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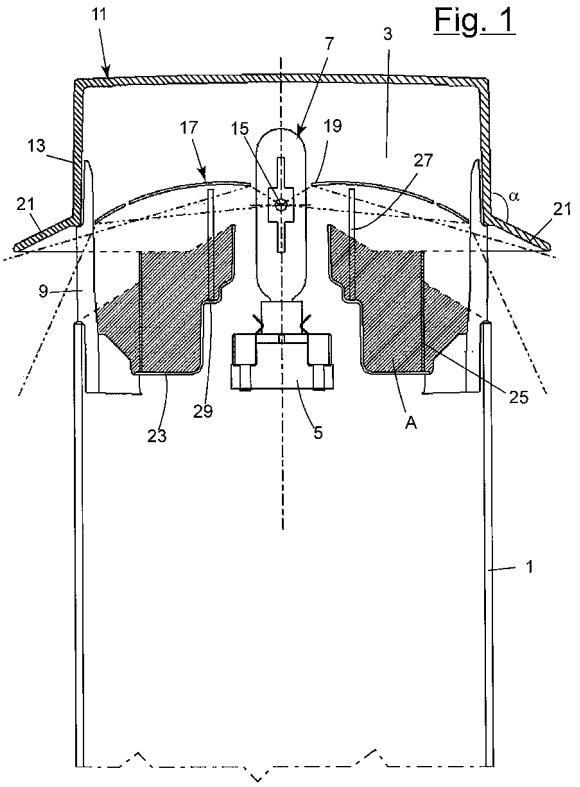
(54) Column lighting device

(57) Lighting device of the column type, comprising a support structure (1) provided at the top thereof with an optical space (3), a housing (5) for at least one light source (7) arranged inside the optical space (3), a light passage screen (9) that makes the side surface of the optical space (3), a cap (11) of opaque material arranged on top of the optical space (3), the side wall (13) of the cap (11) covering at least partly the transparent screen (9), and at least one reflector screen (17) with curved section, with concavity facing downwards, arranged inside the optical space (3). The bottom portion of the side wall (13) of the cap (11) exhibits an enlarged outer edge (21) which operates in combination with the light absorbing means present inside the optical space (3) for screening all the light beams emitted above the horizontal plane passing through the centre of gravity of the transparent portion of the screen (9) and/or for deviating the light beams emitted by the light source (7) and reflected by the reflector screen (17) downwards.

Fig. 1



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Description

[0001] The present invention relates in general to lighting devices and more in particular, to a column lighting device of the so-called "bollard" type.

[0002] Column lighting devices, also called "bollards" for their particular shape vaguely similar to that of a bollard, may be divided into two product classes: those wherein the light source is visible and those wherein the light source is screened with respect to the observer.

[0003] It is known that column lighting devices in the first class exhibit the problem of the possible blinding of an observer, whereas lighting devices in the second class have very low lighting performance, due to the fact that the screening absorbs a considerable portion of the light radiation.

[0004] To solve these problems, in the Italian patent application No. MI2005A000595 the same Applicant discloses a column lighting system internally provided with a light source and an outer top cap or cover that covers at least partly a side screen that allows the passage of the light emitted by the above light source. The device is further internally provided with a reflector screen capable of directing the light beams through the portion of side screen not covered by the top cap.

[0005] This particular embodiment allows combining visual comfort needs, efficiency and restriction of light scattering upwards, but nevertheless it exhibits some disadvantages.

[0006] In order to adjust to the most recent standards concerning the reduction of light pollution, in fact, it has been noted that a lighting device like the one described above exhibits the disadvantage of emitting an overly high amount of light if the portion of transparent side screen not covered by the top cap is particularly wide.

[0007] On the other hand, if the height of the transparent screen was simply reduced by the top cap for limiting the light emission, or if such cap was provided with a long protruding veil that covers the entire transparent screen, also the efficiency of the lighting device itself would be too reduced in relation to the amount of light that the light source contained therein can emit.

[0008] The object of the present invention therefore is to provide a column lighting device capable of reducing as much as possible the light scattering upwards or, in other words, of sending the light only downwards relative to a horizontal plane passing through the lighting element, with the objective of returning within the parameters set forth by the strict current regulations regarding light pollution.

[0009] Another object of the present invention is to provide a column lighting device particularly efficient in relation to the light emitted, exhibiting devices capable of ensuring an improved and more even lighting of the ground in the proximity of the base thereof.

[0010] Yet another object of the present invention is to have a column lighting device which should be simple and inexpensive to manufacture and manage.

[0011] These objects according to the present invention are achieved by making a column lighting device which exhibits the features described in claim 1.

[0012] Further features of the column lighting device of the present invention are described in the following dependent claims.

[0013] The features and the advantages of a column lighting device according to the present invention will appear more clearly from the following description, made by way of a non-limiting example with reference to the attached schematic drawing wherein there is shown a section view of a preferred embodiment of the column lighting device of the invention.

[0014] With reference to the particular embodiment shown in Figure 1, there is schematically shown a lighting system of the so-called "bollard" type, consisting of a support structure 1 with elongated shape in the top portion whereof there is formed an optical space 3 wherein a housing 5 is arranged for at least one light source 7.

[0015] The side surface of the optical space 3, through which the light is emitted outwards, consists of a light passage screen 9, made of shock resistant material and transparent to light, for example of glass or, preferably, of a plastic transparent material such as polycarbonate.

[0016] On top of the column lighting device there is then arranged a cap 11 of opaque material that blocks the emission of light upwards, whose side wall 13 covers at least partly the transparent screen 9.

[0017] Inside the optical space 3 of the column lighting device, immediately on top of bulb 15 of light source 7, there is arranged a reflector screen 17 with curved section, with concavity facing downwards. The surface of the reflector screen 17 with curved section exhibits, proceeding from the centre towards the periphery of the reflector screen 17 itself, a first portion 19 that follows an ascending pattern, the remaining portion of the surface having on the other hand a descending pattern. In particular, the surface portion 19 with ascending pattern has a shorter length, measured on the vertical section, as compared to that of the remaining portion of screen 17.

[0018] As is seen in the figure, the reflector screen 17 is centrally pierced to be arranged around the light source 7 and is positioned for being, in operating conditions, immediately above bulb 15 of the light source 7 itself, so as to direct the light beams laterally downwards through screen 9.

[0019] Advantageously, the bottom portion of the side wall 13 of cap 11 exhibits an enlarged outer edge 21 which forms a little veil capable of screening all the light beams emitted above the horizontal plane passing through the centre of gravity of the transparent portion of screen 9 and/or further deviating the light beams emitted by source 7 and reflected by screen 17 downwards. The tilt of veil 21 relative to wall 13 of cap 11 is variable according to the amount of light to be emitted through the transparent screen 9, while directing as much as possible such light towards the base of the support structure 1, but it is in any case such that angle α that forms be-

tween said veil 21 and said wall 13 is larger than 90°.

[0020] According to a preferred embodiment of the invention, both the peripheral portion of the reflector screen 17, that is, that facing the transparent screen 9, and veil 21 of cap 5 are at a lower height than bulb 15 of the light source 7. Therefore, the light source 7 is completely screened relative to the horizontal plane passing through the centre of gravity of the transparent portion of screen 9, thus being impossible for the light emitted by said source 7 to cross the transparent screen 9 following a trajectory parallel to the ground or directed upwards. In this way, the light source 7 is completely hidden to an observer's view whose eyes are at a greater height than that of the transparent screen 9. Moreover, the particular tilt of veil 21, along with the bend of the reflector screen 17, allows deviating the light with particularly narrow angles for projecting it into the zones closer to the base of the support column 1 of the lighting device.

[0021] The column lighting device according to the invention further envisages the presence, inside the optical space 3 that seats the light source 7, of a labyrinth consisting of a plurality of light absorbing screens arranged in a concentric manner, of honeycomb structures and of spongy material padding (not shown) that operate separately or in conjunction for preventing stray light beams from being directed upwards.

[0022] More in particular, in the example of embodiment illustrated in the figure, the labyrinth is arranged in area A shown by a dashed line and is arranged below the horizontal plane passing through bulb 15. It comprises at least a first light absorbing screen 23, arranged circumferentially about housing 5 of the light source 7, a few distance therefrom and right below the bottom end of bulb 15. Preferably, the top edge of the light absorbing screen 23 is at a higher height than the bottom edge of veil 21, so as to further contribute to preventing light from being emitted from the lighting device according to the invention in a direction parallel to the ground.

[0023] Moreover, the light absorbing labyrinth of the column lighting device according to the embodiment shown in the figure comprises at least a second light absorbing screen 25, of generally cylindrical shape and arranged farther from the light source 7 and lower than screen 23 described above.

[0024] Similar to that indicated for the first screen 23, also the top edge of light absorbing screen 25 is at a height equal to or higher than, the bottom corner of veil 21.

[0025] The function of the second light absorbing screen 25, which can also operate in combination with further screening walls and/or with padding of a spongy material, is to eliminate the forming of unpleasant signs that could form on the ground as a consequence of the unavoidable construction variability of the light sources usable and to increase the visual comfort.

[0026] In particular, if there are multiple concentric screening walls (not shown) besides screen 25, they are arranged in such a way as to have a decreasing height starting from the vertical centre of gravity axis of column 1 as the outer wall of column 1 itself is approached.

[0027] Finally, there may be provided a transparent enclosure 27 partly arranged inside the light absorbing labyrinth, preferably made of glass, optionally coloured, and of generally cylindrical shape. Such enclosure 27, which may extend also above the horizontal plane passing through bulb 15 and preferably rests on a suitable plane portion 29 provided on screen 23, laterally surrounds the light source 7 and physically separates the central zone of the optical space 3, which seats said light source 7, from more peripheral zones of the optical space 3 itself. The presence of enclosure 27 prevents excessive overheating of the air inside the optical space 3, the hot air thus being able to go upwards to be conveyed through the only opening at the central hole of the reflector screen 17.

[0028] It will be understood that thanks to the concurrent presence of elements like the reflector screen 19, veil 21 and the light absorbing labyrinth, as well as to their particular shape and arrangement inside column 1 of the lighting device according to the invention, the purposes mentioned hereinbefore are achieved. In particular, the purpose of fully screening the light source relative to the horizontal plane passing through the centre of gravity of the transparent portion of the light passage screen is achieved, since no surface inside the optical space reflects light on said horizontal plane.

[0029] Moreover, all the surfaces inside the optical space, with the exception of the transparent ones and of those specifically designed to be reflecting, are treated in such a way as to absorb light, so that only the desired amount of light is correctly directed, maximising the efficiency of the lighting device and completely eliminating stray reflection production phenomena.

[0030] The present invention has been described by way of a non-limiting example according to a preferred embodiment thereof, but it is understood that variations and/or changes may be made by men skilled in the art without departing from the relative scope of protection, as defined in the annexed claims.

[0031] In particular, the shapes of the lighting device of the invention may differ from that shown by way of a non-limiting example only in the figure, and the materials used may also be different on the basis of the different technical requirements.

Claims

1. Column lighting device comprising:

- a support structure (1) provided at the top with an optical space (3);
- a housing (5) for at least one light source (7) arranged inside said optical space (3);
- a light passage screen (9) that makes the side surface of said optical space (3);
- a cap (11) of opaque material arranged on top

of said optical space (3), the side wall (13) of said cap (11) covering at least partly said transparent screen (9); and

- at least one reflector screen (17) with curved section, with concavity facing downwards, arranged inside said optical space (3),

characterised in that the bottom portion of the side wall (13) of said cap (11) exhibits an enlarged outer edge (21) which operates in combination with light absorbing means present inside said optical space (3) for screening all the light beams emitted above the horizontal plane passing through the centre of gravity of the transparent portion of said screen (9) and/or for deviating the light beams emitted by said light source (7) and reflected by said reflector screen (17) downwards.

2. Lighting device according to claim 1, **characterised in that** the tilt of said enlarged outer edge (21) relative to the wall (13) of said cap (11) is variable according to the amount of light to be emitted through said transparent screen (9) and to be directed towards the base of said support structure (1).

3. Lighting device according to claim 2, **characterised in that** the angle (α) formed between said enlarged outer edge (21) and said wall (13) is larger than 90°.

4. Lighting device according to claim 1, **characterised in that** both the peripheral portion of said reflector screen (17) and said enlarged outer edge (21) of the cap (5) are at a lower height than the bulb (15) of said light source (7).

5. Lighting device according to claim 1, **characterised in that** said light absorbing means comprises a labyrinth consisting of at least two light absorbing screens arranged in a concentric manner, of honeycomb structures and/or of opaque padding that operate separately or in conjunction for preventing stray light beams from passing through said transparent screen (9).

6. Lighting device according to claim 5, **characterised in that** said labyrinth is arranged below the horizontal plane passing through said emitter bulb (15) of said light source (7).

7. Lighting device according to claim 6, **characterised in that** said labyrinth comprises at least a first light absorbing screen (23), arranged around the housing (5) of said light source (7).

8. Lighting device according to claim 7, **characterised in that** the top edge of said light absorbing screen (23) is at a higher height than the bottom corner of said enlarged outer edge (21).

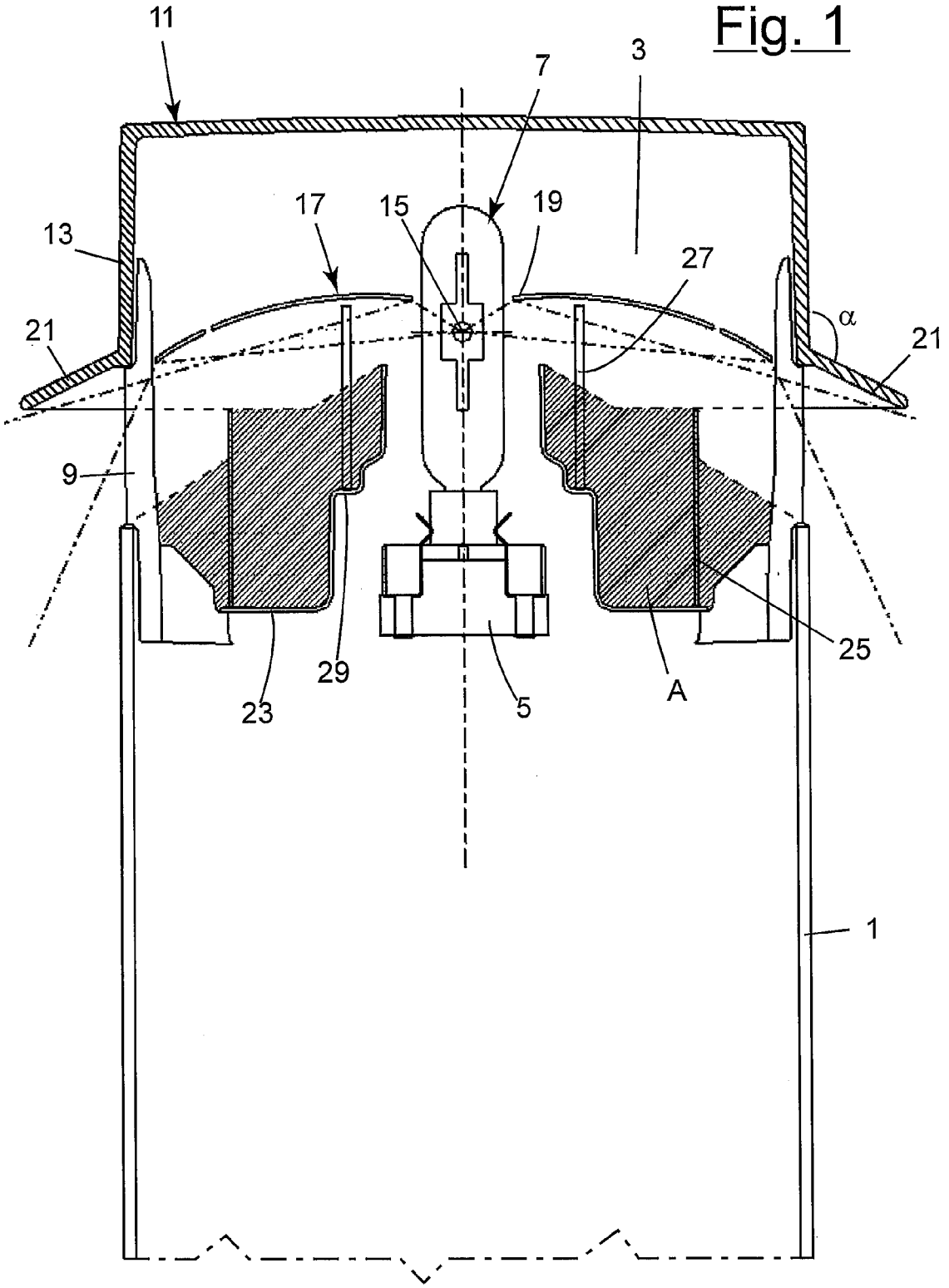
9. Lighting device according to claim 7, **characterised in that** said labyrinth further comprises at least a second light absorbing screen (25), arranged farther from said light source (7) and lower than said screen (23).

10. Lighting device according to claim 9, **characterised in that** the top edge of said light absorbing screen (25) is at a height equal to or higher than, the bottom corner of said enlarged outer edge (21).

11. Lighting device according to claim 9, **characterised in that** said at least one second screen (25) comprises at least two screens arranged so as to have a decreasing height starting from the vertical centre of gravity axis of said support structure (1) as the outer wall of said support structure (1) is approached.

12. Lighting device according to claim 5, **characterised in that** it further comprises a transparent enclosure (27), partly arranged within said labyrinth, which laterally surrounds the light source (7), physically separating the central zone of said optical space (3), which seats said light source (7), from the more peripheral zones of said optical space (3).

Fig. 1



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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