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(54) **Lighting fixture protection**

(57) The invention relates to a light-permeable protection (1) for a ceiling lamp. The lighting fixture (2) comprises a reflector (3) and, as fitted therein, a replaceable electric light source (4), such as a mercury lamp, so that said protection is fastened in connection with the reflector of said lighting fixture. According to the invention, the protection (1) is realized to be a separate accessory including a light-permeable cupola part (11) and a collar (12) provided with fastening means (13), such as a number of screws or a hoop and latch arrangement, for fastening the cupola part detachably to the reflector of the lighting fixture, so that it encompasses the light aperture (31) of the reflector (3). The invention also relates to a lighting fixture (2) provided with a protection (1).

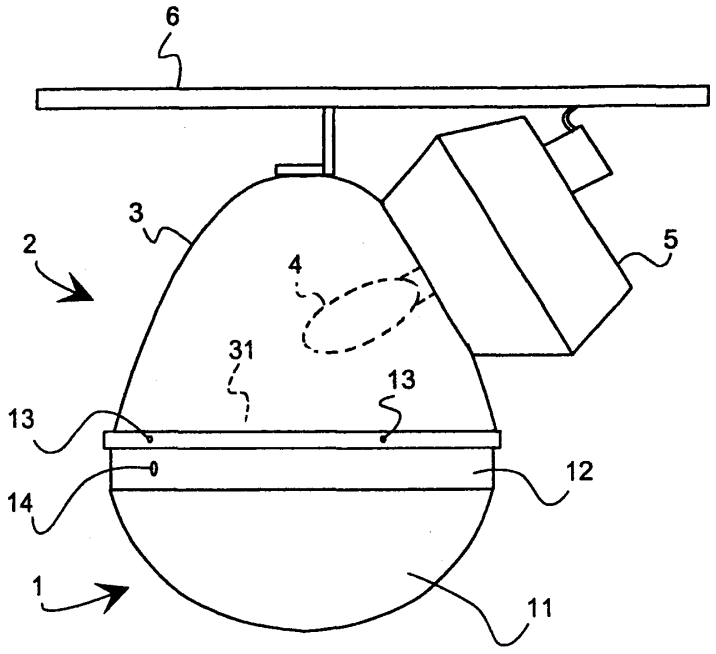

FIG. 1

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Description

[0001] The invention relates to a lighting fixture protection according to the preamble of claim 1. The invention also relates to a lighting fixture according to the preamble of claim 8.

[0002] In the prior art, there is known a light source unit from the Japanese patent publication JP-2001307535, in which unit, a light-permeable protective element is fitted in the opening of the reflector element. Said protective element is realized of a netting element. Its purpose is to prevent the glass splinters from a high-pressure lamp, such as a mercury lamp, from scattering out of the light source unit, in case the lamp should, for one reason or another, explode or be otherwise broken into small pieces. The problem here is the net-like structure of the protective element, which probably remarkably reduces the luminosity of the lamp.

[0003] In the prior art there is known, for example among the industrial lamps manufactured by the applicant, particularly among industrial lamps to be attached to the ceiling, a protection realized of light-permeable plate glass attached to a reflector. The purpose of this, however, is to prevent the access of dust into the lamp, and thus to prevent the reflector from getting dirty. When a high-pressure lamp explodes, a sudden increase in pressure inside the lamp easily breaks the plate glass, which results in more glass splinters than in the case of the destruction of an industrial lamp that is not provided with any plate glass in connection with the reflector.

[0004] The object of the invention is to eliminate the drawbacks connected to the above described lighting fixtures and particularly to their protective elements. Another object of the invention is to realize a novel protection that is in particular suited to be used as an accessory for already installed lighting fixtures, in order to improve safety for instance in the production facilities of food industry.

[0005] A lighting fixture protection according to the invention is characterized by what is set forth in claim 1. A lighting fixture according to the invention is characterized by what is set forth in claim 8. Independent claims describe preferred embodiments of the invention.

[0006] The invention relates to a light-permeable protection for a lighting fixture, particularly a ceiling lamp or a floodlight for a high space, said lighting fixture comprising a reflector and a replaceable electric light source, such as a mercury lamp, connected thereto, so that the protection is attached in connection with said reflector. According to the invention, the protection is realized as a separate accessory including a light-permeable cupola part and a collar provided with fastening means for fastening the cupola part detachably in the lighting fixture reflector, so that it encompasses the light aperture of the reflector.

[0007] It is an advantage of the invention that the protection is a separate accessory that can be installed in existing industrial lamps or the like. As an alternative, it can be purchased as an accessory for new lighting fixtures in industrial or exhibition facilities or in public facilities in general, either new facilities or facilities to be restored. This makes it possible to raise the safety level in said facilities, because the risk of scattering glass splinters produced by possibly explosive lamps is eliminated. This aspect is particularly important in the illumination of production facilities in the food industry. The spreading of tiny glass splinters in the foodstuffs treated in the production process is not desirable. It is, however, pointed out that a lighting fixture functions and can be used also without a protection according to the invention.

[0008] According to a preferred embodiment of the invention, the collar of the protection is provided with a fastening edge that forms an expansion in the open orifice of the collar, in which expansion the outer edge of the reflector orifice can be fitted so that it is supported against said expansion. The advantage is that the protection can be easily attached in place in the reflector of the lighting fixture, and also detached and removed, when necessary.

[0009] In a second preferred embodiment of the invention, the fastening edge of the collar is provided with a sealing. The advantage is that the protection is pressed compactly against the reflector, and gaps cannot be left therebetween. All possible lamp glass splinters can thus be held inside the interior formed by the protection and the reflector.

[0010] In a third preferred embodiment of the invention, the protection, preferably its collar, is provided with at least one aperture. The advantage is that the ventilation in the interior of the protection and the reflector is arranged to be carried out through the aperture. When the lighting fixture is in operation, the air inside the protection and the reflector is heated and expanded, and through the aperture, the expanding air can be discharged out of the lighting fixture. When the lighting fixture is switched off, the situation is reversed, and air flows through the aperture into the interior of the lighting fixture. In that case, the reflector of the lighting fixture can be a closed reflector, realized without any apertures.

[0011] In a fourth preferred embodiment of the invention, the aperture is provided with a dust filter. The advantage is that dust cannot penetrate into the interior of the lighting fixture along with ventilation.

[0012] In a fifth preferred embodiment of the invention, the cupola part is a revolution body with a curved surface, preferably an essentially hemispherical body. The advantage of this kind of shape is that it endures, without being broken and/or detached, the next impact-like pressure wave following the breaking of the lamp.

[0013] In a sixth preferred embodiment of the invention, the cupola part is made of plastic, such as acryl, polycarbonate or the like. The advantage is that, as is well known, a plastic material endures impacts and pressure changes better than for example glass, and what is more, it is much lighter in weight.

[0014] The invention also relates to a lighting fixture,

particularly a ceiling lamp or floodlight made for high spaces, which lamp essentially comprises a reflector and a replaceable electric light source, such as a mercury lamp, fitted therein, as well as a light-permeable protection that is attached in connection with the reflector. According to the invention, the protection includes a light-permeable cupola part and a collar provided with fastening means for fastening the cupola part detachably to the reflector of the lighting fixture, so that it encompasses the light aperture of the reflector.

[0015] The invention is explained in more detail below, with reference to the appended drawing, where

Figure 1 is a side-view illustration of a ceiling lamp that is provided with a protection according to the invention;

Figure 2 is a side-view illustration of a protection according to the invention, and

Figure 3 shows an enlarged view of a cut-off part A - A of the protection illustrated in Figure 2.

[0016] Like numbers for like parts are used in the drawings.

[0017] In Figure 1, the lighting fixture 2 is an industrial lamp installed in the ceiling, which lamp is used for illuminating high spaces, for example with a height of 5 - 20 m, for instance industrial or corresponding facilities. The lighting fixture 2 comprises a reflector 3 and, as fitted therein, a replaceable electric light source 4, such as a mercury lamp, a high-pressure sodium lamp as well as mechanical and electric connecting elements 5 for connecting the lamp in the lighting fixture and further to an electricity source, advantageously the mains. By a support element 6, the lighting fixture 2 can be attached to the ceiling, but it can also be attached to the wall or to a pillar by suitable suspension elements.

[0018] In the example of Figure 1, the shape of the reflector 3 of the lighting fixture 2 is a rotation paraboloid, but it can also have some other geometrical shape, such as a truncated cone or the like, the cross-section of which can be a circle, an ellipse, a square, a rectangle or a combination of these.

[0019] The protection 1 according to the invention is detachably attached in connection with the reflector 3, particularly in its light aperture 31, as is illustrated in Figures 1 and 3. The protection 1 is realized to be a separate accessory that includes a light-permeable cupola part 11 and a collar 12. Fastening means 13 are provided for fastening the cupola part 11 of the collar 12 in the lower part of the reflector 3, particularly in the light aperture 31 of the reflector, so that it encompasses the light aperture 31.

[0020] In the described preferred embodiment of the invention, the fastening means 13 are realized by means of screws 13a. Advantageously the screws 13a are arranged at regular angle intervals, for instance at intervals of 90 degrees, on the circumference of the collar 12, so that in the protection fastening step, they can be turned towards the collar 12 and the interior of the protection 1, for fastening the protection to the reflector, and respectively in the removal step, they can be turned outwards from the collar 12 and from the interior of the protection, for detaching the protection from the reflector in order to remove it.

[0021] The collar 12 of the protection 1 is annular in shape, and it is provided with a fastening edge 12a. The fastening edge 12a forms, in the open orifice of the collar 12, an expansion in which the outer edge 32 encompassing the orifice 31 of the reflector 3 can be fitted, so that it is supported against the interior of the expansion. In addition, the fastening edge 12a of the collar 12 is provided with a sealing 16, preferably a sealing strip. In the fastening step of the protection 1, the sealing 16 is compressed in between the outer edge 32 of the reflector 3 and the fastening edge 12a, so that it forms an air-tight lock between the interior and exterior that the reflector and the protection have in common. When suitably turned to be closed (cf. dotted lines in connection with the screw 13a in Figure), the screws 13a serving as the fastening means 13 hold the reflector 3, by its outer edge 32, inside the fastening edge 12a, and consequently the protection 1 and the reflector 3 of the lighting fixture 2 mutually attached.

[0022] As an alternative, the fastening means 13 can be realized by means of a hoop and a latch arrangement. In that case the hoop is connected to the top part of the collar 12. When the protection 1 is attached in connection with the reflector 3, the hoop is tightened around the lower part of the reflector of the lighting fixture by means of one or several latches belonging to the latch arrangement. The hoop is loosened by opening the latches, and respectively the protection can be detached from the reflector 3.

[0023] According to a preferred embodiment of the invention, the collar 12 of the protection 1 is provided with at least one aperture 14. Through said aperture 14, the ventilation of the interior of the reflector 3 and the protection 1 is arranged to be carried out. In addition, it is advantageous that a dust filter 15 is provided in connection with the aperture/apertures 14. In the embodiment of Figure 3, the collar 12 is provided with a pocket 17, in which pocket an advantageously plate-like, porous and elastic dust filter can be fitted and easily replaced.

[0024] In an embodiment of the invention according to the drawings, the cupola part 11 of the protection is a revolution body with a curved surface, preferably a body with an essentially hemispherical shape. Advantageously the cupola part 11 is made of plastic, such as acryl, polycarbonate or the like.

[0025] The invention also relates to a lighting fixture 2 that is provided with a protection 1 described above. In particular, said lighting fixture 2 is a ceiling lamp or a floodlight made for high spaces, which lamp comprises a reflector 3 and as fitted therein, a replaceable electric

light source 4, such as a mercury lamp, and a light-permeable protection 1 that is attached in connection with the reflector. The protection 1 comprises a light-permeable cupola part 11 and a collar 12 provided with fastening means 13 for fastening the cupola part detachably in the reflector 3 of the lighting fixture, so that it encompasses the light aperture 31 of the reflector 3.

[0026] The protection 1 is preferably realized and fastened in the reflector 3 by methods and elements that are described in the specification and/or drawings above.

[0027] The invention is not restricted to the above described embodiment only, but many modifications are possible within the scope of the inventive idea defined in the claims.

Claims

1. A light-permeable protection (1) for a lighting fixture, particularly a ceiling lamp or floodlight made for high spaces, said lighting fixture (2) comprising a reflector (3) and, as fitted therein, a replaceable electric light source (4), such as a mercury lamp, so that said protection is fastened in connection with the reflector of said lighting fixture, **characterized in that** the protection (1) is realized to be a separate accessory including a light-permeable cupola part (11) and a collar (12) provided with fastening means (13) for fastening the cupola part detachably to the reflector of the lighting fixture, so that it encompasses the light aperture (31) of the reflector (3).

2. A lighting fixture protection according to claim 1 or 2, **characterized in that** the protection collar (12) is provided with a fastening edge (12a) that forms an expansion in the open orifice of the collar, in which expansion the outer edge (32) of the orifice (31) of the reflector (3) can be fitted, so that it is supported against the expansion.

3. A lighting fixture protection according to claim 1, 2 or 3, **characterized in that** the fastening edge (12a) of the collar (12) is provided with a sealing (16).

4. A lighting fixture protection according to claim 1 or 2, **characterized in that** the protection (1), preferably its collar (12), is provided with at least one aperture (14), through which the ventilation in the interior of the protection is arranged to be carried out.

5. A lighting fixture protection according to claim 3, **characterized in that** a dust filter (15) is provided in connection with the aperture/apertures (14).

6. A lighting fixture protection according to any of the preceding claims, **characterized in that** the cupola part (11) is a revolution body with a curved surface, preferably a body having an essentially hemispherical shape.

7. A lighting fixture protection according to any of the preceding claims, **characterized in that** the cupola part (11) is made of plastic, such as acryl, polycarbonate or the like.

8. A lighting fixture (2), particularly a ceiling lamp or a floodlight made for high spaces, comprising a reflector (3) and, as fitted therein, a replaceable electric light source (4), such as mercury lamp, and a light-permeable protection (1) that is fastened in connection with the reflector, **characterized in that** the protection (1) includes a light-permeable cupola part (11) and a collar (12) provided with fastening means (13) for fastening the cupola part detachably in the reflector of the lighting fixture, so that it encompasses the light aperture (31) of the reflector (3).

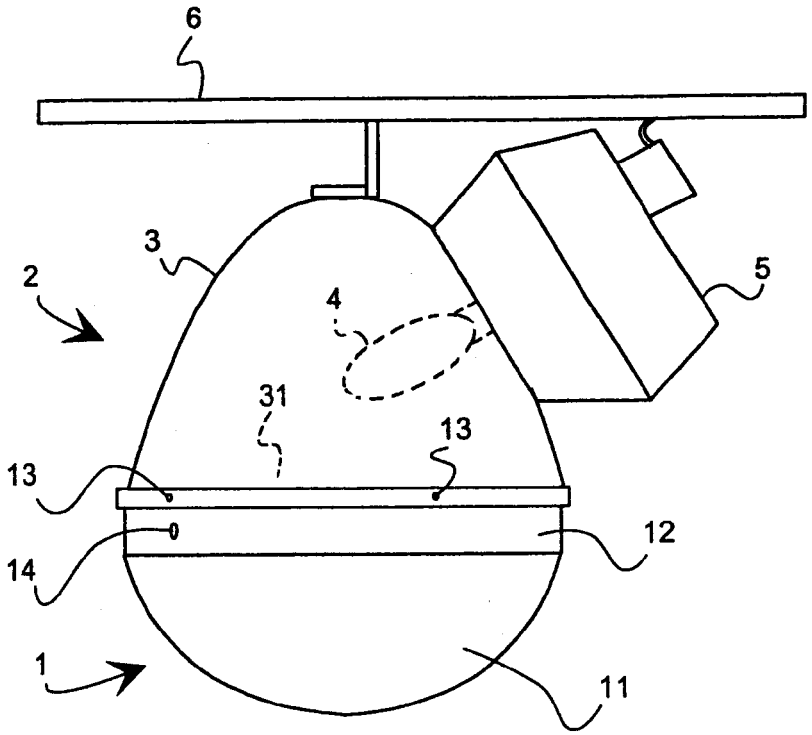

FIG. 1

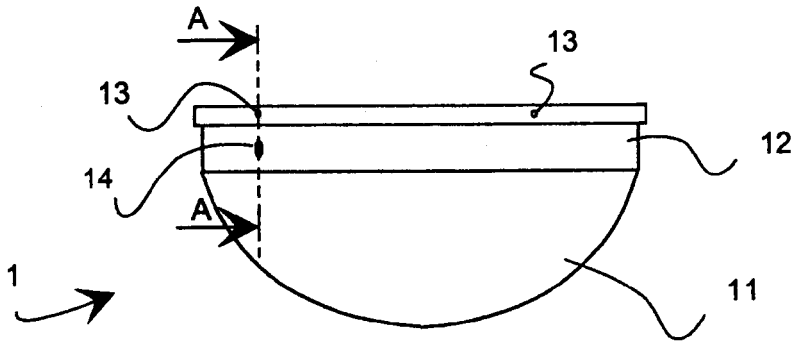

FIG. 2

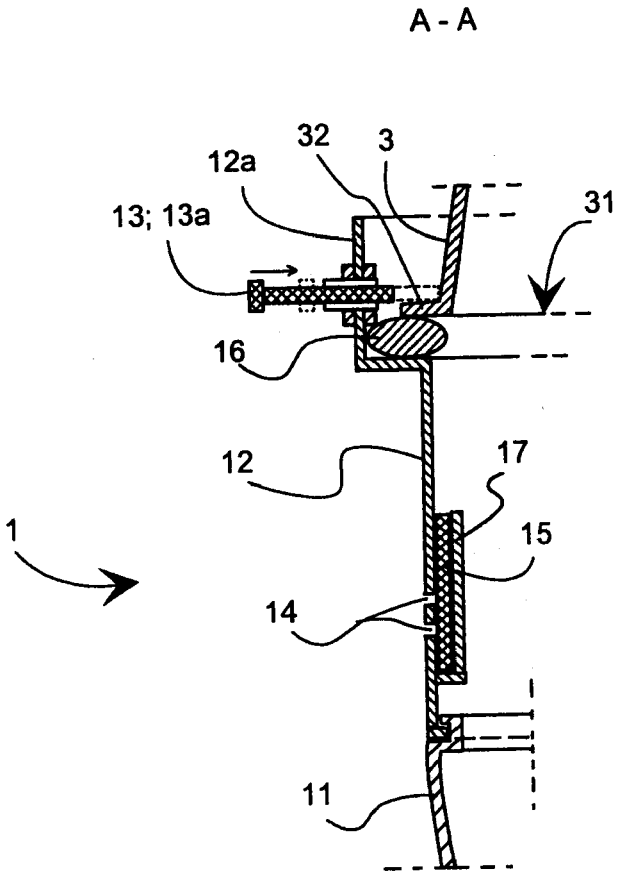

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 06 11 8918

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 November 2006	Allen, Katie

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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