

ABSTRACT

Disclosed herein is a moulded window panel assembly comprising a window pane portion having a peripheral region, a peripheral support portion moulded onto the peripheral region, the peripheral support
5 portion including at least one internal passage, the internal passage extending along the peripheral region from an entry location for delivering a supply of power and/or fluid to a delivery location.

WINDOW PANEL ASSEMBLY

BACKGROUND OF THE INVENTION

5 1. FIELD OF THE INVENTION

The present invention relates to improvements to window panels.

10 2. DESCRIPTION OF THE RELATED ART

Automobile window panels have become increasingly complex in recent years as they become more integrated into the structure and function of the vehicle. The rear hatch panel of a "hatch back" type vehicle is usually provided with a defrost circuit, which means that it must be supplied with power.

Usually this is done by a separate cable which is anchored to vehicle structure adjacent the window.

15 However, this arrangement is problematic since the wire can become damaged or dislodged during use.

SUMMARY OF THE INVENTION

In one of its aspects, there is provided a moulded window panel assembly comprising a window pane
20 portion having a peripheral region, a peripheral support portion moulded onto the peripheral region, the peripheral support portion including at least one internal passage, the internal passage extending along the peripheral region from an entry location for delivering a supply of power and/or fluid to a delivery location.

25 In some embodiments, the at least one internal passage contains at least one power cable.

In some embodiments, the power cable substantially fills the passage.

In some embodiments, the peripheral support portion has at least one intermediate support portion and a conduit portion engaged with the intermediate support portion and containing the internal passage.

5 In some embodiments, the intermediate support portion includes a channel section having pair of spaced locating flanges, for engaging opposite sides of the window pane portion.

In some embodiments, the spaced locating flanges extend from a body, the body containing the internal passage.

10 In some embodiments, the window pane portion has a peripheral edge and further comprises an adhesive layer located on the body between the spaced locating flanges, the adhesive layer arranged to form a bond between the body and the peripheral edge.

15 In some embodiments, the window pane portion has a peripheral edge and the spaced locating flanges extend from a body, the body having an inner surface which is spaced from the peripheral edge to form an internal cavity to contain the at least one internal passage.

Some embodiments provide a power cable located in the internal cavity or in the internal passage.

20 Some embodiments provide a plurality of conduit portions, each being engaged with the intermediate support portion.

In some embodiments, the plurality of conduit portions includes one or more power cables and/or one or more fluid pipes.

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In another of its aspects, the present invention provides a moulded window panel assembly comprising a window pane portion having a peripheral region, a peripheral support portion moulded onto the peripheral region, the peripheral support portion including one or more internal passages and a powered accessory unit

mounted adjacent the peripheral region, one of the internal passages including a power cable for supplying power to the powered accessory unit.

In some embodiments, the powered accessory unit is a window wiper unit.

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In still another of its aspects, there is provided a method of forming a moulded window panel assembly comprising the steps of providing a window pane portion having a peripheral region, locating the window pane portion in a mould with a mould cavity adjacent the peripheral region, locating in the mould cavity one or more than one conduit portion, arranging the conduit portion in the mould cavity so as to extend
10 from an entry location on a resulting moulded window panel assembly for delivering a supply of power and/or fluid to a region adjacent a delivery location thereon, delivering a flowable moulding material into the mould cavity to form a peripheral support portion on at least a portion of the peripheral region and to contain the at least one conduit portion, and withdrawing the window pane portion from the mould.

15 Some embodiments provide the step of installing at least one power cable, fluid hose, antenna, and/or reinforcing cable in the conduit portion.

In some embodiments, the power cable substantially fills the conduit portion.

20 Some embodiments provide the step of locating at least one intermediate support portion in the peripheral region of the window pane portion within the cavity and engaging the conduit portion with the intermediate support portion.

Some embodiments provide the steps of providing the intermediate support portion with a channel section
25 having pair of spaced locating flanges, and engaging each locating flange with a corresponding side of the window pane portion.

Some embodiments provide the step of forming the intermediate support portion with a body having at

least one internal passage therein.

Some embodiments provide the steps of applying an adhesive layer on the body between the spaced locating flanges, so that the adhesive layer forms a bond between the body and a peripheral edge of the window pane portion.

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Some embodiments provide the steps of forming the intermediate support portion with a body, applying an adhesive layer on the body between the spaced locating flanges, so that the adhesive layer forms a bond between the body and a peripheral edge of the window pane portion, and arranging the body with an inner surface which is spaced from the peripheral edge to form an internal cavity to contain the at least one internal conduit portion.

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Some embodiments provide the step of placing a power cable in the cavity.

Some embodiments provide the step of locating a plurality of conduit portions in the cavity.

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In some embodiments, the plurality of conduit portions includes one or more power cables and/or one or more fluid pipes.

In yet another of its aspects, there is provided a moulded window panel assembly comprising a window pane means having a peripheral region, peripheral support means moulded onto the peripheral region, the peripheral support means including at least one internal passage means, the internal passage means extending along the peripheral region from an entry location for delivering a supply of power and/or fluid to a delivery location.

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In yet another of its aspects, there is provided a method of forming a moulded window panel assembly comprising a step for providing a window pane portion having a peripheral region, a step for locating the window pane portion in a mould with a mould cavity adjacent the peripheral region, a step for locating in the mould cavity one or more than one conduit portion, a step for arranging the conduit portion in the

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mould cavity so as to extend from a entry location on a resulting moulded window panel assembly for delivering a supply of power and/or fluid to a region adjacent a delivery location thereon, a step for delivering a flowable moulding material into the mould cavity to form a peripheral support portion on at least a portion of the peripheral region and to contain the at least one conduit portion, and a step for
5 withdrawing the window pane portion from the mould.

BRIEF DESCRIPTION OF THE DRAWINGS

Several preferred embodiments of the present invention will now be described, by way of example only,
10 with reference to the appended drawings in which:

Figure 1 is a perspective assembly view of a window panel assembly;

Figure 1a is an end view of a window panel assembly in an operative orientation in a vehicle;
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Figures 1b, 1c and 1d are front views of alternative window panel assemblies;

Figure 2 is a magnified fragmentary perspective view of a portion of the assembly of figure 1;

20 Figure 3 is a plan view of the assembly of figure 1;

Figures 4 through 8 are magnified fragmentary perspective views of alternatives to the portion of the assembly shown in figure 2;

25 Figure 9 is a fragmentary sectional schematic view of a method to form the window panel assembly of figure 1; and

Figure 10 is a fragmentary perspective view of an alternative to the method shown in figure 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figures 1 to 3 show a moulded window panel assembly 10 having a window pane portion 12 with a
5 peripheral region 14 and a peripheral edge 16. The window pane portion 12 has a number of passages 12a
for hinge, travel control and latch mechanisms for mounting the moulded window panel assembly in the
tailgate of a passenger vehicle, for example as shown in figure 1a. A peripheral support portion 18 is
moulded onto the peripheral region 14. Of course, the peripheral support portion 18 may extend along
substantially the entire peripheral region 14 of the window pane portion 12, as desired. The peripheral
10 support portion 18 includes at least one internal passage, in this case two internal passages 20, which
extend along the peripheral region 14 from an entry location shown at 22 for delivering a supply of power
and/or fluid to a delivery location shown at 24. A cover plate 24a is shown for covering the delivery
location following installation.

15 In this case, the moulded window panel assembly 10 has a second entry location shown at 26. This may be
desirable to deliver more than one supply of power or fluid to the delivery location 24. There may, of
course, be more than one delivery location 24, if desired. The delivery location is provided for the
window wiper unit, while a second delivery location may be provided for another power or fluid
consuming device, such as a brake light. As can be seen, the moulded window panel assembly 10 is a rear
20 window of a vehicle, such as a sport utility as shown in figure 1a., though other embodiments may involve
window panel assemblies for other applications, such as all terrain vehicles, motorcycles and water craft as
shown in figures at 10b, 10c and 10d in figures 1b, 1c and 1d respectively, as well as windows for
residential and commercial buildings, for instance. Furthermore, the window pane portion may be made of
polymeric materials other than glass, such as those known in the trade as LEXAN and PLEXIGLASS, as
25 well as laminates of glass, plastic and other materials, among others.

Referring to figure 2, the internal passages 20 contain at least one power cable 28 and it can be seen that
the power cable substantially fills the internal passage 20, though the power cable 28 may not fill the entire

internal passage 20 but rather may simply be loosely contained therein. Alternatively, the power cable may essentially form the passage. In this case, the conduit portion may be provided by an outer skin 28a of the power cable 28. In figure 3, the power cables 28 are joined to a common connector plug 28b to connect with the window wiper unit (not shown).

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Referring to figure 2, the moulded window panel assembly 10 has an intermediate support portion 30, or otherwise known as a pre-form strip with a conduit portion 32 containing the internal passages 20.

Referring to the example shown in figure 5, the intermediate support portion 30 includes a channel section 34 having pair of spaced locating flanges 36 extending from a body 38. The spaced locating flanges 36 engage opposite sides of the window pane portion 12, as seen in figure 2, though other configurations for the intermediate support portion 30 may also be employed as desired. In figures 1 to 3, the body 38 contains the internal passages 20, though the passage may be formed adjacent the body 38, if desired.

Referring to figure 1, an adhesive layer 40 is located on the body 38 between the spaced locating flanges 36 and the adhesive layer 40 is arranged to form a bond between the body 38 and the peripheral edge 16. The adhesive layer 40 may be made of a material known by the tradename MYLAR or other such materials capable of withstanding the temperatures encountered during a plastic moulding process. If desired, the adhesive layer may be applied on or both of the spaced locating flanges 36 and/or the inner surface 38a of the body 38. The adhesive layer 40 may be applied either continuously or at regular or irregular spaced intervals. Alternatively, the intermediate support portion 30 may be formed to establish a relatively snug friction fit when the intermediate support portion 30 is applied to the window pane portion 12.

In one variation as shown in figure 4, the body 38 has an inner surface 38a which is spaced from the peripheral edge 16 to form an internal cavity 42 to contain the internal passages. A power cable may thus be located in the internal cavity 42 or in the internal passages or both, as desired.

Referring to figures 6 and 8, the conduit portion 32 may, if desired, be integrally formed with the intermediate support portion 30 to contain one or more power cables 28 as shown in figure 6, or one or

more power cables 28 and/or one more fluid pipes 46 as shown in figure 8.

The moulded window panel assembly 10 may be formed by a number of methods, including by an injection moulding (or also known as encapsulation) technique, as represented in figure 9. In one example, the intermediate support portion 30 is, in advance, moulded with two power cables 28 in situ. An adhesive layer 40 is applied to the inner surface 38a of the body 38 and the latter is applied to the peripheral region 14 of the window pane portion 12.

With the intermediate support portion in place, the window pane portion 12 is placed in a mould, two mating dies of which are shown at 50, with a mould cavity 52 which is oriented to be adjacent the peripheral region 14.

With the window pane portion and the conduit portion in place, a flowable moulding material is delivered to the mould cavity under conditions sufficient to form a peripheral support portion on at least a portion of the peripheral region and to contain the at least one conduit portion. After a suitable setting period, the window panel assembly 10 may then be withdrawn from the mould cavity 52.

If desired, arrangements may be used to protect the power cables 28 and to seal the mould in the region of the delivery location 24 during the moulding process. For instance, as shown in figure 10, a preformed block 54 may be dimensioned to match the dimensions of the delivery location 24 and be provided with an inner cavity 54a to receive the power cables 28. In this particular example, the mould cavity 52 is enlarged at 52a to accommodate the preformed block 54. Alternatively, the preformed block 54 may be shaped to fit in the mould cavity 52 with the need for an enlargement.

While the window panel assembly 10 makes use of an intermediate support portion, it will be understood that other arrangements may be used to position in the conduits in position in the mould cavity. For instance, the conduit may be fastened directly to the peripheral edge 16 of the window, such as by the use of glues or adhesive materials, clips or other fasteners or 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.

5 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.

Thus, the window panel assembly 10 provides a peripheral support portion which is formed on a window pane and which provides for one or more passages therein for such things as power cables or fluid hoses,
10 radio or other communications antennae or other vehicle or other accessories which may be suitably located in such an internal passage, and/or strengthening members such as reinforcing cable, such as glass or steel fibres and the like.

CLAIMS:

1. A moulded window panel assembly comprising a window pane portion having a peripheral region,
a peripheral support portion moulded onto the peripheral region, the peripheral support portion
5 including at least one internal passage, the internal passage extending along the peripheral region
from an entry location for delivering a supply of power and/or fluid to a delivery location.
2. An assembly as defined in claim 1 wherein the at least one internal passage contains at least one
power cable.
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3. An assembly as defined in claim 2, wherein the power cable substantially fills the passage.
4. An assembly as defined in claim 1, the peripheral support portion having at least one intermediate
support portion, a conduit portion engaged with the intermediate support portion and containing
15 the internal passage.
5. An assembly as defined in claim 4, wherein the intermediate support portion includes a channel
section having pair of spaced locating flanges, for engaging opposite sides of the window pane
portion.
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6. An assembly as defined in claim 5, wherein the spaced locating flanges extend from a body, the
body containing the internal passage.
7. An assembly as defined in claim 6, wherein the window pane portion has a peripheral edge,
25 further comprising an adhesive layer located on the body between the spaced locating flanges, the
adhesive layer arranged to form a bond between the body and the peripheral edge.
8. An assembly as defined in claim 5, wherein the window pane portion has a peripheral edge and the

spaced locating flanges extend from a body, the body having an inner surface which is spaced from the peripheral edge to form an internal cavity to contain the at least one internal passage.

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9. An assembly as defined in claim 8, further comprising a power cable located in the internal cavity or in the internal passage.
10. An assembly as defined in claim 9, further comprising a plurality of conduit portions, each being engaged with the intermediate support portion.
- 10 11. An assembly as defined in claim 10 wherein the plurality of conduit portions includes one or more power cables and/or one or more fluid pipes.
12. A moulded window panel assembly comprising a window pane portion having a peripheral region, a peripheral support portion moulded onto the peripheral region, the peripheral support portion including one or more internal passages and a powered accessory unit mounted adjacent the peripheral region, one of the internal passages including a power cable for supplying power to the powered accessory unit.
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13. An assembly as defined in claim 12, wherein the powered accessory unit is a window wiper unit.
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14. A method of forming a moulded window panel assembly comprising the steps of providing a window pane portion having a peripheral region, locating the window pane portion in a mould with a mould cavity adjacent the peripheral region, locating in the mould cavity one or more than one conduit portion, arranging the conduit portion in the mould cavity so as to extend from a entry location on a resulting moulded window panel assembly for delivering a supply of power and/or fluid to a region adjacent a delivery location thereon, delivering a flowable moulding material into the mould cavity to form a peripheral support portion on at least a portion of the peripheral region and to contain the at least one conduit portion, and withdrawing the window
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pane portion from the mould.

15. A method as defined in claim 14 further comprising the step of installing at least one power cable, fluid hose, antenna, and/or reinforcing cable in the conduit portion.
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16. A method as defined in claim 15, wherein the power cable substantially fills the conduit portion.
17. A method as defined in claim 15, further comprising the step of locating at least one intermediate support portion in the peripheral region of the window pane portion within the cavity and
10 engaging the conduit portion with the intermediate support portion.
18. A method as defined in claim 17, further comprising the steps of providing the intermediate support portion with a channel section having pair of spaced locating flanges, and engaging each locating flange with a corresponding side of the window pane portion.
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19. A method as defined in claim 18, further comprising the step of forming the intermediate support portion with a body having at least one internal passage therein.
20. A method as defined in claim 19, further comprising the steps of applying an adhesive layer on the
20 body between the spaced locating flanges, so that the adhesive layer forms a bond between the body and a peripheral edge of the window pane portion.
21. A method as defined in claim 18, further comprising the steps of forming the intermediate support portion with a body, applying an adhesive layer on the body between the spaced locating flanges,
25 so that the adhesive layer forms a bond between the body and a peripheral edge of the window pane portion, and arranging the body with an inner surface which is spaced from the peripheral edge to form an internal cavity to contain the at least one internal conduit portion.

22. A method as defined in claim 21, further comprising the step of placing a power cable in the cavity.
23. A method as defined in claim 21, further comprising the step of locating a plurality of conduit portions in the cavity.
24. A method as defined in claim 23, wherein the plurality of conduit portions includes one or more power cables and/or one or more fluid pipes.
25. A moulded window panel assembly comprising a window pane means having a peripheral region, peripheral support means moulded onto the peripheral region, the peripheral support means including at least one internal passage means, the internal passage means extending along the peripheral region from an entry location for delivering a supply of power and/or fluid to a delivery location.
26. A method of forming a moulded window panel assembly comprising a step for providing a window pane portion having a peripheral region, a step for locating the window pane portion in a mould with a mould cavity adjacent the peripheral region, a step for locating in the mould cavity one or more than one conduit portion, a step for arranging the conduit portion in the mould cavity so as to extend from a entry location on a resulting moulded window panel assembly for delivering a supply of power and/or fluid to a region adjacent a delivery location thereon, a step for delivering a flowable moulding material into the mould cavity to form a peripheral support portion on at least a portion of the peripheral region and to contain the at least one conduit portion, and a step for withdrawing the window pane portion from the mould.

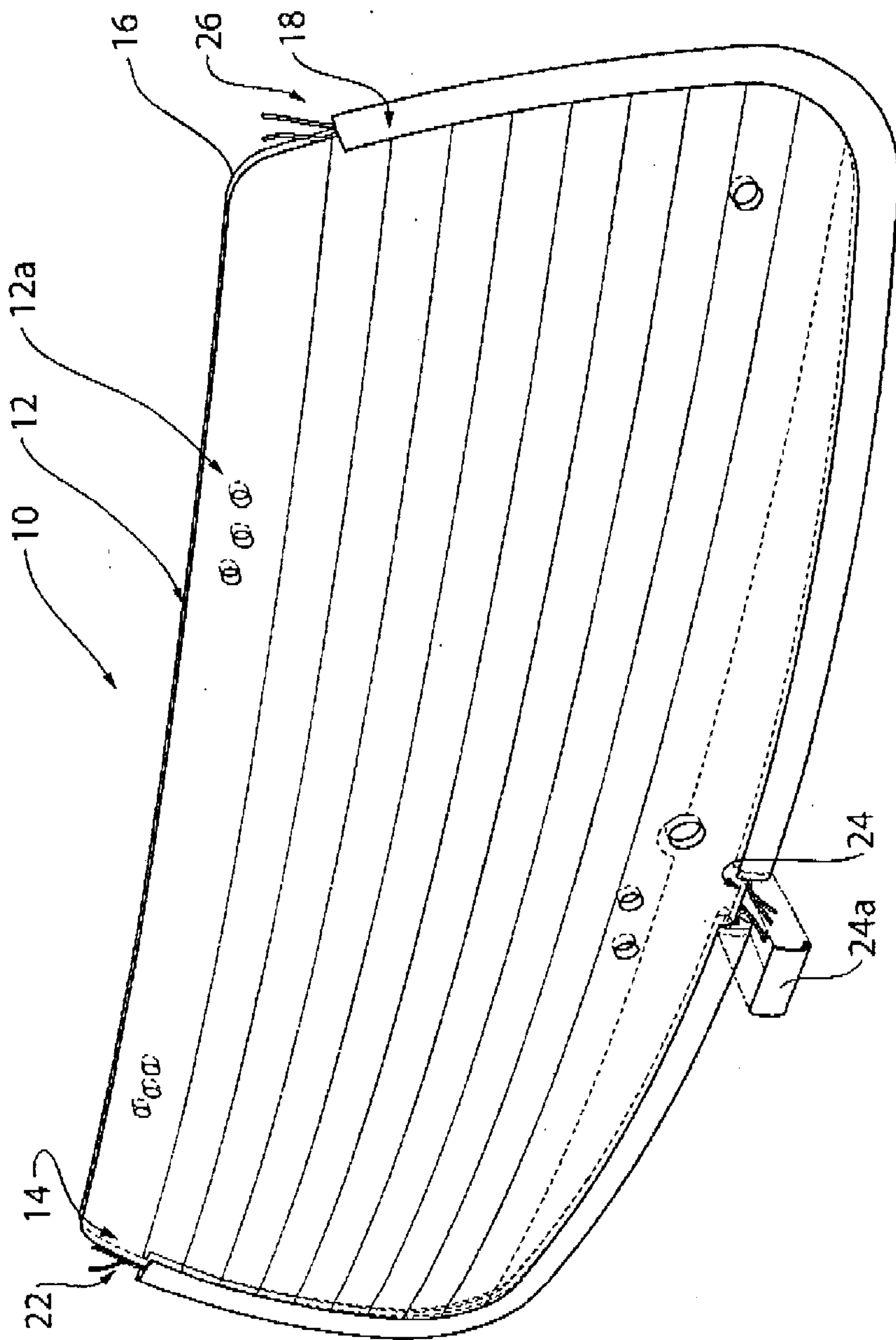


FIG. 1

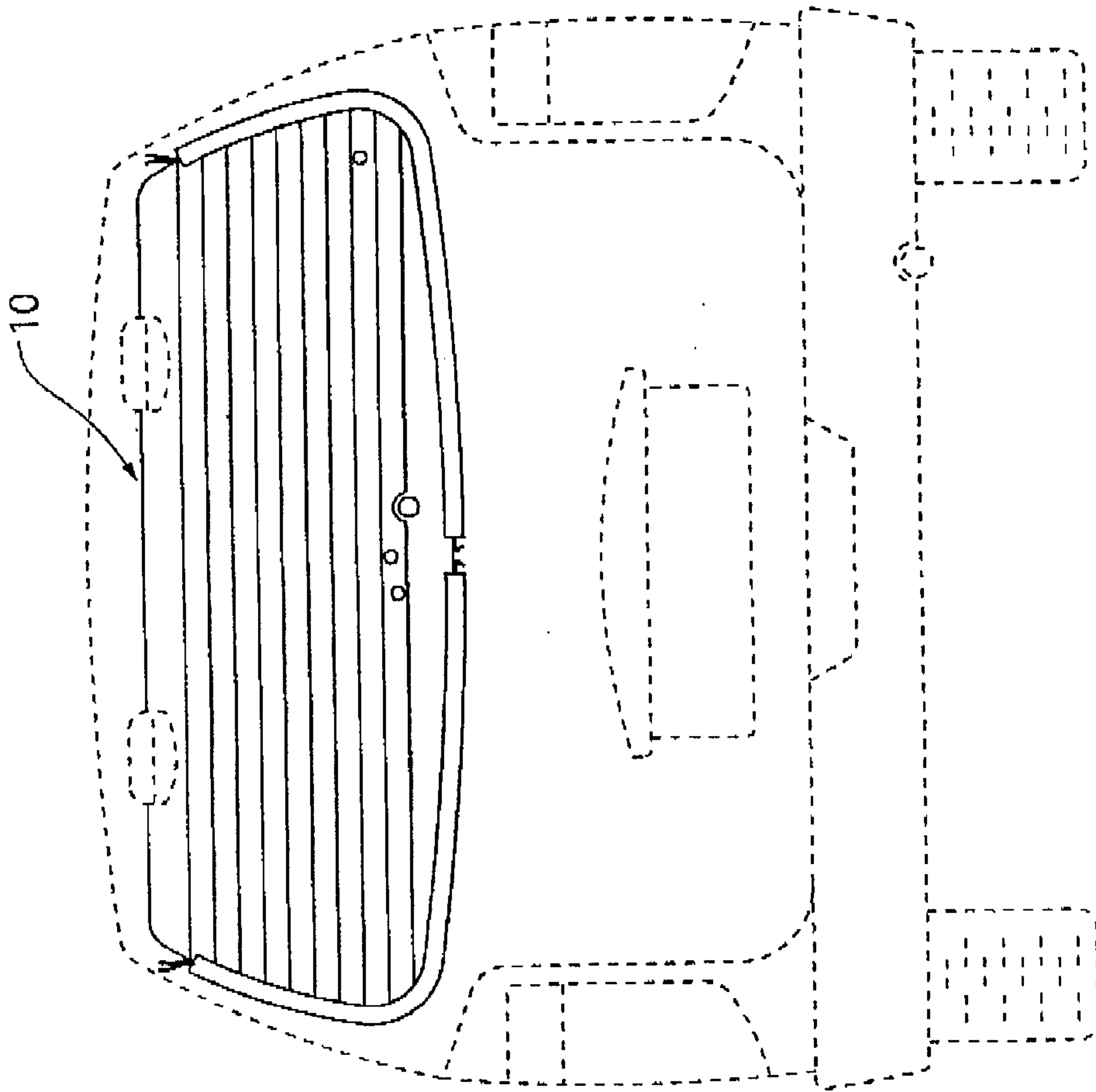


FIG. 1a

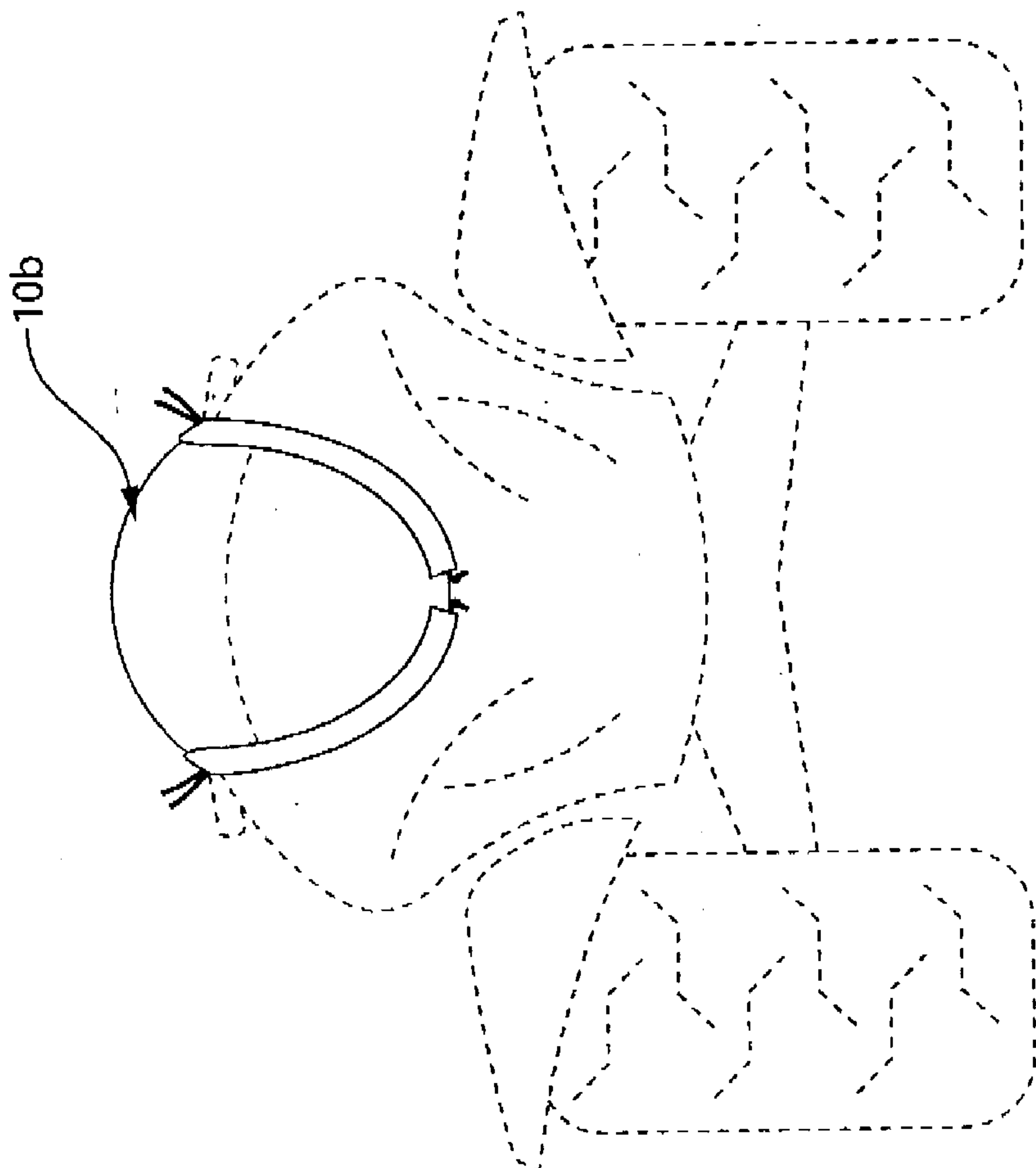
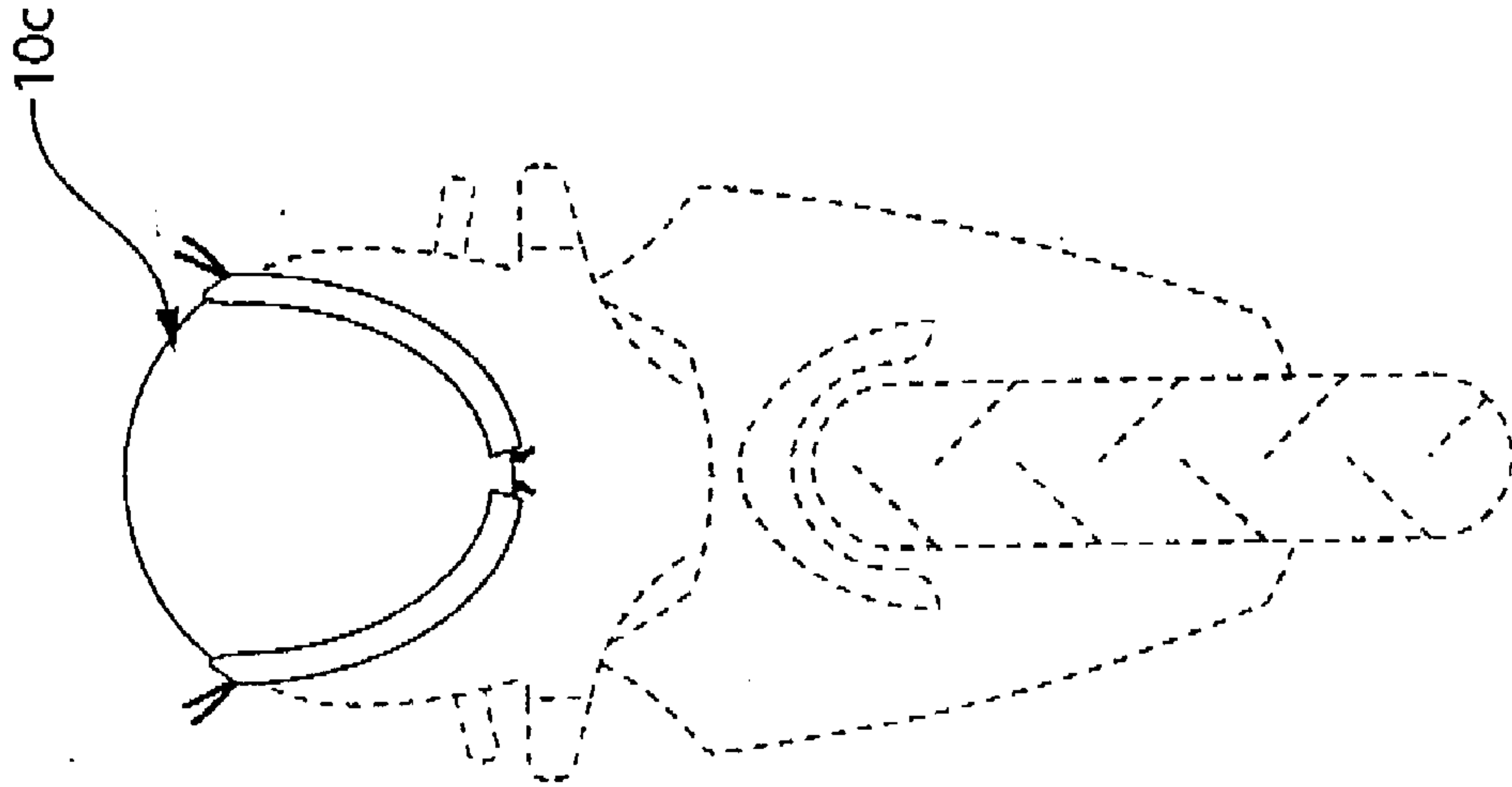


FIG. 1b

FIG. 1c



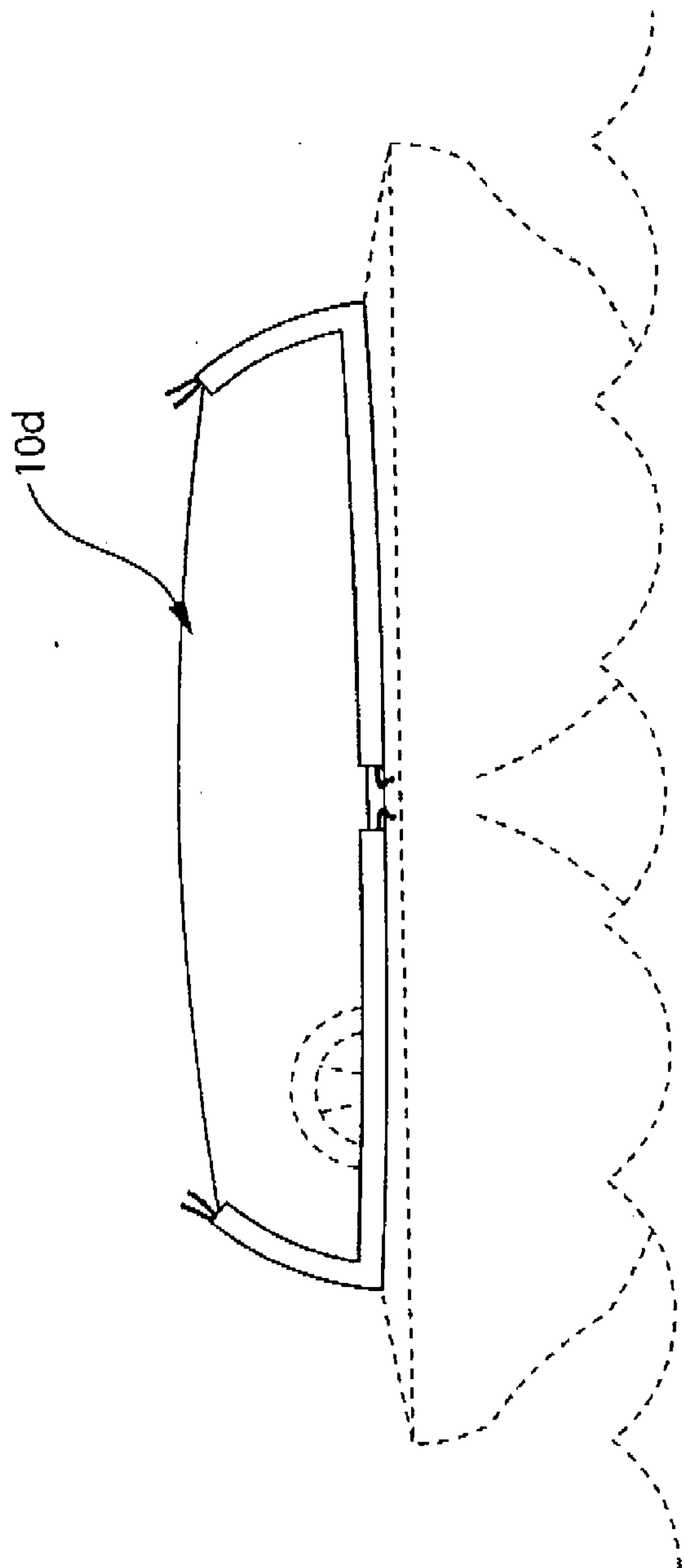


FIG. 1d

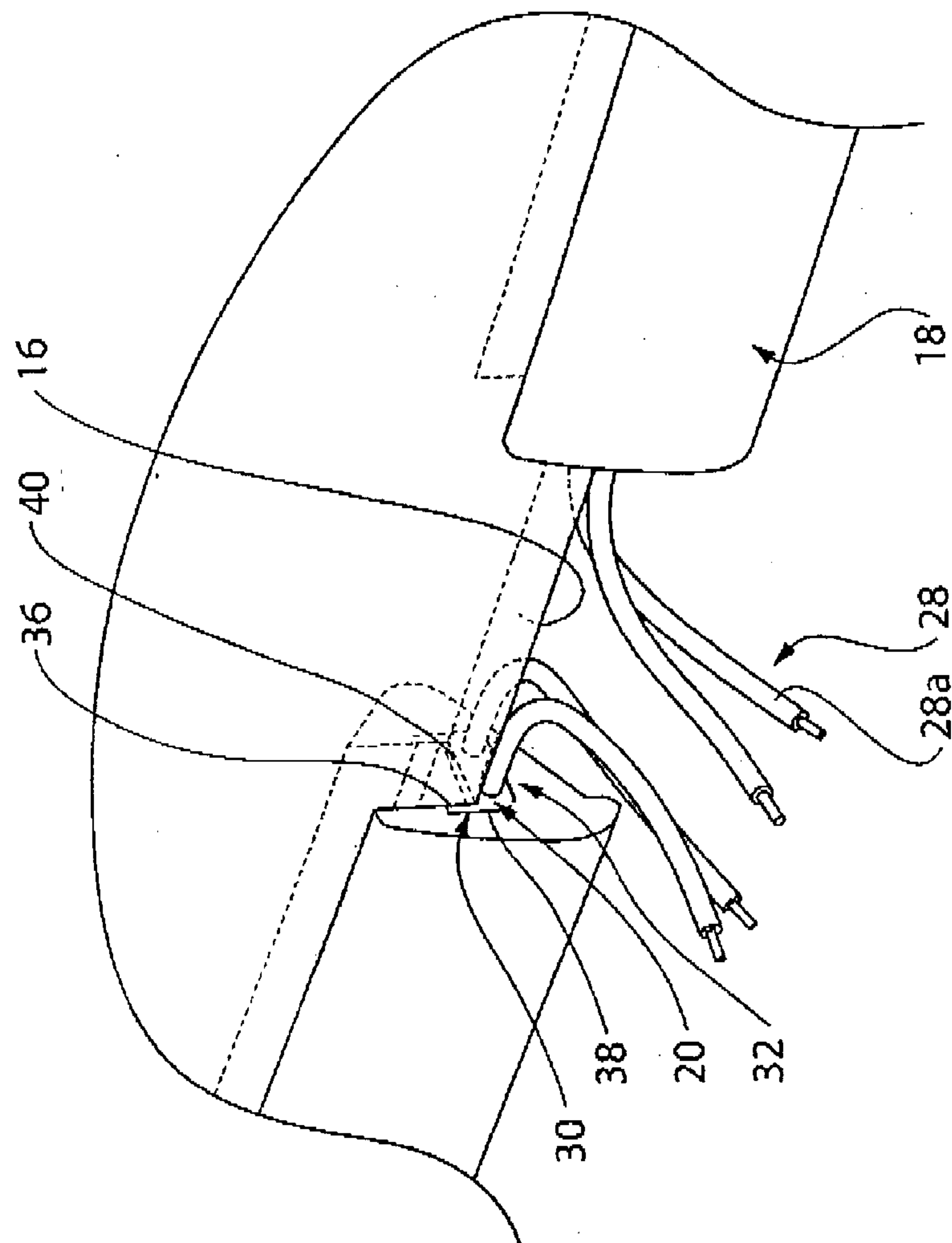


FIG. 2

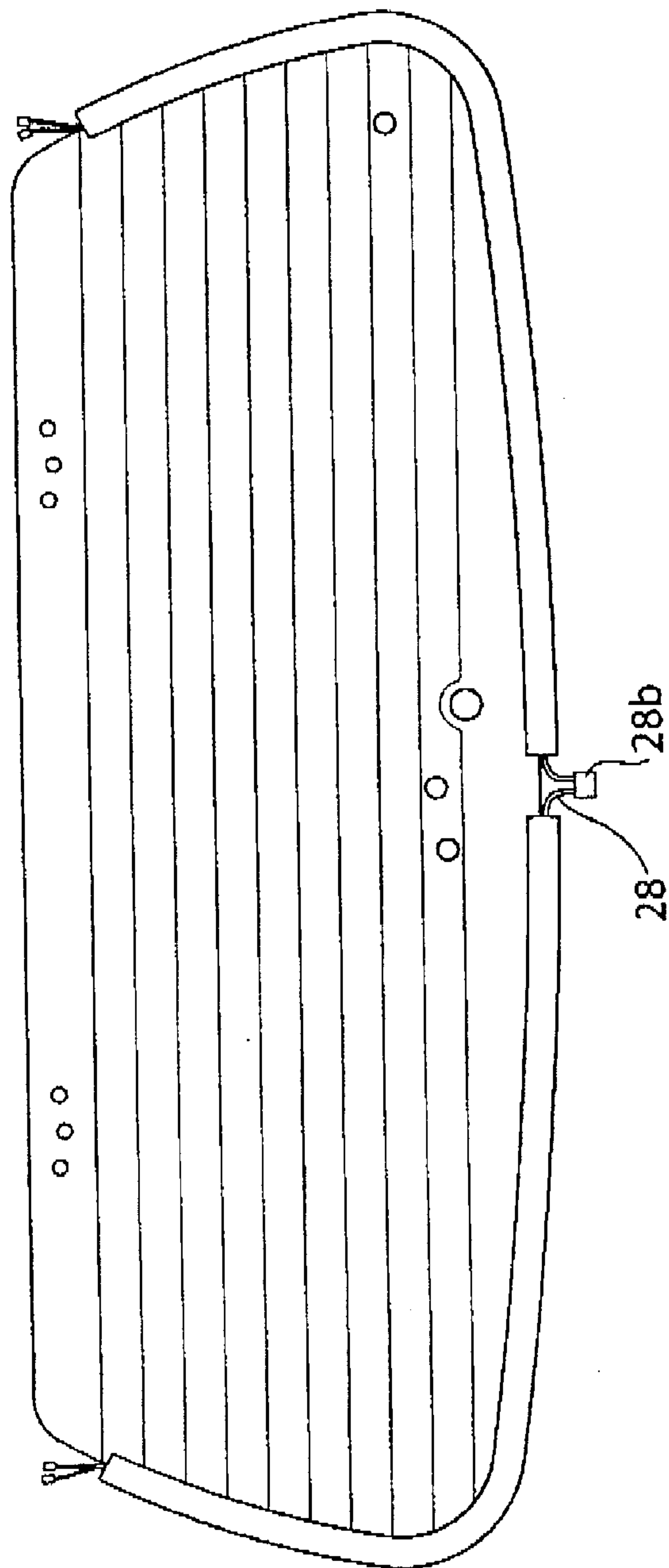


FIG. 3

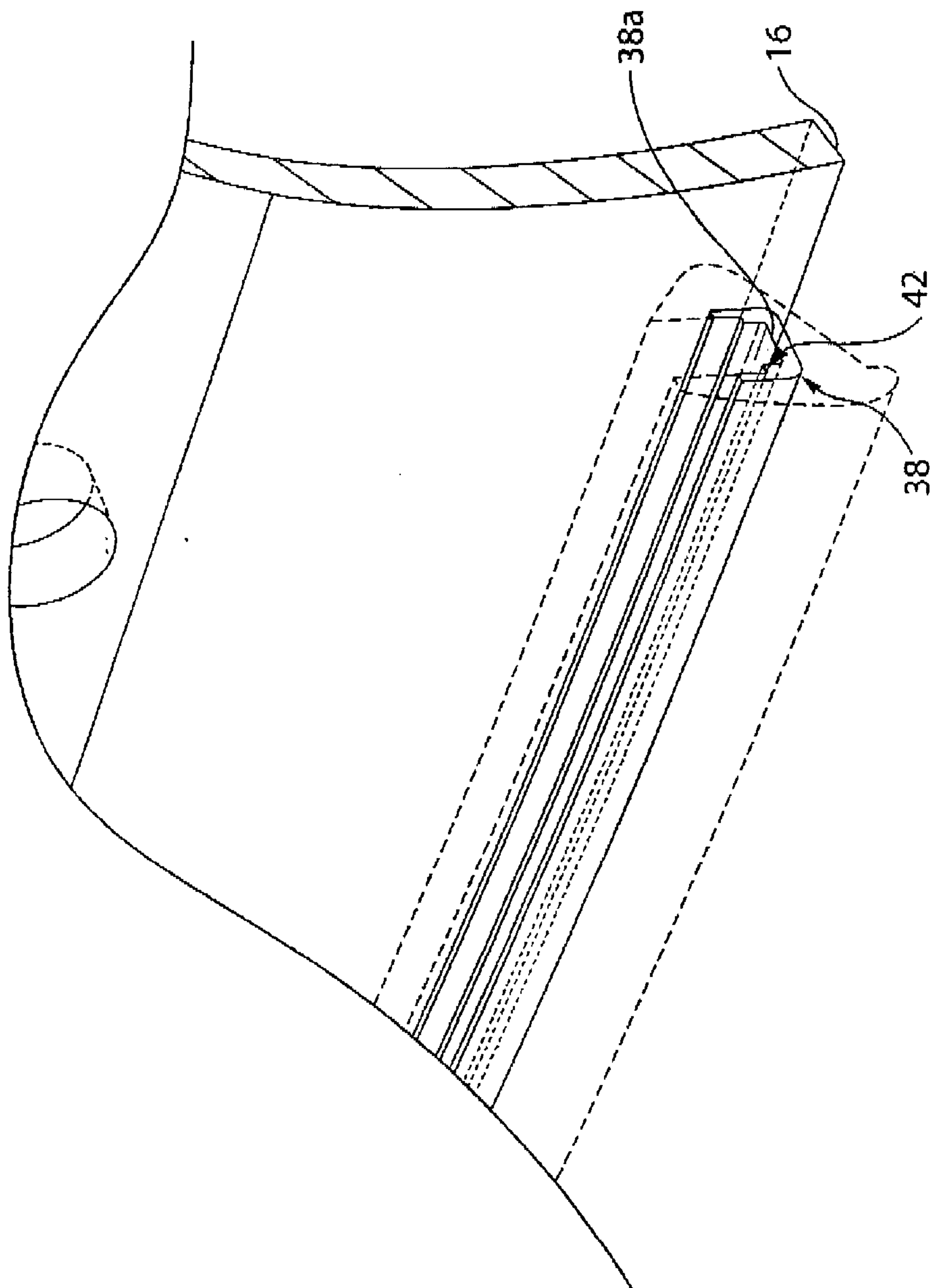
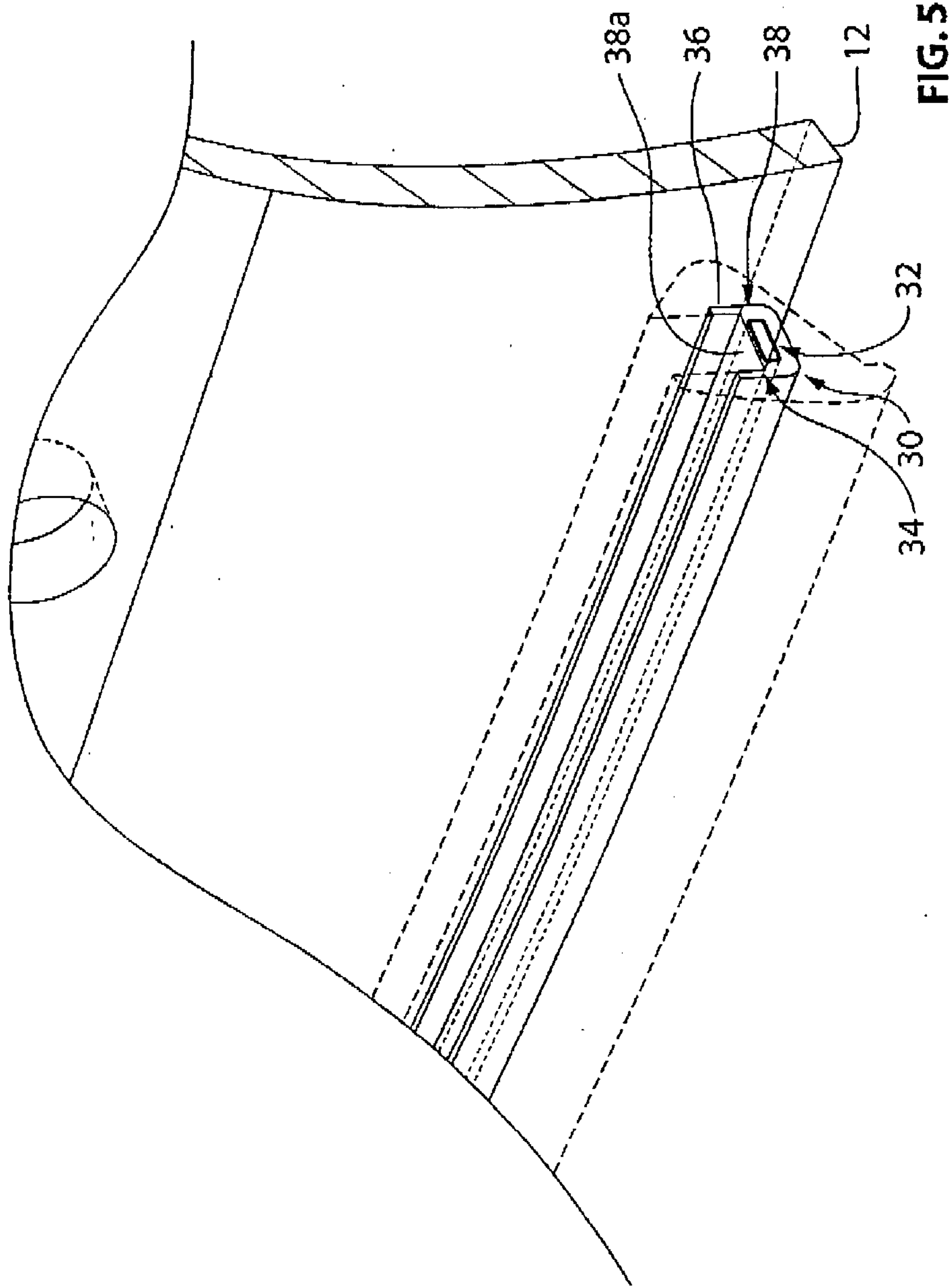
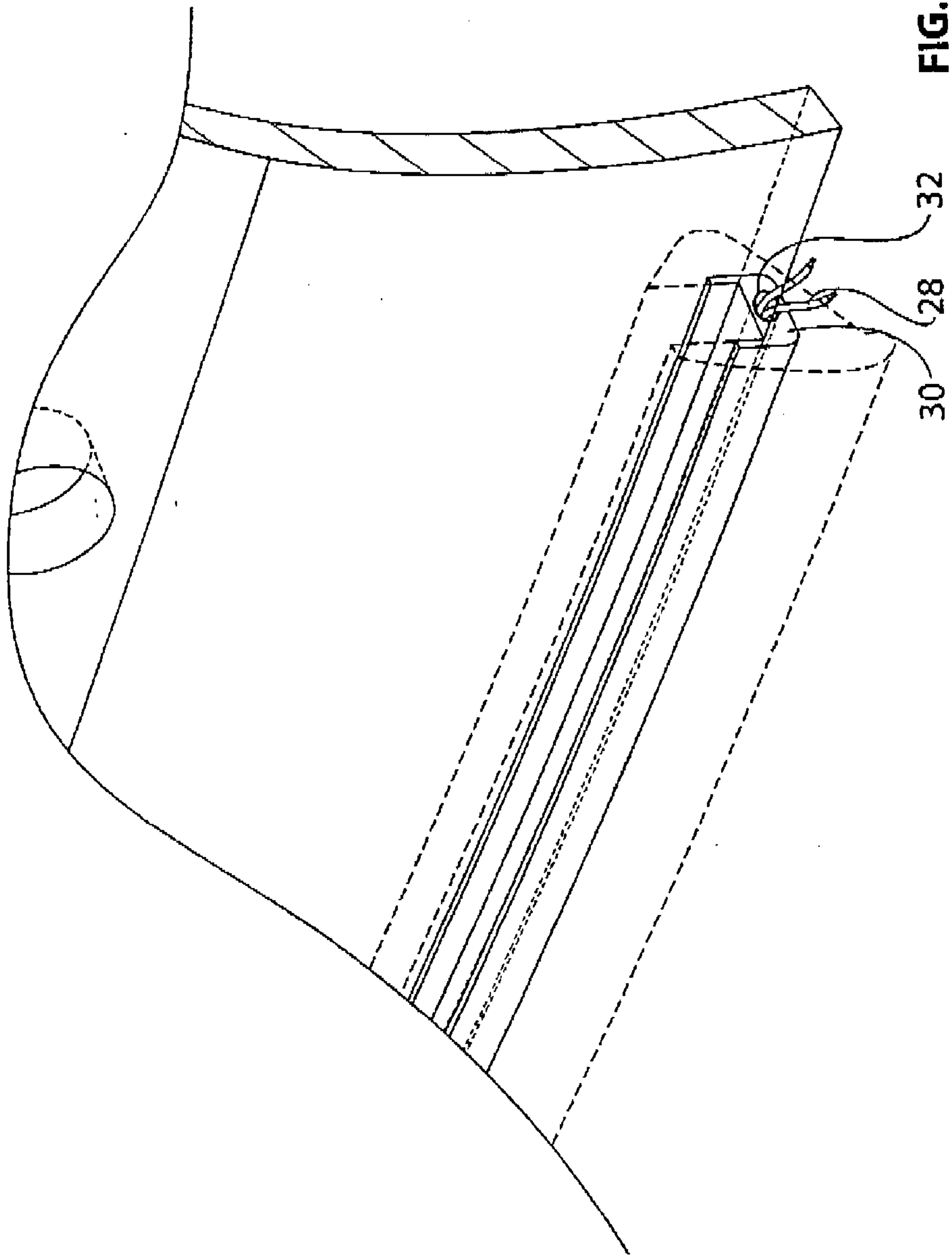


FIG. 4





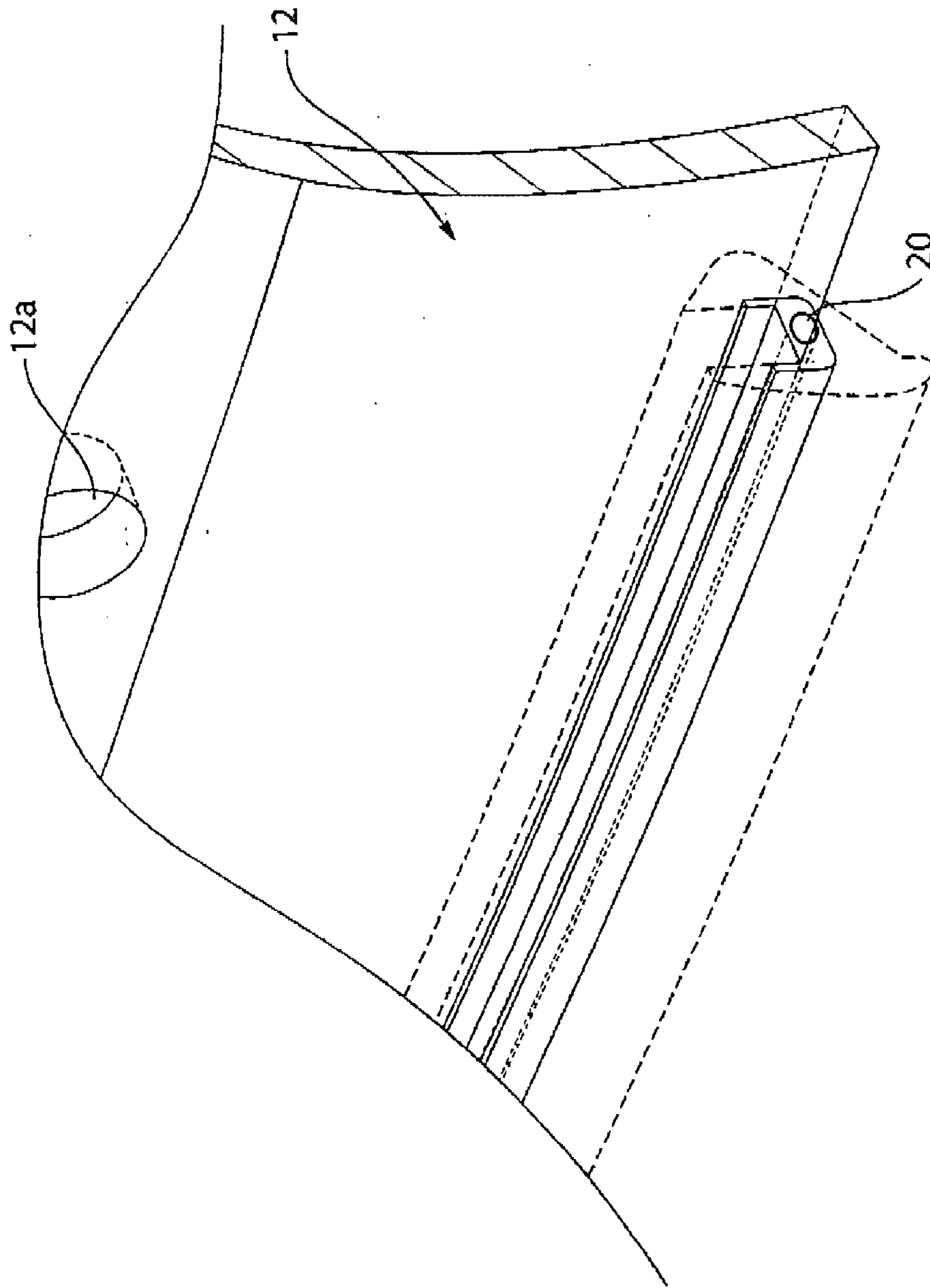


FIG. 7

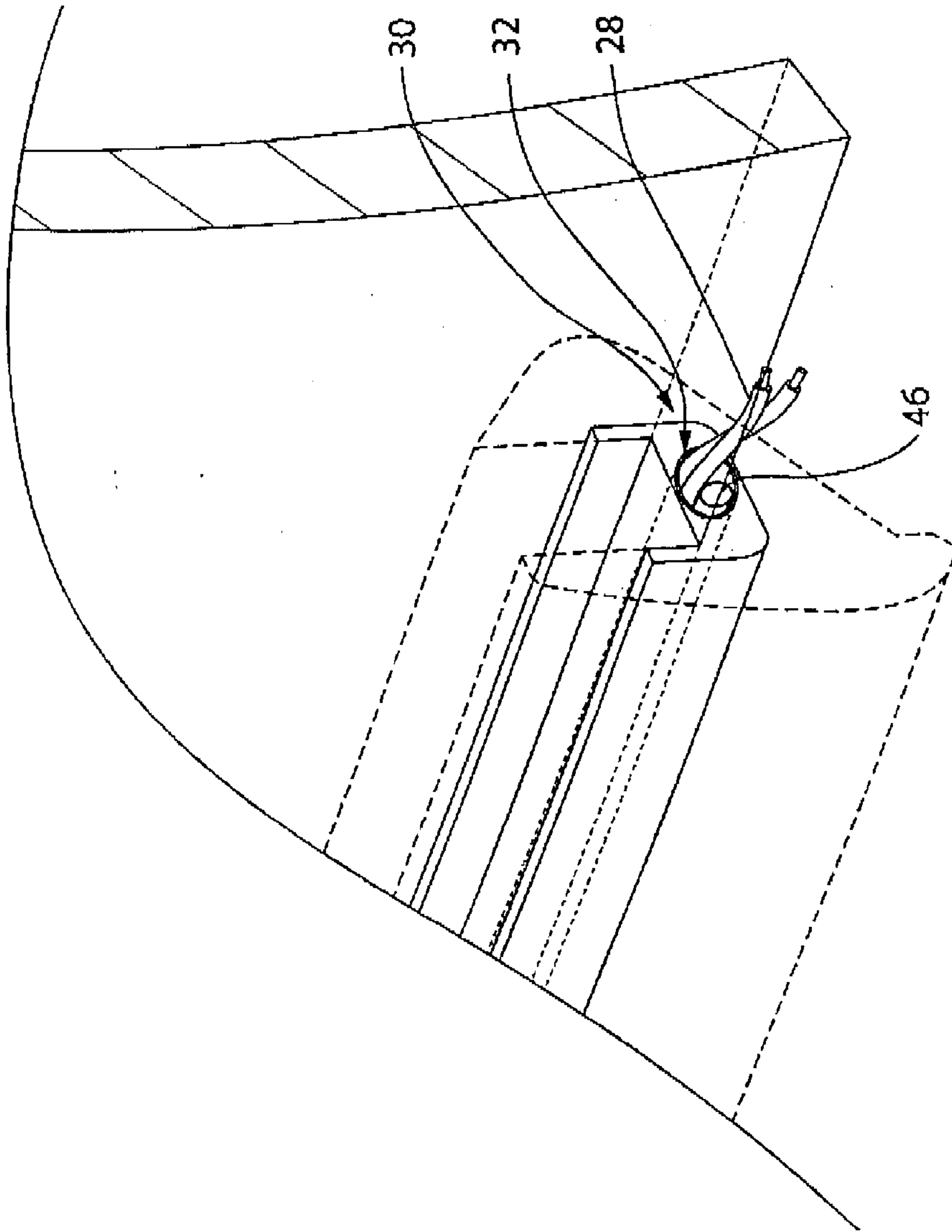


FIG. 8

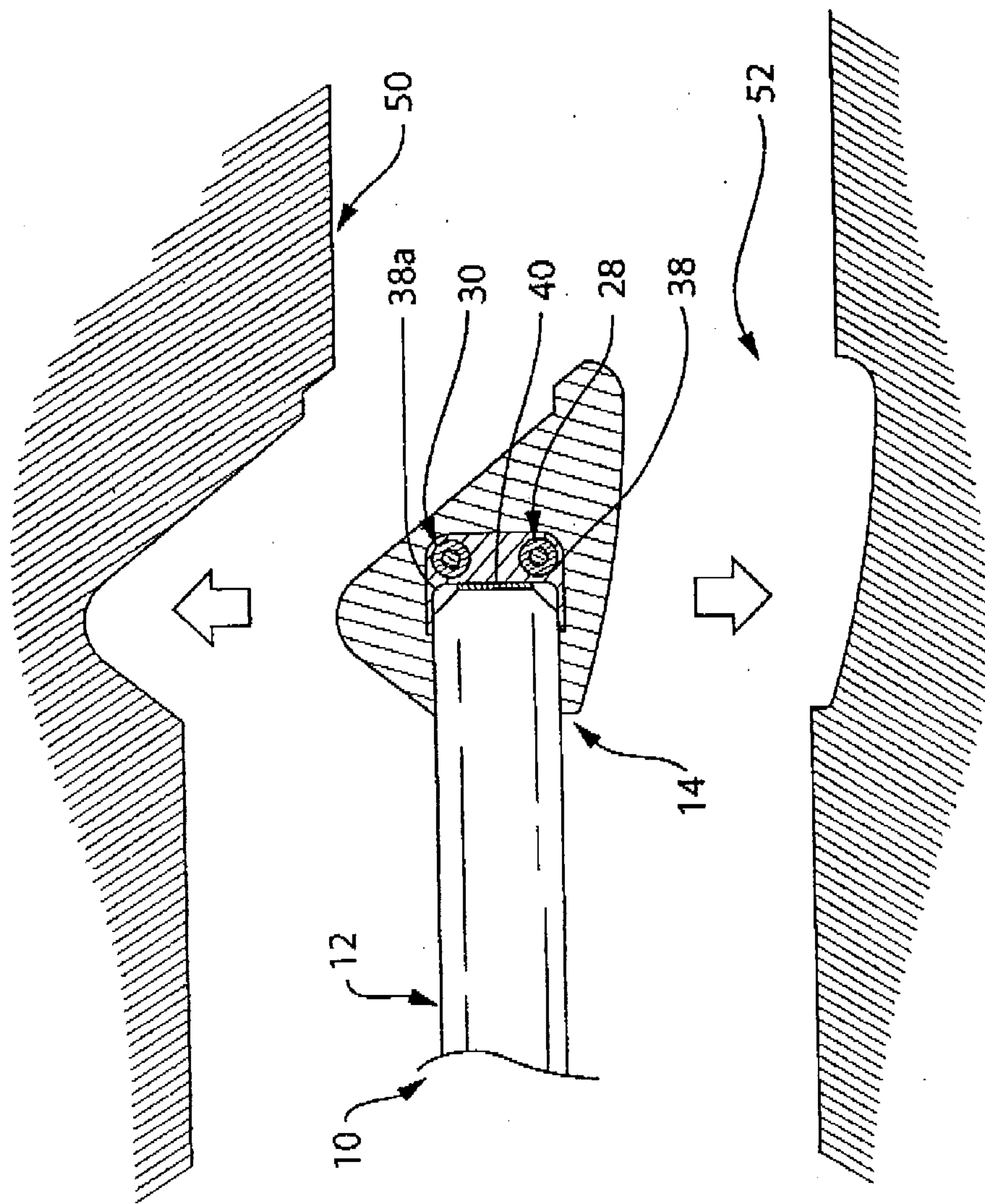


FIG. 9

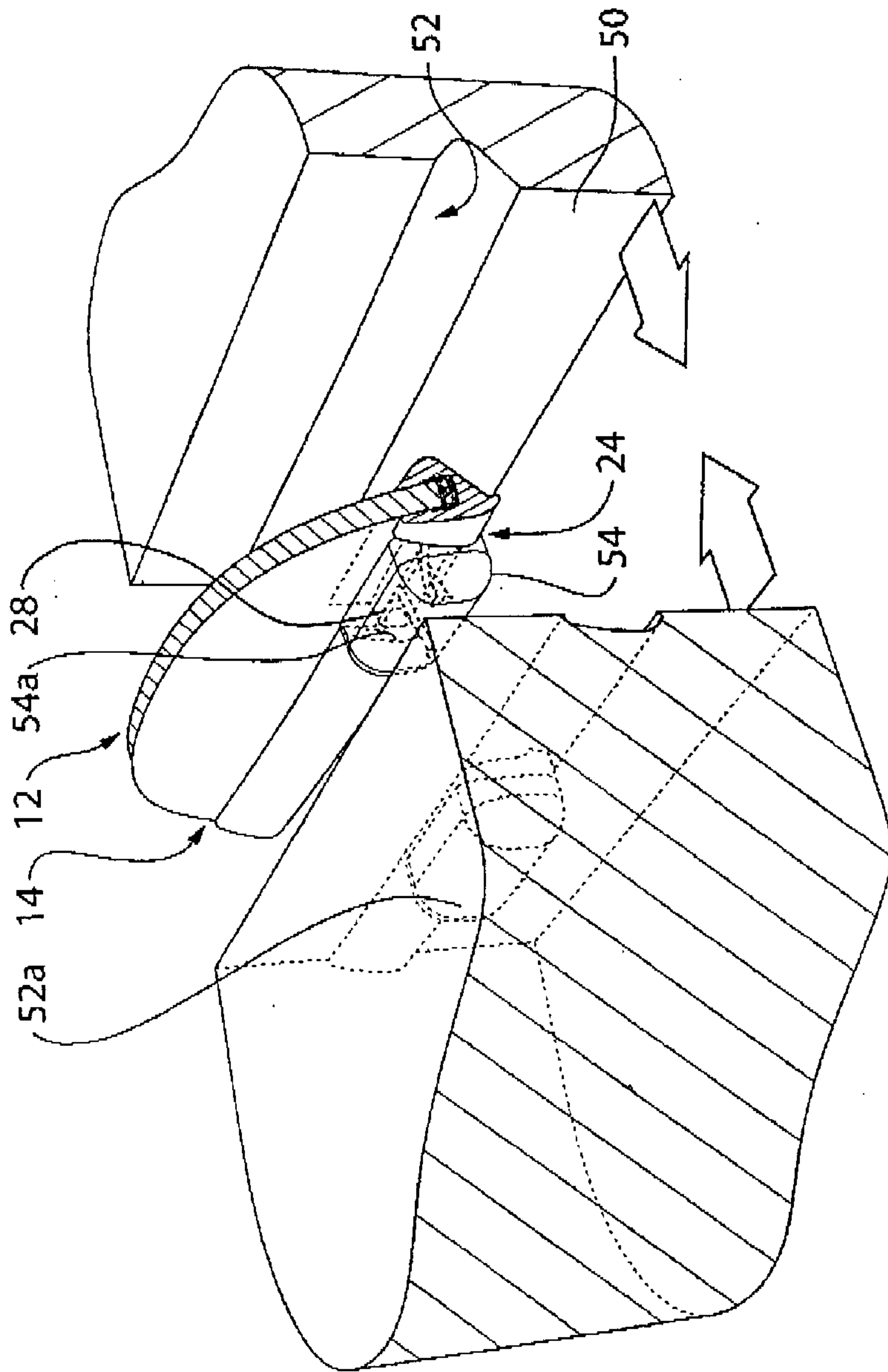


FIG. 10

