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(54) Antiskid mechanism for walking aid device

(57) An antiskid arrangement (10) for a conventional walking aid device is provided. The antiskid arrangement (10) comprises an antiskid mechanism, housed within a casing (11). The antiskid arrangement is configured to be connected to the shaft (21) of a conventional walking aid device. The antiskid mechanism housed within the casing (11) comprises in turn a mechanical module, an electronic module (16) and a spike member (12), which is adapted to perform a reciprocating movement. The electronic module (16) comprises at least one sensor device, adapted to receive signal(s) from the external signal source, to detect the presence of and/or interruption in said signal(s) and to acquire an activated state in response to the presence of and/or interruption in said signal(s).

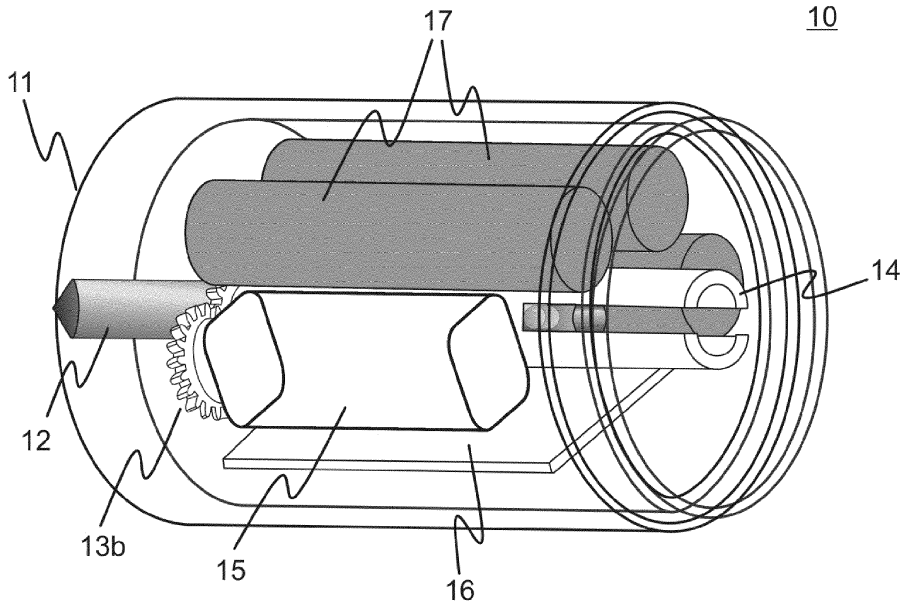

Figure 2

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Description

FIELD OF THE INVENTION

[0001] Generally the invention relates to antiskid mechanisms. In particular the present invention concerns an antiskid mechanism for walking aid devices, such as walking sticks, canes, crutches and the like.

BACKGROUND

[0002] During winter months or rainy season walking surfaces can be difficult to navigate. Every year thousands of people fall on slippery roads which accidents cause joint displacements and bone fractures. The consequence of such accidents is a need for a person with e.g. a limb temporarily disabled to use a walking aid device, such as crutches, a walking stick and the like. Use of walking aid devices in slippery conditions, however, causes even more problems, because these devices do not normally provide sufficient traction on ice. The obvious solution is to equip walking aid devices with a grip providing means. Most frequently exploited grip providing means for walking aid devices naturally comprise an antiskid rod, a pin or a spike integrated within a ground engaging portion of a walking aid device. Different implementations and concepts for walking aid devices with antiskid means are known to exist, varying from providing a walking aid device with an additional antiskid adapter to antiskid means integrated within walking aid devices. Integrated antiskid means are conventionally provided with a manual trigger. Mechanical solutions with a spike, extendable/retractable from the ground engaging portion of a walking aid device, are known to be actuated by various kinds of levers, handles, buttons, rotary and sliding switches, and other manually operated switches, such as disclosed in patent publications WO 9,315,626 and US 4,977,914 and in utility model publication CN 2010/32888, for example. Manually operated in an aforesaid manner antiskid means integrated within accessory devices (adapters) additionally connectable to walking aids are known from US 3, 901,258 and WO 03/022,092, for example. Actuating switch for such antiskid means is built up within an adapter and in order to operate such a switch the user has to either lift the walking aid device or lean down.

[0003] Above described antiskid mechanisms with manual actuation means are constrained with several common drawbacks. First of all, a person with a limb disabled may encounter certain difficulties while manually pushing or turning a switch, especially when such an action requires bending down or lifting a walking aid device off the ground, and especially wherein said action has to be repeated every time upon navigating between indoors and outdoors. Especially elder people may have troubles with balancing themselves while trying to master an aforesaid manual switch. Another drawback relates to mechanical shifting of an antiskid rod or a spike within manually actuated antiskid mechanisms caused by multiple physical force applications upon a switch and, as a result, loosened connection between an antiskid rod/spike and an actuating switch. This, in turn, causes a process of extension/retraction of an antiskid rod/spike to be hampered, thus bringing more trouble to a user of a walking aid device and shortening lifespan of an antiskid means. An additional inconvenience of using a walking aid device with manually actuated antiskid mechanism is a need of touching the switch by hand, thus possibly getting into trouble to dirt oneself.

[0004] It is therefore desirable to provide an antiskid mechanism for a walking aid device with an automated actuation system so, that an antiskid rod/spike may be easily extended/retracted from the head of the walking aid device without performing any manual operations to trigger such action. Furthermore it is desirable to provide such a mechanism to be integrated into commercially available walking aid devices.

SUMMARY OF THE INVENTION

[0005] It is an object of the present invention to at least alleviate each of the above mentioned drawbacks and to provide an automated technical solution for an antiskid mechanism to be integrated into a ground contacting portion of the conventional walking aid device, such as a rubber stopper, a ferrule or a capping member. The term "conventional walking aid device" herein generally refers to such appliances as crutches, walking sticks and/or canes, and the like.

[0006] The object is achieved by implementing an automated antiskid arrangement for a conventional walking aid device, wherein the antiskid arrangement is preferably realized in the form of a ground contacting capping member or a ferrule for said walking aid device.

[0007] In the preferred embodiment the antiskid arrangement is provided with an antiskid mechanism, housed within a casing connectable to a walking aid device at one end and contacting a walking surface at the opposite end. An antiskid mechanism housed within the casing comprises in turn a mechanical module, an electronic module and a spike member, which is thus adapted to perform a reciprocating movement by projecting out of the casing of the capping member through an aperture arranged at the ground contacting surface thereof and by retracting back into the casing. The spike member has a sharp spike-like distal end and a screw-threaded proximal portion. The electronic module comprises at least one sensor device adapted to receive a signal/signals from an external signal source and to acquire an activated state in response to said signal. An external signal source may be provided by, but not limited with, a magnetic field, an electromagnetic field and the like. Activation of the sensor device triggers reciprocating, i.e. projecting and/or retracting, movement of the spike member, mediated by the elements of the mechanical module.

[0008] For clarity purposes the term "distal" and com-

binations thereof generally indicate in this disclosure a part of an appliance localized more distantly from a reference point, whereas a reference point is provided as the part of a walking aid device shaft to which a rubber ferrule is usually attached. The term "proximal" and combinations thereof indicate, in opposite, a part of an appliance localized closer to an aforesaid reference point.

[0009] The antiskid arrangement preferably further comprises an adapter element for connecting the casing to a shaft of a walking aid device.

[0010] In one embodiment the sensor device is configured as a magnetic sensor device.

[0011] In another, substantially supplementary embodiment, the magnetic sensor device is configured as a Hall Effect sensor.

[0012] In some embodiments the sensor device is adapted to acquire an activated state when positioned into a region close around an external signal source. Such region of close proximity to and/or around the external signal source is defined by an utmost distance for the sensing circuit to detect and/or receive the external signal sufficient for triggering further events resulting in reciprocating movement of the spike member.

[0013] In one exemplary embodiment the magnetic sensor device is adapted to acquire an activated state when positioned into a region of a close proximity to a magnetic field source. The external signal source, such as a magnetic field source, may thus be integrated and/or attached to a paired walking aid device or to user's footwear, for example. The term "activated state" with regards to the sensor device defines in this discloser such an operational state of the sensor device, which results in triggering a certain mechanical action and/or an action chain, such as actuation of the mechanical module leading in turn to reciprocating movement of the spike member.

[0014] In some embodiment the mechanical module preferably comprises a gear wheel arrangement and a motor element. The gear wheel arrangement preferably comprises at least two toothed gear wheels, one of which is provided with a sleeve bearing adapted to receive a proximal portion of the spike member and the other one is connected to the motor element. Motor element in operation causes gear wheels to rotate in tandem thus promoting reciprocating movement of the spike member in regards to the hosting sleeve bearing element. Tandem operation of gear wheels therefore promote an advancement of the spike member out of the sleeve bearing element to such an extent, that the spike member protrudes out of the capping member casing through an aperture arranged at the ground contacting surface thereof. Retraction of the spike member back into the casing is implemented in similar way.

[0015] In some embodiments the antiskid arrangement comprises at least one power source. In some embodiments the power source is a battery. In some embodiments the power source is a battery of a standard size AA or AAA.

[0016] In further embodiment, the antiskid arrangement is configured to be interchangeable with a standard rubber stopper or a ferrule of a conventional walking aid device. The antiskid arrangement is further provided with an adapter element having a distal connector adapted to be fitted onto the casing of the antiskid arrangement and a proximal connector adapted to be fitted onto a ground pointing end of the shaft of a walking aid device with a conventional rubber stopper detached.

[0017] In still further embodiment the adapter element can be implemented with an inner diameter of the proximal connector ranging 15-30 mm, preferably 16-25 mm

[0018] In another aspect of the invention a method for operation of an antiskid arrangement for walking aid devices is provided.

[0019] The utility of the present invention arises from a variety of reasons depending on each particular embodiment thereof. Firstly, the user is provided with an automated solution allowing the spike to extend out of a capping member/a ferrule of a walking aid device and retract back by simply bringing the capping member into a close proximity to a magnetic field source, which may be provided with and/or within the paired walking aid device and user's footwear, for example. In order to perform such an operation the user is not required to manually release the spike member extension/retraction trigger. Secondly the antiskid arrangement of the present invention is implemented in the form of a capping member for a conventional walking aid device. Therefore the user is only required to detach a rubber ferrule from a walking aid device and to attach the antiskid arrangement instead. This procedure is simple and trouble-free comparing to the necessity of purchasing walking aid devices with integrated antiskid solutions. Thirdly, the antiskid arrangement of present invention is supplied with an adapter element or elements, which may be changed depending on the diameter of the shaft of a walking aid device. Providing the antiskid arrangement with a set of adapter elements is a simple and cost-effective solution to adjust a capping member/a ferrule for walking aid devices with varying shaft diameters.

[0020] It should be generally understood that:

[0021] The term "walking aid device" refers in this discloser to any means adapted to provide assistance while walking and that are not equipped with wheels, said means preferably, but not exclusively comprising any type of crutches, walking sticks and walking canes.

[0022] The term "user" refers in this disclosure to the person who utilizes the walking aid device until not otherwise stated.

[0023] The term "automated" refers in this discloser largely as an antonym to the term "manual" and with regards to the device of the disclosure is defined substantially as requiring no manual (performed by hand) action from the user.

[0024] The term "module" may refer in this disclosure to a multi-part arrangement of different elements adapted to perform a certain function whether physically connect-

ed or not, and also to elements integrated into a single-part arrangement.

[0025] The term "ground" is utilized in this disclosure in its broadest meaning and may be attributed to any walking surface in general.

[0026] The terms "first" and "second" are used herein to distinguish an element from other element and not to denote any particular order or importance if not otherwise explicitly indicated.

[0027] The term "or" refers to a single element of stated alternative elements or a combination of two or more elements. For example, the phrase "crutches or a walking stick" refers to crutches, a walking stick, or both crutches and a walking stick.

[0028] Different embodiments of the present invention will become apparent by consideration of the detailed description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029]

Fig. 1A illustrates a two-dimensional profile of an antiskid arrangement connected to the shaft of a walking aid device by means of an adapter element, and with a spike member protruding out of the casing.

Fig. 1B illustrates a ground contacting surface of an antiskid arrangement.

Fig. 1C is a side view of an antiskid arrangement of Fig. 1A connected to an adapter element, and with a spike member protruding out of the casing (left) and remaining inside the casing (right).

Fig. 2 illustrates an antiskid arrangement with the antiskid mechanism enclosed within the casing.

Fig. 3A provides a three-dimensional view of an antiskid arrangement connected to the shaft of a walking aid device by means of an adapter element.

Fig. 3B provides a longitudinal sectional view of an antiskid arrangement connected to the shaft of a walking aid device by means of an adapter element.

Fig. 3C illustrates a cross-section of an antiskid arrangement via the line A-A' of previous figure.

Fig.4 is an exemplary illustration of separate elements comprising an antiskid arrangement; an adapter element is also shown.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0030] Detailed embodiments of the present invention are disclosed herein with the reference to accompanying drawings. The same reference characters are used throughout the drawings to refer to same members. Following citations are used for the members:

10 - an antiskid arrangement for a walking aid device;

11 - a casing;

12 - a spike member;

12a - a distal portion of the spike member;

12b - a proximal portion of the spike member (a screw shaft);

13 - a gear wheel arrangement;

13a - a first gear wheel with a sleeve bearing;

13b - a second gear wheel;

14 - a hollow sleeve shaft;

15 - a motor element;

16 - an electronic module;

17 - a power source;

18 - an adapter element;

18a - a distal connector for the adapter element;

18b - a proximal connector for the adapter element;

21 - a shaft of a walking aid device.

[0031] An automated antiskid arrangement **10** for a conventional walking aid device is provided (Figs.1A-C), comprising a casing **11** and an antiskid mechanism housed within the casing. An adapter element **18** is further provided. The antiskid arrangement **10** is thus implemented in the form of a ground contacting capping member or a ferrule normally attachable to a ground pointing end of a walking aid device by means of said adapter element **18.** Fig.1A thus illustrates a two-dimensional profile of the antiskid arrangement **10** connected to the shaft **21** of a walking aid device by means of an adapter element **18** with a spike member **12** protruding out of the casing. Antiskid arrangement **10** with a spike member in a retracted position i.e. hidden within the casing **11** is illustrated by Fig. 1C (right). An exterior view of the antiskid arrangement **10** defined by the casing **11** with the adapter element **18** attached thereto thus resembles a conventional capping member or a ferrule for a walking aid device. A ground contacting surface of an antiskid arrangement **10** is illustrated by Fig. 1B. The ground contacting surface is preferably provided with a rounded recess, diameter of which recess is indicated

by an arrow. Substantially in the middle of said recess a closed aperture is situated, implemented in the form of a cross-like insection, for example, and thus allowing the spike member **12** to penetrate the ground contacting surface while advancing towards the ground and retracting back into the casing **11.** Whether this to be the case, the ground contacting surface is preferably implemented from a substantially soft rubber-like material. Alternatively, the ground contacting surface may comprise a permanent open aperture, accommodating a distal end (tip) of the spike member **12** so, that the spike member in retracted position does not protrude over the depth of the recess indicated by an arrow (Fig.1B) and is thus not noticeable from the outside. In the latter case the recess of a sufficient depth may be provided to avoid scratching non-slippery surfaces and/or to prevent the spike member from wearing out.

[0032] The casing **11** is preferably manufactured from hard materials, such as steel; however other options, such as rubber, plastic or composites are not excluded. The adapter element **18** is preferably manufactured from rubber, or any other material suitable to provide a sufficient fitting onto the shaft of a walking aid device. The antiskid arrangement **10** provided with the adapter element **18** and implemented in accordance with the embodiments of the invention in the form of a ground contacting capping member of a walking aid device, is preferably dimensionally equivalent to a conventional rubber ferrule of 2-7 cm in height, for example.

[0033] In the preferred embodiment the antiskid arrangement **10** is provided with an antiskid mechanism, housed within a casing **11** connectable to the shaft of a walking aid device at one end and contacting a walking surface at the opposite end. Casing-enclosed antiskid mechanism is illustrated by Fig. 2. An antiskid mechanism housed within the casing **11** comprises in turn a spike member **12,** an electronic module **16** and a mechanical module, comprised in turn of multiple elements described further. An antiskid mechanism additionally comprises power source(s) **17.** The electronic module **16** comprises at least one sensor device, such as a sensing circuit, said circuit provided on a support, such as a (circuit) board. Circuit boards, to which electronic components are fixed, integrated or otherwise provided, represent a common state-of-art and may be further referred as Printed Wiring Boards (PWBs) or Printed Circuit Boards (PCBs). Said circuit may also be provided with other known means, such as hybrid integrated circuit and/or ceramic circuitry, in order to obtain required reliability in the demanding environment. The sensor device is adapted to detect both presence and absence of an external signal produced by an external signal source and to respond to the presence or the interruption of signal data stream by producing a proportional output.

[0034] Preferably, but not exclusively, the sensing circuit is configured as a magnetic field circuit. Such magnetic sensor device is adapted to produce a corresponding response for the presence or the interruption of a magnetic field evident in terms of further mechanical actions taking place within the antiskid arrangement **10.** In order to detect magnetic field the sensor device has to be positioned into a region close around an external magnetic field source, which external magnetic field source is defined herein by a magnetic field source located elsewhere with regards to an antiskid arrangement **10.** An exemplary magnetic field source may preferably be integrated and/or attached to a paired walking aid device or to user's footwear. Said magnetic field source may be a magnet, for example.

[0035] The magnetic sensor device is preferably configured as a Hall Effect sensor. A Hall Effect sensor is a transducer that varies its output voltage in response to changes in magnetic field. Hall Effect sensor can respond to the presence (or absence) of the magnetic field by generating an electrical signal, which can be further used to alter an operating state of the mechanical module. Activation of the magnetic sensor device triggers projecting-retracting movement of the spike member **12,** mediated by the elements of the mechanical module.

[0036] Magnetic sensor is preferably configured as a pole-dependent latch sensor, to ensure an accurate performance of the antiskid arrangement **10** based on projecting and retracting movement of the spike member **12.** A south pole (+) of the magnet is designed to produce a first signal to activate the sensor, whereas a north pole (-) is designed to produce a second signal for sensor deactivation. Latching is further required to make certain that when the south pole (+) is removed from the proximity of the sensor, it will remain in activated state until it senses the opposite pole (-). The sensor may be designed as an omnipolar sensor to be able to operate with either plus or minus magnetic poles. Aforesaid description of the magnetic sensor is however provided by the way of example and not limitation; other technical implementations of the sensor device are possible whether adapted to perform a triggering function, as disclosed further.

[0037] In one substantially additional embodiment the electronic module **16** comprises at least one sensing device configured as an electromagnetic sensor.

[0038] In some other embodiments the magnetic sensor device may be configured as any other suitable sensor device to detect magnetic field or change thereof. Such sensor devices include, but are not limited thereto, electric coils, magneto-diodes, magneto-transistors and/or Lorentz force sensors.

[0039] In some further embodiments the sensor device may be configured in the form of any technically appropriate circuit adapted to detect the presence and/or change in an external signal stream and/or signal field when positioned into a region sufficiently close around thereto; and to produce a comparable response respectively.

[0040] The provision of the mechanical module is such, to enable the spike member **12** to move down and protrude out of the casing **11** through an aperture arranged on a ground contacting surface, and to move up and re-

tract back into the casing **11.** We refer now to Fig.3A, which provides a three-dimensional view on the antiskid arrangement **10** connected to the shaft **21** of a walking aid device by means of the adapter element **18.** A detailed view onto a spike member **12** and a gearwheel with sleeve bearing **13a** for receiving said spike member is provided in a dashed box (Fig.3A). Mechanical module preferably comprises a gear wheel arrangement **13** and a motor element **15.** The gear wheel arrangement preferably comprises at least two toothed gear wheels **13a** and **13b,** one of which is provided with a sleeve bearing adapted to receive a at least a proximal portion of the spike member **12** and the other one is connected to the motor element. A spike member receiving gearwheel **13a** provided with a sleeve bearing will be referred in this disclosure as a first gearwheel, and a motor connected gearwheel **13b** will be referred in this disclosure as a second gearwheel.

[0041] Once a sensor device, such as a magnetic sensor device, for example, receives a signal from a corresponding external field/signal source, such as a magnetic field source, for example, it produces an electric signal sufficient to activate a motor element **15,** which motor element in operation causes gear wheels **13a** and **13b** to rotate in tandem thus promoting reciprocating movement of the spike member **12** in regards to the hosting sleeve bearing element. The sensor device is therefore configured to produce a first electric signal sufficient to trigger projection of the spike member **12** out of the casing **11** in response to the first activation signal received from the field/signal source; and to produce a second electric signal sufficient to trigger retraction of the spike member **12** back to the casing in response to the second activation signal received from the magnetic field source. Time span between the first and the second signaling events and consequences thereof depend on how often the sensor device is caused to approach the signal source so, that the distance between the sensor device and the signal source is sufficient for either of the above mentioned signaling events to be initiated.

[0042] The sleeve bearing element of the first gear wheel **13a** may further be enclosed into a hollow sleeve shaft **14** directly connected to the motor element **15** (Fig. 4).

[0043] The motor element **15** may be configured as any technically appropriate for the purposes of the present disclosure motor or actuator, including, but are not limited to magnetic linear motors or actuators, piezoelectric linear motors, magneto-resistive actuators and the like. Respectively, the actuation force may be applied through loaded mechanical spring, either hydraulic or pneumatic. Such loaded intermediates may be powered by any type of suitable electrical motor, or by mechanical energy harvesting.

[0044] We refer now back to Fig. 3A The spike member **12** is configured in the form of an antiskid spike, pin or rod. Said spike member has a distal portion **12a** with a sharp antiskid spike-like distal end and a screw-threaded proximal portion **12b** (Fig. 3A, dashed box). The distal portion **12a** (or a distal end thereof) is the one that provides an improved traction for a walking aid device, and the one that is visible from an outside while the spike member **12** is in projected position. The proximal portion **12b** is a screw-threaded portion, arranged to fit into the sleeve bearing of the gearwheel **13a** by nut-and-bolt principle, wherein an inner surface of said sleeve bearing is turn provided with female type screw-thread. Motor-mediated rotation of the second gearwheel **13b** thus causes the first gearwheel **13a** to rotate simultaneously, and since the inner surface of the first gearwheel **13a** sleeve bearing is screw-threaded it causes the spike member **12** to reciprocate in regards to a whole anti-skid mechanism. Tandem operation of gear wheels **13a** and **13b** therefore promote an advancement of the spike member **12** out of the first gearwheel **13a** sleeve bearing element to such an extent, that the spike member protrudes out of the casing **11** through an aperture arranged at the ground contacting surface thereof. Retraction of the spike member back into the casing, when improved traction with a walking surface is no longer required, is implemented in similar way. As described above, the latch function of the magnetic sensor enables the spike member **12** to remain outside the casing **11** until the magnetic sensor will receive the second signal, produced by a negative magnetic pole, for example. Since magnet or magnets of a suitable size may be arranged within and/or onto the paired walking aid device or user's footwear, magnetic sensor mediated projection and retraction of the spike member **12** may be triggered by simply touching the second crutch or a footwear item provided with a magnet.

[0045] In some embodiments the antiskid arrangement **10** comprises at least one power source **17,** which may be provided as a battery. The battery is preferably a standard battery of size AA or AAA. Other technical implementations of power source **17** are not however excluded, whether smaller batteries of sufficient power may be cost-effectively integrated within the antiskid arrangement **10.** The embodiment illustrated by Figures 2-4 is provided with three conventional batteries as aforesaid. Such combination of conventional power sources may provide enough electric power to drive the spike member out of the casing and back for about 1000 times. In some embodiments the power source(s) are implemented as rechargeable and configured to be recharged from e.g. force applied via a walking aid device while walking. It is to be understood, that the number, size and arrangement of power sources **17** provided by figures within present disclosure are exemplary and realization thereof on the basis of other power providing means is not excluded.

[0046] Fig. 3B is a longitudinal sectional view of the antiskid arrangement **10** connected to the shaft **21** of a walking aid device by means of an adapter element **18;** and Fig. 3C provides a cross-sectional view of said antiskid arrangement **10** via the line A-A' of Fig. 3B. Fig.4 is, in turn, an exemplary illustration of separate elements

comprising the antiskid arrangement **10** (dashed box) and the adapter element **18.**

[0047] In accordance with some embodiments, the antiskid arrangement **10** is configured to be interchangeable with a standard rubber stopper or a ferrule of a conventional walking aid device. Such interchangeability or modularity is achieved by providing the antiskid arrangement **10** with the adapter element **18** having a distal connector **18a** adapted to be fitted onto the casing **11,** and a proximal connector **18b** adapted to be fitted onto a ground pointing end of the shaft **21** of a walking aid device with a conventional rubber stopper detached. Exemplary adapter element **18** with distal- and proximal connectors **18a** and **18b,** respectively, is illustrated on Fig. 4, and the way of placement thereof in between the casing **11** and the shaft **21** of a conventional walking aid device is shown on Figs.1 and 3A-3B.

[0048] Provision of the adapter element **18** enables the user to utilize the antiskid arrangement **10** with walking aid devices of different shaft diameter. The adapter element **18** can thus be implemented with a standard distal connector **18a** to be fitted onto the casing **11,** but with an inner diameter of a proximal connector **18b** ranging 15-30 mm, preferably 16-25 mm. In other words, one antiskid arrangement **10** may be equipped with a set of adapter elements **18,** which is in particular convenient whether user has several walking canes, for example, of varying shaft diameter. Respectively, said adapter elements are provided with the proximal connector **18b** implemented to fit most standard size walking aid devices (16-19-22-25 mm).

[0049] In another aspect of the invention a method for operation of an automated antiskid arrangement **10** for walking aid devices is provided, said method comprises at least several of the following stages, such as:

a. obtaining an automated antiskid arrangement **10;**
b. obtaining an adapter element **18** having a distal connector **18a** and a proximal connector **18b** of an inner diameter suitable for a particular walking aid device being currently in use;
c. fixing the adapter element **18** by the distal connector thereof onto the end portion of the casing **11** of the antiskid arrangement **10,** opposite to the ground pointing end;
d. detaching a conventional rubber stopper from a ground pointing end of the shaft of a walking aid device;
e. connecting an anti-skid arrangement **10** to a ground pointing end of the shaft **21** of a walking aid device by means of the adapter element **18;**
f. wherever required inducing a reciprocating movement of the spike member **12** forward and outside the casing **11** by positioning the antiskid arrangement **10** into a region of a close proximity to an external signal source, such as a magnetic field source, for example, provided with and/or within the paired walking aid device and/or footwear of a user
g. wherever required inducing a reciprocating movement of the spike member **12** backwards inside the casing **11** by positioning the antiskid arrangement **10** into a region of a close proximity to an external signal source, such as a magnetic field source, for example, for a second time.

[0050] The above description of various embodiments of the automated antiskid arrangement is given by way of an example, and not limitation. Automated antiskid arrangement, in accordance with the embodiments disclosed herein, is intended to provide a representative basis for teaching one skilled in art to employ the present invention in various configurations in regards to its aspects.

Claims

1. An automated antiskid arrangement (10) for a conventional walking-aid device, comprising an antiskid mechanism housed within a casing (11), **characterized in that** the antiskid mechanism comprises a mechanical module, an electronic module (16) and a spike member (12) with a distal end configured as an antiskid spike and directing the ground, wherein

   - the electronic module (16) comprises at least one sensing circuit adapted to receive a signal(s) from an external signal source, to detect the presence of and/or interruption in said signal(s) and to acquire an activated state in response to the presence of and/or interruption in said signal(s);
   - the spike member (12) is adapted to perform reciprocating movement by projecting outside the casing (11) by its spike-like distal end and/or by retracting back into the casing through an aperture arranged in a ground contacting surface of the casing;
   - the sensing circuit while being in activated state is adapted to induce reciprocating movement of the spike member in either direction; and
   - the mechanical module is adapted to mediate reciprocating movement of the spike member.

2. The automated antiskid arrangement of claim 1, wherein the mechanical module comprises a gear wheel arrangement (13) and a motor element (15), wherein the gear wheel arrangement is formed by at least a first gear wheel (13a) and a second gear wheel (13b), wherein the first gear wheel (13a) is provided with a sleeve bearing adapted to receive at least a portion of the spike member (12) and the second gear wheel (13b) is connected to the motor element (15) so, that in presence of an external signal source, such as magnetic field, the spike member (12) is motor-actuated to project in a ground direction

and to protrude through an aperture at a ground contacting surface to an outside of the casing (11).

3. An automated antiskid arrangement of claims 1 and 2, further comprising an adapter element (18) provided with a distal connector (18a) adapted to be fitted onto the casing (11) and with a proximal connector (18b) adapted to be fitted onto a ground pointing end of the shaft (21) of a walking aid device with a conventional rubber stopper detached.

4. The automated antiskid arrangement of claim 3, wherein the proximal connector (18b) of the adapter element (18) has an inner diameter in a range of 15-30 mm, preferably in a range of 16-25 mm.

5. The automated antiskid arrangement (10) of any of the preceding claims, wherein the sensing circuit provided within the electronic module (16) is adapted to receive signal(s) from an external magnetic field.

6. The automated antiskid arrangement of claim 5, wherein the sensing circuit is configured as a Hall Effect sensor.

7. The automated antiskid arrangement of any of the preceding claims, wherein the sensing circuit of the electronic module (16) is adapted to acquire an activated state when positioned into a region of a close proximity to an external signal source.

8. The automated antiskid arrangement of any of the preceding claims, said arrangement is provided in the form of a ground contacting capping member and/or a ferrule for a conventional walking aid device to be interchangeable with a standard rubber stopper and/or a ferrule of a conventional walking aid device.

9. The automated antiskid arrangement of any of the preceding claims, said arrangement comprises at least one power source (17).

10. The automated antiskid arrangement of claim 9, wherein the power source (17) is preferably a battery of a standard size AA or AAA.

11. Method of operation an automated antiskid arrangement (10) for conventional walking-aid devices, said method comprises at least several of the following stages, such as:

a. obtaining an automated antiskid arrangement (10);
b. obtaining an adapter element (18) having a distal connector (18a) and a proximal connector (18b) of an inner diameter suitable for a particular walking aid device being currently in use;
c. fixing the adapter element (18) by the distal connector thereof onto the end portion of the casing (11) of the antiskid arrangement (10), opposite to the ground pointing end;
d. detaching a conventional rubber stopper from a ground pointing end of the shaft of a walking aid device;
e. connecting an anti-skid arrangement (10) to a ground pointing end of the shaft (21) of a walking aid device by means of the adapter element (18);
f. wherever required inducing a reciprocating movement of the spike member (12) forward and outside the casing (11) by positioning the antiskid arrangement (10) into a region of a close proximity to an external signal source, such as a magnetic field source, for example, provided with and/or within the paired walking aid device and/or footwear of a user
g. wherever required inducing a reciprocating movement of the spike member (12) backwards inside the casing (11) by positioning the antiskid arrangement (10) into a region of a close proximity to an external signal source, such as a magnetic field source, for example, for a second time.

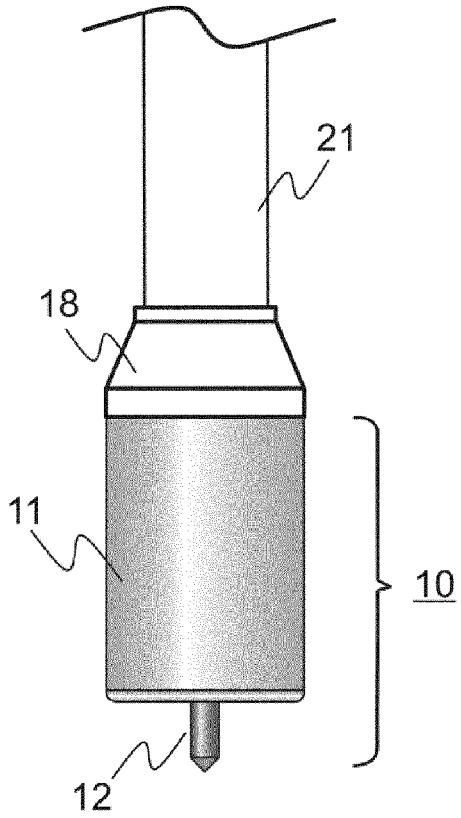

Figure 1A

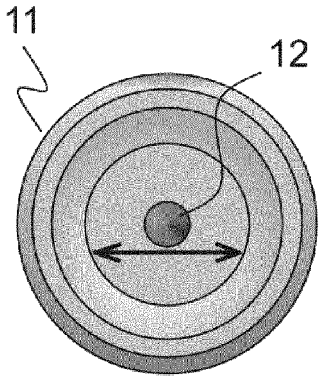

Figure 1B

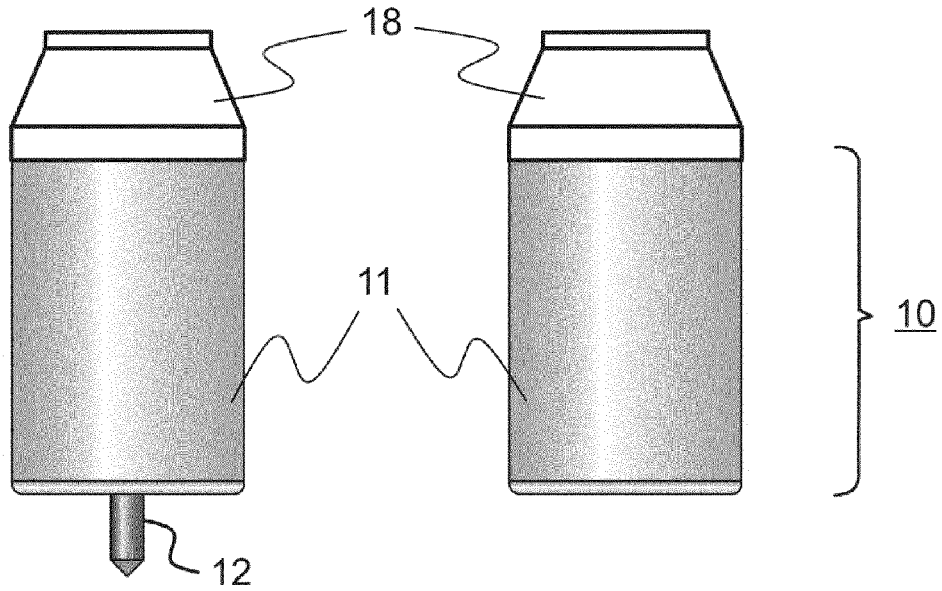

Figure 1C

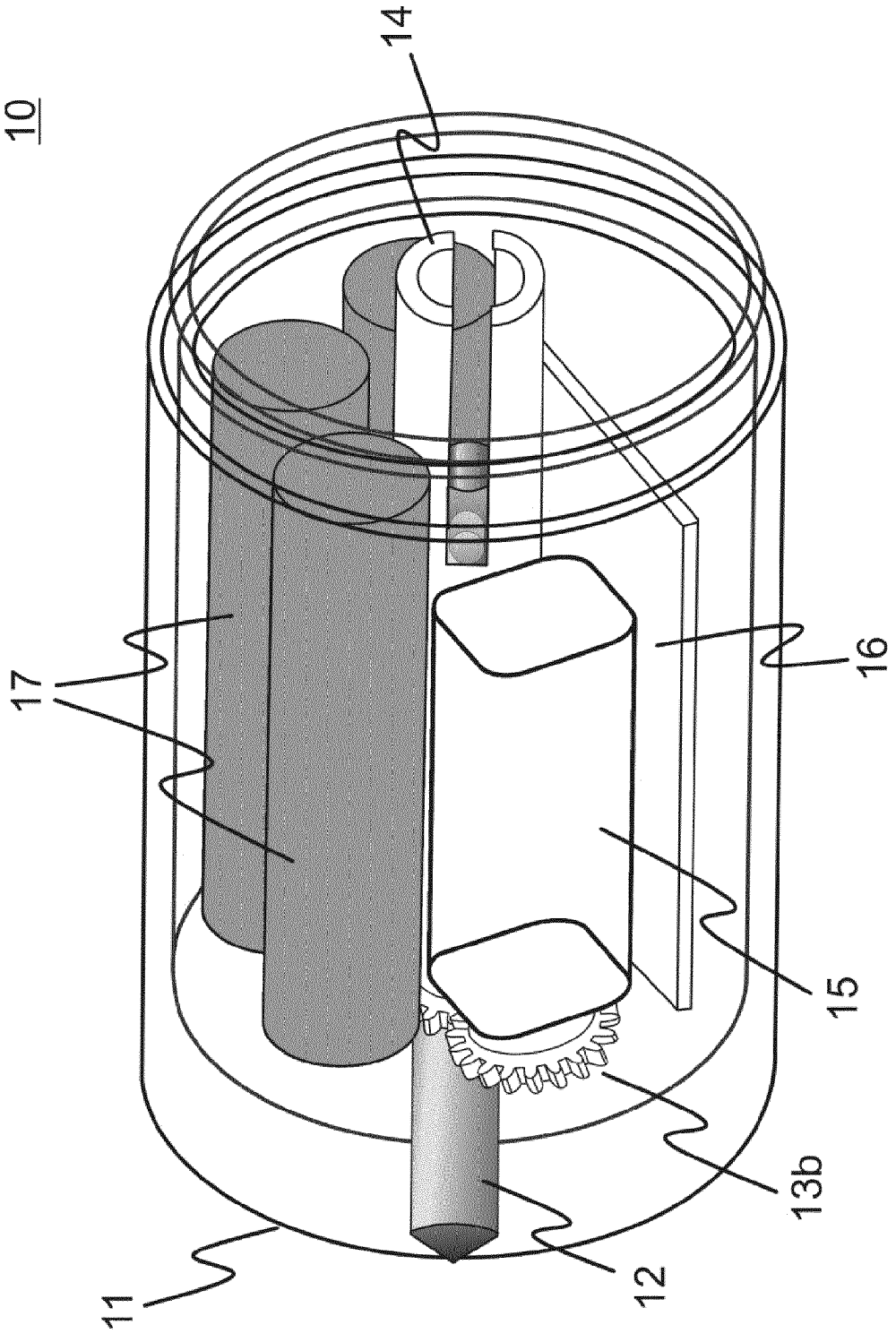

Figure 2

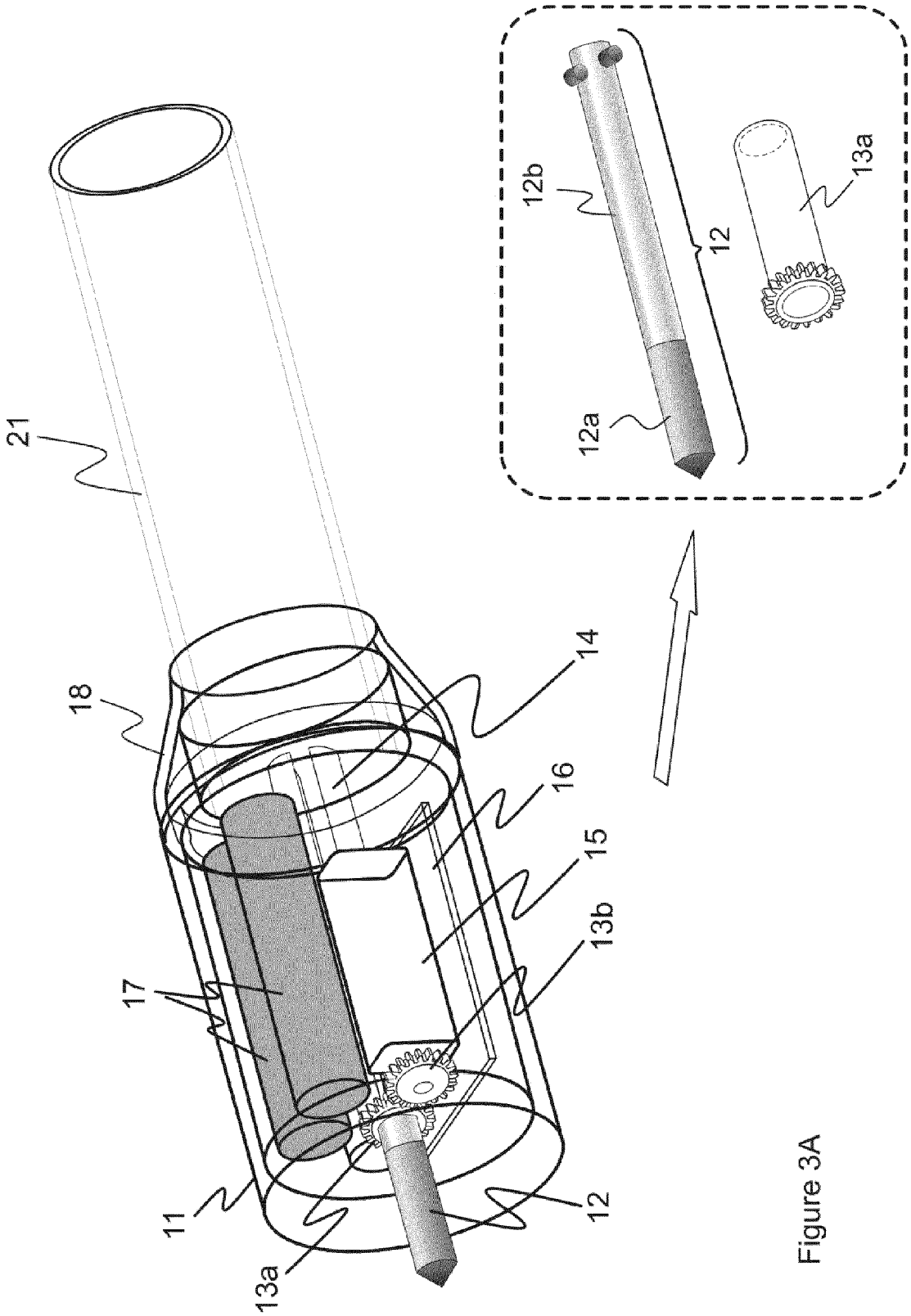

Figure 3A

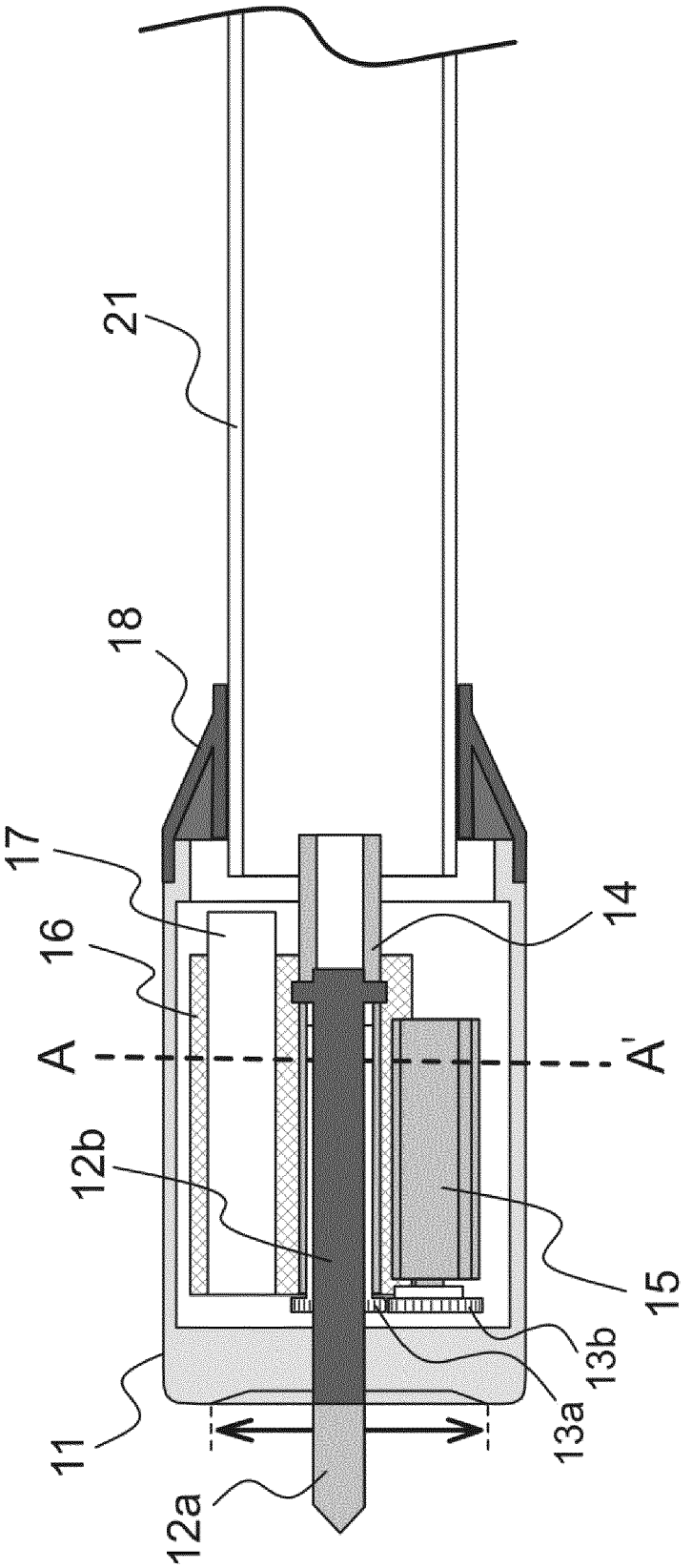

Figure 3B

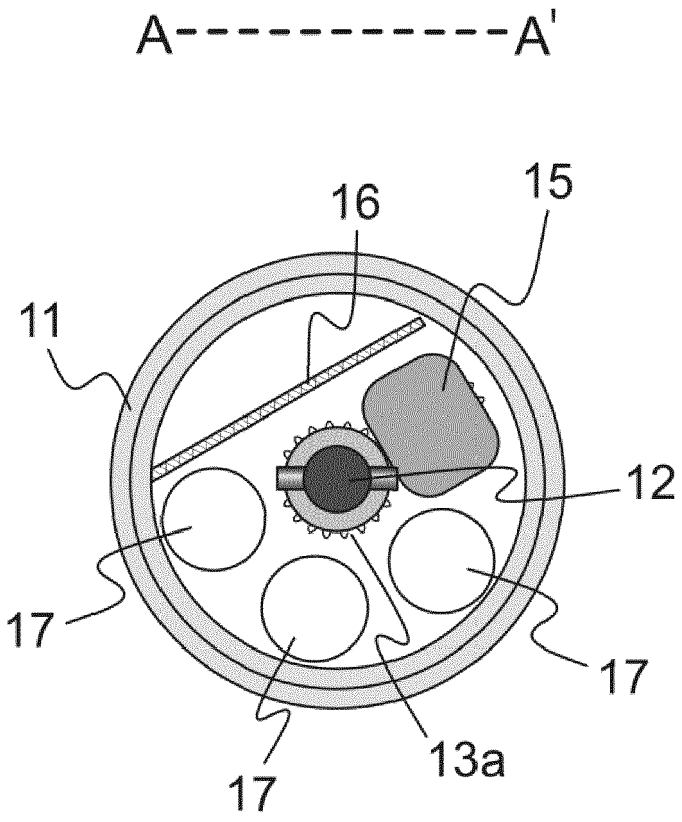

Figure 3C

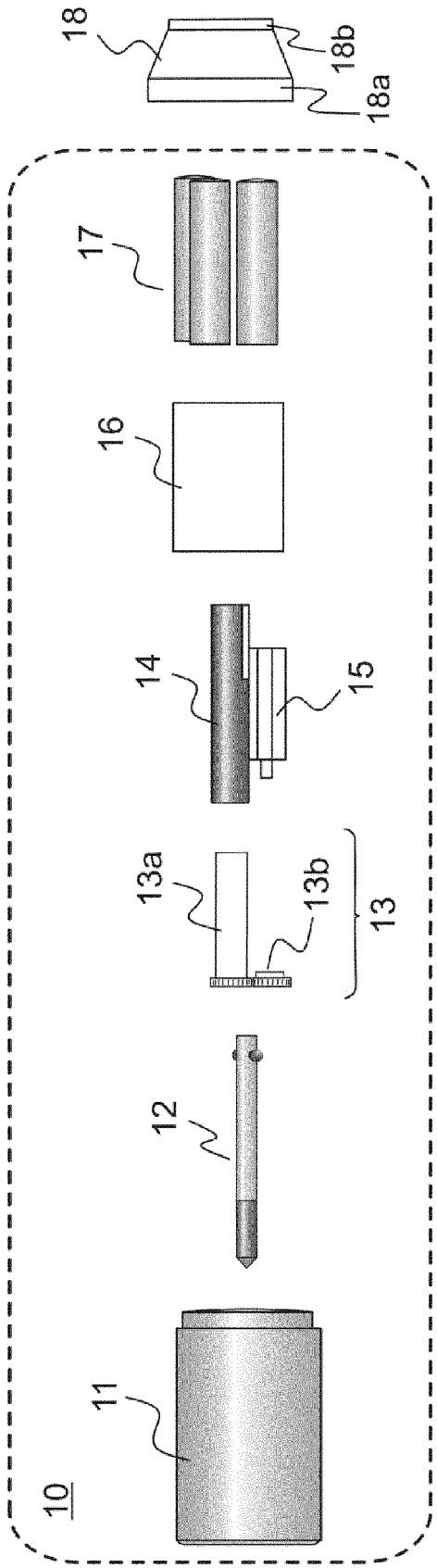

Figure 4

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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 1387

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

A45B
A61H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 June 2013	Van Bastelaere, Tiny

CATEGORY OF CITED DOCUMENTS

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18-06-2013

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REFERENCES CITED IN THE DESCRIPTION

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