

(19)



(11)

**EP 2 787 275 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**08.10.2014 Bulletin 2014/41**

(51) Int Cl.:  
**F21S 8/06** <sup>(2006.01)</sup>      **F21V 21/16** <sup>(2006.01)</sup>  
**F21V 21/112** <sup>(2006.01)</sup>      **F21V 23/04** <sup>(2006.01)</sup>  
**F21V 23/06** <sup>(2006.01)</sup>      **F21Y 101/02** <sup>(2006.01)</sup>

(21) Application number: **14161218.4**

(22) Date of filing: **24.03.2014**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
 GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
 PL PT RO RS SE SI SK SM TR**  
 Designated Extension States:  
**BA ME**

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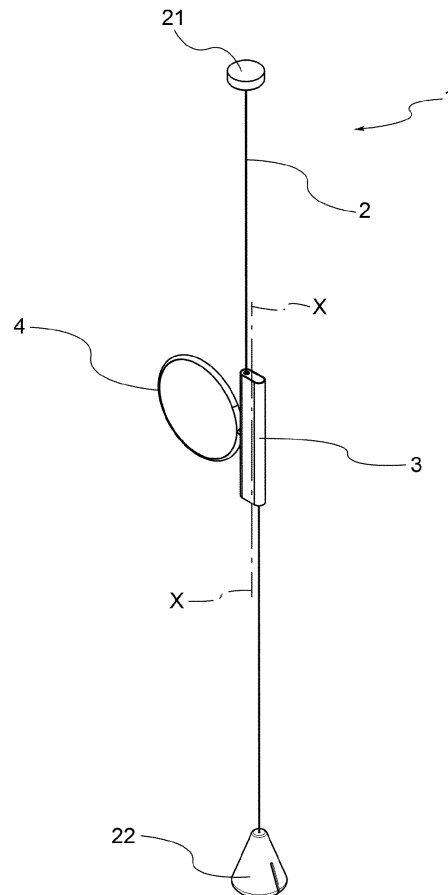
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(30) Priority: **05.04.2013 IT BS20130048**

(54) **Suspension lighting device**

(57) A lighting device (1) of the suspended type, comprising a tensioned cable (2) suitable for anchoring to a ceiling, a body (3) sliding along the cable (2), and an optical group (4) engaged to the body (3). The lighting device (1) further comprises a positioning system provided inside the body (3), and comprising a plurality of pulleys which define a path for the cable (2). Said path triggers a system of forces suitable for keeping the lighting device at the desired height.



*Fig. 1*

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## Description

**[0001]** Object of the present invention is a LED lighting device, in particular of the suspension type.

**[0002]** The lighting industry is characterised by significant efforts in terms of innovation, both aesthetically and functionally.

**[0003]** In particular, suspended lighting devices, anchored to the ceiling through a steel cable, and free of sliding along the cable in order for them to be positioned at the desired height, are becoming very widespread.

**[0004]** Such suspended lighting devices, however, have some drawbacks, related in particular to the correct maintenance of the device and of the lamp in the desired position. The lighting device, in the absence of suitable longitudinal fixtures along the cable, may in fact slide in a position different from the desired one. In addition, the lamp has to be oriented in all desired directions without having the entire lighting device incline with respect to the vertical direction because of the unbalance the weights involved.

**[0005]** An object of the present invention is to solve the issues of the prior art by taking into account the needs of the industry.

**[0006]** In particular, an object of the present invention is to create a LED lighting device of the suspended type that, once positioned, is capable of maintaining the selected position.

**[0007]** Such object is achieved by a lighting device made according to claim 1. The dependent claims describe preferred or advantageous embodiments of the lighting device.

**[0008]** The features and advantages of the lighting device according to the present invention will appear more clearly from the following description, made by way of an indicative and non-limiting example in accordance with the annexed figures, wherein:

- figure 1 shows an axonometric view of the lighting device according to the present invention;
- figure 2 shows a longitudinal section view of the lighting device of figure 1;
- figure 3 shows an exploded view of the lighting device of figure 1;

**[0009]** With reference to the annexed figures, reference numeral 1 globally denotes a lighting device of the suspended type, for example LED.

**[0010]** The lighting device 1 comprises a cable 2, preferably made of steel, tensioned.

**[0011]** The cable 2 may be anchored to a ceiling, for example by means of a support 21 provided at the upper end of the cable itself. The cable 2 is kept tensioned, for example by means of a counterweight 22 placed at the lower end of the cable itself or by securing to the lower end of the cable to the floor.

**[0012]** The lighting device 1 comprises a body 3, which may slide along the cable 2.

**[0013]** The body 3, preferably having a box shape, essentially extending along a vertical axis X, and is provided with a base 31 and a cover 32.

**[0014]** The body 3 is provided with an upper end 38 and a lower end 39, both provided with openings for the passage of the cable 2. As shown in figure 2, in fact, the cable 2 enters the body 3 through an entrance aperture 28 located at the upper end 38 and exits through an exit aperture 29 located at the lower end 39 of the body 3.

**[0015]** The lighting device 1 further comprises an optical group 4, engaged to the body 3.

**[0016]** Preferably, the optical group 4 extends mainly on one side of the body 3, along an horizontal axis Y, substantially orthogonal to the vertical axis X. The optical group 4 is rotatable around the axis Y, preferably by 360°, so as to orientate the light beam in all desired directions.

**[0017]** The optical group 4 comprises a luminous LED panel 42, which can be electrically powered via a power supply cable (not shown), and a support 41, which supports the panel 42 and permits the engagement of the optical group 4 to the base 31.

**[0018]** Preferably, the optical group 4 is of circular shape, preferably a disk.

**[0019]** The optical group 4 is detachable from the body 3 and is rotatable around the axis X by means of a male/female coupling system.

**[0020]** Such coupling system comprising a male member 43, provided on the support 41, and a corresponding female member 33, provided on the base 31. Preferably, the female member 33 is located on one side of the base 32, substantially centred with respect to the length of the body 3.

**[0021]** Preferably, the male/female coupling system extends along the axis Y.

**[0022]** The male/female coupling system further creates the electrical connection between the optical group 4 and a power supply 47, accommodated in the base 32 and electrically connected to the power supply cable.

**[0023]** The power supply cable enters inside the body 3 by means of an entrance 34, provided at the lower end 39, and is kept in position along the relevant path down to the power supply 47 by means of a tab 48.

**[0024]** Again in the base 32 is provided a current control unit 44 and at least one driver 45 to manage electronic components.

**[0025]** The optical group 4 may be controlled in the switching on/off step by means of a switch 46, housed preferably at the upper end 38 of the body 3. Preferably, the switch 46 is a capacitor switch, managed by means of the driver 45 accommodated in the base 31.

**[0026]** The luminous LED panel 42 must ensure an optimal light flow capable of illuminating correctly the surrounding environment. For example, the luminous LED panel 42 has a power of 18 W, a light flow of total 1400lm, Colour Rendering Index (CRI) 90.

**[0027]** The lighting device 1 is kept in the desired position by means of a positioning system provided inside the body 3.

**[0028]** The positioning system comprises a plurality of pulleys 61, 81 arranged inside the body 3, around which the cable 2 is passed. The pulleys 61, 81 of the positioning system define, inside the body 3, a path for the cable 2, a path triggering a system of forces capable of keeping the lighting device at the desired height.

**[0029]** Preferably, each pulley 61, 81 is fitted along its circumference with a groove suitable to house the cable 2, so that it does not come out of its predefined path.

**[0030]** Preferably, there are also provided covers 64, 84, which may be positioned over the pulleys 61, 81, so that the cable 2 does not come out of its predefined path.

**[0031]** In particular, the positioning system comprises a longitudinal stop system 6 and a balancing system 8.

**[0032]** The longitudinal stop system 6 allows maintaining the body 3 of the lighting device 1 at the desired height along the cable 2.

**[0033]** The balancing system 8 allows maintaining the body 3 of the lighting device 1 in a vertical position.

**[0034]** As shown in figure 2, the longitudinal stop system 6 comprises at least three pulleys 61, around which the cable 2 is passed. The pulleys 61 define a waved path, preferably having a V shape, for the cable 2, a path triggering a play of friction between the cable 2 and the pulleys 61.

**[0035]** Preferably the waved path defined by the pulleys 61 is protected by the cover 64, so that the cable 2 cannot come out.

**[0036]** Preferably, the longitudinal stop system 6 is located in the proximity of the lower end 39 of the body 3, wherein suitable pins 62 are provided. The pins 62, around which the pulleys 61 rotate, also allow securing the pulleys 61 to the base 31.

**[0037]** In use, the body 3, in virtue of his weight, tends to slide downwards if the longitudinal stop system 6 does not trigger the play of friction that prevent it from sliding. The body 3 may therefore slide along the cable 3 only by user operation, who applied from the outside a direct downward or upward force, capable of overcoming the friction of the longitudinal stop system 6. Therefore, in order to change the height of the lighting device 1, it is necessary to slide the body 3 along the cable 2. Once the body 3 has been released in the desired position, it stops by itself and keeps the desired position.

**[0038]** As shown in figure 2, the balancing system 8 comprises at least two pulleys 81, around which the cable 2 is passed. The pulleys 81 define a linear path for the cable 2, which permits the throwing off centre of the cable 2 from an entrance axis X' to an exit axis X'', so as to balance the weights at play.

**[0039]** The entrance axis X' is defined as an axis parallel to the vertical axis X and passing through the entrance aperture 28; the exit axis X'' is defined as an axis parallel to the vertical axis X and passing through the exit aperture 29. The entrance axis X' is parallel to the exit axis X''.

**[0040]** Preferably, the entrance axis X' is thrown off centre of the exit axis X''. In particular, the entrance axis

X' is distanced by a distance D from the exit axis X''.

**[0041]** Preferably, the linear path defined by the pulleys 81 is protected by the cover 84, so that the cable 2 cannot come out.

**[0042]** Preferably, the balancing system 8 is located in the proximity of the lower end 38 of the body 3, wherein suitable pins 82 are provided. The pins 82, around which the pulleys 81 rotate, also allow securing the pulleys 81 to the base 31.

**[0043]** In use, the lighting device 1 tends to incline with respect to the vertical axis X if the balancing system 8 does not balance the weights at play. In fact, since the optical group 4 extends on one side of the body 3, the lighting device 1 risks to incline with respect to the vertical direction each time the orientation of the optical group 4 is adjusted in rotation around the axis Y. Thanks to the balancing system 8, once the support 41 has been oriented in the desired position, the lighting device 1 remains axially aligned along the vertical direction without the need of counterweights.

**[0044]** Innovatively, the lighting device according the present invention, once positioned, is capable of keeping the selected position.

**[0045]** Advantageously, the lighting device according to the present invention remains still along the cable without the need of suitable longitudinal fixtures. Advantageously, the lighting device according to the present invention is orientable in all desired directions without inclining with respect to the vertical direction.

**[0046]** It is clear that a man skilled in the art can make changes and variations to the device described above, all falling within the scope of protection defined in the following claims.

### Claims

1. Lighting device (1) of the suspension type, comprising:
  - a cable (2), tensioned, suitable for anchoring to a ceiling;
  - a body (3), sliding along the cable (2);
  - an optical group (4), engaged to the body (3);
  - a positioning system provided inside the body (3), comprising a plurality of pulleys (61, 81) which define a path for the cable (2), path which triggers a system of forces suitable for keeping the lighting device at the desired height.
2. Lighting device (1) according to claim 1, wherein each pulley (61, 81) is fitted along its circumference with a groove suitable to house the cable (2), so that it does not come out of its predefined path.
3. Lighting device (1) according to claim 2, wherein the positioning system comprises a longitudinal stop system (6) suitable for keeping the body (3) of the

lighting device (1) at the desired height along the cable (2).

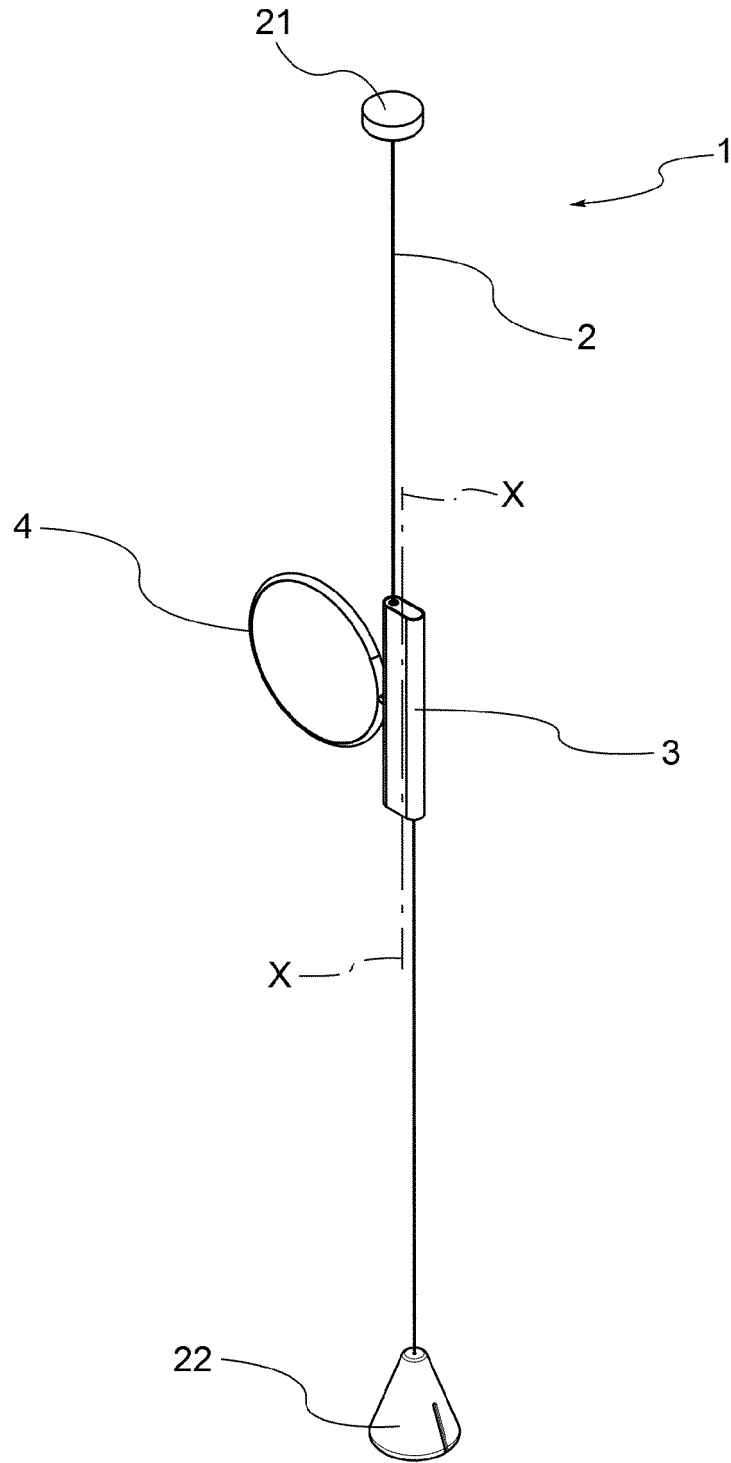
4. Lighting device (1) according to claim 3, wherein the longitudinal stop system (6) comprises at least three pulleys (61) defining a waved path for the cable (2), a path triggering a play of friction between the cable (2) and the pulleys (61) which prevents the body (3) from sliding downwards along the cable (2) as a result of the weight of the lighting device (1). 5
5. Lighting device (1) according to claim 4, wherein the waved path is substantially V-shaped. 10
6. Lighting device (1) according to any of the previous claims, wherein the positioning system comprises a balancing system (8), suitable for keeping the body (3) of the lighting device (1) in a vertical position. 15
7. Lighting device (1) according to claim 6, wherein the balancing system (8) comprises at least two pulleys (81), defining a linear path for the cable (2), a path which permits the throwing off centre of the cable (2) from an entrance axis (X') to an exit axis (X''), so as to balance the weights at play. 20  
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8. Lighting device (1) according to claim 7, wherein:
  - the body (3) extends mainly along a vertical axis (X) and is provided with an entrance aperture (28) for the entrance of the cable (2) and an exit aperture (29) for the exit of the cable (2); 30
  - the entrance axis (X') is defined as an axis parallel to the vertical axis (X) and passing through the entrance aperture (28); 35
  - the exit axis (X'') is defined as an axis parallel to the vertical axis (X) and passing through the exit aperture (29).
9. Lighting device (1) according to claim 8, wherein the entrance axis (X') is offset from the exit axis (X''). 40
10. Lighting device (1) according to claim 8 or 9, wherein the entrance axis (X') is distanced by a distance (D) from the exit axis (X''). 45
11. Lighting device (1) according to any of the previous claims, wherein the optical group (4) comprises a luminous LED panel (42), which can be electrically powered via a power supply cable, and a support (41), which supports the panel (42) and permits the engagement of the optical group (4) to the body (3). 50
12. Lighting device (1) according to claim 11, wherein the optical group (4) extends mainly from one side of the body (3), along a horizontal axis (Y). 55
13. Lighting device (1) according to claim 12, wherein

the optical group (4) can be rotated around the horizontal axis (Y).

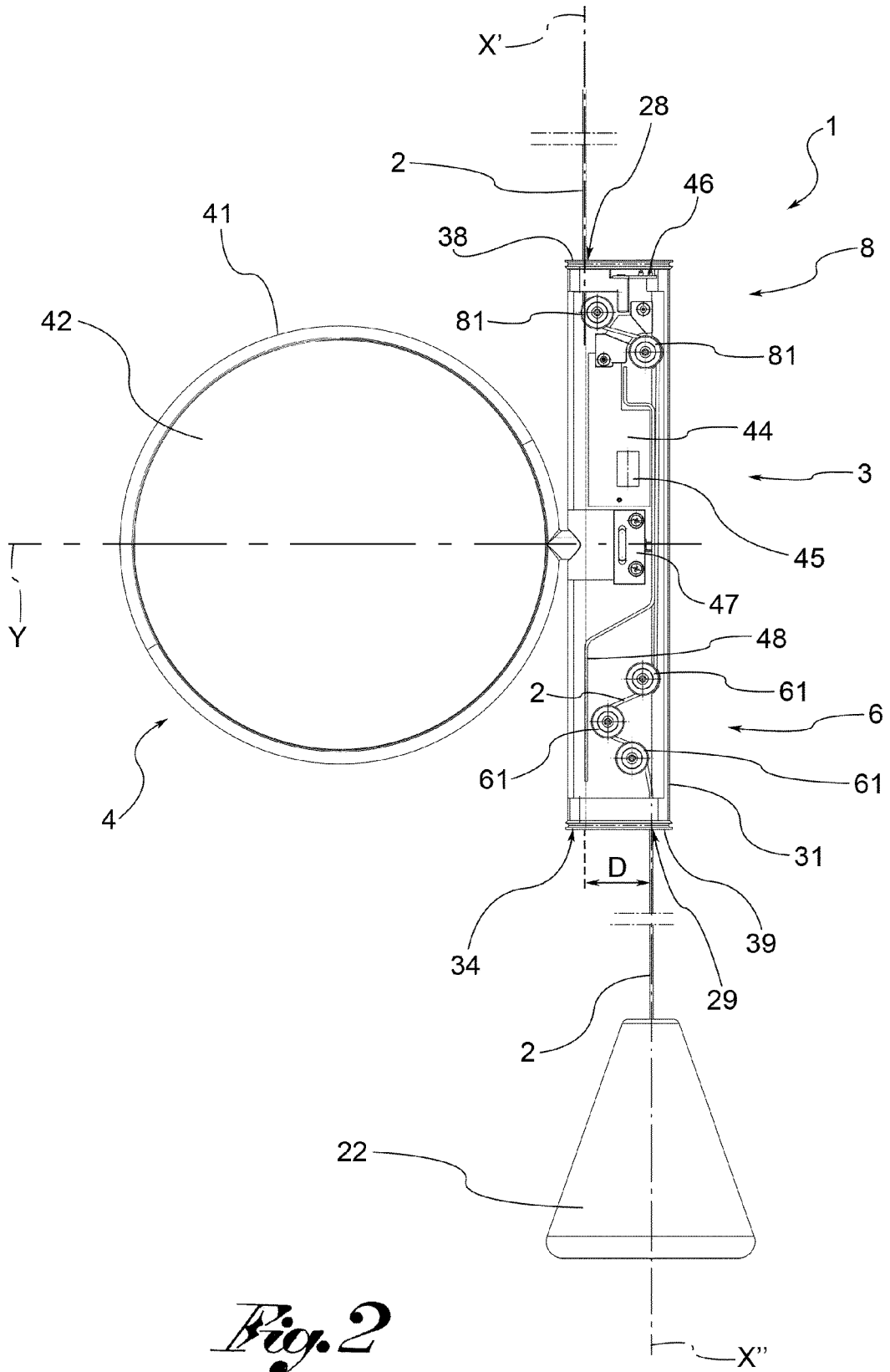
14. Lighting device (1) according to any of the claims from 11 to 13, wherein the optical group (4) is engaged with the body (3) by means of a male/female coupling system provided on the support (41).

15. Lighting device (1) according to any of the claims from 11 to 14, wherein the optical group (4) can be controlled by a switch (46), housed preferably at the upper end of the body (3).

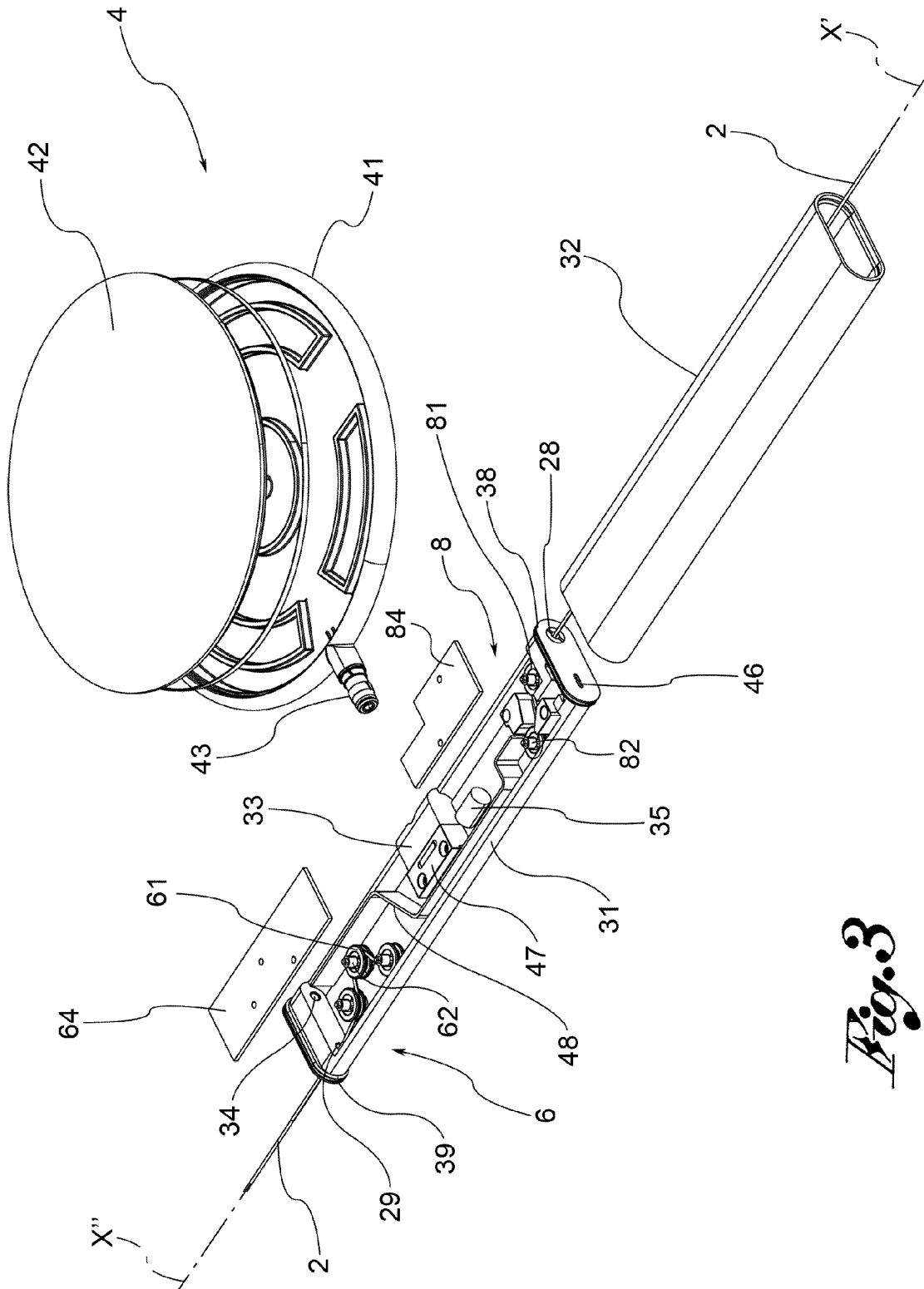
16. Lighting device (1) according to claim 15, wherein the switch (46) is a capacitor switch.



*Fig. 1*



*Fig. 2*



*Fig. 3*



EUROPEAN SEARCH REPORT

Application Number  
EP 14 16 1218

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