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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) **Lighting advertising element**

(57) The element simulating the luminous neon display consists of the light diffusing tube (1) made of plastic, the housing (2) and the light emitting diodes LED (3). The light diffusing tube (1) is made of polyethylene or polypropylene in natural pearl colour or characterized by colouration within its whole volume or with colored surface or in natural pearl colour, wherein said tube is provided with longitudinal gap (6) with borders (7) and the housing (2) is made of transparent plastic and characterized by rectangular cross - section with the grooves (8) on side walls (9). The light rays diffusing tube (1) is incorporated in the housing (2) by insertion of the borders (7) into the grooves (8) in the housing (2). The diodes (3) are provided with the chamfer (13) on their light emitting side (12) and are adhesive bonded onto the upper wall (10) of the housing (2) in the position of the light emitting side (12) oriented towards said housing (2). The masking cover (16) characterized by "C" letter shape is incorporated on the housing (2) and encompasses the lower wall (11) and side walls (9) in the portion protruding out of the contour of light rays diffusing tube (1). The inner surface (18) of the masking cover (16) has been designed as the surface reflecting the light rays. The masking cover (16) is provided with fixed feet (20) enabling the fastening of the element to the general structure of the advertising (22).

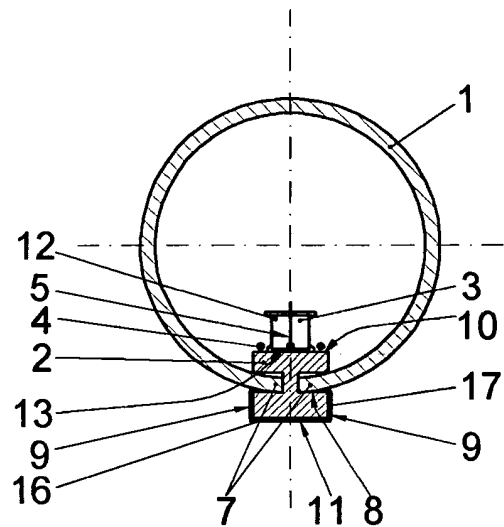


Fig.1

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Description

[0001] A subject matter of the present invention is a lighting advertising element incorporating light emitting diodes (LED) and simulating the luminous neon display.

[0002] The device described in WO 0179748 patent is known as the transparent two - dimensional advertising with diodes. The lighting emitted by means of diodes incorporated in said device is diffused by the diffusing element and illuminates the board designed as the panel displaying the advertising material. The power supply wires for the diodes are laid in the gaps inside the advertising.

[0003] The device described in US 6,361,186 patent is known as the lighting provision simulating the luminous neon display, incorporating LED diodes and consisting a diffuser diffusing the light rays; said diffuser is constructed as an elongated transparent tube with circular cross - section and non - transparent elongated tubular enclosure incorporating the inserted board with LED diodes connected in series with power source and wiring. The diffuser made of transparent plastic, is characterized by a flat surface, in the part of its circular circumference, provided with the borders shaped in form of triangular detents. The both side walls of said tubular enclosure are terminated with similar detents. The diffuser is integrated with the enclosure by means of said detents, when depressed. The board with LED diodes is inserted into the groves or supported onto the protrusions provided on the side inner walls of the enclosure. The diodes are fixed and positioned on the board with their lighting side oriented towards the diffuser diffusing the light rays. The light emitted from LED diodes is initially diffused on the wall forming a flat surface and on the diffuser wall again. The passage of light rays through the double wall results in the diffusion of bright lighting of LED diodes.

[0004] According to variant solution, the diffuser within its flat surface portion is provided with longitudinal gap without any obstacle in form of the double diffusing wall for the light rays emitted by LED diodes incorporated on the board deeply inside the enclosure. Owing to the distance between the diodes and the diffuser wall, significant quantity of diodes is required to ensure proper light brightness. In the both solution variants, a distance between LED diodes with their lighting side oriented towards the external wall of the diffuser and said wall is required; therefore said diodes are incorporated in the enclosure in order to prevent any lighting points visible from outside. The distance layout between LED diodes and diffuser wall is of essential importance for the achievement of lighting intensity in manner preventing its visibility from outside in form of inner lighting points. The light diffusing tube of the diffuser is usually made of transparent pearl polyethylene

[0005] The essence of the invention is the lighting advertising element consisting of light rays diffusing tube made of plastic with any configuration of its cross - section, but preferably with circular shape, the housing and

LED diodes connected with their power source by means of wiring, characterized by the fact that the said light rays diffusing tube is provided with longitudinal gap with borders, along its whole length or almost whole length, with said housing made of transparent plastic and characterized by almost rectangular cross - section with the grooves on side walls resulting in its shape resembling "H" letter, with said light rays diffusing tube incorporated in said housing by insertion of the borders into the groves in the housing. The light emitting diodes are incorporated in the upper wall of the housing with their lighting side oriented towards the housing.

The light emitting diodes are provided with chamfer on their lighting sides and are adhesive bonded onto the upper wall of the housing with the surfaces of said chamfers. According to variant embodiment, LED diodes, also provided with chamfer on their lighting sides, are incorporated in the cavities provided in the upper wall of the housing with their lighting side oriented towards the housing. In order to protect the diodes against falling out of the cavities, their contact wires are adhesive bonded onto the upper wall of the housing.

The light rays diffusing tube is made of polyethylene or polypropylene in natural pearl colour or in natural pearl colour characterized by colouration within its whole volume or in natural pearl colour with colorized surface or in natural pearl colour with colorized coated outer layer.

[0006] The masking cover characterized by "C" letter shape is incorporated on the housing and encompasses the lower wall and side walls in the portion protruding out of the contour of light rays diffusing tube. The borders of the flanges of said cover are bent inwards in order to protect the cover against its falling out of the housing. The inner surface of the masking cover has been designed as the surface reflecting the light rays. It is possible to substitute said surface by means of foil reflecting the light rays.

[0007] The masking cover, integrated with the housing in reliable manner, has been provided with the feet enabling the fastening of the whole element of illuminated advertising to the general structure of the advertising.

[0008] The face openings of the light rays diffusing tube, after installation of electric wires outlets, are covered with protective covers in order to protect the interior of the element against penetration of any contaminants as well as rainfalls and snowfalls.

[0009] The element according to the present invention is characterized by the simple solution and facilitated assembling of said element and of the whole illuminated advertising. The element with the diodes is characterized by high durability and low sensitivity to the influence of weather conditions as well as by costs savings resulting from reduced energy consumption in comparison with conventional luminous neon displays.

[0010] However the essential advantage of the element according to the present invention is the fact that the diodes are fixed in the position with their lighting sides towards the housing and the radiation is emitted from the

rear side of the diodes in form of dispersed light beam characterized by very large and practically unlimited apex angle. The light rays emitted by the side surfaces of diodes are also dispersed. The main light beam emitted by flat chamfer of the diode penetrates through the adhesive layer, transparent plastic of the housing and then to the wall of light dispersing tube, being the subject of multiple refraction.

Some of light rays are reflected from the reflecting inner surface of the masking cover and are directed back into the interior of the light diffusing tube or penetrate into the wall of said tube. Such propagation of light rays emitted from the diodes results in bright and uniform illumination of the light diffusing tube within its whole length and circumference and the phenomenon of point lighting does not occur.

[0011] The subject of the present invention as an embodiment example has been illustrated in the drawing wherein Fig.1 illustrates the element of illuminated advertising in cross - section along the line A-A marked in the Fig.2. Fig.2 illustrates the side view of the element. Fig.3 illustrates the light diffusing tube in the view towards the gap and Fig.4 illustrates the housing with incorporated diodes in top view in direction of A arrow marked in the Fig.2. The side view of the element of illuminated advertising in variant solution has been shown in Fig.5. Fig.6 illustrates the side view of the housing and masking cover, to the left from symmetry axis - with the cover provided with inner surface reflecting the light rays and to the right from symmetry axis - with the cover provided with reflecting foil. Fig.7 illustrates the light emitting diode with the chamfer on its light emitting side.

[0012] The element of illuminated advertising consists of the light diffusing tube 1, housing 2 and the light emitting diodes LED 3. The light diffusing tube is made of pearl polyethylene with colouration within its whole volume and characterized by circular shape of its cross - section with outer diameter of 36 mm and wall thickness of 2 mm. The light diffusing tube 1 is provided with longitudinal gap 6 with borders 7 created in result of longitudinal tube cutting along its whole length. The housing 2 is made of methyl polymetacrylate (plexiglass) and characterized by rectangular shape of its cross - section with the grooves 8 on its side walls 9. The light diffusing tube 1 is incorporated in the housing 2 by the insertion of the borders 7 into the grooves 8. The light emitting diodes 3 are incorporated on the upper wall 10 of the housing 2 wherein said diodes are oriented with their light emitting side 12 towards said housing 2. The applied diodes 3 are provided with the chamfer 13 on their light emitting side 12 and are adhesive bonded on the upper wall 10 of the housing 2 with spacing of 25 mm. TERMIK heat melting adhesive (symbol B1621) with pearl colour to be applied by means of spray gun has been used for adhesive bonding. The diodes 3 are integrated with electric wires 4 connected to the power supply source (not illustrated in the drawing) by means of soldering. According to the number of applied diodes 3 and essentially

according to power input, the diodes 3 or the circuits consisting of greater number of the diodes 3 connected in series are connected parallel to electrical wires 4. The masking cover 16 characterized by "C" letter shape is incorporated on the housing 2 and encompasses the lower wall 11 and side walls 9 of said housing 2 in the portion protruding out of the contour of light rays diffusing tube 1. The borders of the flanges 17 of said cover 16 are bent inwards in order to protect the cover 16 against its falling out of the housing 2. The cover 16 is made of steel sheet 0,5 mm thick and its inner surface 18 has been polished to enable the reflection of the light rays. The bottom surface of the cover 16 is provided with at least two feet 20 incorporated by welding in order to enable the fastening of the element of illuminated advertising to the general structure of the advertising 22 in an easy manner. The face openings of the light rays diffusing tube 1, after installation of electric wires outlets 4, are covered with protective covers 21 to be adhesive bonded onto the edges of said light rays diffusing tubes 1.

[0013] In the alternative embodiment of the element, LED diodes 3 provided with chamfer 13 on their lighting side 12, are incorporated in the cavities 14 provided in the upper wall 10 of the housing with their lighting side oriented towards the housing. In order to protect the diodes against falling out of the cavities, their contact wires are adhesive bonded onto the upper wall 10 of the housing 2. The contact wires 5 of the diodes 3 incorporated in said manner, after interconnection by soldering, are bonded by means of adhesive layer 15 to the upper wall 10 of the housing 2.

[0014] The different embodiments, are characterized by the masking cover 16 with its inner surface 18 reflecting the light rays or with aluminium foil 19 with glossy surface reflecting the light rays and laid on the inner wall of the masking cover 16.

Claims

1. The lighting advertising element consisting of light rays diffusing tube made of plastic with any configuration of its cross - section, but preferably with circular shape, the housing and LED diodes connected with their power source situated out of said element by means of wiring, **characterized in that** the said light rays diffusing tube (1) is provided with longitudinal gap (6) with borders (7), along its whole length or almost whole length, with said housing (2) made of transparent plastic and **characterized by** almost rectangular cross - section with the grooves (8) on side walls (9) resulting in its shape resembling "H" letter, wherein said light rays diffusing tube (1) is incorporated in said housing (2) by insertion of the borders (7) into the grooves (8) in the housing (2) and the light emitting diodes (3) are incorporated in the upper wall (10) of the housing (2) with their lighting side (12) oriented towards said housing (2).

2. The element according to claim 1 **characterized in that** the said light emitting diodes (3) are provided with the chamfer (13) on their light emitting side (12) and are adhesive bonded to the upper wall (10) of the housing (2). 5
3. The element according to claim 1 **characterized in that** the said light emitting diodes (3) are provided with the chamfer (13) on their light emitting side (12) and are incorporated on that side (12) in the cavities (14) provided in the upper wall (10) of the housing (2). 10
4. The element according to claim 3 **characterized in that** the their contact wires (5) of light emitting diodes (3) are bonded by means of adhesive layer (15) to the upper wall (10) of the housing (2). 15
5. The element according to claim 1, or 2, or 3 or 4 **characterized in that** the light rays diffusing tube (1) is made of polyethylene or polypropylene in natural pearl colour or in natural pearl colour **characterized by** colouration within its whole volume or in natural pearl colour with colorized surface or in natural pearl colour with colorized coated outer layer. 20
6. The element according to claim 1 to 5 **characterized in that** the masking cover (16) **characterized by** "C" letter shape is incorporated on the housing (2) and encompasses the lower wall (11) and side walls (9) of said housing (2) in the portion protruding out of the contour of light rays diffusing tube (1) and the borders of the flanges (17) of said cover (16) are bent inwards. 25
7. The element according to claim 6 **characterized in that** the inner surface (18) of the masking cover (16) has been designed as the surface reflecting the light rays. 30
8. The element according to claim 6 **characterized in that** the inner surface (18) of the masking cover (16) is lined with the foil (19) reflecting the light rays. 35
9. The element according to claim 6 or 7 or 8 **characterized in that** the masking cover (16) is provided with fixed feet (20) enabling the fastening of the whole element of illuminated advertising to the general structure of the advertising (22). 40
10. The element according to claim 1 to 9 **characterized in that** the face openings of the light rays diffusing tube (1) are plugged with protective covers (21). 45

Amended claims in accordance with Rule 137(2) EPC. 55

1. The lighting advertising element consisting of light

rays diffusing tube (1) made of plastic with any configuration of its cross - section, but preferably with circular shape, the housing (2) and LED diodes (3) connected with their power source situated out of said element by means of wiring (4), **characterized in that** the said light rays diffusing tube (1) is provided with longitudinal gap (6) with borders (7), along its whole length or almost whole length, with a housing (2) made of transparent plastic and **characterized by** almost rectangular cross - section with the grooves (8) on side walls (9) resulting in its shape resembling "H" letter, wherein said light rays diffusing tube (1) is incorporated in said housing (2) by insertion of the borders (7) into the grooves (8) in the housing (2) and the light emitting diodes (3) are incorporated in the upper wall (10) of the housing (2) with their lighting side (12) oriented towards said housing (2) and the masking cover (16) **characterized by** "C" letter shape is incorporated on the housing (2) and encompasses the lower wall (11) and side walls (9) of said housing (2) in the portion protruding out of the contour of light rays diffusing tube (1) and the borders of the flanges (17) of said cover (16) are bent inwards and moreover the inner surface (18) of the masking cover (16) has been designed as the surface reflecting the light rays or the inner surface (18) of the masking cover (16) is lined with the foil (19) reflecting the light rays.

2. The element according to claim 1 **characterized in that** the said light emitting diodes (3) are provided with the chamfer (13) on their light emitting side (12) and are adhesive bonded to the upper wall (10) of the housing (2).

3. The element according to claim 1 **characterized in that** the said light emitting diodes (3) are provided with the chamfer (13) on their light emitting side (12) and are incorporated on that side (12) in the cavities (14) provided in the upper wall (10) of the housing (2).

4. The element according to claim 3 **characterized in that** the their contact wires (5) of light emitting diodes (3) are bonded by means of adhesive layer (15) to the upper wall (10) of the housing (2).

5. The element according to claim 1, or 2, or 3 or 4 **characterized in that** the light rays diffusing tube (1) is made of polyethylene or polypropylene in natural pearl colour or in natural pearl colour **characterized by** colouration within its whole volume or in natural pearl colour with colorized surface or in natural pearl colour with colorized coated outer layer.

6. The element according to claim 1 to 5 **characterized in that** the masking cover (16) is provided with fixed feet (20) enabling the fastening of the whole element of illuminated advertising to the general

structure of the advertising (22).

7. The element according to claim 1 to 6
characterized in that the face openings of the light
rays diffusing tube (1) are plugged with protective
covers (21). 5

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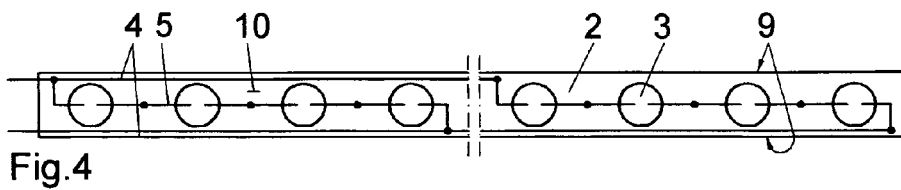
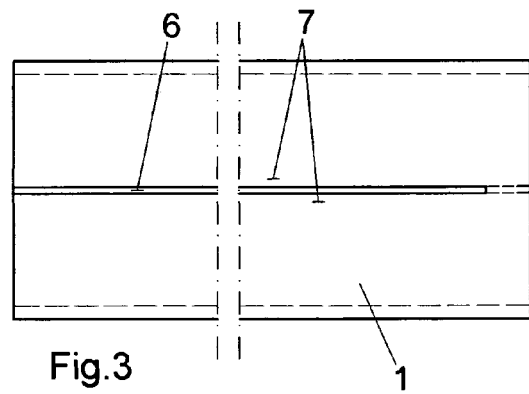
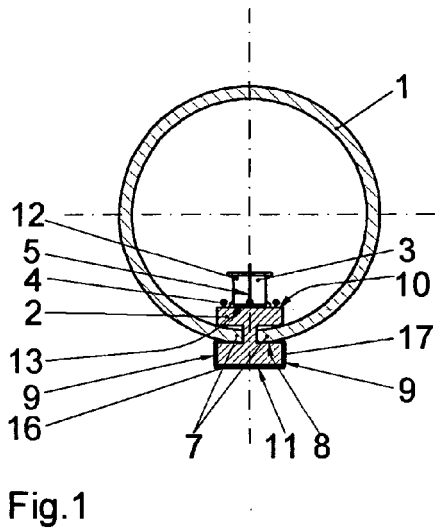
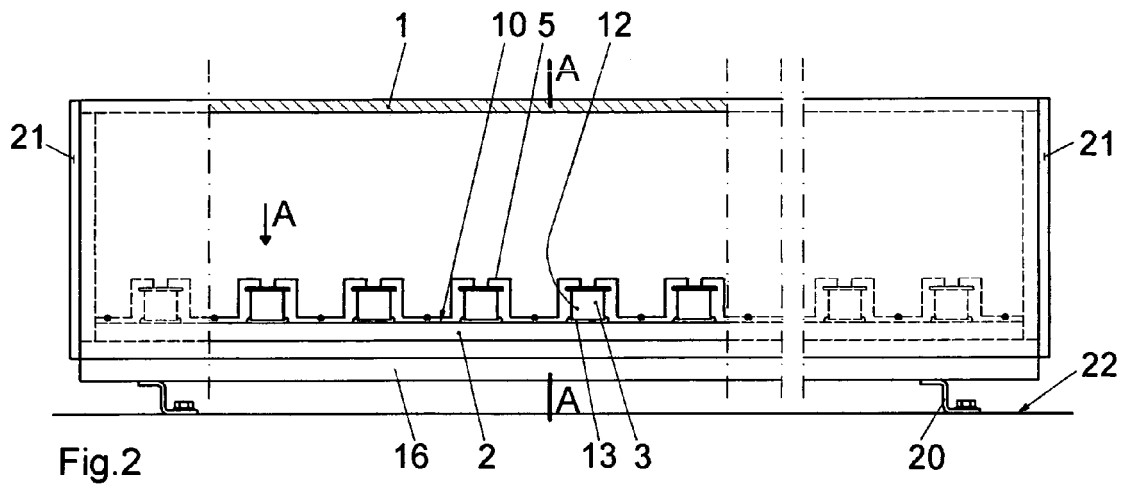
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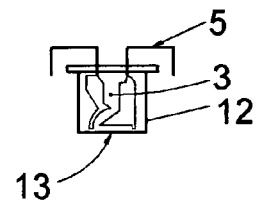
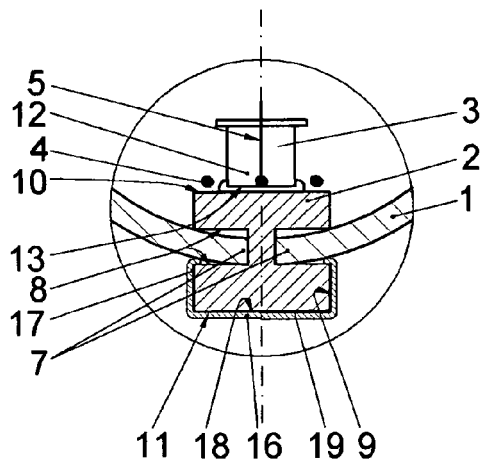
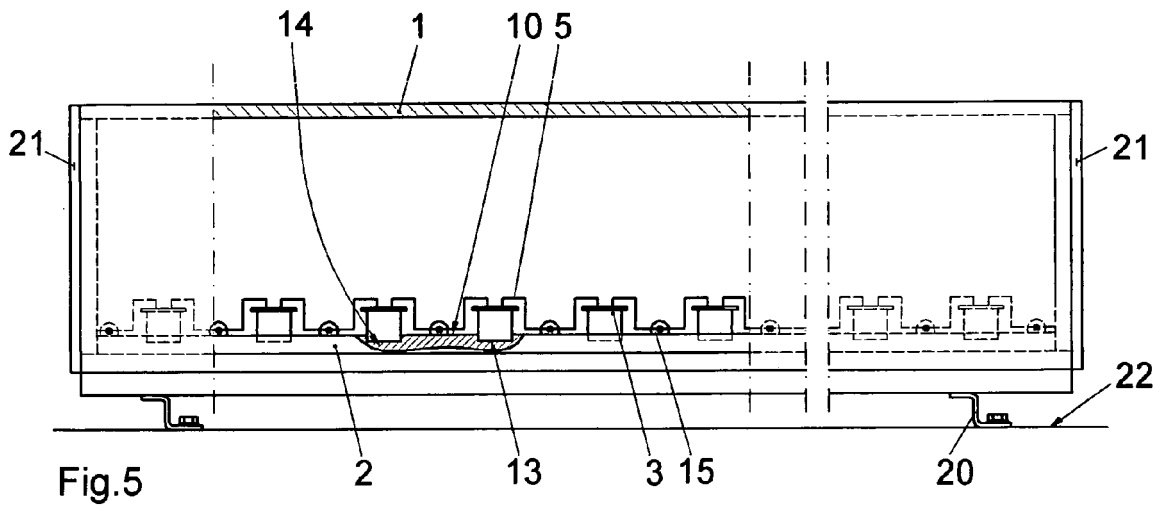
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 June 2007	Examiner Pierron, Christophe
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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