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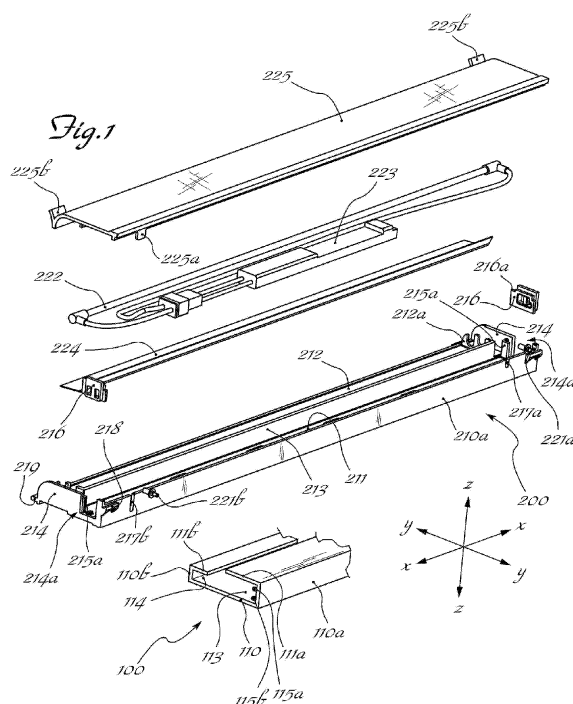
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(54) **Low-voltage modular lighting apparatus for display units and/or areas**

(57) Lighting apparatus for display units or display areas, comprising: a fixed rail (100), carrying a pair of electric conductors (114a, 114b) extending in the longitudinal direction and a lighting unit (200;1200;2200), said rail (100) having a vertical rear side (110a) and vertical front side (110b) which have a different height in the vertical direction (Z-Z) and are provided with an associated flange (111a, 111b) extending in the transverse direction (Y-Y) and having a different length in the same direction; the lighting unit (200) comprises a container (210) which extends in the longitudinal direction (X-X) and inside which a first rear seat (211) and a second front seat (212) are formed, said seats extending in the longitudinal direction and being separated from each other in the transverse direction by a longitudinal partition (213); the front seat (212) having a pair of resilient projections (212a) which are open in the vertical for inserting and holding at least one lamp (222), the two seats (211, 212) being closed at the opposite ends by an associated transverse wall (214) which has an opening (214a) connecting the rear seat (211) with the exterior and the rear vertical seat (210a) of the container (210) having pairs of eyelets (217a,217b) which are suitable for insertion of an associated electric contact (221a,221b) and longitudinal projections (218) extending in the longitudinal direction and suitable for engagement with the corresponding rear seat (113) of the rail (100); it being envisaged that in its front part the container (110) comprises lugs (219) suitable for insertion inside the front longitudinal seat (114) of the rail (100).



Description

[0001] The present invention relates to a modular lighting apparatus for display units or display areas.

[0002] In the technical sector relating to the manufacture of display units for products of various kinds such as cosmetics, perfumes and the like it is known that there exist problems resulting from the need to illuminate the products which are arranged on various shelves of the display unit, while ensuring at the same time the safety of the user who, when in the vicinity of the display unit and removing a product, must not come into contact - even accidentally - with live electric parts.

[0003] For this purpose, numerous devices able to ensure optimum insulation of the visible parts of the display unit, including also the use of low-voltage lighting means, have been developed.

[0004] These known display units nevertheless require the installation of complicated and costly electric cables and/or electrical contact means of the sliding contact type which increase considerably the costs for production and maintenance of the display unit.

[0005] Also known from EP 2,123,200 in the name of the same present Applicant is a lighting apparatus comprising a fixed rail and lighting bodies which may be displaced on said rail and from which they also receive electric power.

[0006] Although performing its intended function this apparatus is, however, not very modular in nature and does allow different types of lamps to be interchanged, thereby requiring the use of special accessories.

[0007] The technical problem which is posed, therefore, is to provide a lighting apparatus for display units and/or display areas for products of various kinds, which has small dimensions, in particular in the direction of the thickness, or light emission, and allows easy and dynamic relative positioning of the lighting bodies with respect to the objects on display on each self or in each area to be illuminated, allowing variation in the relative arrangement as required, but without the need for structural modifications of the display unit and/or the lighting system.

[0008] In connection with this problem it is also required that the apparatus should be modular and be able to use different types of lamps without the need for auxiliary external accessories.

[0009] In addition, it is also required that the apparatus should be formed by a small number of parts, which can be easily produced, assembled and installed also by non-specialized users.

[0010] These results are achieved according to the present invention by an apparatus for illuminating display units or display areas according to the characteristic features of Claim 1.

[0011] Further details may be obtained from the following description of a non-limiting example of embodiment of the subject of the present invention provided with reference to the accompanying drawings in which:

- Figure 1: shows an exploded view of the lighting apparatus according to the present invention;
- Figure 2: shows a perspective view of the apparatus partially assembled;
- Figure 3: shows a perspective view of the apparatus of Fig. 1 assembled and during mounting on the support rail;
- Figure 4: shows a perspective view of the lighting apparatus according to the invention in its position for use;
- Figure 5: shows a schematic cross-section along the plane indicated by V-V in Fig. 4;
- Figure 6: shows a schematic perspective view of a second embodiment of the apparatus;
- Figure 7: shows a schematic perspective view of a further variation of embodiment of the apparatus;
- Figure 8: shows a schematic perspective view of the apparatus according to Fig. 7 modularly extended in the longitudinal direction;
- Figure 9a: shows a schematic perspective view of a variation of embodiment of the apparatus according to Fig. 1;
- Figure 9b: shows a schematic cross-section along the plane indicated by IXb-IXb in Fig. 9a;
- Figure 10: shows a schematic perspective view of a third embodiment of the apparatus;
- Figure 11: shows a schematic perspective view of the apparatus of Fig. 9 mounted on the support and power rail; and
- Figure 12 shows a schematic cross-section of the apparatus according to Fig. 10 in the position for use.

[0012] As shown in Figs. 1, 2 and 5 and assuming solely for the sake of convenience of description and without any limitation of meaning a set of three reference axes in a longitudinal direction X-X, transverse direction Y-Y and vertical direction Z-Z, respectively, as well as a front part corresponding to the light emission side and a rear part opposite to the front part, the lighting apparatus for display units according to the present invention comprises:

- a fixed rail 100,

which is formed by a section 110 extending in the longitudinal direction X-X and with a substantially C-shaped cross-section, the rear vertical side 110a and front vertical side 110b of which have different heights in the vertical direction Z-Z and are folded in the transverse direction Y-Y so as to form respective flanges 111a, 111b of different length extending longitudinally over the entire length of the rail, respectively able to define a first rear seat 113 and a second front seat 114, the rear vertical side 110a of the C having, mounted thereon, the conductors 115a, 115b for connection to the low-voltage power supply, so as to produce the two polarities of the power

supply.

[0013] The rail has moreover holes for fixing it to a vertical surface and/or to a horizontal surface forming for example the sides or a shelf of a display unit (not shown) and/or the wall or the ceiling of a closed area;

- a lighting unit 200 comprising:
 - a container 210 which extends in the longitudinal direction X-X and inside which a first rear seat 211 and a second front seat 212 are formed, said seats extending in the longitudinal direction X-X and being separated from each other in the transverse direction Y-Y by a longitudinal partition 213; the two seats 211, 212 are closed at the opposite ends by an associated transverse end wall 214;

the front seat 212 has at the opposite longitudinal ends pairs of resilient projections 212a which are open in the vertical direction for inserting and holding at least one lamp 222 of the type known as CCFL (Cold Cathode Fluorescent Lamp);

said transverse end walls 214 have a respective opening 214a connecting the rear seat 211 with the exterior and, along the vertical edges of said opening 214a, the inner surface of the wall 214 has vertical guides 215a able to receive the sides 216a of corresponding closing cover-pieces 216 which can be inserted into the seat parallel to the vertical direction Z-Z;

the rear vertical surface 210a of the container 210 has:

- a pair of eyelets 217a, 217b which are open in the vertical direction Z-Z and have a different depth in the same direction, for inserting an associated electric contact 221a, 221b of the resilient spring type, and
- longitudinal projections 218 extending in the longitudinal direction X-X and suitable for resting on the corresponding rear flange 111a of the rail 100;

in its front part the container 110 has further extensions 219 extending in the transverse direction Y-Y and suitable for insertion inside the front longitudinal seat 114 of the rail 100.

- lamps 222 connected to adapter devices 223 for converting the current from low voltage to the power supply for operation of the lamps; once assembly has been performed, the lamps 222 will be arranged in the front seat 212 of the container and retained by the resilient means 212a, while the conversion devices 223 will be housed inside the first rear seat 211;
- a reflective sheet 224 to be arranged between the bottom of the front seat 212 and the lamp 222 in order to recover the light rays and improve the illumination externally;
- a transparent cover 225 for closing the container

210, provided with vertical rear teeth 225a able to interfere with the resilient contacts 221a, 221b in order to lock them inside the respective seat; and provided with front gripping tabs 225b for opening/closing said cover.

[0014] Figures 2, 3 and 4 show the apparatus in the assembled condition and overturned, respectively, so that it is possible to see the various component parts described in the text and in the correct working position with the rail at the top and transparent cover at the bottom.

[0015] As shown in Fig. 6 it is envisaged that the lamp 222 may be replaced by LEDs 1222 which are housed inside the same front seat 212 and which are able to achieve a reduction in the power consumption and less heating of the apparatus for the same lighting power.

[0016] Fig. 7 shows a further embodiment of the apparatus according to the invention where it is envisaged replacing the cover-pieces 216 with a terminal pin/socket 1216a, 1216b, i.e. a male pin and female socket, respectively, for allowing series connection in the longitudinal direction X-X of several modules as shown in Fig. 8, all being powered by means of the end terminal connected to the power supplier via conventional means 1216c.

[0017] For assembly of the apparatus it is envisaged that, once the rail 100 has been fixed in position and the necessary lighting modules 200 provided, the insertion of the latter on the former is performed in the transverse direction with the rear extensions 218 engaging underneath the rear flange 111a and the spring contacts 221a, 221b engaging inside the rear seat 113 of the rail; pushing the unit up against the rear wall causes compression of the contacts which allow entry of the front extensions 219 inside the rail; when the assembly is then released, the pressing action of the spring contacts which resume the rest position causes the front extensions 219 to be positioned underneath the front flange 111b, ensuring fastening in the transverse direction Y-Y and vertical direction Z-Z, but leaving it free to slide in the longitudinal direction X-X, while the electric contacts 221a, 221b close the power supply circuit.

[0018] In this way the lighting unit 200 may slide on the rail 100, being able to be positioned with continuity in any position without interrupting the power supply to the lamps, thereby allowing the latter to be displaced so as to light up different areas of a display unit and/or an area (not shown). Figs. 9a and 9b show a preferred embodiment of the apparatus according to the invention where it is envisaged that the lamp 222 has opposite ends connected to a respective spindle 231 of a roller wheel 230 for rotational operation of the lamp 222 itself which may thus be angularly oriented towards the parts to be illuminated.

[0019] Correspondingly, the cover 225 has an end recess 225c suitable for allowing an angular section of the roller wheel 230 to protrude so that it may be operated from the outside.

[0020] Preferably, the roller wheel 230 has a toothed

external surface 231a for facilitating operation by the user.

[0021] As shown in Figures 10, 11 and 12 a further variation of embodiment of the lighting unit 2200 is envisaged whereby the container 210 is formed by a base piece 2210 having, hinged therewith at 2222a, a spotlight 2222 which is electrically powered by two resilient spring contacts 2221a, 2221b acting on the conductors of the rail 100; the base piece has in turn a rear plinth 2218 suitable for insertion in the rear seat 113 of the rail and a lug 2219 suitable for insertion in the front seat 114 of the said rail; in addition to sliding in the rail the spotlight may also be oriented rotating it about its hinge 2222a.

[0022] It is also possible to mount on the rail directable flanges 300 showing information and able to be backlit.

[0023] It is therefore clear how, with the lighting apparatus according to the invention, it is possible to achieve effective lighting of display units and/or display areas of widely varying forms without the need for complicated electrical wiring and using low-voltage light sources which cannot be accessed by the user who is therefore guaranteed maximum safety when arranging in position and/or removing a displayed product.

[0024] In addition, owing to the possibility of providing a modular arrangement using several single lampholders mounted on a single common rail, any fused lamp bulbs can be easily replaced and/or the position of the lighting body varied and/or several lighting bodies may be lit at the same time and/or light sources of different types may be used without the need for structural variations of the assembly.

Claims

1. Lighting apparatus for display units or display areas, comprising:

- a fixed rail (100) formed by a profiled part (110) extending in the longitudinal direction (X-X) and with a substantially C-shaped cross-section, carrying a pair of electric conductors (114a, 114b) extending in the longitudinal direction (X-X);
- a lighting unit (200; 1200; 2200)

characterized in that

said rail (110) has a rear vertical side (110a) and front vertical side (110b) which have a different height in the vertical direction (Z-Z) and are provided with an associated flange (111a, 111b) extending in the transverse direction (Y-Y) and having a different length in the same direction, being respectively able to define a first rear longitudinal seat (113) and a second front longitudinal seat (114), **in that** said lighting unit (200) comprises a container (210) which extends in the longitudinal direction (X-X) and inside which a first rear seat (211) and a second front seat

(212) are formed, said seats extending in the longitudinal direction (X-X) and being separated from each other in the transverse direction (Y-Y) by a longitudinal partition (213); the front seat (212) having pairs of resilient projections (212a) which are open in the vertical direction for inserting and holding at least one lamp (222),

the two seats (211, 212) being closed at the opposite ends by an associated transverse wall (214) which has an opening (214a) connecting the rear seat (211) with the exterior, and **in that** the rear vertical surface (210a) of the container (210) has a pair of eyelets (217a, 217b) which are open in the vertical direction (Z-Z) and have a different depth in the same direction, being suitable for insertion of an associated electric contact (221a, 221b) of the resiliently yielding type in the transverse direction (Y-Y) and longitudinal projections (218) extending in the longitudinal direction (X-X) and suitable for engagement with the corresponding rear seat (113) of the rail (100); it being envisaged that the container (110) comprises in its front part lugs (219) extending outwards in the transverse direction (Y-Y) and suitable for insertion inside the front longitudinal seat (114) of the rail (100).

2. Apparatus according to Claim 1, **characterized in that**, along the vertical edges of said opening (214a), the inner surface of the transverse end wall (214) has vertical guides (215a) able to receive the sides (216a) of corresponding closing cover-pieces (216; 1216a; 1216b) which can be inserted into the seat parallel to the vertical direction (Z-Z).
3. Apparatus according to Claim, **characterized in that** said lamps are of the low-voltage CCFL type extending in the longitudinal direction.
4. Apparatus according to Claim 1, **characterized in that** said lamps are of the LED type.
5. Apparatus according to Claim 1, **characterized in that** it comprises adapter devices (223) for converting the mains current into low voltage for powering the lamps housed inside the first rear seat (211) of the container (210).
6. Apparatus according to Claim 1, **characterized in that** it comprises a reflective sheet (224) arranged between the bottom of the front seat (212) and the lamp (222).
7. Apparatus according to Claim 6, **characterized in that** said transparent cover (225) for closing the container (210) has vertical rear teeth (225a) for locking in the vertical direction (Z-Z) the electrical contacts (221a, 221b) and front gripping tabs (225b) for opening/closing said cover.

8. Apparatus according to Claim 1, **characterized in that** it comprises a respective male and female terminal pin/socket (1216a,1216b) for closing the openings (214a) of the container end walls, able to allow series connection of several modules in the longitudinal direction (X-X). 5
9. Apparatus according to Claim 1, **characterized in that** said lamp (222) has opposite ends which are connected to a respective spindle (231) of a roller wheel (230) for rotationally operating the said lamp (222) for angular orientation thereof. 10
10. Apparatus according to Claim 9, **characterized in that** the cover (225) has an end recess (225c) suitable for allowing an angular section of the roller wheel (230) to protrude. 15
11. Apparatus according to Claim 9, **characterized in that** the roller wheel (230) has a toothed external surface (231a). 20
12. Apparatus according to Claim 1, **characterized in that** the lighting unit (2200) comprises a base piece (2210) having, hinged therewith (2222a), a spotlight (2222) electrically powered by two resilient spring contacts (2221a,2221b) acting on the conductors of the rail (100). 25
13. Apparatus according to Claim 12, **characterized in that** said base piece (2210) has a rear plinth (2218) suitable for insertion in the rear seat (113) of the rail and a front lug (2219) suitable for insertion inside the front seat (114) of the said rail. 30

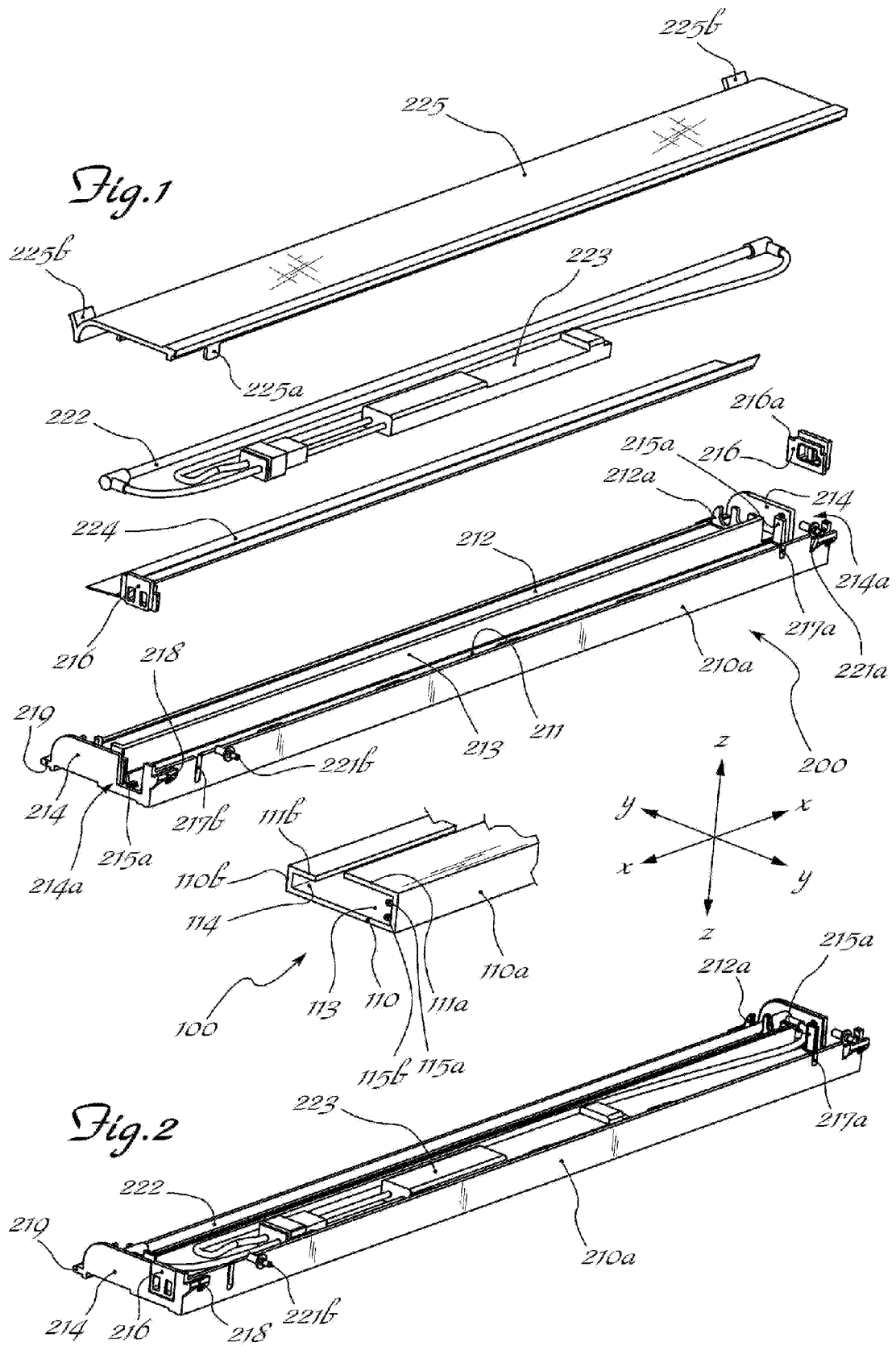
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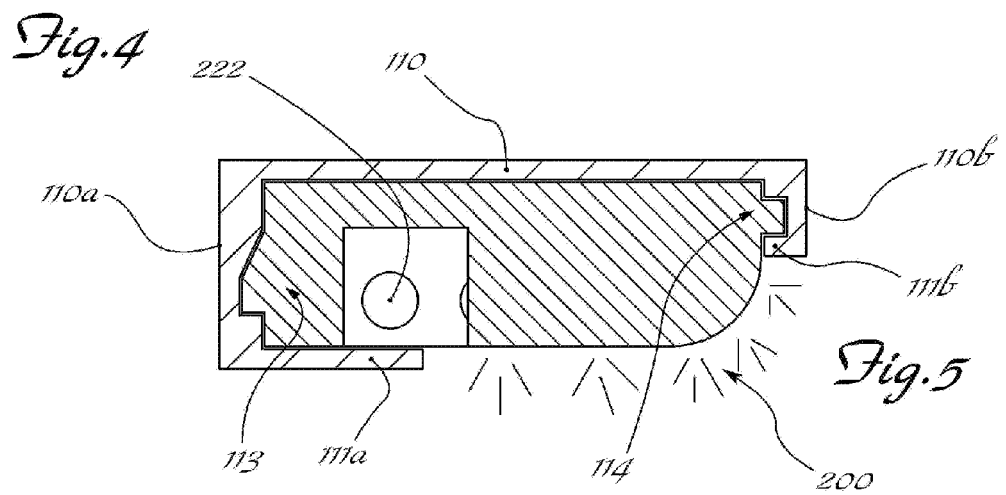
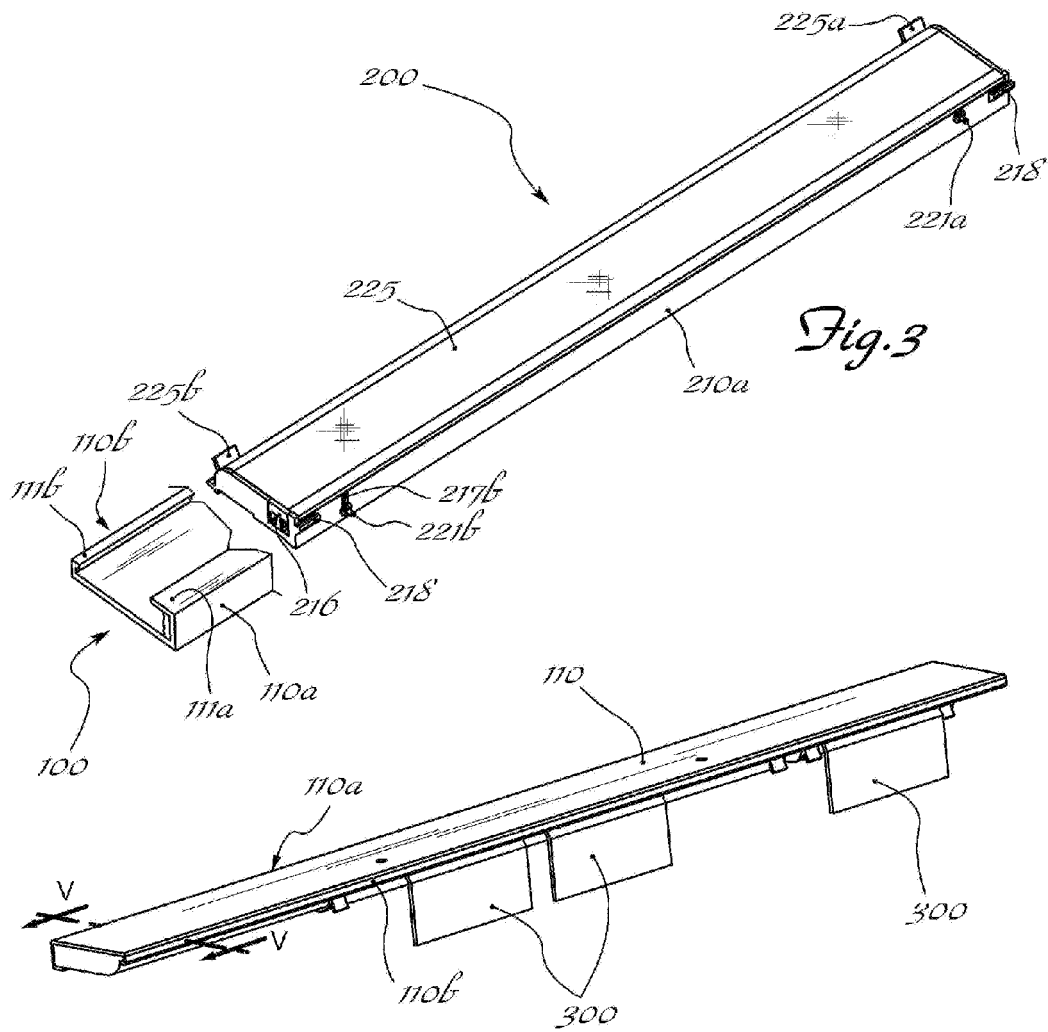
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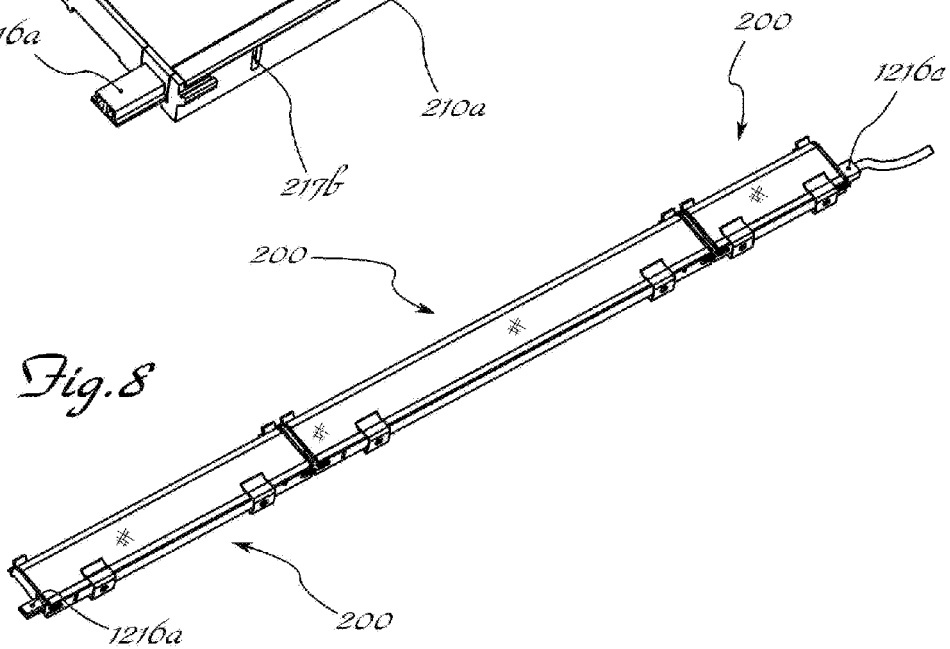
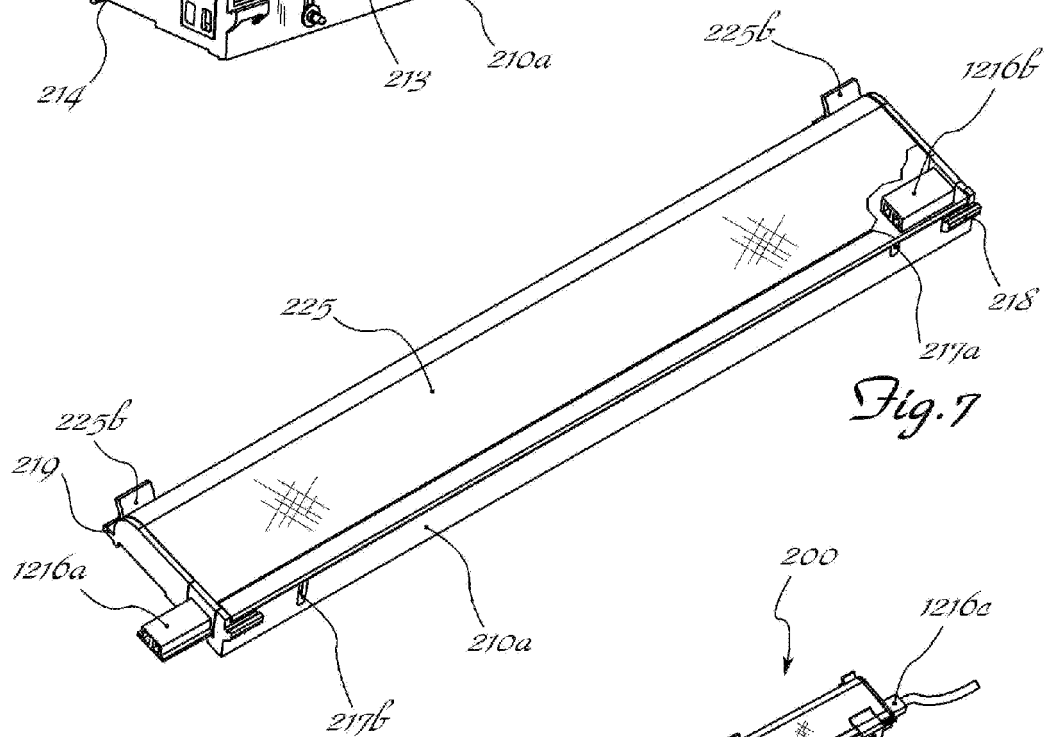
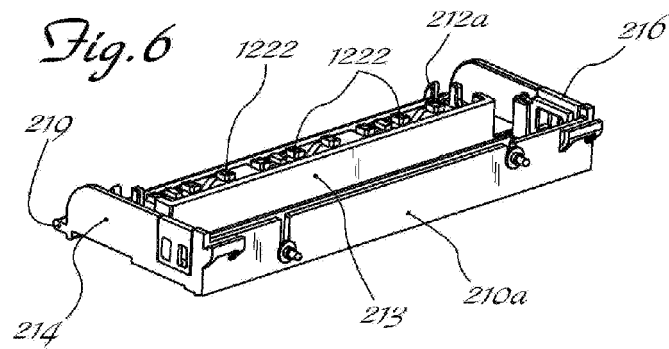


Fig. 9a

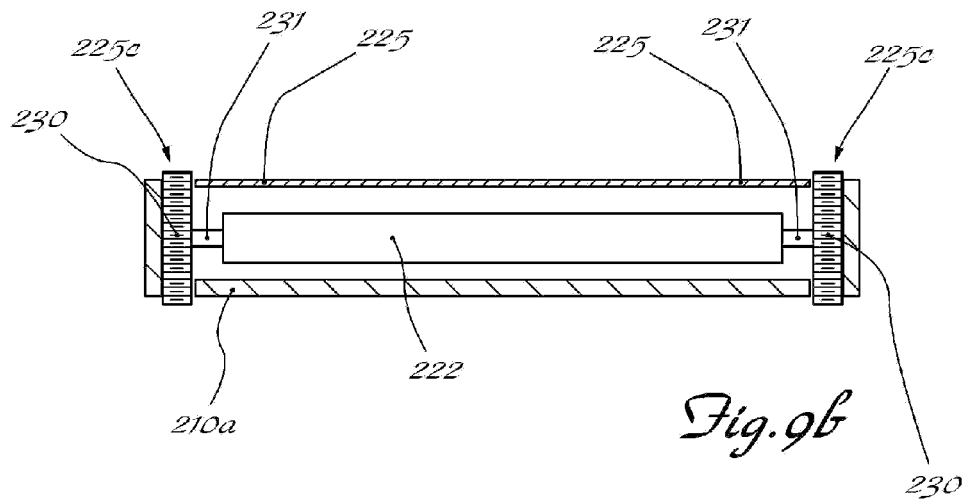
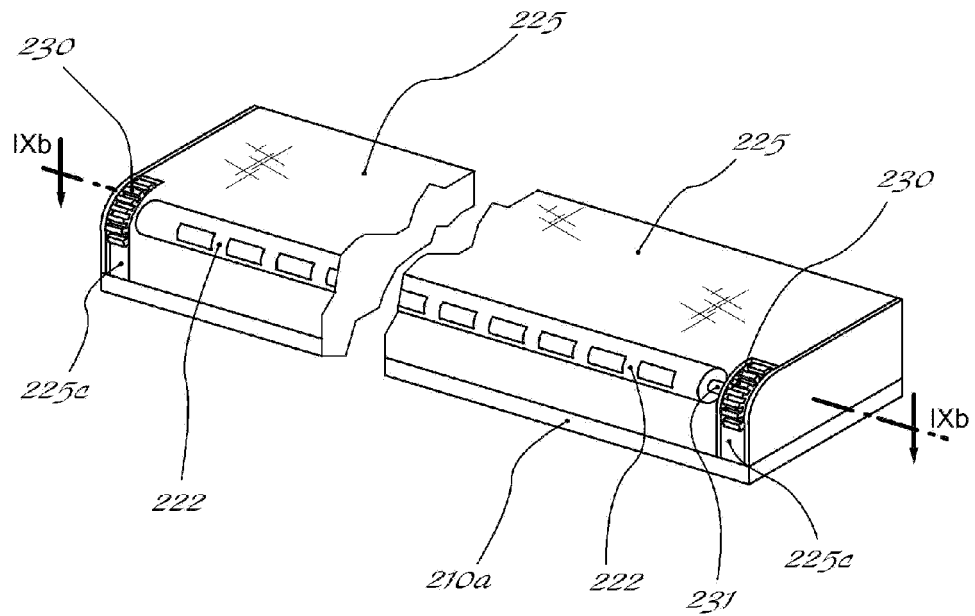
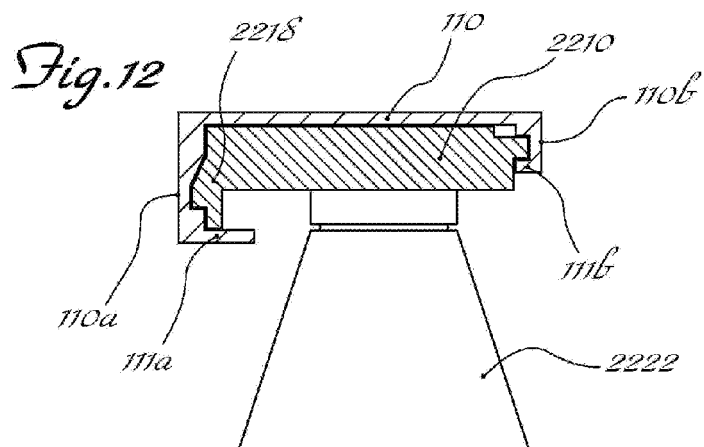
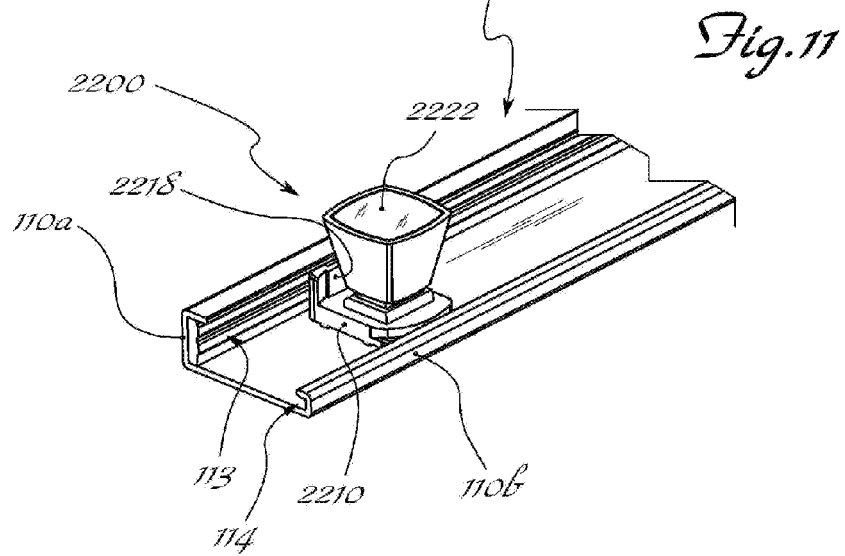
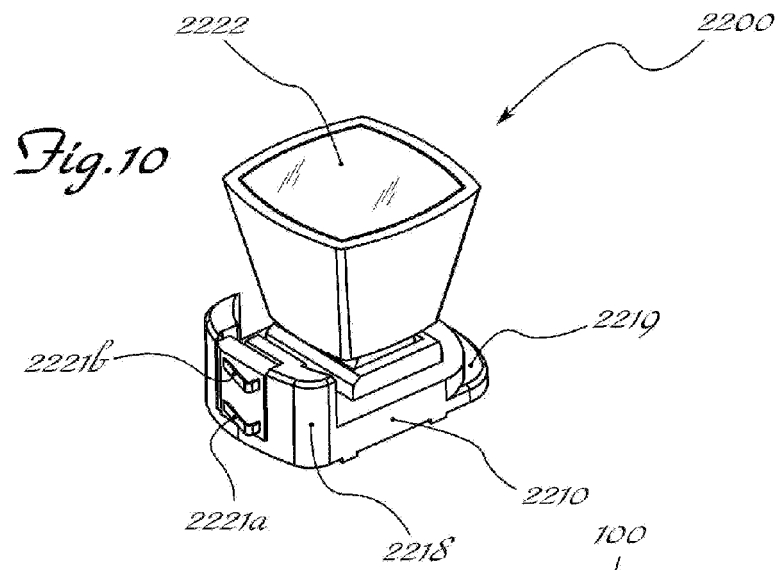


Fig. 9b





EUROPEAN SEARCH REPORT

Application Number
EP 11 15 2647

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 110 057 A1 (SARNO DISPLAY S R L SOCIO UNIC [IT]) 21 October 2009 (2009-10-21) * figures 1-4 * * paragraph [0008] - paragraph [0016] * -----	1,5	INV. F21V21/35 F21V33/00 A47F11/10
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			TECHNICAL FIELDS SEARCHED (IPC)
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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 9 March 2011	Examiner Allen, Katie
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 15 2647

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09-03-2011

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