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(54) **ADJUSTABLE HANDLE FOR MOUNTING THE LIGHT FITTING OF A ROAD LAMP AND ROAD LAMP**

(57) The solution according to the invention relates to the issue of illuminating public spaces. The object of the invention is an adjustable handle (1) for mounting the fitting of a road lamp, comprising a main bushing (member) (2) for mounting said handle on a post or support of the light, an auxiliary bushing (member) (3) for mounting said handle in or on the road fitting, the main bushing (2) and the auxiliary bushing (3) being connected rotatably by means of a screw (4) fixing the angular position of the fitting relative to the longitudinal axis of the screw (4),

characterised in that it comprises a system for adjusting the position of the light fitting relative to the longitudinal axis of the auxiliary bushing (3), comprising a slit (14) on the perimeter of the auxiliary bushing (3), a screw (15) passing therethrough which fixes the angular position of the light fitting relative to the longitudinal axis of the auxiliary bushing (3), connected to a pressure element (16) inside the auxiliary bushing (3). The object of the invention is also a road lamp (100) comprising the fitting (101) and the adjustable handle (1).

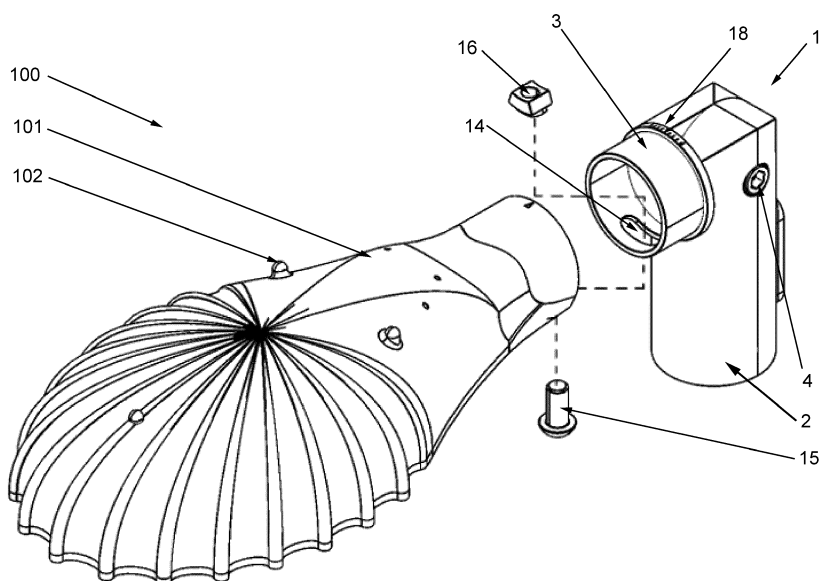


Fig. 1

Description

Technical field

[0001] The object of the invention is an adjustable handle for mounting the light fitting of a road lamp, in particular a LED light. The object of the invention is also a road lamp, in particular a LED light.

Background of the invention

[0002] Street (road) lights are mounted along communication routes (streets, roads, crossroads, etc.) in order to illuminate them and areas adjacent to them. Road conditions are complex and variable; roads can be curved, go up or down, etc. Various levels of light intensity are required depending on the existing conditions. Most of conventionally mounted road lamps provide vertical downward illumination and they are not capable of guaranteeing a proper light intensity level, adhering to quality standards.

[0003] Chinese utility model CN209262888U discloses an adjustable corner joint for a street light, comprising a bushing adapted to seating on a mast and a bushing adapted to mounting on a fitting post, both bushings being rotatably connected by means of a two-part slot and a screw connecting both parts of the slot, which at the same time fixes the mutual position of both bushings. The presented solution enables changing the angular position of the light fitting only relative to the transverse axis of the light fitting.

[0004] From the Chinese patent application CN103775990A there is a known connecting assembly with an adjustable angle, comprising a main connecting element and an auxiliary connecting element, as well as a fixing screw. Both the main connecting element and the auxiliary connecting element comprise an integrally formed tubular part and a disc part. The disc part of the main connecting element and the disc part of the auxiliary connecting element are provided with round sprockets, the sprocket of the main connecting element being interlocked with the sprocket of the auxiliary connecting element. Moreover, after fixing the angle between the main connecting element and the auxiliary connecting element, this fixing is secured by means of a fixing screw. The solution disclosed in this document enables changing the angular position of the light fitting only in a transverse axis relative to the fittings of the light. The description according to CN103775990A also discloses a LED road lamp with a high power, comprising a light body, a light post and a connecting assembly with an adjustable angle. Most of the resolutions described above enable adjusting the position of the fitting only relative to the transverse axis of the fitting, which does not allow for precise setting of the lighting geometry that would fulfil the requirements and/or the designs.

[0005] From the description of the Chinese utility model CN207849216U there is in turn known a rotating street

light comprising a lighting assembly (a light fitting) connected to a connecting post, consisting of three elements connected in sequence, with rotatable constructions used between them, whose axes of rotation are perpendicular relative to each other. The solution according to CN207849216U enables changing the angular position of the light fitting relative to two axes perpendicular to each other.

[0006] Nonetheless, there is still a need to develop a universal solution which would enable providing the required level of illumination under diverse road conditions, which would be characterised by a simple design, easy assembly and handling.

The Essence of the Invention

[0007] The first aspect of the invention is an adjustable handle for mounting the light fitting of a road lamp, comprising a main bushing for mounting the handle on a post or a support of the light, an auxiliary bushing for mounting the handle in or on the fitting, the main bushing and the auxiliary bushing being rotatably connected by means of a screw fixing the angular position of the fitting relative to the longitudinal axis of this screw. The handle according to the invention further comprises a system for adjusting the position of the fitting relative to the longitudinal axis of the auxiliary bushing, comprising a slit on the perimeter of the auxiliary bushing, a screw passing there-through which fixes the angular position of the light fitting relative to the longitudinal axis of the auxiliary bushing, connected to a pressure element inside the auxiliary bushing.

[0008] The adjustable handle according to the invention enables adjusting the position of the light fitting of the light, in particular the LED light, in two perpendicular axes, the adjustment in the axis transverse to the longitudinal axis of the fitting being possible within a range of more than $\pm 180^\circ$. The solution is characterised by a simple design, as well as easy assembly and handling, which is particularly significant in the case of light fittings mounted at considerable heights relative to the ground.

[0009] Preferably, the pressure element is slidably seated within the slit, or it has the form of a ring loosely fitted with the auxiliary bushing. These solutions allow such blocking of the pressure element which would prevent its rotational movement, at the same time making it possible to tighten the screw fixing the angular position of the fitting relative to the longitudinal axis of the auxiliary bushing without the use of additional tools immobilising the pressure element. This facilitates the assembly and proper angular orientation of the fitting, also facilitating its subsequent handling (e.g. changing the angular position).

[0010] Preferably, the ends of the main bushing and of the auxiliary bushing placed next to each other are enclosed by face plates, considerably limiting the access of weather elements into the interior of the fitting and the light post.

[0011] It is also preferable to make openings intended for a power supply cable in the face plates, making it possible to conceal it inside the handle.

[0012] Preferably, the slit enables rotation of the screw relative to the longitudinal axis of the auxiliary bushing by an angle of $\pm 15^\circ$.

[0013] Preferably, the main bushing and/or the auxiliary bushing comprise indicators determining the mutual angular position of the main bushing and of the auxiliary bushing. Moreover, preferably, the auxiliary bushing comprises indicators determining the angular position of the road fitting relative to the longitudinal axis of the auxiliary bushing.

[0014] It is also recommended for the screw fixing the mutual position of the main bushing and the auxiliary bushing and the screw fixing the angular position of the fitting relative to the longitudinal axis of the auxiliary bushing to be selected in a manner which would enable their mounting by means of the same key (the same type and size).

[0015] The second aspect of the invention is a road lamp, in particular a LED light, comprising the light fitting and the adjustable handle according to the first aspect of the invention.

[0016] Preferably, the light fitting of the light comprises at least one fixing spike on its outer surface, adjusted to the placement of a device thereon for determining the position of the fitting relative to the ground surface. The use of at least one fixing spike allows placing this device in a predetermined position, which translates into the accuracy of the results of measuring the angular position. A recommended solution involves the use of three fixing spikes arranged in a triangle, preferably an isosceles triangle.

[0017] The device mounted on the surface of the light fitting enables precise determination of the geometrical orientation of the light fitting (the angle of inclination relative to the longitudinal and transverse axes) and confirmation of the correct geometrical orientation of the light fitting by the performed measurement.

[0018] Preferably, the device for determining the position of the light fitting relative to the ground surface is provided with a system for mechanically measuring the geometrical orientation of the light fitting relative to the ground surface. Such a system may have the form of two bubble levels arranged at a right angle.

[0019] Preferably, the device for determining the position of the light fitting relative to the ground surface is provided with a system for electronically measuring the geometrical orientation of the light fitting relative to the ground surface.

[0020] Preferably, the device for determining the position of the fitting relative to the ground surface is provided with a module for determining the geographical position. Such a module allows determining the geographical position of a specific light fitting. The module works based on the GPS and/or GLONAS system.

[0021] It is also preferable to use a wireless commu-

nication module in the device for determining the position of the light fitting relative to the ground surface. This allows wireless transmission of data to an external device with dedicated software, like, e.g. a smartphone.

[0022] Such a device in combination with dedicated software considerably facilitates correcting the orientation of both new light fittings and those already installed, as well as inventorying the light equipment in possession. This also constitutes a simplification of the installer's equipment - one small device for setting and inventorying.

Advantages of the invention

[0023] The solution according to the invention enables precise determination of the geometrical orientation of the light fitting (the angle of inclination relative to the longitudinal and transverse axes) via fluid adjustment of its angular position in two axes perpendicular to each other.

The adjustment is very simple and it is performed by loosening one screw (for each axis), fixing the required angular inclinations and tightening this screw.

[0024] Our solution does not require blocking the orientation of the light fitting by two or more screws. The solution is simple and easy to apply from a lift (while working at heights - a single screw, a single key size).

[0025] The use of the adjustable handle for the light fitting of a road lamp according to the invention affects the quickness of installation of the light fittings (one method of assembly on a boom or on a post), the easiness of setting the geometry of lighting in two axes (precise angular orientation in the transverse and longitudinal axes) and the aesthetics of the entire fitting - the handle is an optically light design, lacking protruding elements.

[0026] Moreover, the assembly of light fittings on posts and booms, with a varying angle of orientation of the mounting support (a post, a boom) with the use of the handle according to the invention does not require installing additional technical elements.

Description of the drawings

[0027] The object of the invention is presented in an embodiment in the drawing, in which:

Fig. 1 presents the road lamp with an adjustable handle according to the invention in an exploded view,

Fig. 2 presents the adjustable handle according to the invention in an exploded view,

Fig. 3 presents the main bushing and the auxiliary bushing of the adjustable handle according to the invention in an axonometric view,

Fig. 4 presents the adjustable handle according to the invention in a rear axonometric view

Fig. 5 presents the road lamp with the adjustable handle according to the invention in an axonometric view,

Fig. 6 presents the road lamp with the adjustable handle and a device for determining the position of the fitting relative to the ground surface according to the invention in an axonometric view,

Fig. 7 presents the device for determining the position of the fitting relative to the ground surface in a top and bottom view.

Description of the invention

Example 1

[0028] Figs. 1 - 4 present the adjustable handle 1 for mounting the light fitting of a road lamp, which comprises a main bushing 2 for mounting said handle on a post or a support of the light, an auxiliary bushing 3 for mounting said handle in or on the fitting. The main bushing 2 and the auxiliary bushing 3 are rotatably connected via a screw 4 fixing the angular position of the fitting relative to the longitudinal axis of the screw 4. The screw 4 is placed in the mutually corresponding protrusions 5, 6 of the main bushing 2 and of the auxiliary bushing 3, which form a positive connection. The protrusions 5, 6 have slots 7, 8 intended for a power supply cable for the light fitting. The slots 7, 8 have centrally positioned coaxial cylinders 9, 10, in which the screw 4 is placed axially. At the same time, the cylinders 9, 10 constitute an element on which the power supply cable can be loosely wound.

[0029] Winding the cable on the cylinders 9, 10 prevents it from being under tension, which limits the risk of damaging it or ripping it out of the handle.

[0030] Preferably, the ends of the main bushing 2 and of the auxiliary bushing 3 placed next to each other are enclosed by face plates 11, 12, which considerably limit the access of weather elements into the interior of the fitting and the light post. Openings 13 intended for the power supply cable are made in the face plates 11, 12.

[0031] The adjustable handle 1 further comprises a system for adjusting the position of the light fitting 101 of the road lamp 100 relative to the longitudinal axis of the auxiliary bushing 3. This system comprises a slit 14 on the perimeter of the auxiliary bushing 3, a screw 15 passing therethrough which fixes the angular position of the fitting 101 in the longitudinal axis of the auxiliary bushing 3, connected to a pressure element 16 slidably seated in the slit 14 inside the auxiliary bushing 3. The slit 14 is made on a fragment of the perimeter of the auxiliary bushing 3 and it enables the rotation of the screw 15 relative to the longitudinal axis of the auxiliary bushing 3 by an angle of $\pm 15^\circ$.

[0032] In the present embodiment, the screw 4 and the screw 15 are mounted by means of the same key (e.g. a hex key).

[0033] Moreover, the main bushing 2 and the auxiliary bushing 3 comprise indicators 17 determining their mutual angular position. The auxiliary bushing 3 comprises indicators 18 determining the mutual angular position of the light fitting of the road lamp relative to the longitudinal axis of the auxiliary bushing 3.

[0034] Loosening the screw 4 allows fixing the angular orientation of the main bushing 2 and the auxiliary bushing 3 relative to the longitudinal axis of the screw 4. It is synonymous with setting the mutual angular position of both bushings, as well as setting the angular position of the light fitting relative to a post or a support of the light (e.g. mounted to the wall of a building). Upon fixing the desired position of both bushings, this position is secured by tightening the screw 4.

[0035] The adjustment of the position of the light fitting 101 of the road lamp 100 relative to the longitudinal axis of the auxiliary bushing 3 is in turn performed by loosening the screw 15 placed in the opening of the light fitting 101. As a result of loosening the screw 15, the pressure element 16 does not press the auxiliary bushing 3 against the element of the light fitting 101, in which or on which the handle 1 is seated. Due to this, the screw 15 can slide freely along the slit 14, which results in the ability to freely and fluidly rotate the fittings relative to the longitudinal axis of the auxiliary bushing 3. Upon fixing the desired position of the light fitting 101, this position is secured by tightening the screw 15, which results in pressing the auxiliary bushing 3 by the pressure element 16 against the element of the light fitting 101, in which or on which the handle 1 is seated, preventing further rotation of the light fitting relative to the longitudinal axis of the auxiliary bushing 3.

Example 2

[0036] The handle like in example 1, the pressure element 16 having the form of a ring loosely fitted with the auxiliary bushing 3.

Example 3

[0037] Fig. 1 and Fig. 5 present the LED road lamp 100 comprising the light fitting 101 and the adjustable handle 1 for mounting the light fitting of the road lamp according to the first embodiment.

Example 4

[0038] Figs. 6 and 7 present the LED road lamp 100 like in example 3, the light fitting 101 comprising on its surface three fixing spikes 102, on which there is a device 200 for determining the position of the fitting relative to the ground surface, the device 200 comprising slots 201 adjusted to cooperate with the fixing spikes 102.

[0039] The device 200 is provided with a system for mechanically measuring the geometrical orientation of said light fitting relative to the ground surface in the form

of two bubble levels 202, 203 arranged at a right angle. The device (200) for determining the position of the fitting (101) relative to the ground surface is also provided with a module for determining the geographical position, the operation of which is based on the GPS and/or GLONAS system.

[0040] Moreover, the device 200 also comprises a wireless communication module, which allows wireless transmission of data to an external device with dedicated software, like, e.g. a smartphone.

[0041] The device 200 in combination with dedicated software considerably facilitates correcting the orientation of both new light fittings and those already installed, as well as inventorying the light equipment in possession. This also constitutes a simplification of the installer's equipment - one small device for setting and inventorying.

Example 5

[0042] The LED road lamp 100 like in example 4, wherein, instead of the system for mechanically measuring the geometrical orientation of said road fitting relative to the ground surface, the light 100 is provided with a system for an electronic measurement of the geometrical orientation. For example, this system can have the form of an integrated gyroscopic electronic system known from prior art, comprising a gyroscope and an accelerometer.

Claims

1. An adjustable handle (1) for mounting the light fitting of a road lamp, comprising:

- a main bushing (2) for mounting said handle on a post or a support of the light,
- an auxiliary bushing (3) for mounting said handle in or on the fitting,
- the main bushing (2) and the auxiliary bushing (3) being rotatably connected via a screw (4) fixing the angular position of the fitting relative to the longitudinal axis of the screw (4)

characterised in that:

it comprises a system for adjusting the position of the fitting relative to the longitudinal axis of the auxiliary bushing (3), comprising a slit (14) on the perimeter of the auxiliary bushing (3), a screw (15) passing therethrough which fixes the angular position of the light fitting relative to the longitudinal axis of the auxiliary bushing (3), connected to a pressure element (16) inside the auxiliary bushing (3).

2. The handle according to claim 1, **characterised in that** the pressure element (16) is slidably seated in the slit (14), or it has the form of a ring loosely fitted

with the auxiliary bushing (3).

3. The handle according to claim 1 or 2, **characterised in that** the ends of the main bushing (2) and the auxiliary bushing (3) placed next to each other are enclosed by face plates (11, 12).
4. The handle according to any of the claims 1 to 3, **characterised in that** openings (10) intended for a power supply cable are made in the face plates (11, 12)
5. The handle according to any of the claims 1 to 4, **characterised in that** the slit (14) enables the rotation of the screw (15) relative to the longitudinal axis of the auxiliary bushing (3) by an angle of $\pm 15^\circ$.
6. The handle according to any of the claims 1 to 5, **characterised in that** the main bushing (2) and/or the auxiliary bushing (3) comprise indicators (17) determining the mutual angular position of the main bushing (2) and the auxiliary bushing (3).
7. The handle according to any of the claims 1 to 6, **characterised in that** the auxiliary bushing (3) comprises indicators (18) determining the angular position of the fitting relative to the longitudinal axis of the auxiliary bushing (3).
8. The handle according to any of the claims 1 to 7, **characterised in that** the screw (4) and the screw (15) are mounted by means of the same key.
9. A road lamp (100) comprising the fitting (101) and the adjustable handle (1) according to any of the claims from 1 to 8.
10. The light according to claim 9, **characterised in that** the fitting (101) comprises at least one fixing spike (102) on its outer surface, adjusted to the placement of a device (200) thereon for determining the position of the fitting relative to the ground surface.
11. The light according to claim 10, **characterised in that** the device (200) for determining the position of the fitting (101) relative to the ground surface is provided with a system for mechanically measuring the geometrical orientation of said light fitting relative to the ground surface.
12. The light according to claim 11, **characterised in that** the system for mechanically measuring the geometrical orientation of said light fitting relative to the ground surface has the form of two bubble levels (202, 203) arranged at a right angle.
13. The light according to claim 10, **characterised in that** the device (200) for determining the position of

the fitting (101) relative to the ground surface is provided with a system for electronically measuring the geometrical orientation of said light fitting relative to the ground surface.

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14. The light according to any of the claims 9 to 11, **characterised in that** the device (200) for determining the position of the fitting (101) relative to the ground surface is provided with a module for determining the geographical position.

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15. The light according to any of the claims 9 to 12, **characterised in that** the device (200) for determining the position of the fitting (101) relative to the ground surface is provided with a wireless communication module.

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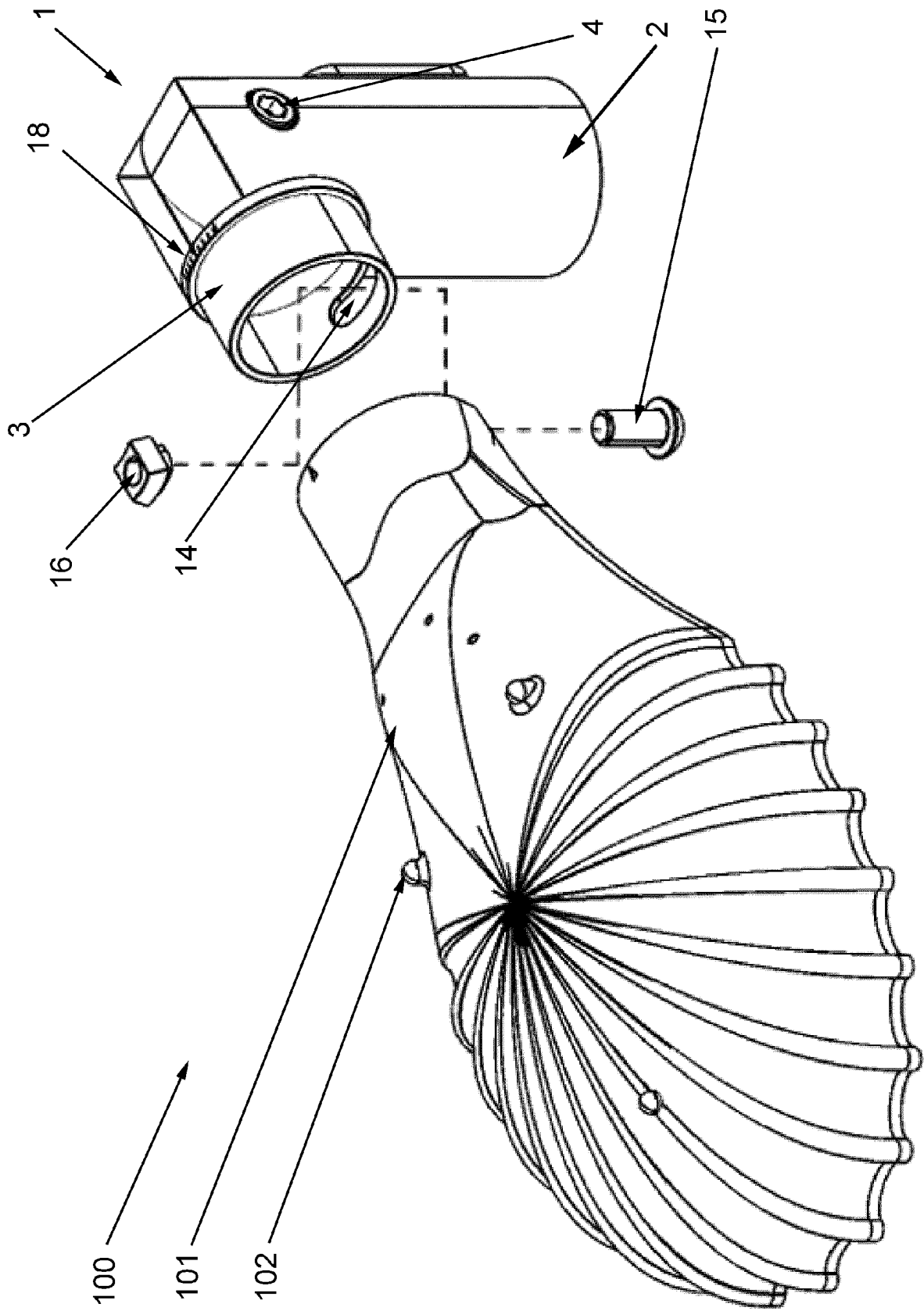


Fig. 1

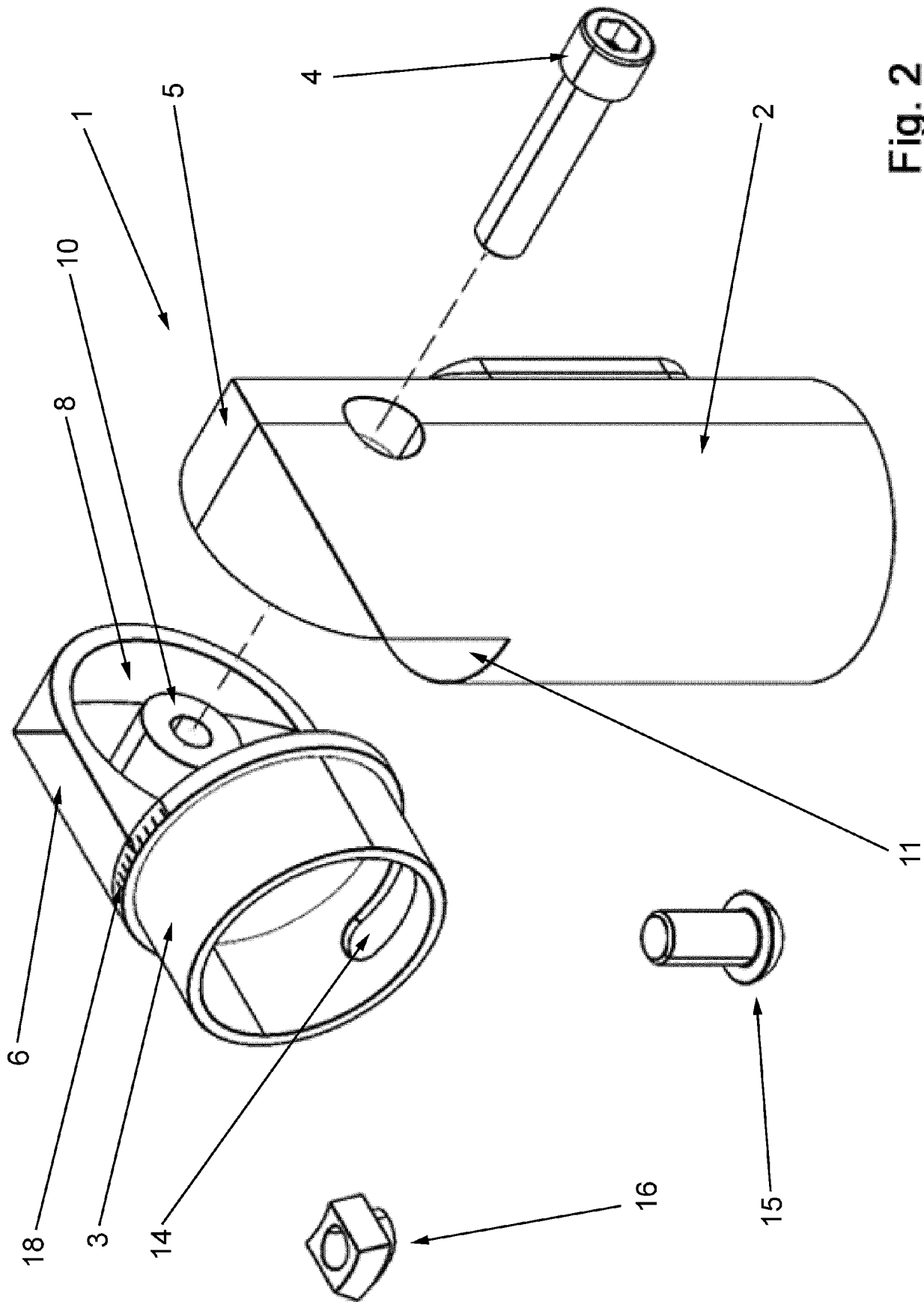


Fig. 2

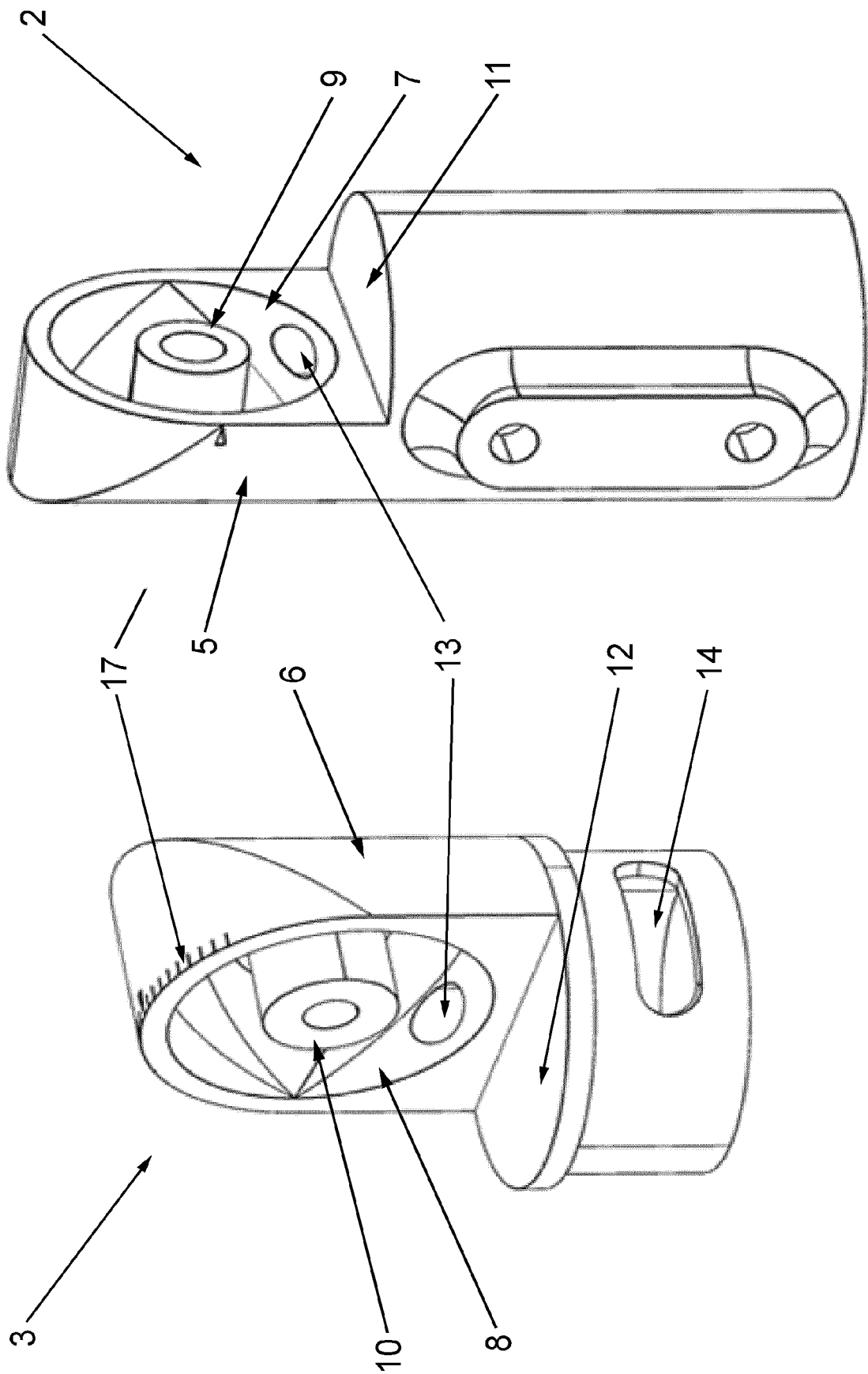


Fig. 3

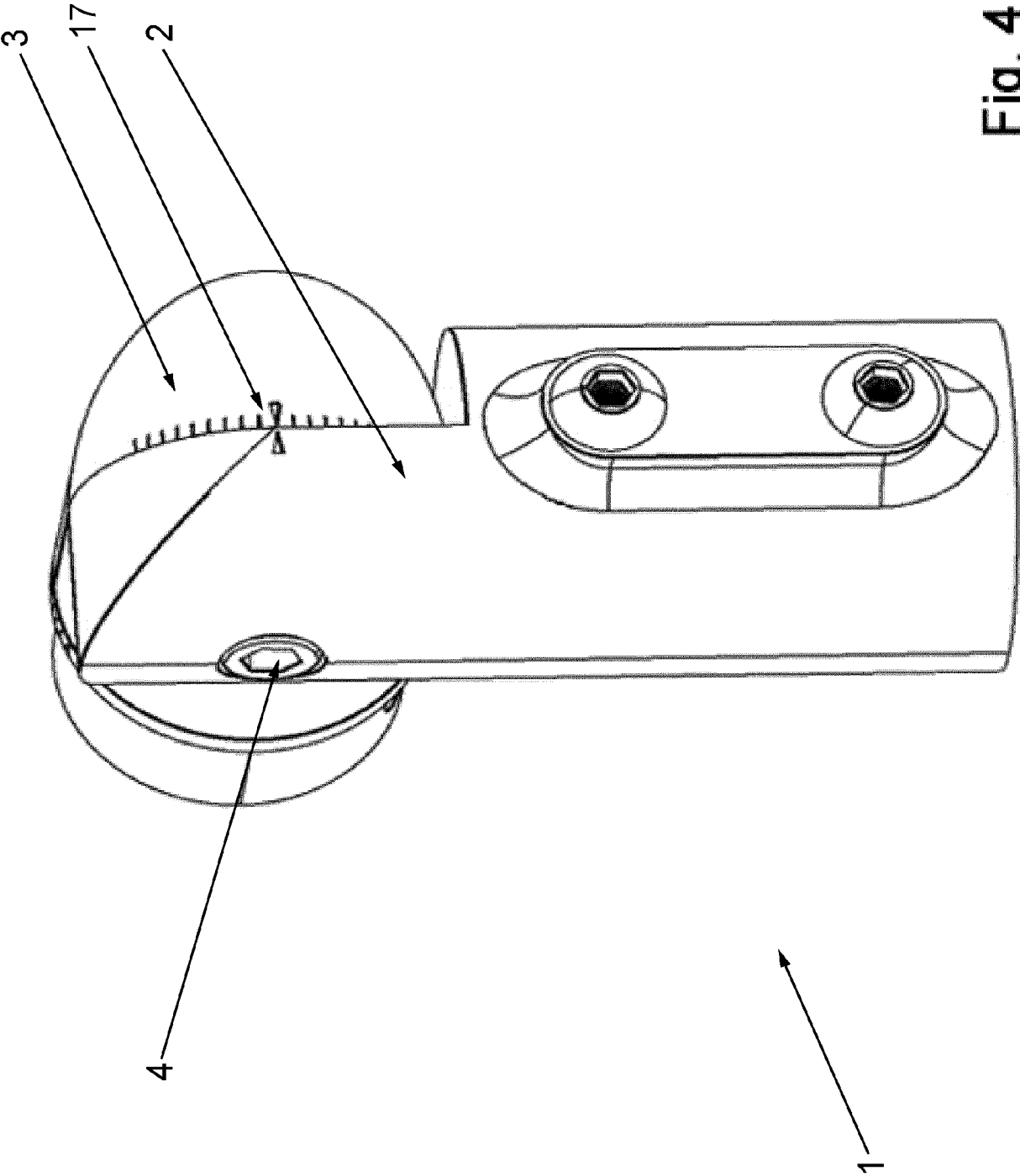


Fig. 4

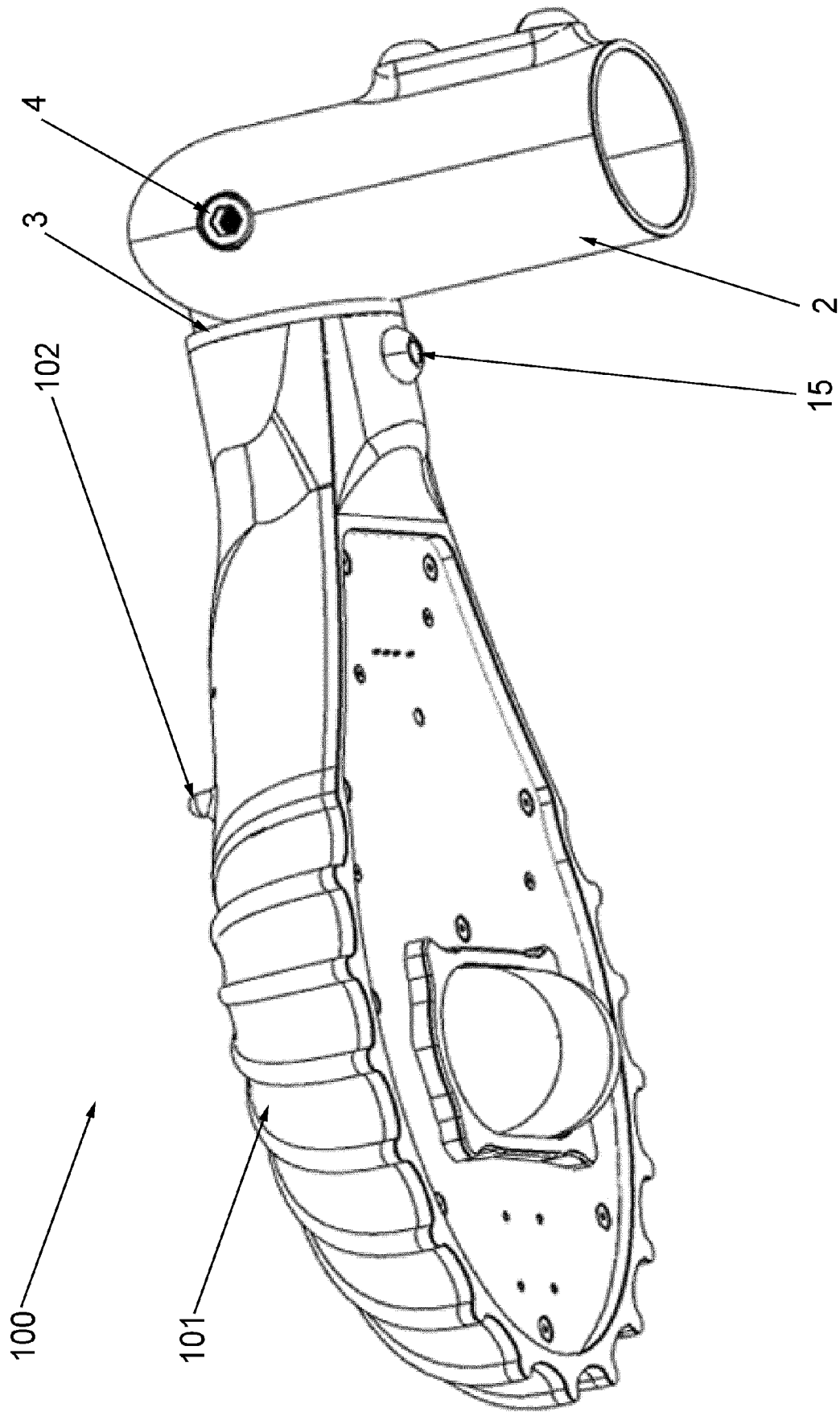


FIG. 5

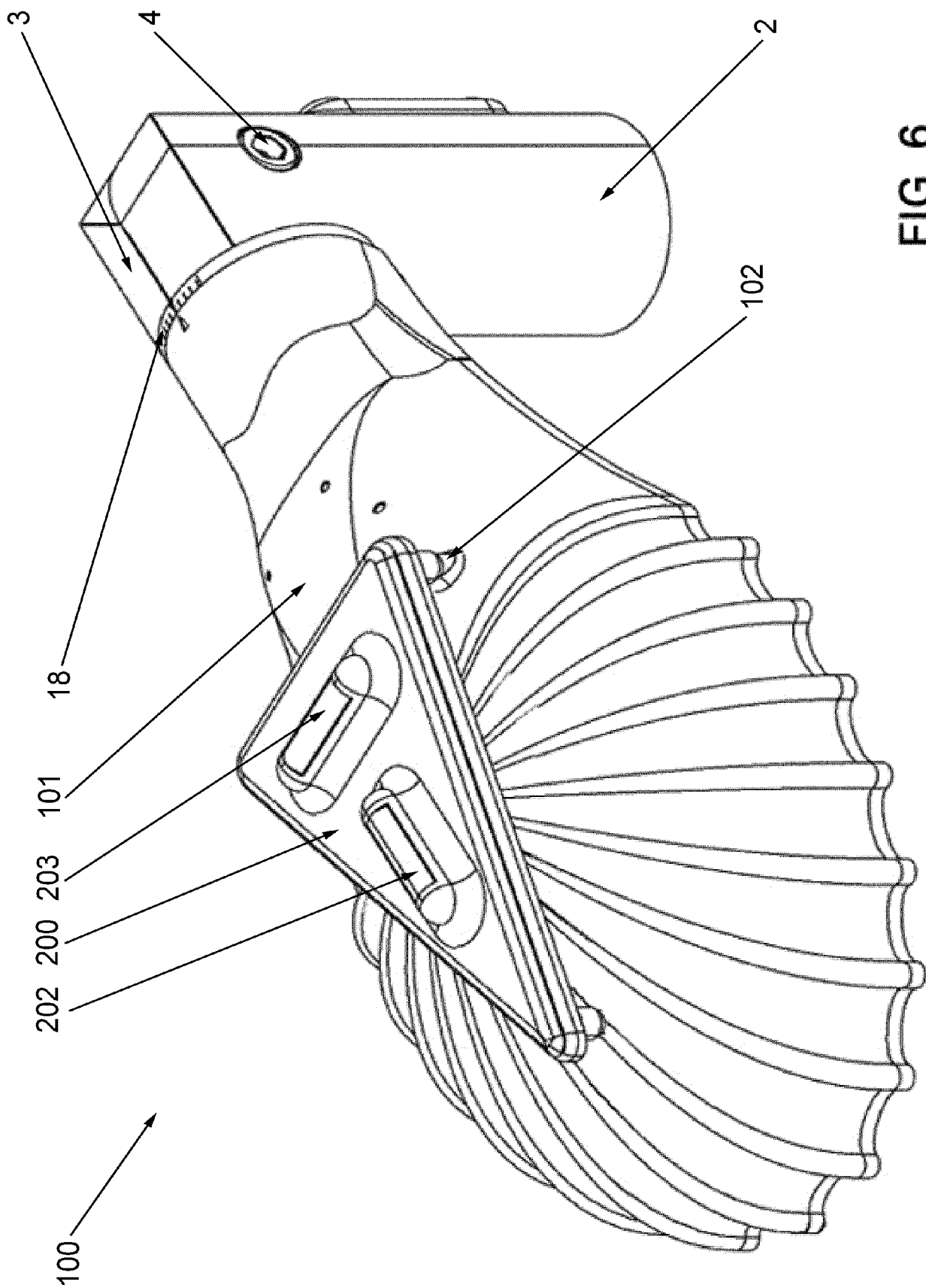


FIG. 6

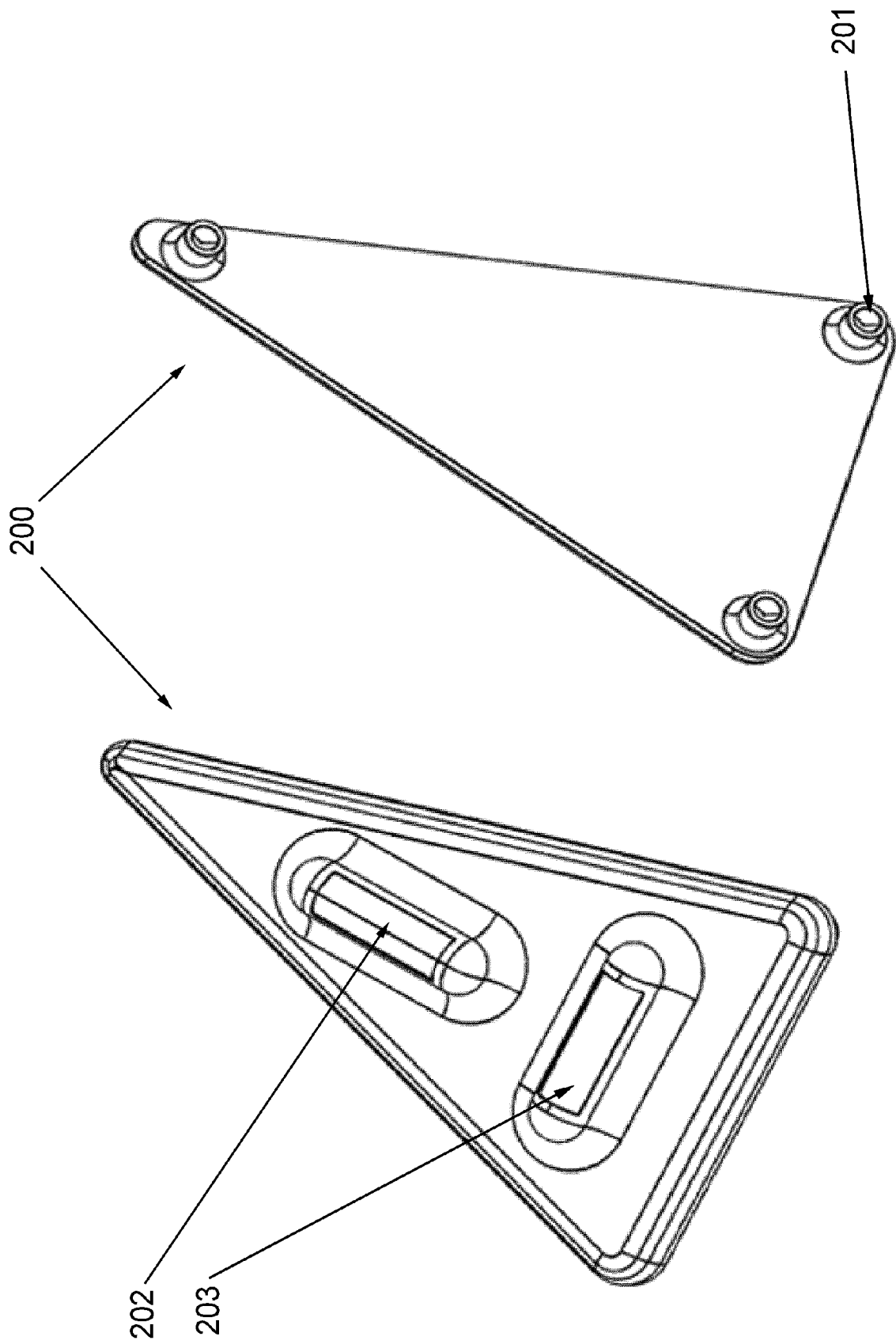


Fig. 7



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