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port element (14), on which the light sources and the feeder of the equipment are wired. Since the movable head (13) is the only opening between the outside and the inside, the seal results extremely improved, compared to the traditional equipment, because the silicone seal gasket (17) has a length lower than that one of the traditional equipment, and the rigidity of the movable head (13) offers an uniform pressure on the silicone gasket (17), unlike what happens in the traditional equipment.



Description

[0001] The present invention relates generally to watertight seal lighting equipment.

[0002] More particularly, the invention relates to a pre-assembled lighting ceiling lamp for waterproof and anti-corrosive environments.

[0003] The ceiling lamps for waterproof and anticorrosive environments are lighting apparatus with typically IP65 protection degree, entirely made of plastic or metal, which use fluorescent lamps of T5 or T8 type.

[0004] These ceiling lamps of traditional type present a protection screen made of plastic or moulded glass or a slab made of tempered glass; in addition, they can use luminous flux recuperators (reflectors) made of polished aluminium or metalized plastic.

[0005] The degree of protection against liquid or fluids in general penetration is achieved through a seal gasket which is placed between the plastic structure or body and the screen and kept in position by means of perimetrical closing hooks.

[0006] The light sources used in these lighting equipment imply a non-negligible dimension of the same (about 1,3-1,5 meters, depending on the type of fluorescent lamp used) and, therefore, the perimeter on which the seal gasket works becomes a path which can exceed 3 linear meters.

[0007] It follows, therefore, that closing hooks (present in a number of 8-10 per each lighting equipment) distribute the pressure exerted on the gasket in an irregular way and moreover, in the most applications, the same hooks can become repositories of dirt, oils, etc. and thus make difficult the cleaning operations, which are necessary for the maintenance of the lighting equipment.

[0008] The seal gasket is finally stressed whenever the access to the interior of the equipment becomes necessary in order to perform routine maintenance (for example, for replacing the exhausted fluorescent lamps), with the risk of compromising the seal degree of the equipment.

[0009] The purpose of the present invention is therefore to eliminate the drawbacks complained, creating a watertight seal lighting equipment which allows to keep for long the seal against fluids penetration, without the need to use hooks or other closing elements between the body and the equipment screen.

[0010] Another purpose of the present invention is to provide a watertight seal lighting equipment which allows to achieve a predetermined protection degree against the fluids penetration, according to the regulations in force in the field.

[0011] Another purpose of the invention is to implement a watertight seal lighting equipment which allows to achieve good photometric performances.

[0012] Further purpose of the invention is to carry out a watertight seal lighting equipment which has an excellent quality/price ratio and presents ease of installation and maintenance.

[0013] These and other purposes, according to the present invention, are achieved by implementing a watertight seal lighting equipment, according to the attached claim 1.

[0014] Other specific and detailed technical features are contained in the dependent claims.

[0015] Advantageously, the watertight seal lighting equipment, which is the object of the present invention, allows to achieve the lighting of waterproof and anticorrosive environments, having the body and the screen pre-assembled, sealed, without the use of closing hooks.

[0016] Further features and advantages of a watertight seal lighting equipment, according to the present invention, will result greatly evident from the following description, referring to an illustrative and preferred, but not limiting, embodiment and from the attached drawings, where:

- figure 1 is a perspective view from the top of a watertight seal lighting equipment, according to the present invention;
- figure 2 is a perspective view from the bottom of a watertight seal lighting equipment, according to the present invention;
- figure 3 shows an enlargement of the detail indicated with A in figure 1;
- figure 4 shows an enlargement of the detail indicated with B in figure 1;
- figure 5 is a partial plan view from the bottom of the watertight seal lighting equipment, according to the present invention;
- figure 6 is a first partial side view of the watertight seal lighting equipment, according to the present invention;
- figure 7 is a partial plan view from the top of the watertight seal lighting equipment, according to the present invention;
- figure 8 is a second side view of the watertight seal lighting equipment, according to the present invention;
- figure 9 is a perspective view from the bottom of the watertight seal lighting equipment, in the first operative position, according to the present invention;
- figure 10 is a plan view from the bottom of the watertight seal lighting equipment of figure 9, in the first operative position, according to the present invention;
- figure 11 is a sectional view taken along the line XI-XI of figure 10;
- figure 12 shows an enlargement of the detail indicated with E in figure 11;
- figure 13 is a perspective view from the bottom of the watertight seal lighting equipment, in a second operative position, according to the present invention;
- figure 14 is a plan view from the bottom of the watertight seal lighting equipment of figure 13, in the second operative position, according to the present

- invention;
- figure 15 is a sectional view taken along the line XV-XV of figure 14;
- figure 16 shows an enlargement of the detail indicated with F in figure 15;
- figures 17, 18, 19 and 20 show perspective views from the top of the watertight seal lighting equipment, according to the present invention, in various operative positions;
- figure 21 shows an enlargement of the detail indicated with C in figure 18;
- figure 22 is a side view of the watertight seal lighting equipment illustrated in figures 17, 18, 19 and 20, according to the invention;
- figure 23 is a sectional view taken along the line XX-III-XXIII of figure 22;
- figure 24 shows an enlargement of the detail indicated with D in figure 23;
- figures 25, 26, 27 and 28 show a series of perspective views which illustrate a hooking system for the installation of the watertight seal lighting equipment, according to the present invention, in a classic ceiling configuration.

[0017] With reference to the figures mentioned, the watertight seal lighting equipment, which is the object of the present invention, includes a main body 10, made of sheet iron moulded in one piece, and painted with epoxy-polyester powder, an upper closing screen 11, obtained from a flat slab of tempered glass, a first closing head 12, moulded by die-casting of aluminum and sealed both to the body 10 and the screen 11, and a second movable head 13, moulded by die-casting of aluminum and which can be open with respect to the body 10 (as shown in detail in figures 9, 17, 18 and 21).

[0018] Within the body 10 an extractable support 14 is also arranged, on which the light sources and the feeder are wired and above which luminous flux recuperator or reflector is placed, for a more effective diffusion of the light towards the outside.

[0019] The main body 10 is assembled, by means of mechanical crimping, to the tempered glass closing screen 11, and includes a silicone-based sealing system, as well as the closing head 12 is glued, by means of silicone, to one end of the body 10, while to the other end a moulded frame 15 is fixed, made by die-casting of aluminum, on which the movable head 13 closes, through a hinge coupling 16.

[0020] The movable head 13 represents the only opening between the exterior and the interior of the lighting equipment according to the invention and the silicone gasket which makes the seal, indicated with 17 in figure 24, is placed only on the perimetrical edge of the head 13, thereby presenting a length lower than 30 cm, about one tenth of the length of the gaskets present on watertight seal lighting equipment of traditional type.

[0021] Furthermore, the rigidity of the head 13 provides a uniform pressure on the silicone gasket 17.

[0022] Another innovative element of the lighting equipment according to the invention consists of the system of electrical contact 18 present on the inner part of the movable head 13 (figure 21).

5 **[0023]** In particular, at the moment of the opening of the head 13, acting on the only seal hook of the hinge coupling 16, the electrical disconnection occurs automatically, allowing the user and/or installer and/or maintainer to act totally safely within the equipment.

10 **[0024]** Moreover, the support group 14 of the fluorescent lamps and the feeder can be unthreaded from the inside of the body 10, thanks to a sliding guide system, which allows the extraction thereof.

15 **[0025]** It can be provided a safety hook, which limits the stroke of the support group 14, but, in cases of extraordinary maintenance, the hook can be manually disarmed, in order to allow the total extraction of the support 14.

20 **[0026]** Further characteristic of the present invention is represented by the special hooking system for the installation of the lighting equipment in the classic ceiling configuration.

25 **[0027]** The system allows, in particular, a quick installation of the equipment, beyond to solve the problem of how to access the interior of the body 10 in a condition of continuous row installation, with lighting equipment fitted one adjacent to another.

30 **[0028]** With particular reference to figures 25, 26, 27 and 28, each lighting equipment presents two fastening points, each consisting of two elements 25, 26, made of stainless steel, of which a first element 25, fixed on the outer portion of the body 10, presents a protrusion or bracket 24, suitable to fit within a seat 23 of the element 26, fixed to a surface 22 typically consisting of a ceiling or false ceiling.

35 **[0029]** After having fixed the shaped elements, respectively, 25, 26 on the two surfaces 10, 22 (fig. 25), it is thus possible to quickly hook the ceiling lighting equipment, inserting the bracket 24 into the seat 23 and possibly assuring it, by a safety pin 27 (fig. 26).

40 **[0030]** The bracket 24, thus mounted, serves as rotation fulcrum of the entire lighting equipment, preferably at the fixed plate 12, as shown in detail in figure 27.

45 **[0031]** At this stage, it is possible to anchor the lifting cable 28, made of steel, at the opposite end of the rotation fulcrum, preferably at the movable plate 13, and, by rotating the lighting equipment around the first constraint (consisting of the elements 25, 26 placed at a first end of the lighting equipment, preferably adjacent to the fixed plate 12), the installation is completed by hooking the second bracket 24 of the first element 25 in the seat 23 of the second element 26, at the opposite end of the lighting equipment, preferably adjacent to the movable plate 13 (fig. 28).

50 **[0032]** The lifting cable 28, anchored to the bottom of the outer body 10 of the lighting apparatus, at the frame 15 of the movable plate 13, by means of a hook 29 which fits into a slot 30, allows to keep the lighting equipment

in sloped position, with respect to the installation surface 22, also solving the problem of the possible access within each equipment, in case the latter is part of a plant with continuous row lighting equipment, and facilitating in every situation the extraction of the movable plate 13.

[0033] Finally, the watertight seal lighting equipment according to the invention provides a cam system for adjusting the position of the environmental light sensor.

[0034] It is known that the environmental light sensor, marked with 20 in figures 12 and 16, of the watertight seal lighting equipment works optimally when it is close to the inner surface of the upper screen 11.

[0035] In the case illustrated in the present invention, since such a sensor 20 is an element extractable from the body 10, together with the support group 14, during the insertion of the support 14 within the body 10 of the equipment, the aforesaid sensor keeps a raised position during all the moving of the support 14 (figures 9, 10, 11 and 12) and only near a mechanical end of stroke, corresponding to the total insertion of the support 14 into the body 10, a cam 19 intervenes, which, acting on a support bracket 21 of the sensor 20, varies its position along the vertical axis (figures 13, 14, 15 and 16), until the same sensor 20 reaches the contact with the inner surface of the screen 11 (normal operative condition).

[0036] At a new extraction of the support group 14, the cam 19 acts again on the support bracket 21, placing the sensor 20 in a raised position in order to allow the extraction of the support group 14, complete with the environmental light sensor 20.

[0037] From the description made, the technical features of watertight seal lighting equipment, according to the present invention, as well as the resulting benefits, are clear.

[0038] In particular, among them we mention the following:

- pre-assembly of the structure;
- lack of perimetrical hooks;
- uniform and better seal than that one of the traditional equipment;
- innovative design;
- photometric and optical performances equal to the market references;
- ease of installation and maintenance;
- excellent quality/price ratio;
- automatic electrical contact system;
- system of regulation of the position of the environmental lighting sensor.

[0039] It is, finally, clear that many other variations can be made to the lighting equipment in question, without for this reason going out of the novelty principles inherent to the inventive idea, as it is clear that, in the practical implementation of the invention, materials, shapes and sizes of the illustrated details may be any, depending on the requirements, and the same may be replaced with others technically equivalent.

Claims

1. Watertight seal lighting equipment, in particular for lighting watertight and anti-corrosion environments, comprising a containing body (10), which is made in a single piece and is mechanically fixed to at least one closing screen (11) through seal means, said closing screen (11) being obtained from at least one transparent slab, which is suitable for spreading out a light beam produced by at least one light source and is directed toward at least one reflector or recuperator of luminous flux before said luminous flux is spread outside the equipment, and at least two heads (12, 13), respectively placed at the ends of said equipment and able to assemble said body (10) and said screen (11), **characterized in that** at least one first head (12) is fixed to said body (10) and to said screen (11) at a first end of the lighting equipment, while at least one second head (13), which is located at a second end of the equipment, is movable and can be opened, so that at least one support element (14), in which the power supply circuits of the lighting equipment and said at least one light source are electrically connected, can be extracted from said body (10).
2. Lighting equipment as claimed in claim 1, **characterized in that** at least one frame (15) is fixed to said second end of the equipment, said second head (13) being closable over said frame (15) by means of coupling means (16).
3. Lighting equipment as claimed in claim 2, **characterized in that** seal means (17) are interposed between said second head (13) and said frame (15) and among said first head (12), said body (10) and said closing screen (11).
4. Lighting equipment as claimed in claim 1, **characterized in that** at least one electrical terminal (18) is provided on the internal part of said second head (13), so that when said second head (13) is opened said power supply circuits and said at least one light source are automatically disconnected.
5. Lighting equipment as claimed in claim 1, **characterized in that** said support element (14) is extractable from said body (10) by means of a slide guide system.
6. Lighting equipment as claimed in claim 5, **characterized in that** at least one safety hook is provided in order to limit the stroke of said support element (14) when said support element (14) is extracted from said body (10).
7. Lighting equipment as claimed in claim 1, **characterized in that** at least two shaped elements (25)

are provided on said body (10), said elements (25) being able to fix said lighting equipment to an installation surface (22), each of said elements (25) including at least one bracket (24) insertable inside at least one seat (23) of at least one further shaped element (26), which is fixed to said installation surface (22). 5

8. Lighting equipment as claimed in claim 7, **characterized in that** said bracket (24) constitutes a rotation pivot of the lighting equipment, so that at least one lifting rope (28) for lifting said lighting equipment is fixed to the opposite end of said rotation pivot, in order to keep said lighting equipment in a inclined position with respect to said installation surface (22). 10 15

9. Lighting equipment as claimed in claim 1, **characterized in that** at least one environmental brightness sensor (20) is installed over said support element (14), said sensor (20) being in contact with the inner surface of said screen (11) during a normal operation of the equipment, that is when said second head (13) is closed and said support element (14) is wholly contained within said body (10), while said sensor (20) is in a raised position when said support element (14) is extracted from said body (10). 20 25

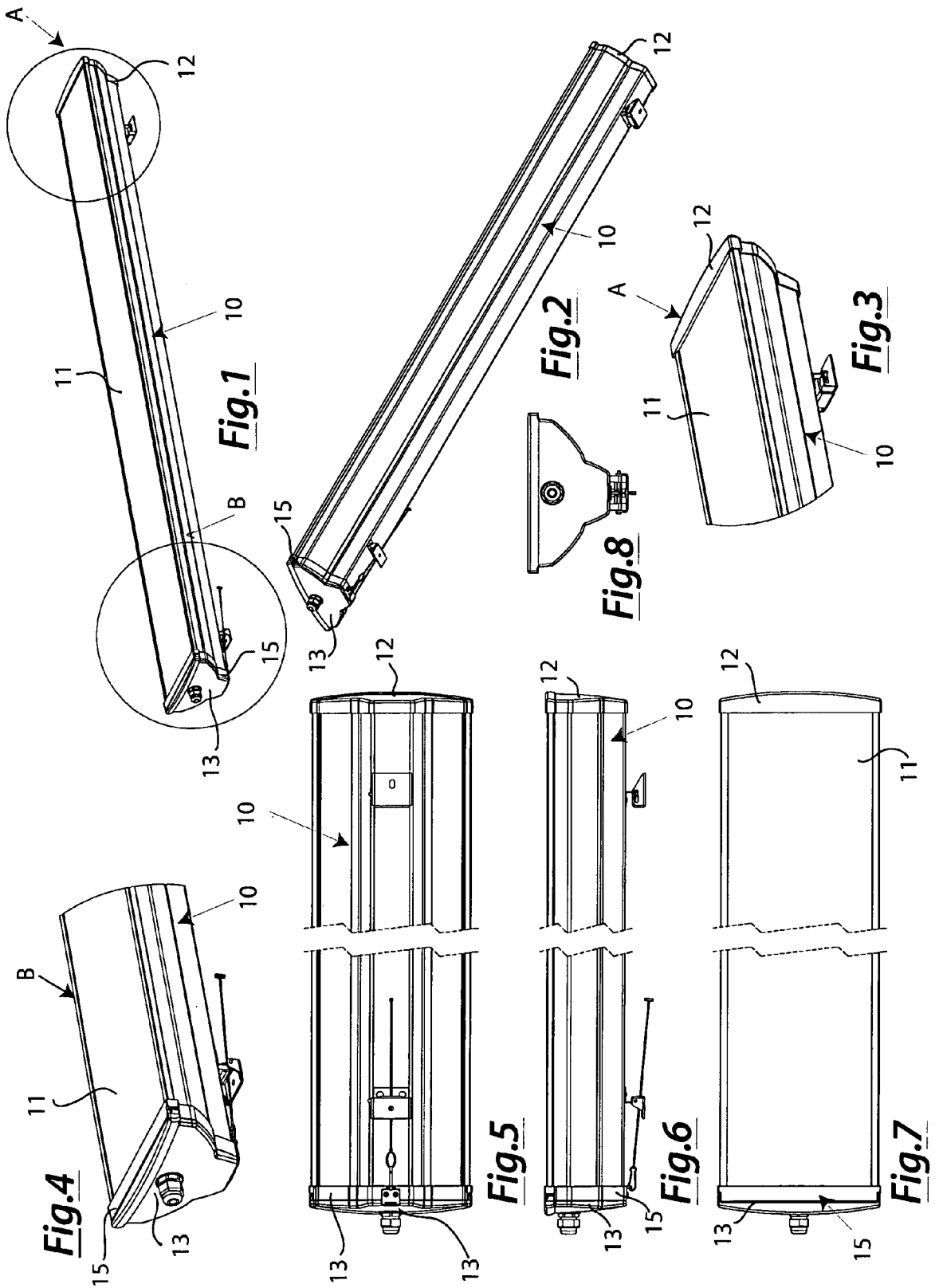
10. Lighting equipment as claimed in claim 9, **characterized in that**, when a full inclusion of said support element (14) is carried out within said body (10) and near a mechanical limit stop, at least one cam (19) is able to act on a support (21) of said environmental brightness sensor (20), so as to vary the position of said sensor (20) along a vertical axis so long as said sensor (20) contacts said inner surface of the screen (11). 30 35

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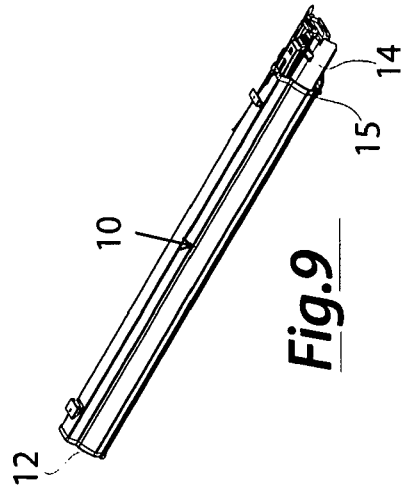


Fig. 9

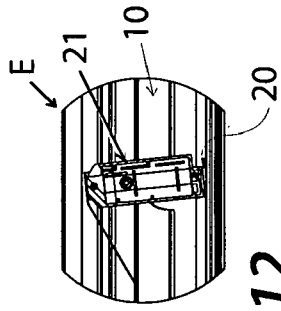


Fig. 12

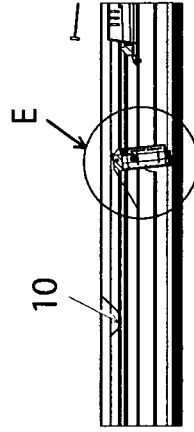


Fig. 11

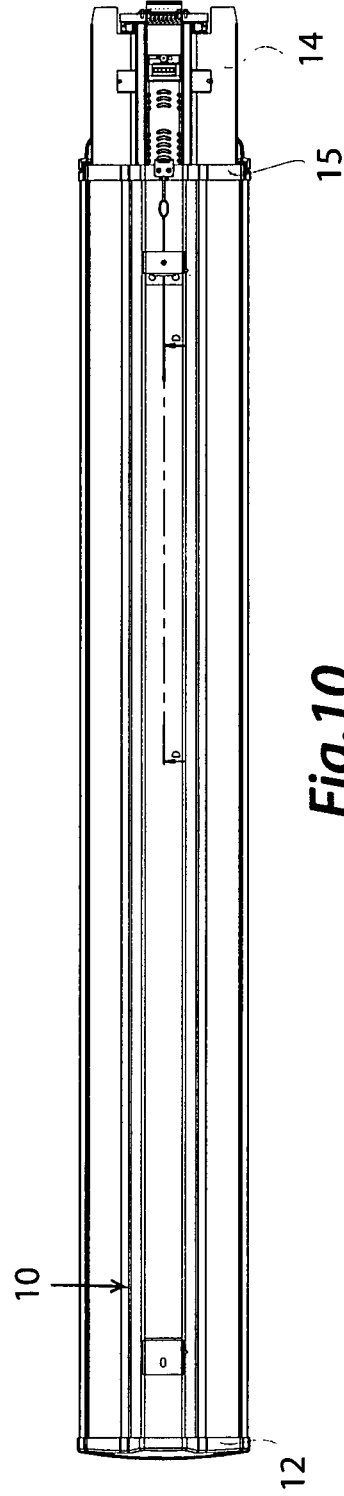
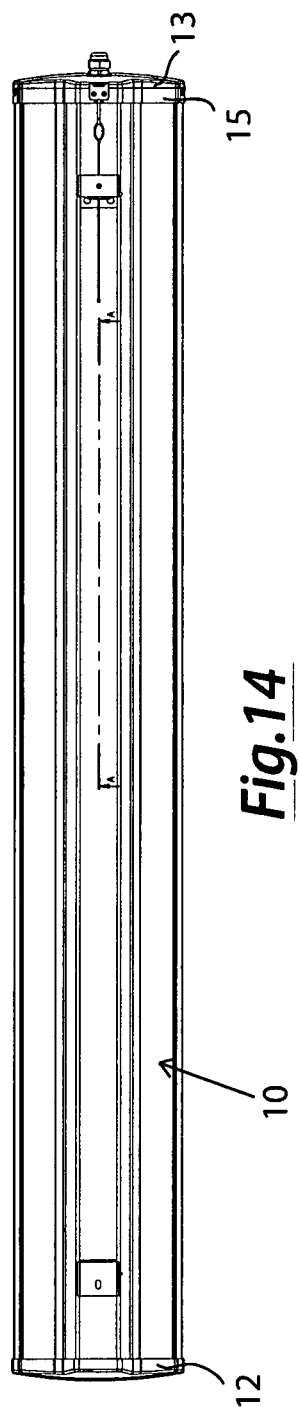
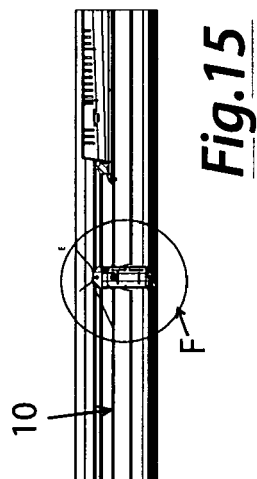
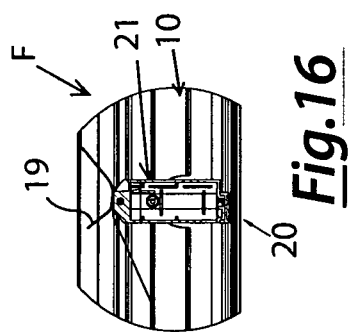
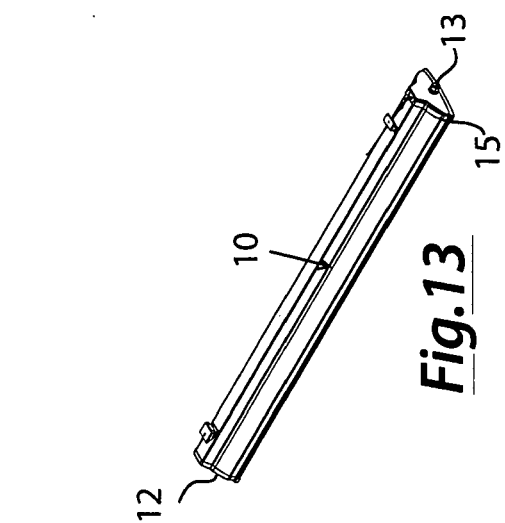
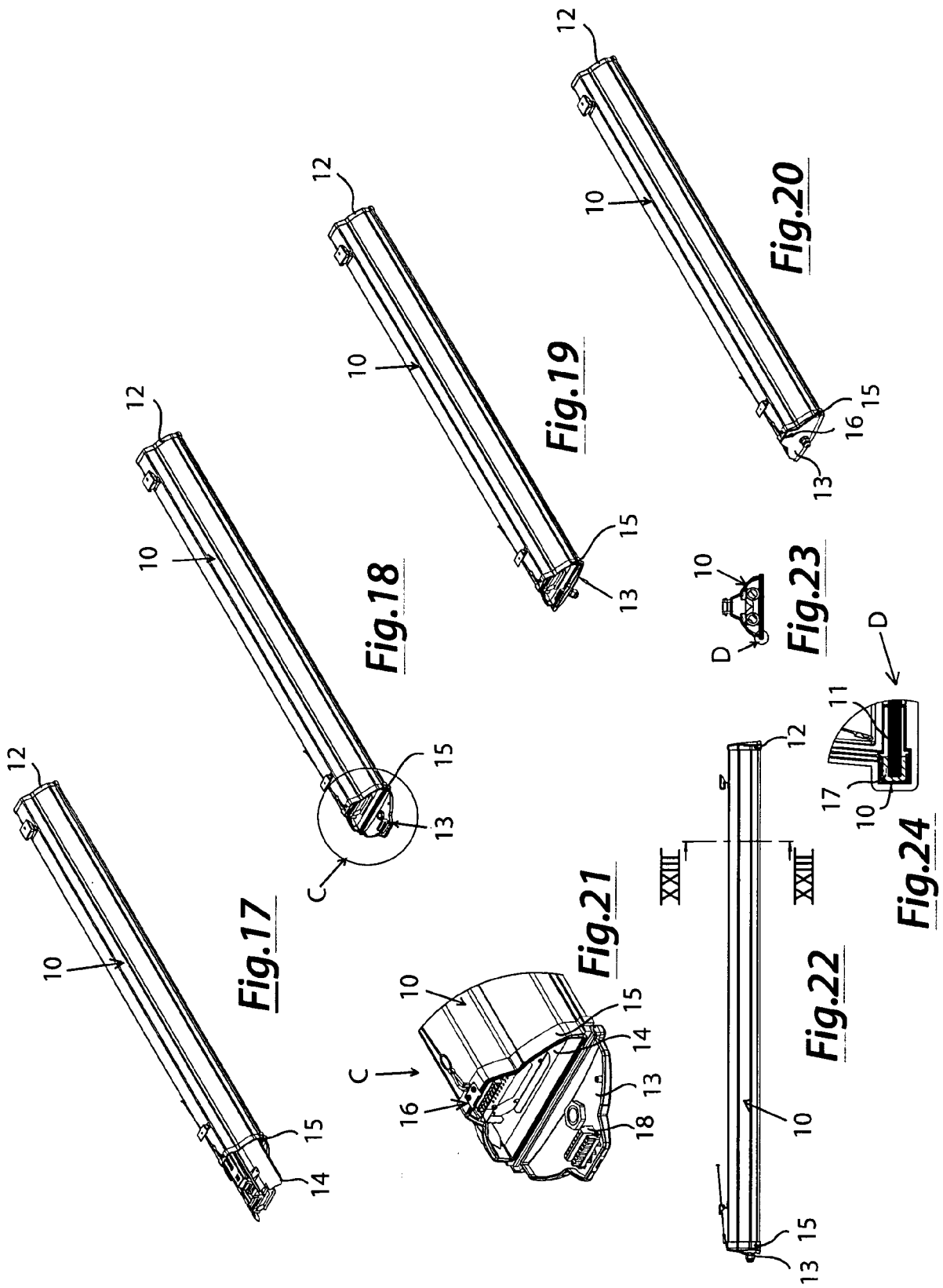


Fig. 10





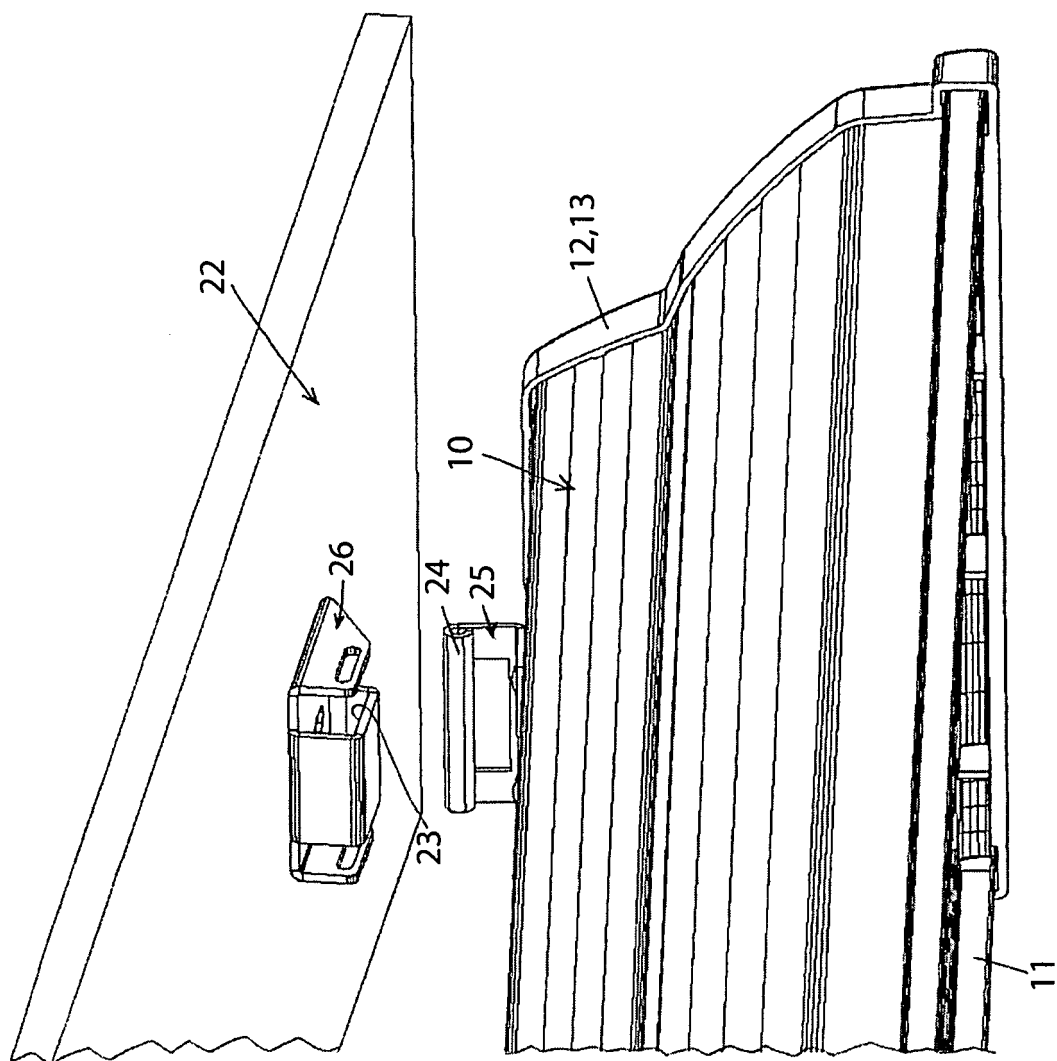


Fig.25

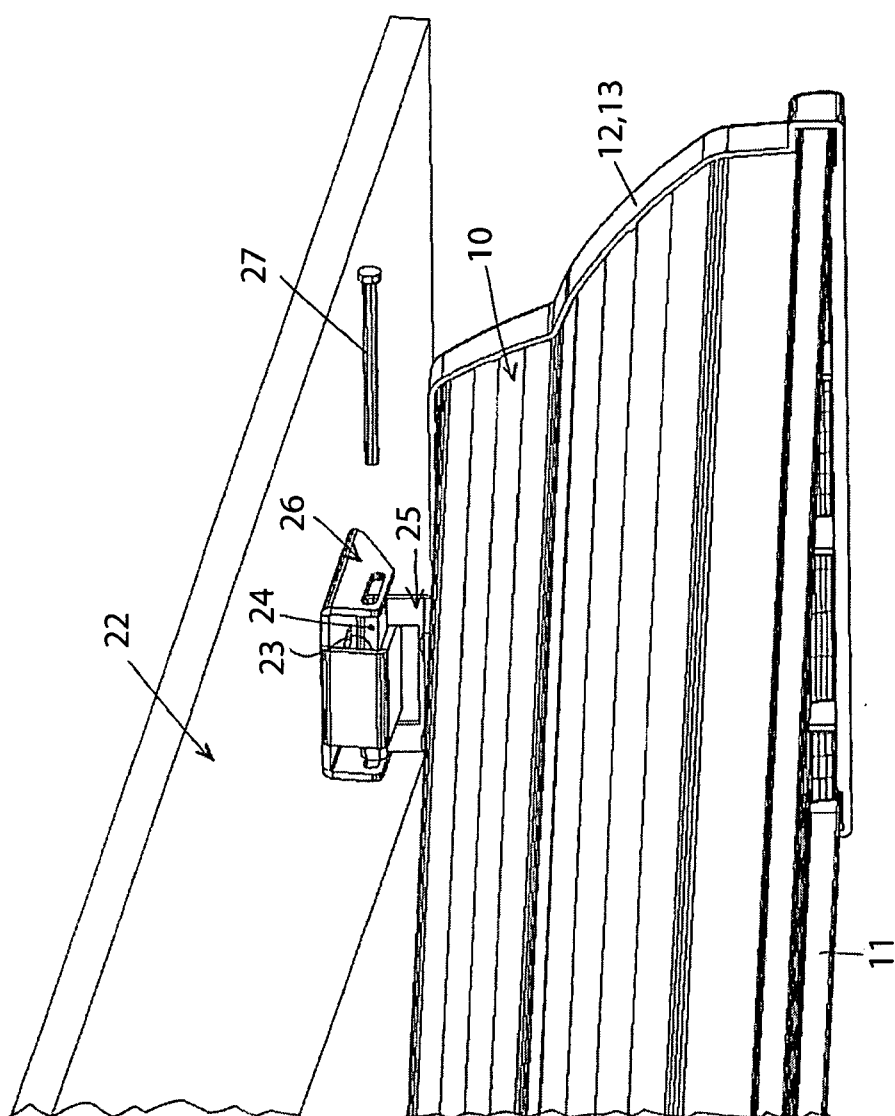


Fig.26

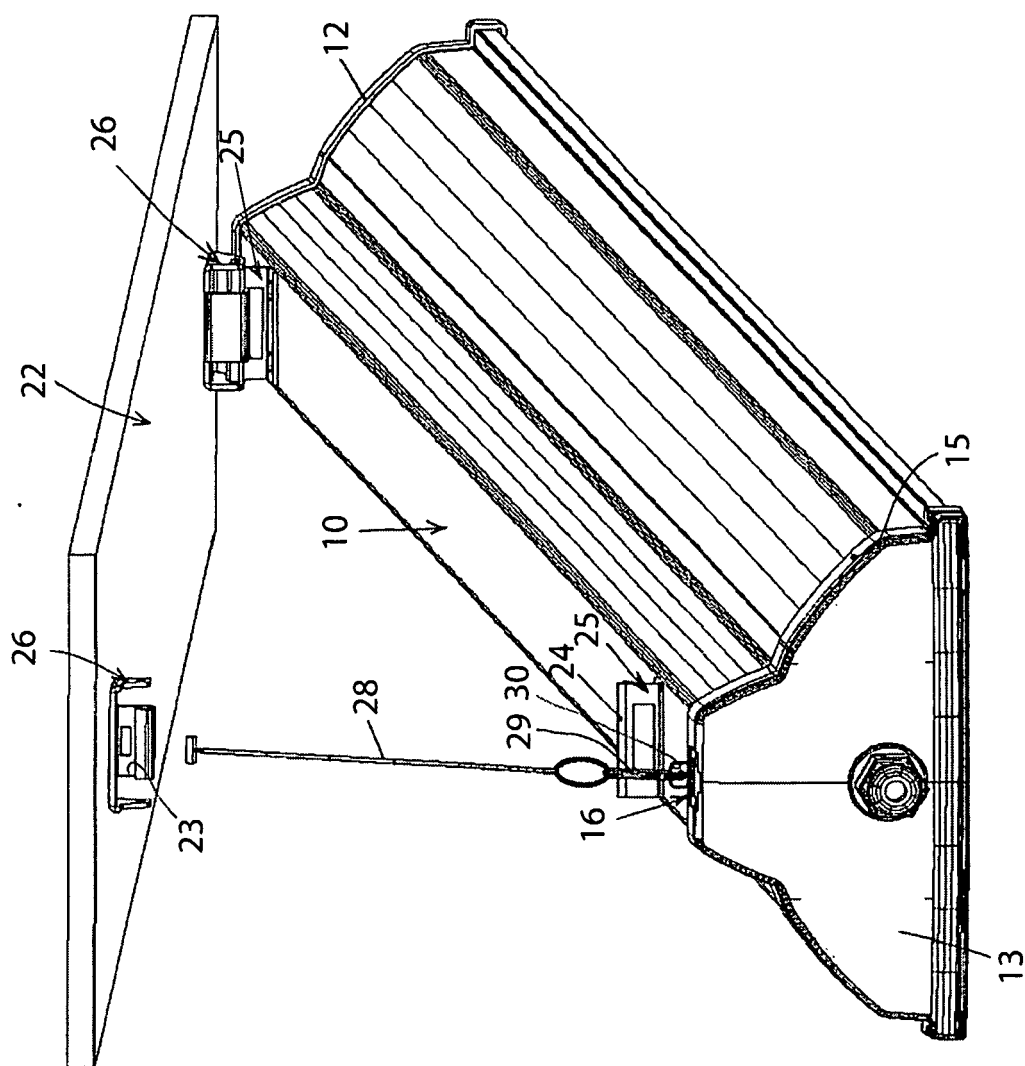


Fig.27

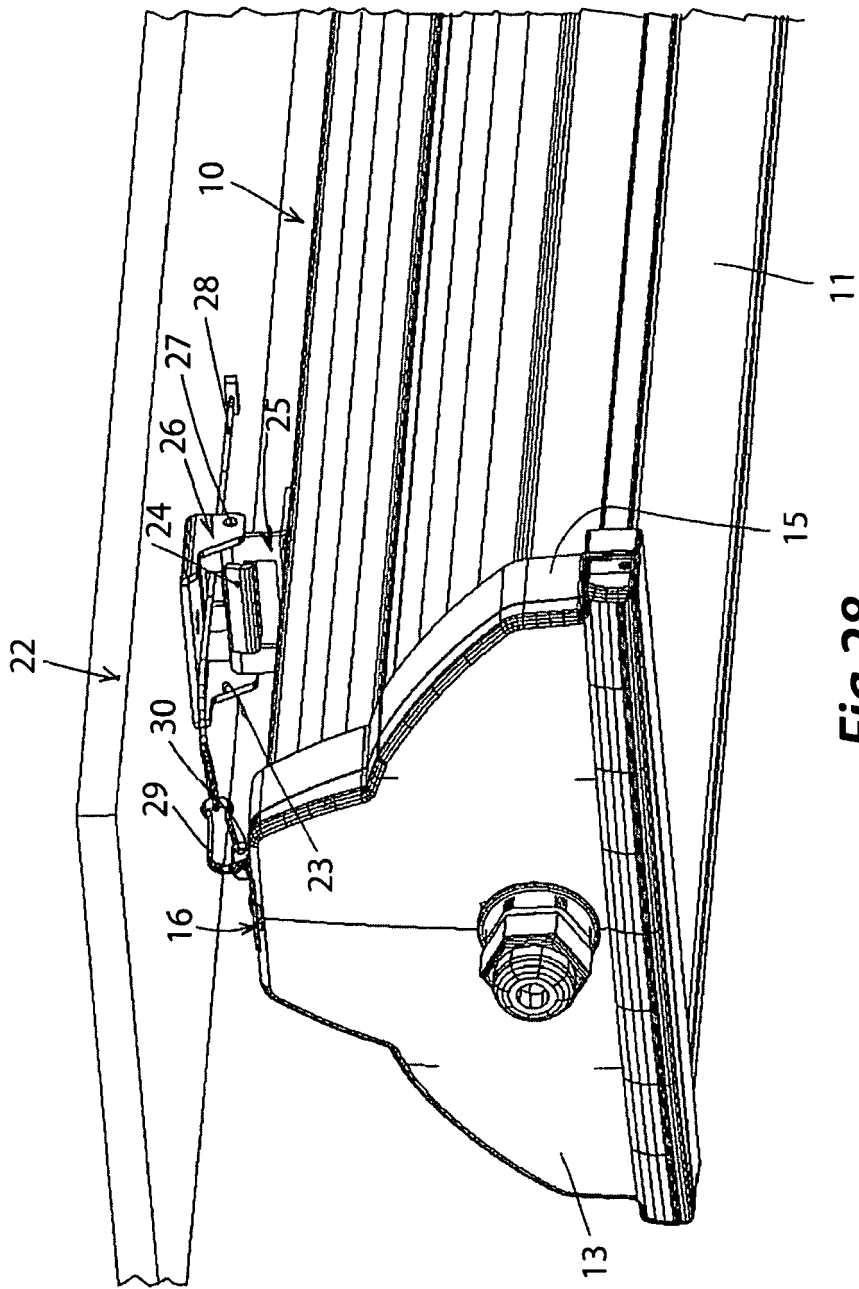


Fig.28