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(54) **HEAT SINK FOR LAMP AND METHOD OF REALIZATION OF SAID HEAT SINK FOR LAMP**

(57) It is provided a heatsink (1) for a lamp (10) defining a main axis (1a) and comprising a shell (2) defining a plane section (20) perpendicular to said main axis (1a) and extending continuously along said main axis (1a), an internal partition (21), an external partition (22) and a

seat (23) obtained on the internal partition (21) and configured to house at least one lighting element (11), wherein the section (20) has a convex shape corresponding to a portion of a ring (1b) defining a minimum thickness of 5 mm.

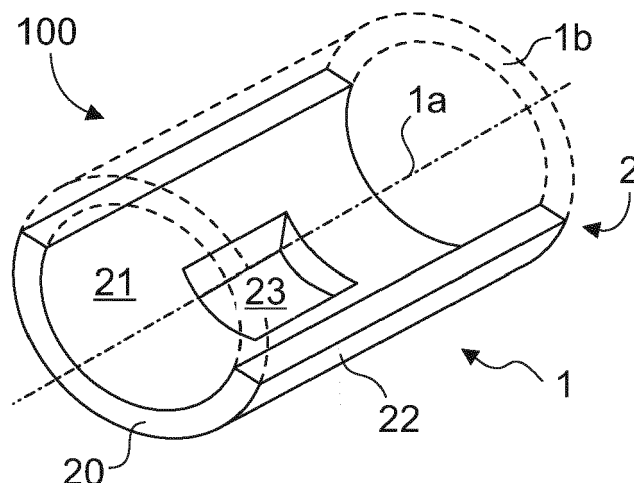


Fig. 1

Description

[0001] The present invention relates to a heatsink for lamp and method of realization of said heatsink for lamp of the type specified in the preamble of the first claim.

[0002] In particular, the present invention relates to a heatsink, and relative manufacturing method, for lamps of various kinds, for example wall, ceiling, desk, indoor, outdoor and other categories.

[0003] A similar heatsink is described in patent application WO-A-2007/006130.

[0004] As is known, lamps are tools used for lighting.

[0005] Within this category, it is possible to highlight a plurality of product categories including, for example, wall lamps, ceiling lamps, desk lamps, indoor and outdoor lamps and other categories.

[0006] Basically, in the plurality of cases, the aforementioned lamps comprise, at least, a support and a container electrically connected to an external source, usually by means of cables, and comprising at least one lighting element.

[0007] This element can be a common light bulb or an LED or other type of technologies used in the current state of the art for lighting.

[0008] In addition, the lamps include at least one device capable of dissipating heat at the lighting element in such a way as to reduce the temperature to which the lamp is subjected in the lighting area.

[0009] In particular, this device is known by the term "heatsink" and can have various shapes and sizes.

[0010] Usually, the heatsinks adopted on the lamps are of the passive type and therefore include a body consisting of lamellae in metallic material, such as copper or aluminum, held together by a supporting structure, also in copper or aluminum.

[0011] The heat is dissipated thanks to the thermal conductivity of the metal used and the convective currents that are generated, due to the temperature difference, in the air around the heatsink.

[0012] The known art described includes some important drawbacks.

[0013] In particular, these heatsinks require machining which implies high times and costs, since their geometry is rather complicated.

[0014] In addition, the support body of the heatsinks can have a contoured shape which implies further machining and further manufacturing costs and times.

[0015] There are also box-like components capable of incorporating the lighting elements in order to ensure the dissipation of the heat generated by the elements themselves. These box-like components, however, have a low dissipation efficiency and are, like common heatsinks, extremely unsightly.

[0016] In this situation, the technical task underlying the present invention is to devise a heatsink for a lamp and a method of realization of said heatsink for a lamp capable of substantially obviating at least part of the aforementioned drawbacks.

[0017] Within the scope of said technical task, it is an important object of the invention to obtain a heatsink which allows to guarantee good efficiency in the face of structural characteristics suitable not to disfigure the design of the lamp including the heatsink. Another important object of the invention is to provide a method of realization of a heatsink for a lamp which is extremely economical and reduces the time required for manufacturing the heatsink.

[0018] The technical task and the specified aims are achieved by a heatsink for a lamp as claimed in the annexed claim 1.

[0019] Preferred technical solutions are highlighted in the dependent claims.

[0020] The characteristics and advantages of the invention are clarified below by the detailed description of preferred embodiments of the invention, with reference to the accompanying figures, in which:

the **Fig. 1** shows a tubular element from which is obtained a heatsink for the lamp according to the invention with a semi-circular cross-section;

the **Fig. 2** illustrates a tubular element from which is obtained a heatsink for the lamp according to the invention with a semi-square cross-section;

the **Fig. 3a** is an exploded view of a heatsink for the lamp according to the invention in a preferred embodiment wherein is also provided with a lighting element and the cover;

the **Fig. 3b** shows a supporting structure of a lamp including a heatsink according to the invention wherein the heatsink is constrained to the support structure by means of fixed constraints;

the **Fig. 4a** shows a cross-sectional view of a heat sink for the lamp according to the invention in an alternative embodiment;

the **Fig. 4b** illustrates a cross-sectional view of a lamp including the heatsink of Fig. 4a and wherein the constraint between the support structure and the heatsink is realized by means of magnetic detachable constraints; and

the **Fig. 5** is a perspective view of Fig. 4b lamp.

[0021] In the present document, the measurements, values, shapes and geometric references (such as perpendicularity and parallelism), when associated with words like "about" or other similar terms such as "approximately" or "substantially", are to be considered as except for measurement errors or inaccuracies due to production and/or manufacturing errors, and, above all, except for a slight divergence from the value, measurements, shape, or geometric reference with which it is associated. For instance, these terms, if associated with a value, preferably indicate a divergence of not more than 10% of the value.

[0022] Moreover, when used, terms such as "first", "second", "higher", "lower", "main" and "secondary" do not necessarily identify an order, a priority of relationship

or a relative position, but can simply be used to clearly distinguish between their different components.

[0023] Unless otherwise specified, as results in the following discussions, terms such as "treatment", "computing", "determination", "calculation", or similar, refer to the action and/or processes of a computer or similar electronic calculation device that manipulates and/or transforms data represented as physical, such as electronic quantities of registers of a computer system and/or memories in, other data similarly represented as physical quantities within computer systems, registers or other storage, transmission or information displaying devices.

[0024] The measurements and data reported in this text are to be considered, unless otherwise indicated, as performed in the International Standard Atmosphere ICAO (ISO 2533:1975).

[0025] With reference to the drawings, the heatsink for lamp according to the invention is globally indicated with the number 1.

[0026] The heatsink 1 is capable of being used on lamps 10 of various kinds. For example, the heatsink 1 can be used on indoor lamps 10 such as the lamp 10 shown in Figs. 3a-3b, or it can be used on wall lamps, such as the lamp 10 shown in Figs. 4a-5. The heatsink 1 can be used equivalently for lamps 10 of different types, such as desk lamps and outdoor lamps.

[0027] The heatsink 1 is, in fact, connectable to any support structure 12.

[0028] The support structure 12 can include a simple rod on which the heatsink 1 can be constrained, or it can comprise other elements, for example a deformable structure for making a desk lamp or wall-fixing platforms with one or more support bars.

[0029] For example, the support structure 12 can be complete with base and rod and, in general, it is configured to support the heatsink 1 in any situation, or rather with respect to the wall, the ground, a ceiling or the like.

[0030] Therefore, the invention can allow the realization of a new lamp 10 which includes the heatsink 1 and a support structure 12 configured to support the heatsink 1. Naturally, essentially, the lamp 10 also comprises at least one lighting element 11. The lighting element 11 can be of any type, for example a light bulb, or a neon light or other commonly available type. Preferably, the lighting element 11 is of the LED type. Furthermore, preferably, the lighting element 11 is included in the heatsink 1, when the heatsink 1 is in use, as described later.

[0031] The heatsink 1, in particular, defines a main axis 1a.

[0032] The main axis 1a is essentially the prevailing development axis. However, in general, the main axis 1a is preferably a reference axis around which the heatsink 1 develops.

[0033] Preferably, in fact, the heatsink 1 comprises a shell 2.

[0034] The shell 2 is substantially a one-piece element suitable for allowing heat dissipation. However, the shell 2 does not have the geometric characteristics of the heat-

sinks of the known art.

[0035] In fact, the shell 2, as anticipated, preferably develops around the main axis 1a. In detail, the shell 2 defines a section 20.

[0036] The section 20 is flat and, moreover, is perpendicular to the main axis 1a. The section 20 therefore develops continuously along the main axis 1a. In this way, the shell 2 substantially defines a section 20 constant along the entire extension, along the main axis 1a, of the heatsink 1.

[0037] Furthermore, the shell 2 defines an internal partition 21 and an external partition 22. The internal partition 21 is preferably coincident with the surface of the shell 2 facing the main axis 1a. The external partition 22 is preferably coincident with the external surface of the shell 2 which faces the outside.

[0038] Advantageously, the shell 2 also defines a seat 23.

[0039] The seat 23 is preferably obtained on at least one of the partitions 20, 21.

[0040] Preferably, the seat 23 is obtained on the internal partition 21. However, it could equivalently be obtained on the external partition 22. In particular, preferably, the seat 23 corresponds to a groove made on the internal surface 21 in such a way as to be able to house objects inside it.

[0041] In particular, in fact, the seat 23 is configured to house at least one lighting element 11.

[0042] Furthermore, the seat 23 can be substantially counter-shaped to the lighting element 11 in such a way as to house exactly the same without further empty spaces.

[0043] The seat 23 can also include one or more holes suitable for allowing the passage of junction elements for connection, for example, with the support structure 12. Or it can allow the passage of cables or other corresponding elements and capable of allowing the power supply of the lighting element 11.

[0044] Or, for example, in a configuration wherein the seat 23 is made on the external partition 22, it can include a hole suitable for allowing the passage of light from the lighting element 11 towards the main axis 1a.

[0045] In any case, preferably, the section 20 of the shell 2 has some particular characteristics.

[0046] In detail, advantageously, the section 20 has a convex shape corresponding to a ring portion 1b.

[0047] The ring 1b, shown in Figs. 1-2, is nothing other than a virtual geometric figure capable of allowing the definition of the section 20. The ring 1b can substantially be a closed geometric figure defining its own perimetric thickness.

[0048] Preferably, in particular, the ring 1b defines a minimum thickness of 5 mm.

[0049] Even more conveniently, the ring 1b defines a minimum thickness of 1 cm.

[0050] Naturally, the ring portion 1b and, therefore, the section 20 of the shell 2 also define the same thickness as the ring 1b.

[0051] Furthermore, the ring 1b can be a circular or squared ring.

[0052] For example, as shown in Fig. 1, the ring 1b can define a circular crown and, in this configuration, the section 20 can define a semi-circular shape.

[0053] Or, as shown in Fig. 2, the ring 1b can define a substantially square or rectangular or quadrangular shape. Therefore, in this configuration, the section 20 can define a semi-square or even triangular shape depending on how the section 20 is made. Regardless of the shape of the section 20, the heatsink 1 can also include a cover 3.

[0054] If present, the cover 3 is substantially configured to at least partially plug the seat 23. In this way, the lighting element 11 is closed between the seat 2 and the cover 3.

[0055] Even more preferably, the cover 3 can have one or more holes designed to allow the passage of light from the lighting element 11, or the passage of junction elements between the heatsink 1 and the support structure 12 or, again, the passage of connection elements for the power supply of the lighting element 11. In order to minimize the empty spaces, the cover 3 may be counter-shaped to the seat 23.

[0056] The operation of the heatsink 1 described above in structural terms is substantially similar to the prior art heatsinks, with similar efficiencies but an extremely simplified structure and that it also allows the support of the lighting element 11.

[0057] The invention also comprises a new method of manufacturing a heatsink 1 for lamp 10.

[0058] Preferably, the method comprises a retrieval step. In this step, at least one tubular element 100 is retrieved.

[0059] The tubular element 100 can be any tube commonly made on the market. In fact, there are no particular technological limits that prevent the realization of these tubular elements 100.

[0060] The greatest advantage of the method according to the invention, given by the structure of the heatsink 1, is that the method does not provide for a making phase of the tubular element 100, but a simple procurement or procurement phase.

[0061] In other words, the structure of the heatsink 1 allows the heatsink 1 to be made by exploiting or recycling tubular elements 100 which can be commonly found on the market.

[0062] Naturally, the tubular element 100 extends along the main axis 1a and defines a section having a convex shape corresponding to a ring 1b as described above.

[0063] Furthermore, the tubular element 100 itself defines an internal partition 21 and an external partition 22. Basically, a part of the tubular element 100 defines the shell 2 of the heatsink 1.

[0064] In this sense, the shell 2 is nothing more than a portion of tubular element 100 cut and separated from the rest of the tubular element 100.

[0065] In fact, preferably, the method also includes a cutting phase. In the cutting phase, the tubular element 100 is cut along the main axis 1 a, or rather with cuts parallel to the main axis 1a, in such a way as to define the section extrapolated from the ring 1b.

[0066] Preferably before the cutting phase, the method can advantageously include a sectioning step. In the sectioning phase, the tubular element 100 is sectioned, or cut with cutting lines perpendicular to the main axis 1a, along one or more planes perpendicular to the main axis 1a. In this way, long tubular elements 100 can give rise to a plurality of shells 2 to make various heat sinks 1 from the same tubular element 100.

[0067] Naturally, the cutting phase can also give rise to several shells 2 of heatsinks 1.

[0068] Furthermore, the cutting can be carried out along a middle plane in such a way that the section 20 defines, for example in the case of a circular ring 1b, a semi-circular shape.

[0069] The method can, therefore, include a drilling phase. During the drilling phase, one of the partitions 20, 21 is drilled in such a way as to define the seat 23 and thus create the device 1.

[0070] The heatsink 1 for lamp and the method of manufacturing the heatsink 1 according to the invention achieve important advantages.

[0071] In fact, the heatsink ensures good efficiency in the face of structural characteristics suitable not to deface the design of the lamp that includes the heat sink. The lines of the heatsink are simple, not complex.

[0072] In this sense, a further advantage is given by the fact that the method of manufacturing the heatsink is extremely economical and reduces the time required to manufacture it.

[0073] In addition, the fact of being able to use tubular elements conventionally on the market allows to reduce, in particular, the manufacturing steps and, last but not least, to use recycled materials to make heatsinks.

[0074] The invention is susceptible of variants falling within the scope of the inventive concept defined by the claims.

[0075] In this context, all the details can be replaced by equivalent elements and the materials, shapes and dimensions can be any.

Claims

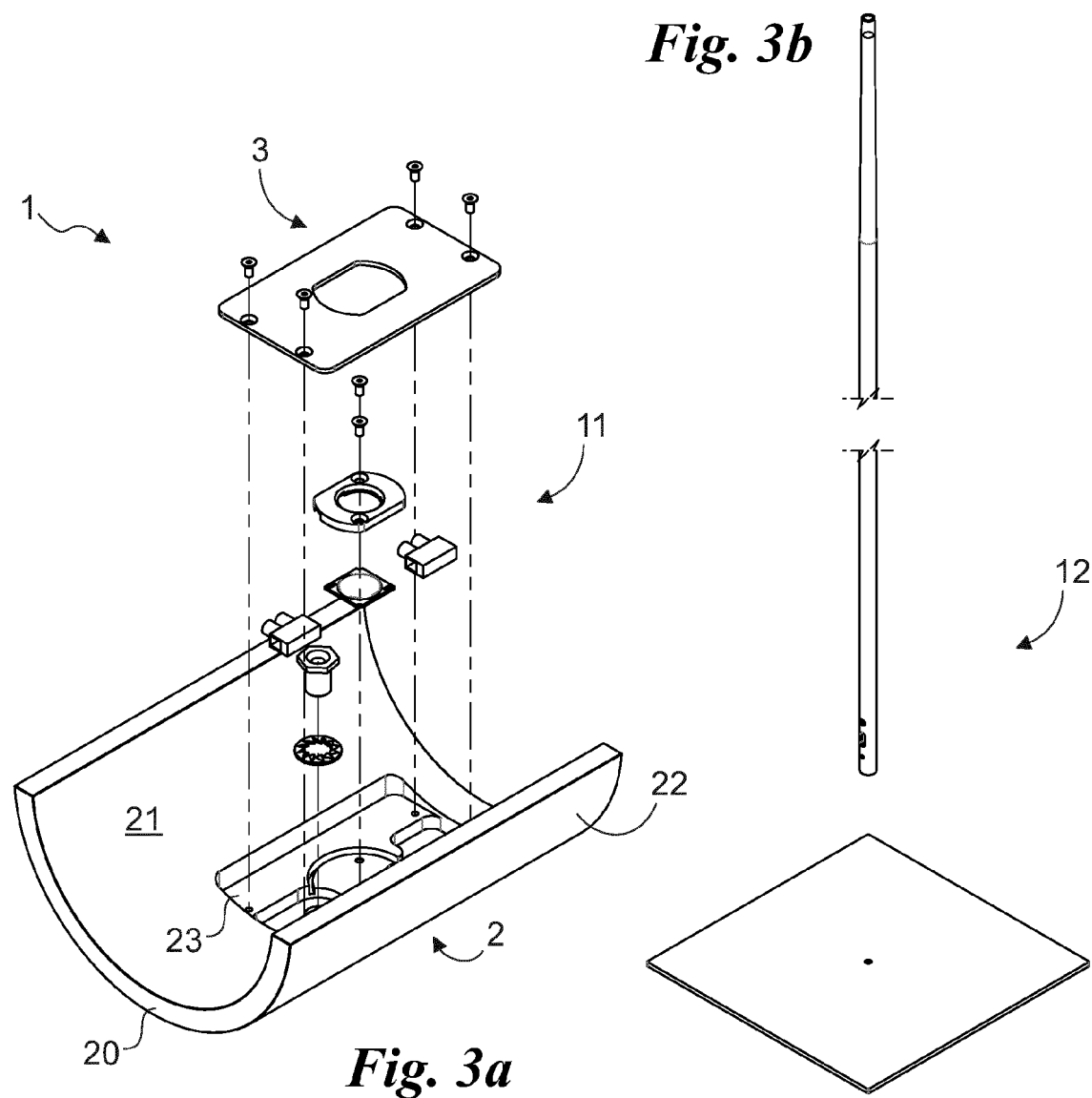
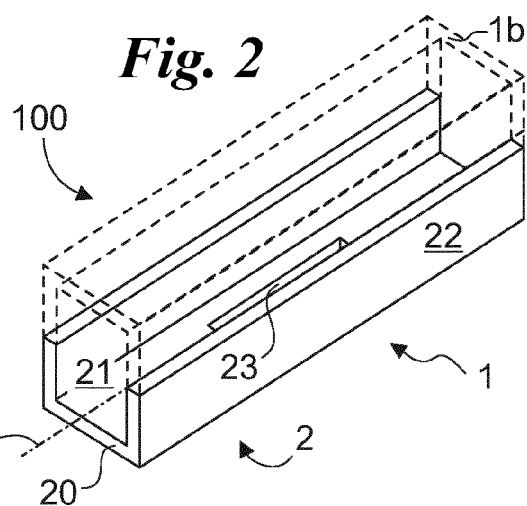
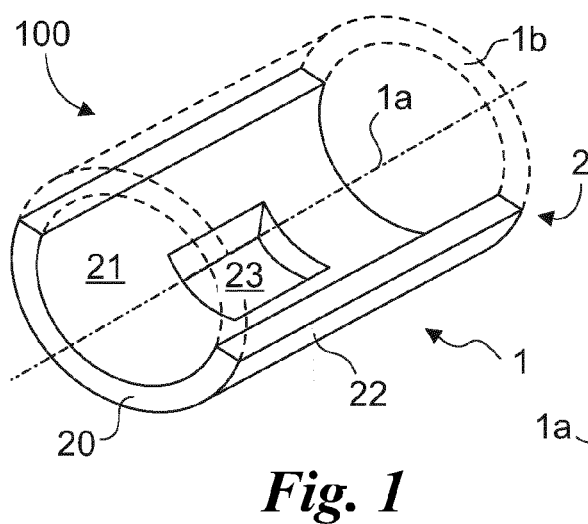
1. Method for manufacturing a heatsink (1) for a lamp (10) **characterized by** comprising:

- obtaining at least one tubular element (100) extending along a main axis (1a) and defining a section having a convex shape corresponding to a ring (1b) defining a minimum thickness of 5 mm, an internal partition (21) and an external partition (22),
- cutting said tubular element (100) along said

- main axis (1a) in such a way as to make at least one shell (2) defining a section (20) having a convex shape corresponding to a portion of said ring (1b),
- drilling one of said partitions (22,21) in such a way as to define a seat (23) configured to house an lighting element (11) in such a way as to realize said device (1). 5
2. Method according to claim 1, comprising: 10
- sectioning said tubular element (100) along one or more planes perpendicular to said main axis (1a). 15
3. A method according to any one of claims 1-2, wherein said ring (1b) is circular and said cutting of said tubular element (100) along said main axis (1a) is carried out along a centerline plane so that said section (20) defines a semi-circular shape. 20
4. Heatsink (1) for the lamp (10) realized with a method according to any one of claims 1-3.
5. Heatsink (1) according to claim 4, wherein said ring (1 b) defines a minimum thickness equal to 1 cm. 25
6. Heatsink (1) according to any one of claims 4-5, wherein said section (20) defines a semi-circular shape. 30
7. Heatsink (1) according to any one of claims 4-6, comprising a cover (3) configured to plug at least partially said seat (23). 35
8. Heatsink (1) according to any one of claims 4-7, wherein said cover (3) is counter-shaped to said seat (23).
9. A lamp (10) including a heatsink (1) according to any one of claims 4-8, a lighting element (11) disposed within said seat (23) and a support structure (12) configured to support said heatsink (1). 40
10. A lamp (10) according to claim 9, wherein said heat sink (1) and said support structure (12) are mutually constrained by means of solvable magnetic means. 45

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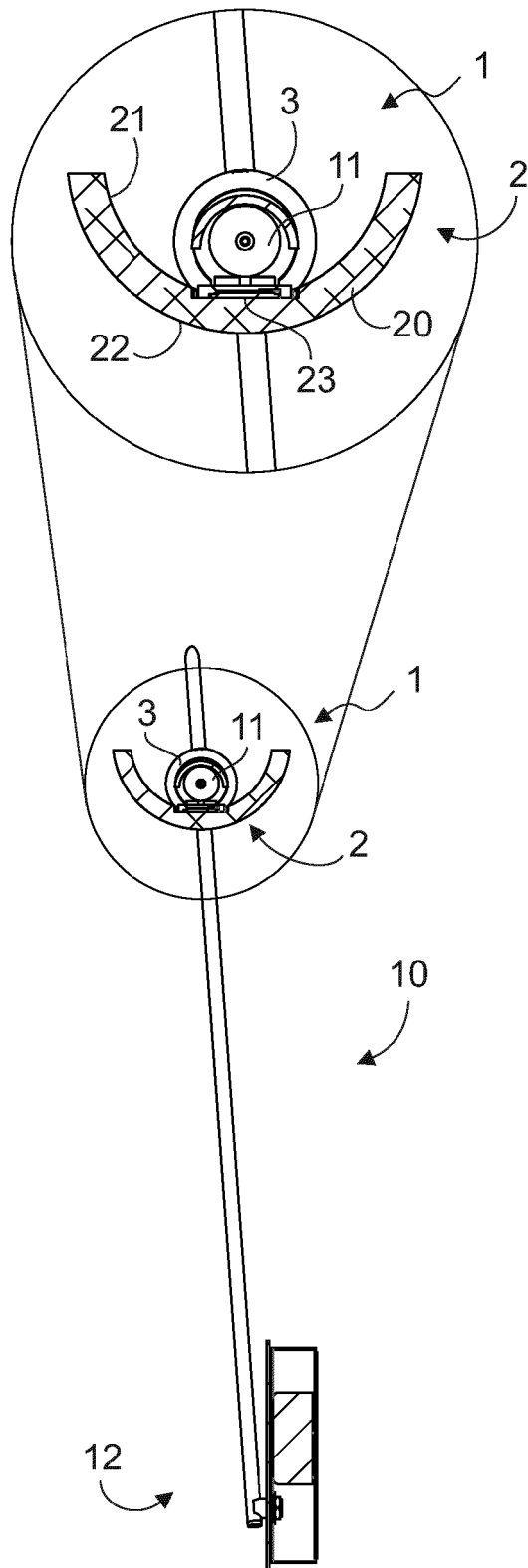


Fig. 4a

Fig. 4b

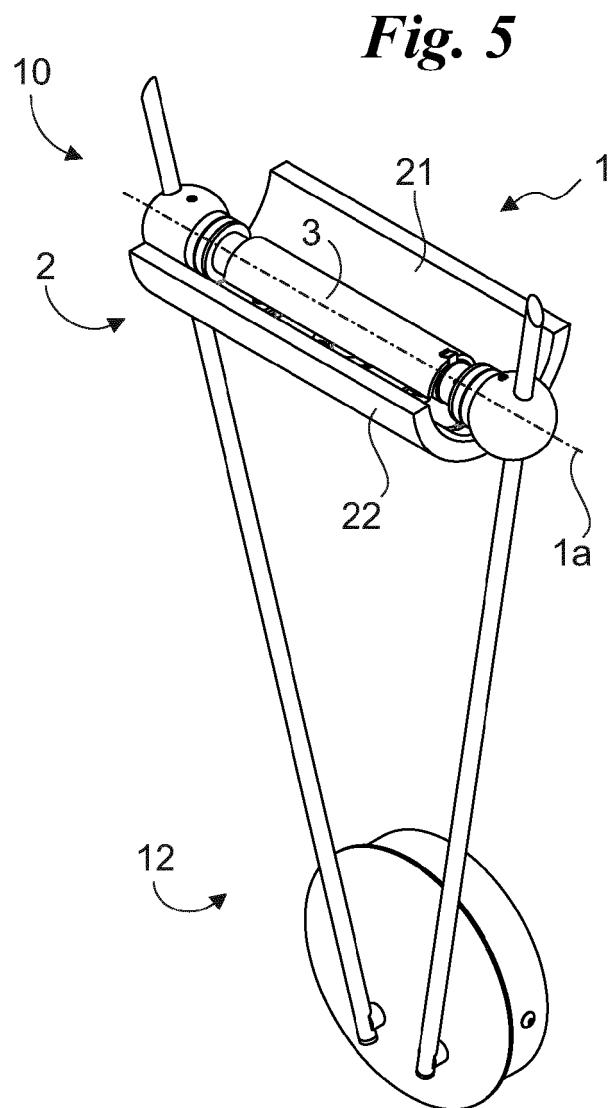


Fig. 5



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Application Number
EP 21 15 6914

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 March 2021	Examiner Blokland, Russell
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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