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(71) Applicant: **Netun Solutions, S.L.**
36201 Vigo (Pontevedra) (ES)

(72) Inventor: **Torre Sarmiento, Jorge**
36201 Vgo (ES)

(74) Representative: **Temiño Ceniceros, Ignacio**
Abril Patentes y Marcas, S.L.
Calle Zurbano, 76 - 7°
28010 Madrid (ES)

(54) **LIGHTING FIXTURE AND EQUIPMENT FOR SIGNALLING DANGEROUS SITUATIONS**

(57) The present invention relates to a lighting fixture for signalling dangerous emergency situations and to equipment comprising at least one lighting fixture. The lighting fixture is a mobile and portable assembly having a base (2) to which a lighting device (1) is adapted, and wherein the base (2) is torch-shaped, meaning that the fixture can be fitted or adapted to a marking cone, a tripod, a New Jersey-type plastic barrier, in the gap in a guardrail joist, or to any other road structure with a hole or a gap, and it can even be used manually by an operator. In turn, equipment is defined that comprises at least one lighting fixture and a charging station (E) that is made up of a structure comprising at least one compartment (24) to which the base (2) of the lighting fixture is fitted.

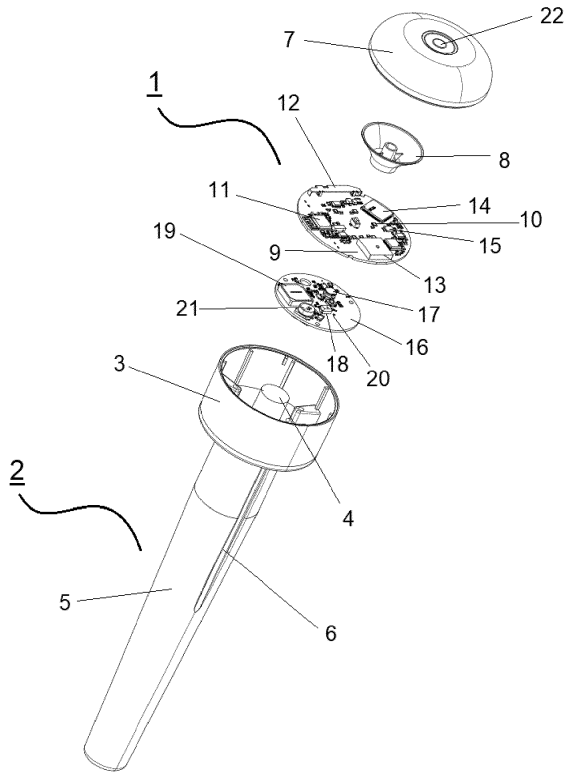

FIG.1

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Description

Field of the invention

[0001] The present invention relates to a lighting fixture for signalling dangerous emergency situations and to equipment comprising at least one lighting fixture. The lighting fixture is a mobile and portable assembly having a base to which a lighting device is adapted, and wherein the base is torch-shaped, meaning that the fixture can be fitted or adapted to a marking cone, a tripod, a New Jersey-type plastic barrier, in the gap in a guardrail joist, or to any other road structure with a hole or a gap, and it can even be used manually by an operator. In turn, equipment is defined that comprises at least one lighting fixture and a charging station that is made up of a structure comprising at least one compartment to which the base of the lighting fixture is fitted.

[0002] The field of application of the present invention falls within the different types of lighting devices and means, specifically those that are portable and are used as danger and/or position signalling lighting instruments.

Background of the invention

[0003] As is well known, different types of incidents constantly occur on roads, some of these incidents having a short duration and occurring suddenly or with the possibility of occurring, such as breakdowns or accidents. Other incidents, however, are scheduled and therefore tend to affect normal traffic conditions along very long stretches and for fairly lengthy periods of time.

[0004] At present, possible sites are marked with presignalling equipment that is carried by default by the vehicles of operators or users who are located at the vehicle's highest point. The existence of removable visual signals that are placed several tens of metres from the vehicle is also widely known.

[0005] However, in the case of scheduled services, with planned start and end dates, the sites must be marked with regulatory or standardised visual means, from start to finish. Notifications on the information panels installed on roads, and in mobile applications in general, which usually takes a considerable amount of time or are sometimes not reported due to various errors, can also be managed manually. Occasionally, actions on the road end and unspecified amount of time is needed to remove notifications from the panels or applications, ultimately leading to errors that affect traffic conditions and the circumstances of users, generating uncertainty or even unexpected traffic accidents, as is the case of sporting events in which a vehicle unrelated to the competition may interrupt the competition and can cause material damage or even injuries, in addition to risks.

[0006] These situations are resolved by the present invention, relating to an autonomous torch-shaped device, with the particularity that it can adapt to the current standardised technical signalling means, such as cones, into which it is inserted through the upper opening thereof, or to any other type of road structure comprising a hole or a gap, such as a tripod, a New Jersey-type plastic barrier, or in the gap in a guardrail joist.

[0007] Currently, no solution is known that allows for this versatility and, in this context, cones comprising a lighting signal included in the structure thereof, such as those disclosed in documents ES1100682U or ES1280194U, or barriers comprising a luminaire, are known. In other words, the luminaires are fixed and form part of the road structure assembly, and in any event, they cannot be located on other structures. Therefore, there is no known fixture that does not form part of that specific road structure and that, by being autonomous, can be arranged or located on any type of road structure. For example, the lighting fixture object of the present invention can be located on a cone and the next day this same fixture can be located on a tripod. In this regard, the fixture object of the present invention allows, in an extreme situation, for the operator to use it manually, in other words, he can balance it as a torch, something that cannot be done with the equipment known in the state of the art.

[0008] Another particularity of the invention is that the fixture is very versatile in terms of lighting signal emission and several complementary functionalities, since it can comprise any type of lighting device based on currently marketed technologies. This device, for example, can be equipped with a stationary intermittent or fixed light source at its highest point with a combination of fixed white light as an emergency lantern, and it can be equipped with a telecommunications board with geopositioning, an accelerometer-type status control device or sensor or similar, intended to report any change in the position of the device and the support it is on, as well as various sensors for controlling the conditions of use, such as the status of the batteries and telecommunications, and the conditions in its location, such as humidity, temperature, altitude or others. It can be equipped with means to be able to synchronise with speed measurement equipment at worksites via remote software, determining a flash of greater intensity or frequency when a vehicle approaches at a speed faster than allowed, or even when a vehicle with connectivity or using the same associated control application also approaches at very high speed.

[0009] Considering the background known in the state of the art, the fixture object of the present invention provides a solution to the technical problem of having portable and autonomous means that can be used in any type of road marking structure that comprises a hole or a gap, or is even to be balanced by the user themself as if it were a torch; and furthermore, it allows the lighting signal to comprise other functionalities such as being able to be controlled and programmed remotely, or having multiple types of sensors or auxiliary systems.

Explanation of the invention

[0010] The lighting fixture for signalling dangerous situations object of the present invention provides a solution to the technical problem raised above and for this, the fixture comprises a base and a lighting device that is fixed to the base and has the particularity that the base is torch-shaped and comprises an upper receptacle that is open, said receptacle configured to house a lighting device, and accommodating at least one power source; and a lower pole or handle, which starts perpendicularly from the upper receptacle and comprises at least one guide slot on its side surface.

[0011] This particular shape of the base makes it possible, on the one hand, to accommodate and hold a lighting device, said device comprising various functionalities already known today, and, on the other hand, it allows the base to be inserted into any type of road structure, such as a cone or a tripod, this fixture being mobile and autonomous and separate from the very constitution of said road structure.

[0012] Further describing the invention in detail, the pole has an essentially frustoconical shape with a variable and decreasing diameter as it descends, which allows it to be coupled, for example, to the hollow heads of the road marking cones in the market. In this regard, the slot is vertical and longitudinal and allows the device to remain centred and attached to a charging station while charging.

[0013] It should also be noted that the lighting device can be of the commercially known type, but for the present invention the device must preferably comprise at least one lampshade, one reflector, one electronic board equipped with at least one electroluminescent LED photodiode, an activation and deactivation push button or button or similar element, and a programmable control module connected to all of them and allowing the device to be autonomously managed. Additionally, the device may comprise means of telecommunication, geopositioning and/or other types of sensors that can give the device assembly versatility and extended functionalities.

[0014] In this regard, it is indicated that the use of a lighting fixture such as the one previously defined is so that it can be inserted into the hole or gap in a road marking structure, where the road marking structure is selected from a road marking cone, a tripod, a plastic barrier, a guardrail joist or similar structures.

[0015] Equipment for signalling dangerous situations is also defined, said equipment comprising at least one lighting fixture such as the one previously described and a charging station that allows said lighting fixtures to be charged and fixed.

[0016] The charging station has a structure comprising a horizontal support plate with at least one circular cavity, where the cavity is intended for the base of the lighting fixture to be inserted and fixed therein. The inside of the cavity may comprise at least one vertical counter-guide that remains in contact with the slot in the base of the lighting device, so that, as previously indicated, it remains centred and attached to the charging station. In addition, the station comprises at least one electric charger, preferably of the wireless type, equipped with the technical means required to recharge the batteries when the torch is fully inserted into the cavity of said station.

[0017] Going into a greater detail, the support surface of the charging station for the base of lighting fixtures may comprise a degree of inclination configured so that the necks of the bases, inserted into their respective cavities, do not interfere with other fixed or mobile elements within the possible structure where the assembly is mounted.

[0018] It should be noted that, throughout the description and claims, the term "comprises" and its variants are not intended to exclude other technical features or additional elements. In this sense, neither the material nor the dimensions of the different elements that make up a possible embodiment of a lighting device or a charging station are intended to be limiting.

BRIEF DESCRIPTION OF THE FIGURES

[0019] In order to complete the description and to help make the features of the invention more readily understandable, a set of figures and drawings is presented wherein the following is represented by way of illustration and not limitation:

Figure 1 shows an exploded view of the different components of a possible embodiment of the lighting fixture object of the present invention.

Figure 2 shows a perspective view of a lighting fixture object of the present invention, where the base of the fixture is shown in detail.

Figure 3 shows a perspective view of a possible embodiment of equipment that comprises a charging station with two lighting fixtures.

Figure 4 shows a side elevation view of the equipment shown in the previous figure.

Figure 5 shows a side elevation view of the equipment shown in the previous figure.

Figure 6 shows a perspective view in which a lighting fixture is installed on a tripod.

Figure 7 shows a perspective view in which a lighting fixture is installed on a road marking cone.

DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

[0020] As shown in the preceding set of figures, a possible embodiment of the invention is described below,

where this possible embodiment of the lighting fixture, see Fig. 6 and 7, is coupled or installed on a marking cone (C) and on a tripod (T).

[0021] Further describing a possible embodiment of the invention in detail, it can be seen that the fixture comprises a base (2) and a lighting device (1) that is fixed to the base, either by pressing or by screwing, and has the particularity that the base (2) is torch-shaped and comprises an upper receptacle (3) that is open, said receptacle configured to house the lighting device (1), and accommodating at least one power source (4); and a lower pole (5) starting perpendicularly from the upper receptacle and comprising at least one guide slot (6) on its side surface.

[0022] As shown, the lower pole (5) has an essentially frustoconical shape with a variable and decreasing diameter as it descends, which allows it to be coupled, for example, to the hollow heads of the road marking cones in the market (see Fig. 7). In this regard, the slot (6) is arranged longitudinally and allows the device to remain centred and attached to a charging station while charging. Likewise, the lower tip of the pole can be rounded to avoid possible damage when handled by an operator.

[0023] The base assembly (2) therefore has a torch shape, which on the one hand allows it to be inserted into and coupled to any type of road structure, since it is a mobile and autonomous device separate from the very constitution of said road structure; and, furthermore, it has the particularity and advantage that it accommodates and holds a lighting device (1), said device comprising various functionalities already known today.

[0024] In a possible embodiment of the invention, the lighting device (1) comprises in its zenith area the essential elements for its operation as stationary lighting signals, in other words, a lampshade (7), a reflector (8), an electronic board (9) equipped with at least one electroluminescent LED photodiode (10), in colour and with features predefined by the conditions of use of the device, said elements aligned and centred with respect to the reflector (8) in order to distribute an intermittent light beam around the axis of said reflector (8) forming a uniform ring of light around the body of the base (2), the frequency and intensity of which varies depending on the needs that are required; and a programmable control module with a suitable computer program. Said board (9) can also have a telecommunications module or elements (11) such as a SIM card or similar, and geopositioning (12), and the respective transmitting and receiving antennas (13) thereof, necessary to effectively position the device with respect to the point where it is located. It can also have a possible telecommunications module (14) controlled by Bluetooth protocol, Wi-Fi or other existing technology in order to control and program the equipment remotely, through the aforementioned telecommunications attributes, and a programmable control module with a suitable computer program. Likewise, it can have an optical sensor (15) capable of measuring and adjusting the intensity of the light signal emission to the environmental conditions predefined by the same and the other sensors of the device. The device may comprise a second electronic board (16) interconnected to the previous one, equipped with auxiliary means or environmental control sensors, such as a temperature sensor (17), a rain sensor (18), a humidity sensor (19) and/or other equipment stability control and emergency sensors, such as a position control or gravity sensor (20) or a sound sensor (21) alerting a low battery emergency, and comprising a connector that is connected to the power source (4) of the base. In addition, the device may comprise an activation and deactivation push button (22) or button, preferably arranged at a zenith point of the assembly and accessible to the user.

[0025] A possible embodiment of equipment for signalling dangerous and/or emergency situations is also defined, said equipment comprising at least one lighting fixture such as the one previously described and a charging station (E) that allows said lighting fixtures to be charged and fixed, where the charging station has a structure comprising a horizontal support plate (23) with at least one circular cavity (24), where the cavity is intended for the base (2) of the lighting fixture to be inserted and fixed therein, for which the side of said cavities has a coupling neck consistent with the upper diameter and format of the lower pole (5) of the fixture that keeps the lighting fixture fixed in said cavity. The inside of the cavity may comprise at least one vertical counter-guide (25) that remains in contact with the guide slot (6) in the base of the lighting device, so that, as previously indicated, it remains centred and attached to the charging station. In addition, the station comprises at least one internal electric charger (not shown), preferably of the wireless type, equipped with the technical means required to recharge the batteries when the torch is fully inserted into the cavity of said station. For example, conventional wireless recharging magnetic activation and deactivation means can be arranged internally, reflecting the recharging status through the very LED diodes (10) of the lighting device (1).

[0026] In a possible embodiment of the invention, the station (E) comprises a vertical panel (26) for fixing to a vertical wall, fixing by means of permanent screw-type fixing elements through respective holes (27), and where the vertical panel (26) for fixing starts from the horizontal support plate (23). In addition, the surface of the support plate (23) for accommodating the lighting fixtures can also be designed with a suitable degree of inclination so that the fixtures inserted into the respective cavities thereof do not interfere with other fixed or mobile elements in the place where the assembly is being mounted.

[0027] To make the invention more readily understandable, the operation of the equipment is explained below. The structure of the charging station (E) containing lighting fixtures is mounted on a vertical panel of a motor vehicle and is connected to its main power source, i.e., the vehicle's battery. Therefore, while the aforementioned lighting fixtures in said station are recharging, and

until they are removed from the charging support and manually moved to their stable position inside the upper cavity of a marking cone, a tripod or any other fixed element, where, either after pressing the push button (22) or due to the action of a position control sensor (20) when it detects the immobility of the equipment over a predefined period of time, it starts up and activates its light position system as well as its telecommunications system, connecting via its available technical telecommunications means, either directly through the mobile telephone network or through a remote application via its local communication protocol, or even in parallel, issuing a data packet to a remote database or server, from where the same are managed, providing the relevant or preconfigured data in said packet, such as its global position, temperature, altitude, humidity, or others, in addition to the technical state in which is found at all times, such as battery level, time remaining for its replacement, a failure in the system, recharge level, and possibly a sound sensor for alerting a low charge emergency. Therefore, when a predefined drop in the capacity of the power source (4) or battery occurs, the device emits a sound and light warning for its substitution, recharging or replacement by another fixture. In this case, the second fixture continues to operate, while the first fixture charges at the station (E) until a new replacement is made at the predefined signalling point, or at another location, and so on, allowing uninterrupted use of the equipment for as long as necessary.

[0028] Taking these aspects into account, the present invention is an effective form of immediate signalling, both in terms of visuals and in terms of telematics, of all kinds of technical events that may occur on the road, during the time that the same last. The telecommunications accessories that the lighting device (1) may have make it possible, through several wireless protocols that are already known, to control the equipment and even adapt a plurality of them to very complex and diverse events, ranging from works and services to cycling tours where junctions have to be pre-signalled, or even where alternative routes must be marked in order to avoid places where damage has occurred due to atmospheric events or events of any other kind. It is a versatile and safe system that allows the event to be controlled remotely, both by the operators who execute it and by the people who control it technically, or the authorities themselves through their computer systems, and the users of public roads, either through a mobile application or through new vehicles that may have interconnectivity. In addition, it is also a technical solution that ensures the safety of the personnel operating at a worksite or performing a service.

Claims

1. A lighting fixture for signalling dangerous situations, comprising a base (2) and a lighting device (1), and **characterised in that** the base (2) comprises:

   an upper receptacle (3) that is open, said receptacle being configured to house and fix the lighting device (1);
   a lower pole (5) starting perpendicularly from the lower portion of the upper receptacle (3); and
   where the base (2) accommodates at least one power source (4) that is connected to a connector arranged in the lighting device (1).

2. The lighting fixture, according to claim 1, wherein the side surface of the lower pole comprises at least one guide slot (6) that is arranged longitudinally on said surface.

3. The lighting fixture, according to claim 1, wherein the lower pole (5) has a frustoconical configuration.

4. The lighting fixture, according to claim 1, wherein the lower tip of the lower pole (5) is rounded.

5. The lighting fixture, according to claim 1, wherein the lighting device (1) comprises a lampshade (7), a reflector (8), an electronic board (9) equipped with at least one electroluminescent LED photodiode (10), an activation and deactivation push button (22), and a programmable control module.

6. The lighting fixture, according to claim 5, wherein the lighting device (1) comprises at least one telecommunications module.

7. The lighting fixture, according to claim 5, wherein the lighting device (1) comprises a geopositioning module (12).

8. The lighting fixture, according to claim 5, wherein the lighting device (1) comprises a second electronic board (16) interconnected to the previous one that is equipped with at least one control sensor selected from a temperature sensor (17), a rain sensor (18), a humidity sensor (19), a position control sensor (20) and a sound sensor (21) alerting an emergency.

9. Use of a lighting fixture such as the one defined in any of claims 1-8 to be inserted into a hole or gap in a road marking structure.

10. The use of a lighting fixture, according to claim 9, wherein the road marking structure is selected from a road marking cone, a tripod, a plastic barrier or a guardrail joist.

11. Equipment for signalling dangerous situations that comprises at least one lighting fixture according to any of claims 1-8, **characterised in that** it further comprises a charging station (E) comprising:

a horizontal support plate (23) with at least one circular cavity (24) through which the base (2) of a lighting fixture is inserted, and wherein the side of said cavities has a coupling neck consistent with the upper diameter of the pole (5), keeping the lighting fixture fixed in said cavity; and

an internal electric charger that is connected to the power source (4) of the lighting fixture.

12. The equipment, according to claim 11, **characterised in that** the electric charger is wireless.

13. The equipment, according to claim 12, wherein the electric charger and the power source (4) comprise wireless recharging magnetic activation and deactivation means.

14. The equipment, according to claim 11, wherein the inside of the cavity (24) comprises at least one vertical counter-guide (25) that remains in contact with the slot (6).

15. The equipment, according to claim 11, wherein the charging station (E) comprises a vertical panel (26) for fixing that starts from the horizontal support plate (23).

16. The equipment, according to claim 15, wherein the vertical panel (26) comprises holes (27) for fixing the charging station (E) by means of screws.

17. The equipment, according to claim 11, wherein the surface of the support plate (23) is inclined.

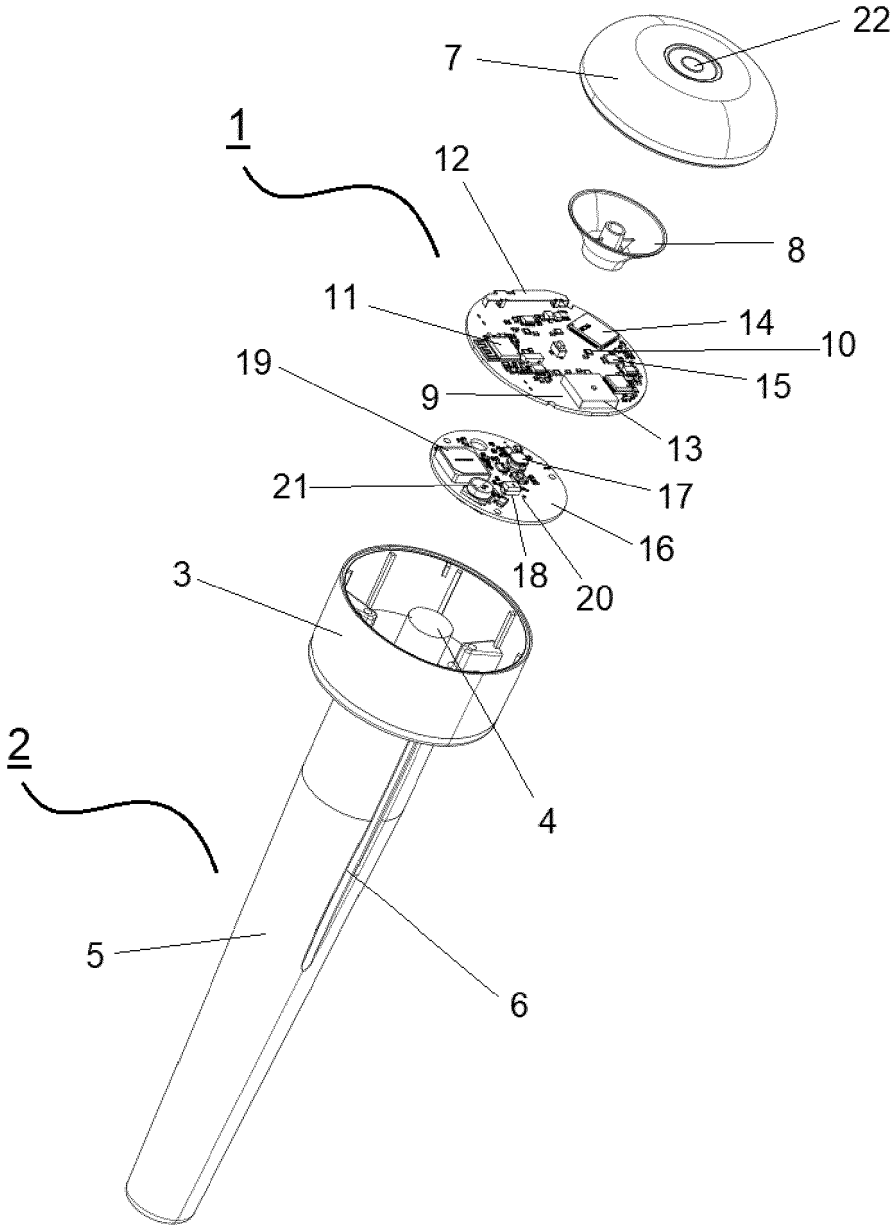

FIG.1

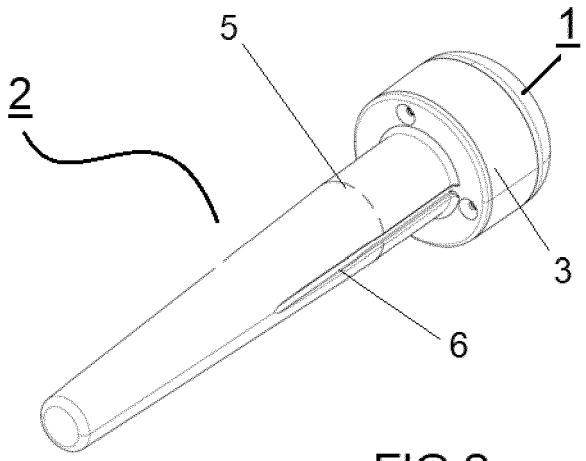

FIG.2

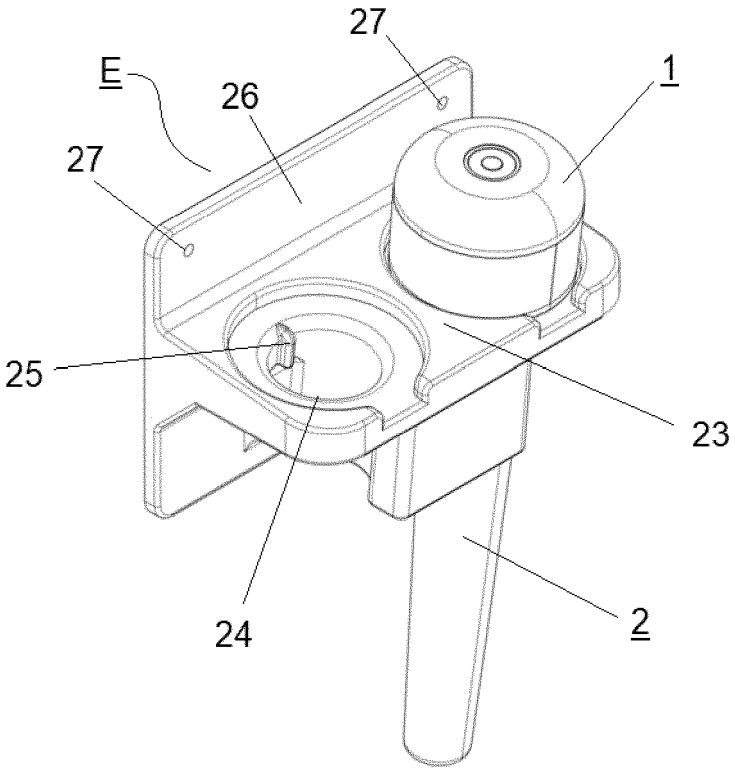

FIG.3

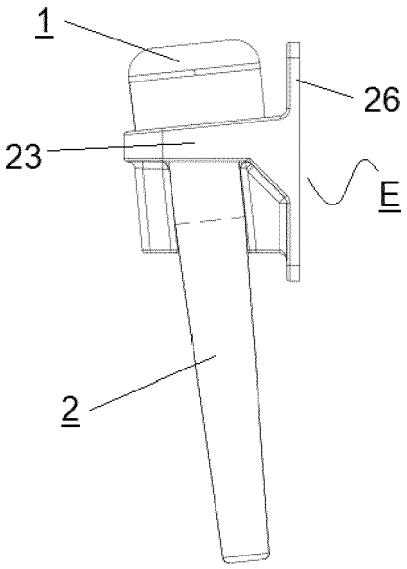

FIG.4

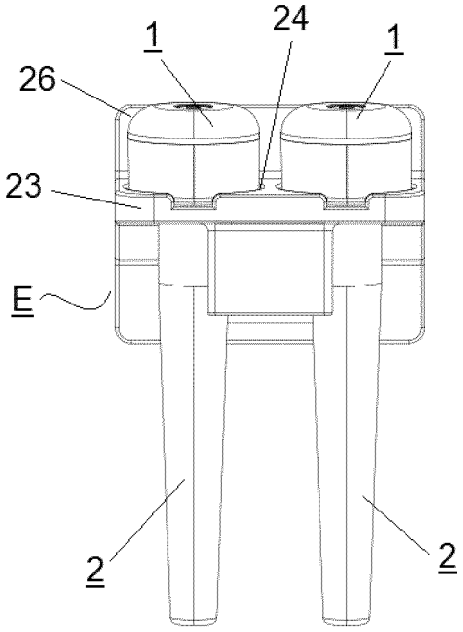

FIG.5

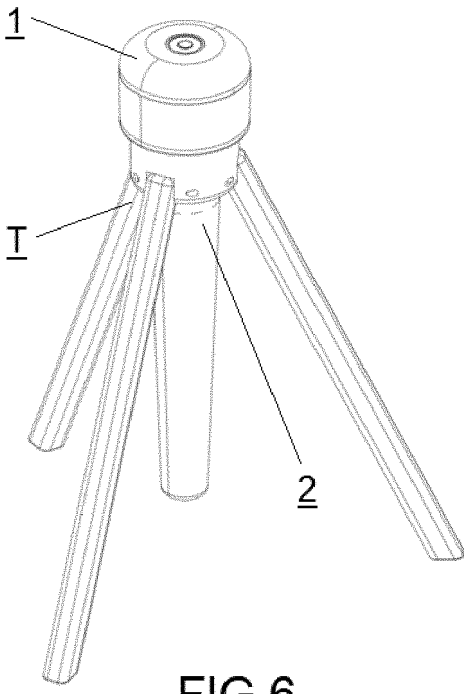

FIG.6

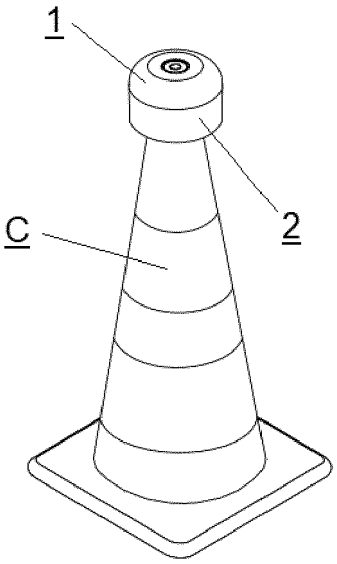

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 23 38 2856

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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
Munich	13 February 2024	Giannakou, Evangelia

CATEGORY OF CITED DOCUMENTS

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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