0049] The possible presence of kiss-cut slots (which may be used in combination with holes 140) may ease the bending of support 12 at bending lines 14 even at room temperature.

[0050] In addition to facilitating the bending operation, the kiss-cut slots (which substantially include a partial cut of base layer 1204 and/or of cover layer 1206) may help preserving the deformed shape, thereby preventing support 12, after bending, from restoring the original flat condition.

[0051] As exemplified herein, holes 140 and/or kiss-cut slots 142 may be located in a position exactly corresponding to bending lines 14, specifically with the bending lines corresponding to the axes of the holes/slots. Said solution, however, may not be strictly mandatory.

[0052] Figures 3 and 4 exemplify the possibility of bending a module 10 as exemplified in Figures 1 and 2 in such a way as to impart module 10 a bent shape grossly resembling a ω (small letter omega).

[0053] On this subject, it will be appreciated that:

- in Figure 3, bending lines 14 are formed by the rows of holes 140, adapted to implement a possible embodiment of such bending lines, and
- in Figure 4, which highlights various geometric parameters of module 10 and the related bending parameters, bending lines 14 are identified essentially as a geometric entity.

[0054] A bending operation as exemplified in Figures 3 and 4 may be achieved e.g. by a bending apparatus comprising two vacuum plates (known in themselves) which are destined to be applied (preferably on opposed faces) onto support 12 on either side of bending line 14.

[0055] Said plates may be adapted to perform a relative movement which determines a corresponding bending of support 12 at bending lines 14.

[0056] According to criteria known in themselves, in order to take into account the springback of the material of support 12, the bending angle may be chosen so as to correspond to a value $\theta' = \theta + \Delta\theta$, wherein θ is the value of the desired final bending and $\Delta\theta$ takes into account the material springback.

[0057] It will be appreciated that, in the case of an incorrect bending, the latter may be corrected by restoring support 12 back to the original flat condition, and by repeating the bending operation correctly.

[0058] The general criteria exemplified in the foregoing may be applied to a wide range of possible embodiments.

[0059] This is true as regards the distribution of stripes or bands 121, 122, as regards the distribution of LEDs and as regards the method of implementation of bending lines 14.

[0060] For example, Figures 3 to 7 refer to a module 10 including, on each side of the longitudinal central plane of the general ω -like shape of module 10 (this plane is represented by axis z of Figure 4), two portions, each of which includes an "active" stripe 121 which carries LEDs L and is set between two wings 122 (free from LEDs L), with both wings 122 which generally diverge from each other.

[0061] In one or more embodiments, the bending operation of module 10 exemplified in the annexed Figures (including Figures 11 and 12 which will be better detailed in the following) may be performed in such a way that cover layer 1206 (adapted to comprise a reflective material, e.g. comprising a white or whitish material) faces inwardly of the channel formation deriving from bending, e.g. towards the inside of the channel formation jointly defined by both wings 122, which are separated by an active stripe 121 carrying LEDs L.

[0062] In this scenario (as visible in the Figures) LEDs L face inwardly of said channel formation.

[0063] In one or more embodiments, as exemplified in Figures such as Figures 3 and 4, module 10 may be equipped with two stripes of LEDs L arranged on the stripes 121, one for each portion of module 10.

[0064] It will be appreciated that such a mounting arrangement is purely exemplary and must not be construed, even indirectly, as limiting the embodiments.

[0065] This is true also as regards other features such as:

- the presence of five bending lines 14, partitioning module 10 in six areas or stripes (indeed, the number of lines 14 may be chosen at will: 1, ..., n),
- the symmetrical arrangement of bending lines 14 and of stripes 121, 122 with respect to the central line of module 10 (axis z of Figure 4),
- the possible (but not mandatory) alternation of stripes 121 with LEDs and of stripes 122 free from LEDs,
- the width (a, b, c in the presently considered example) of the various stripes.

[0066] The previous list is exemplary and non-limiting.

[0067] For example, in one or more embodiments as exemplified in Figures 3 to 10, stripes or bands 121 carrying LEDs may have a width (denoted as "a" in the Figures) smaller than width "b", "c" of stripes 122 adjacent thereto, which may respectively be located outside and inside module 10 (see Figure 4).

[0068] In one or more embodiments, the choice of widths "a", "b", "c" may involve "b" being twice as wide as "a" (i.e. $b \sim 2a$), while for width "c" a value may be cho-

sen which is approximately one and a half times "a" ($c \sim 1,5a$).

[0069] As regards the bending angles denoted as α (alpha), β (beta) e γ (gamma) in Figure 4, it is possible to choose a value of alpha amounting approximately to the value of beta ($\beta \sim \alpha$) and a value of gamma amounting approximately to twice the value of alpha ($\gamma \sim 2\alpha$), so as to originate the previously mentioned shape of a ω (small letter omega).

[0070] In one or more embodiments module 10, once bent at will, may be inserted into a housing 20, e.g. by sliding it lengthwise within the same, e.g. in the direction pointed by the arrow of Figure 5, which is aligned with axis y of reference system x, y, z shown in Figure 4 (and also appearing in Figure 6).

[0071] For example, housing 20 may have the cross-section profile exemplified in Figures 5 and 6, i.e. a heart-shaped profile having two lobes 20a, 20b, each being adapted to receive one of the ω -shaped portions of module 10 therein. Each lobe 20a, 20b of housing 20 (see again Figures 5 and 6) is adapted to receive a respective portion of module 10 therein, comprising a stripe 121 carrying LEDs L which is set between two stripes or wings 122, said two stripes or wings 122 optionally being mutually diverging towards the mouth portion of the channel shape of housing 20.

[0072] In one or more embodiments, said mouth portion may be overlapped by a cover 30 of a light-permeable material (e.g. a transparent or translucent material) adapted to protect the interior of housing 20 from the penetration of foreign agents without hampering the emission of light radiation from mouth portion of housing 20.

[0073] As regards the size of module 10 (and therefore of housing 20 which receives it), for width W and height H one or more embodiments may envisage values respectively amounting to 20-60 mm and 60-100 mm.

[0074] It will be appreciated that module 10 may have an indefinite length, and may therefore be adapted to be cut to length according to the application requirements, therefore offering the possibility of customization.

[0075] As bending line(s) may extend in the lengthwise direction of housing 20 (axis y in Figures 4 and 6), the distribution of the light radiation which may be emitted from the exit mouth (e.g. cover 30) of a device as exemplified in Figures 5 and 7 may have two rather broad peaks on the sides of axis z in Figure 4, and a trough ("hole") at such axis.

[0076] Such a light radiation distribution may be defined as a "moth-like" distribution.

[0077] This light distribution may be suitable e.g. in installations wherein the lighting device is located above an aisle having shelves on both sides, as in a retail store, the lighting peaks being mainly directed onto the shelves.

[0078] As the position of the peaks depends on the bending angles and/or on the size of the various areas of module 10, the position may be optimized according to the final installation conditions (mounting height of de-

vice 10, height of the shelves, width of the aisle).

[0079] On the contrary, in the longitudinal plane (direction of axis y) the distribution of the light radiation emitted by the device may have an at least approximately lambertian pattern.

[0080] Such a difference between both planes may be due to the fact that in the transverse plane the light emitted by LEDs L interacts with bent support 12 (e.g. with cover layer 1206, adapted to perform a reflective action), while said interaction does not occur in the longitudinal direction.

[0081] In one or more embodiments, given the presence of a symmetrical structure and bending pattern of module 10, said side peaks may be symmetrical with respect to axis z.

[0082] In one or more embodiments, given the presence of an asymmetrical structure and bending pattern of module 10, said side peaks may be asymmetrical with respect to axis z.

[0083] In one or more embodiments, the angular positions of the peaks (which may be symmetrical or non-symmetrical with respect to the central plane of the device) may be varied by acting e.g. onto the bending angles α , β , γ , and therefore on the relative orientations (and optionally on the widths "a", "b", "c") of stripes 121, 122.

[0084] As regards the material of housing 20, it is possible to resort to plastic or lightweight metal materials.

[0085] In one or more embodiments, a housing 20 having a heart-like shape as exemplified in Figures 5 to 10 may be obtained through extrusion.

[0086] Said shape may help the insertion of module 10 into housing 20, e.g. by lengthwise sliding.

[0087] Moreover it is possible to provide hook ribs, such as rib 22 exemplified in the enlarged view of Figure 7, which are adapted to achieve a fixation of module 10. For example, in one or more embodiments, in order to implement a retention within housing 20, it is possible to take advantage of the relative rigidity of module 10, given e.g. by core layer 1200 comprising a metal material, such as copper, in combination with the shape of the co-extruded profile, adapted to counter relaxation.

[0088] Moreover, in one or more embodiments, housing 20 and module 10 (once bent) may have complementary channel-shaped formations, which may ease retention of module 10 by housing 20 which encompasses and surrounds module 10 arranged therein.

[0089] In one or more embodiments, light-permeable cover 30 (if present) may be made of a transparent or translucent material, e.g. a plastic material adapted to be co-extruded with the rest of housing 20.

[0090] In one or more embodiments, cover 30 may have a sculpturing (e.g. an array of lenses) adapted to perform a further shaping action on the light radiation emitted from lighting device 10.

[0091] Figures 8 and 9 show possible examples of end caps 24 which are adapted to be mounted, e.g. by snap fitting, on the ends of housing 20, and which may option-

ally perform a sealing action (protection of the module from the environment) while optionally having openings 240 for the passage of cables or the insertion of connectors.

[0092] Connectors 240 may be protruding from or flush with end caps 24.

[0093] Moreover, Figures 5, 6, 10 (as well as 11 to 13) exemplify the possible presence of hook formations 40 of various kinds (which may optionally be integral with housing 20, e.g. via co-extrusion) for mounting the lighting device.

[0094] In one or more embodiments there may be provided e.g. profiled hook formations 40 (e.g. with a T-shaped or an L-shaped profile) which may be used to mount the lighting device onto a support structure (e.g. onto a ceiling).

[0095] Figures 11 to 13 exemplify various other options provided by one or more embodiments.

[0096] For example, Figure 11 exemplifies the possibility of arranging a module 10 within a housing 22 having a general channel-like shape, the other features being substantially similar to the previously exemplified housing 20.

[0097] In one or more embodiments, as exemplified in Figure 11, a module 10 may have the shape of a channel, with:

- a central "active" stripe 121 arranged at (and optionally contacting) the bottom wall of housing 20, e.g. with two rows of LEDs L, in an at least approximately lateral position, and
- two side "passive" stripes or wings 122 (free from LEDs) flanking central stripe 121 and mutually diverging towards the mouth portion of housing 20 (e.g. from a cover 30).

[0098] In one or more embodiments, both wings 122 may be bent from stripe 121 (along two bending lines 14) with an angle β (beta - from the normal to the extension plane of stripe 121) having an approximate width of 20°-70°.

[0099] A lighting device as exemplified in Figure 11 may emit a light distribution having a FMHM (Full Width Half Maximum) value in the transverse plane which may be modified by acting both on bending angle β and on the width of stripes 121 and 122.

[0100] Moreover, the possibility is given to originate a lighting pattern having substantially a lambertian distribution also in the transverse plane with respect to module 10 (plane x-z of Figure 4).

[0101] Figure 13 exemplifies embodiments generally deriving from the arrangement exemplified in Figure 11, and which take into account the possible visibility of the light radiation sources L from outside the lighting device.

[0102] In one or more embodiments as exemplified in Figure 11, sources L are arranged on central stripe 121 and are located at the bottom wall of housing 20; therefore, they are visible from the outside (when they are off)

through cover 30.

[0103] Figure 13 exemplifies the possibility of "masking" the light radiation sources L by employing a support 12 comprising four bending lines 14, so as to originate again a module 10 with a general channel-like shape, which is adapted to be received within housing 20 and comprises:

- a central "passive" stripe 122 arranged at (and optionally contacting) the bottom wall of housing 20;
- two "active" stripes 121 (carrying LEDs L) flanking central stripe 122, e.g. mutually diverging towards the mouth portion of housing 20 (which may optionally be closed by cover 30),
- each "active" stripe 121 is flanked, on the external side from housing 20, i.e. on the side which will face the mouth emitting the light radiation, by a further "passive" stripe or wing 122, free from LEDs, bent towards the corresponding stripe 121 so as to hide the LEDs L from the outside.

[0104] The embodiments as exemplified in Figure 13 preserve flexibility and freedom of shaping, as well as the possibility of acting e.g. both on sizes (width of the various stripes 121, 122) and on the bending angle imparted to module 10 along lines 14, in a way substantially similar to what has previously been exemplified with reference to Figure 11.

[0105] Without prejudice to the basic principles, the details and the embodiments may vary, even appreciably, with respect to what has been described herein by way of non-limiting example only, without departing from the extent of protection.

[0106] The extent of protection is defined by the annexed claims.

Claims

1. A lighting device (10), including:

- a channel-shaped housing (20) extending in a longitudinal direction (y) and having a mouth portion (30) to emit light radiation therefrom,
- a light radiation source module (10) in said housing (20), the light radiation source module (10) including a laminar support member (12) bent to a channel shape open towards the mouth portion (30) of the housing (20) at at least one bending line (14) extending in said longitudinal direction (y), said at least one bending line (14) partitioning said laminar support member (12) in a plurality of stripes (121, 122), wherein said plurality of stripes includes at least one stripe (121) with electrically-powered light radiation sources (L) therealong.

2. The lighting device of claim 1, wherein said plurality

of stripes includes at least one first stripe (121) with light radiation sources (L) and at least one second stripe (122) free from light radiation sources.

3. The lighting device of claim 2, wherein said plurality of stripes includes at least one first stripe (121) with light radiation sources (L) set between a pair of second stripes (122) free from light radiation sources, the second stripes of said pair preferably mutually diverging towards the mouth portion (30) of the housing (20).

4. The lighting device of claim 2 or claim 3, wherein said at least one second stripe (122) free from light radiation sources is bent towards said at least one first stripe (121) with light radiation sources (L) thereby masking the light radiation sources (L) with respect to the mouth portion (30) of the housing (20).

5. The lighting device of any of the previous claims, wherein the housing (20) includes a heart-shaped cross-section with two lobes (20a, 20b) each housing a respective portion of said light radiation source module (10), each of said respective portions preferably including a first stripe (121) with light radiation sources (L) set between a pair of second stripes (122) free from light radiation sources.

6. The lighting device of any of the previous claims, wherein the housing (20) includes hook formations (22) for the support member (12) of said light radiation source module (10).

7. The lighting device of any of the previous claims, wherein said at least one bending line (14) includes a lines of blind or through holes (140), preferably of elongate shape, in said laminar support member (12) of said light radiation source module (10).

8. The lighting device of claim 7, wherein said laminar support member (12) of said light radiation source module (10) includes a metallic core layer (1200) sandwiched between a base layer (1204) and a cover layer (1206), said cover layer (1206) preferably including a reflective material, and wherein said blind or through holes (140) extend through said metallic core layer (1200) and at least one of said base layer (1204) and said cover layer (1206).

9. The lighting device of any of the previous claims, including a light permeable cover (30) extending over the mouth portion of the housing (20).

10. The lighting device of any of the previous claims, wherein said electrically-powered light radiation sources include LED sources.

11. A method of producing a lighting device (10), the

method including:

- providing a channel-shaped housing (20) extending in a longitudinal direction (y) and having a mouth portion (30) to emit light radiation therefrom, 5
- arranging in said housing (20) a light radiation source module (10) including a laminar support member (12) bent to a channel shape open towards the mouth portion (30) of the housing (20) at at least one bending line (14) extending in said longitudinal direction (y), said at least one bending line (14) partitioning said laminar support member (12) in a plurality of stripes (121, 122), wherein said plurality of stripes includes at least one stripe (121) with electrically-powered light radiation sources (L) therealong. 10 15

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FIG. 1

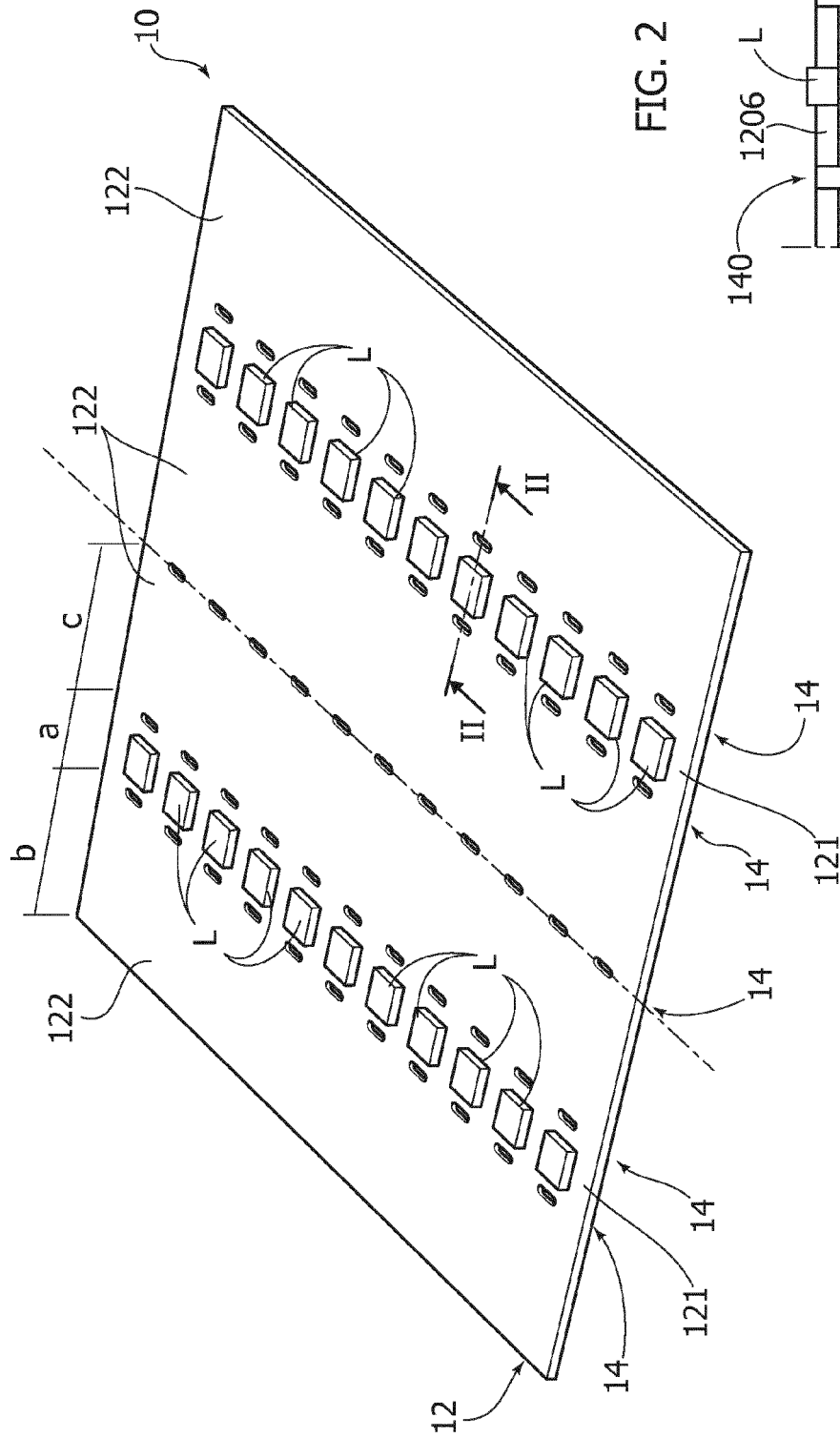
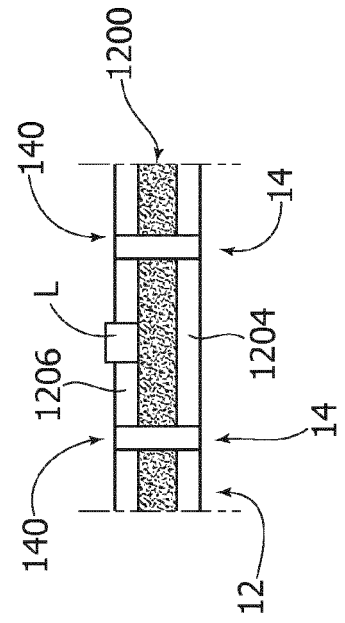


FIG. 2



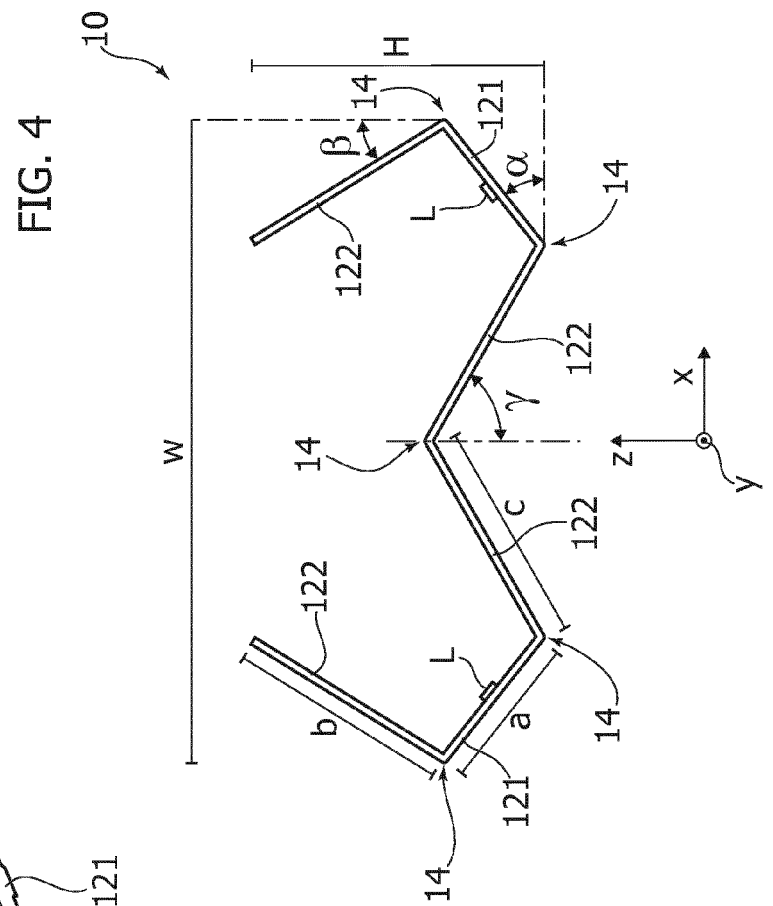
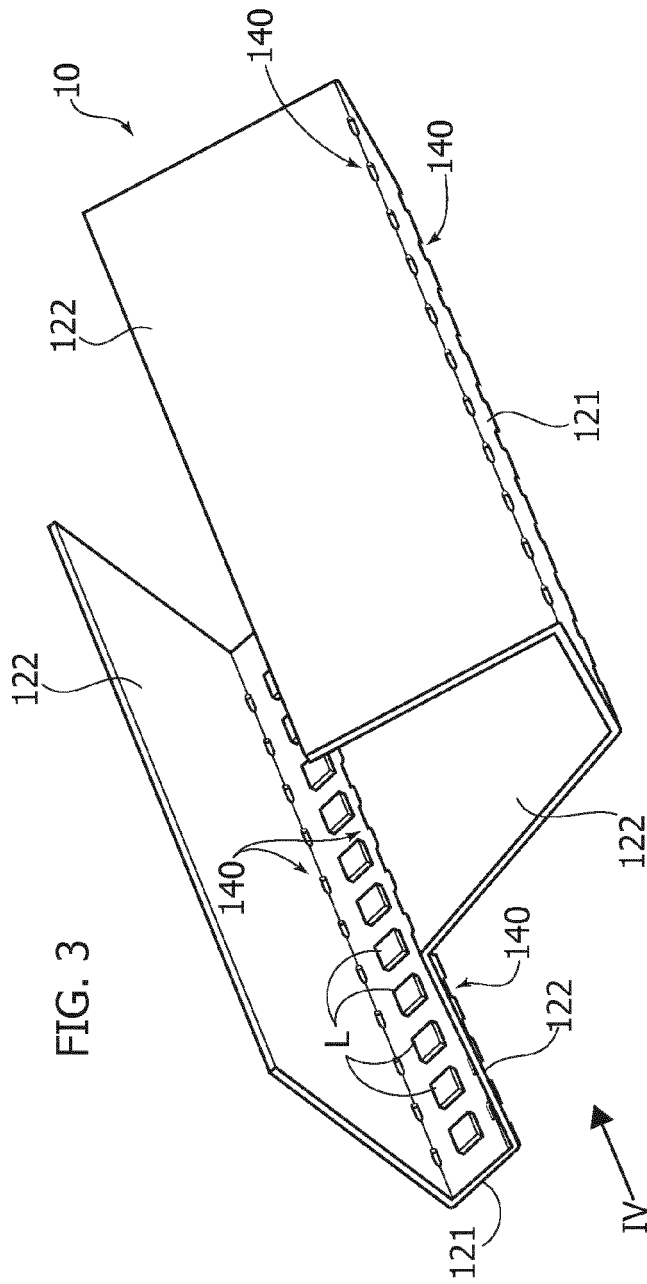


FIG. 5

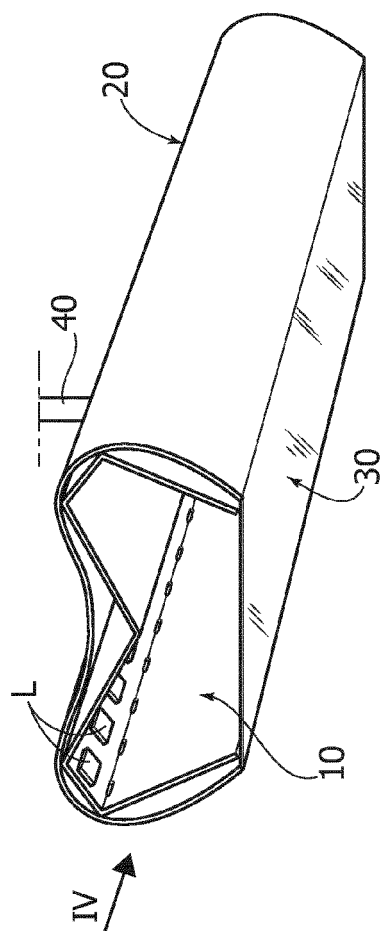


FIG. 7

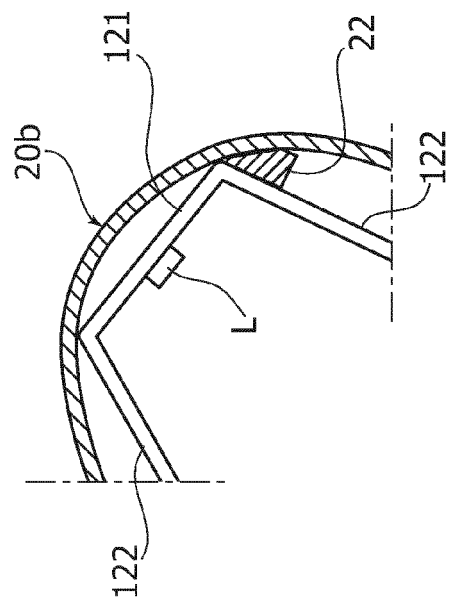


FIG. 6

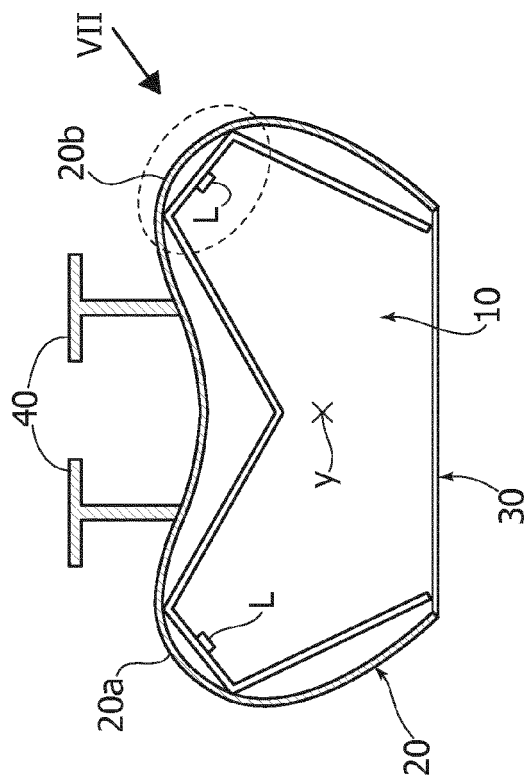


FIG. 8

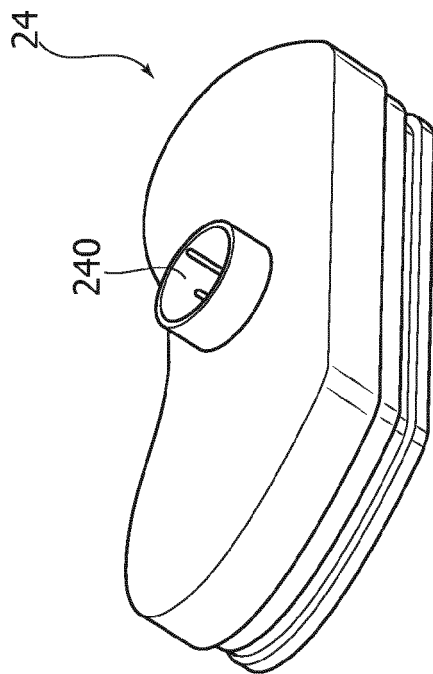


FIG. 9

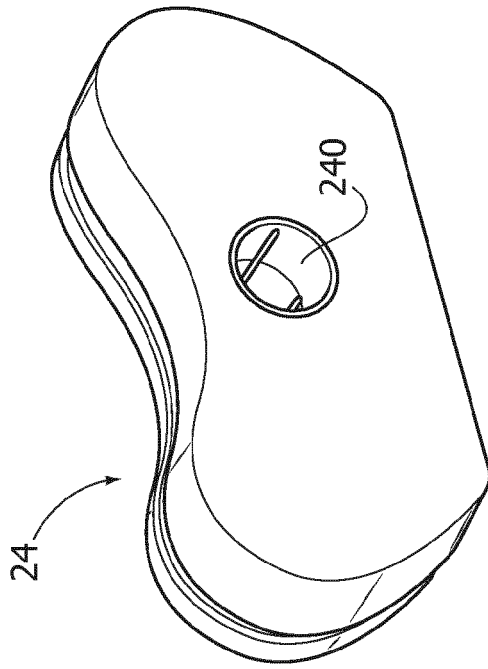


FIG. 10

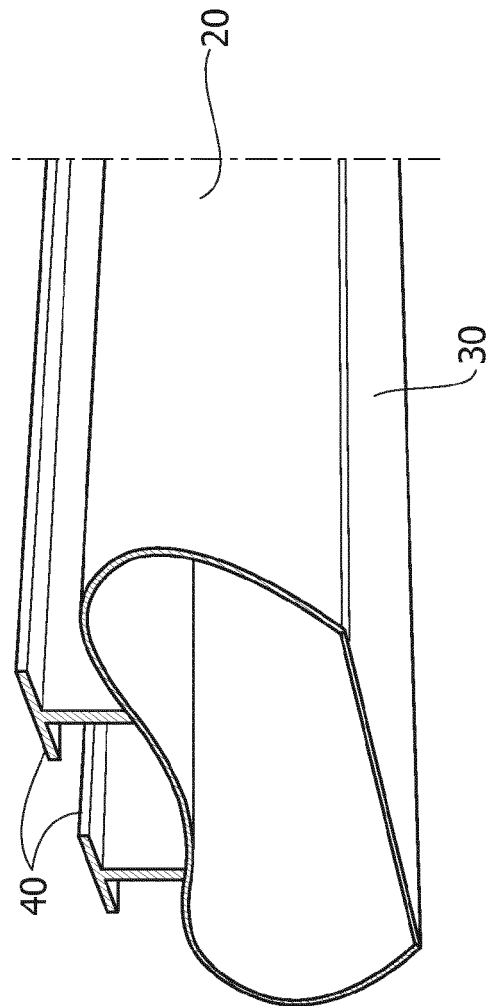


FIG. 11

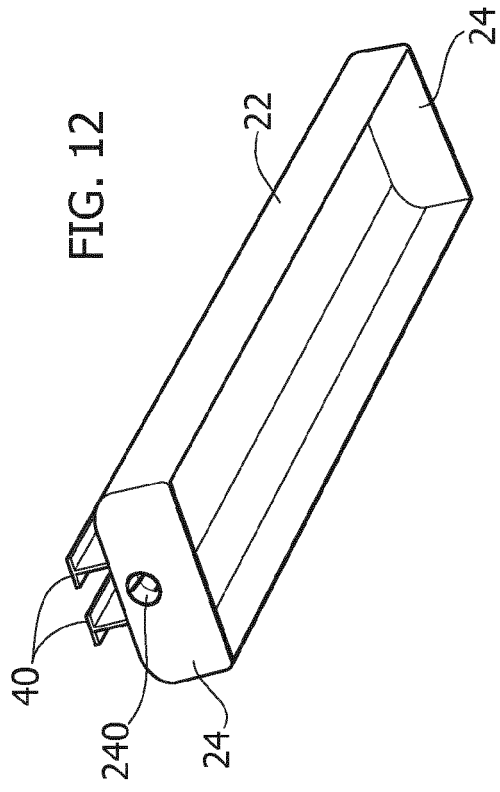
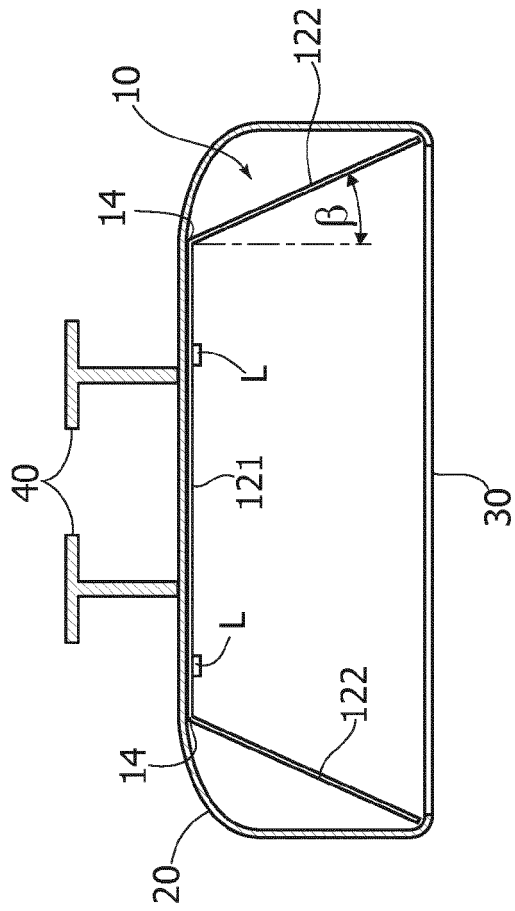
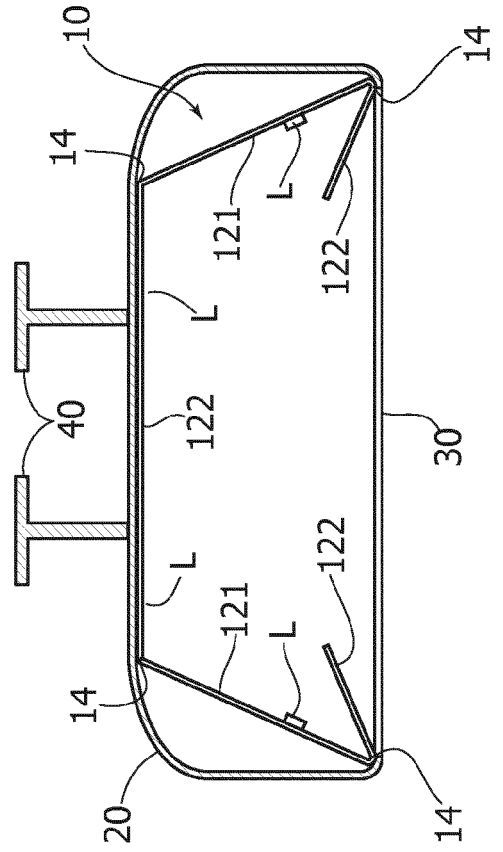


FIG. 13





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Application Number
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Y	* paragraph [0050] - paragraph [0052]; figures 5-7 *	7,8		

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A	* paragraph [0004] - paragraph [0007]; figures 10,11 *	1,11		

The present search report has been drawn up for all claims				
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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document				

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