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(54) **PULL SWITCH APPARATUS**

ZUGSCHALTERVORRICHTUNG

APPAREIL INTERRUPTEUR À TIRETTE

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(56) References cited:
DE-U- 1 636 660
DE-U- 7 337 037
GB-A- 2 191 634
JP-A- 60 198 003
JP-U- 5 057 720

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Description

[0001] This invention relates to pull switch apparatus, particularly to ceiling mounted pull switches which are conventionally used for safety reasons in domestic rooms where there is installed plumbing, for example bathrooms and toilets.

[0002] Such pull switches are actuated by the user grasping and pulling down on a cord depending from the switch housing which is mounted on the ceiling. When actuated in this way, they turn the light(s) in the room in question on or off.

[0003] A problem arises, particularly in modem homes which are relatively space-constricted, that if the switch is actuated in the night time, when most of the accommodation is in darkness, the sudden illumination can easily cause others in the home to be disturbed, even to the extent of waking up. This can be very tiresome if one sleepless child who wishes to visit the bathroom or toilet then wakes another, or even others. But it is unusual for the child (or indeed adult) to close the door behind themselves before actuating the switch and flooding the area with light. Additionally, there may be a ventilation fan connected to the light circuit and adapted to turn on when the light is turned on, and this could be quite noisy and accordingly increase the risk of disturbing others, especially if it is arranged to continue operating for some time after the light is switched off.

[0004] A further difficulty in such circumstances is that the normal illumination instantly destroys the dark adaptation of the persons eyes, so that when they have finished using the room, and switch the light off using the pull switch, they are wholly unsighted and cannot immediately see where they are going.

[0005] It is well known to provide illumination to the actuating member of a pull switch. This enables the cord to be seen, for example at night, so that it can be easily actuated. Examples of such arrangements are disclosed in US 6315431B, GB-A-2191634, JP 60198003A, JP 11297119A and US 5454056.

[0006] However, all of these disclosures merely propose illuminating the graspable portion of the pull switch so that it can be easily found and then actuated, so giving rise to the disadvantages mentioned above.

[0007] Thus, GB-A-2191634 discloses a pull switch apparatus consisting of a pull switch adapted to be mounted on a ceiling, a depending actuation cord, and, attached to the cord, a gripping member in the form of a casing having within it a power source, an illumination device, and switch means connected to the power source and the illumination device and adapted to cause the illumination device to be illuminated when the switch means is operated. In accordance with the present invention, the illumination is actuated when the casing is moved or when the casing is approached by a person.

[0008] Motion activated lamps are known in a variety of embodiments, for example for illuminating the area around a door on the approach of a person and for so-called "security lights" designed to be mounted on the outside of buildings and to illuminate if a person approaches. Domestically, a variety of motion activated lamps is known, for example as described in US-A-2008/0094827 and US-B-6729740. Neither of these, however, is disclosed in combination with a pull switch. By combining the usually low intensity light source with the pull switch, which is located adjacent the entry door to a bathroom or toilet, the practical advantages obtained that the degree of illumination necessary is immediately provided to enable the person to see where they are going. This also contrasts with prior suggestions for bathroom night lights which use some other object in the bathroom, such as a soap dispenser (US-A-2007/0007304) or associated with the toilet itself (WO 95/25853) in order to provide the desired illumination.

[0009] Preferably the illumination device is one or more light emitting diodes. The diodes may be mounted in the casing in any convenient fashion and arranged to emit low-level light when actuated to illuminate the surrounding area softly.

[0010] Because the user is in the dark, very low overall levels of illumination are sufficient to enable them to see what they are doing, but such levels are insufficient to cause any disturbance to others.

[0011] The diodes may be protected from damage by being located behind a transparent or translucent window forming part of the casing.

[0012] The power source within the casing is conveniently one or more battery cells, for example two or four AA or AAA size cells.

[0013] Also within the casing is the switching mechanism. While this may be essentially mechanical if it consists of a motion detector, it is more reliable to use a solid state motion detector or proximity detection switch, as there are then no moving parts which might give rise to problems such as wear or sticking.

[0014] While it is of no consequence in terms of the user if the device operates even in daylight conditions, the life of the power supply may be increased if the casing includes an on/off switch enabling the automatic illumination feature to be turned off during the day or if another light source such as the main room light is on, or includes means (normally a light sensitive or photo transistor) to detect the ambient or surrounding levels of light, and arranged to ensure that if there is sufficient daylight, or a main light within the room is switched on, then the switching mechanism will not operate.

[0015] The shape of the casing may vary widely, but it is conveniently of a generally cylindrical shape which may be easily grasped and pulled down to operate the main illumination when needed. At night, simply moving it or putting a hand near it will cause the low level illumination to be provided from the casing. One end of the casing is adapted to receive the cord depending from the ceiling switch, for example taking the form of a screw-on end cap with a central small hole through which the cord is passed and then knotted before the end cap is replaced

on the end of the housing. Unscrewing the end cap may give access to the battery compartment(s), or the casing itself may be configured with an access hatch and battery compartment, or be separable into two parts to give access to one or more cavities for the receipt of the battery cells.

[0016] In such embodiments, the end cap may incorporate a mechanism to enable quick release of the device from the cord to enable it to be used in an emergency as an emergency light, or as a safety light. This quick release mechanism could be in the form of a twist clip of two halves (either screwed together or incorporating a bayonet type fastening), one attached to the end cap, and one attached to the cord, or the end cap itself may be removable if not used as the cover for the battery compartment. This allows the device to be attached to, or released from the cord by a simple twisting action. When the device has been detached from the cord, it may be inconvenient, for example, if the user puts the device down, that the time circuit causes a loss of illumination, so the device may also include an override switch which acts to cause the device to emit light continuously.

[0017] The invention is illustrated by way of example in the accompanying drawings, in which:

[0018] Figure 1 is a perspective view of switching apparatus according to the present invention seen from below;

[0019] Figure 2 is a perspective view from above of the lower part of the apparatus shown in Figure 1, separated into two parts;

[0020] Figure 3 is a view similar to Figure 2 but showing the lower part of the apparatus separated at an alternative position;

[0021] Figure 4 is a perspective view of half of the lower part of the apparatus shown in Figure 1, as if longitudinally bisected; and

[0022] Figures 5 and 6 are perspective views of the two sides of a circuit board forming part of the apparatus.

[0023] As shown in Figures 1 to 3 on a cord 1 depending from a ceiling switch 2 is a pull grip generally identified as 3. The pull grip 3 consists of a tapered generally cylindrical housing body 4 with an end cap 5 having a central hole through which cord 1 passes, and within which the end of cord 1 is knotted. The lower end of the housing carries a rotatable translucent or transparent cover 6 having a central portion in the form of a Fresnel lens 7.

[0024] By grasping the pull grip 3 and pulling it downwards, ceiling switch 2 may be actuated in known fashion.

[0025] End cap 5 is connected to the upper portion of body 4 via a bayonet connection, so it may be disconnected from body 4 as shown in Figure 2. Body 4 consists of two parts threaded together. Gripping formations 8 on body 4 enable the two parts to be easily separated or reassembled. When separated, as shown in Figure 3, access to a battery compartment is provided.

[0026] At the bottom of the casing behind the cover 6, which may be clear or tinted, are four LEDs. Within the casing is a circuit and batteries arranged so that if the casing is moved, or if someone approaches it, the LEDs are supplied with current and light is emitted from cover 6. By rotating the cover, an internal switch may be actuated to cause the LEDs to illuminate continuously. The range of rotation is shown by the two spaced moulded markings 9 on the cover and these can be registered with a moulded bead 10 on the bottom of body 4 at the limits of rotational movement of the cover 6.

[0027] Referring now to Figure 4, this shows the detailed configuration of the various parts, viz: end cap 5, main body 4 and cover 6. It also shows a circuit board assembly 14 including a motion sensor 15 and LEDs 16, and fixing screws 17 holding assembly 14 to the lower part of body 4. Located inside body 4 are four battery cells 18. The threaded connection between the two parts of body 4 is denoted 19.

[0028] The motion sensor 15 is a pyroelectric infrared sensor (PIR) which detects relative motion (within a radius of about 2 metres) due to altering heat states such as that caused by a person moving within the locality of the device.

[0029] The 'range of vision' of sensor 15 is wide as it sits just above Fresnel lens 7.

[0030] The triggering of sensor 15 causes a change in logic state within an integrated electronic circuit 22 mounted on the circuit board assembly.

[0031] The circuit board assembly is shown in more detail in Figures 5 and 6, with the tracks omitted for clarity. In addition to the components noted above, the board carries a sprung leaf 20 and cooperating contact post 21, battery contact studs 22, and a photoelectric light sensor 23.

[0032] When sensor 15 detects incoming IR radiation, it causes the integrated circuit 22 to operate via solid state switching to supply a continuous current to the light-emitting diodes 16 so that they illuminate the area around the device.

[0033] A timer circuit within the IC 22 will switch off the LEDs after a period of about 30 seconds of detecting no motion sensed by the PIR (when in the dark) and also within a period of up to 30 seconds of the detection of daylight or an additional light source such as the main room light being switched on by sensors 23. If this happens in the dark and while a user is still near the device, it can be reactivated by a simple movement within its 2 metre range e.g. by waving a hand.

[0034] If the unit is to be used as an emergency light, it may be detached from cord 1 by undoing the bayonet connection between the upper part of body 4 and cap 5 (leaving cap 5 on cord 1 so the cord can still be pulled down to operate switch 2 if desired), and cap 6 swivelled so that an internal formation 26 (shown in Figure 4) abuts spring leaf 20 and moves it into contact with post 21 to cause the LEDs 16 to illuminate continuously until cap 6 is swivelled back.

Claims

1. Pull switch apparatus consisting of a pull switch (2) adapted to be mounted on a ceiling, a depending actuation cord (1), and, attached to the cord (1), a gripping member (3) in the form of a casing having within it a power source, an illumination device, and switch means connected to the power source and the illumination device and **characterised by** means adapted to cause the illumination device to be lit when the casing is moved or when the casing is approached by a person.

2. Pull switch apparatus according to Claim 1 wherein the illumination device is one or more light emitting diodes (16).

3. Pull switch apparatus according to Claim 2 wherein the diodes are located behind a transparent or translucent window (6) forming part of the casing.

4. Pull switch apparatus according to any one of Claims 1 to 3 wherein the power source consists of one or more battery cells (18).

5. Pull switch apparatus according to any one of the preceding Claims and wherein the casing includes a switching mechanism comprising a solid state motion detector (15) or proximity detection switch to cause the illumination device to operate.

6. Pull switch apparatus according to any one of the preceding Claims and wherein the casing includes an on/off switch (20, 21) enabling the actuation of the illumination device to be turned off.

7. Pull switch apparatus according to any one of the preceding Claims wherein the casing is of a generally cylindrical shape which may be easily grasped and pulled down to operate the pull switch.

8. Pull switch apparatus according to any one of the preceding Claims wherein one end of the casing is in the form of a screw-on end cap (5) adapted to receive the cord (1) depending from the pull switch (2) with a central small hole through which the cord passes.

9. Pull switch apparatus according to Claim 8 wherein unscrewing the end cap (5) gives access to a battery compartment.

10. Pull switch apparatus according to any one of the preceding Claims in which the casing includes an end cap (5) to which the actuation cord is attached and a mechanism enabling the quick release of the casing from the cord to enable its use in an emergency as an emergency light or torch, or as a safety light.

11. Pull switch apparatus according to Claim 10 wherein the mechanism is in the form of a twist clip of two halves, either screwed together or incorporating a bayonet type fastening, one attached to the end cap (5), and one attached to the cord.

12. A pull switch handle consisting of an elongate casing, means (5) at one end of the casing for attaching to a pull switch, and means (6, 7) at the other end of the casing for emitting light, and the casing having within it a power source, a detector adapted to detect when the casing is moved or when the casing is approached by a person and switch means connected to the power source, the detector and the light emitting means and adapted to cause the light emitting means to emit light when the detector is actuated.

13. A pull switch handle according to Claim 12 wherein the light emitting means is one or more light-emitting diodes (16).

14. A pull switch handle according to Claim 12 or 13 wherein the casing includes means to disable the actuation of the means for emitting light when the ambient illumination around the device exceeds a certain level.

15. A pull switch handle according to any one of Claims 12 to 14 and including switch means (20, 21) to enable the means for emitting light to be operated independently of ambient lighting conditions or motion or proximity detection.

Patentansprüche

1. Zugschaltervorrichtung, bestehend aus einem Zugschalter (2), der zur Befestigung an einer Decke ausgelegt ist, einem herabhängenden Auslösungskabel (1) und einem am Kabel (1) befestigten Greifelement (3) in der Form eines Gehäuses, das eine Stromquelle, eine Beleuchtungsreinrichtung und Schaltermittel darin aufweist, welche Schaltermittel mit der Stromquelle und der Beleuchtungseinrichtung verbunden sind, und **gekennzeichnet durch** Mittel, die so ausgelegt sind, dass sie bewirken, dass die Beleuchtungseinrichtung leuchtet, wenn das Gehäuse bewegt wird oder wenn sich eine Person dem Gehäuse nähert.

2. Zugschaltervorrichtung gemäß Anspruch 1, wobei es sich bei der Beleuchtungseinrichtung um eine oder mehrere Leuchtdioden (16) handelt.

3. Zugschaltervorrichtung gemäß Anspruch 2, wobei sich die Dioden hinter einem durchsichtigen oder

durchscheinenden Fenster (6) befinden, das ein Teil des Gehäuses ist.

4. Zugschaltervorrichtung gemäß einem der Ansprüche 1 bis 3, wobei die Sromquelle aus einer oder mehreren Batteriezellen (18) besteht.

5. Zugschaltervorrichtung gemäß einem der vorhergehenden Ansprüche, wobei das Gehäuse einen Schaltmechanismus umfasst, der einen Festkörper-Bewegungsmelder (15) oder Näherungsmeldungsschalter umfasst, um zu bewirken, dass die Beleuchtungseinrichtung arbeitet.

6. Zugschaltervorrichtung gemäß einem der vorhergehenden Ansprüche, wobei das Gehäuse einen Ein/Aus-Schalter (20, 21) aufweist, der es ermöglicht, dass die Auslösung der Beleuchtungseinrichtung deaktiviert wird.

7. Zugschaltervorrichtung gemäß einem der vorhergehenden Ansprüche, wobei das Gehäuse eine im Allgemeinen zylindrische Form aufweist, welche leicht ergriffen und nach unten gezogen werden kann, um den Zugschalter zu betätigen.

8. Zugschaltervorrichtung gemäß einem der vorhergehenden Ansprüche, wobei ein Ende des Gehäuses die Form einer anschraubbaren Endkappe (5) aufweist, die so ausgelegt ist, dass sie das vom Zugschalter (2) herabhängende Kabel (1) mit einem kleinen mittigen Loch aufnimmt, durch welches das Kabel durchtritt.

9. Zugschaltervorrichtung gemäß Anspruch 8, wobei das Abschrauben der Endkappe (5) Zugang zum Batteriefach gewährt.

10. Zugsehaltervorrichtung gemäß einem der vorhergehenden Ansprüche, wobei das Gehäuse eine Endkappe (5), an der das Auslösungskabel befestigt ist, und einen Mechanismus aufweist, der die Schnelllösung des Gehäuses vom Kabel ermöglicht, um seine Verwendung in einem Notfall als Notbeleuchtung oder Notlampe oder als Sicherheitsbeleuchtung zu ermöglichen.

11. Zugschaltervorrichtung gemäß Anspruch 10, wobei der Mechanismus die Form eine Drehklamme mit zwei Hälften aufweist, die entweder zusammengeschraubt sind oder eine Bajonettbefestigung umfassen, wobei eine an der Endkappe (5) und eine am Kabel befestigt ist.

12. Zugschaltergriff, bestehend aus einem länglichen Gehäuse, Mitteln (5) an einem Ende des Gehäuses zum Befestigen eines Zugschalters, und Mitteln (6, 7) am anderen Ende des Gehäuses zum Ausstrahlen von Licht, wobei das Gehäuse eine Stromquelle, einen Melder, der so ausgelegt ist, dass er meldet, wenn das Gehäuse bewegt wird oder wenn sich eine Person dem Gehäuse nähert, und Schaltermittel darin aufweist, welche Schaltermittel mit der Stromquelle, dem Melder und den Leuchtmitteln verbunden sind, und ausgelegt, um zu bewirken, dass die Leuchtmittel Licht ausstrahlen, wenn der Melder ausgelöst wird.

13. Zugschaltergriff gemäß Anspruch 12, wobei es sich bei den Leuchtmitteln um eine oder mehrere Leuchtdioden (16) handelt.

14. Zugschaltergriff gemäß Anspruch 12 oder 13, wobei das Gehäuse Mittel zum Desaktivieren der Auslösung der Mittel zum Ausstrahlen von Licht umfasst, wenn die Umgebungsbeleuchtung um die Einrichtung herum ein bestimmtes Niveau überschreitet.

15. Zugschaltergriff gemäß einem der Ansprüche 12 bis 14, umfassend Schaltermittel (20, 21), um die Mittel zum Ausstrahlen von Licht zu befähigen, unabhängig von Umgebunsbeleuchtungsbedingungen oder Bewegungs- oder Näherungsmeldung betätigt zu werden.

Revendications

1. Appareil interrupteur à tirette, constitué d'un interrupteur à tirette (2), adapté pour être monté sur un plafond, un cordon d'actionnement (1) pendant, et, attaché au cordon (1), un organe de saisie (3) se présentant sous la forme d'un boîtier comprenant en lui une source d'énergie, un dispositif d'éclairage, et des moyens de commutation, connectés à la source d'énergie et au dispositif d'éclairage et **caractérisé par** des moyens adaptés pour provoquer l'éclairage du dispositif d'éclairage, lorsque le boîtier est déplacé ou lorsque le boîtier est approché par une personne.

2. Appareil interrupteur à tirette selon la revendication 1, dans lequel le dispositif d'éclairage est constitué d'une ou plusieurs diodes photoémettrice (16).

3. Appareil interrupteur à tirette selon la revendication 2, dans lequel les diodes sont situées derrière une fenêtre (6) transparente ou translucide, faisant partie du boîtier.

4. Appareil interrupteur à tirette selon l'une quelconque des revendications 1 à 3, dans lequel la source d'énergie est constituée d'une ou plusieurs cellules de batterie (18).

5. Appareil interrupteur à tirette selon l'une quelconque

des revendications précédentes et dans lequel le boîtier comprend un mécanisme de commutation, comprenant un détecteur de mouvement à semiconducteurs (15) ou un interrupteur de détection de proximité, pour provoquer l'actionnement du dispositif d'éclairage.

6. Appareil interrupteur à tirette selon l'une quelconque des revendications précédentes et dans lequel le boîtier comprend un interrupteur marche/arrêt (20, 21), permettant de mettre hors service l'actionnement du dispositif d'éclairage.

7. Appareil interrupteur à tirette selon l'une quelconque des revendications précédentes, dans lequel le boîtier est d'une forme globalement cylindrique, pouvant être aisément saisie et tirée vers le bas pour actionner l'interrupteur à tirette.

8. Appareil interrupteur à tirette selon l'une quelconque des revendications précédentes, dans lequel une extrémité du boîtier se présente sous la forme d'un bouchon d'extrémité (5) à visser, adapté pour recevoir le cordon (1) pendant de l'interrupteur à tirette (2), avec un petit trou central à travers lequel le cordon passe.

9. Appareil interrupteur à tirette selon la revendication 8, dans lequel le dévissage du bouchon d'extrémité (5) donne accès à un compartiment à batterie.

10. Appareil interrupteur à tirette selon l'une quelconque des révendications précédentes, dans lequel le boîtier comprend un bouchon d'extrémité (5), auquel le cordon d'actionnement est attaché, et un mécanisme permettant le dégagement rapide du boîtier vis-à-vis du cordon, pour permettre son utilisation dans un cas d'urgence, en tant qu'éclairage ou torche d'urgence, ou en tant d'éclairage de sécurité.

11. Appareil interrupteur à tirette selon la revendication 10, dans lequel le mécanisme se présente sous la forme d'une pince à blocage par rotation composée de deux moitiés, soit vissées ensemble, soit incorporant une fixation de type à baïonnette, une étant attachée au bouchon d'extrémité (5) et l'autre attachée au cordon.

12. Manette pour interrupteur à tirette, consistant en un boîtier allongé, des moyens (5), à une extrémité du boîtier, pour attachement à un interrupteur à tirette, et des moyens (6, 7), à l'autre extrémité du boîtier, pour émettre de la lumière, et le boîtier ayant à l'intérieur de lui une source d'énergie, un adaptateur adapté pour détecter lorsque le boîtier est déplacé ou lorsque le boîtier est approché par une personne, et des moyens de commutation, connectés à la source d'énergie, au détecteur et aux moyens pour émettre de la lumière et adaptés pour que les moyens pour émettre de la lumière émettent de la lumière lorsque le détecteur est actionné.

13. Manette pour interrupteur à tirette selon la revendication 12, dans laquelle les moyens pour émettre de la lumière sont constitués d'une ou plusieurs diodes photoémettrice (16).

14. Manette pour interrupteur à tirette selon la revendication 12 ou 13, dans laquelle le boîtier comprend des moyens pour désactiver l'actionnement des moyens pour émettre de la lumière, lorsque l'éclairage ambiant autour du dispositif dépasse un certain niveau.

15. Manette pour interrupteur à tirette selon l'une quelconque des revendications 12 à 14 et comprenant des moyens de commutation (20, 21), pour permettre aux moyens pour émettre de la lumière d'être actionnés indépendamment des conditions d'éclairage ambiant, ou d'un mouvement, ou d'une détection de proximité.

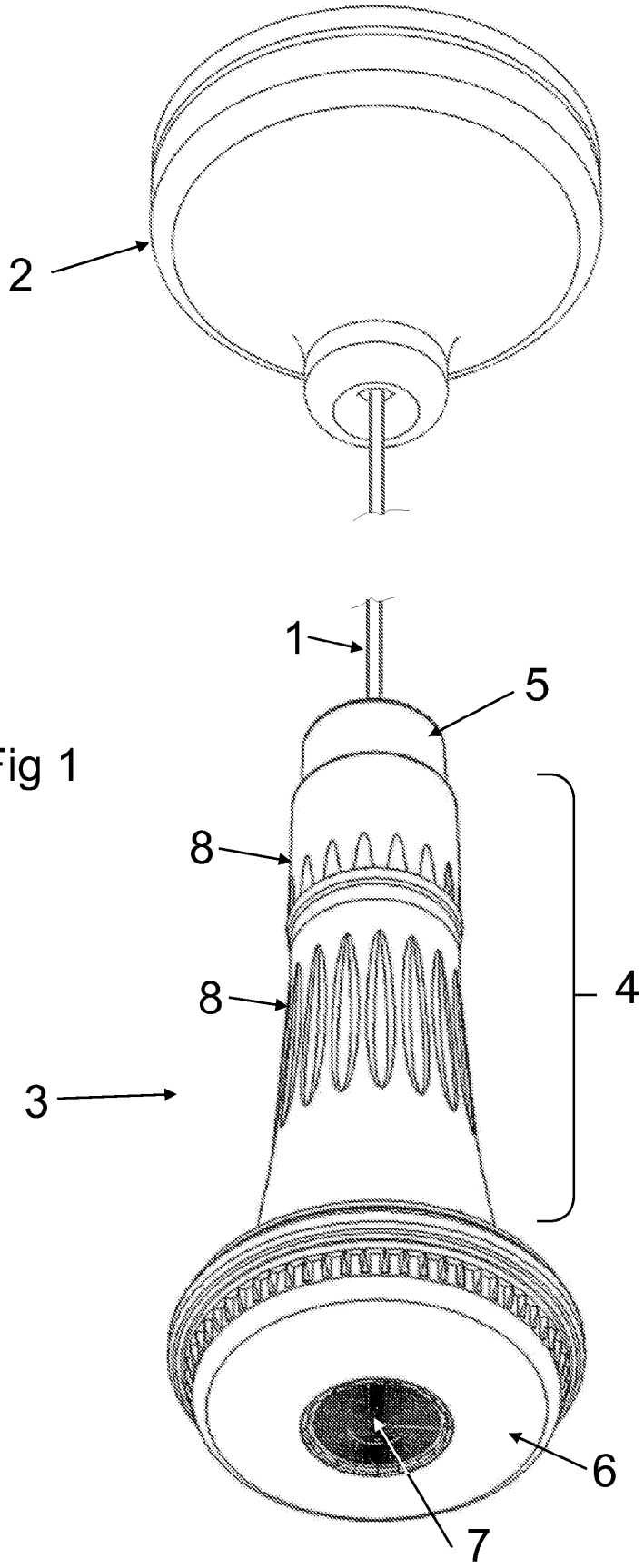


Fig 1

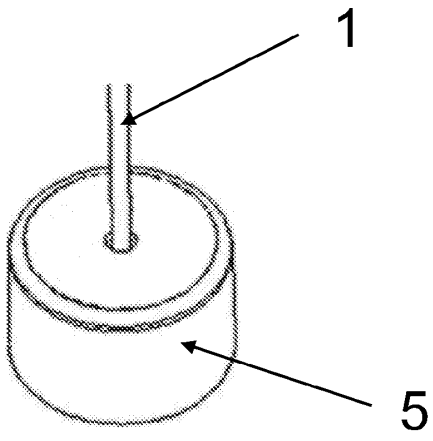


Fig 2

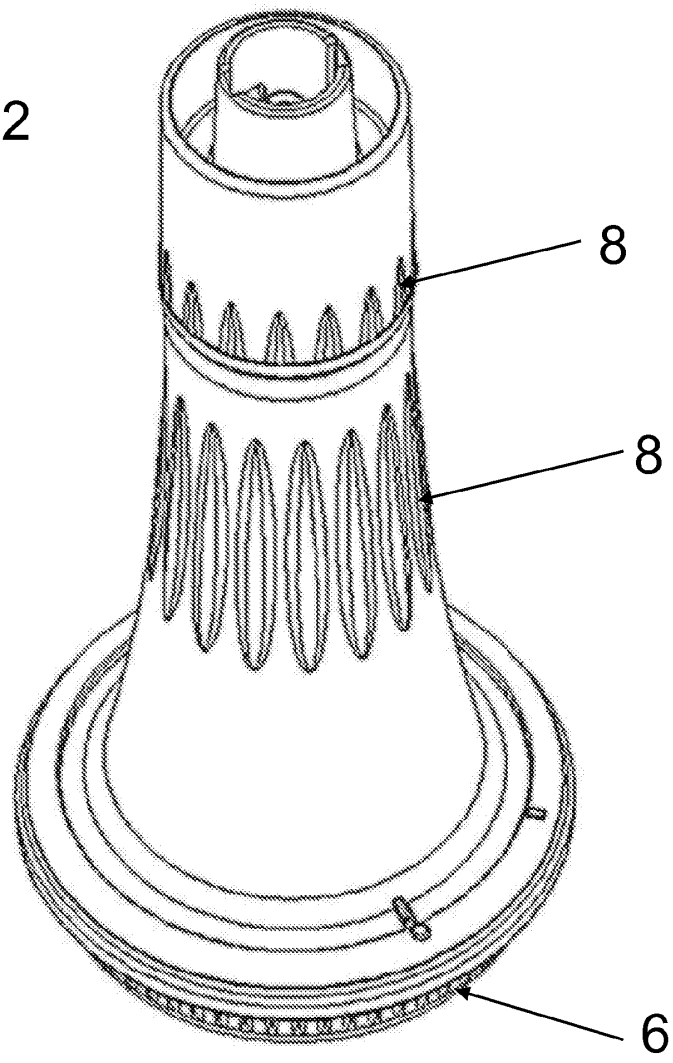


Fig 3

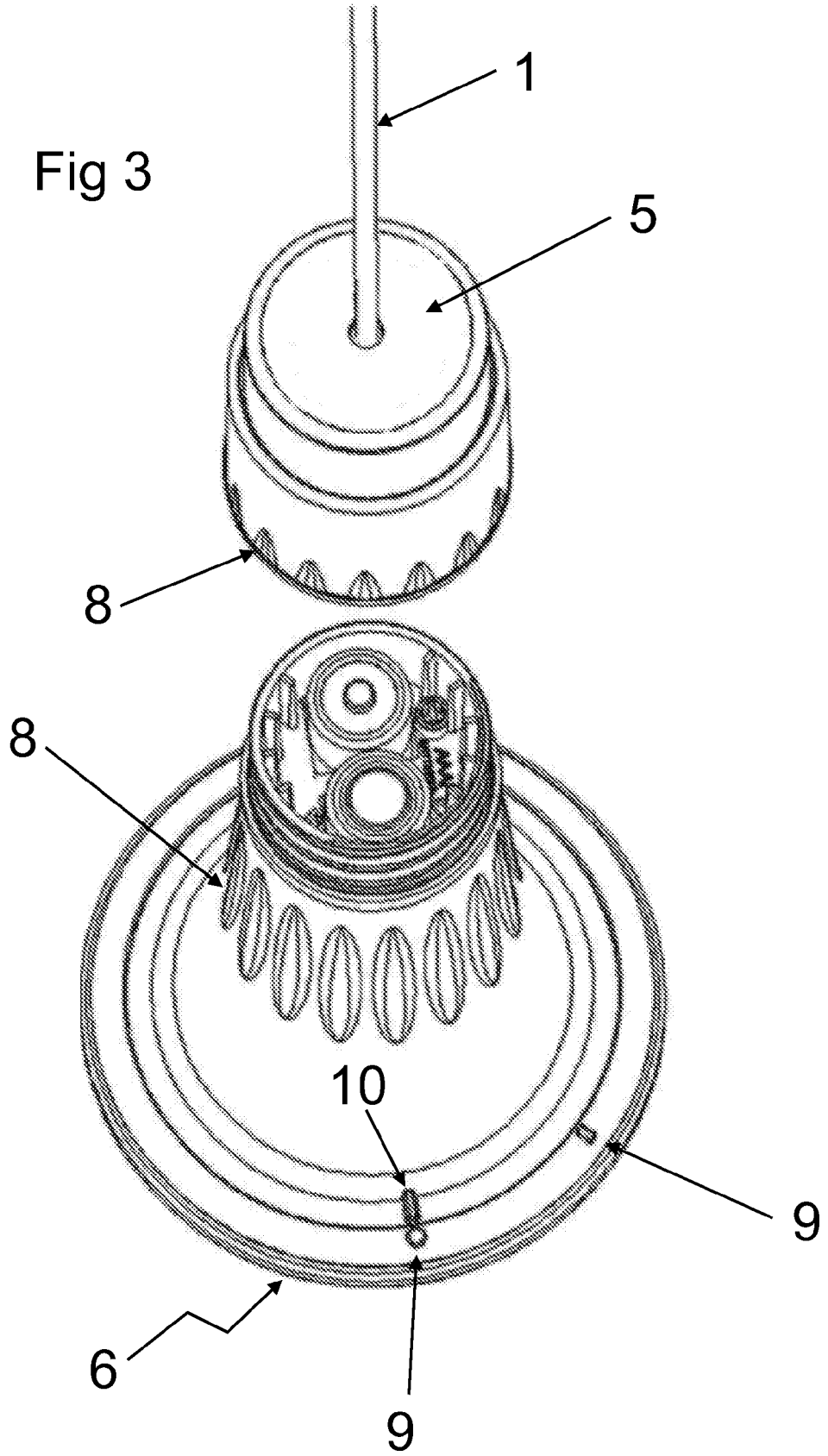


Fig 4

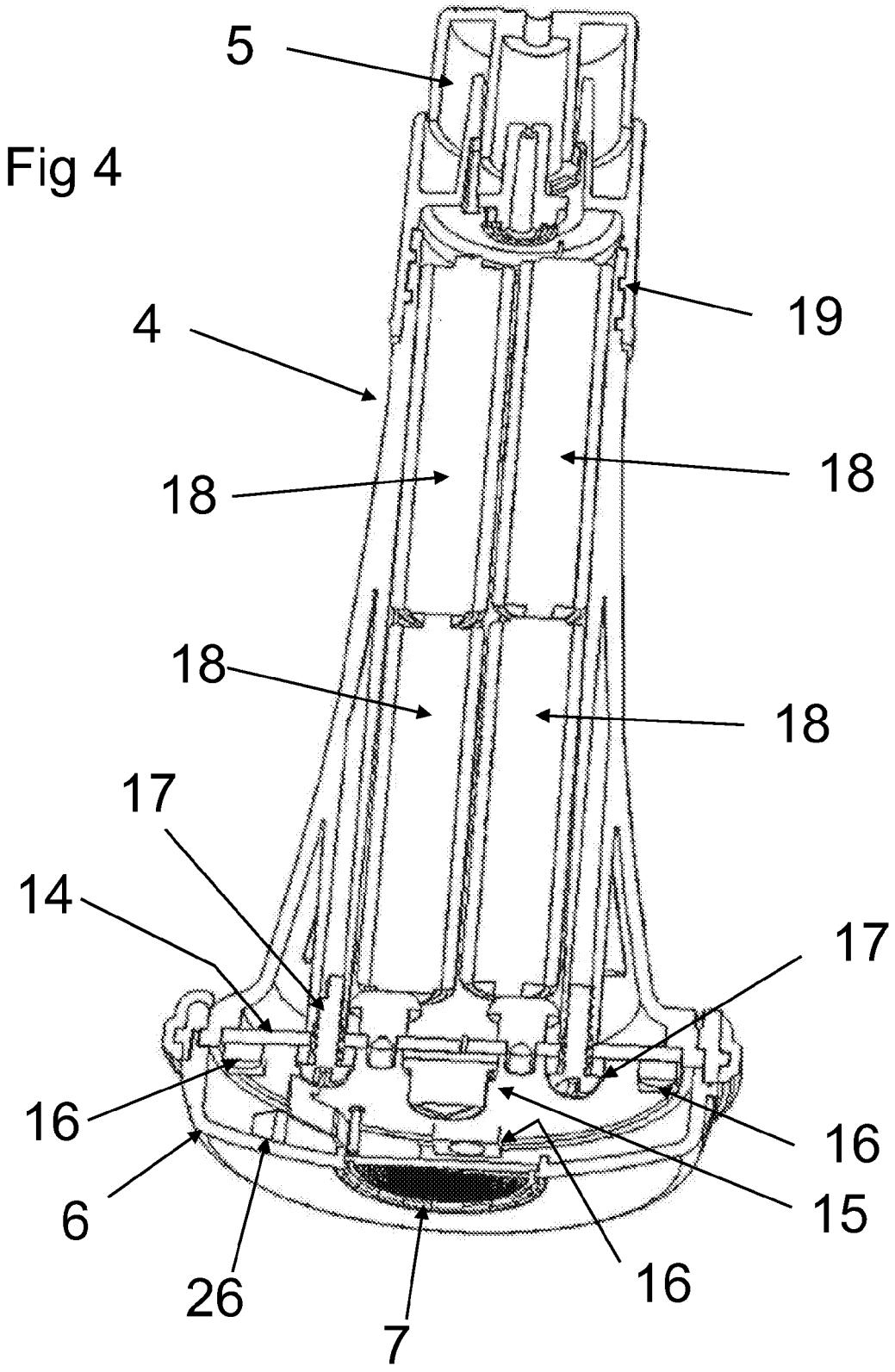


Fig 5

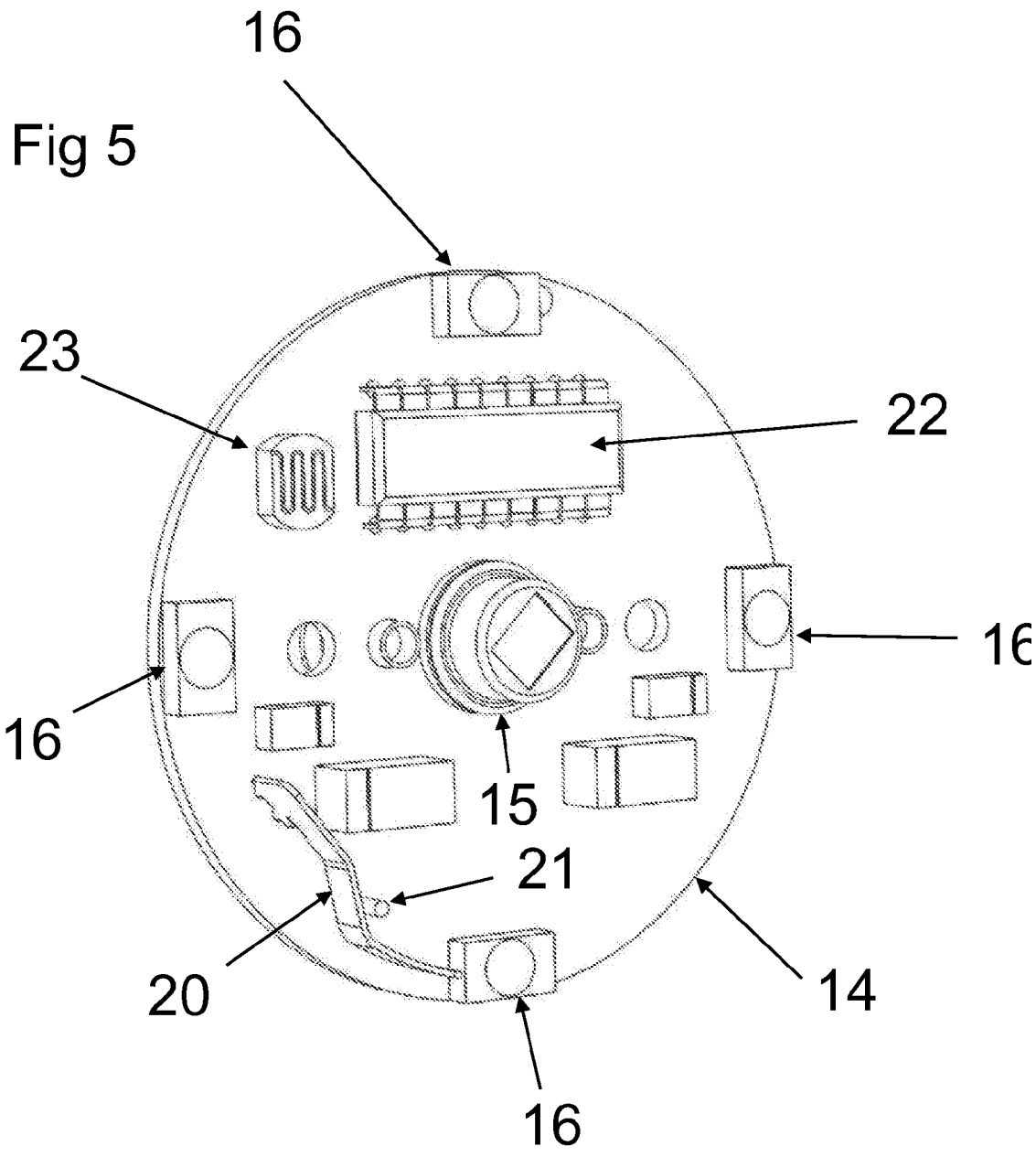
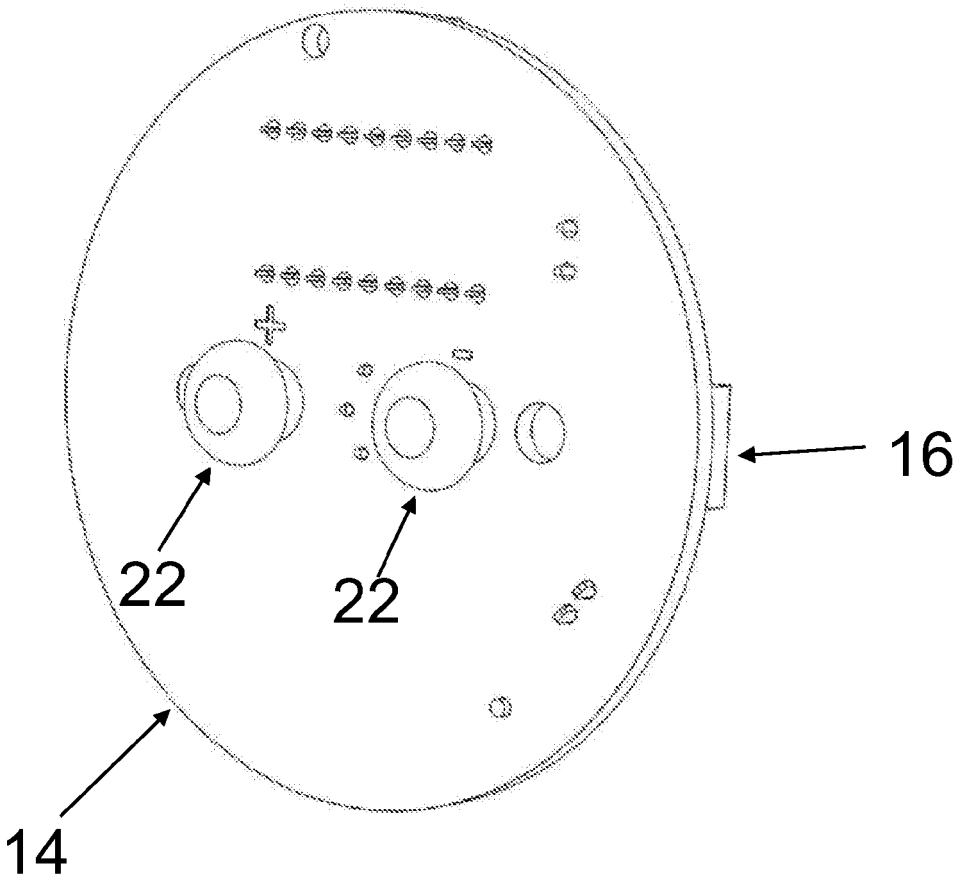


Fig 6



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6315431 B **[0005]**
- GB 2191634 A **[0005] [0007]**
- JP 60198003 A **[0005]**
- JP 11297119 A **[0005]**
- US 5454056 A **[0005]**
- US 20080094827 A **[0008]**
- US 6729740 B **[0008]**
- US 20070007304 A **[0008]**
- WO 9525853 A **[0008]**