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(54) Lighting fixture.

(57) Lighting fixture having a box-shaped housing, which is provided with a rectangular bottom plate (2) and four side plates (3,3,4,4) which are located in pairs, spaced from each other by some distance and being parallel to each other, said side plates defining a rectangular lighting opening (5) opposite the rectangular bottom plate (2), and with side reflectors (11), as well as with lighting equipment including an elongated light source (9). A part of the bottom plate (2) associated with the location of the elongated light source (9) is formed in the shape of a top reflector.

Method of producing a lighting fixture wherein the top reflector shape is formed in the bottom plate (2) by means of a stamp.

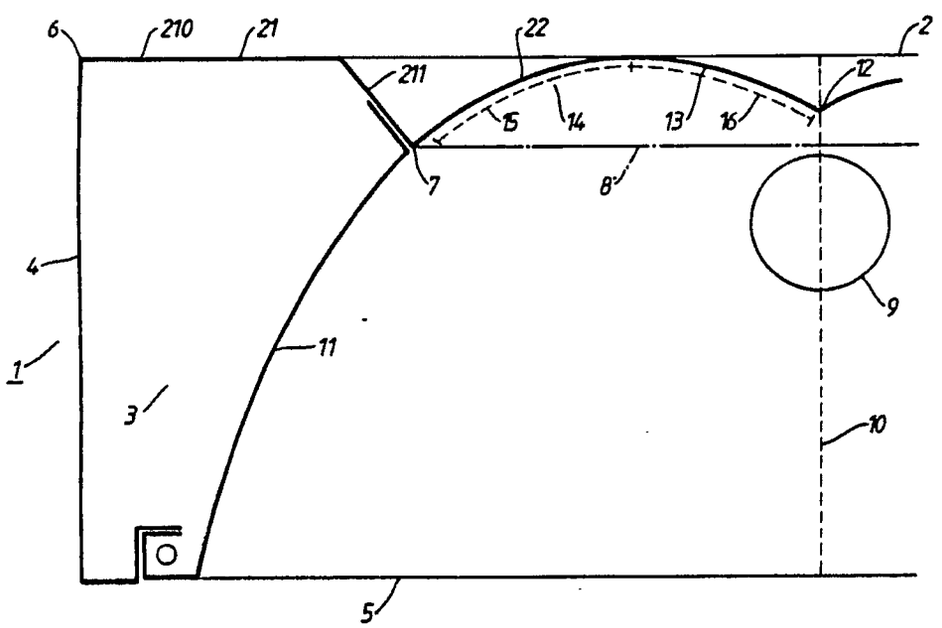

Fig.1.

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The invention relates to a lighting fixture, comprising a box-shaped housing having a rectangular bottom plate and a first and a second pair of parallel side plates connected with the bottom plate, said side plates defining a rectangular lighting opening, at least one lamp holder, which can be mounted on at least one position at the inside of at least one of said side plates of the first pair, for a substantially elongated light source, and two side reflectors accommodated between a respective side plate of the second pair and the bottom plate, and more in particular the invention relates to such a lighting fixture wherein the bottom plate is provided with two end parts, whose sides opposite the sides connected with a respective side plate of the second pair along first connecting lines are located on second connecting lines, which are parallel to the side plates of the second pair and which are located at a smaller distance from the lighting opening than the first connecting lines, and with an intermediate part, of which opposite sides are respectively located on the second connecting lines, as well as to a method of producing such lighting fixtures.

Lighting fixtures of the above kind are known. A separate top reflector is secured to the bottom plate on a position which corresponds with the location of the elongated light source. More in particular the top reflector is secured, for example with pop rivets, to the surface of the intermediate part of the bottom plate directed towards the lighting opening. The intermediate part is flat and lies parallel to the lighting opening. Each end part of the bottom plate consists of a flat part which is parallel to the lighting opening, but is located at a larger distance therefrom than the intermediate part, and of a flat connecting part which connects the flat part of the end part to the intermediate part. The lowering in the bottom plate formed by said connecting parts of the end parts and the intermediate part is on the one hand used for reinforcing the bottom plate and on the other hand for preventing any resonance of the bottom plate if a ballast is mounted thereon, in particular on the flat part of one of the end parts of the bottom plate. Said lowering is moreover used for mounting the side reflectors and the top reflector, the latter to the intermediate part thereof.

A top reflector is a relatively expensive part of a lighting fixture, but on the other hand it is very desirable for accurately directing the light and converting the light flow from the rear side of the lamp into useful light.

The object of the invention is to provide a lighting fixture in which no separate top reflector is used, but wherein the advantages thereof are still substantially achieved.

In order to accomplish said objective the invention provides a ligting fixture of the kind mentioned first in the preamble, which is characterized in that a part of the bottom plate associated with the location of the elongated light source is formed in the shape of a top reflector, as well as in a lighting fixture of the kind mentioned secondly in the preamble, which is characterized in that the intermediate part is shaped in such a manner that from the second connecting lines to a sectional line of the intermediate part parallel to said second connecting lines the distance from the surface of the intermediate part directed towards the lighting opening to the lighting opening becomes larger along at least a first part of the path defined by a respective second connecting line and said sectional line.

It has become apparent that by means of one or more the top reflector formed in the bottom plate of the lighting fixture more than 80% of the light flow from the rear side of the accessory fluorescent lamps is converted into useful light.

The profiling of the intermediate part is dependent on the width and the depth of the lighting fixture, the connection and the shape of the side reflectors and the further lighting demands, which in their turn may depend on the available mounting depth in the assembly, the height of the light-point, the mutual distance of lighting fixtures and the distance between the lighting fixture and for example a window. Furthermore an efficient use of the light source and an enhanced fixture and lighting efficiency can be achieved without a relatively expensive top reflector being necessary.

A method of producing the lighting fixture of the kind mentioned first is characterized in that the shape of the top reflector is formed in the bottom plate by means of a stamp.

A method of producing a lighting fixture of the kind mentioned secondly is characterized in that the bottom plate is configured by means of a stamp.

The invention will be explained in more detail with reference to two embodiments illustrated in the drawing, in which:

Figure 1 is a cross-sectional view of substantially half of a lighting fixture according to a first embodiment of the invention; and

Figure 2 is a cross-sectional view of substantially half of a lighting fixture according to a second embodiment of the present invention.

Referring first to Figure 1, reference numeral 1 indicates a box-shaped housing of a lighting fixture half according to a first embodiment of the invention diagrammatically illustrated in cross-section. Said box-shaped housing 1 has a rectangular bottom plate 2, a first pair of side plates parallel to each other and to the sheet on which Figure 1 is drawn, one.of said side plates being designated by

reference numeral 3, and a second pair of parallel side plates, whereby one of said side plates is designated by reference numeral 4, said four side plates 3, 3; 4, 4 being connected with the bottom plate 2 and defining a rectangular lighting opening 5. Each side plate 4 of the second pair is connected, along a first connecting line 6, with an end part 21 of the bottom plate 2, which is furthermore provided with an intermediate part 22. Said end part 21 and said intermediate part 22 are connected together along a second connecting line 7. Of course only one point of the first and second connecting lines 6 and 7 is shown in the cross-sectional view of Figure 1. The end part 21 again consists of a flat part 210 and a flat connecting part 211, which connects the flat part 210 of the end part 21 to the intermediate part 22. The connecting part 211 of the end part 21 is drawn obliquely in Figure 1, but it may also be parallel to the side plate 4. The intermediate part 22 may also be connected with the side plate 4 only by a connecting part 211 along the first connecting line 6. In that case the connecting part 211 may be flat, but it may also be curved. Reference numeral 8 indicates a chain-dotted line representing the intermediate part according to prior art. Reference numeral 9 finally indicates a fluorescent lamp as a substantially elongated light source, reference numeral 10 indicates the centre of the lighting fixture and reference numeral 11 indicates one of two side reflectors.

Summarizing, much the same as a lighting fixture according to prior art a lighting fixture comprises a box-shaped housing 1 having a rectangular bottom plate 2 and a first and a second pair of parallel side plates 3 and 4 respectively connected with the bottom plate 2, said side plates defining a rectangular lighting opening 5, a lamp holder (not shown), which can be mounted in at least one position at the inside of at least one of the side plates 3 of the first pair, for a substantially elongated light source 9, and two side reflectors 11 accommodated between a respective side plate 4 of the second pair and the bottom plate 2, the bottom plate 2 being provided with two end parts 210, whose sides located opposite the sides connected to a respective side plate 4 of the second pair along first connecting lines 6 are located on second connecting lines 7, which are parallel to the side plates 4 of the second pair and which are located at a smaller distance from the lighting opening 5 than the first connecting lines 6, and with an intermediate part 22, of which opposite sides are respectively located on the second connecting lines 7. Furthermore, in accordance with the invention and different from the prior art, the intermediate part 22 is shaped such that from the second connecting lines 7 to a sectional line 12, parallel to said second connecting lines 7, only one point of said sectional line 12 being visible in Figure 1 of course, of the intermediate part 22 the distance from the surface 13 of the intermediate part 22 directed towards the lighting opening to the lighting opening 5 becomes larger along at least a first part 15 of the path 14 defined by a respective second connecting line 7 and the sectional line 12. Preferably the distance from the surface 13 of the intermediate part to the lighting opening 5 becomes smaller along a second and last part 16, joining up with the first part 15, of the path 14. Also the curvature in the intermediate part 22 caused by the varying distance from the surface 13 of the intermediate part to the lighting opening 5 is preferably symmetric with respect to the sectional line 12.

Although the end parts 21 and the intermediate part 22 may be connected in different ways, which are obvious to a person skilled in this field of the art, they preferably form an integral part of the bottom plate 2. Preferably the intermediate part 22 is punched in the bottom plate 2 in that case, or formed in another manner. Also the end parts 21 may be punched in the bottom plate 2.

Preferably ventilation holes (not shown) are provided in the end parts 210.

According to the invention the intermediate part 22, or top reflector, may be formed in the bottom plate by means of a stamp. Moreover, the entire bottom plate may be configured by means of a stamp.

Figure 2 shows a second embodiment of the invention, wherein the same reference numerals are used as in Figure 1.

The lighting fixture shown in Figure 2 is moreover provided with a ballast 17 and a lamellae grate 18 having longitudinal lamellae 19 and transverse lamellae 20. Just like in Figure 1 the centre of the lighting fixture is indicated by the chain line designated by reference numeral 10. In figure 2 the longitudinal lamellae therefore take over part of the function of the side reflectors 11, as a result of which an extra degree of freedom for the curvature is obtained, whereby the curvature of the side reflector 11 and the transverse lamella 19 not shown in Figure 2 may be different from the side reflector 11 and the transverse lamella that are shown. This also applies to the part of the top reflector (the intermediate part) 13 that is not shown. The ballast 17 has a predetermined hum distance from the side plate 4. It is noted that the lighting fixtures shown in Figures 1 and 2 may be surface mounted lighting fixtures, they may also be built-in lighting fixtures, however, as a result of which the free end configuration of the side plates of the housing 1 is different. In Figure 2 the height of the side plate 4 may for example be 97 mm and

the total width of the lighting fixture may be 230 mm, which width is divided in two by the chain line 10.

Claims

1. Lighting fixture, comprising a box-shaped housing having a rectangular bottom plate and a first and a second pair of parallel side plates connected with the bottom plate, said side plates defining a rectangular lighting opening, at least one lamp holder, which can be mounted on at least one position at the inside of at least one of said side plates of the first pair, for a substantially elongated light source; and two side reflectors accommodated between a respective side plate of the second pair and the bottom plate, characterized in that a part of the bottom plate associated with the location of the elongated light source is formed in the shape of a top reflector.

2. Method of producing a lighting fixture according to claim 1, characterized in that the top reflector shape is formed in the bottom plate by means of a stamp.

3. Lighting fixture comprising a box-shaped housing having a rectangular bottom plate and a first and a second pair of parallel side plates connected with the bottom plate, said side plates defining a rectangular lighting opening, at least one lamp holder, which can be mounted on at least one position at the inside of at least one of said side plates of the first pair, for a substantially elongated light source, and two side reflectors accommodated between a respective side plate of the second pair and the bottom plate, wherein the bottom plate is provided with two end parts, whose sides opposite the sides connected with a respective side plate of the second pair along first connecting lines are located on second connecting lines, which are parallel to the side plates of the second pair and which are located at a smaller distance from the lighting opening than the first connecting lines, and with an intermediate part, of which opposite sides are respectively located on the second connecting lines, characterized in that the intermediate part is shaped in such a manner that from the second connecting lines to a sectional line of the intermediate part parallel to said second connecting lines the distance from the surface of the intermediate part directed towards the lighting opening to the lighting opening becomes larger along at least a first part of the path defined by a respective second connecting line and said sectional line.

4. Lighting fixture according to claim 3, characterized in that the distance from the surface of the intermediate part tot the lighting opening becomes smaller along a second and last part of the path joining up with the first part.

5. Lighting fixture according to claim 3 or 4, characterized in that the curvature in the intermediate part caused by the varying distance from the surface of the intermediate part to the lighting opening is symmetric with respect to the sectional line.

6. Lighting fixture according to any one of the claims 3 - 5, characterized in that the end parts and the intermediate part form an integral part of the bottom plate.

7. Lighting fixture according to any one of the claims 3 - 6, characterized in that the intermediate part is punched in the bottom plate.

8. Lighting fixture according to any one of the claims 3 - 7, characterized in that the end parts are punched in the bottom plate.

9. Lighting fixture according to any one of the claims 3 - 8, characterized in that the bottom plate comprises a plurality of parallel intermediate parts for co-operation with respective elongated light sources.

10. Lighting fixture according to any one of the claims 3 - 9, characterized in that at least one ventilation opening is provided in at least one of the end parts.

11. Method of producing a lighting fixture according to any one of the claims 3 - 10, characterized in that the bottom plate is configured by means of a stamp.

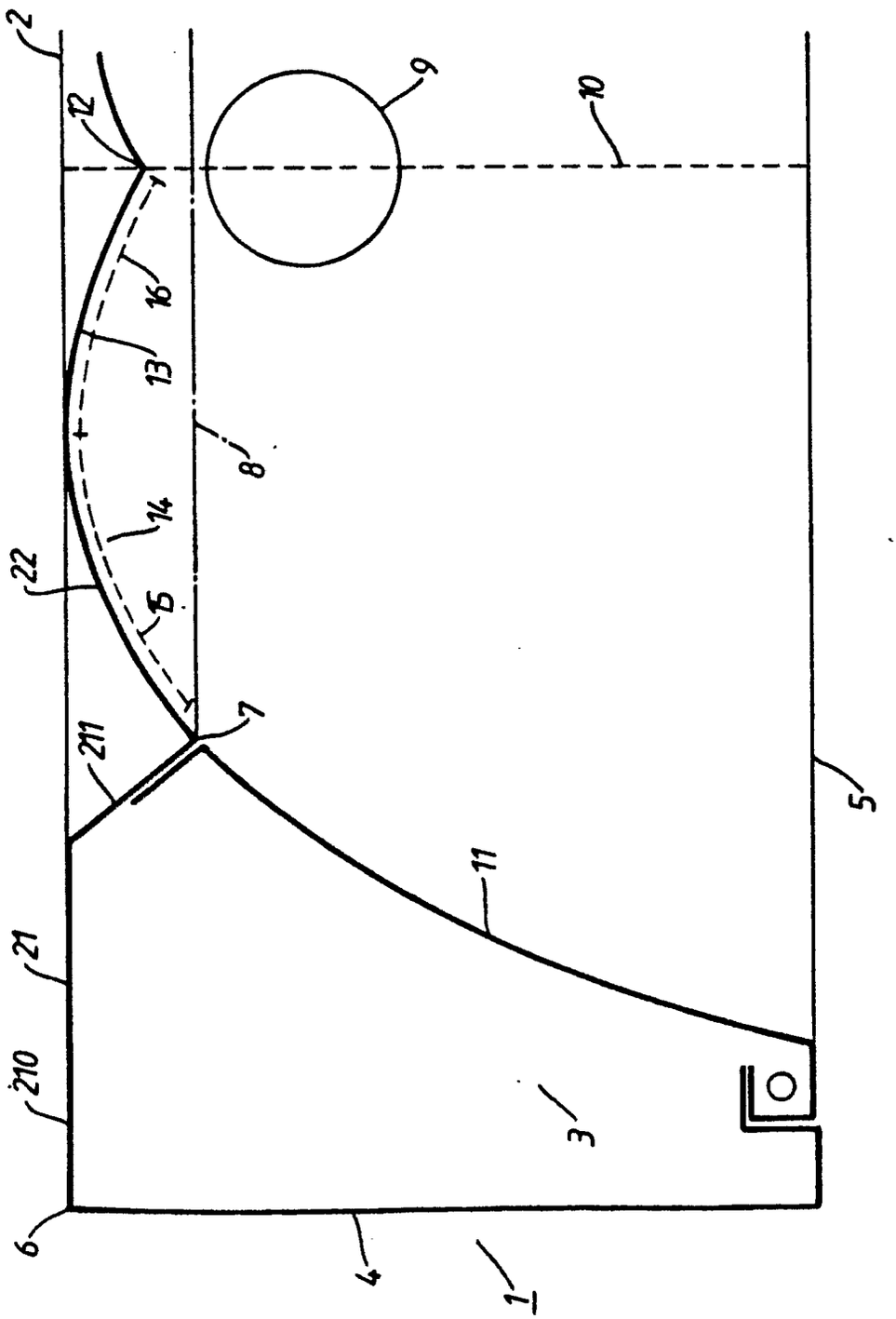

Fig.1.

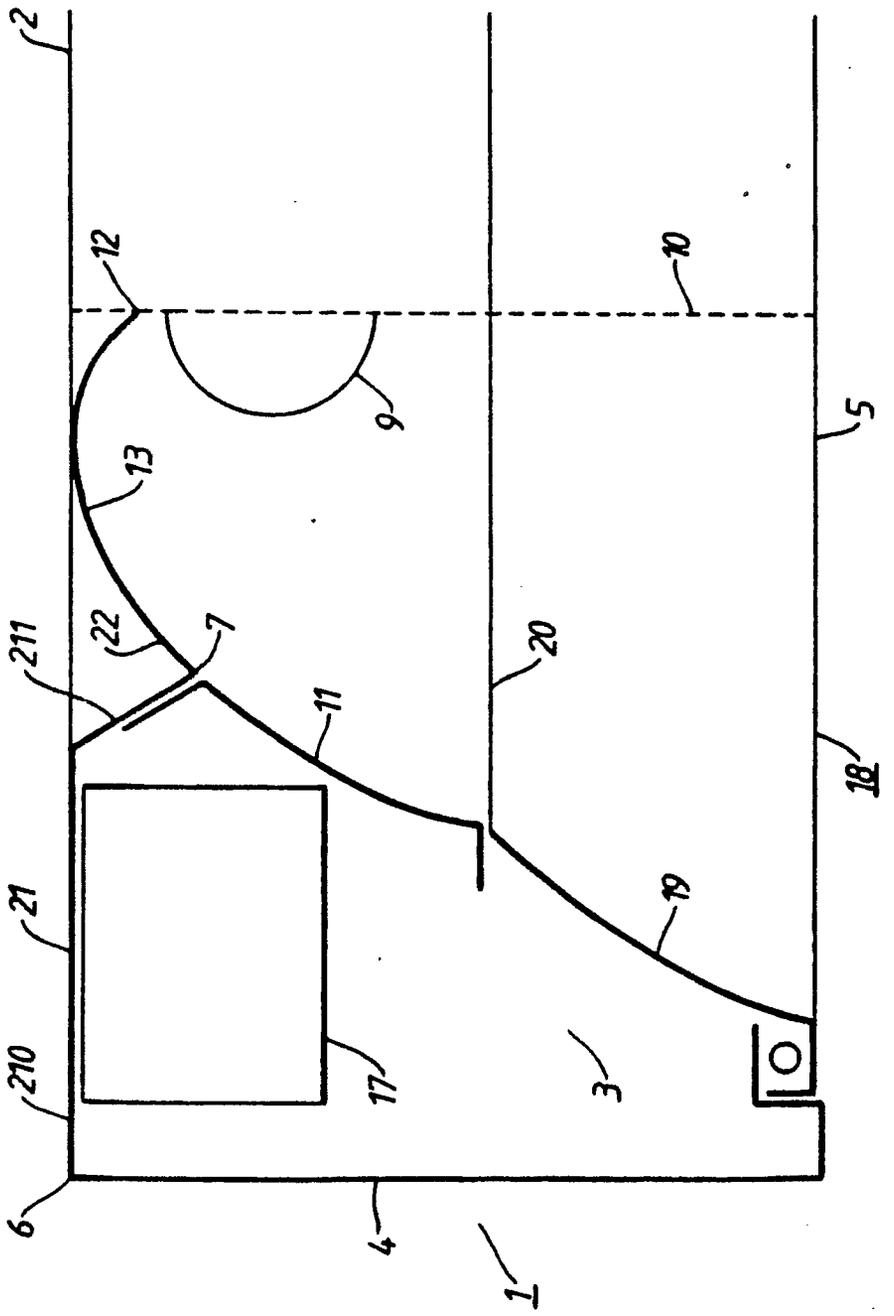

Fig.2.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 20 1033

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	CH-A-465714 (SIEMENS) * the whole document *	1, 9	F21S3/02 F21V7/12
A	US-A-4751626 (PLEWMAN) * column 3, lines 60 - 62; figure 1 *	1	
A	FR-A-1437302 (MINNESOTA MINING AND MANUFACTURING COMPANY) * page 2, column 3, line 54 - column 4, line 5; figures 1, 2 *	3, 4, 5, 10	
A	US-A-2436635 (DE BISHOP) * column 2, lines 30 - 32; figures 1-4 *	1	
A	US-A-1950380 (ARRAS) * column 1, lines 60 - 65 *	2, 7, 8, 11	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

F21S
F21V

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 JUNE 1990	VAN OVERBEEKE J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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