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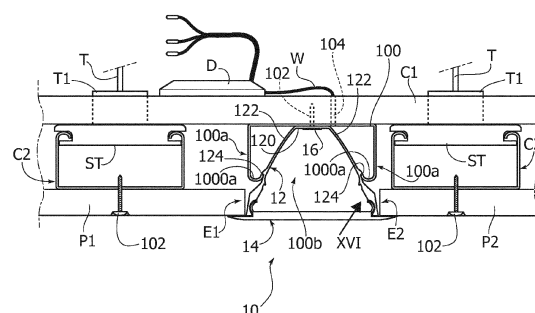
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(54) **A CASING FOR LIGHTING DEVICES, CORRESPONDING LIGHTING DEVICE, LIGHTING INSTALLATION AND METHOD**

(57) A casing for lighting devices, e.g. for mounting in gypsum ceilings comprises an elongate, channel-shaped body (12) having an inner surface inwardly of the channel shape and an outer surface outwardly of the channel shape, wherein. The channel-shaped body (12) comprises a corner portion (120) extending at a longitudinal intermediate plane (X12) of the body (12) and two lateral arms (122) extending from the corner portion (120) away from the intermediate plane (X12) of the body (12). The lateral arms (122) have respective distal end edges (122a) extending in a same direction on opposite sides of the intermediate plane (X12) of the body (12), with an open mouth portion of the body (12) between the distal end edges (122a) with the lateral arms (122). The lateral arms (122) comprise longitudinal snap coupling formations (124) extending lengthwise of the respective lateral arm (122) at a position of the outer surface of the channel-shaped body (12) between the corner portion (120) and the distal end edge (122a) of the respective lateral arm (122) as well as distal coupling formations (126) extending lengthwise of the respective lateral arm (122) at the distal end edge (122a) of the lateral arm. A strip-like light-permeable closure lid (14) for the open mouth portion of the channel-shaped body (12) is provided having lateral coupling formations (142) complementary to and coupleable with the distal coupling formations (126) of the lateral arms (122) of the channel-shaped body (12).

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FIG. 15



Description

Technical field

[0001] The description relates to lighting systems.

[0002] One or more embodiments may relate to lighting systems intended for wall mounting, e.g. in ceilings.

Technological background

[0003] Covering surfaces by means of covering plates is a technique adopted in many different areas.

[0004] A possible example is provided by coverings for walls and ceilings as indicated with different designations such as countertop, drywall, plasterboard, gypsum coverings and the like.

[0005] Similar arrangements may be used for covering surfaces e.g. in furnishing.

[0006] Due to their large diffusion, these coverings oftentimes incorporate lighting sources. For instance, in the case of ceilings, producers as well as architects appreciate the availability of easy-to-use, inexpensive solutions for installing light modules, e.g. with the aim of facilitating the adoption of linear light engines adapted to become a sort of integral part of the surface covered (e.g. a gypsum board ceiling or vertical wall). Monolith and flat/linear shapes are increasingly used in the construction of new buildings and in refurbishing old ones.

[0007] Conventional solutions such as e.g. lighting solutions for gypsum ceilings may comprise fixed pre-assembled modules adapted to be integrated in the gypsum. For instance, these solutions may comprise luminaires of the pre-assembled type arranged in the gypsum covering using different parts for fixing, e.g. a customized track to support the luminaire adapted to receive the connection wires and then the body of the luminaire itself, plus possibly a corresponding optics.

[0008] The resulting systems may be rather complex, with installation of these systems becoming cumbersome and time-consuming and/or requiring particular skills: for instance, in order to be performed efficiently and with good results, breaking and/or cutting gypsum may require a certain ability. Also, tracks mounted in the gypsum represent separate components, separate from the gypsum support tracks or rails.

[0009] Certain solutions may comprise applying optics to existing products e.g. with rubber, which may be the source of the various drawbacks.

[0010] To sum up, avoiding the use of suspended lighting modules and/or of lighting modules which may involve complex steps during mounting and installation, e.g. with cutting of the e.g. gypsum plates, are desirable options. This applies, e.g. to reducing the steps involved in installing such lighting systems and the associated costs (e.g. in terms of materials). Also, the availability of solutions with attractive design is appreciated.

[0011] Documents such as DE 10 2009 023 052 A1, DE 10 2015 203 214 A1, US 7 506 997 B1, US 2007/0

139 961 A1, US 2009/0 261 368 A1, US 2010/0 079 989 A1, US 2011/0 297 970 A1, US 2015/0 117 001 A1, US 2016/0 033 105 A1, EP 3 217 068 A1, CN 203 775 525 U as well as DE 10 2016 221 130.7 are exemplary of activity in the area to which embodiments may apply.

Object and summary

[0012] An object of one or more embodiments is to contribute in providing improved solutions as desirable.

[0013] According to one or more embodiments, that object can be achieved by means of a casing for lighting devices having the feature set forth in the claims that follow.

[0014] One or more embodiments may relate to a corresponding lighting device.

[0015] One or more embodiments may relate to a corresponding lighting installation.

[0016] One or more embodiments may relate to a corresponding method.

[0017] The claims are an integral part of the teaching provided herein in respect of embodiments.

[0018] One or more embodiments may provide a snap-in casing for a lighting device (possibly providing a reflective support and a diffuser plus anti-glare or Unified Glare Rating - UGR control).

[0019] One or more embodiments may be applied e.g. to continuous light modules for use in covering surfaces by means of covering plates in the building and/or furnishing industry. Lighting provided in plates for covering walls (comprising ceilings) are exemplary of such a possible use.

[0020] One or more embodiments may provide easy-to-install arrangements adapted for use in combination with standard countertop/drywall profiles and rail supports.

[0021] One or more embodiments may provide lighting modules adapted to become an integral part of a surface covered (e.g. a ceiling).

[0022] One or more embodiments are suited for use with flexible and rigid light engines as already currently available.

[0023] One or more embodiments may provide a continuous lighting system which may comprise a cover member (possibly providing diffuser and/or UGR control) which may be cut to length according to specific needs, applications and tastes.

[0024] One or more embodiments may use channel-shaped linear support members (rails) as currently used in the building industry, e.g. in gypsum ceilings.

[0025] One or more embodiments may provide one or more of the following advantages:

- reduction of number of installation steps,
- reduction of cost, due e.g. to a simplified design and/or to the possibility of reducing the number of light radiation sources involved in providing a certain amount of lighting (lumen output), this resulting in a

higher lumen/watt ratio.

Brief description of the figures

[0026] One or more embodiments will now be described, by way of example only, with reference to the annexed figures, wherein:

- Figures 1 to 4 are exemplary of certain possible acts (steps) involved in covering a surface with covering plates,
- Figures 5 to 12 are various perspective views exemplary of possible features of components for use in one or more embodiments,
- Figure 13 is exemplary of certain possible acts in embodiments,
- Figure 14 is an enlarged view corresponding to arrow XIV in Figure 13 reproduced on a magnified scale and rotated for clarity of representation,
- Figure 15 is exemplary of certain possible acts in embodiments,
- Figure 16 is an enlarged view corresponding to arrow XVI in Figure 13 reproduced on a magnified scale and rotated for clarity of representation,
- Figures 17 and 18 are exemplary of certain possible acts in embodiments, and
- Figure 19 comprises three portions designated a), b), and c), respectively, which are exemplary of a possible variant of embodiments and possible use thereof.

[0027] It will be appreciated that, for the sake of clarity and ease of presentation, the various figures may not be drawn to a same scale.

Detailed description

[0028] In the ensuing description, one or more specific details are illustrated, aimed at providing an in-depth understanding of examples of embodiments of this description. The embodiments may be obtained without one or more of the specific details, or with other methods, components, materials, etc. In other cases, known structures, materials, or operations are not illustrated or described in detail so that certain aspects of embodiments will not be obscured.

[0029] Reference to "an embodiment" or "one embodiment" in the framework of the present description is intended to indicate that a particular configuration, structure, or characteristic described in relation to the embodiment is comprised in at least one embodiment. Hence, phrases such as "in an embodiment" or "in one embodiment" that may be present in one or more points of the present description do not necessarily refer to one and the same embodiment. Moreover, particular conformations, structures, or characteristics may be combined in any adequate way in one or more embodiments.

[0030] The references used herein are provided mere-

ly for convenience and hence do not define the extent of protection or the scope of the embodiments.

[0031] Figure 1 is exemplary of a method of covering a surface S with covering plates P1, P2.

[0032] A wall surface such as e.g. a ceiling in a building covered by means of (according to various current designations) countertop, drywall, plaster, gypsum or the like may be exemplary of such a surface S.

[0033] As noted, one or more embodiments are in no way limited to use in covering ceilings and may be applied to covering a wide variety of surfaces comprising e.g. vertical walls, floors, staircases, ramps, and so on. Also, possible uses of embodiments are not limited to the building industry. Embodiments may be used e.g. to cover surfaces in furnishing and various types of appliances.

[0034] For that reason, the instant detailed description will refer to a "surface S" and to "covering plates" e.g. two of these, designated P1, P2 with mutually opposed (e.g. rectilinear) end edges E1, E2 without any particular emphasis being placed on the nature and the characteristics of the surface S and the plates P1, P2 as these may be devised differently as a function of the intended application e.g. building (ceilings, walls), furnishing, and so on.

[0035] Also, the mounting surface S as exemplified in Figures 1 and 2 is no longer visible in figures such as Figures 4, 13, 15, 17 and 18 in order to avoid making the relative representation unduly complicated.

[0036] An application as exemplified in Figure 1 may comprise providing over the surface S a first array of first linear support members C1 (e.g. box-like profiles of rectangular or square cross-section or channel-shaped profiles) extending in a first direction (roughly corresponding to the plane of the page in Figure 1).

[0037] Providing the first array of support members C1 over the mounting surface S may be e.g. by means of rigid/flexible attachment members T having distal channel-shaped formations T1 (facing downwards in Figure 1) adapted to receive the support members C1 extending therealong and fixed therein e.g. by screws (not visible in the figures).

[0038] This may lead to the linear support members C1 being arranged at a distance to the surface S e.g. by being suspended therefrom (e.g. in the exemplary case where the surface S is a ceiling).

[0039] The first support members C1 may be mounted extending in a same direction (e.g. parallel to one another) at a distance of about 1 m (e.g. 1200 mm) from one another.

[0040] An application as exemplified in Figure 1 may comprise providing over the first array of first linear support members C1 a second array of second linear support members C2 arranged to extend transverse (optionally perpendicular) to the first direction of the first members C1 in the first array, so that the first array of first support members C1 lies between the mounting surface S and the second array of second support members C2.

[0041] As exemplified herein, the second support

members C2 may comprise channel-shaped profiles adapted to be located at a distance of e.g. 600-1200 mm from each other and coupled to the first support members C1 e.g. via screws or clamping members. These clamping members can be integrated into the attachment members T.

[0042] For instance, support members such as the second support members C2 as used in standard gypsum board ceiling installations may exhibit a channel-shaped profile having a width of e.g. 60 mm between side walls extending e.g. 27 mm from the central (web) portion of the profiles and provided with a distal hook-like margins projecting e.g. inwardly of the channel shape of the profile C2.

[0043] It will be appreciated that all the quantitative data (e.g. spacing, dimensions) provided herein are merely exemplary and in no way limitative of embodiments.

[0044] Coupling of the support members C2 in the second array to the support members C1 in the first array may be e.g. via linear strip profiles ST which may be set against the first support members C1 and fixed thereto (e.g. via screws, not visible in the figures) and have lateral grooves into which the distal hook-like margins of the support members C2 may engage.

[0045] This may facilitate snap-like coupling of the members C2 with the profiles members ST (fixed to the members C1) to thereby establish coupling of the members C2 to the members C1 as desired. Due to the members C1 being mounted onto the surface S (via the members T, T1) this will result in the members C2 being in turn coupled (e.g. mounted, suspended) to the surface S.

[0046] Covering plates (such as e.g. gypsum or plaster boards P1, P2) may then be applied onto the second array of support members C2 (e.g. via screws as visible in the following) with the opposed edges E1, E2 of the plates abutting against one another to provide continuity of the covering.

[0047] It will be appreciated that a covering such as a ceiling as exemplified herein may comprise many plates intended to extend over the whole surface S. Only two such plates are visible in the figures for simplicity.

[0048] An arrangement as exemplified in Figure 1 is otherwise conventional in the art, with the first linear support members C1 and second linear support members C2 oftentimes referred to as primary and secondary rails, respectively. The secondary rails may also be referred to as "furring" rails. Also, while different shapes and/or structures (e.g. a closed boxed shape and an open, channel-shaped shape) are exemplified for the members C1 and C2 in Figure 1, certain solutions may adopt a same structure (e.g. channel-shaped) for both members C1 and C2.

[0049] Figure 2 is exemplary of the possibility of:

- providing a supply of linear channel-shaped profiles with identical cross-section for use in providing the secondary members C2, and
- taking one or more profiles in the supply and mount-

ing them, so-to-say, turned upside-down between two secondary members C2, in order to provide at least one channel-shaped mounting member 100 having an inner cavity between two longitudinal side-walls 100a arranged onto the first support members C1, with the open mouth portion 100b of the mounting member 100 facing away from the linear support members C1 in the first array.

[0050] The different reference (100 in the place of C2) used in the figures to designate the mounting member in question (which may be in fact the same type of, e.g. metal, profile used to provide the secondary support members C2) is intended to highlight the fact that, in one or more embodiments, the mounting member 100 may possibly be a different type of channel-shaped member than the members C2. Also, in one or more embodiments, the support members C2 may not exhibit a channel shape as exemplified in the figures.

[0051] In one or more embodiments, using a same type of profile for both the support members C2 and for the mounting member(s) 100 may be advantageous in so far as a single type of profile may be used for two purposes.

[0052] Figure 2 is exemplary of the possibility of fixing the mounting member 100 onto the first support members C1, e.g. by screws 102.

[0053] In one or more embodiments, these screws may be the same type of screws used for mounting the plates or boards P1, P2 onto the support members C2 (e.g. as discussed in the following).

[0054] Figure 2 is further exemplary of the possibility of providing (e.g. via drilling D) passageways 104 which facilitate passing towards the inner cavity of the mounting member 100 electrical wiring W from a driver unit D (power supply and, possibly, control e.g. dimming and so on) for a lighting device to be arranged at the mounting member 100 as discussed in the following.

[0055] An exemplary arrangement of such a wiring W/driver circuitry D is shown in Figure 3.

[0056] In one or more embodiments, due to the presence of the members T, the first array of support members C1 may lie at a distance with respect to the mounting surface S. A certain space may thus be available between the surface S and the first support members C1 for locating the driver circuitry D as well as cabling connecting one or more such units to the mains supply and/or further control systems of a lighting installation as discussed in the following.

[0057] Figure 4 is exemplary of the possibility of installing covering plates P1, P2 by coupling them (e.g. by screws 102) to the second support members C2.

[0058] In contrast to the conventional arrangement exemplified in Figure 1, in one or more embodiments as exemplified in figure 4, the plates P1, P2 (e.g. gypsum or plaster boards or other types of plates) can be coupled to the support members C2 by leaving a gap between the mutually facing edges E1, E2.

[0059] As exemplified in Figure 4, this may occur as a

result of the (rectilinear) facing edges E1, E2 of the plates P1, P2 extending at and along the side walls 100a of the mounting member 100 so that the gap between the edges E1, E2 is located at the open mouth portion 100b of the mounting member 100.

[0060] An installation as exemplified in Figure 4 may involve some alignment of the plates P1, P2 (in both the vertical and horizontal directions of Figure 4) e.g. in order to adjust the width of the gap between the edges E1, E2 to adapt it precisely to the location of the side walls 100a of the mounting member 100. As discussed in the following, one or more embodiments may comprise provisions allowing for some (slight) inaccuracies in the mutual locations of the plates P1, P2 and the thickness thereof as well, thus making such a "fine tuning" unnecessary.

[0061] As exemplified in Figure 4, a mounting cavity is thus provided in the mounting member 100 which is adapted to receive (see e.g. Figures 13, 15, 17 and 18) a lighting device 10 having the features discussed in the following.

[0062] In one or more embodiments, the lighting device 10 may comprise a casing in turn comprising a channel-shaped body portion 12 and a strip member 14 intended to act as a closure lid for the body 12.

[0063] Various possible details of the lighting device 10 e.g. the body 12 and the closure lid 14 are exemplified in Figures 5 to 12. For instance, in one or more embodiments, the casing 12, 14 may comprise a sort of elastic rail design.

[0064] In one or more embodiments, the body 12 (and the casing as a whole) may comprise flexible material (such as elastic plastic material). This may facilitate a snap connection with the mounting member 100, primarily with the sidewalls 100a thereof (e.g. at the distal, hook-shaped distal ends thereof designated 1000a).

[0065] As exemplified in Figures 5 to 11, the casing for the device 10 may comprise an elongate, channel-shaped body 12 having an inner surface inwardly of the channel shape and an outer surface outwardly of the channel shape.

[0066] As exemplified herein, the channel-shaped body 12 may comprise a corner (or edge) portion 120 e.g. comprising a planar strip extending lengthwise of the body 12.

[0067] In one or more embodiments, the body 12 may comprise two lateral arms 122 extending from the corner portion 120 away from an intermediate longitudinal plane X12 of the body 12 (shown for simplicity in Figure 5 only).

[0068] The lateral arms 122 have respective distal end edges 122a extending in a same direction (e.g. parallel to each other) on opposite sides of the intermediate plane X12 with an open mouth portion of the channel-shaped body 12 between the distal end edges 122a.

[0069] In one or more embodiments, the inner surface of the body 12 may comprise material and/or be treated with processes making the inner surface reflective to facilitate reflecting towards the open mouth portion of the body 12 light radiation produced by a light radiation

source 16 arranged at the corner portion 120 of the body 12.

[0070] In one or more embodiments, the light radiation source 16 may comprise an elongate, electrically-powered light radiation source arranged in the body 12 of the casing extending along the corner portion 120 e.g. by being coupled (e.g. adhesively) to the inner surface of the body 12 at the corner portion 120.

[0071] In one or more embodiments, the light radiation source 16 may comprise an elongate, strip-like light radiation source. A flexible, ribbon-type module of the type currently referred to as "flex" and comprising light radiation sources such as LED sources is exemplary of a light radiation source 16 adapted for use in embodiments.

[0072] A variety of lighting modules of this type are available commercially with the group of companies to which the applicant companies belong.

[0073] Selection of the light radiation source 16 may be based e.g. on color temperature (e.g. CCT) and lumen output as desired.

[0074] Such a light radiation source 16 may be supplied in the form of an elongated elements wound in bobbin.

[0075] Such a light radiation source 16 may be provided with a double-sided adhesive tape laminated on the back side of the lighting module (opposite to the location of the light radiation generators) so that the light radiation source 16 may be positioned and adhesively coupled to the corner portion 120 of the body 12, e.g. at the inner side thereof, after peeling the protective tape on the back side of the adhesive tape from the LED module.

[0076] In one or more embodiments the body 12 (and the casing 12, 14 as a whole) may be flexible enough to fit and lock into the mounting member 100.

[0077] In one or more embodiments, the body 12 (and the casing 12, 14 as a whole) may be provided in the form of an elastic rail which may be snap-in inserted into the mounting member 100 by using a slight compressive force in the direction of the arrows of Figure 7.

[0078] For instance, the compressive force may bring the distal end edges 122a closer to the intermediate plane X12 and a (slight) downward insertion force (as exemplified in Figure 8) may lead the body 12 to be snap-in coupled mechanically (locked) with the mounting member 100.

[0079] In one or more embodiments, the body 12 (and the casing 12, 14 as a whole) may comprise plastic and/or metallic materials (possibly in the form of composite materials) having a flexibility/elasticity judiciously managed through design specifications with the possibility of making the body 12 (and the casing 12, 14 plus the radiation source 16, that is the device 10 as a whole) adapted to be accommodated into different types of mounting members 100.

[0080] As noted, this may advantageously (yet not necessarily) have the same profile shape of the second support members C2, while the first support members C1 may adopt either the same or (as exemplified herein) a

different profile.

[0081] Advantageously, however, both profiles C1 and C2, even if different, may have a same "height" (e.g., by way of non-limiting example, 27 mm).

[0082] In one or more embodiments, coupling of the device 10 to the mounting member 100 may involve providing the body 12 of the casing of the device 10 with longitudinal snap coupling formations 124 extending lengthwise of the respective lateral arm 122 of the body 12 at a position of the outer surface of the channel-shaped body 12 between the corner portion 120 and the distal end edge 122a of the respective lateral arm.

[0083] In one or more embodiments as exemplified in the figures, the coupling formations 124 may comprise longitudinal grooves capable of receiving in a snap-in coupling relationship the distal hook-shaped distal end portions 1000a of the side walls 100a of the mounting member 100.

[0084] Of course, this is one of a variety of various coupling options adapted to be used in embodiments. Just to make another example, the coupling arrangement may be a complementary one to the one exemplified herein, namely, the outer surface of the lateral arms 122 of the body 12 can be provided with longitudinal ribs adapted to be "clutched" by the hook-shaped distal ends 1000a of the mounting member 100 or capable of extending into complementary grooves provided at the distal ends 1000a.

[0085] Figures 10 to 12 are exemplary of ways of providing electrical connection (power supply and, possibly, control) from the driver unit D to the light radiation source 16 via the cabling W extending through the passageways 104.

[0086] For instance, as exemplified in Figures 10 and 11, a so-called ZIF (Zero Insertion Force) connector 106 can be used for that purpose.

[0087] In one or more embodiments, end vanes or caps 108 insertable into and across the body 12 may provide end closure walls of the body 12 (notionally of indefinite length, and adapted to be cut to length by taking into account application requirements, desires or tastes).

[0088] End vanes or caps 108 as exemplified in Figure 12 may facilitate enhanced optical efficiency (e.g. by reflective properties provided at the surface facing towards the inner space of the channel 12).

[0089] As exemplified in Figure 12 such end vanes or caps may be easily provided with slots or cutout grooves 108a to facilitate passing electrical wiring W there-through.

[0090] One or more embodiments may provide for the presence of distal coupling formations 126 extending lengthwise of the lateral arms 122 of the body 12 at the distal end edges 122a in order to facilitate coupling with the closure lid 14 of the casing.

[0091] In one or more embodiments as exemplified herein, the distal coupling formations 126 may comprise longitudinal grooves formed along the distal end edges 122a facing inwardly of the channel shape of the body

12. The formations 126 are adapted to receive engaged therein complementarily formations such as e.g. protruding ribs 142 provided along the side edges of the closure lid 14.

[0092] Coupling of the formations 126, 142 may thus occur at the region between the longitudinal edges E1, E2 of the plates P1, P2, the end margins 1000a of the sidewalls 100a of the mounting member 100 and the distal end edges 122a of the lateral arms 122 of the body 12.

[0093] The formations 126, 142 facilitate applying the closure lid 14 onto the open mouth portion of the channel-shaped body 12, thus facilitating closing the gap between the mutually facing (and spaced apart) edges E1, E2 of the plates P1, P2.

[0094] As noted, coupling between the complementary formations 126, 142 of the body 12 and the closure lid 14 may be provided with some play adapted to allow for possible slight misalignments of the plates P1, P2 (e.g. in the "vertical" direction of Figure 4).

[0095] Also, the view of Figure 14 highlights the possibility for the closure lid 14 to comprise protruding side portions 144 which protrude outwardly of the distal end edges 122a of the lateral arms 122 of the body 12 with the capability of extending towards and over the end edges E1 and E2 (the end edge E2 is shown in Figure 14 by way of example) in order to facilitate covering any gap G between the distal edges 122a and the facing edges E1, E2 of the plates P1, P2.

[0096] This facilitates hiding possible imperfections due to the oftentimes not-so-square plates as provided e.g. by plaster or gypsum boards and/or to irregularities, e.g. lack of exact planarity of the mounting surface S.

[0097] This may represent a desirable feature in installing plaster or gypsum boards, primarily for aesthetic reasons, while also making it unnecessary to apply additional labour and materials in order to remove possible aesthetic defects.

[0098] Again, the one shown in the figures is just one of a variety of coupling options of the body 12 and the closure lid 14. Just to make another example, the coupling arrangement may be a complementary one to the one exemplified herein, namely, the distal end edges 122a of the lateral arms 122 of the body 12 can be provided with longitudinal ribs adapted to be received in longitudinal grooves extending along the sides of the closure lid 14.

[0099] In one or more embodiments, the closure lid 14 may comprise material which is light-permeable by being transparent and/or diffusive.

[0100] In one or more embodiments, the closure lid 14 may exhibit optical features (e.g. surface sculpturing) with the lid 14 playing the role of a so-called secondary-optics in the installation, a primary optics being possibly provided by the reflective inner surfaces of the lateral arms 122 of the body 12.

[0101] For instance, the closure lid 14 can be manufactured as a flexible strip using a roll-to-roll process e.g. with the sufficient thickness of plastic material to make it

rollable. The corresponding optical features may be designed according to any known principles (small prisms, lenslets and the like) e.g. to provide shaping/diffusion of the light radiation emitted from the device and/or UGR control and lighting uniformity.

[0102] Figures 16 and 17 exemplify the possibility, for one or more embodiments, to comprise a "tertiary" optics in the lighting device 10 by providing in the lateral arms 122 of the body 12 further longitudinal coupling formations 128 extending lengthwise of the lateral arms 122 of the body 12 at a position of the inner surface of the body 12 between the corner or edge portion 120 and the distal end edges 122a of the lateral arms 122.

[0103] A strip-like (e.g. flexible) optical element 18 may then be provided having side edges coupleable (e.g. via formations 182) with the further longitudinal coupling formations 128 so that the optical element 18 may extend bridge-like between the lateral arms 122 of the channel-shaped body 12 between the corner portion 120 and a distal end edges 122a.

[0104] In one or more embodiments as exemplified herein, the further longitudinal coupling formations 128 may be provided in the form of longitudinal grooves extending along the inner surface of the lateral arms 122 while the complementary formations 182 of the optical element 18 comprise hook-like ribs capable of extending into the grooves 128 thereby facilitating e.g. snap-in coupling of the optical element 18 (possibly again of the flexible type) with the body 12. Once again it will be appreciated that a complementary coupling arrangement may be provided between the optical element 18 and the body 12.

[0105] In one or more embodiments, the optical element 18 may comprise optical features (e.g. a prisms lens or distribution of lenslets) to enhance the lighting output e.g. in terms of lighting uniformity.

[0106] In one or more embodiments, the combination of a primary optics (reflective inner surfaces of the body 12), a secondary optics (the closure lid 14) and a tertiary optics (optical element 18) may result in improvements in UGR control and lighting uniformity. It will be otherwise appreciated that use of all of the primary, secondary and tertiary optics in combination is optional and not mandatory.

[0107] Figure 18 (which substantially corresponds to Figure 17 in so far as the parts or elements described therein are concerned) is exemplary of an approach allowing for possible variations in the thicknesses of the cover plates P1, P2.

[0108] For instance, a typical thickness value for gypsum or plaster boards may be about 9.5 mm. However, plate thickness may vary, for instance (in the case of a gypsum boards), to values such as 12.5 mm, 15mm and 18 mm.

[0109] For instance, the arrangement of Figure 18 may refer to embodiments wherein the various parts or elements of the device 10 and/or the mounting member 100 are shaped and dimensioned with reference to a lowest

expected thickness value for the boards P1, P2.

[0110] In that case, spacers 130 (possibly with thicknesses selectable in a range of different thicknesses) may be provided between the mounting member 100 and the first support members C1 to accommodate other (larger) thickness options, without this involving re-design of the various components.

[0111] Also, electrically-insulating spacers 130 coupled via electrically-insulating coupling means (e.g. screws 102) to the corner portion 120 at the outer surface of the body 12 (e.g. with mounting member 100 therebetween - see Figure 18) may provide, possibly together with heat-dissipation from the light radiation source 16, (bi-directional) electrical insulation of the device 10 with respect to a grid comprising electrically conductive (e.g. metal) support members C1 (and C2). This facilitates taking into account possible dispersions from the drivers D mounted thereon and/or the associated cabling/wiring/connectors as well as the fact that in certain embodiments the body 12 may comprise electrically-conductive material (e.g. metal) and be exposed to touch by users.

[0112] Figure 19 is exemplary of the possibility that the distal coupling formations 126 of the side walls 122 and/or the lateral coupling formations 142 of the closure lid 14 may comprise a plurality of individual coupling members providing a corresponding plurality of selectable coupling positions of the closure lid 14 to the channel-shaped body 12 at different distances (of the closure lid 14) to the corner portion 120 of the channel-shaped body 12.

[0113] For instance, Figure 19 exemplifies the possibility of so-to-say partitioning the grooves 126 in a set of e.g. two or more sub-grooves 1260 (e.g. four of them) so that the protruding formations 142 from the closure lid 14 may be engaged in a selected one of these sub-grooves (e.g. in an uppermost position as exemplified in portion a) of the Figure 19, a lowermost position as exemplified in portion c) of Figure 19 or an intermediate position as exemplified in portion b) in Figure 19).

[0114] This may permit adjusting the mounting position of the closure lid 14 onto the body 12 in order to facilitate abutment of the protruding lateral formations 144 of the closure lid 14 against the edges E1, E2 of the plates P1, P2.

[0115] One more embodiments may thus comprise a casing for lighting devices comprising:

- i) an elongate, channel-shaped body (e.g. 12) having an inner surface inwardly of the channel shape and an outer surface outwardly of the channel shape, wherein:
 - the channel-shaped body comprises a corner (or edge) portion (e.g. 120) extending at a longitudinal intermediate plane (e.g. X12) of the body and two lateral arms (e.g. 122) extending from the corner portion away from the intermediate plane of the body,
 - the lateral arms have respective distal end edges

es (e.g. 122a) extending in a same direction on opposite sides of the intermediate plane of the body, with an open mouth portion of the body between the distal end edges of the lateral arms, and

- the lateral arms comprise longitudinal snap coupling formations (e.g. 124) extending lengthwise of the respective lateral arm at a position of the outer surface of the channel-shaped body between the corner portion and the distal end edge of the respective lateral arm as well as distal coupling formations (e.g. 126) extending lengthwise of the respective lateral arm at the distal end edge thereof, and
- ii) a strip-like light-permeable closure lid (e.g. 14) for the open mouth portion of the channel-shaped body, the closure lid having lateral coupling formations (e.g. 142) complementary to and coupleable with the distal coupling formations of the lateral arms of the channel-shaped body (12).

[0116] A casing according to one or more embodiments (and a lighting device comprising such a casing with an elongate, electrically-powered light radiation source e.g. 16 arranged in the casing extending along the corner portion of the channel-shaped body) may be suited for use in a method according to one or more embodiments, wherein the method may comprise:

- providing over a mounting surface (e.g. S) a first array of first linear support members (e.g. C1) extending in a first direction,
- coupling to the first support members in the first array a second array of second linear support members (e.g. C2), extending transversely to the first direction, with the first array of support members between the mounting surface and the second array of support members,
- coupling to the first array of support members, opposite to the mounting surface, at least one channel-shaped mounting member (e.g. 100) having an inner cavity between longitudinal side walls (e.g. 100a) and an open mouth portion (e.g. 100b) facing away from the first array of support members, the at least one channel-shaped mounting member extending in a same direction as the second linear support members in the second array of support members,
- mounting onto the second array of support members, opposite the first array of support members, at least one pair of covering plates (e.g. P1, P2) having mutually facing edges (e.g. E1, E2) extending at the longitudinal side walls of the mounting member and providing a gap therebetween at the open mouth portion of the mounting member, and
- arranging a lighting device according to one or em-

bodiments in the inner cavity of the mounting member with the closure lid of the casing of the lighting device extending across the gap between the mutually facing edges of the covering plates.

[0117] A casing according to one or more embodiments (and a lighting device comprising such a casing with an elongate, electrically-powered light radiation source e.g. 16 arranged in the casing extending along the corner portion of the channel-shaped body) may be suited for use in an installation according to one or more embodiments, wherein the installation may comprise:

- a first array of first linear support members extending in a first direction over a mounting surface,
- a second array of second linear support members coupled to the first support members in the first array, the support members in the second array extending transversely to the first direction with the first array of support members between the mounting surface (S) and the second array of support members,
- at least one channel-shaped mounting member coupled to the first array of support member opposite the mounting surface, the at least one channel-shaped mounting member extending in a same direction as the second linear support members in the second array of support members, the at least one channel-shaped mounting member having an inner cavity between longitudinal side walls and an open mouth portion facing away from the first array of support members,
- at least one pair of covering plates mounted onto the second array of support members opposite the first array of support members, the at least one pair of covering plates having mutually facing edges extending at the longitudinal side walls of the mounting member and providing a gap therebetween at the open mouth portion of the mounting member, and
- a lighting device according to one or more embodiments arranged in the inner cavity of the mounting member with the closure lid of the casing of the lighting device extending across the gap between the mutually facing edges of the covering plates.

[0118] In one or more embodiments of the casing, the closure lid may comprise protruding side formations (e.g. 144) which, with the closure lid coupled to the lateral arms of the channel-shaped body to close the open mouth portion of the body, protrude outwardly of the distal end edges (122a) of the lateral arms of the channel-shaped body.

[0119] In one or more embodiments of the casing, the distal coupling formations of the channel-shaped body and the lateral coupling formations of the closure lid may comprise a plurality of individual coupling members (e.g. 1260) providing a plurality of selectable coupling positions of the closure lid to the channel-shaped body at different distances from the corner portion of the channel-shaped body.

[0120] In one or more embodiments of the casing, the intermediate longitudinal plane (e.g. X12) may comprise a median longitudinal plane of the channel-shaped body with the two lateral arms mirror-symmetrical with respect to the median longitudinal plane.

[0121] In one or more embodiments of the casing, the lateral arms of the channel-shaped body may be elastically deformable towards and away from the intermediate longitudinal plane.

[0122] One or more embodiments of the casing may comprise a light-reflective inner surface of the channel-shaped body.

[0123] In one or more embodiments of the casing:

- the lateral arms of the channel-shaped body may comprise further longitudinal coupling formations (e.g. 128) extending lengthwise of the respective lateral arm at a position of the inner surface of the channel-shaped body between the corner portion and the distal end edge (122a) of the respective lateral arm,
- a strip-like optical element may be provided having side edges coupleable (e.g. 182) with the further longitudinal coupling formations to extend bridge-like between the lateral arms of the channel-shaped body.

[0124] In one or more embodiments of the casing:

- the corner portion of the channel-shaped body may comprise a planar portion of the inner surface of the casing, said planar portion providing a mounting surface for lighting devices, and/or
- transverse vanes (e.g. 108) may be provided insertable into the channel-shaped body to provide cross-wise partitioning of the channel-shaped body.

[0125] One or more embodiments may include at least one electrically-insulating spacer (e.g. 130) coupleable with electrically-insulating coupling means (e.g. 102 in Figure 18) to the corner portion of the body at the outer surface thereof.

[0126] In one or more embodiments, adapted for use with one or more embodiments of the casing/lighting device, the method of one or more embodiments may comprise arranging the lighting device in the inner cavity of the mounting member by snap-engaging the longitudinal snap coupling formations of the lateral arms of the channel-shaped body of the casing of the lighting device with the side walls of the channel-shaped mounting member.

[0127] One or more embodiments of the method may comprise:

- arranging the channel-shaped body of the casing of the lighting device in the inner cavity of the channel-shaped mounting member, and
- coupling the closure lid of the casing of the lighting device with the channel-shaped body of the casing arranged in the inner cavity of the channel-shaped

mounting member by bringing the closure lid in alignment with the mutual facing edges of the covering plates in the at least one pair of covering plates.

5 **[0128]** One or more embodiments of the method may comprise:

- providing a supply of linear channel-shaped profiles (e.g. C2, 100) with identical cross sections, and
- 10 - using profiles from said supply of channel-shaped profiles to provide both the at least one mounting member and the linear support members in the second array of support members.

15 **[0129]** It will be otherwise appreciated that features and/elements exemplified herein (singly or in combination) in connection with a certain one of the figures can be applied (singly or in combination) also in embodiments exemplified in any other of the figures.

20 **[0130]** Without prejudice to the underlying principles, the details and embodiments may vary, even significantly, with respect to what has been described in the foregoing by way of example only, without departing from the extent of protection.

25 **[0131]** The extent of protection is defined by the annexed claims.

LIST OF REFERENCE SIGNS

	channel-shaped body/casing	12, 14
30	corner portion	120
	longitudinal intermediate plane	X12
	lateral arms	122
	distal end edges	122a
35	longitudinal snap coupling formations	124
	distal coupling formations	126
	closure lid	14
	lateral coupling formations	142
	protruding side formations	144
40	coupling members	1260
	further coupling formations	128
	light radiation source/lighting device	16
	optical element	18
	side edge	182
45	transverse vanes	108
	electrically-insulating spacer	130
	electrically-insulating coupling means	102
	mounting surface	S
50	attachment members	T
	distal formations	T1
	first array of support members	C1
	second array of support members	C2
	mounting member	100
55	longitudinal side walls	100a
	open mouth portion	100b
	covering plates	P1, P2

(continued)

facing edges

E1, E2

Claims**1.** A casing for lighting devices, the casing comprising:

- i) an elongate, channel-shaped body (12) having an inner surface inwardly of the channel shape and an outer surface outwardly of the channel shape, wherein:

- the channel-shaped body (12) comprises a corner portion (120) extending at a longitudinal intermediate plane (X12) of the body (12) and two lateral arms (122) extending from the corner portion (120) away from the intermediate plane (X12) of the body (12),
- the lateral arms (122) have respective distal end edges (122a) extending in a same direction on opposite sides of the intermediate plane (X12) of the body (12), with an open mouth portion of the body (12) between the distal end edges (122a) of the lateral arms (122), and
- the lateral arms (122) comprise longitudinal snap coupling formations (124) extending lengthwise of the respective lateral arm (122) at a position of the outer surface of the channel-shaped body (12) between the corner portion (120) and the distal end edge (122a) of the respective lateral arm (122) as well as distal coupling formations (126) extending lengthwise of the respective lateral arm (122) at the distal end edge (122a) thereof, and

- ii) a strip-like light-permeable closure lid (14) for the open mouth portion of the channel-shaped body (12), the closure lid (14) having lateral coupling formations (142) complementary to and coupleable with the distal coupling formations (126) of the lateral arms (122) of the channel-shaped body (12).

2. The casing of claim 1, wherein the closure lid (14) comprises protruding side formations (144) which, with the closure lid (14) coupled to the lateral arms (122) of the channel-shaped body (12) to close the open mouth portion of the body (12), protrude outwardly of the distal end edges (122a) of the lateral arms (122) of the channel-shaped body (12).**3.** The casing of claim 1 or claim 2, wherein the distal coupling formations (126) of the channel-shaped body (12) and the lateral coupling formations (142)

of the closure lid (14) comprise a plurality of individual coupling members (1260) providing a plurality of selectable coupling positions of the closure lid (14) to the channel-shaped body (12) at different distances from the corner portion (120) of the channel-shaped body (12).

4. The casing of any of the previous claims, wherein the intermediate longitudinal plane (X12) comprises a median longitudinal plane of the channel-shaped body (12) with the two lateral arms (122) mirror-symmetrical with respect to the median longitudinal plane (X12).**5.** The casing of any of the previous claims, wherein the lateral arms (122) of the channel-shaped body (12) are elastically deformable towards and away from the intermediate longitudinal plane (X12).**6.** The casing of any of the previous claims, comprising a light-reflective inner surface of the channel-shaped body (12).**7.** The casing of any of the previous claims, wherein:

- the lateral arms (122) of the channel-shaped body (12) comprise further longitudinal coupling formations (128) extending lengthwise of the respective lateral arm (122) at a position of the inner surface of the channel-shaped body (12) between the corner portion (120) and the distal end edge (122a) of the respective lateral arm (122),
- a strip-like optical element (18) is provided having side edges coupleable (182) with the further longitudinal coupling formations (128) to extend bridge-like between the lateral arms (122) of the channel-shaped body (12).

8. The casing of any of the previous claims, wherein:

- the corner portion (120) of the channel-shaped body (12) comprises a planar portion of the inner surface of the casing (12), said planar portion providing a mounting surface for lighting devices (16), and/or
- transverse vanes (108) are provided insertable into the channel-shaped body (12) to provide cross-wise partitioning of the channel-shaped body (12).

9. The casing of any of the previous claims, including at least one electrically-insulating spacer (130) coupleable with electrically-insulating coupling means (102) to the corner portion (120) of the body (12) at the outer surface thereof.**10.** A lighting device, comprising:

- a casing (12, 14) according to any of claims 1 to 9, and
- an elongate, electrically-powered light radiation source (16) arranged in the casing (12, 14) extending along the corner portion (120) of the channel-shaped body (12).

11. A method, comprising:

- providing over a mounting surface (S) a first array of first linear support members (C1) extending in a first direction,
- coupling to the first support members (C1) in the first array a second array of second linear support members (C2), extending transversely to the first direction, with the first array of support members (C1) between the mounting surface (S) and the second array of support members (C2),
- coupling to the first array of support members (C1), opposite to the mounting surface (S), at least one channel-shaped mounting member (100) having an inner cavity between longitudinal side walls (100a) and an open mouth portion (100b) facing away from the first array of support members (C1), the at least one channel-shaped mounting member (100) extending in a same direction as the second linear support members (C2) in the second array of support members,
- mounting onto the second array of support members (C2), opposite the first array of support members (C1), at least one pair of covering plates (P1, P2) having mutually facing edges (E1, E2) extending at the longitudinal side walls (100a) of the mounting member (100) and providing a gap therebetween at the open mouth portion (100b) of the mounting member (100), and
- arranging a lighting device (10) according to claim 10 in the inner cavity of the mounting member (100) with the closure lid (14) of the casing of the lighting device (10) extending across the gap between the mutually facing edges (E1, E2) of the covering plates (P1, P2).

12. The method of claim 11, wherein arranging the lighting device (10) in the inner cavity of the mounting member (100) comprises snap-engaging the longitudinal snap coupling formations (124) of the lateral arms (122) of the channel-shaped body (12) of the casing of the lighting device (10) with the side walls (100a) of the channel-shaped mounting member (100) .

13. The method of claim 11 or claim 12, comprising:

- arranging the channel-shaped body (12) of the casing of the lighting device (10) in the inner

cavity of the channel-shaped mounting member (100), and

- coupling the closure lid (14) of the casing of the lighting device (10) with the channel-shaped body (12) of the casing arranged in the inner cavity of the channel-shaped mounting member (100) by bringing the closure lid (14) in alignment with the mutual facing edges (E1, E2) of the covering plates (P1, P2) in the at least one pair of covering plates (P1, P2).

14. The method of any of claims 11 to 13, comprising:

- providing a supply of linear channel-shaped profiles (C2, 100) with identical cross sections, and
- using profiles from said supply of channel-shaped profiles to provide both the at least one mounting member (100) and the linear support members (C2) in the second array of support members.

15. A lighting installation, comprising

- a first array of first linear support members (C1) extending in a first direction over a mounting surface (S),
- a second array of second linear support members (C2) coupled to the first support members (C1) in the first array, the support members (C2) in the second array extending transversely to the first direction with the first array of support members (C1) between the mounting surface (S) and the second array of support members (C2),
- at least one channel-shaped mounting member (100) coupled to the first array of support member (C1) opposite to the mounting surface (S), the at least one channel-shaped mounting member (100) extending in a same direction as the second linear support members (C2) in the second array of support members, the at least one channel-shaped mounting member (100) having an inner cavity between longitudinal side walls (100a) and an open mouth portion (100b) facing away from the first array of support members (C1),
- at least one pair of covering plates (P1, P2) mounted onto the second array of support members (C2) opposite the first array of support members (C1), the at least one pair of covering plates (P1, P2) having mutually facing edges (E1, E2) extending at the longitudinal side walls (100a) of the mounting member (100) and providing a gap therebetween at the open mouth portion (100b) of the mounting member (100), and
- a lighting device (10) according to claim 10

arranged in the inner cavity (100b) of the mounting member (100) with the closure lid (14) of the casing of the lighting device (10) extending across the gap between the mutually facing edges (E1, E2) of the covering plates (P1, P2).

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FIG. 1

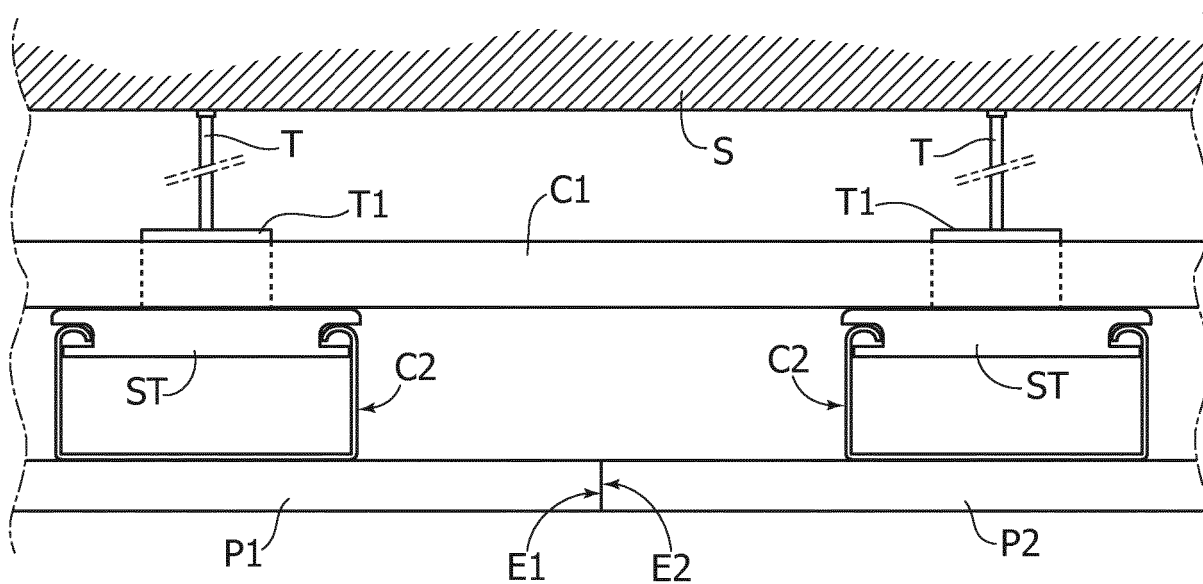


FIG. 2

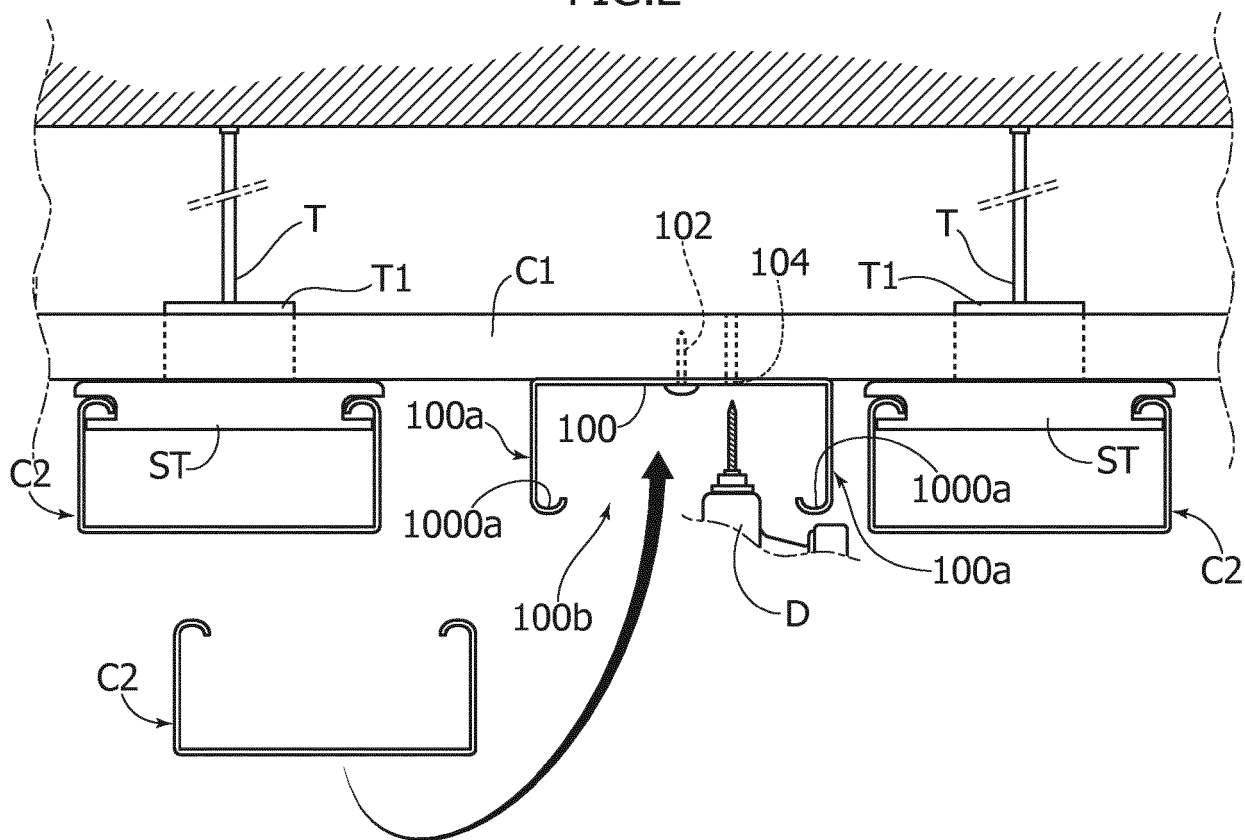


FIG. 3

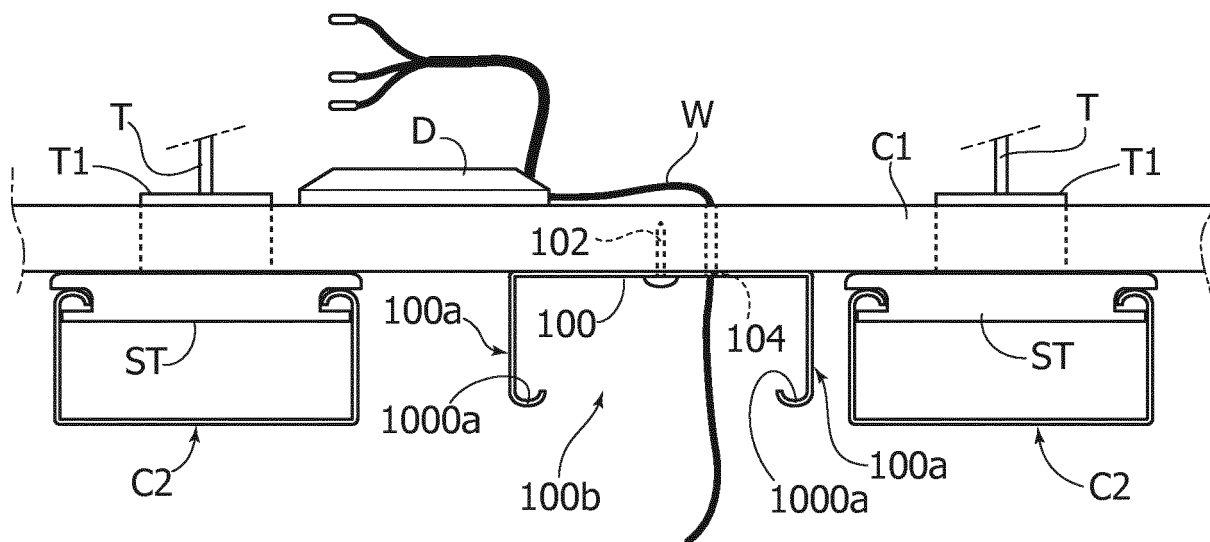


FIG. 4

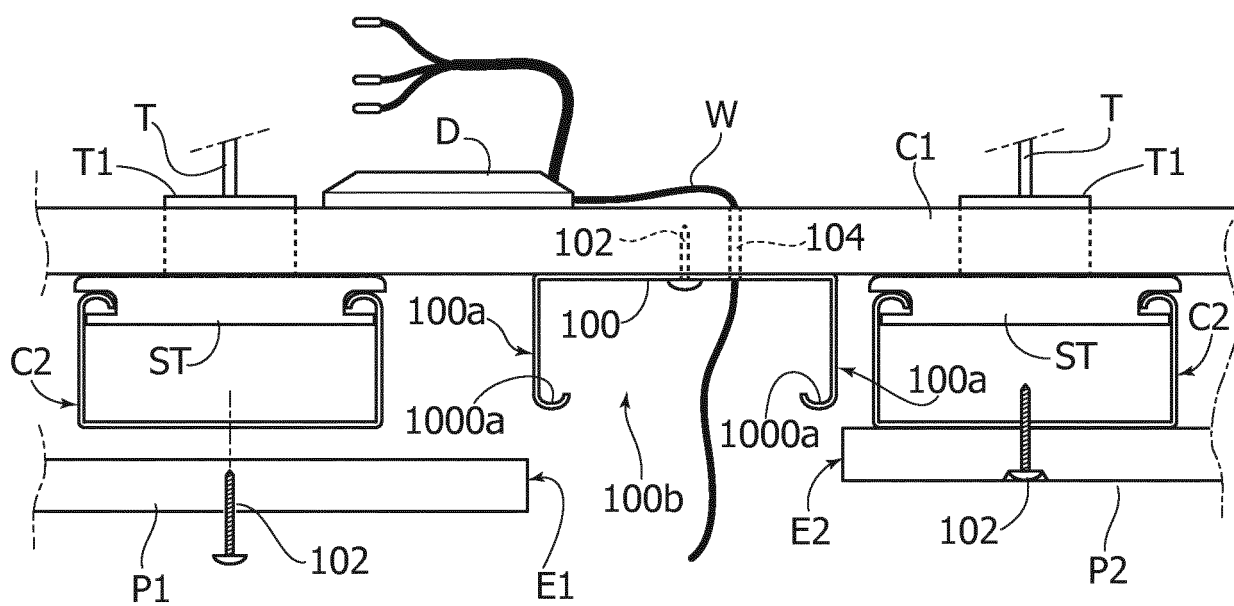


FIG. 5

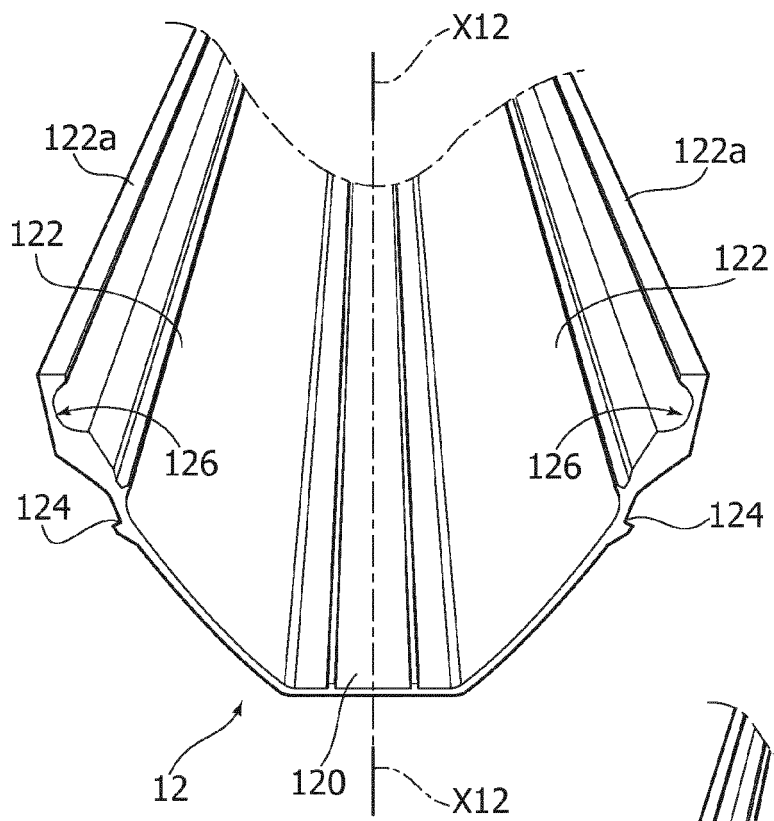


FIG. 6

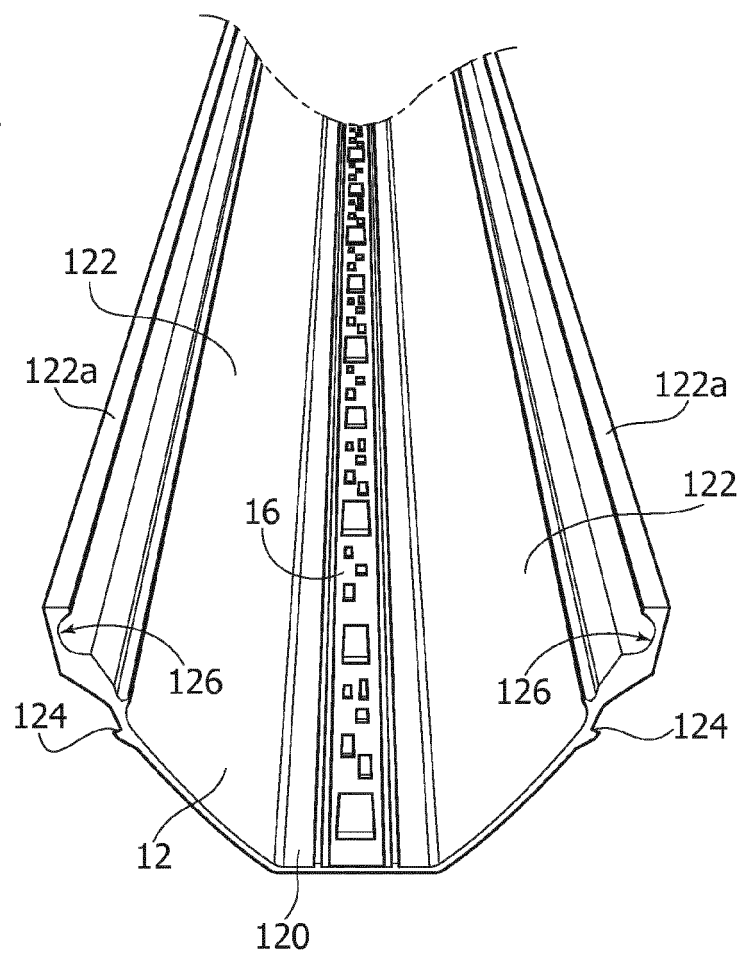


FIG. 7

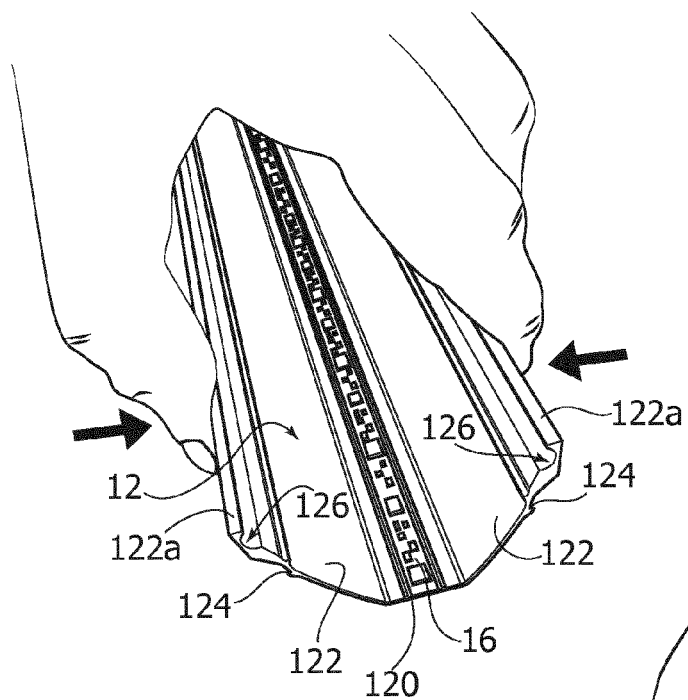


FIG. 8

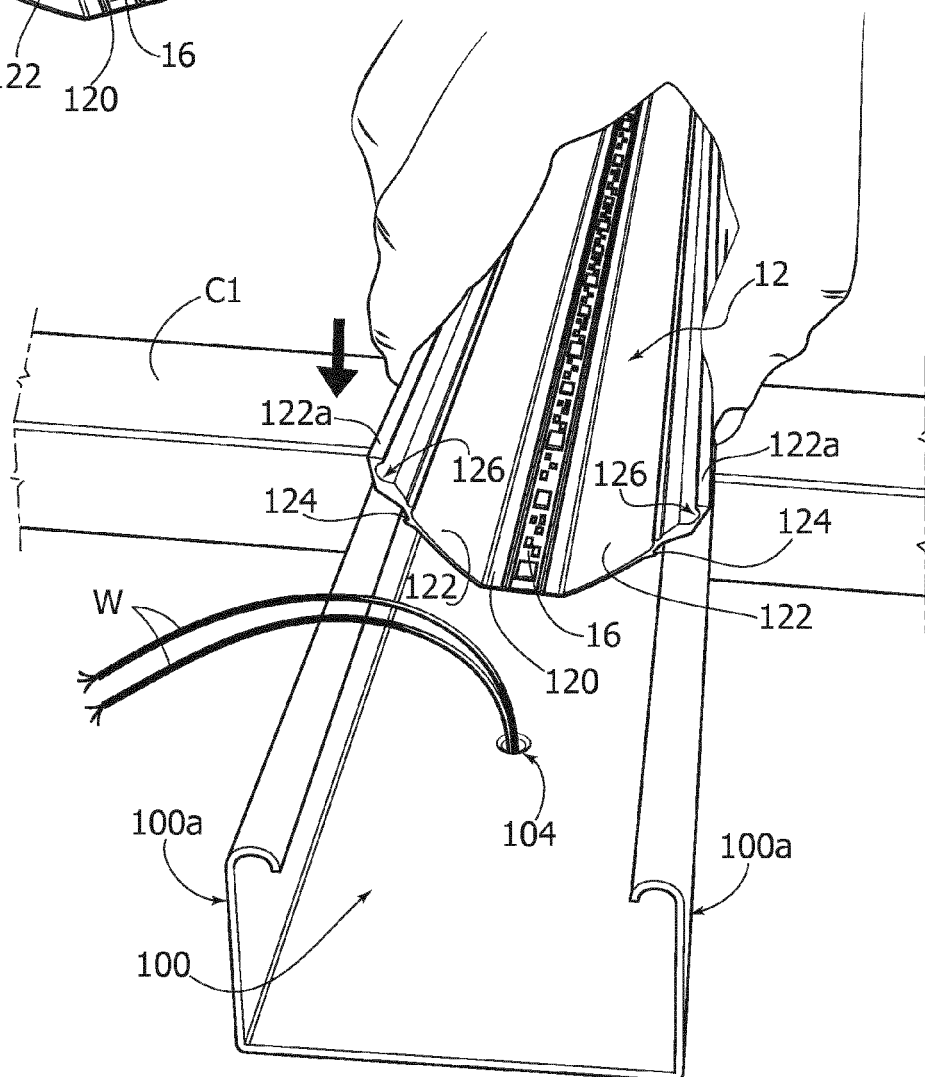


FIG. 9

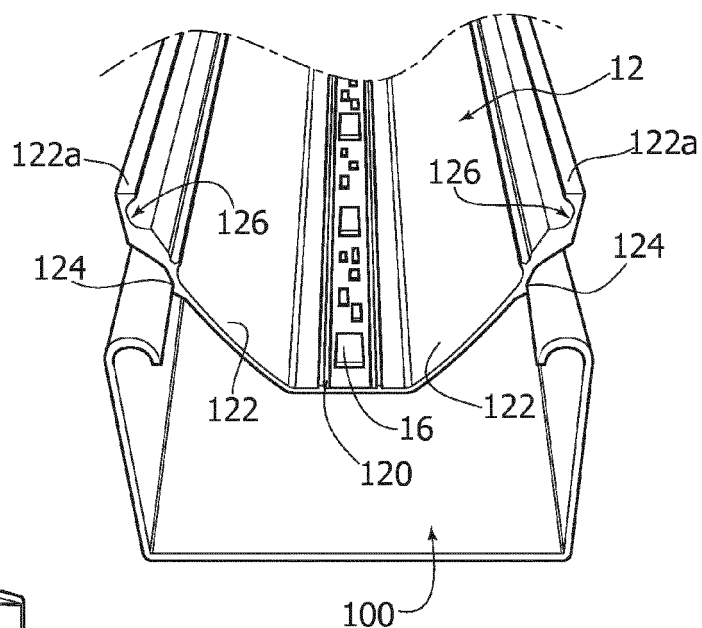


FIG. 10

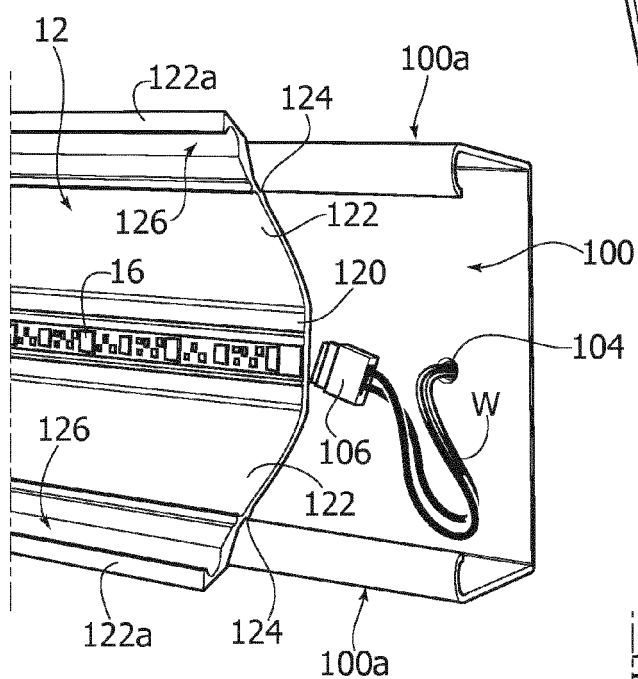


FIG. 11

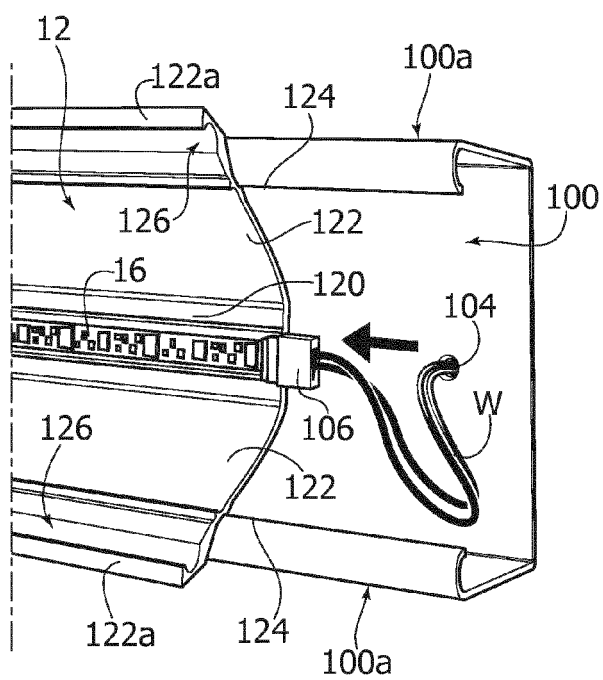


FIG. 12

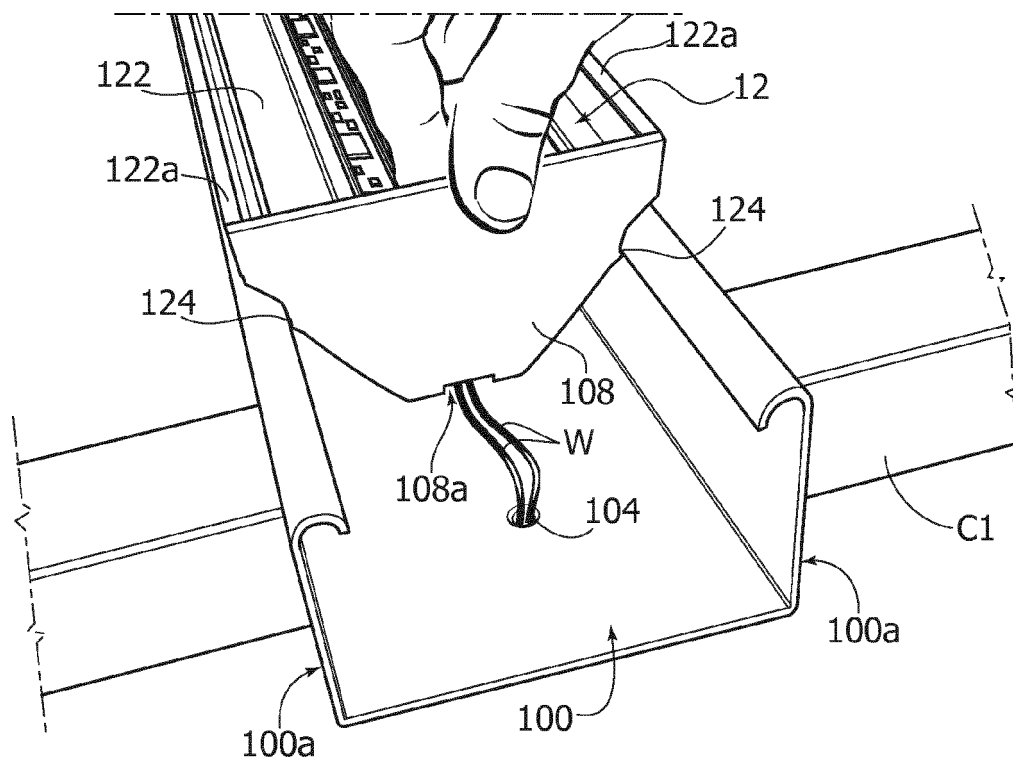


FIG. 13

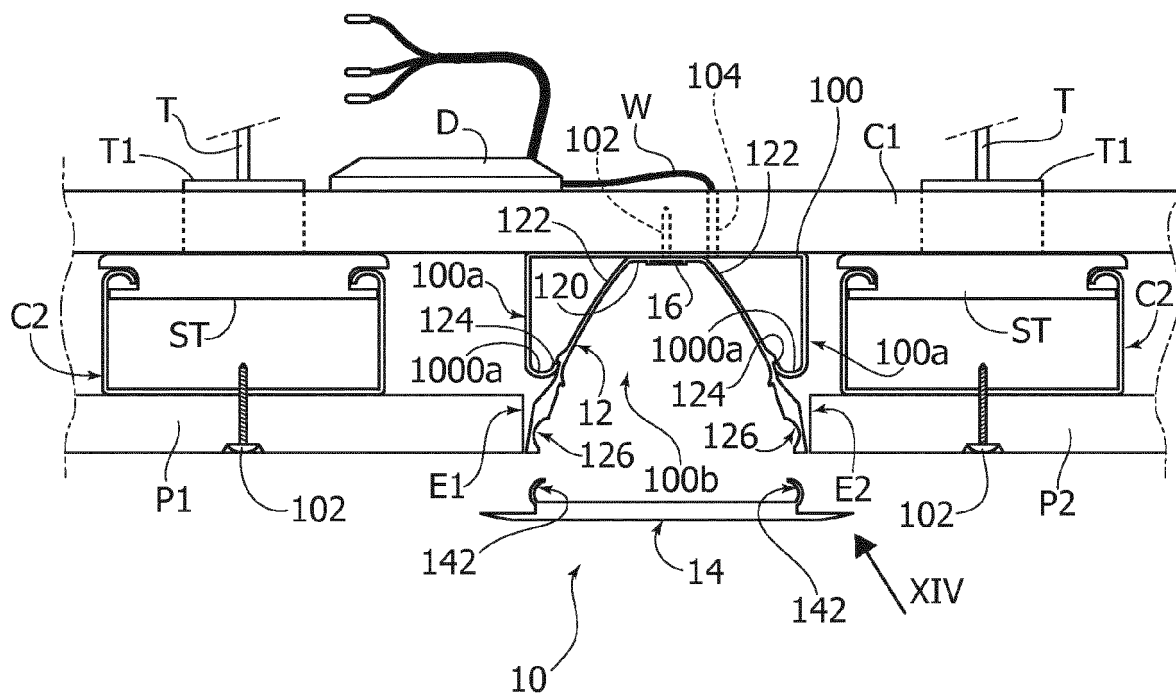


FIG. 14

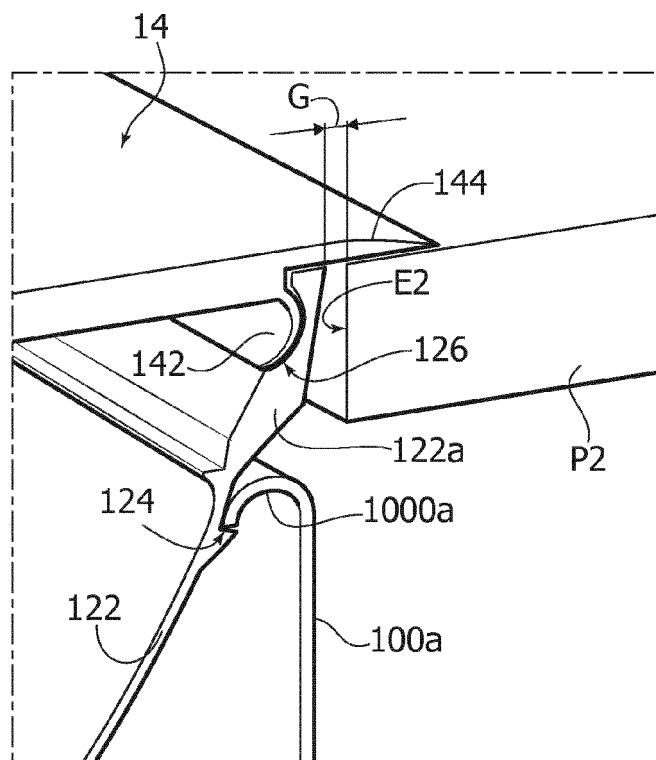


FIG. 15

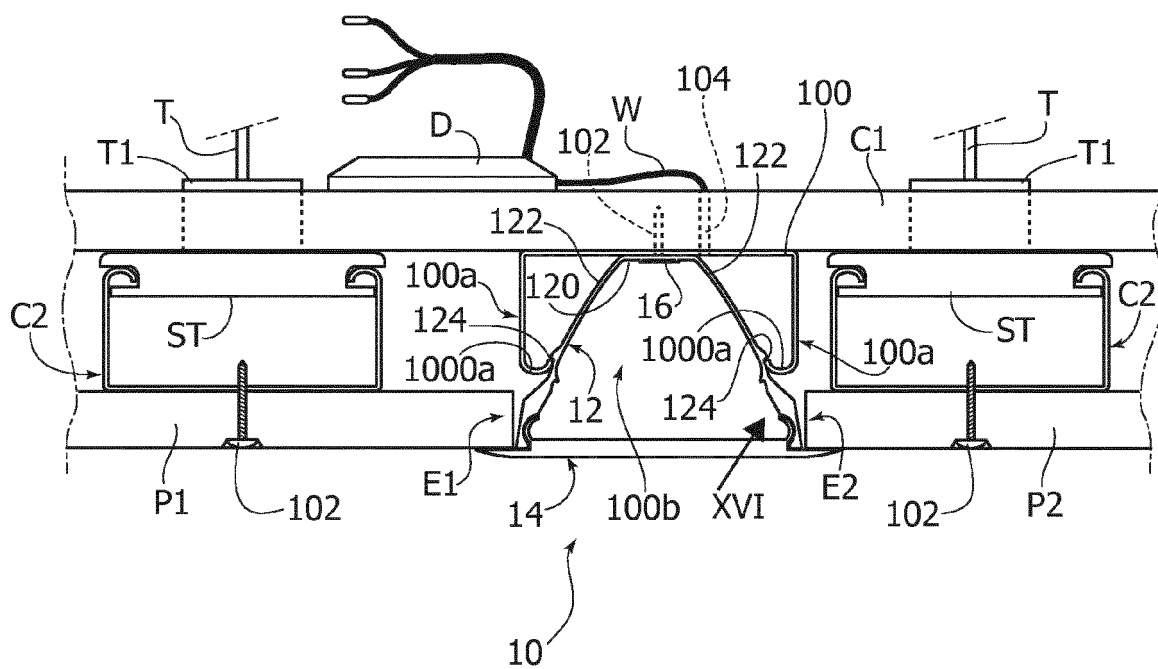


FIG. 18

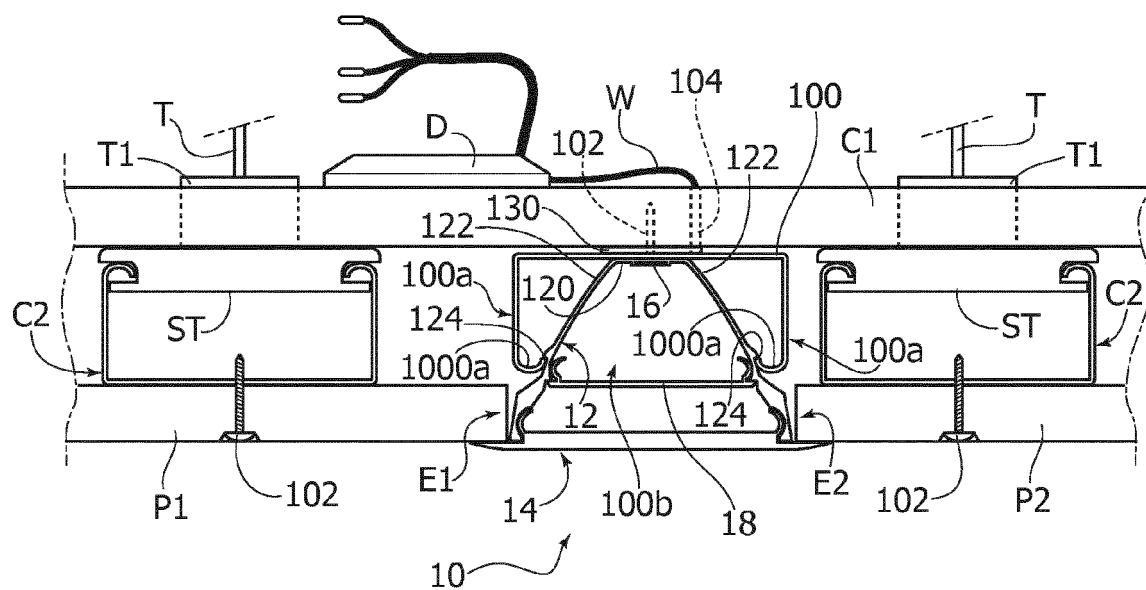
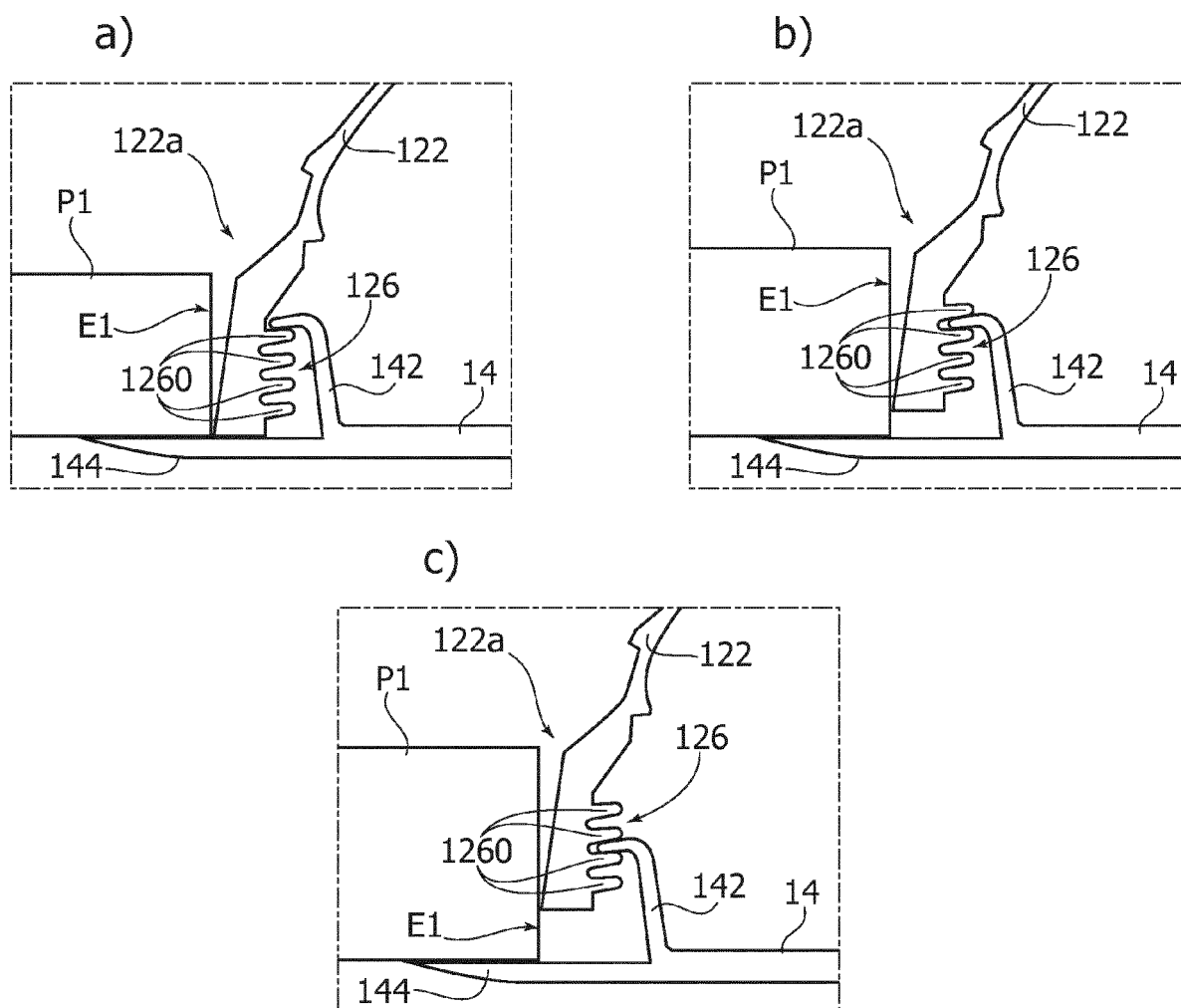


FIG. 19





EUROPEAN SEARCH REPORT

 Application Number
 EP 18 20 4518

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A	* paragraph [0031] - paragraph [0034] *	1	ADD. F21Y103/10 F21Y115/10
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 November 2018	Examiner Dinkla, Remko
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The members are as contained in the European Patent Office EDP file on
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