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(54) **Title:** A LIGHT DEVICE

Fig.1.

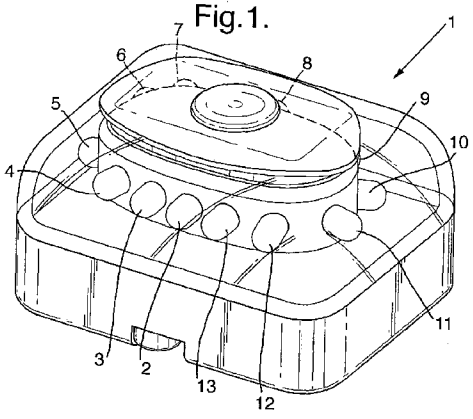
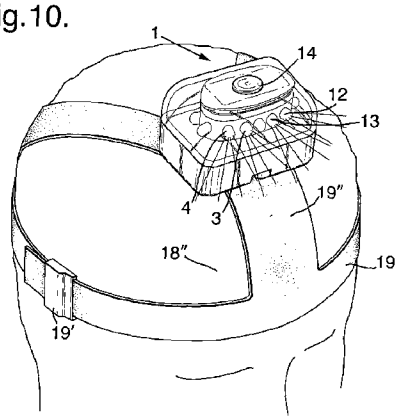


Fig.10.



(57) **Abstract:** A light device designed to be, with the aid of a fastening means, fastenable to and 5 position-adjustable on a user's body part, and where the radiation direction of the light is selectable as a function of how the light is oriented on the body part or an item of clothing for the body part. The light is a multifunctional light which is optionally adjustable to radiate essentially in one main direction or to be 360° omnidirectional. The radiation of light in said main direction comprises the option between radiation o with white light and radiation with red night-vision adapted light. The omnidirectional radiation of light comprises the option of at least one of: flashing and constant light.

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A light device

The present invention relates to a light device designed to be, with the aid of a fastening means, fastenable to and position-adjustable on a user's body part or on a item of clothing for the body part, wherein the light is a multifunctional light which has optionally adjustable radiation direction related to how the light is oriented on the body part or the item of clothing.

There is already known a light, produced by the applicant, designed especially to provide general omnidirectional illumination, either as constant light or as flashing light, when the light is placed with the aid of an attachment magnet, for example, on top of a peaked cap or the like, on the top of a car roof or on a surface of a boat, or is secured with the aid of a strap-fastened fastening bracket and magnetic fastening to some article or other or to a person in instances where a warning situation needs to be seen from a long distance or illumination of an area close to the light is desirable.

This type of light has particular applications where there is a need for omnidirectional light, but is not so suitable for other types of illumination.

Another light of this type is known from GB 235476.

For further illustration of the prior art, reference is made to US 2007/0159809-A1 and JP Patent Abstracts 2004311188.

The object of the present invention has been to provide a light device which not only serves said purposes, but also provides a number of other functions in the same light, whilst the fastening possibilities for such a light are also extended.

According to the invention, the device is characterised in:

- that the light is optionally adjustable to radiate essentially in one main direction with limited angle of radiation or to be 360° omnidirectional;
- that the light is movable and positionable with the aid of said fastening means along a curved portion of the body part; and
- that the light is intended to emit light:
    - in an omnidirectional mode or in said main direction mode when it is on a top part of the curved portion; and
    - in said main direction mode when it is at a point along the curved portion between the top part and an area of the curved portion, forward-facing on the user, which has a greater angle relative to the horizontal than the top part.

According to a further embodiment of the device there is used a fastening means selected from the group consisting of:

- strap(s) or belt(s) with a hook and loop fastener portion for attachment to the body part directly or on the outside of an item of clothing for the body part, and a cooperating hook and loop fastener portion on the light;
- item of clothing for the body part equipped with a hook and loop fastener portion, and a cooperating hook and loop fastener portion on the light;
- strap(s), belt(s) or self-shaping band with ferromagnetic material as a part thereof for attachment to the body part directly or on the outside of an item of clothing for the body part, and a cooperating magnet on the light;
- item of clothing for the body part equipped with ferromagnetic material, and a cooperating magnet on the light;
- strap(s) or belt(s) with a snap fastener portion for attachment to the body part directly or on the outside of an item of clothing for the body part, and a cooperating snap fastener portion on the light;
- item of clothing for the body part equipped with a snap fastener portion, and a cooperating snap fastener portion on the light; and
- strap(s) or belt(s) with a slideway equipped with a slider, where the strap or belt is intended for attachment on the outside of the item of clothing for the body part or constitutes part of the item of clothing, the slider have a fastening means portion, and where on the light there is a fastening means portion that cooperates with the slider.

According to another embodiment, the light has a horizontal sensor for activation and/or deactivation of the light's 360° omnidirectional mode, thus ensuring that the light is only able to emit light in the omnidirectional mode when it is in a horizontal position or deviates from the horizontal position at an angle selected in the range of 0-30°.

The light is adapted, in said main direction mode, to be able to emit either red light or white light, and the main direction mode angle of radiation for red light may be smaller than for said white light.

The present device will, for example, be employable for use on a user's head or head garment or on a shoulder area or clothing for a shoulder area.

For radiation in one main direction, such as in the direction of vision or field of vision of a user, there is the option between radiation with white light or with red, night vision adapted light.

These features and other embodiments of the invention are set forth in the attached claims, and are described in the description below with reference to the attached drawing figures.

Fig. **1** is a front perspective view of a light according to the invention.

Fig. **2** is a top view of the light shown in Fig. 1.

Fig. **3** shows a simplified circuit diagram that is related to the operation of the light.

Fig. **4** shows the light in a night light mode.

Fig. **5** shows the light radiating in a main direction.

Fig. **6** shows the light in a 360° omnidirectional mode.

Figs. **7** and **8** show, by way of example, how the light may be worn by a user.

Fig. **9** is a top view of how the light can be placed on the head with the aid of head straps.

Fig. **10** shows how the light can be placed on the user's head between the top of the head and the forehead with the aid of head straps and fastening means.

Figs. **11-13** show, by way of example, alternative fastening means.

Fig. **1** shows a light **1** that is a multifunctional light which is optionally adjustable to radiate essentially in one main direction **A** (see Fig. **2**) or to be 360° omnidirectional.

In the illustrated example, the light has twelve light sources **2-13**, of which one light source **2** is advantageously arranged to be able to emit red light adapted in particular for night vision, i.e., in order not to ruin a user's night vision under given conditions.

For radiation in one main direction, such as in a user's direction of vision or field of vision **B**, there is thus the option of radiation of white light from the light sources **3, 4, 12** and **13**, as shown in Fig. **5**, and radiation of red, night vision adapted light from light source **2**, as shown in Fig. **4**. Here, the angle of radiation will in both cases of course be limited.

It will be seen here, on perusing Figs. **4** and **5,** that the angle of radiation from the light source **2** is smaller than the total angle of radiation from the light sources **3, 4, 12** and **13**.

In the second alternative, there is a possibility of omnidirectional radiation of light, i.e., that the light sources **3 -13** emit light, as indicated in Fig. **6**. Here, there is also the possibility that such 360° omnidirectional light is optionally either flashing or appears as constant light. There is, of course, also the possibility that only one of these options is available.

One single operation mode control switch **14**, preferably located on the top of the light will, upon repeated depression, be capable of triggering in a cycle the light's functions with the aid of a light source control unit **15**, for example thus:

a) red light source **2** is lit;

b) red light source **2** is extinguished and white light sources **3, 4, 12** and **13** are lit with constant light emission.

c) white light sources **5-11** are lit in addition, with constant light emission;

d) white light sources **3-13** are put in flashing function;

e) all light sources **2-13** are extinguished.

It will be understood that, for example, step c) or step d) could optionally be omitted.

The light sources **2-13** and the unit **15** receive power supply from a battery **16**.

It is also conceivable that the light is equipped with a horizontal sensor **17** for activating and/or deactivating the light's 360° omnidirectional mode, i.e., that the light can only emit light in omnidirectional mode when it is in a horizontal position or deviates from the horizontal position at an angle selected in the range of 0-30°.

Figs. **7** and **8** show, as a non-limiting example, how a user might use such a light device. In Fig. **7** it is shown that the user **18** is equipped with head straps **19** which have

fastening means portions for engagement with a fastening means portion on the light **1** for desired positioning of the light between the top (the crown) of the head **18'** and the user's forehead. It is also shown that the user **18** may have a belt or a strap **20** around, for example, his upper arm **18''**, where the belt or strap **20** is provided with a fastening means portion and where the light **1** in a corresponding manner is provided with a cooperating fastening means portion. In Fig. **8**, instead of head straps **19**, a head garment **21** is used that is provided with fastening means portion **22** for cooperation with mating fastening means portion (not shown in Figs. **7** and **8**) on the light. In Fig. **7** the light is so positioned along the curve of the head that it emits light in the user's direction of vision **A** or field of vision **B**, whilst in Fig. **8** the light **1** is so positioned on the top of the head **18'** that its light emitting function is 360^{0} omnidirectional, either with constant light or with flashing light. In a similar manner, the user can also use a jacket **23** which, for example, on an upper arm or shoulder portion **23'** thereof is equipped with a fastening means portion **23''; 23'''** for cooperation with mating fastening means portion (not shown in Figs. **7** and **8**) on the bottom of the light **1**.

Fig. **9** shows in more detail how the device appears with head straps and where there is advantageously at least one known per se head strap tensioner **19'**, and in Fig. **10** it is shown how the light **1**, for example, is located along the head strap **19''** and thus the curved part of the skull which extends between the crown of the head and the forehead, so that the light **1** can be used to provide light for walking or for reading, depending upon how far from the forehead **18''** the light is situated.

It will thus be understood that when the light **1** is worn on a user's **18** head **18'**, the light is positionable by means of said fastening means between the top of the head and the forehead. Although it is possible that the light will be intended to only emit light in an omnidirectional mode when it is on the top of the head, it is also conceivable that it will also be able to emit light in said main direction when it is on the top of the head. When the light is at a point along the curved part of the head between the top and the forehead, the light will be designed to only emit light in said main direction, i.e., either with just light source **2** alone or with only light sources **3, 4, 12** and **13**.

Although there are many possible fastening means within the scope of the invention, some of the possible embodiments for use in a preferred mode of the invention are mentioned below.

As fastening means, there can be a choice from the group consisting of:

- strap(s) or belt(s) **24** with a hook and loop fastener portion **25** for attachment to the body part directly or on the outside of an item of clothing, and a cooperating hook and loop fastener portion **25'** on the light **1**, or an item of clothing **24'** equipped with a hook and loop fastener portion **25,** and a cooperating hook and loop fastener portion **25'** on the light **1**, as indicated in Fig. **11**;

- strap(s), belt(s) or self-shaping band **26** with ferromagnetic material **27** as a part thereof for attachment to the body part directly or on the outside of an item of clothing, and a cooperating magnet **27'** on the light **1**, or an item of clothing **26'** equipped with ferromagnetic material **27**, and a cooperating magnet **27'** on the light **1**, as indicated in Fig. **12**;

- strap(s) or belt(s) **28** with a snap fastener portion **29** for attachment to the body part directly or on the outside of an item of clothing, and a cooperating snap fastener portion **29'**on the light **1**, or an item of clothing **28** equipped with a snap fastener portion **29**, and a cooperating snap fastener portion **29'**on the light **1** as indicated in Fig. **13**; and

- strap(s) or belt(s) **30** with a slideway **31** equipped with a slider **31'**, where the strap or belt is intended for attachment on the outside of the item of clothing or constitutes a part thereof, the slider have a fastening means portion **32**, e.g., a hook and loop fastener, and where on the light **1** there is a fastening means portion **32'** that cooperates with the slider **31'**, as in the example a hook and loop fastener portion.

As the item of clothing, there can be chosen, for example, at least one of the following: a head garment, a jacket, a pair of trousers. It is also conceivable that the item of clothing, for example, is a glove. Furthermore, it is envisaged that if a head garment, for example, has a brim, it will be possible to fasten the light to the top or bottom of the brim.

As light sources, ordinary low voltage light bulbs can be used, although it is preferred, in order to save power, to use light-emitting diodes (LED), which have good light output in relation to power consumption.

Patent claims

1.
A light device designed to be, with the aid of a fastening means, fastenable to and position-adjustable on a user's body part or on a item of clothing for the body part, wherein the light is a multifunctional light which has optionally adjustable radiation direction related to how the light is oriented on the body part or the item of clothing, characterised in

- that the light is optionally adjustable to radiate essentially in one main direction with limited angle of radiation or to be 360° omnidirectional;
- that the light is movable and positionable with the aid of said fastening means along a curved portion of the body part; and
- that the light is intended to emit light:
  - in an omnidirectional mode or in said main direction mode when it is on a top part of the curved portion; and
  - in said main direction mode when it is at a point along the curved portion between the top part and an area of the curved portion, forward-facing on the user, which has a greater angle relative to the horizontal than the top part.

2.
A device as disclosed in claim 1, characterised in there is used a fastening means selected from the group consisting of:

- strap(s) or belt(s) with a hook and loop fastener portion for attachment to the body part directly or on the outside of an item of clothing for the body part, and a cooperating hook and loop fastener portion on the light;
- item of clothing for the body part equipped with a hook and loop fastener portion, and a cooperating hook and loop fastener portion on the light;
- strap(s), belt(s) or self-shaping band with ferromagnetic material as a part thereof for attachment to the body part directly or on the outside of an item of clothing for the body part, and a cooperating magnet on the light;
- item of clothing for the body part equipped with ferromagnetic material, and a cooperating magnet on the light;
- strap(s) or belt(s) with a snap fastener portion for attachment to the body part directly or on the outside of an item of clothing for the body part, and a cooperating snap fastener portion on the light;
- item of clothing for the body part equipped with a with a snap fastener portion, and a cooperating snap fastener portion on the light; and

- strap(s) or belt(s) with a slideway equipped with a slider, where the strap or belt is intended for attachment on the outside of the item of clothing for the body part or constitutes part of the item of clothing, the slider having a fastening means portion, and where on the light there is a fastening means portion that cooperates with the slider.

3.
A device as disclosed in claim 1 or 2, c h a r a c t e r i s e d i n
- that the light has a horizontal sensor for activation and/or deactivation of the light's 360° omnidirectional mode, so that the light is only able to emit light in an omnidirectional mode when it is in a horizontal position or deviates from the horizontal position at an angle selected in the range of 0-30°.

4.
A device as disclosed in claim 1, 2 or 3, c h a r a c t e r i s e d i n
- that the light is adapted, in said main direction mode, to be able to emit either red light or white light.

5.
A device as disclosed in claim 4, c h a r a c t e r i s e d i n
- that the main direction mode angle of radiation for red light is smaller than for said white light.

6.
The use of a device as disclosed in any one of claims 1-5 for use on a user's head or head garment or a shoulder area or clothing for a shoulder area.

Fig.1.

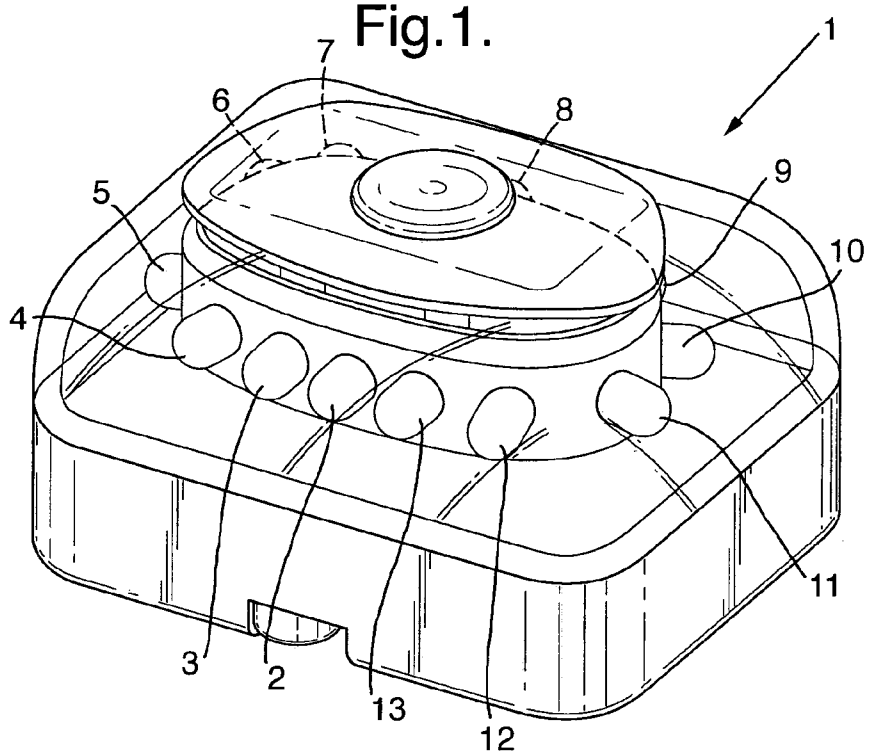


Fig.2.

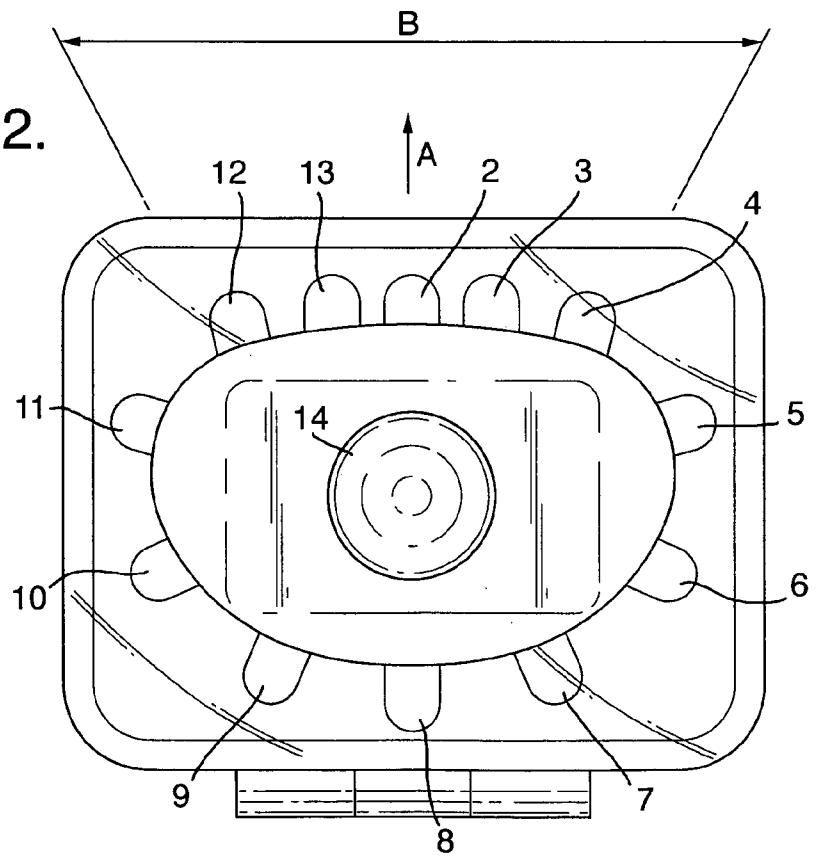


Fig.3.

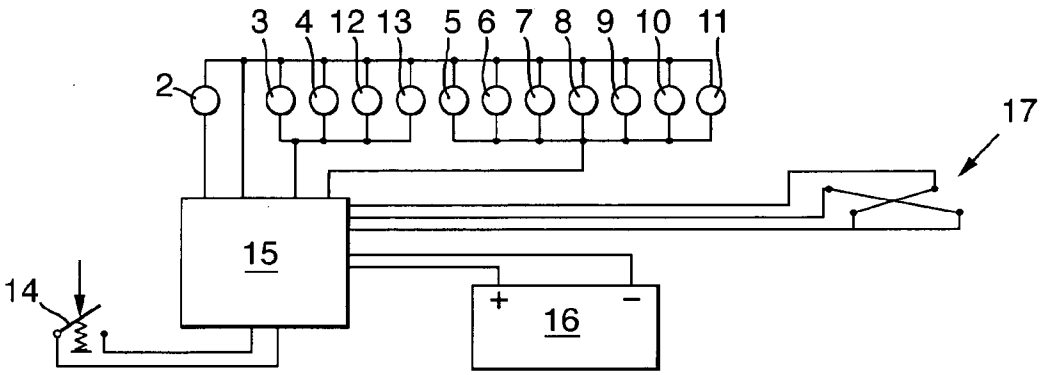


Fig.4.

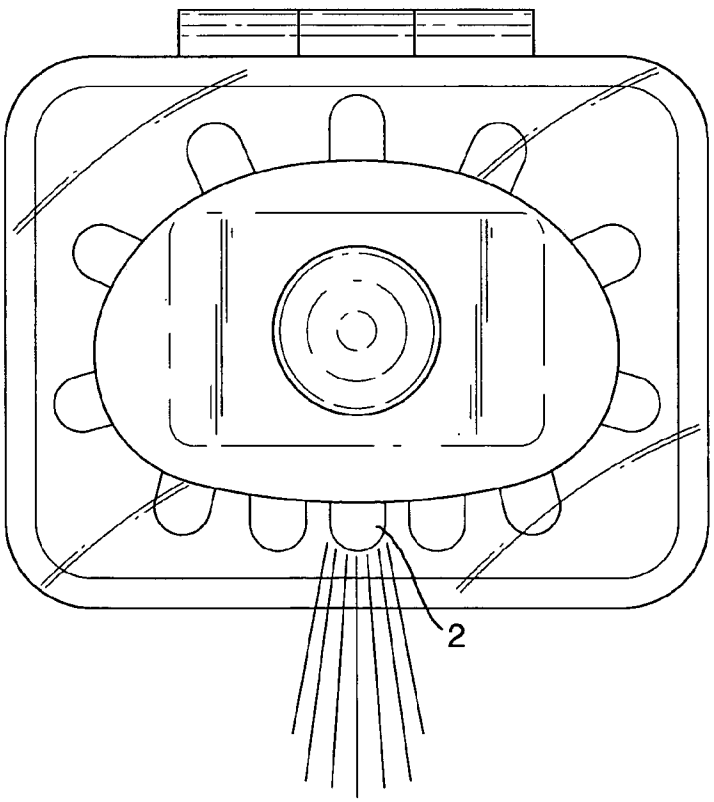


Fig.5.

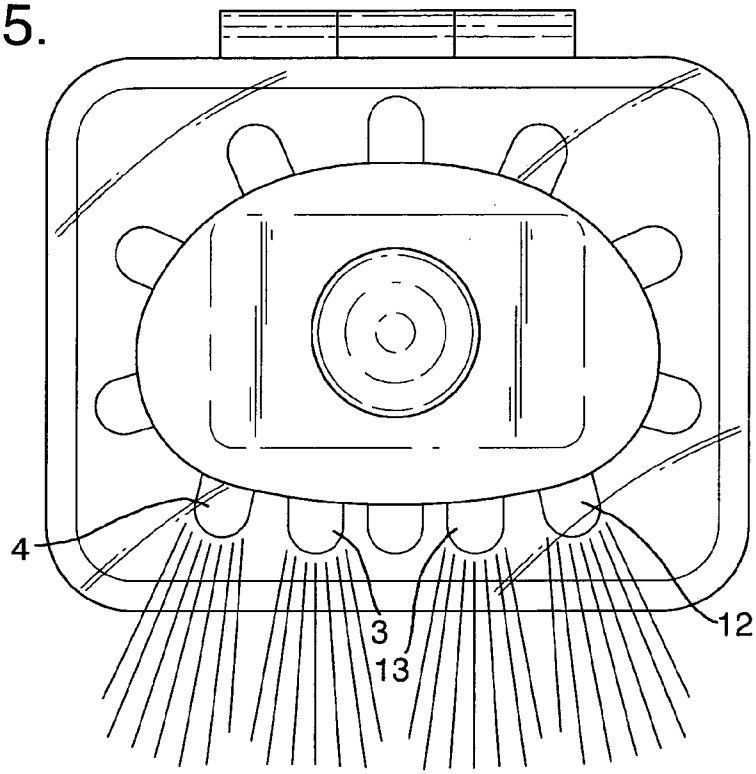


Fig.6.

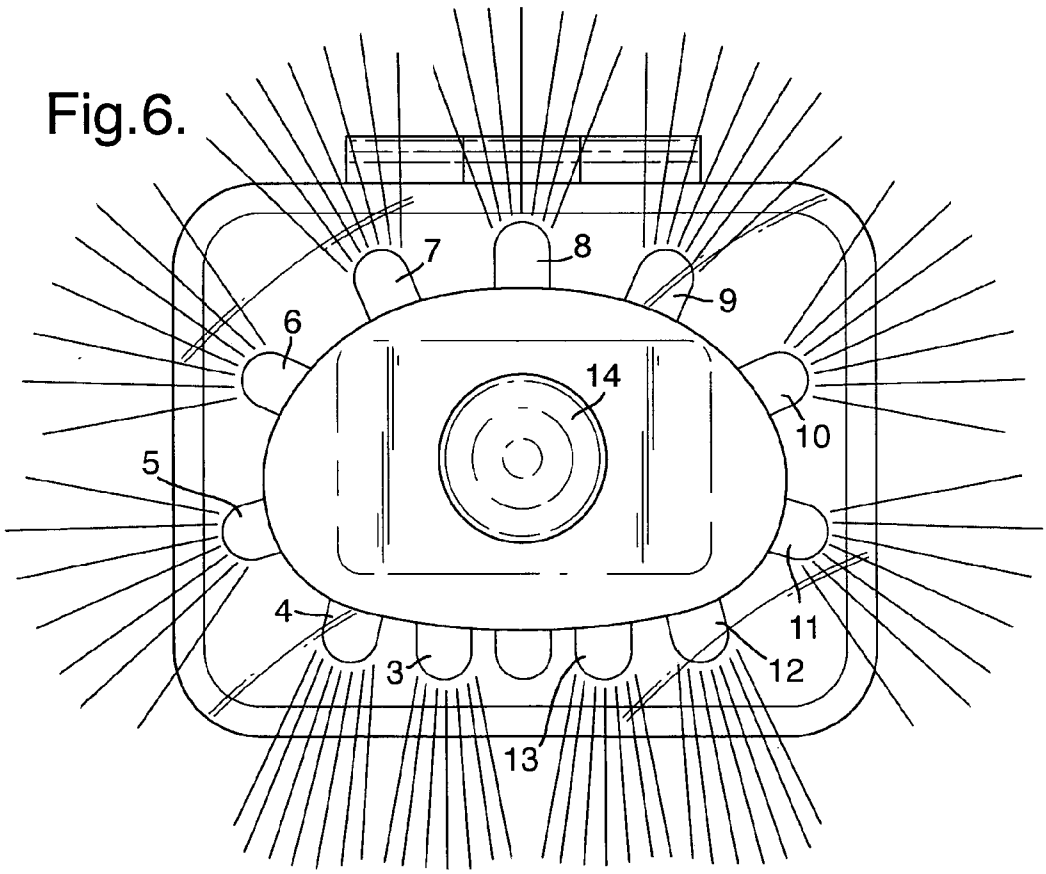


Fig.7.

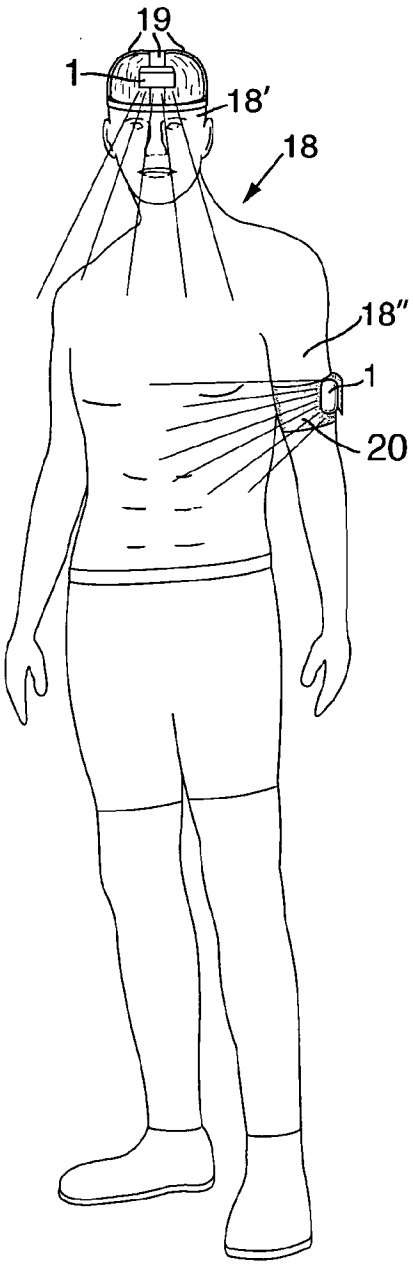


Fig.8.

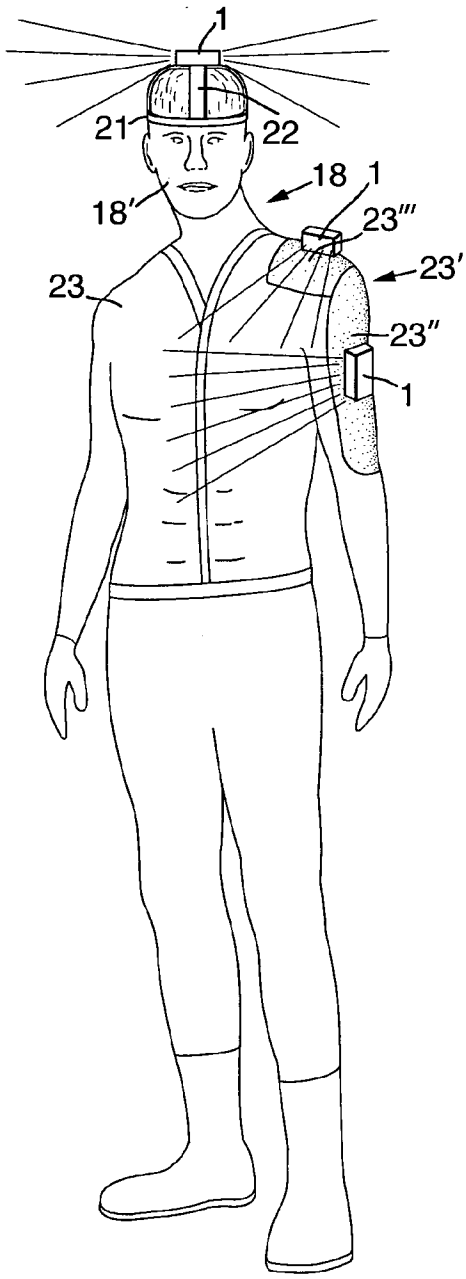


Fig.9.

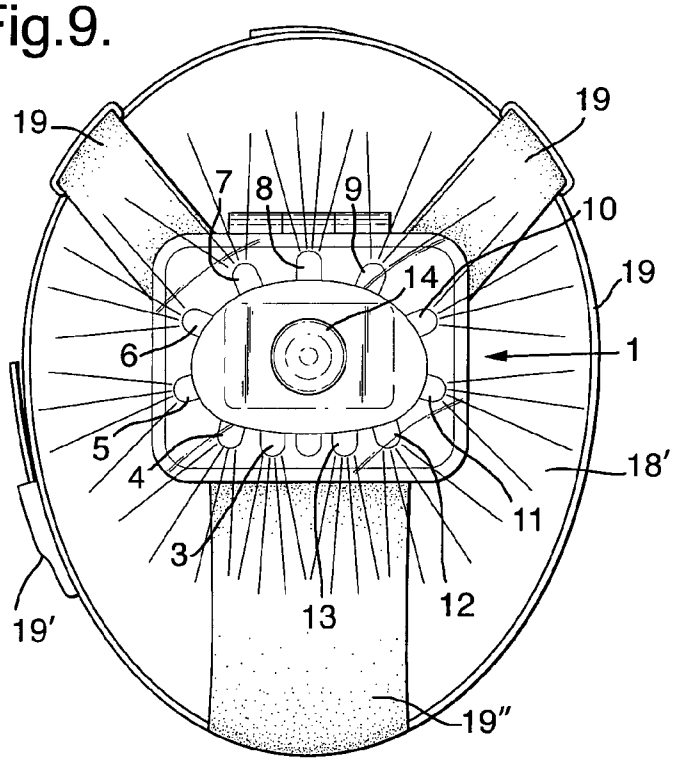


Fig.10.

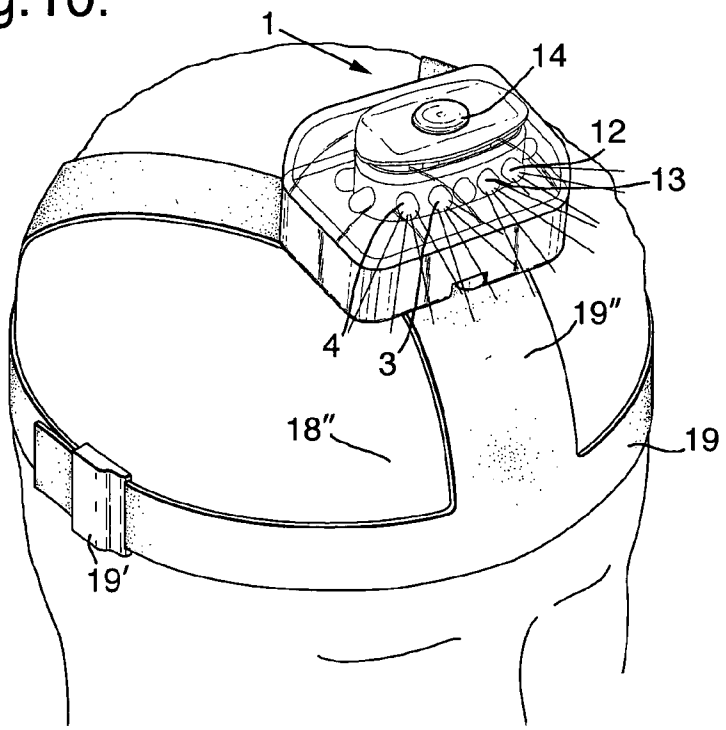


Fig.11.

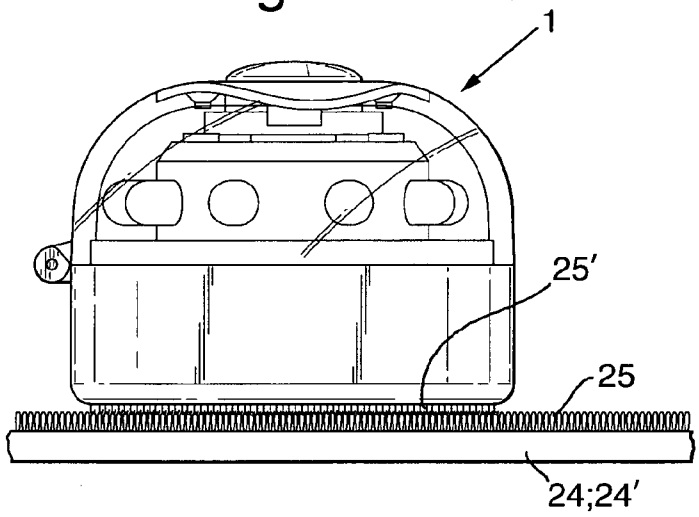


Fig.12.

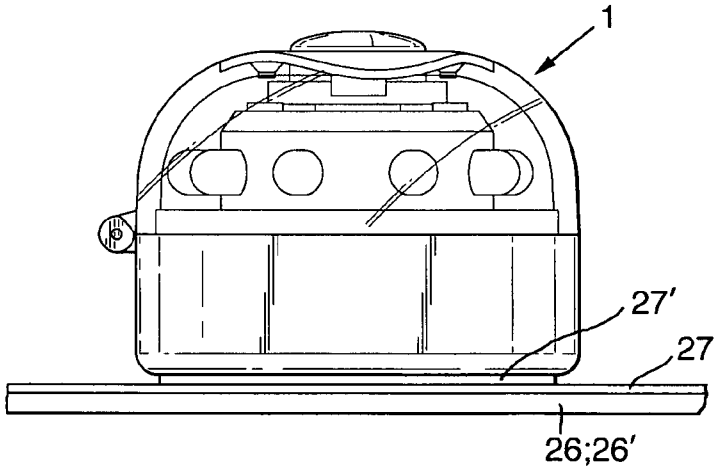


Fig.13.

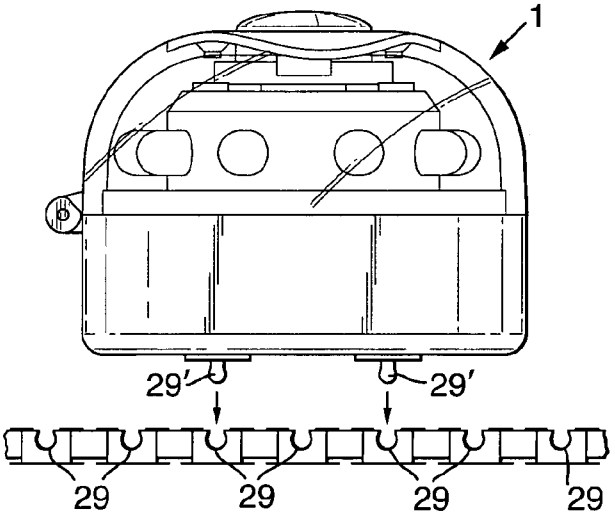
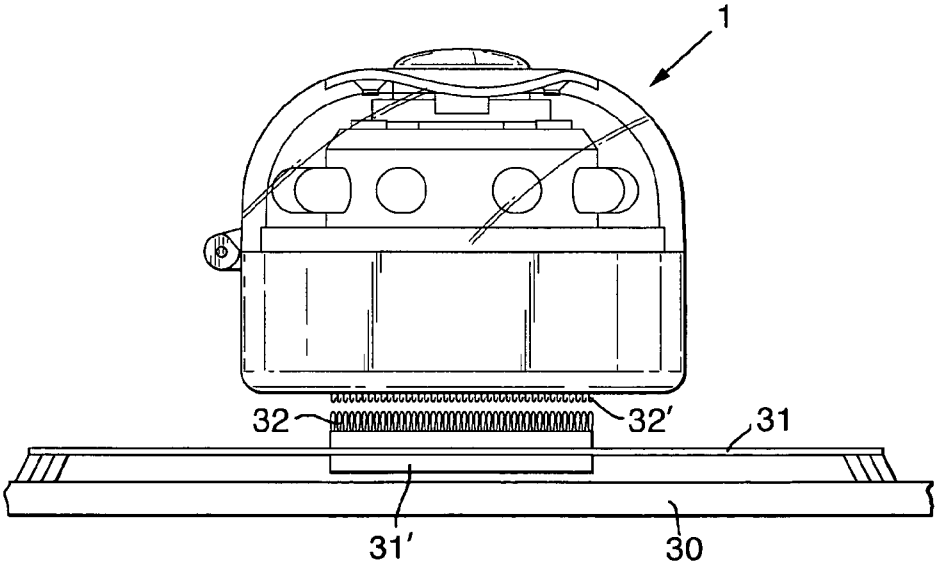


Fig.14.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2008/000467

A. CLASSIFICATION OF SUBJECT MATTER

F21V 19/02 (2006.01), F21L 4/00 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F21L, F21S, F21V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

DK, FI, NO, SE classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

epodoc, wpi

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,D A,D	US 2007/0159809 A1 (KIM, P et. al.) 12.07.2008 Abstract, [0004], [0007], [0014], [0062]	1, 2, 4, 6 3, 5
X,D A,D	Patent Abstracts of Japan, JP 2004311188 (ABC TWENTY ONE KK) 04.11.2004 whole document	1, 2, 4, 6 3, 5
A,D	GB 2354579, (QUANTRILL, G) 28.03.2001 whole document	1-6

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
30.03.2009	31.03.2009
Name and mailing address of the ISA/ Nordic Patent Institute, Helgeshoy Alle 81 DK-2630 Taastrup, Denmark Facsimile No. +45 53 50 80 08	Authorized officer Olav A. Aasen Telephone No. +47 22 38 75 78

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/NO2008/000467

US	2007/0159809	A1	12.07.2007	NONE
JP	2004311188	A	04.11.2004	NONE
GB	2354576	A	28.03.2001	NONE