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(54) **Luminous signaling device**

(57) Luminous signaling device, comprising at least a modular element (11) having a tubular support (26) and an associated light source (25) conformed to emit light uniformly in every direction. The tubular support (26) comprises coupling means for the mechanical coupling, in a superimposed condition, of the modular element (11) with other modular elements (11), a cover element (12), a base element (14), and one or more separation elements (21).

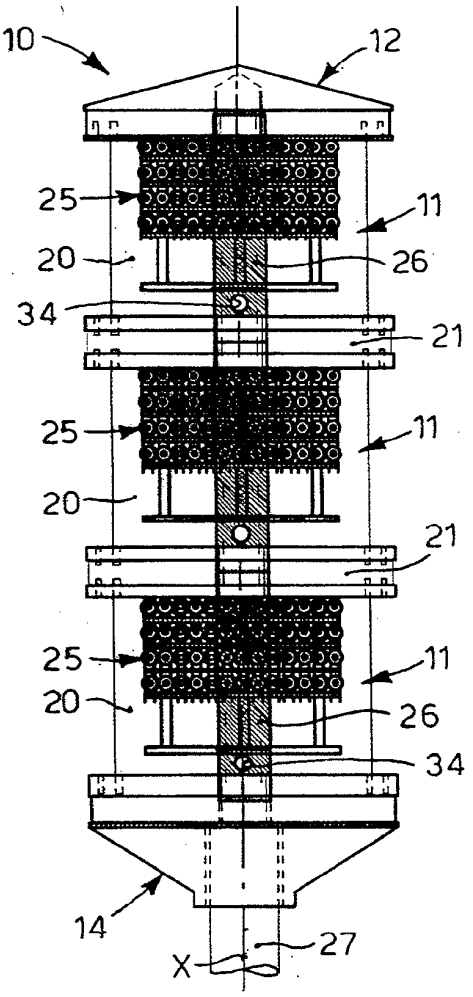

fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a luminous signaling device, which can be used preferably but not only to illuminate or signal obstructions or other, of the permanent or temporary type, in the field of means of transport for things or persons.

[0002] In particular the luminous signaling device according to the invention can be used, for example, in the aeronautical field to signal to aircraft the presence of obstacles, for example the tops of skyscrapers, antennae or other, or in the nautical field or on land to signal quays, piers or obstacles to maritime navigation, or in the field of ground transport to signal road obstacles, railings or barriers etc., or as an aid to signal access roads to building sites, factories or other.

BACKGROUND OF THE INVENTION

[0003] Luminous signaling devices are known, used to indicate the presence of very high obstacles for aircraft, such as buildings, skyscrapers, factory chimneys, telecommunication towers, wind energy plants, off-shore plants, piers of bridges, or to signal airport runways or heliport pads from a distance, or in the nautical or ground transport fields to signal obstacles or as an aid to signal access to building sites, factories or other.

[0004] A first type of known signaling device is provided with at least a light source, such as an incandescent or gas lamp, which emits colored light suitable for the type of signal desired, for example white, red, green, yellow etc. This device is conformed according to a substantially cylindrical geometry, so that the light is emitted radially from the sides of the source in a uniform manner in every angular direction.

[0005] In many applications, for example to signal obstacles to aerial navigation, the international rules lay down that the signaling devices used must function continuously for at least a year, without carrying out replacement or maintenance operations of the lamps. However, it is not easy to guarantee such an operating duration, also because of the extreme functioning conditions to which the signaling devices may be subjected, for example in cold regions or vice versa in extremely sunny regions and/or characterized by very high temperature ranges.

[0006] Therefore, a commonly adopted solution is to provide at least two distinct light sources in the signaling devices, contained in box-like elements supported by means of correspondent supports of the fork type and normally disposed adjacent at the same height or slightly offset. A first light source is used as a main source during the normal functioning of the device, while a second light source is activated and used as an auxiliary or emergency light source, in the event of breakages or malfunctioning of the main light source.

[0007] One disadvantage of these known devices is that the adjacent disposition of the main and auxiliary light sources determines the generation of a shadow zone of one source on the other, which makes it impossible to effectively visualize the light emitted by the signaling device from some specific angles. Moreover the known device has rather long installation times, due to the need to position the supports of the single light sources correctly, which determines high costs of installation and maintenance. The high cost is also due to the presence of two specific and distinct supports.

[0008] A second type of known luminous signaling device provides, inside the same box-like body, two distinct superimposed light sources of the LED type, where the individual LED-type luminous elements are distributed on a tubular support with a circular geometry which optimizes the relative light emission.

[0009] One disadvantage of this second type of luminous signaling device is that, despite a greater operating duration of the LED light sources, any maintenance operation needs the containing box to be opened, with the possibility of damaging the light sources or an individual LED element.

[0010] The document US-A-6,135,612 shows a signaling lamp with a base and a hollow light transmission cylinder attached to the base and in which a light source is contained formed by a lower and upper assembly plate connected by peripheral tubes in their turn attached to pins joined to the base of the lamp, a reflecting element and a LED facing toward the reflecting element. An upper cover is provided, which in turn is connected to the upper assembly plate by means of a screw or rivet. This lamp has the disadvantage that it does not allow a continuous and uniform diffusion of the light at 360°, because of the presence of the peripheral tubes that constrain the assembly plates which inevitably create shadow zones. Moreover, the presence of different connecting means, that is pins, tubes, screws and rivets, among the various components, makes this lamp not suitable for achieving modular illumination systems. Furthermore, especially if modular systems are to be achieved, there are obvious structural limitations for the passage of the feed cables inside the lamp.

[0011] Both the document DE-U-20114306 and the document EP-A-1.439.120 show a danger signaling lamp which can be configured in a modular manner, providing illuminating bodies attached with respect to each other, inside each of which a specific light source is provided. However, this lamp has the disadvantage that the attachment means between the various modules, provided along the periphery of each illuminated body, are duplicated for each module, making the production rather complex and costly in terms of time and material. Moreover, an entrance of the cables is provided which is repeated for each module of the lamp, increasing the complexity and costs in this case too.

[0012] The lamp in the document DE-A-19513983 can be configured in a modular manner, however this too has

attachment means for each module present along the periphery, with the aforementioned disadvantages.

[0013] The document EP-A-1,347,233 shows a signaling lamp in sectors defined by transverse partitions, across which a single, flat, parallelepiped bar is provided, which has two main sides opposite each other on which a plurality of light sources are attached. This lamp is not modular, each partition which defines the various sectors has to have a central window of sufficient size to allow, in the assembly step, the bar with the light sources to pass. In the event of fire in one of the luminous sectors, the others are inevitably damaged. Moreover the flat parallelepiped conformation of this bar determines a light emission which is not uniform at 360°.

[0014] The document DE-A-3806217 also shows an emergency or signaling lamp with luminous sectors, but not modular, which suffers from similar disadvantages as the previous one. In particular, the lamp does not emit light uniformly at 360°, but only in angularly offset sectors where the light sources are specifically disposed. Moreover, this lamp is hollow inside in order to house the various electronic functioning cards and in this case too the various sectors are in direct communication and a fire inside compromises the functioning of the lamp.

[0015] One purpose of the present invention is to make a luminous signaling device which allows to reduce times and costs of installation and maintenance.

[0016] A further purpose is to make a luminous signaling device which allows to avoid reciprocal luminous interferences between the light sources or other components of the device.

[0017] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0018] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0019] In accordance with the above purpose, a luminous signaling device according to the present invention comprises one or more light sources, conformed to emit light in every emission direction, therefore by 360° around an axis.

[0020] According to one feature of the present invention, the signaling device comprises at least a modular element having a tubular support and an associated light source conformed to emit light uniformly in every direction. The tubular support comprises coupling means for the mechanical coupling, in a superimposed position, of the modular element, with other modular elements, with a cover element, with a base element or with one or more separation elements.

[0021] In this way, in the installation step, it is possible to compose the signaling device, according to necessity, by coupling several modular elements according to the desired conformation, for example with a desired number of light sources, which can be independently activated. This also allows to disassemble the device, also partly, in a rapid and quick manner in order to carry out any maintenance required to a specific light source, without risk of damaging the distinct light sources housed in other containing seatings.

[0022] In some forms of embodiment, the signaling device comprises:

- at least the modular element having the tubular support which develops along a central axis of the modular element, to support the associated light source which is suitable to emit light uniformly in every direction at 360°, and an emission window, made of material transparent to luminous radiation and having a tubular cylindrical shape, disposed around the tubular support in order to define a lateral wall to contain the light source contained therein and to act as a light directing lens for the light emitted by the light source;
- a cover element disposed at one end of the tubular element and a base element disposed at the other end of the tubular element.

[0023] The tubular support comprises the coupling means of the pin type which are aligned along the central axis and around which the light source develops in an axial symmetric manner. The pin-type coupling means are provided for the mechanical coupling, in a superimposed condition along the central axis, of the modular element with other modular elements, with the cover element and the base element and with possible one or more separation elements between the various superimposed modular elements.

[0024] The tubular support also has at least a through opening which develops centrally along the central axis for the internal passage of feed or signal cables, toward each light source, so as to define in a modular manner a single closed box-like body provided with several closed and superimposed containing seatings in order to house one or more light sources, which are also electrically autonomous and separated with respect to each other.

[0025] According to a variant, the luminous signaling device comprises one or more emission windows to emit light emitted by a corresponding light source. Each emission window is mechanically coupled to at least two from among the cover element, the base element or the interposition element, so as to define corresponding closed containing seatings for each light source.

[0026] In this way the vertical development of the signaling device allows each light source to emit light without any reciprocal interferences, such as shadow zones caused by supports, attachment brackets or other. This therefore allows to make signaling devices with a vertical development, using, where needed, several independent

light sources, for example, with auxiliary or back-up functions of the main light source of the device.

[0027] This is advantageous also in the case of break downs, fires, or other damage to one of the modular elements, which thus do not affect the remaining modular elements, maintaining the overall functionality of the lamp.

[0028] According to a variant, each light source comprises a plurality of luminous LED elements.

[0029] According to another variant the luminous LED elements of each light source are distributed regularly in groups of adjacent linear strips, each strip being disposed according to a circular geometry.

[0030] According to a further variant the linear strips are disposed so as to achieve a staggered distribution of the LED elements. This allows to obtain a substantially uniform emission of light, minimizing the number of LED elements used but given the same luminous power.

[0031] According to another variant, the signaling device comprises directive means, associated to the linear strips of the LED elements, able to convey the light emitted. This allows to render the luminous emission more efficient, and to reduce, for example, dispersion in unwanted directions.

[0032] In some forms of embodiment, the directive means are fins which develop in an axial symmetric manner around the central axis for a radial extension chosen according to the desired aperture of emission; the fins are alternated with seatings in which the linear strips are disposed.

[0033] In some forms of embodiment, the tubular support is made as a single body obtained by a chip removal process and which has the directive means and the through aperture integrated and made as a single piece.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a schematic lateral view of a luminous signaling device according to the present invention in a first configuration;
- fig. 2 is a schematic lateral view of the luminous signaling device according to the present invention in a second configuration;
- fig. 3 is a schematic lateral view of the luminous signaling device in a third configuration;
- fig. 4A is a lateral view of a first detail of the device in fig. 1;
- fig. 4B is a view from above of fig. 4A;
- fig. 5A is a lateral view of a second detail of the device in fig. 1;
- fig. 5B is a view from above of fig. 5A;
- fig. 6A is a lateral view of a third detail of the device in fig. 1;
- fig. 6B is a view from above of fig. 6A;
- fig. 7 is a schematic lateral view of a light source of the device in fig. 1;
- fig. 8 is a schematic lateral view of the luminous signaling device in a fourth configuration.

[0035] To facilitate comprehension, the same reference numbers have been used, where possible, to identify common elements that are identical in the drawings. It is understood that elements and characteristics of one form of embodiment can conveniently be incorporated in other forms of embodiment without any further clarifications.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

[0036] With reference to the attached drawings, a luminous signaling device 10 according to the present invention comprises a box-like containing body defined by an upper cover 12, a lower cover 14, one or more separators 21 and one or more interposed emission windows 20. The device 10 also comprises one or more modular elements 11, comprising a light emission source, or bulb 25, and a corresponding support 26, aligned along a common central axis X.

[0037] In some forms of embodiment, the upper cover 12 and lower cover 14 are made of a material resistant both to high and to low temperatures, such as polytetrafluoroethylene (PTFE) which guarantees wide ranges of working temperature and allows the production of surfaces with a low friction coefficient in order to prevent the deposit of powders or atmospheric agents, such as snow or other. This material is also very resistant to impacts, so as to resist hailstones or other objects.

[0038] The upper cover 12 and the lower cover 14 (figs. 4A-5B) have a substantially circular geometric shape with the same base diameter. In particular the upper cover 12 has a regular conical shape, flat and solid, and is provided with a threaded seating 13 (fig. 5A) in its lower section which develops axially from its base surface along part of its height. The seating 13 is suitable for the insertion of the support 26 for the bulb 25 which also has a clamping function, as will be described more fully hereafter.

[0039] The lower cover 14 has a flat, truncated/conical shape, disposed, when in use, with the base surface toward the top and is provided with a first threaded hole 15 which develops axially from its lateral surface. The first threaded hole 15 is suitable for the insertion, for example by screwing, of a support base 27 or of another type of support having a tubular structure.

[0040] The lower cover 14 also comprises a second threaded hole 18, connected to the first threaded hole 15 and having a smaller diameter than it. A mating end of the support 26 of the bulb 25 is inserted, again by screwing, into the second threaded hole 18.

[0041] Each cover 12, 14 is also provided with two cir-

cular grooves suitable to cooperate with respective base portions of the emission windows 20. The grooves, first grooves 16a, 16b and second grooves 17a, 17b respectively, develop peripherally on the respective base surfaces of the covers 12, 14. In particular, the first groove 16a of the lower cover 14 is concentric and inside the second groove 17a of the cover 14 and the first groove 16b of the upper cover 12 is concentric and inside the second groove 17b of the upper cover 12. The grooves 16a, 16b have the same diameter, as do the grooves 17a, 17b. The grooves 16a, 16b, 17a and 17b also have a regular and square transverse profile, mating respectively to the shape of the emission window 20.

[0042] The separator 21, also made of polytetrafluoroethylene (PTFE), substantially cylindrical and flat in shape, is provided with an upper surface 23a and with an opposite lower surface 23b (figs. 6A and 6B) suitable to delimit the containing seatings respectively above and below. Each separator 21 is also provided with a threaded hole 22 that connects the surfaces 23a, 23b, disposed substantially in a central position and suitable to insert stably the support 26 so as to achieve a stable clamping of adjacent bulbs 25.

[0043] Each surface 23a, 23b of the separator 21 is also provided with two circular grooves, respectively first groove 16c and second groove 17c which develop peripherally on the surfaces and are suitable to cooperate with respective base portions of the emission windows 20. In particular, each first groove 16c is concentric to and inside the corresponding second groove 17c. The grooves 16c also have the same diameter as the grooves 16a and 16b, just as the grooves 17c have the same diameter as the grooves 17a, 17b. The grooves 16c, 17c also have a regular and square transverse profile, mating respectively with the shape of the emission window 20 or the shape of a cylindrical containing wall 24 as will be described hereafter.

[0044] The emission window 20, made of transparent plastic material, for example polycarbonate or other similar material, has a cylindrical tubular shape, with a diameter equal to the diameter of the grooves 16a, 16b, 16c, and is suitable to define a lateral containing wall as well as to function as a light directing lens for the light emitted by the bulb 25.

[0045] The emission window 20 has a transverse thickness that is slightly less than the width of the grooves 16a, 16b, 16c, so as to allow its lower and upper circular ends to be inserted into the grooves 16a and 16b. Advantageously, a sealing element is provided to be inserted into the grooves 16a, 16b and 16c, for example a rubber packing, not shown, so as to seal each containing seating against atmospheric agents such as rain and damp, and contaminants such as powders, grains of sand and so forth.

[0046] The bulb 25, or light emission source, comprises a plurality of LED type luminous elements 25a, disposed on the attachment support 26 (fig. 7), as will be described hereafter.

[0047] The support 26 is an oblong tube in shape, develops along the central axis X and is hollow inside so as to define, as will be described hereafter in more detail, a single conduct or through aperture 31 for the cables to pass through.

[0048] The support 26 is suitable to assume a bearing function for the modular structure of the luminous signaling device 10. The support 26 comprises opposite pin-type mechanical coupling means that develop along the central axis X, for example, but not only, conformed as threaded portions 30 made on its ends, or portions with a bayonet or snap-in coupling, or other mechanical coupling. The portions 30 are suitable to be screwed into the seatings 13 of the upper cover, into the through holes 22 of the separator 21 and/or into the second threaded hole 18 of the lower cover.

[0049] Advantageously the support 26, in correspondence with its threaded portions 30, has mating connection portions, not shown, able to cooperate reciprocally so as to dispose two or more supports 30 directly superimposed. This disposition allows to make a single conduct or through aperture 31 inside the device 10 for the passage of electric feed cables or other cables, for example signal cables, relating to possible auxiliary electronic apparatuses, or to achieve a single containing seating in which two bulbs 25 are disposed.

[0050] Each support 26 is also provided with an exit hole 34, made on its lateral surface in communication with the through aperture 31, through which the electric feed cables of the bulb or bulbs 25 protrude into each containing seating.

[0051] Therefore the covers 12, 14, the separator 21, the emission window 20 and the modular element 11 are mechanically coupled in a modular manner by means of the support 26 and the corresponding threaded holes, so as to define a single closed box-like body provided with several closed and superimposed containing seatings to house one or more light sources.

[0052] In particular, with reference to fig. 1, which shows a first configuration of the signaling device 10 according to the present invention, between the lower cover 14 and the upper cover 12 three bulbs 25 are disposed superimposed in three containing seatings, and two separators positioned between. A first bulb 25, or lower bulb, is attached to the lower cover 14 by connecting and screwing the lower threaded portion 30 of the support 26 into the corresponding second threaded hole 18 of the cover 14.

[0053] A first separator 21 is stably attached above the first bulb 25, again by connecting and screwing an upper threaded portion of the support 26 into a lower part of the through hole 22 of the separator 21.

[0054] Moreover, the emission window 20 is disposed between the lower cover 14 and the first separator 21. In particular, the base ends of the emission window 20 are inserted into the respective second grooves 17a, 17c of the lower cover 14 and the separator 21. The emission window 20 is stably clamped between the lower cover

14 and the first separator 21 by regulating in the desired manner the screwing of the threaded portions 30 of the support 26.

[0055] A second bulb 25, or intermediate bulb 25, is attached stably superimposed above the first separator 21 and a second separator 21 is attached on the intermediate bulb 25, again by inserting and screwing into the second holes 18, in the same way as described above. Between the first separator 21 and the second separator 21 a corresponding emission window 20 is disposed, inserted with its base ends into the second grooves 17c of the separators 21, so as to define a second containing seating, above the first seating.

[0056] A third bulb 25, or upper bulb 25, is positioned stably on the second separator 21 and the upper cover 12 is attached on the upper bulb 25, by inserting and screwing the upper threaded portion 30 into the seating 13, in the same way as described above.

[0057] In this way, it is possible to compose according to needs a luminous signaling device 10 having three distinct containing seatings, one for each bulb 25, in which each bulb 25 is able for example to be independently activated to emit light of different color. It is also possible to access, for maintenance or other reasons, a single containing seating simply by unscrewing the threaded portions 30 of a corresponding support 26 from the relative separator or separators 21 and removing the emission windows 20 from the relative grooves 17a, 17b.

[0058] Fig. 2 shows a luminous signaling device 10 in a second configuration, in which two modules 11 are coupled one above the other by coupling the respective supports 26 in a single containing seating defined by the lower cover 12, the upper cover 14 and the emission window 20. The emission window 20 in this case has a height correlated to the overall height of the two superimposed bulbs. This second configuration allows to define for example a device 10 in which both bulbs 25 emit light of the same color and in which they are activated independently so as to achieve, for example, an emergency function in which one of the two bulbs 25 is used as a reserve light source. The superimposed disposition of the bulbs 25 allows to prevent any reciprocal light interference, such as for example unwanted shadow zones or other.

[0059] Fig. 3 shows a luminous signaling device 10 in a third configuration, in which between the covers 12, 14 a single separator 21 is disposed, to define an upper containing seating for a bulb 25 and a lower containing seating defined by the cylindrical wall 24. In the lower containing seating it is possible for example to house auxiliary apparatuses, such as electronic feed and/or control circuits, or a barometric unit, electric cables to feed the bulb 25, timer or programming circuits or a buffer battery to guarantee the correct functioning of the device 10 even in conditions when the supply of electric energy is temporarily interrupted.

[0060] The cylindrical wall 24 is made for example of opaque plastic material and has a diameter and thickness such as to be inserted into corresponding first grooves, in this case the grooves 16a, 16c of the lower cover 14 and of the separator 21. In the lower containing seating only the tubular support 26 is present. In fact, the cylindrical wall 24 is stably clamped between the lower cover 14 and the separator 21 by screwing the relative threaded portions 30 of the support 26 into the holes 18 and 22.

[0061] In some forms of embodiment, the LED type elements 25a are disposed on linear strips 28 (fig. 7), adjacent and wound on the support 26. The LED type elements 25a are disposed in a regular manner along each strip 28, for example equally distanced according to a staggered distribution between one strip 28 and the other. This distribution allows great efficiency and to maintain a uniform level of light emission in every radial direction, even if there is a malfunction of a single LED element 25a, minimizing the number of LED elements 25a used.

[0062] The bulb 25 also comprises a plurality of directive fins 29, made for example in a single piece with the support 26, which are annular or discoid in shape, for example shaped with a circular crown, and develop on planes substantially perpendicular to the axis of the tubular structure of the support 26. The fins 29 are suitable both to define relative housing seatings for the linear strips 28, and also to convey the light emitted by them. The transverse size of the fins 29 is chosen according to the desired emission aperture. Indeed, if the fins 29 are bigger, there is a greater restriction of the emission aperture, as shown in fig. 7, which shows a first light emission aperture E' in the x-y plane of the sheet of a LED element 25a, corresponding to a predetermined diameter of the fins 29, and a second emission aperture E", in the x-y plane of the sheet, restricted and corresponding to an increase L in the diameter of the fins 29.

[0063] In particular, the support 26 in fig. 7 is advantageously made in a single piece with the pin-type coupling means, in this case the threaded portions 30 and the fins 29. In some forms of embodiment, the support 26 is made starting from a solid body, for example cylindrical, made of suitable plastic polymer material, for example PVC, which is subjected to a chip removal process, in particular transverse turning, so as to achieve the seatings that define the fins 29 with the desired radial extension and in which the strips 28 will be positioned. Finally, the support 26 is holed centrally, to define the through aperture 31.

[0064] Alternative materials for making the support 26, but also the separator 21 and possibly the covers 12 and 14, can be chosen from among nylon, Teflon, aluminum or steel.

[0065] Alternatively, as for example in fig. 8, it is possible to provide the use of a bulb 25 found on the market, which is centrally associated with a pin that achieves the pin-type coupling means as above.

[0066] It is understood that the luminous signaling device 10 according to the present invention can be achieved, as shown in fig. 8, by associating two covers

114, 214, one lower and one upper, so as to define together with a corresponding emission window 20 a containing seating for a corresponding bulb 25. In this configuration the device 10 comprises a wind gauge 40 disposed on the cover 214 and attached thereto by means of a support element 41, for example by screwing on the relative threaded hole 115.

[0067] Instead of the wind gauge 40, for example, any other measuring device may be provided or, as we have already described, it is possible to obtain a structure by coupling the covers, the supports and the emission windows in a desired manner, defining superimposed containing seatings.

[0068] It also comes within the field of the invention to provide the presence of a light shutter, not shown, made of opaque plastic material able to block the emission of light. The shutter has a regular shape, like the arc of a circle, in this case semicylindrical, such as to allow it to rotate around the emission window 20. The shutter also has a height substantially identical to that of the corresponding emission window 20 and a transverse thickness slightly less than the width of the second grooves 17a, 17b, 17c. The shutter is mobile, and can rotate by 360° around the central axis X, with respect to the box-like body defined by the covers 12, 14, by the separator or separators 21 and by the emission window 20. It can slide in the relative grooves 17a, 17b, 17c and thus rotate with respect to the bulb 25. This allows to define one or more darkening directions in which the light emitted by the bulb 25 is intercepted by the inner surface of the shutter.

Claims

1. Luminous signaling device, **characterized in that** it comprises:

   - at least a modular element (11) having a tubular support (26) which develops along a central axis (X) of the modular element (11), in order to support an associated light source (25) suitable to emit light uniformly in every direction at 360° around said central axis (X), and an emission window (20), made of material transparent to luminous radiation and having a cylindrical tubular shape, disposed around said tubular support (26) in order to define a lateral containing wall of the light source (25) contained inside it and to act as a light directing lens for the light emitted by the light source (25);
   - a cover element (12) disposed at one end of said tubular element (11) and a base element (14), disposed at an opposite end of said tubular element (11),

   said tubular support (26) comprising pin-type coupling means (30) aligned along said central axis (X) and around which said light source (25) develops in an axial symmetric manner, said pin-type coupling means (30) being provided for the mechanical coupling, in a superimposed condition along said central axis (X), of the modular element (11) with other modular elements (11), with said cover element (12) and said base element (11) and with one or more possible separation elements (21) between the various superimposed modular elements (11), said tubular support (26) also having at least a through aperture (31) which develops centrally along said central axis (X) for the internal passage of feed or signal cables, toward each light source (25), so as to be able to define modularly a single closed box-like body provided with several closed and superimposed containing seatings in order to house one or more light sources (25), which are also electrically autonomous and separated from each other.

2. Device as in claim 1, **characterized in that** each emission window (20) is mechanically coupled with at least two of said cover elements (12), base elements (14) and separation elements (21), to define corresponding closed containing seatings.

3. Device as in claim 1 or 2, **characterized in that** it comprises at least a containing wall (24), mechanically coupled with at least two of said cover elements (12), base elements (14) and separation elements (21), to define at least a corresponding auxiliary containing seating to house at least an auxiliary apparatus.

4. Device as in any claim hereinbefore, **characterized in that** each light source (25) comprises a plurality of LED elements (25a).

5. Device as in claim 4, **characterized in that** the luminous LED elements (25a) are distributed regularly in groups of adjacent linear strips (28), each linear strip (28) being disposed according to a circular geometry.

6. Device as in claim 5, **characterized in that** it comprises directive means (29) associated with the linear strips (28) and able to convey the light emitted by the LED elements (25a).

7. Device as in claim 6, **characterized in that** said directive means are fins (29) which develop in an axial symmetric manner around said central axis (X) for a radial extension chosen according to the desired emission aperture, said fins (29) being alternated by seatings in which said linear strips (28) are disposed.

8. Device as in claim 6 or 7, **characterized in that** said tubular support (26) is made in one piece obtained

by removal of chip and which has, integrated and made in one piece, said directive means (29) and said through aperture (31).

9. Device as in any claim hereinbefore, **characterized in that** it comprises shutter means, associated with at least an emission window (20) in order to define one or more directions of darkening, in which at least part of the light emitted by the light source (25) is intercepted.

10. Device as in claim 9, **characterized in that** the shutter means are selectively mobile with respect to the emission window (20).

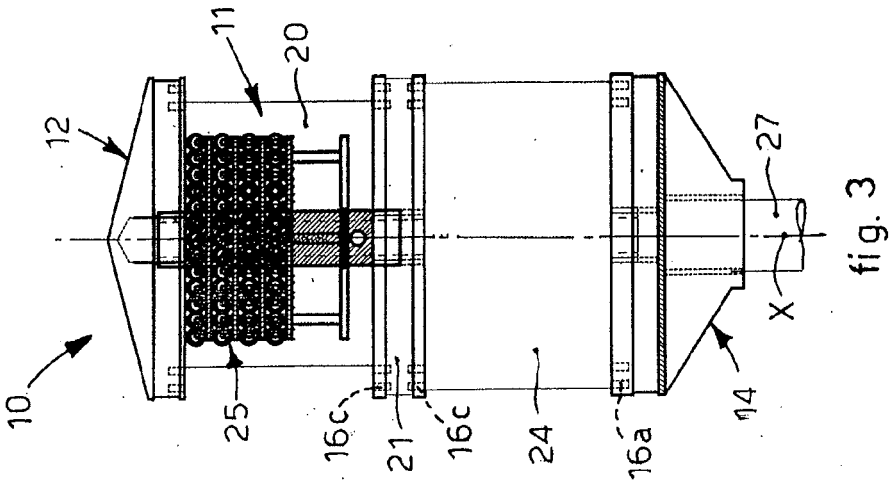

fig. 3

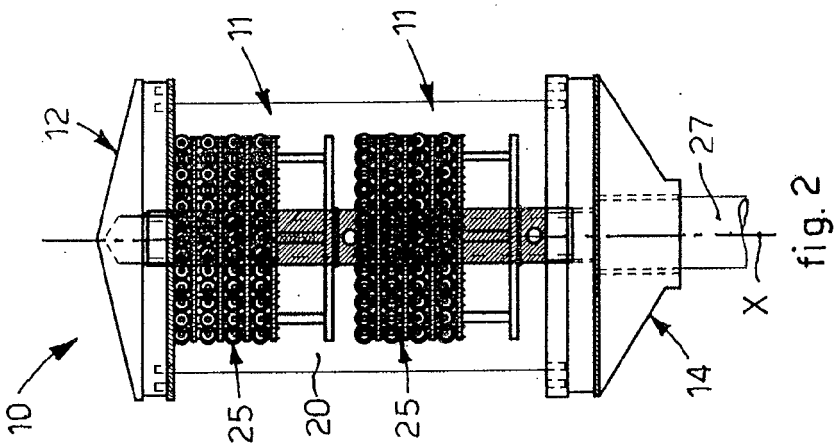

fig. 2

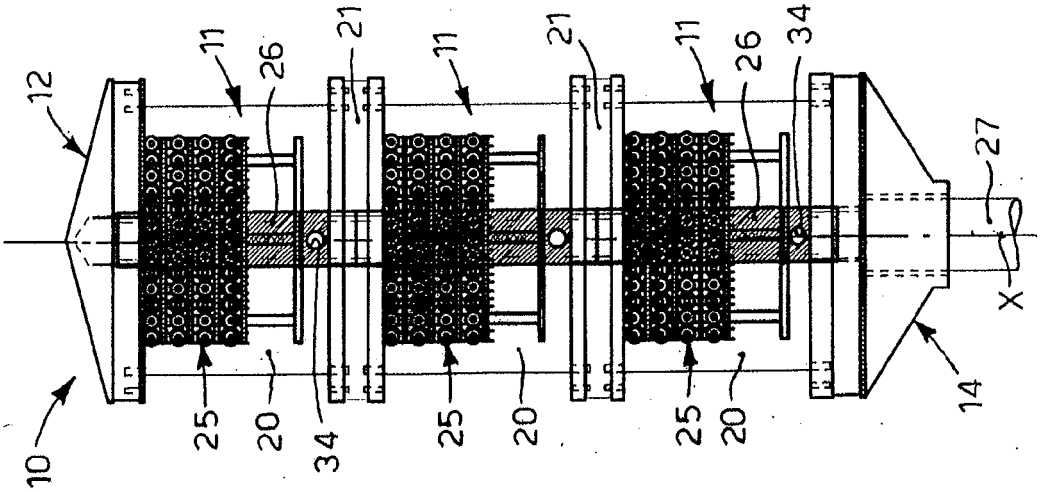

fig. 1

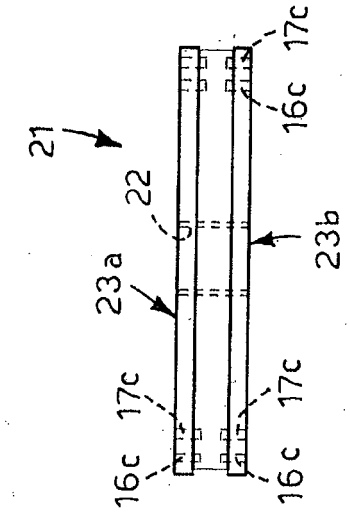

fig. 6A

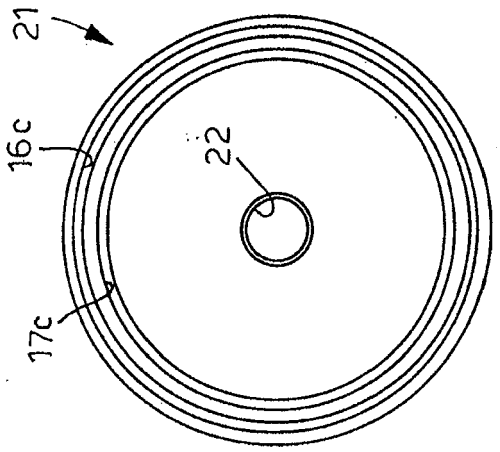

fig. 6 B

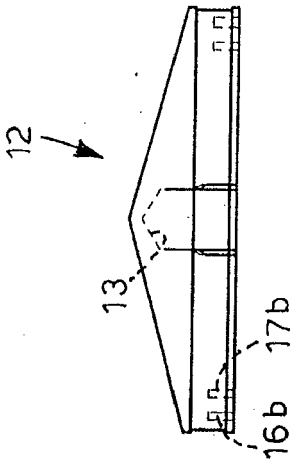

fig. 5A

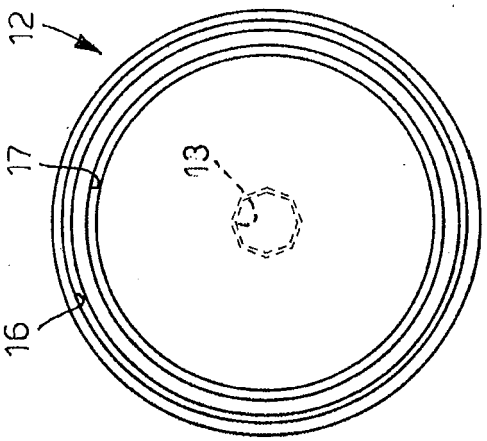

fig. 5 B

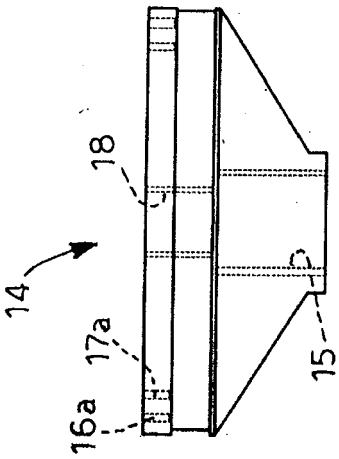

fig. 4A

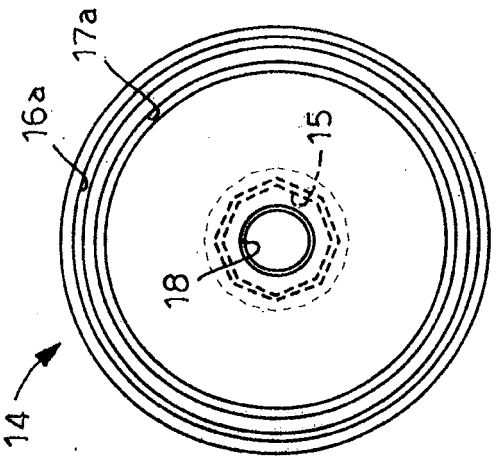

fig. 4 B

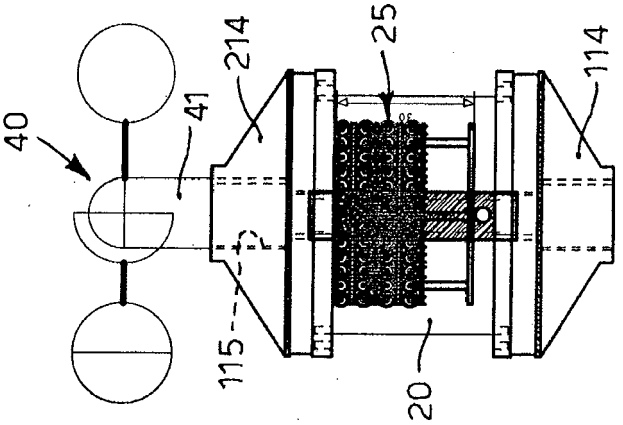

fig. 8

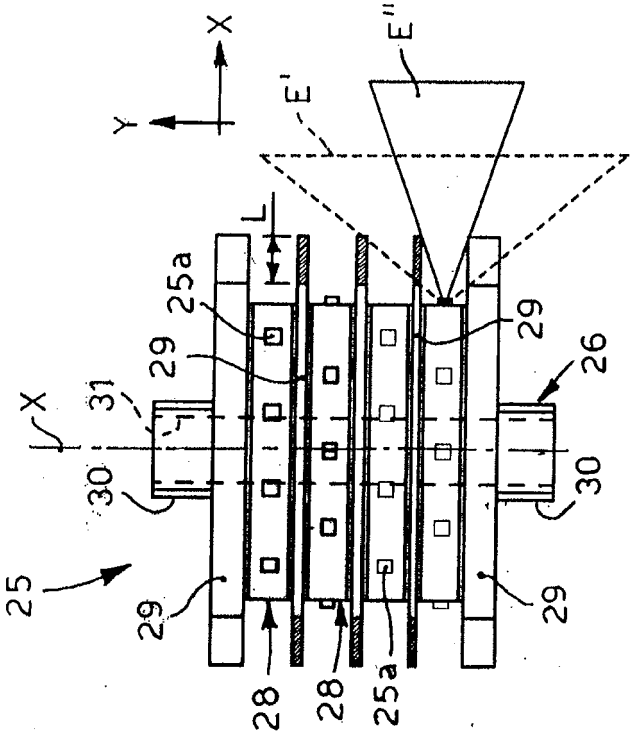

fig. 7

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EUROPEAN SEARCH REPORT

Application Number
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