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(72) Inventeurs/Inventors:
SMITH, RUSS, CA;
MORNEAU, ANDREW, CA;
DINSMORE, KEVIN, CA

(73) Propriétaire/Owner:
HONDA MOTOR CO., LTD., JP

(74) Agent: GASTLE AND ASSOCIATES

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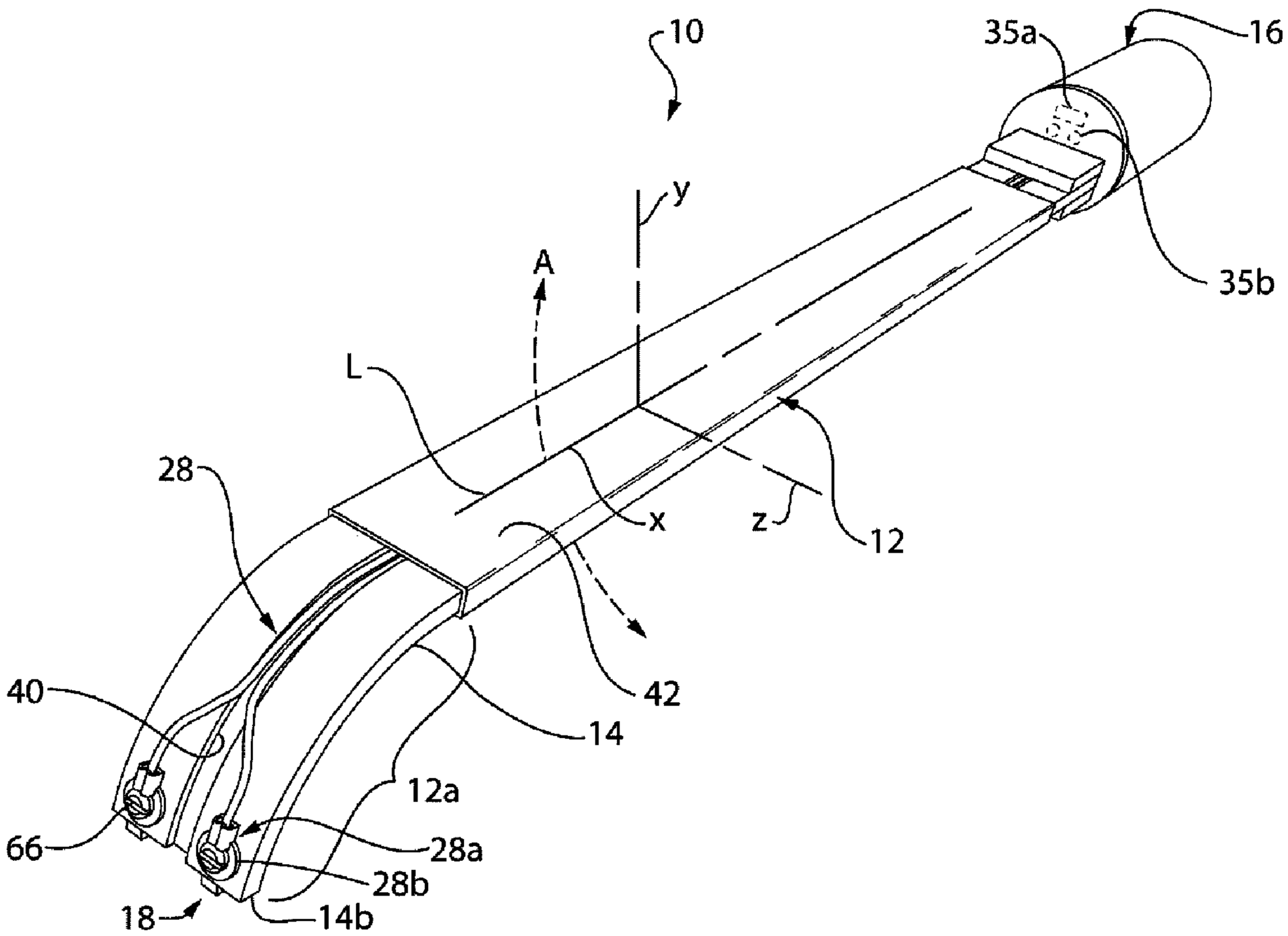

(57) Abrégé/Abstract:
Disclosed herein is a device for detecting fluids comprising a non-conductive wand portion having an elongate arm with a first longitudinal axis and dimensioned to permit flex along an arc normal to the first longitudinal axis. The arm has a first end and a

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(57) Abrégé(suite)/Abstract(continued):
second end and a handle portion located near the first end. A pair of spaced electrode portions is located near the second end and a ground detection unit is associated with the handle portion and in communication with the spaced electrode portions. The ground detection unit is operable to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto. A method for detecting fluids using the device is also provided herein.

ABSTRACT

Disclosed herein is a device for detecting fluids comprising a non-conductive wand portion having an elongate arm with a first longitudinal axis and dimensioned to permit flex along an arc normal to the first longitudinal axis. The arm has a first end and a second end and a handle portion located near the first end. A pair of spaced electrode portions is located near the second end and a ground detection unit is associated with the handle portion and in communication with the spaced electrode portions. The ground detection unit is operable to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto. A method for detecting fluids using the device is also provided herein.

FLUID DETECTION

FIELD OF THE INVENTION

The present invention relates to fluid detection and more particularly, but not necessarily exclusively, to the detection of fluids such as water in vehicle cavities.

DESCRIPTION OF THE RELATED ART

In the manufacture and/or assembly of chassis and other articles, such as automotive vehicles, it is not uncommon to find unwanted accumulations of moisture, water or cleaning solvents. These can accumulate and cause further damage. It is important, then, that these accumulations be found, perhaps for removal and/or for later remedial action.

It would be desirable to provide a novel approach to this task.

SUMMARY OF THE INVENTION

One embodiment provides a device for detecting fluids comprising an elongate wand portion having a first end and a second end, a handle portion located near the first end, a pair of spaced electrode portions located near the second end, a ground detection unit associated with the handle portion and in communication with the spaced electrode portions, the ground detection unit being operable to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto.

In an alternative embodiment, the wand portion is resiliently flexible and includes an outer surface, a pair of wires located adjacent the outer surface, each of the wires joining the ground detection unit with a corresponding electrode portion.

In an alternative embodiment, the wand portion further includes a central recess, the wires being located within the recess.

In an alternative embodiment, the wand portion further includes an outer covering to cover the outer surface.

In an alternative embodiment, the handle portion includes an inner chamber, the ground detection unit being located in the inner chamber.

In an alternative embodiment, the handle portion includes a body with an outer engagement surface, a cover portion having an inner engagement surface for engaging the outer engagement surface.

In an alternative embodiment, the outer and inner engagement surfaces are threaded.

In an alternative embodiment, the handle portion further includes a passage to receive the first end.

In an alternative embodiment, the body includes a pair of opposed support flanges extending outwardly from the body for supporting the wand portion near the first end.

In an alternative embodiment, the body includes a support member extending into the inner chamber, the support member including a first portion and a second portion. The ground detection unit includes a battery positioned adjacent the first portion and the ground detection unit includes a circuit portion positioned adjacent the second portion.

In an alternative embodiment, the wand portion has a first longitudinal axis with a rectangular lateral cross section dimensioned to permit the wand portion to flex along an arc normal to the longitudinal axis and a curved outer region adjacent the second end.

In an alternative embodiment, the electrode portions are secured by threaded fasteners to a region immediately adjacent the second end.

Another alternative embodiment provides a method for detecting fluids at a location in a vehicle chassis, comprising providing a wand portion with at least one elongate arm, providing a handle portion located near a first end of the wand portion and a pair of spaced electrode portions near a second end of the wand portion, associating a ground detection unit with the handle portion, establishing communication between the spaced electrode portions and the ground detection unit in order to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto.

In still another alternative embodiment, the wand portion is flexible, and further comprising orienting the wand portion to extend into the location in the vehicle chassis

In an alternative embodiment, the location is a cavity in a trunk section of the vehicle and the orienting includes locating the second end of the wand portion between an inner wall surface and an inner liner portion.

Still another alternative embodiment provides a device for detecting fluids comprising a wand portion having an elongate resiliently flexible arm, the arm having a first end and a second end, a handle portion located near the first end, a pair of spaced electrode portions located near the second end, the handle portion including an inner chamber, a ground detection unit located in the inner chamber and in communication with the spaced electrodes, the ground detection unit operable to detect the presence of an electrical connection between the electrodes and to emit a signal corresponding thereto.

Still another alternative embodiment provides a device for detecting fluids comprising a wand portion means having an elongate arm, the arm having a first end and a second end, a handle portion located near the first end, a pair of spaced electrode portions located near the second end, a ground detection means associated with the handle portion and in communication with the spaced electrode portions, the ground

detection means being operable to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto.

A still further alternative embodiment provides a method for detecting fluids at a location in a vehicle chassis, comprising providing a wand portion with an elongate resiliently flexible arm, providing a handle portion located near a first end of the wand portion and a pair of spaced electrodes near a second end of the wand portion, providing an inner chamber within the handle portion, providing a ground detection unit within the inner chamber, establishing communication between the spaced electrodes and the ground detection unit in order to detect the presence of an electrical connection between the electrodes and to emit a signal corresponding thereto.

Still a further alternative embodiment provides a method for detecting fluids at a location in a vehicle chassis, comprising a step for providing a wand portion with an elongate resiliently flexible arm, a step for providing a handle portion located near a first end of the wand portion and a pair of spaced electrodes near a second end of the wand portion, a step for providing an inner chamber within the handle portion, a step for providing a ground detection unit within the inner chamber, a step for establishing communication between the spaced electrodes and the ground detection unit in order to detect the presence of an electrical connection between the electrodes and to emit a signal corresponding thereto.

Still another embodiment, provides a probe for detecting fluids, comprising a handle portion, the handle portion terminating at an elongate wand portion; the wand portion having a proximal end adjacent the handle portion and a remote end, the wand portion being operable to be extended through an entry location in a confined space for the distal end to reach a target location relatively deeply within the confined space, a pair of spaced electrode portions located at, and exposed externally of, the distal end, a ground detection unit associated with the handle portion and a communication path extending from the ground detection and between the proximal distal ends to the spaced electrode portions, the ground detection unit being operable to detect the presence of an electrically conductive fluid in contact with the spaced electrode portions sufficient to establish an electrical connection therebetween and to emit a signal corresponding thereto.

In an alternative embodiment, the handle portion has an inner passage to receive the proximal end.

In an alternative embodiment, the wand portion includes a span of resiliently flexible material.

In an alternative embodiment, the span has a longitudinal axis extending in an "x" direction, the span being resiliently flexible in order to flex in a "y" direction, the span being relatively stiff in a "z" direction.

In an alternative embodiment, the span is in the form of a relatively thick band of resilient material.

In an alternative embodiment, the span is resiliently flexible in a first direction normal to the longitudinal axis and relatively stiff in a second direction normal to the longitudinal axis.

In an alternative embodiment, the detection unit includes a power source and a signal unit, the power source and signal unit being contained within the handle portion.

In some exemplary embodiments there is provided a device for detecting fluids comprising a non-conductive elongate wand portion having a first end and a second end. The elongate wand portion has a first longitudinal axis and is dimensioned to permit flex along an arc normal to the first longitudinal axis and a handle portion located near the first end. A pair of spaced electrode portions is located near the second end and a ground detection unit associated with the handle portion is in communication with the spaced electrode portions. The ground detection unit is operable to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto.

In another exemplary embodiment, a method for detecting fluids at a location in a vehicle chassis is provided. The method comprises providing a wand portion with at least one non-conductive elongate arm, the elongate arm having a first longitudinal axis and is dimensioned to permit flex along an arc normal to the first longitudinal axis, providing a handle portion located near a first end of the wand portion and a pair

of spaced electrode portions near a second end of the wand portion, associating a ground detection unit with
the handle portion, establishing communication between the spaced electrode portions and the ground detection unit in order to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto.

In yet another exemplary embodiment, a device for detecting fluids comprising a non-conductive wand portion having an elongate resiliently flexible arm dimensioned to permit flex along an arc normal to a first longitudinal axis is provided. The arm has a first end and a second end, and a handle portion located near the first end. A pair of spaced electrode portions is located near the second end. The handle portion includes an inner chamber and a ground detection unit located in the inner chamber which is in communication with the spaced electrodes. The ground detection unit is operable to detect the presence of an electrical connection between the electrodes and to emit a signal corresponding thereto.

In still another exemplary embodiment, there is provided a device for detecting fluids comprising a non-conductive wand portion means having an elongate arm dimensioned to permit flex along an arc normal to a first longitudinal axis. The arm has a first end and a second end. A handle portion is located near the first end and a pair of spaced electrode portions is located near the second end. A ground detection means associated with the handle portion and in communication with the spaced electrode portions is provided where the ground detection means is operable to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto.

In yet another exemplary embodiment, a method for detecting fluids at a location in a vehicle chassis is provided. The method comprises providing a non-conductive wand portion with an elongate resiliently flexible arm dimensioned to permit flex along an arc normal to a first longitudinal axis, providing a handle portion located near a first end of the wand portion and a pair of spaced electrodes near a second end of the wand portion, providing an inner chamber within the handle portion, providing a ground detection unit within the inner chamber, establishing communication between the spaced electrodes and the ground

detection unit in order to detect the presence of an electrical connection between the electrodes and to emit a signal corresponding thereto.

In another exemplary embodiment, a probe for detecting fluids comprising a handle portion wherein the handle portion terminates at a non-conductive elongate wand portion is provided. The elongate wand portion has a first longitudinal axis and is dimensioned to resiliently permit flex along a span capable of forming an arc normal to the longitudinal axis. The wand portion has a proximal end adjacent the handle portion and a remote end. The wand portion is operable to be extended through an entry location in a confined space for the distal end to reach a target location relatively deeply within the confined space. A pair of spaced electrode portions is located at, and exposed externally of, the distal end and a ground detection unit is associated with the handle portion. A communication path extends from the ground detection and between the proximal distal ends to the spaced electrode portions. The ground detection unit is operable to detect the presence of an electrically conductive fluid in contact with the spaced electrode portions sufficient to establish an electrical connection therebetween and to emit a signal corresponding thereto.

BRIEF DESCRIPTION OF THE DRAWINGS

Several preferred embodiments of the present invention will be provided, by way of examples only, with reference to the appended drawings, wherein:

Figure 1 is a perspective view of a device for detecting fluids;

Figure 1a is a schematic view of a portion of the device of figure 1;

Figure 2 is a fragmentary part-assembly perspective view of the device of figure 1;

Figure 3 is a perspective view of the device of figure 1 in one operative condition to detect fluids in a vehicle chassis;

Figure 4 is a plan view according to figure 3; and

Figures 5 and 6 are sectional plan and perspective views of the device of figure 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

It should be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of "including," "comprising," or "having" and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. Unless limited otherwise, the terms "connected," "coupled," and "mounted," and variations thereof herein are used broadly and encompass direct and indirect connections, couplings, and mountings. In addition, the terms "connected" and "coupled" and variations thereof are not restricted to physical or mechanical connections or couplings. Furthermore, and as described in subsequent paragraphs, the specific mechanical configurations illustrated in the drawings are intended to exemplify embodiments of the invention. However, other alternative mechanical configurations are possible which are considered to be within the teachings of the instant disclosure. Furthermore, unless otherwise indicated, the term "or" is to be considered inclusive.

Referring to the figures, there is provided a device 10 for detecting fluids, having a wand portion 12 which includes an elongate resiliently flexible arm shown at 14. The arm 14 has a first end 14a (figure 2) and a second end 14b. A handle portion 16 is located near the first end 14a while a pair of spaced electrode portions 18 is located near the second end 14b.

Referring to figure 2, the handle portion 16 includes an inner chamber 24. A ground detection unit 26 is located in the inner chamber 24 and is in communication with the spaced electrode portions 18 by way of a

pair of wires 28. The ground detection unit 26 includes a power source in the form of a battery 32, a ground detection circuit 34 and a signal unit 36. The ground detection unit 26 is, in this example, operable to detect the presence of an electrical connection between the electrode portions 18 and to emit a signal corresponding thereto. The signal is represented schematically at S in figure 4. As can be seen in figure 1a, the battery terminals of the battery 32 are placed in series with the signal unit 36 (such as a buzzer available under the trade name PIEZZO), and with the electrode portions 18. Thus, the signal unit 36 is activated when electrical contact is made between the electrode portions, for example in the presence of water, to close the ground detection circuit. If desired, other arrangements may be provided such as an activation switch shown in dashed lines at 35a in figure 1 as well as one or more status indicators, such as one or more light emitting diodes (LED's) shown in dashed lines at 35b, to include the operating condition of the detection unit 26.

In addition, the ground detection circuit 34 may include and/or be replaced by a programmed logic controller or some other form of controller. The ground detection unit 26 may, in another example, be capable of working in association with or be controlled by a software program configured to run on a general purpose computer, such as personal computer, or on a more substantial computer mainframe, which is operable to work within a network. In this case, the ground detection circuit 34 may communicate with a neighbouring computer 37 via a wired or wireless communication path 38. The network may thus involve several general purpose computers, for example those sold under the trade names APPLE ™ or IBM ™, or clones thereof, which are programmed with operating systems known by the trade names WINDOWS ™, LINUX or other well known or lesser known equivalents of these. The system may involve pre-programmed software using a number of possible languages or a custom designed version of a programming software sold under the trade name ACCESS ™ or similar programming software. The computer network may be a wired local area network, or a wide area network such as the Internet, or a combination of the two, with or without added security, authentication protocols, or under "peer-to-peer" or "client-server" or other networking architectures. The network may also be a wireless network or a combination of wired and wireless networks. The wireless network may operate under frequencies such as

those referred to as radio frequency or "RF" and/or using protocols such as the 802.11, TCP/IP, BLUE TOOTH and the like, or other well known Internet, wireless, satellite or cell packet protocols.

Referring to figure 1, the wand portion 12 has a central recess 40 (figure 1) to receive and contain the wires 28 and has an outer covering 42 to cover the recess.

Referring to figure 2, the handle portion 16 includes a body 48 with an outer engagement surface 48a and a cover portion 50 having an inner engagement surface 50a for engaging the outer engagement surface 48a. In this case, the outer and inner engagement surfaces 48a, 50a are threaded. However, the engagement surfaces 48a, 50a may be coupled using a relatively snug, though non-threaded, fitting between them, or by the use of other arrangements, such by one or more mechanical clips or adhesives.

The handle portion 16 further includes a passage 54 (figure 6) to receive the first end 14a. The body 48 includes a pair of upper and lower opposed support flanges 56a, 56b extending outwardly from the body 48 for supporting the wand portion 12 near the first end 14a.

Referring to figure 2, a support member 60 extends into the inner chamber 24 and includes a first portion 60a and a second portion 60b. The battery 32 is, in this example, positioned adjacent the first portion 60a, and the ground detection circuit 34 is positioned adjacent the second portion 60b. A pair of threaded fasteners 58 (figure 6) secure the first end 14a to the first portion 60a.

Referring to figure 1, the wand portion has a first longitudinal axis L with a rectangular lateral cross section which is dimensioned to permit the wand portion 12 to flex along an arc A normal to the longitudinal axis. The wand portion 12 has an outer region 12a adjacent the second end 14b. The outer region 12a, in this example, is radially curved, though other arrangements may also be utilized as required. For instance, the wand portion 12 may simply be linear but sufficiently flexible that it can, in use, follow the profile of an inner passage being probed. The wand portion 12 may be of other cross sectional shapes as required and may be made up of more than one piece, in some cases.

Referring to figure 2, each of the electrode portions 18 includes a conductive flange 64 extending beyond the outer periphery of the second end 14b. The conductive flange has a flange head portion 64a. In turn, each wire 28 is provided with an electrical coupling 28a (figure 1) at its remote end with a coupling head portion 28b, which is held in contact with the head portion 64a by a threaded fastener 66 anchored through a passage in a region immediately adjacent the second end.

The device 10 may be considered, in this case, as a probe for detecting fluids, in which the handle portion may be configured to be of a size to fit in the hand of an Inspection Associate. In this case, the handle portion terminates at the elongate wand portion and adjacent a proximal end. The wand thus has a span which extends to a remote end and may be particularly suited to applications where it is extended through an entry location in one or more confined spaces (such as can be found in structures such as vehicle chassis) for the distal end to reach a target location relatively deeply within the confined space. The pair of spaced electrode portions are located at and exposed externally at the distal end. The ground detection unit is associated with the handle portion in order that the span may have a configuration conducive to probing the depths of the confined spaces. A communication path extends from the ground detection unit and extends between the proximal end and the distal end to the spaced electrode portions. Thus, the ground detection unit is operable to detect the presence of an electrically conductive fluid (such as, for example, the cleaning, lubrication or other fluids or other electrically conductive materials normally used in the manufacture of articles such as vehicle chassis) into contact with the spaced electrode portions sufficient to establish an electrical connection therebetween and to emit a signal corresponding thereto.

It can be seen, then, that the handle portion has an inner passage to receive the proximal end. Desirably, the wand portion includes a span of resiliently flexible material with a longitudinal axis extending in an "x" direction. More particularly, in this example, the span is in the form of a relatively thick band of resilient material that is resiliently flexible in order to flex in a "y" direction, the span being relatively stiff in a "z" direction. In other words, the span is resiliently flexible in a first direction normal to the longitudinal axis and relatively stiff in a second direction normal to the longitudinal axis. The handle portion and the span

may be considered to have a sword- or scepter-like configuration with a bent or curved end, in this particular example.

The device 10 may be used in the following manner. First, a vehicle chassis is identified for inspection and at least one target location is determined in the vehicle chassis as a potential source of fluids, such as water, for example during the manufacture/assembly of the vehicle chassis. The location may, for instance, be located between an inner trunk liner and a wall of the vehicle chassis (as shown in figures 3 and 4) among other possible locations. An Inspection Associate grasps the device and may then use a sweeping motion or some other movement for passing the electrode portions 18 along one or more paths including the target location(s) as can be seen in figure 4, between positions A and B, with the lower position B showing a source of fluid at F. In this case, fluid F may be of sufficient quantity to make electrical contact simultaneously with both electrode portions 18, causing the detection circuit to close, thus powering the signal unit 36. In an alternative arrangement, the user may activate the detection circuit by way of the activation switch 35a and, then, if applicable, may determine the operating condition of the detection circuit before continuing, by way of the LED's 35b.

In this case, the Inspection Associate may then record the water detection event manually on a written or electronic register. Alternatively, one or more details of the event may be transferred, copied, uploaded or otherwise conveyed to a central controller.

Thus, in one example, the device 10 provides a tool that may be used to check for water leaks under the trunk liner in vehicles, during manufacture or assembly. In this case, then, the device 10 has a wand portion made of material known by the trade name LEXAN with a bend to enhance its use under the trunk liners and into the trunk gutter. This material is suitable because of its flexibility and its memory for its original shape, though other flexible or resiliently flexible materials may be used, as desired. In other examples, the device may be useful with an arm that is substantially inflexible, provided that it may be shaped to extend to a target sensing location. In this case, the wand portion may be modified to have a shape that allows it to accommodate the shape of an access path to the target location. For instance, the

wand portion 12 conveniently follows the trunk shape and may reach the lowest point in the trunk gutter to detect water.

The ground detection unit 26 includes, in one example, a buzzer under the trade name PIEZZO and may be provided with varying degrees of sensitivity so that, in one example, it does not operate without water actually being detected. For instance, the location of the conductive flange may be adjusted relative to the second end 14b to dictate the sensitivity of the device. Alternatively, a fluid-permeable coating or other finish treatment on the electrodes may be available to prevent incidental contact with otherwise dry or substantially fluid-free conductive surfaces.

The wand portion 12 may be provided in a manner which does not include a central recess to receive and contain the wires. Rather, the wires may be otherwise retained along the length of the wand portion, for example by the use of the outer covering and/or by the use of tapes, adhesives or by some other chemical or mechanical fastening arrangement against an outer surface of the wand portion, for instance. In addition, the wires themselves may be replaced by some other form of electrical conduit between the ground detection unit and the electrode portions. For instance, the conduit may be provided by one or more layers of material either applied to the wand portion or contained within the wand portion. The wand portion may be provided in other forms, such as by the use of one or more rod members. The ground detection unit may also be associated with the handle portion 16 without necessarily being located within the inner chamber, provided that the ground detection circuit not unduly obstructing the use of the device. For instance, the ground detection circuit may be located in a separate chamber within a housing that is externally attached to the handle portion. Other power sources may be used as desired, including a power cable to an external power source, a solar cell and the like.

While the present invention has been described for what are presently considered the preferred embodiments, the invention is not so limited. To the contrary, the invention is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

CLAIMS

1. A device for detecting fluids comprising a non-conductive elongate wand portion having a first end and a second end, the elongate wand portion having a first longitudinal axis and being dimensioned to permit flex along an arc normal to the first longitudinal axis, a handle portion located near the first end, a pair of spaced electrode portions located near the second end, a ground detection unit associated with the handle portion and in communication with the spaced electrode portions, the ground detection unit being operable to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto.

2. A device as defined in claim 1, the wand portion being resiliently flexible and including an outer surface, a pair of wires located adjacent the outer surface, each of the wires joining the ground detection unit with a corresponding electrode portion.

3. A device as defined in claim 2, the wand portion further including a central recess, the wires being located within the recess.

4. A device as defined in claim 2, the wand portion further including an outer covering to cover the outer surface.

5. A device as defined in claim 1, the handle portion including an inner chamber, the ground detection unit being located in the inner chamber.

6. A device as defined in claim 5, the handle portion including a body with an outer engagement surface, a cover portion having an inner engagement surface for engaging the outer engagement surface.

7. A device as defined in claim 6, the outer and inner engagement surfaces being threaded.

8. A device as defined in claim 7, the handle portion further including a passage to receive the first end.

9. A device as defined in claim 8, the body including a pair of opposed support flanges extending outwardly from the body for supporting the wand portion near the first end.

10. A device as defined in claim 9, the body including a support member extending into the inner chamber, the support member including a first portion and a second portion, the ground detection unit including a battery positioned adjacent the first portion, the ground detection unit including a circuit portion positioned adjacent the second portion.

11. A device as defined in claim 1, wherein the wand portion has a rectangular lateral cross section along the first longitudinal axis and a curved outer region adjacent the second end.

12. A device as defined in claim 11, the electrode portions being secured by threaded fasteners to a region immediately adjacent the second end.

13. A method for detecting fluids at a location, comprising providing the wand of claim 1; identifying at least one target location as a potential source of fluid; passing the electrode portions along one or more paths including the target location in order to bring the electrode portions into contact with the fluid.

14. A method as defined in claim 13, wherein the target location is in a vehicle chassis.

15. A method as defined in claim 14, wherein the target location is between an inner trunk liner and a wall of the vehicle chassis.

16. A method as defined in claim 13, further comprising recording a fluid detection event..

17. A method as defined in claim 13, further comprising orienting the wand portion to extend into the location in the vehicle chassis.

18. A method as defined in claim 17, the location being a cavity in a trunk section of the vehicle, the orienting including locating the second end of the wand portion between an inner wall surface and an inner liner portion.

19. A device for detecting fluids comprising a non-conductive wand portion having an elongate resiliently flexible arm dimensioned to permit flex along an arc normal to a first longitudinal axis, the arm having a first end and a second end, a handle portion located near the first end, a pair of spaced electrode portions located near the second end, the handle portion including an inner chamber, a ground detection unit located in the inner chamber and in communication with the spaced electrodes, the ground detection unit operable to detect the presence of an electrical connection between the electrodes and to emit a signal corresponding thereto.

20. A device for detecting fluids comprising a non-conductive wand portion means having an elongate arm dimensioned to permit flex along an arc normal to a first longitudinal axis, the arm having a first end and a second end, a handle portion located near the first end, a pair of spaced electrode portions located near the second end, a ground detection means associated with the handle portion and in communication with the spaced electrode portions, the ground detection means being operable to detect the presence of an electrical connection between the electrode portions and to emit a signal corresponding thereto.

21. A method for detecting fluids at a location in a vehicle chassis, comprising providing a non-conductive wand portion with an elongate resiliently flexible arm dimensioned to permit flex along an arc normal to a first longitudinal axis, providing a handle portion located near a first end of the wand portion and a pair of spaced electrodes near a second end of the wand portion, providing an

inner chamber within the handle portion, providing a ground detection unit within the inner chamber, establishing communication between the spaced electrodes and the ground detection unit in order to detect the presence of an electrical connection between the electrodes and to emit a signal corresponding thereto.

22. A probe for detecting fluids, comprising a handle portion, the handle portion terminating at a non-conductive elongate wand portion, the elongate wand portion having a first longitudinal axis and being dimensioned to resiliently permit flex along a span capable of forming an arc normal to the longitudinal axis, the wand portion having a proximal end adjacent the handle portion and a remote end, the wand portion being operable to be extended through an entry location in a confined space for the distal end to reach a target location relatively deeply within the confined space, a pair of spaced electrode portions located at, and exposed externally of, the distal end, a ground detection unit associated with the handle portion and a communication path extending from the ground detection and between the proximal distal ends to the spaced electrode portions, the ground detection unit being operable to detect the presence of an electrically conductive fluid in contact with the spaced electrode portions sufficient to establish an electrical connection therebetween and to emit a signal corresponding thereto.

23. A probe as defined in claim 22, the handle portion having an inner passage to receive the proximal end.

24. A probe as defined in claim 23, the span having a longitudinal axis extending in an "x" direction, the span being resiliently flexible in order to flex in a "y" direction, the span being relatively stiff in a "z" direction.

25. A probe as defined in claim 22, the span being in the form of a relatively thick band of resilient material.

26. A probe as defined in claim 24, the span being resiliently flexible in a first direction normal to the longitudinal axis and relatively stiff in a second direction normal to the longitudinal axis.

27. A probe as defined in claim 22, the detection unit including a power source and a signal unit, the power source and signal unit being contained within the handle portion.

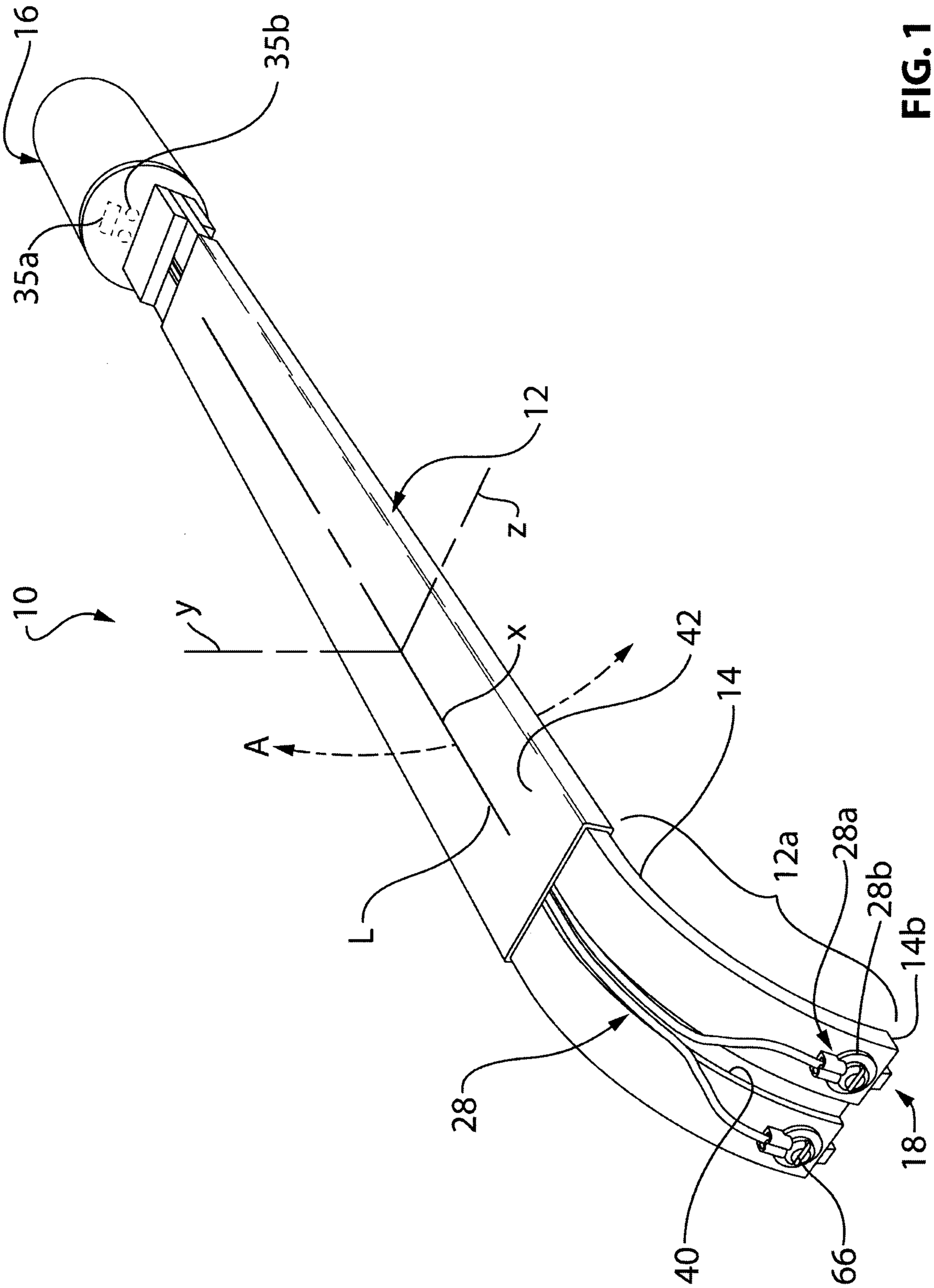


FIG. 1

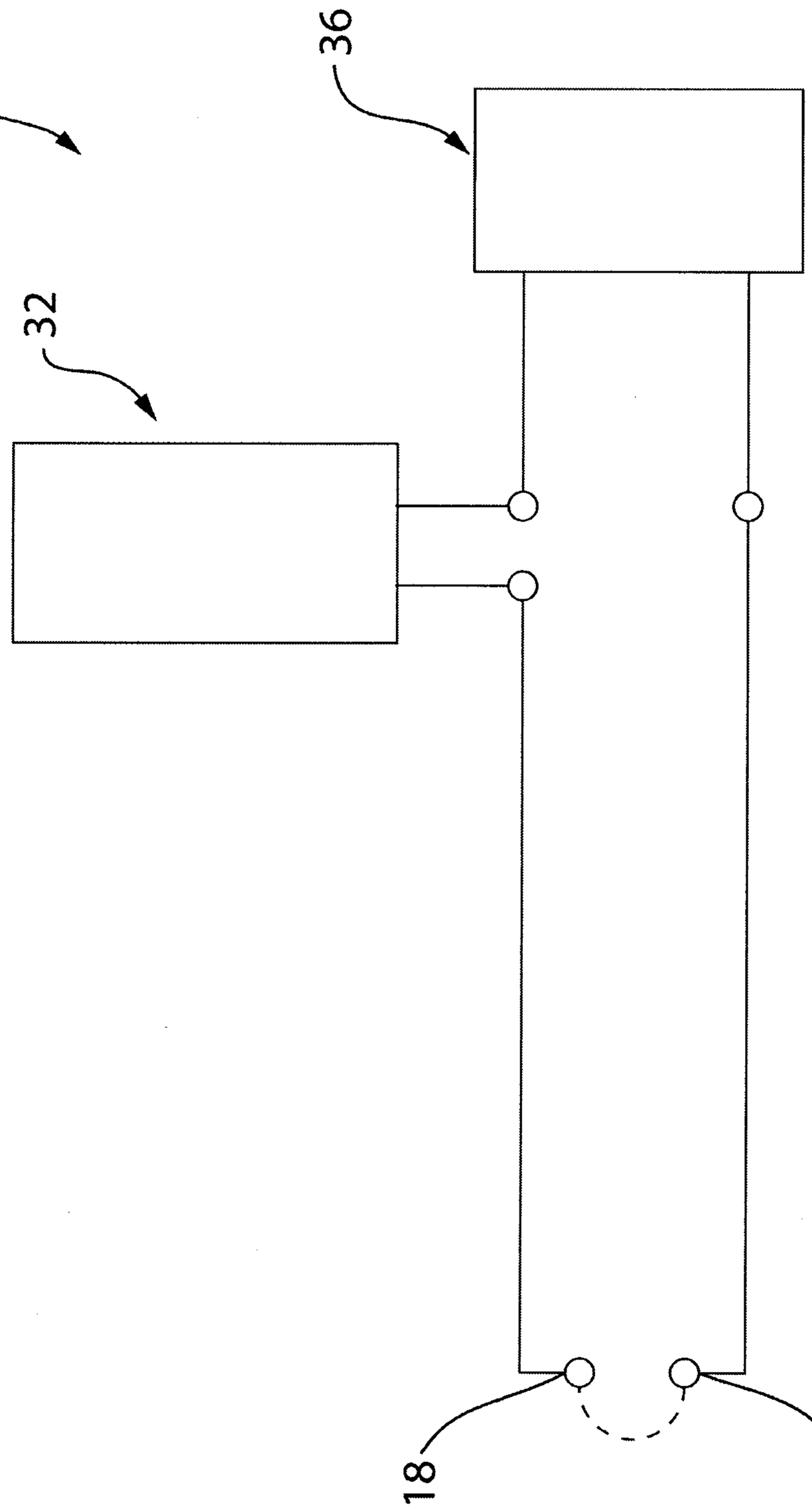


FIG. 1a

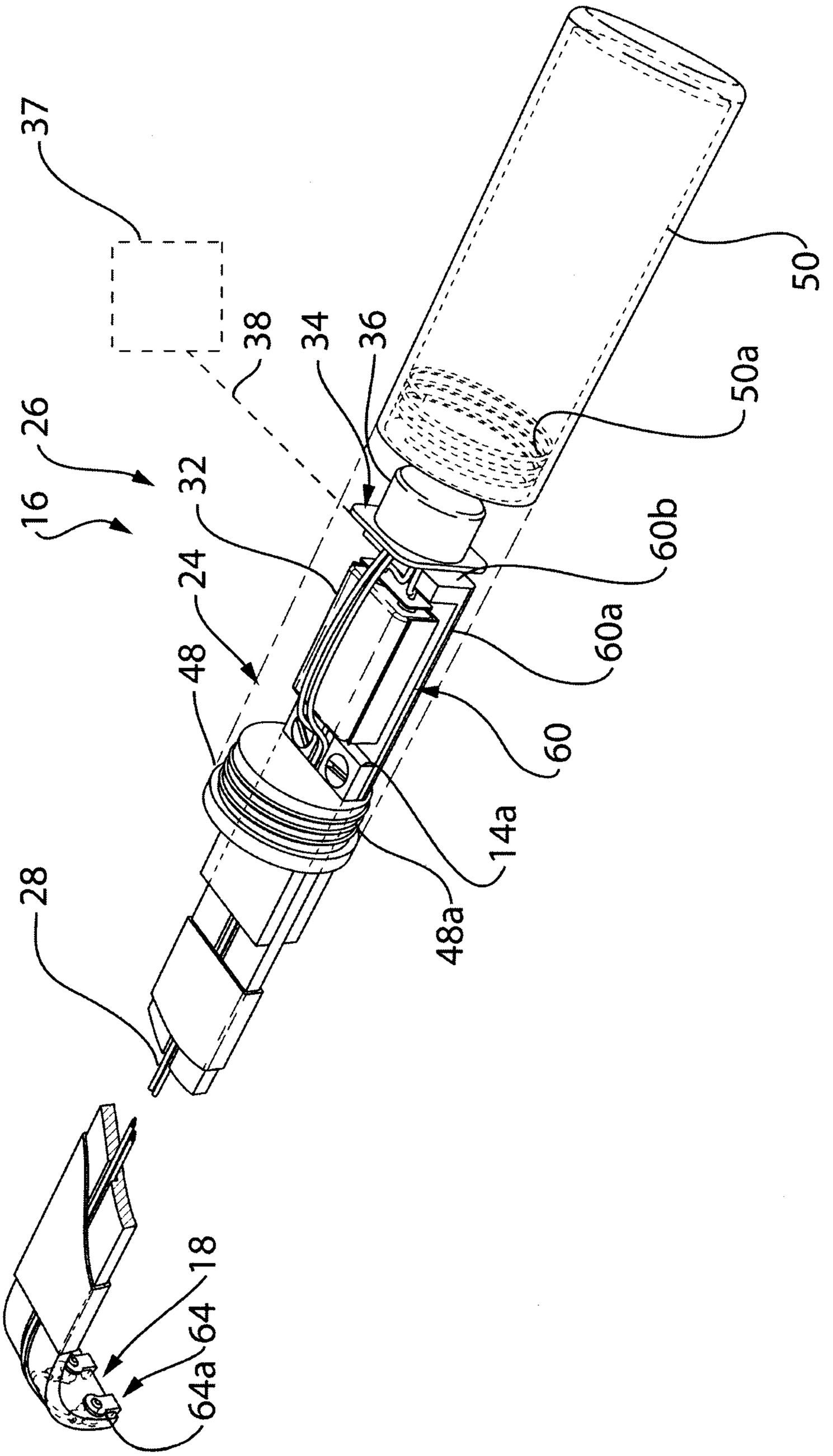


FIG. 2

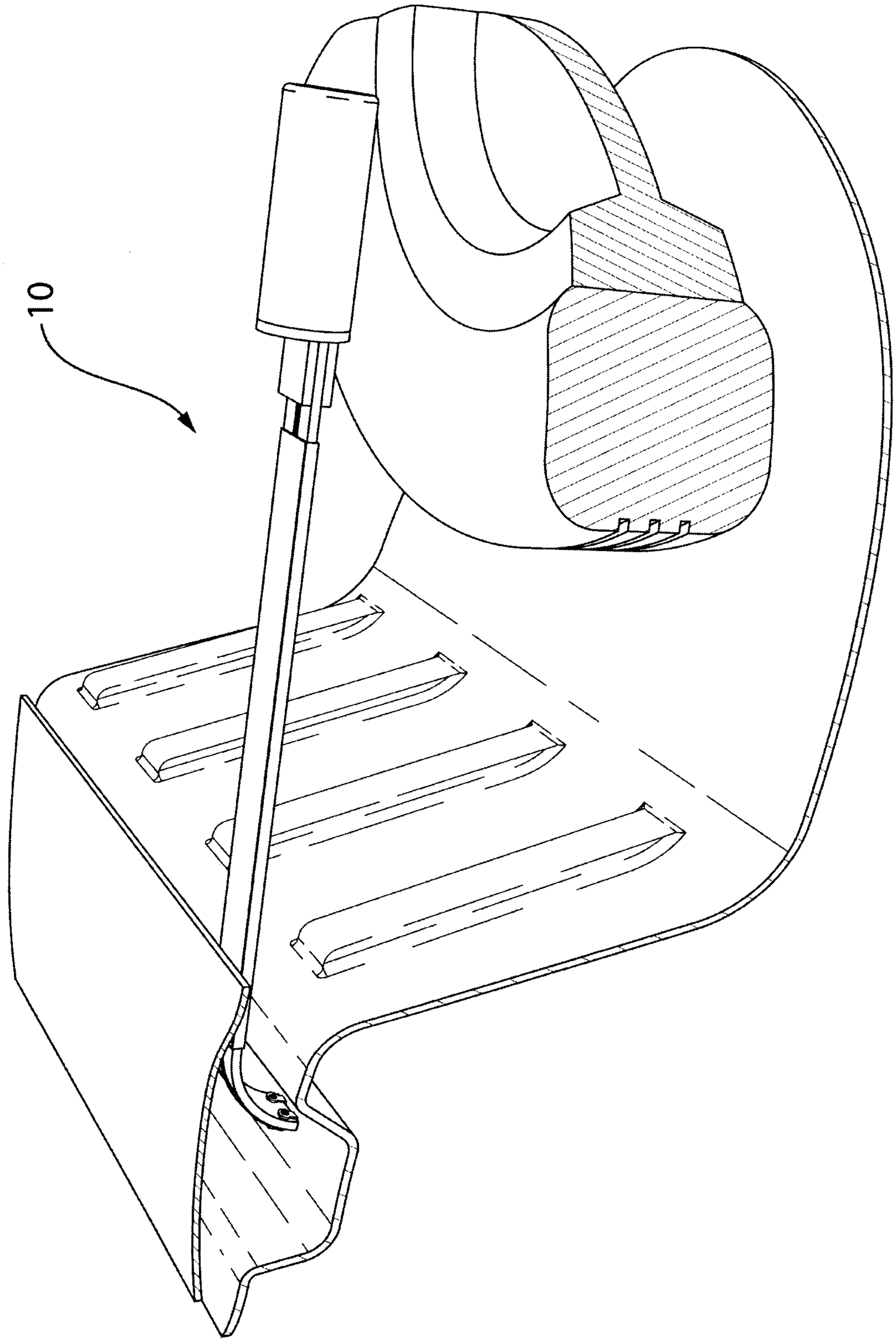


FIG.3

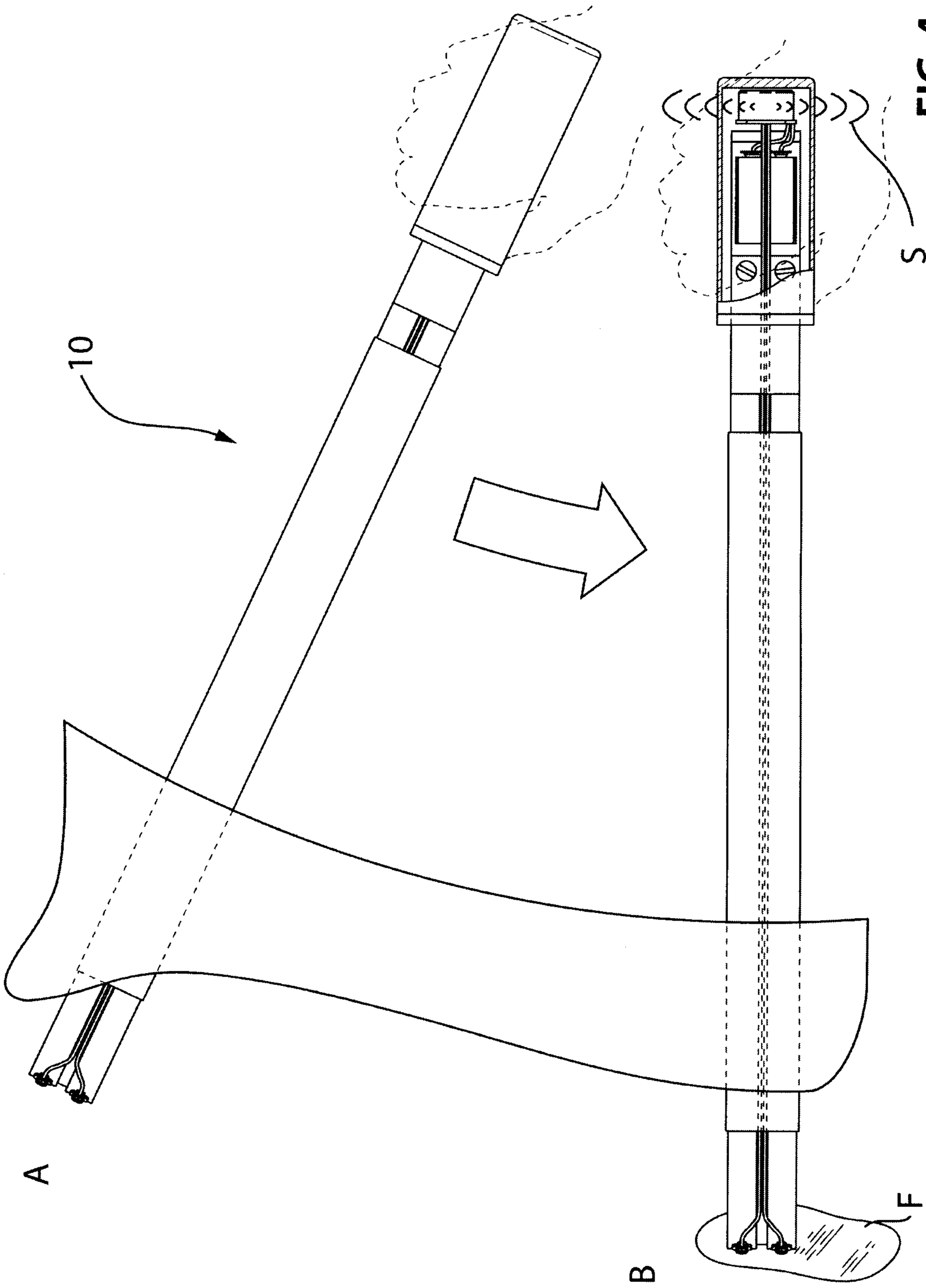
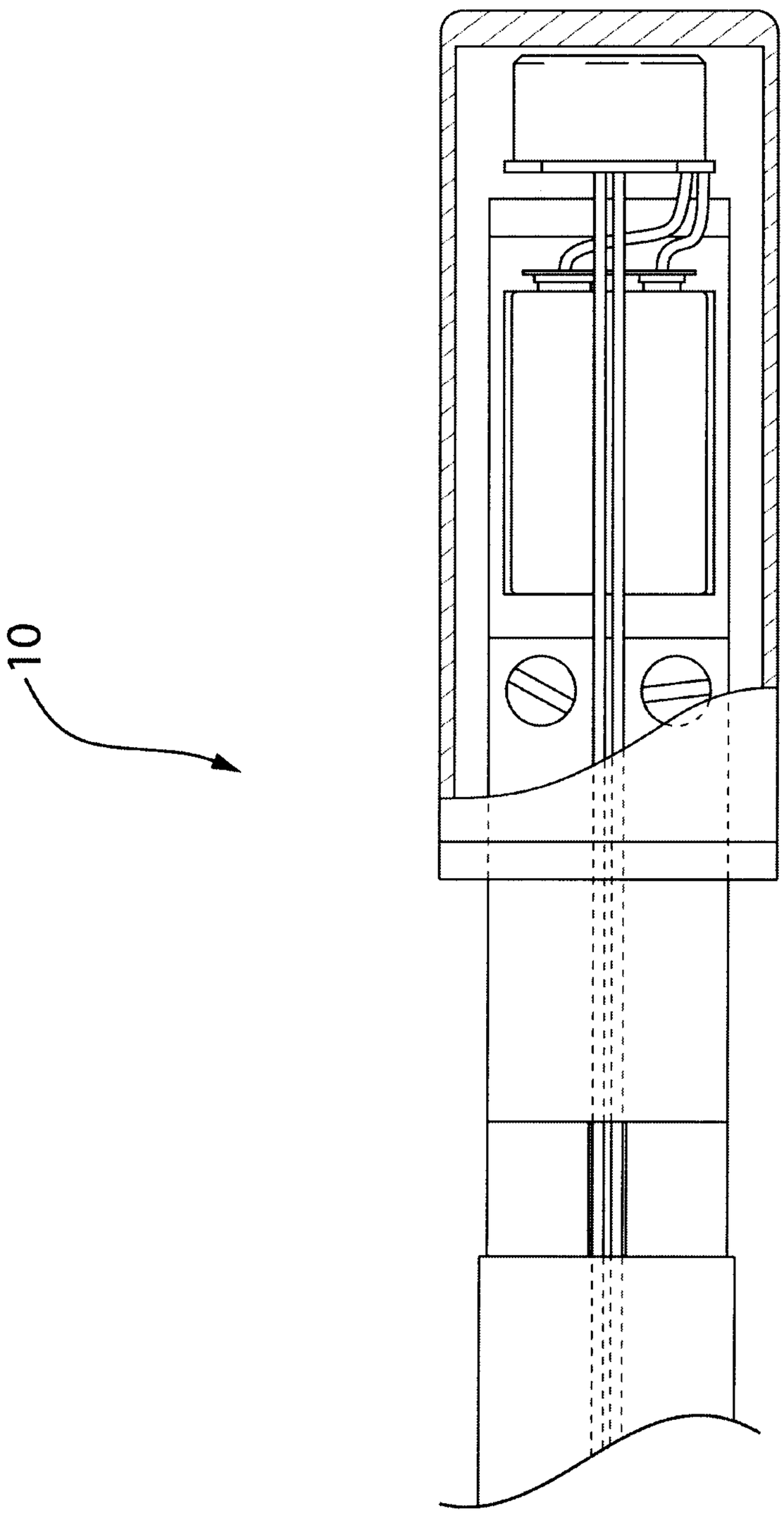


FIG. 4

FIG.5



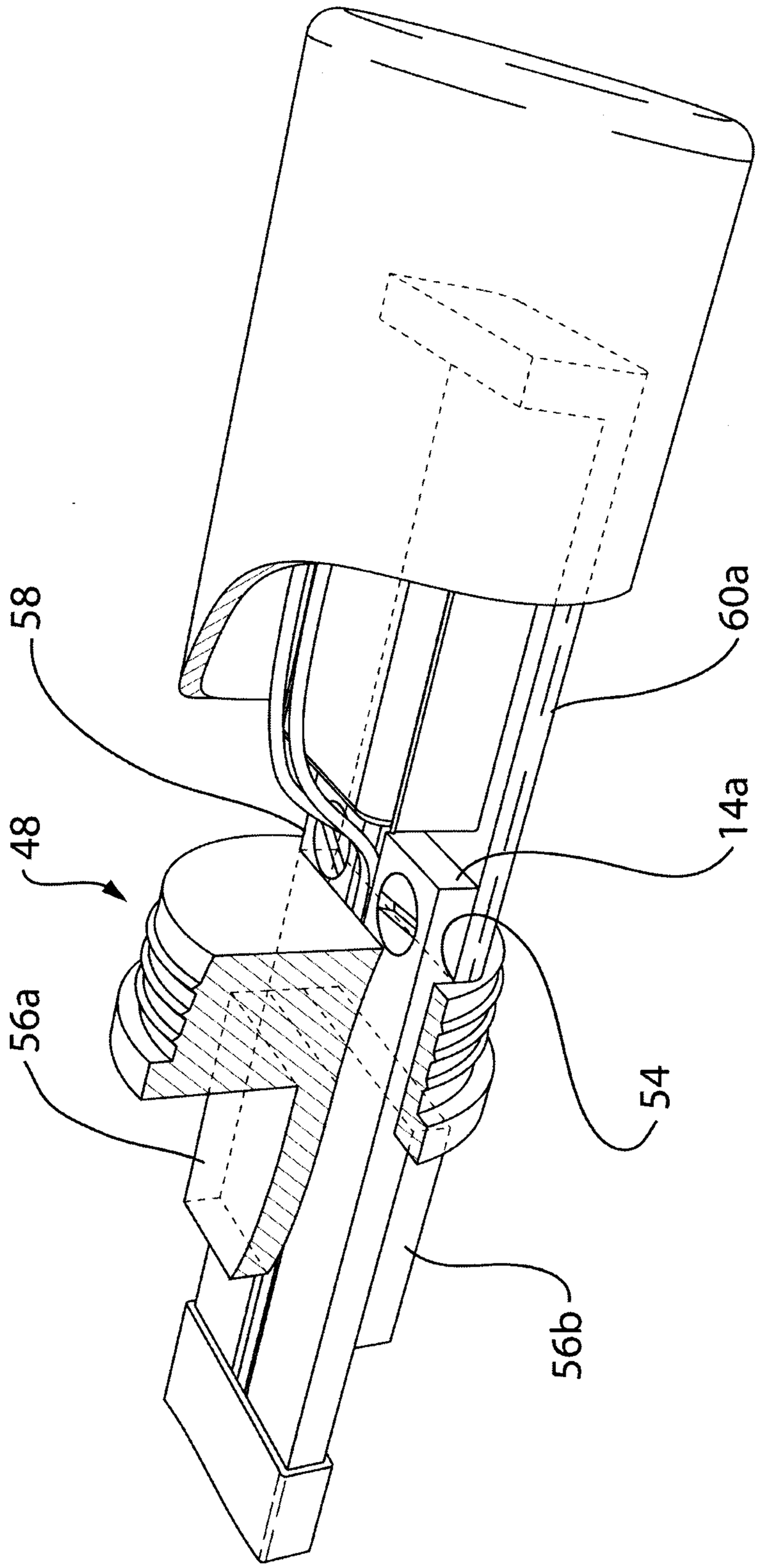
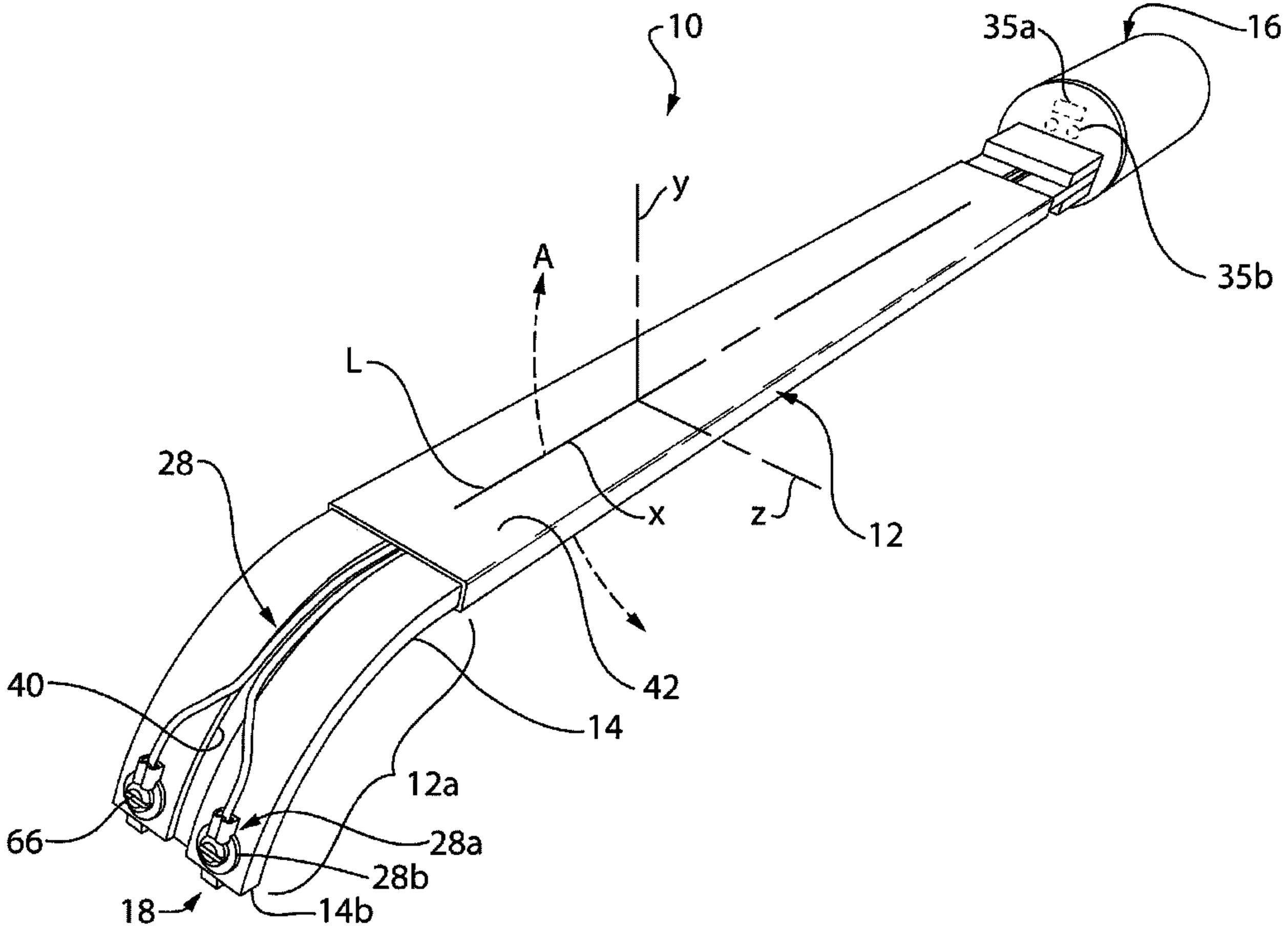


FIG.6


10
35a
16
y
A
35b
L
28
x
z
12
42
40
14
12a
66
28a
28b
18
14b