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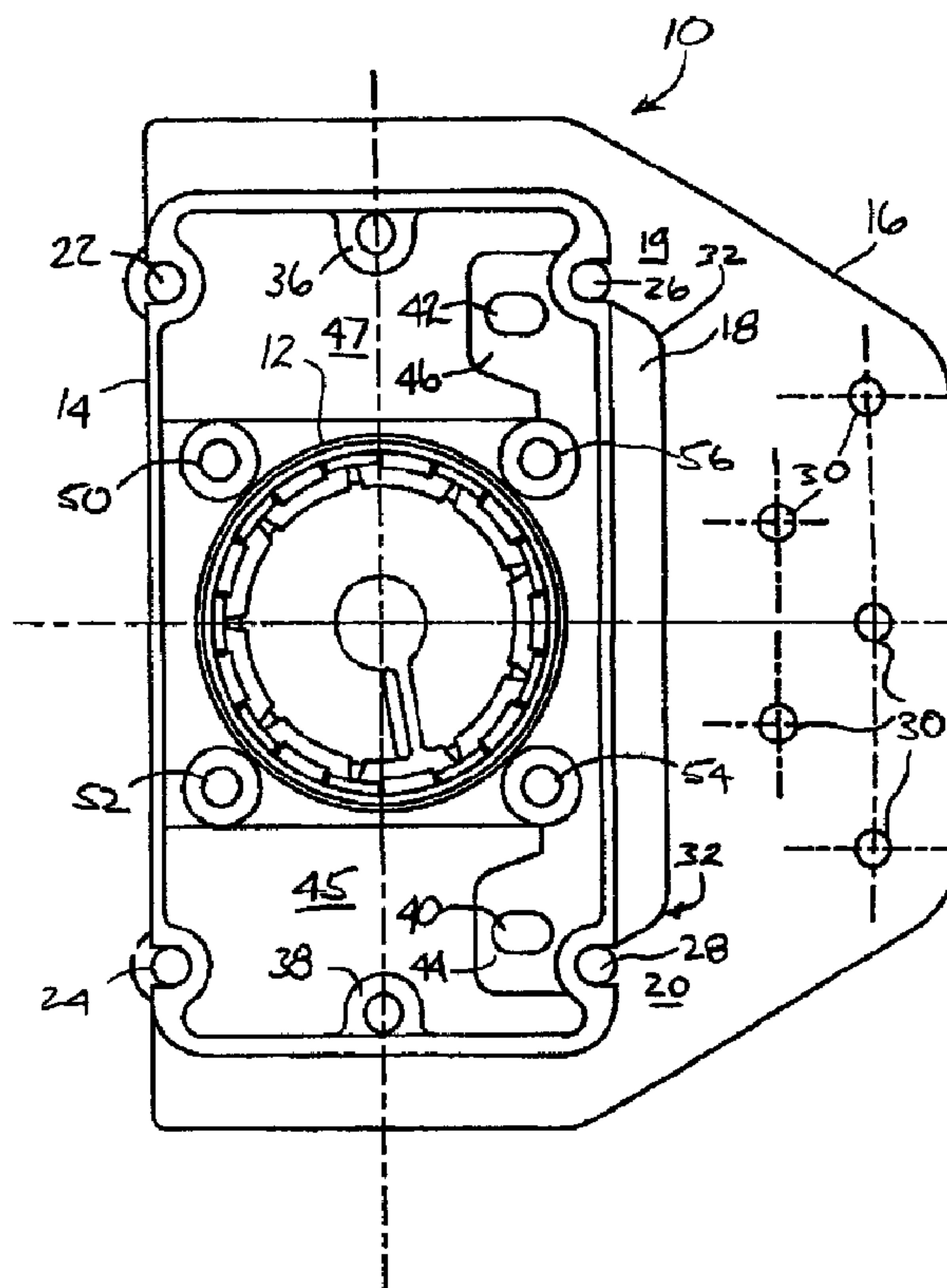
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(54) Titre : PLAQUE DE MONTAGE DE BOUCHE D'ASPIRATEUR CENTRAL AVEC ELEMENT PROTECTEUR AMOVIBLE

(54) Title: CENTRAL VACUUM INLET MOUNTING PLATE WITH REMOVABLE PROTECTOR



(57) Abrégé/Abstract:

A backing plate for an inlet valve for a central vacuum system is disclosed. The backing plate includes a tubular portion, which on one side is secured to vacuum conduits, and on the other side carries a vacuum opening having a rubber seal. The backing plate further includes a removable protective element or router disc to protect the rubber seal, such as for example during installation of dry wall over the backing plate.

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Abstract

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A backing plate for an inlet valve for a central vacuum system is disclosed. The backing plate includes a tubular portion, which on one side is secured to vacuum conduits, and on the other side carries a vacuum opening having a rubber seal. The backing plate further includes a removable protective element or router disc to protect the rubber seal, such as for example

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1 engaging the vacuum motor. Thus when the hose cuff of the portable hose is inserted into the vacuum opening, a low voltage circuit is closed and the vacuum motor is engaged. An example of this type of fitting is shown in U.S patent 4,336,427 to Lindsay.

Typically, a rubber seal or gasket is provided between the cover plate and the backing plate to ensure a good vacuum tight seal. When the rubber gasket or seal is mounted inside of the vacuum opening in the backing plate, it becomes partially exposed and thus is susceptible to damage during installation of the drywall over or around the fitting. Typically in new house installations, the backing plate will be mounted onto the end of the conduit and then nailed to an adjacent stud. For backing plates having a perimeter wall, it has been discovered that it is common for the drywall installer to use a router to define an opening in over mounted drywall. As the router is passed across the face of the backing plate, it may have a tendency to slip into the vacuum opening in the backing plate and damage the rubber seal or gasket. A damaged seal results in a loss of suction which can impair the effectiveness of the central vacuum cleaning system. Additionally, there is a risk that blocking debris may become lodged in the vacuum tube, since the pipe opening is fully exposed during this operation.

16 **SUMMARY OF THE INVENTION**

What is required therefore is a way of protecting the seal from being damaged during installation of the drywall over and around the backing plate and for preventing unwanted debris from being lodged in the exposed tubing. Preferably such protection would not interfere with the ease of use of the backing plate or inlet valve, but would still prevent the seal from being damaged and requiring replacement. Therefore, according to the present invention, there is provided a mounting plate for use in an inlet valve assembly for a central vacuum system, the mounting plate comprising a generally rectangular body having an elongate tubular section having a seal mounting means located on an interior surface therefore, a plurality of fastener openings formed in the body to receive fasteners, and a removable protector mounted in the elongate tubular section.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference will now be made to the following Figures which describe preferred embodiments of the invention and in which

- 1 Figure 1 is a plan view of a vacuum plate according to the present invention;
Figure 2 is a side view of the vacuum plate of Figure 1;
Figure 3 is a top view of the backing plate of Figure 1;
Figure 4 is an enlarged view from the rear of a tubular section of the backing plate of
Figure 1;
- 6 Figure 5 is the view of Figure 4 showing a removable protector;
Figure 6 is a side view of the tubular section of Figure 5;
Figure 7 is a plan view of the tubular section of Figure 5;
Figure 8 is an enlarged of circle 8 of Figure 7;
Figure 9 is a view along lines 9-9 of Figure 8; and
- 11 Figure 10 is a cross-sectional view of the tubular section of Figure 5.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 shows a backing plate indicated generally at 10 according to the present invention. The backing plate includes a tubular section 12, a continuous perimeter wall 14 and a side flange 16. An opening 18 separates the side flange 16 from the mounting plate 10 except for
16 lands 19 and 20 located at the top and the bottom respectively.

Partially formed in the side wall 14 are a plurality of openings 22, 24, 26, 28, 36 and 38 which are intended to accept fasteners such as screws or the like. Wire loop holes 40 and 42 are provided on flanges 44 and 46 which extend into openings 45 and 47 respectively. Further, four mounting openings 50, 52, 54 and 56 are shown located around the perimeter of
21 the tubular portion 12. While any specific configuration of openings 22, 24, 26, 28, 36, 38, 50, 52, 54 and 56 can be used, it has been found that the configuration of the openings as shown is preferred, because this configuration is generally universal; a majority of the inlet valve cover plates presently in the trade are accommodated by this pattern of openings.

As can be seen in the side view, in Figure 2, the apertures 22 and 24 include rearward
26 extensions 58 and 60 which provide enough material for a fastener such a screw to be firmly gripped. Also, the tubular portion 12 can be seen extending rearwardly from the plane of the plate 10. The tubular portion 12 preferably ends with chamfered end portion 13.

1 In Figure 3, it can be seen that the side mounting flange 16 is relatively thin as compared to
the balance of the backing plate and is attached at the side edge to the backing plate. The
preferred thickness t for the flange 16 is 0.060 inches, and it is preferred to form a plurality of
preformed nailing or other fastener holes 30 in the flange to facilitate the attachment of the
flange to a stud or the like. Further a gentle curve is preferred to define the lower and upper
6 borders of the opening 18, as shown by arrow 32. This curve, in combination with a tapering
of thickness as shown at 31 in Figure 3, helps ensure that a break off line for the flange is
generally parallel to the side edge of the backing plate. It will be appreciated that scoring or
other techniques could also be used to cause the flange to break along the desired line
adjacent to the side edge of the backing plate.

11 Turning to Figure 4, the tubular section 12 is shown in larger view with the vacuum opening
61. The tubular section includes a plurality of forward and rearward castellations indicated as
62 and 64 respectively. Each castellation is canted slightly towards the opposing row of
castellations and is preferably placed opposite to a space formed in the facing row of
castellations. In this manner, the rows of castellations can grip a sealing member, such an O-
16 ring 65, securely. Thus, it is unlikely that the sealing O-ring or gasket will be accidentally
pulled or sucked out of the castellations. The castellations are preferably formed with a taper,
so a broader base is adjacent to the O-ring 65. This is indicated by the angled lines with
arrows 63. The taper facilitates molding the castellations. The preferred form of the sealing
ring is a # 130. The castellations may be 0.045 inches thick, and need to extend out from the
21 tubular section enough to grip the preferred sealing ring. Good results have been achieved
using nine castellations in each row, evenly spaced about the inside perimeter of the tubular
section. More or less could be used, however, by varying the length of each castellation.

Figure 5 shows the same view as Figure 4 except that the removable protective element 66 is
shown. As can be seen, a plurality of thin webs 68 extend from the main body of the
26 protective element (which may be referred to as a router disk) across to an inner surface 69 of
the castellations 62. In the most preferred embodiment, the attachment points are formed on
the forward, or outward row of castellations. This facilitates the molding, in one piece, of the
fitting with removable seal protector. In this sense it will be appreciated that the reference to
the forward or outward position is to the position which the removable protective element 66

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1 takes relative to the seal when the backing plate is installed on a stud or the like. The
requirement is for the protective element 66 to be interposed between the potential source of
damage (such as a router) and the part needing protection (the seal and tubular portion).

Figure 6, is a side view of the tubular portion, as well as the castellations 62, 64 in dotted
outline. As can be seen they are formed in two parallel rows in which the opposed rows are
6 spaced offset from each other. The ideal seal will be flexible and thus will have a tendency to
be bent around each castellation, in an alternating or wavy pattern. This has been found
effective to hold the seal in place against forces occurring when the cover plate of the valve
assembly is inserted and withdrawn from the backing plate.

As can be seen in Figure 7, and in particular Figure 8, each web 68 which extends between
11 the protective element and the tubular portion narrows or tapers. Good results have been
achieved with a web that is .07 by .063 inches in cross section at the point where it emerges
from the protective disk 66, and tapers to a .025 by .025 inch cross sectional area where the
web joins the surface 69 of the castellations of the tubular portion (shaded portion of Figure
9). It is preferred to form the taper on the side of the web 68 proximal to the seal, but other
16 configurations are also possible as will be appreciated by those skilled in the art. Figure 9
shows that the cross-sectional area of the web is smallest at the contact point with the
castellation.

By tapering the web 68 as shown, the point of failure of the web 68 will be adjacent to the top
of the castellation. There is a certain tolerance for there to be disconformities or vestiges of
21 plastic left on the inner surface of the castellation, once the protective element 66 has been
torn out. Essentially this tolerance is defined by the difference in height of the castellations
62, 64, and the thickness of the sealing ring 65. To prevent the vestiges of plastic from
interfering with the seal, it is most preferred to cause the webs 68 to separate as close as
possible to the surface of the castellation. It will be appreciated by those skilled in the art that
26 other configurations can also be used, provided they are sized and shaped to permit the seal to
function properly.

The removable protective element 66 is shown with a central opening at 84. A finger tab 86

1 is provided which allows the removable element 66 to be gripped as shown in Figure 10. As
the element is gripped and pulled, successive webs of the element are broken one at a time.
In this manner, the protective element can be easily withdrawn from the tubular portion 12.
Shown in dotted outline in Figure 10 as 100 is a portion of a cover plate or valve, which is
inserted into the tubular portion 12, to form a complete assembly. The portion 100 seals
6 against seal 65 as shown and may be simply pulled in and out as needed. Also shown is
conduit 101 which surmounts the tubular portion 12.

Good results have been achieved by forming the router disk 66 from .063 inches thick
material, and having the central opening about 0.5 inches in diameter. With these dimensions
it has been found that the router disk 66 may be readily manipulated to pull the same away
11 from the tubular section 12. Further, by making the finger tab 86 extend slightly above the
plane defining the opening of the vacuum inlet tubular portion 12, the easy manipulation of
the finger tab 86 is achieved. It is preferred to avoid projecting the finger tab too far into the
space where a router might be expected to pass during installation of the overmounted
drywall. It will be appreciated that what is desired is to position the finger tab 86 in a manner
16 that balances the risk of it being in the way during installation with the desire for the finger
tab to be easily accessed for removing the router disk.

In Figure 10, it can now be appreciated how the present invention operates. Turning to Figure
1, the backing plate 10 can be positioned as necessary on a stud or the like where the end of
the vacuum conduit is located. In some cases, it may not be necessary to attach the mounting
21 flange to an adjacent stud, in which case, the flange can simply be broken off along the line of
the opening 18.

Once the backing plate 10 is secured in position, a drywall installer can press drywall over the
top of it. Then, using a router, and guided by the inside edge of the perimeter wall 14, a
drywall installer can form an opening in the drywall which exactly matches the perimeter
26 wall. During the process, the removable protective cover will be protecting the damageable
rubber seal 65. Further, debris and other blocking material will be prevented from entering
into the vacuum system through the tubular part 12 of the fitting 10. Once the drywall is
installed, and it is necessary to insert an inlet valve 100, then the protective element 66 can

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1 simply be gripped at 86 and pulled away from the internal surface of tubular portion 12.
Because the webs 70 will break adjacent to the internal surface of the tubular element 12, any
disconformities caused or vestiges left will be hidden below the level of the seal 65, or the
castellations 62, 64 depending where the webs attach. Thus, they will not interfere in any
way with the ability of a good vacuum seal to be formed between the inlet valve 100 and the
6 seal 86 mounted in the mounting plate 10.

Although the most preferred form of the invention is to have the removable cover attach to
the tubular section on the castellations, it will be appreciated that the attachment could also be
achieved at other points along the tubular portion 12, closer to the outside edge. However for
maximum protection of the seal 65 and to ensure that the protective element 66 is not
11 prematurely broken or removed, it is preferred to mount it in the tubular section at or about
the castellations 62, 64, as shown. Also, during molding, the castellation forming parts of the
molds act as "gates" for the castellation webs which facilitates consistent molding results.
Of course, if the castellations were to be replaced with a continuous lip, the protective
element 66 could be anchored to such a continuous lip or anywhere on the inside tubular
16 portion.

Further, although the most preferred form of the invention is to integrally form the removable
cover at the time the backing plate is formed, the present invention also comprehends the
removable cover being separately molded and simply press fit into position. However this is
less preferred because of the problems of separate assembly being required and that any such
21 press fit protective element is more likely to become unintentionally separated leading to a
premature loss of protection for the seal and tubular portion.

It will be appreciated by those skilled in the art that while the foregoing makes reference to a
preferred embodiment of the invention, various modifications and alterations can be made
without departing from the spirit or the scope of the invention. For example, while reference
26 has been made to the removable protective element 66 being attached to the castellations, it
could be attached anywhere along the tubular portion 12, provided that protection was
provided to the seal 65 and that any plastic vestiges left over when the disk 66 is removed do
not interfere with the ability to form a good seal between seal 65 and tube 100 of the inlet
valve.

1 THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY
OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOW:

1. A mounting plate for use in an inlet valve assembly for a central vacuum system, the mounting plate having an outer face and an inner face, the mounting plate comprising:
 - 6 a generally rectangular body having an elongated tubular section having a seal mounting means located on an interior surface thereof;
 - a sealing means carried on said mounting means;
 - a plurality of fastener openings formed in the body to receive fasteners; and
 - a removable protector element integrally molded inside said elongated tubular section adjacent to said seal mounting means and between said outer face and said seal mounting means and having:
 - 11 a generally circular outer circumference having
 - a plurality of attachment points with said interior surface comprising breakable connections to said tubular section and
 - 16 a plurality of gaps around said outer circumference between said attachment points,
 - said breakable connections positioned relative to said sealing means wherein after said breakable connections are broken and said removable protector element is removed, and disconformities caused in said tubular section at said breakable connections do not interfere with a
 - 21 seal made at said sealing means.
2. The mounting plate of claim 1 wherein said breakable connections are in the form of webs which taper towards a connection to said elongate tubular section.
3. The mounting plate of claim 2 wherein said webs are thinnest in cross-section at a break off point to promote separation at the connection to reduce vestiges.
- 26 4. The mounting plate of claim 1 wherein the gaps are at least partially blocked by said seal.

- 1 5. The mounting plate of claim 1 wherein the seal mounting means comprises a plurality of castellations extending inwardly from said interior surface of said elongate tubular section.
6. The mounting plate of claim 5 wherein said interiorly extending castellations comprise opposed rings of castellations dimensioned to receive and retain a sealing member therebetween.
- 6 7. The mounting plate of claim 6 wherein said removable protector includes a finger tab for enabling said removable protector to be gripped and torn out of said elongate tubular section.
8. The mounting plate of claim 7 wherein said removable protector includes a central opening to facilitate bending of the removable protector during removal from the elongate
11 tubular section.
9. The mounting plate of claim 8 wherein said body includes an opening above and below said elongate tubular section.
10. The mounting plate of claim 9 wherein the body includes a stud mounting flange.
- 16 11. The mounting plate of claim 10 wherein the stud mounting flange comprises a flat member attached at an upper and a lower end to said body.
12. The mounting plate of claim 11 wherein the stud mounting flange further includes preformed fastener holes formed therein.

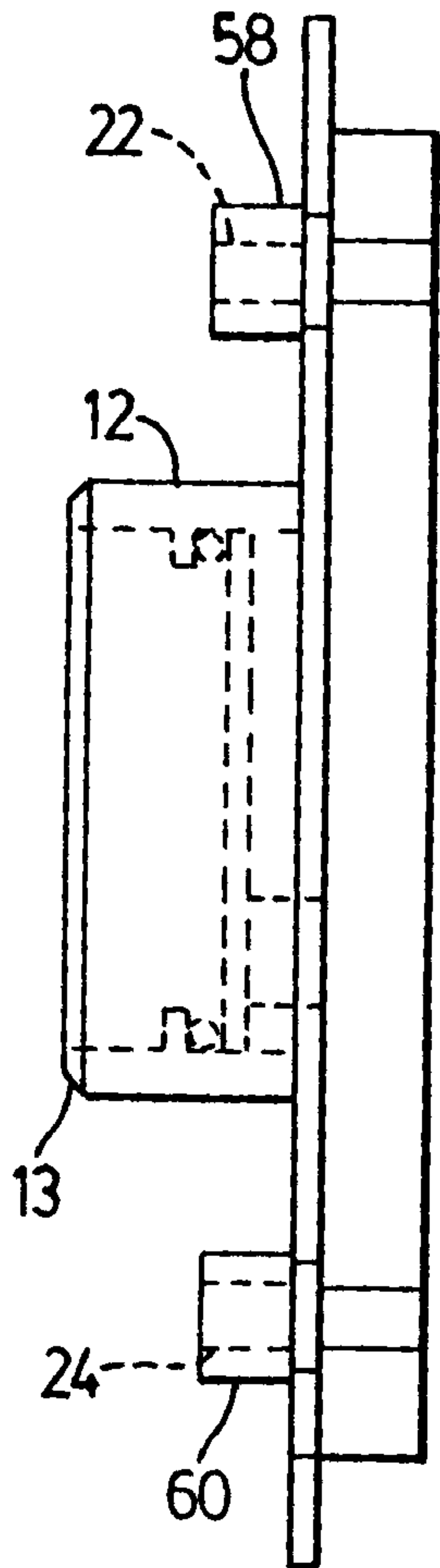


FIG. 2

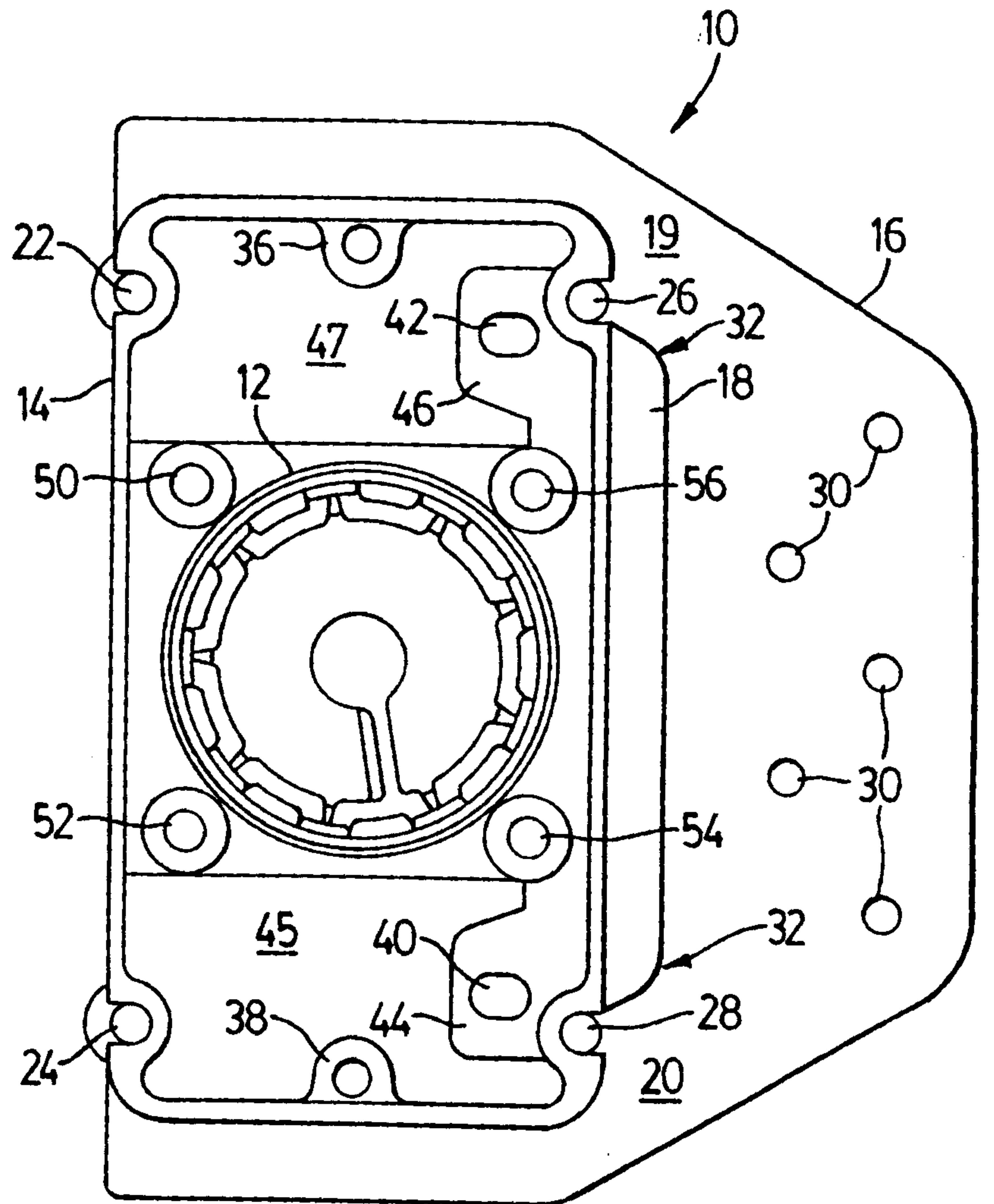


FIG. 1

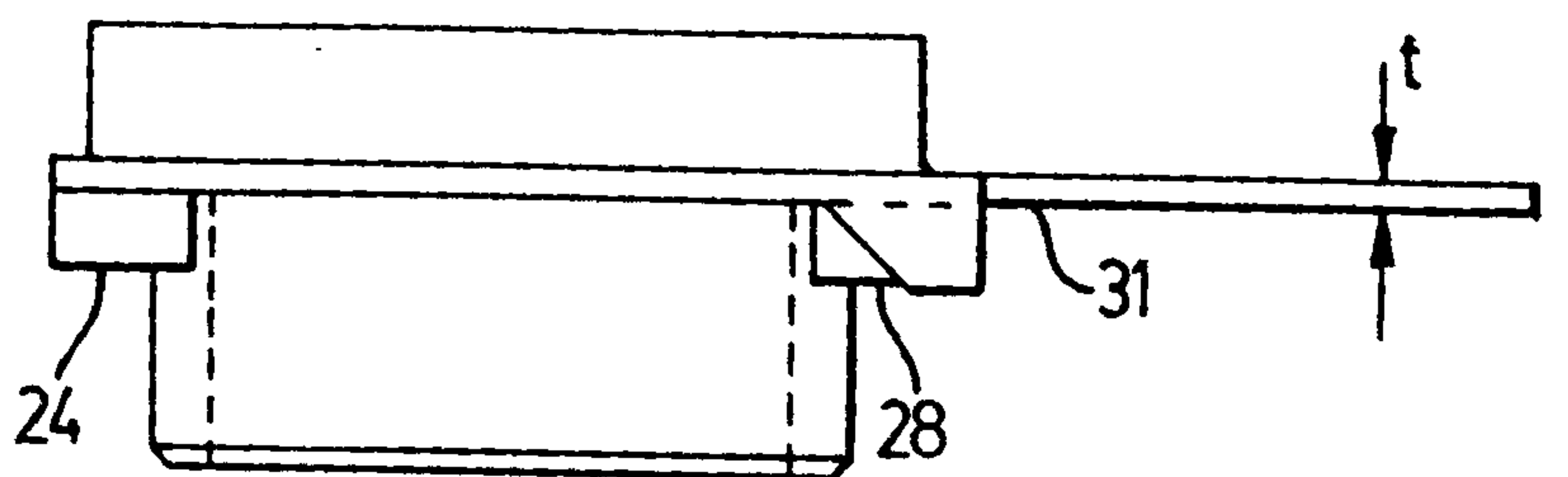


FIG. 3

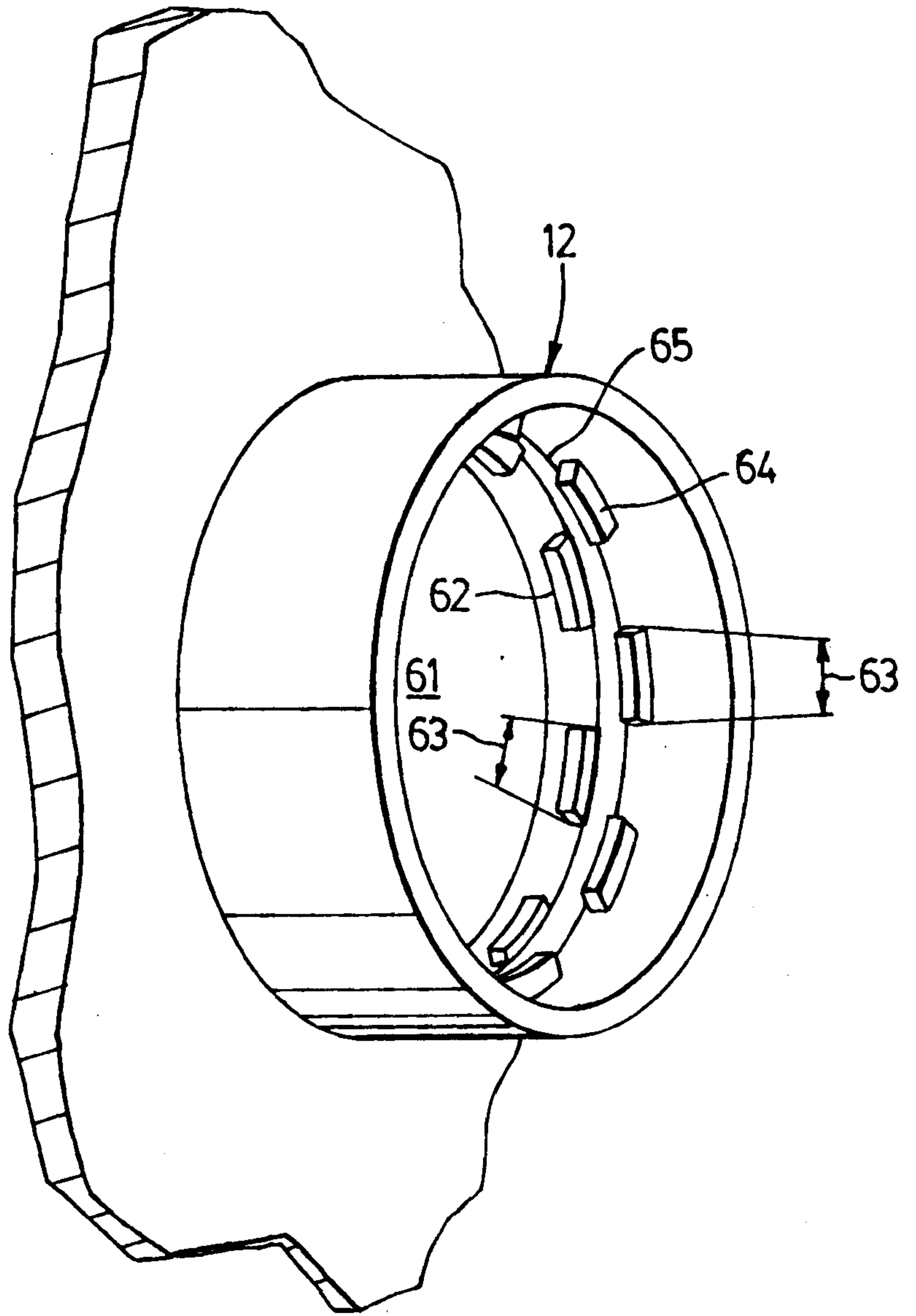


FIG. 4

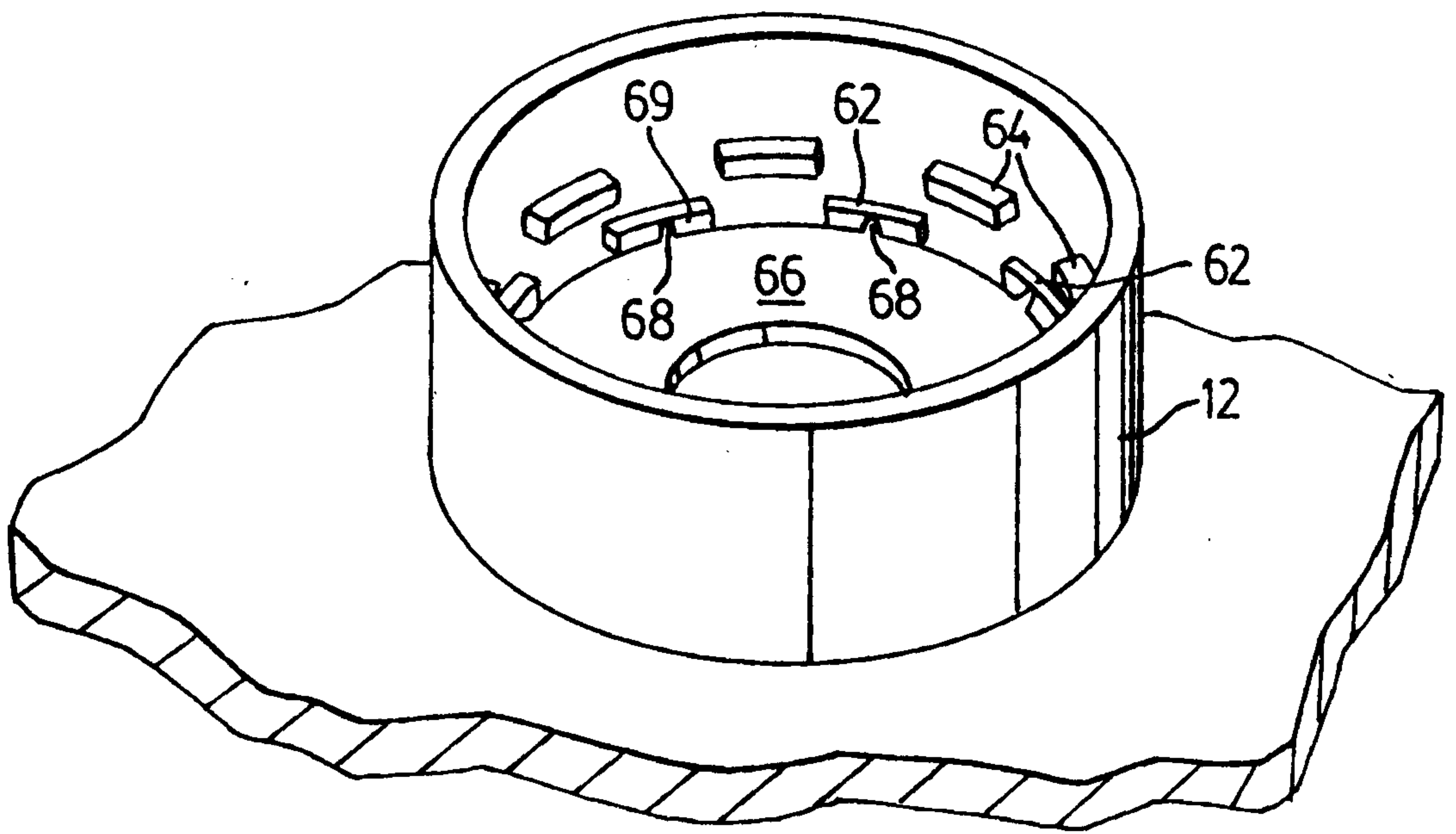


FIG. 5

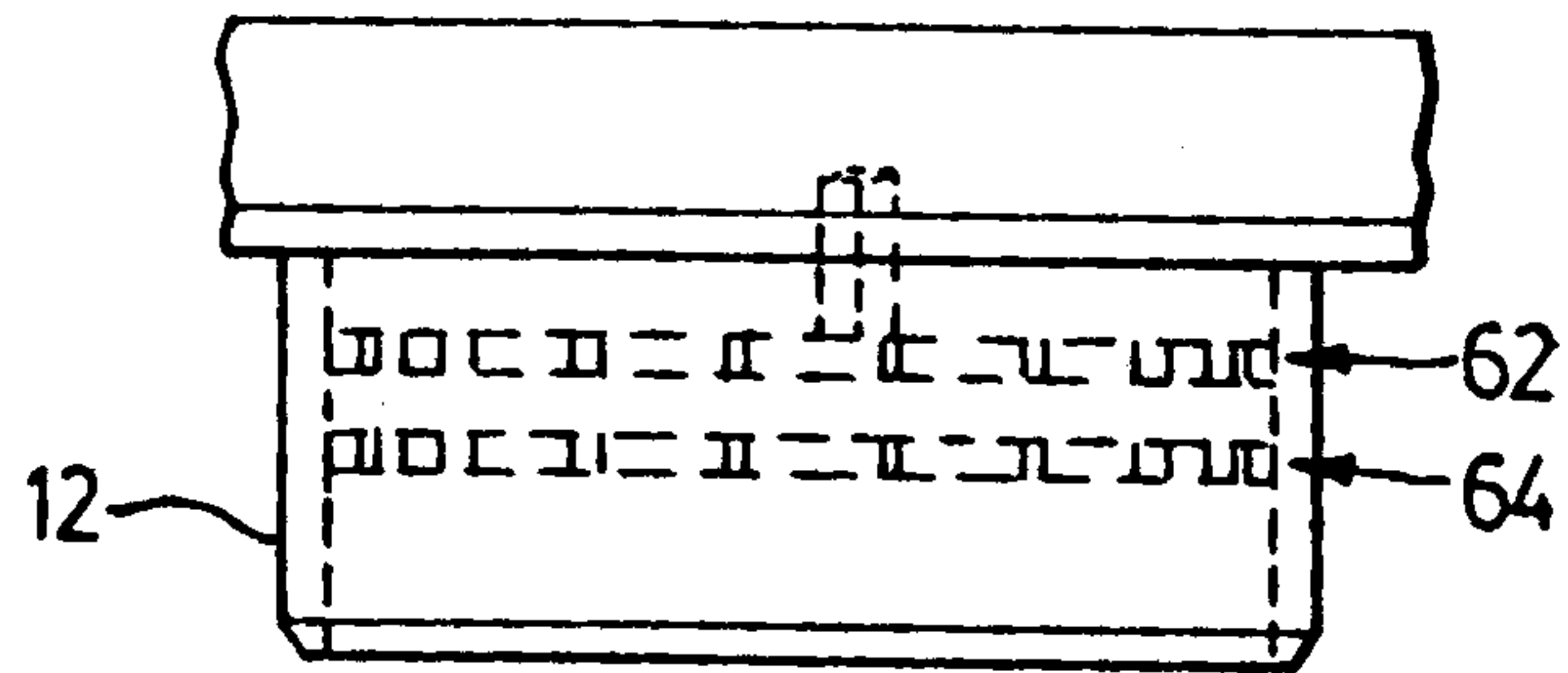


FIG. 6

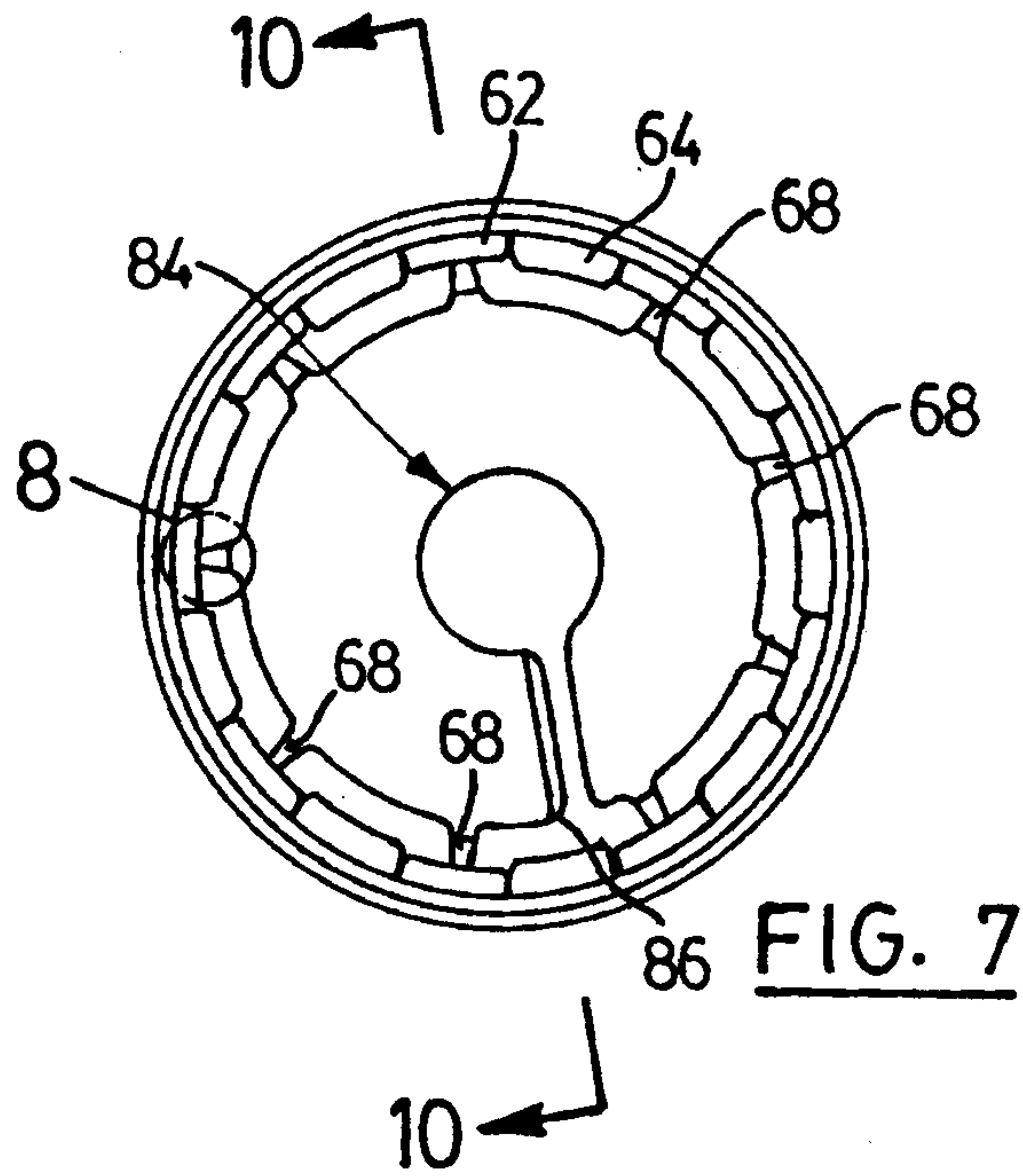


FIG. 7

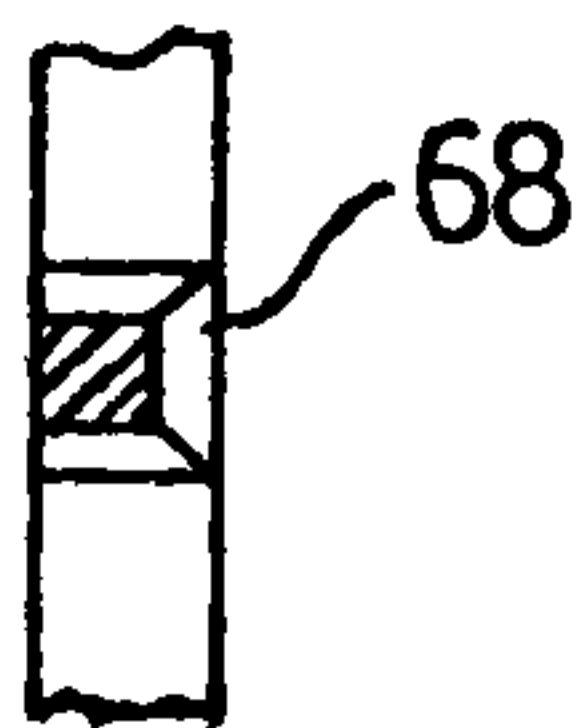


FIG. 9

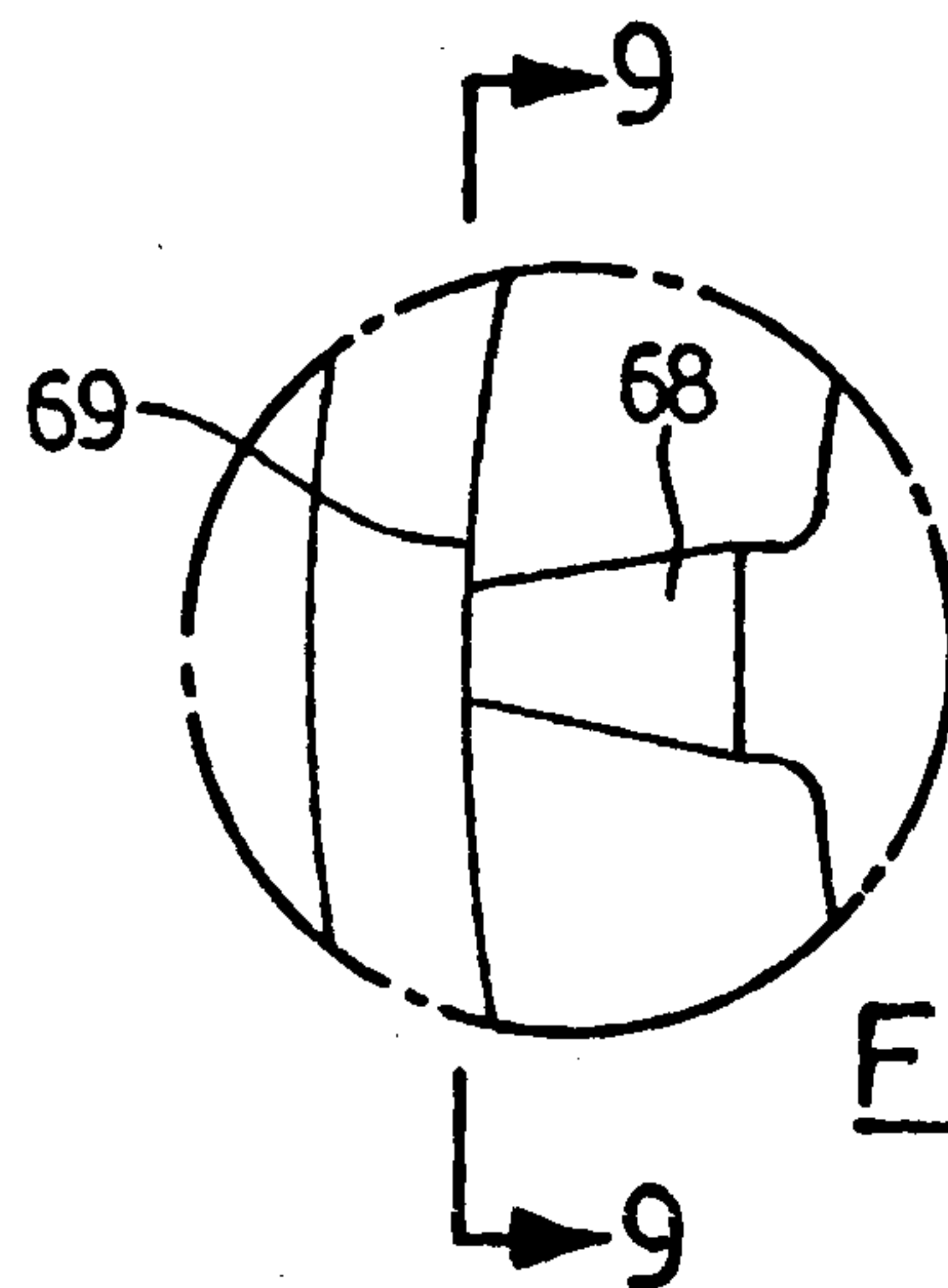


FIG. 8

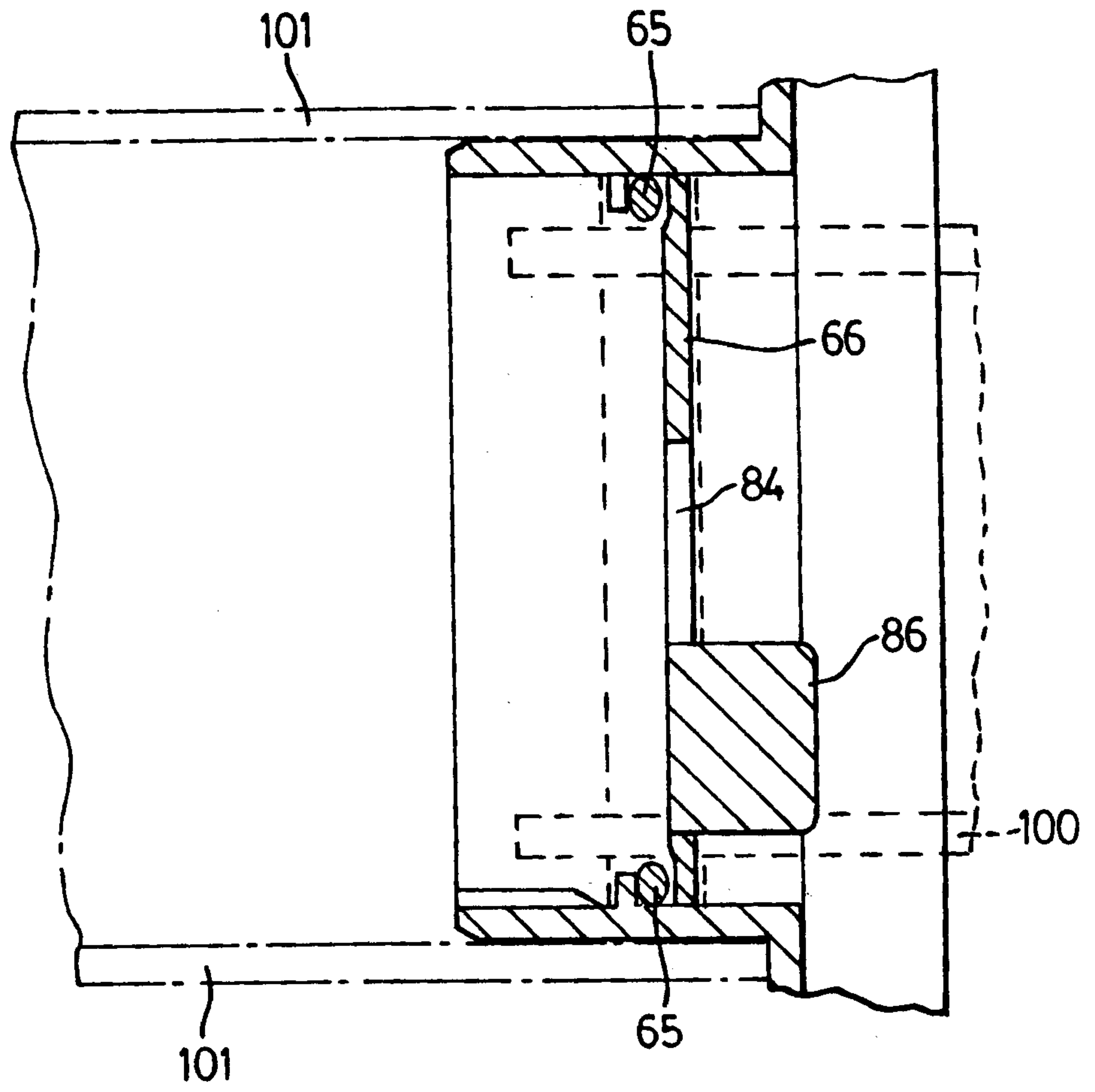


FIG. 10

