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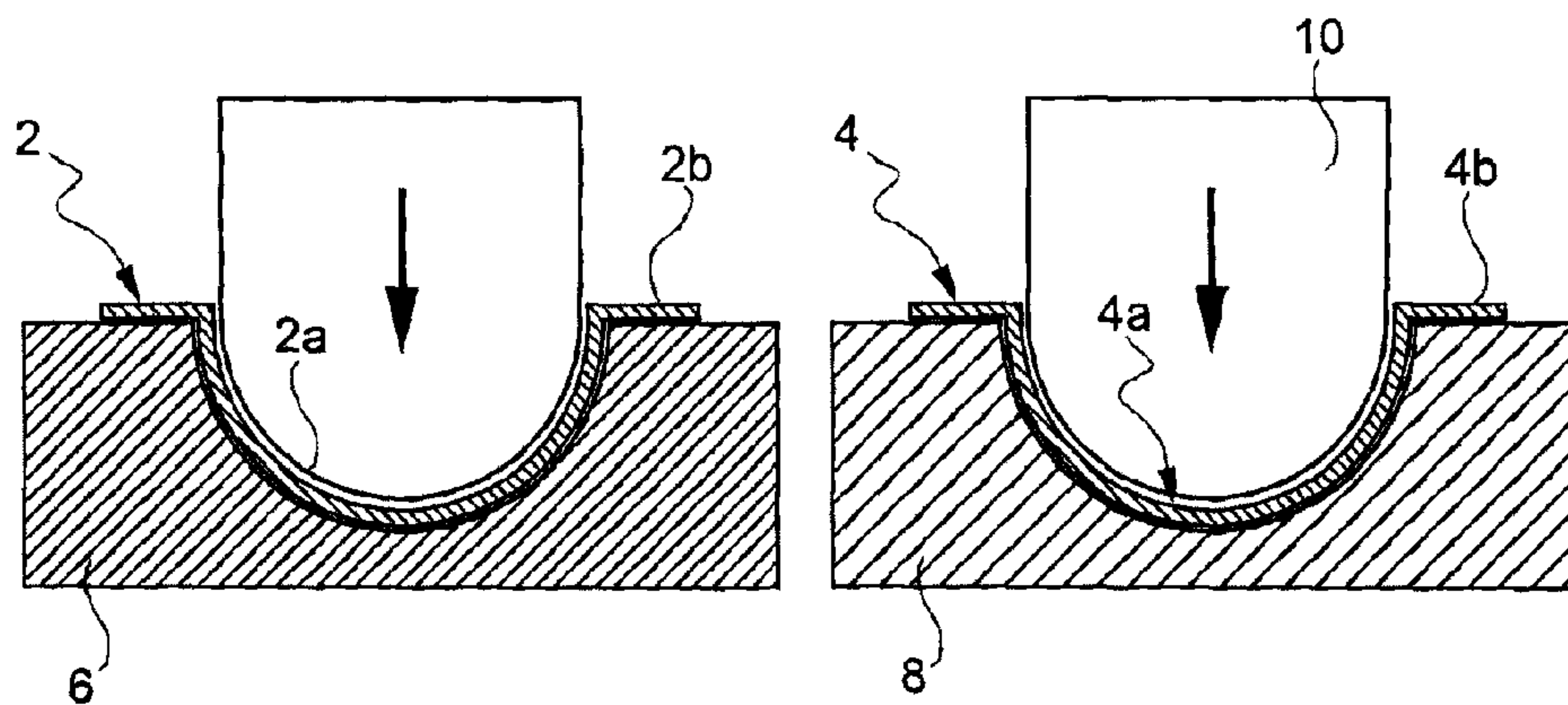
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(54) Titre : DISPOSITIF, APPAREIL ET PROCESSUS SERVANT A EMBALLER UN ARTICLE DANS UNE ENVELOPPE DE MATERIAU EN FEUILLE

(54) Title: DEVICE APPARATUS AND PROCESS FOR WRAPPING AN ITEM IN A CASING OF SHEET MATERIAL



(57) Abrégé/Abstract:

Device and apparatus for wrapping an item (P) in a casing formed by a pair of half-shells (2, 4) of sheeted material with a shape matching respective portions of the outer surface of said item (P) where said half-shells (2, 4) are provided with a respective flange

(57) Abrégé(suite)/Abstract(continued):

(5, 7) surrounding the respective mouth contour and said flanges (5, 7) are connected together by folding and/or upsetting in such a way as to jointly define said casing, comprising a tool provided with an opening (38) with a profile (40) homologous and widened with respect to the perimeter profile defined by the distal end (5a, 7a) of said flanges (5, 7), said tool (36) being mobile in a direction orthogonal to the plane on which the proximal portion (5b, 7b) of said flanges (5, 7) lies, and also being mobile parallel to the plane of said proximal portion of the flanges, motor means (42) being envisaged arranged to position said caulking tool (36) with the profile (40) of said opening (38) in a surrounding relationship with said angled distal portion (5a, 7a) of said flanges (5, 7) and to bring a section of the profile (40) of said opening (38) into contact with a homologous section of the perimeter profile defined by said angled distal portion of said flanges (5, 7) and to cause a movement of approach towards said item (P) of said section of the profile of said opening (38) in contact with said distal portion (7a) to make it fold further on said proximal portion (5b, 7b) and to repeat the aforesaid operations on further sections of the profile of the distal portion (5a, 7a) of said flanges (5, 7).

ABSTRACT

Device and apparatus for wrapping an item (P) in a casing formed by a pair of half-shells (2, 4) of sheeted material with a shape matching respective portions of the outer surface of said item (P) where said half-shells (2, 4) are provided with a respective flange (5, 7) surrounding the respective mouth contour and said flanges (5, 7) are connected together by folding and/or upsetting in such a way as to jointly define said casing, comprising a tool provided with an opening (38) with a profile (40) homologous and widened with respect to the perimeter profile defined by the distal end (5a, 7a) of said flanges (5, 7), said tool (36) being mobile in a direction orthogonal to the plane on which the proximal portion (5b, 7b) of said flanges (5, 7) lies, and also being mobile parallel to the plane of said proximal portion of the flanges, motor means (42) being envisaged arranged to position said caulking tool (36) with the profile (40) of said opening (38) in a surrounding relationship with said angled distal portion (5a, 7a) of said flanges (5, 7) and to bring a section of the profile (40) of said opening (38) into contact with a homologous section of the perimeter profile defined by said angled distal portion of said flanges (5, 7) and to cause a movement of approach towards said item (P) of said section of the profile of said opening (38) in contact with said distal portion (7a) to make it fold further on said proximal portion (5b, 7b) and to repeat the aforesaid operations on further sections of the profile of the distal portion (5a, 7a) of said flanges (5, 7).

(Figures 14 and 15)

Device apparatus and process for wrapping an item in a casing of sheet material

This invention refers to a packaging device and apparatus for wrapping an item, typically a food product, in a casing formed by a pair of half-shells made from sheeted material with a shape matching a respective portion of the surface of the item, and associated packaging process.

In known procedures, the two preformed half-shells are coupled one to the other around the item and connected together by means of an operation known as caulking which implies folding and/or upsetting flanges surrounding the mouth contour of each half-shell.

The term "caulking", which is used in mechanical technologies to indicate the operation of upsetting the edge of riveted sheets, is used in this description in a broad sense to indicate a deformation operation that folds and/or upsets the flange edges of each half-shell in such a way that such flange edges are connected to one another.

A packaging process and apparatus of the type mentioned above are described in DE 17 84 647 U. The procedure described there contemplates an initial stage in which little aluminium sheets are drawn in respective shaped moulds in such a way as to form the two half-shells of the casing; a food product is then inserted into one of the two half-shells, supported by the respective mould, and the second half-shell, inserted in a respective mould, is applied on the part of the product protruding from the first half-shell, thereby positioning the flange edges of the two half-shells in a face-to-face relationship.

When the two moulds have been closed, the flange edges are trimmed or punched; then the flange edges of the two half-shells are joined together by hot-bonding, gluing or folding; this last operation is not described in detail, however.

GB 952 925 describes a procedure and a caulking device in the framework of a process that uses two half-shells of sheet aluminium shaped as a mould for forming a hollow chocolate body; the caulking operation is carried out by arranging the items inserted one by

one between the two sheet aluminium half-shells in a first press which, with the aid of a ring-type shaping element, provokes an initial folding of the flange edges in a direction orthogonal to the general plane of the flanges.

- 5 The items are then transferred to a second press, associated with which is a ring-type shaping element which, in turn, causes the flanges to curl.

One object of this invention is to supply a device that makes it possible to carry out the caulking operation simultaneously on a plurality of items.

10

Another object of the invention is to provide a procedure and an apparatus that permit in-line packaging, operating continuously or step by step, thereby making it possible to package a plurality of items in half-shells of sheeted material with high productivity.

- 15 In the light of these objects, a caulking device, an apparatus comprising it, and a process as defined in the claims that follow constitute the subject of the invention.

Further characteristics and advantages of the invention will be evident from the following detailed description, which is purely exemplificative and not limitative, and which is made
20 with reference to the attached drawings, in which:

- figs. 1-15 are schematic representations that illustrate consecutive stages of the packaging procedure of a preferred embodiment;
- figs. 7a and 7b illustrate two consecutive positions of the operation carried out in fig. 7;
- 25 - fig. 16 is a perspective view of a caulking tool used in the framework of the process; and
- fig. 17 is a plan view of the tool in fig. 16, depicted in an operating position along with the item on which the tool works for the caulking operation.

- 30 The apparatus according to the invention carries out the in-line packaging of a given item starting from an initial sheeted material drawing stage in order to obtain the half-shells that

constitute the casing, and goes on to discharge the completely packaged item.

As will be evident from the description that follows, some of the operating stages described below with reference to the attached drawings are purely optional.

5

Fig. 1 shows a drawing stage for forming a first and second half-shell 2, 4 in a respective honeycomb mould 6 and 8. The half-shells 2, 4 are obtained from a sheet of plastically deformable material. This is typically a sheet of aluminium, for example from 10 μm to 40 μm thick, and can optionally be coated on at least one face with a lacquer or other hot-melt or hot-bonding coating. The moulds 6 and 8 have a shaped moulding cavity 9, 11 (fig. 2) with a form that matches a respective portion of the external surface of the item to package.

The item to package is illustrated in the drawings supplied along with this description, and in figs. 1 to 15 in particular, with a circular cross section, so that the two half-shells 2, 4 are equal to one another in the sections that are the subject of the figures.

It is evident that this is a purely exemplificative choice taken for illustrative simplicity, as the invention should not be understood in any way to be limited to packaging items with circular cross sections or with rotational symmetry; on the contrary, the procedure is particularly advantageous for packaging shaped items with complex and asymmetrical forms, of the type illustrated in fig. 17, for example.

The two half-shells made from sheeted material in which the item is packaged can in this way have forms that differ from one another, it being understood that in any case the mouth profile of the half-shells corresponds to the profile of the item's maximum longitudinal section.

In this way the item to wrap can, for example, be a body of food material, chocolate for example, optionally hollow, such as a chocolate egg (which constitutes a typical example of a body with rotational symmetry) for example, or a body with a complex form, such as a

body representing a toy, a character or an animal.

It is also intended that, although each mould is depicted in the attached drawings with a single seat for drawing the respective half-shell, in industrial practice each mould can
5 comprise a plurality of seats, arranged in a matrix for example, in order to make it possible to draw a plurality of half-shells in a single stage.

A continuous band of sheeted material unwound from a reel is cut to obtain a sheet which is positioned on each mould; in the case in which each mould has a plurality of seats, after
10 having positioned the sheet so that it covers the seats, a first cutting operation is generally carried out in order to subdivide the sheet into small individual sheets, each of which covers a respective seat.

The drawing operation is carried out in a way that is known per se, for example with the
15 use of a plug 10 (or a plurality of plugs 10) with a form that is complementary to the surface of each mould seat or cavity.

The drawing operation is carried out without constraining, or by only constraining slightly, the peripheral edges of each sheet subjected to drawing. The half-shells of sheeted material
20 2, 4 obtained in this way have a hollow surface portion 2a, 4a and a peripheral surface portion 2b, 4b surrounding the mouth contour of the hollow portion, the external profile of which corresponds to the perimeter of each sheet fed to the respective mould.

It should be specified, however, that the procedure described also applies to packaging an
25 item that has a surface with a flat base, and in which case one of the half-shells consists of an undrawn sheet, i.e. a flat sheet; therefore, the fact that the two portions of casing are defined as half-shells in this description is to be intended as inclusive of the case in which one of said portions is a flat sheet.

30 Figs. 2 and 3 illustrate stages (optional moreover) in which the drawn half-shells 2, 4 are transferred into auxiliary supports 12, 14, each having at least one respective seat 16, 18

for receiving and/or supporting the respective half-shell and a portion of general flat surface 20, 22, surrounding the mouth of the respective seat, suitable for supporting the peripheral portion 2b, 4b of the respective half-shell.

5 As illustrated in fig. 3, one of said supports has an annular slot or groove 24 surrounding the mouth profile of the seat 16, the function of which is illustrated below. As indicated, the stages in fig. 2 and fig. 3 are optional, as the drawing operation could be carried out in a mould with characteristics in conformity with the support 12.

10 The item P is then positioned in the half-shell 2, using means of transfer known per se, for example of the suction cup type, and the half-shell 4 is coupled to the half-shell 2 in a position superimposed on the surface portion of the item P which emerges from the seat 16; a configuration is obtained in which the two half-shells 2, 4 are arranged with their peripheral surface portions 2b, 4b that surround the mouth contours of the half-shells in a
15 face-to-face and essentially coplanar relationship, as illustrated in fig. 6.

In order to obtain this configuration, the support 14 can be overturned 180° onto the support 12, as illustrated in fig. 5; for this purpose, the supports 12, 14 can be articulated with one another in book form; however this solution is purely exemplificative as it is
20 intended that the configuration in fig. 6 can be obtained with other operating means which effect the transfer of the half-shells 4, optionally drawn in a separate line, onto the half-shells 2.

The procedure then envisages an operation for cutting the peripheral edges 2b, 4b of the
25 half-shells for the purpose of obtaining, in each half-shell, a flange, indicated as a whole by 5, 7, which surrounds the mouth contour of the half-shells 2, 4, preferably at a uniform distance.

This cutting operation illustrated in figs. 7, 7a and 7b, is preferably carried out by
30 provoking, simultaneously with cutting, the folding of a portion 5a, 7a of the flanges 5, 7 distal from said item P in an angled position, preferably orthogonal, with respect to the

plane on which the flange portions 5b, 7b, proximal to the item P, lie.

This operation can be carried out by means of a device of the type illustrated in fig. 7 which cooperates with the support 12, provided with the annular groove 24.

5

This cutting device comprises a vertically mobile support 26, with associated annular cutting means or punch 28 and presser means 30, 32, preferably elastically constrained to the support 26, that surround the annular cutting means 28 internally and externally.

10 The cutting device is positioned by the presser means 30, 32 in contact with the peripheral portion 4b and with the cutting means 28 which is capable of penetrating the groove 24. The cutting end 28a of the cutting means 28 is capable of penetrating the groove 24 at a slight radial distance from the radially internal wall 24a of the groove 24, this distance being dimensioned in such a way as to be able to receive the flange edges 7a and 5a.

15

In this way, in the course of the cutting operation, the presser means 30 and 32 constrain the peripheral portions 2b and 4b of each half-shell and the descent of the cutting means inside the groove 24 provokes simultaneous folding downwards of the distal flange portions 5a and 7a (figs. 7a and 7b) at the same time as the cutting of said peripheral portions with a flange profile that conforms with the mouth contour of the half-shells.

20

The portions of scrap, indicated as a whole by 13, can be removed following cutting, for example by extraction in a later stage of the procedure.

25 The procedure then preferably envisages an operation for overturning the item P by 180° with the associated half-shells 2, 4, in such a way as to position the folded flange edges 5a, 7a upwards.

This operation can, for example, be carried out in accordance with the operating stages in 30 figs. 8, 9, 10 and 11 that comprise the overturning of the support 14 onto the support 12 to obtain the configuration in fig. 9, in which the two half-shells are constrained between the

respective supports 12, 14, the overturning by 180° of the two associated supports 12, 14 (fig. 10) and the subsequent opening of the top support 14 to obtain the configuration in fig. 11.

- 5 In this configuration, the two half-shells 2 and 4 are not constrained to one another, so that it is necessary to carry out the caulking operation with folding and the possible upsetting of the folded flange edges.

According to the invention, this operation can be carried out by means of a caulking
10 device, having the characteristics defined in the attached claims, described with reference to figs. 12 and 17, which is set up to operate starting from an item wrapped by the two half-shells in the configuration in fig. 11.

It is intended, however, that the configuration in fig. 11 which makes it possible to operate
15 by means of the device described below can be obtained independently with working stages that do not necessarily correspond with those described previously.

Such a device, however, which can constitute a station in a packaging apparatus that carries out one or more of the operations previously described in line, or which can
20 constitute a standalone device to which the items with the associated half-shells 2, 4 can be fed, generally comprises means of support such as, for example, the support 12 in fig. 11 comprising at least one seat 16 suitable for supporting the item P inserted between the two half-shells of sheeted material, or a plurality of seats, each for a respective item; the means of support comprise a substantially flat surface 34 which surrounds the aforesaid seat 16
25 and which is suitable for supporting the flanges 5, 7 of the two half-shells arranged in a relationship of superimposition one on the other.

The device comprises means of caulking arranged to cause the folding and/or upsetting of the flange portions 5a, 7a distal to the item P, starting from a configuration of said flanges
30 in which their distal portions 5a and 7a are already folded in an angled position, generally virtually orthogonal to the surface 34 of the support.

The aforesaid caulking means comprise a caulking tool, indicated by 36, which can be a body in the shape of a plate with an opening 38 (fig. 16) (or a plurality of openings, one for each item to caulk), having a perimeter profile 40 homologous and widened with respect to the perimeter profile defined by the ends of the flanges 5, 7.

5

In this way the caulking tool 36 is capable of being positioned in contact with the surface 34 of the support 12, with the opening 38 in a position surrounding the distal flange portions 5a, 7a at a distance, namely in the configuration shown in fig. 17, visible in which is the top half-shell 2, the perimeter profile defined by the distal portions 5a, 7a and the
10 profile 40 of the opening 38 which is positioned at a virtually uniform distance from the flange edges.

The caulking tool is vertically mobile with respect to the means of support between a raised position and a lowered position, in which it is in contact with the surface 34. The
15 caulking tool 36 is also mobile on a horizontal plane. Motor means 42 are arranged for operating the vertical and horizontal movements of the caulking tool.

In particular, the motor means 42 are arranged to bring consecutive or non-consecutive sections of the profile 40 of the opening 38 into contact with a homologous section of the
20 profile defined by the previously folded distal flange portions 7a, 5a. This operation can be carried out in the position in which the bottom end of the caulking tool is in contact with the surface 34 and is also useful for obtaining, where necessary, correct positioning of said distal flange portions 5a, 7a in a position orthogonal to the surface 34 (fig. 12).

25 The caulking tool is then subject to a vertical movement for a distance d greater than the thickness of the two superimposed proximal flange portions 5b, 7b and such that the bottom end of the profile 40 of the opening 38 is still capable of interfering, following a horizontal displacement, with the top end of the distal flange portions 7a, 5a (fig. 13).

30 Consecutively, the caulking tool 36 is subject to a horizontal movement of approach to the item P, in such a way as to cause further folding towards the inside of the distal flange

portions 7a, 5a (fig. 14), superimposed on the proximal portions 5b, 7b.

Optionally, and in any case preferably, the caulking tool 36 is then subject to a vertical movement of approach towards the surface 34 of the support 12, to cause upsetting (fig. 15).

The aforesaid operations, namely the operations in figs. 12, 13 and 14, and optionally also the operations in fig. 16 (upsetting), are carried out for further consecutive or non-consecutive sections of the profile of the flanges. For example, when the item has a generally quadrangular profile, the aforesaid operations are carried out for each of the sides that define the profile; it is intended however that carrying out the caulking operation along the whole flange profile does not constitute an essential and imperative aspect of the procedure as – in certain applications – it may be desirable to maintain an uncaulked portion of the flange profile, or keep a section of the flange profile in which the flanges are in a superimposed position and are not folded on themselves; this solution can, for example, be applied in the case in which the connection of one section of the flanges is made by applying an adhesive label. In this way the procedure according to the invention has the further advantage that it makes it possible to carry out the caulking operation only on one portion of the perimeter profile of the flanges or on specific portions, even on portions that are not adjacent to one another.

In particular, in the case of a profile of the type illustrated in figs. 16 and 17, the caulking tool can carry out the complete (or partial) caulking operation, being put in motion with a translational movement in two directions orthogonal to one another.

In the case of an item with a body having a profile with curvilinear sections, an ovoid profile for example, the caulking tool can be arranged for a rotary and eccentric movement on the horizontal plane, so as to bring consecutive or non-consecutive sections of the profile 40 of the opening 38 into contact once again with the flange edges and carry out the subsequent operations illustrated.

As indicated above, the final upsetting operation is optional, because in the case of particular configurations of the item to caulk, such as, for example, in the case of an ovoid body, the caulking operation (if necessary) can be carried out at a later stage with an auxiliary tool 36b (fig. 15), vertically mobile under the action of motor means 42a, and
5 provided with an opening the internal profile of which substantially corresponds with the mouth profile of the two half-shells. The aforesaid auxiliary tool 36b can be driven in a vertical movement until contact with flange edges folded on themselves, so as to effect upsetting along the entire contour of the flange edges in a single upsetting operation.

10 The procedure and the caulking device described make it possible in this way to package the items that have a complex or mixtilinear profile, just like bodies with a regular profile or with rectilinear and curvilinear sections.

As already indicated, it is intended that the procedure and the device can be set up to
15 operate simultaneously on a plurality of items.

As indicated, it is possible to carry out the caulking operation along the entire flange contour, by envisaging the possibility of movement of the caulking tool 36 even only in two orthogonal directions in a horizontal plane; in this way the caulking device is
20 particularly simple and advantageous, as it makes it possible to operate on items with different forms, simply by changing the profile 40 of the opening or openings 38.

Naturally, without prejudice to the principle of the invention, the forms of actuation and the embodiment details can be varied compared with what has been described and
25 illustrated for non-limiting exemplificative purposes only, without leaving the framework of the claims that follow.

CLAIMS

We claim:

1. A device for wrapping an item (P) in a casing formed from a pair of half-shells (2, 4) made from sheeted material with a shape matching respective portions of the outer surface of said item (P), wherein said half-shells (2, 4) are provided with a respective flange (5, 7) surrounding the respective mouth contour and said flanges (5, 7) are connected together by folding and/or upsetting so as to jointly define said casing, comprising:
 - support means (12) suitable for supporting said item (P) inserted between said half-shells (2, 4) of sheeted material, with the respective flanges (5, 7) arranged in a face-to-face relationship,
 - caulking means (36) arranged to carry out the folding of said flanges upon themselves, from a configuration in which an end portion (5a, 7a) of said flanges (5, 7) distal from said item (P) is arranged in an angled position with respect to the flange portion (5b, 7b) proximal to said item (P),
- 15 said caulking means (36) comprising: a tool comprising an opening (38) having a profile (40) that is homologous and widened with respect to the perimeter profile defined by the distal end (5a, 7a) of said flanges (5, 7), said tool (36) being mobile in the direction perpendicular to the plane in which the proximal portion (5b, 7b) of said flanges (5, 7) lies and also being mobile parallel to the plane of said proximal portion of the flanges, wherein
- 20 motor means (42) are provided arranged to position said caulking tool (36) with the profile (40) of said opening (38) in an arrangement surrounding said angled distal portion (5a, 7a) of said flange (5, 7) and to bring a section of the profile (40) of said opening (38) into contact with a homologous section of the perimeter profile defined by said angled distal portion of said flanges (5, 7) and to cause an approach movement towards said item (P) by
- 25 said section of the profile of said opening (38) in contact with said distal portion (7a) to cause further folding thereof on said proximal portion (5b, 7b) and to repeat the aforementioned operations on further sections of the profile of the distal portion (5a, 7a) of said flanges (5, 7).
- 30 2. The device according to claim 1, characterised in that, following said approach movement of the profile of said opening (38) that causes the further folding of said distal

portion (5a, 7a) on said proximal portion (5b, 7b), the motor means are arranged to generate a movement of said tool (36) perpendicular to the plane of said proximal portion (5b, 7b), to cause the upsetting of said distal portions (5a, 7a) folded on said proximal portions (5b, 7b).

5

3. The device according to claim 1 or 2, characterised in that said support means (12) comprise a substantially flat surface (34) surrounding said seat (16) suitable for supporting the proximal portions (5b, 7b) of said flanges (5, 7) and said motor means are arranged to:

- actuate said caulking tool (36) between a position away from said surface (34) to a position in which said tool (36) is in contact with said surface (34) and said profile (40) of the opening (38) and surrounds the angled distal portions (5a, 7a) of said flanges (5, 7) at a distance;
- actuate said tool (36) parallel to said surface (34) until a section of the profile (40) of said opening (38) is brought into contact with a homologous section of the angled distal portion (7a) of said flange;
- actuate said tool (36) in the direction perpendicular to said surface (34) up to a distance (d) from said surface (34), such that the profile (40) of said opening (38) is able to interfere with the end of the distal portion (5a, 7a) of said flanges (5, 7) and not interfere with the overlapping proximal portions (5b, 7b) of said flanges (5, 7); and
- actuate said tool (36) according to a movement parallel to said surface (34) according to an approach movement towards said item (P) to cause the folding of said distal portion (5a, 7a) of said flanges (5, 7) on said proximal portion (5b, 7b).

4. The device according to claim 3, characterised in that it comprises an auxiliary upsetting member (36b) for upsetting said flanges (5, 7) comprising an auxiliary tool (36b) provided with an opening with a perimeter profile (40b) substantially matching the mouth profile of said half-shells (2, 4), said auxiliary tool (36b) being mobile in the direction perpendicular to the plane of the proximal portion of said flanges (5, 7) and being mobile between a position away from said flanges (5, 7) and a lowered position in contact with the distal portion (5a, 7a) of said flanges (5, 7) folded on said proximal portion (5b, 7b) to carry out its upsetting.

5. The device according to any one of claims 1 to 4, characterised in that said caulking tool (36) is mobile parallel to the plane of said proximal portion (5b, 7b) of said flanges (5, 7) according to two perpendicular directions.
- 5
6. The device according to any one of claims 1 to 5, characterised in that said tool (36) is mobile parallel to the plane of said proximal portions (5b, 7b) of said flanges (5, 7) according to a rotary or eccentric movement.
- 10 7. An apparatus for packaging an item (P) in a casing formed from a pair of half-shells (2, 4) made from sheeted material, comprising a device according to any one of claims 1 to 6.
8. The apparatus according to claim 7, characterised in that it comprises:
- 15 - first and second drawing means (6, 8, 10) suitable for providing a first (2) and second (4) half-shell of sheeted material, each having a surface portion (2a, 4a) with a matching shape to a respective surface portion of said item (P) and a surface portion (2b, 4b) surrounding said first portion (2a, 4a);
- means for coupling said first and second sheet with respective surface portions (2a, 20 4a) of said item (P) with said peripheral surface portions (2b, 4b) in overlapping relationship; and
- means for cutting said first and second sheet according to a profile surrounding said item (P), so as to form a pair of peripheral flanges (5, 7), said cutting means (26, 28, 30, 32) being arranged to cause, simultaneously to the cutting, the folding of a distal portion 25 (5a, 7a) with respect to the item (P) of said flange (5, 7) in an angled position with respect to the general plane of said flanges (5, 7).
9. A process for wrapping an item (P) in a casing formed from a pair of half-shells (2, 4) made from sheeted material having a shape matching respective outer side portions (2a, 4a) of said item (P), wherein said half-shells (2, 4) are provided with a respective flange (5, 30 7) surrounding the respective mouth outline and said flanges (5, 7) are connected together

through a caulking operation comprising the folding and optionally the upsetting of said flanges (5, 7) so as to jointly define said casing, characterised in that it comprises the operations of:

- supporting said item (P) inserted between a pair of half-shells (2, 4) provided with
5 respective flanges (5, 7) in a face-to-face relationship, with portions of said flanges (5a, 7a) distal with respect to the item arranged in an angled position with respect to the plane in which the flange portions (5b, 7b) proximal to said item lie;
- providing a mobile caulking tool (36) comprising an opening (38) having a profile (40) that is homologous and widened with respect to the perimeter profile defined by the distal
10 end of said flanges;
- positioning said tool (36) with the profile of said opening (38) in a relationship surrounding said angled distal portion (5a, 7a) of said flanges;
- actuating said tool to bring a section of said profile (40) of said opening into contact with a homologous section of the perimeter profile defined by said angled distal portions (5a,
15 7a) of said flanges;
- causing an approach movement towards said item (P) of said section of the profile of said opening (38) in contact with said distal portion (7a) to cause its further folding on said proximal portion (5b, 7b); and
- repeating the aforementioned operations for further sections of the profile of the distal
20 portion (5a, 7a) of said flanges (5, 7).

10. The process according to claim 9, characterised in that, following said approach movement of the profile of said opening (38) that causes the further folding of said distal portion (5a, 7a) on said proximal portion (5b, 7b), it comprises the operation of generating
25 a movement of said tool perpendicular to the plane of said proximal portion (5b, 7b), to cause the upsetting of said distal portions (5a, 7a) folded on said proximal portions (5b, 7b).

11. The process according to claim 9 or 10, characterised in that it comprises the
30 operations of:

- providing a first and second sheet, each having a surface portion (2a, 4a) shaped to

match a respective outer surface portion of said item (P) and a peripheral surface portion (2b, 4b) surrounding said shaped portion;

- coupling said first and second sheet with respective surface portions of said item (P) with said peripheral surface portions (2b, 4b) in an overlapping relationship;
 - 5 - carrying out a cutting operation on said first and second sheet according to a profile surrounding said item (P) so as to form a pair of peripheral flanges (5, 7); and
- further characterised in that said cutting operation is carried out so as to cause, simultaneously to the cutting, the folding of the portion (5a, 7a) of said flanges (5, 7) distal from said item (P) in an angled configuration with respect to the general plane of said
- 10 flanges (5, 7).

12. The process according to claim 9, comprising, following said cutting operation, an operation of inverting said item (P) by 180° with said half-shells (2, 4) coupled.

- 15 13. The process according to any one of claims 9 to 11, characterised in that said caulking operation is carried out through a caulking device as defined in any one of claims 1 to 6.

14. The device according to claim 3, wherein said motor means are arranged to actuate
- 20 said tool (36) in the direction perpendicular to said surface (34) to cause the upsetting of said distal end portion (5a, 7a) on said proximal portion (5b, 7b).

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FIG.1

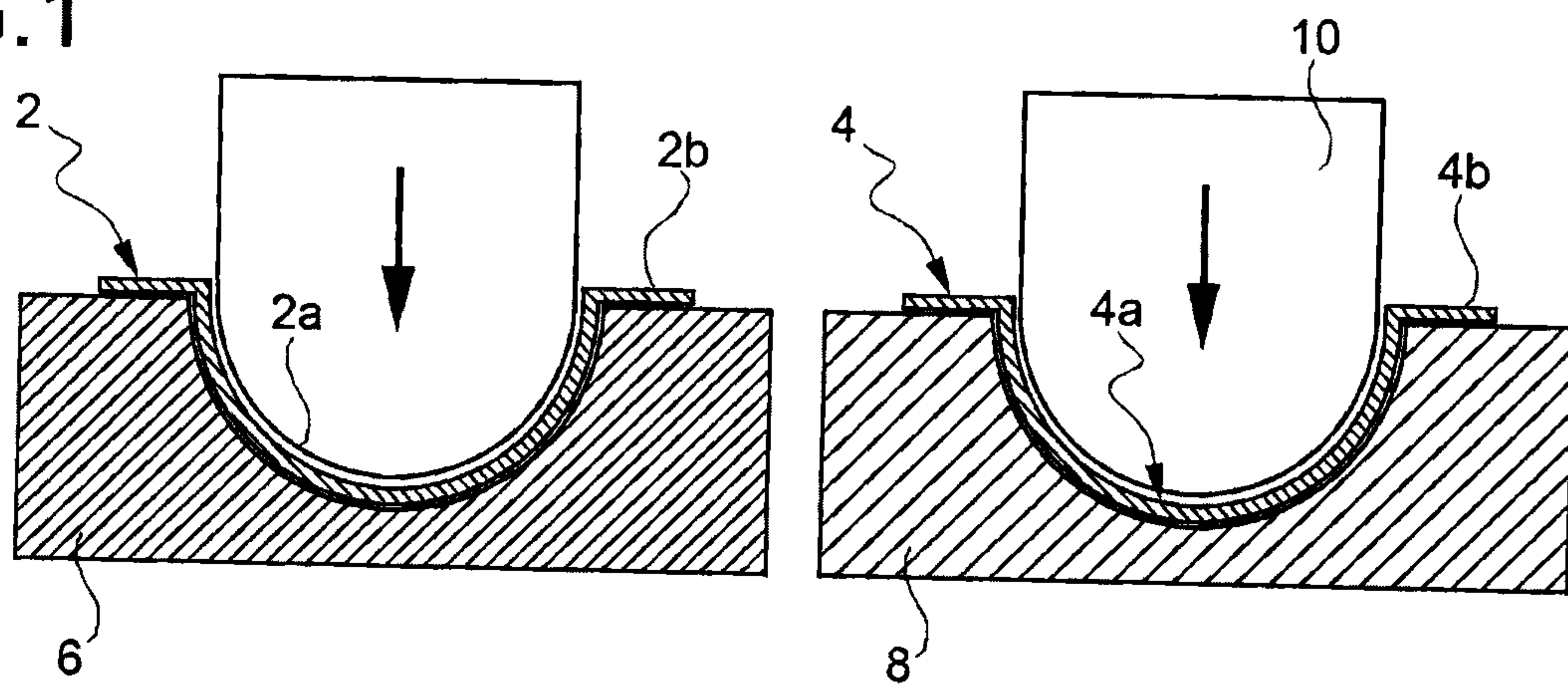


FIG.2

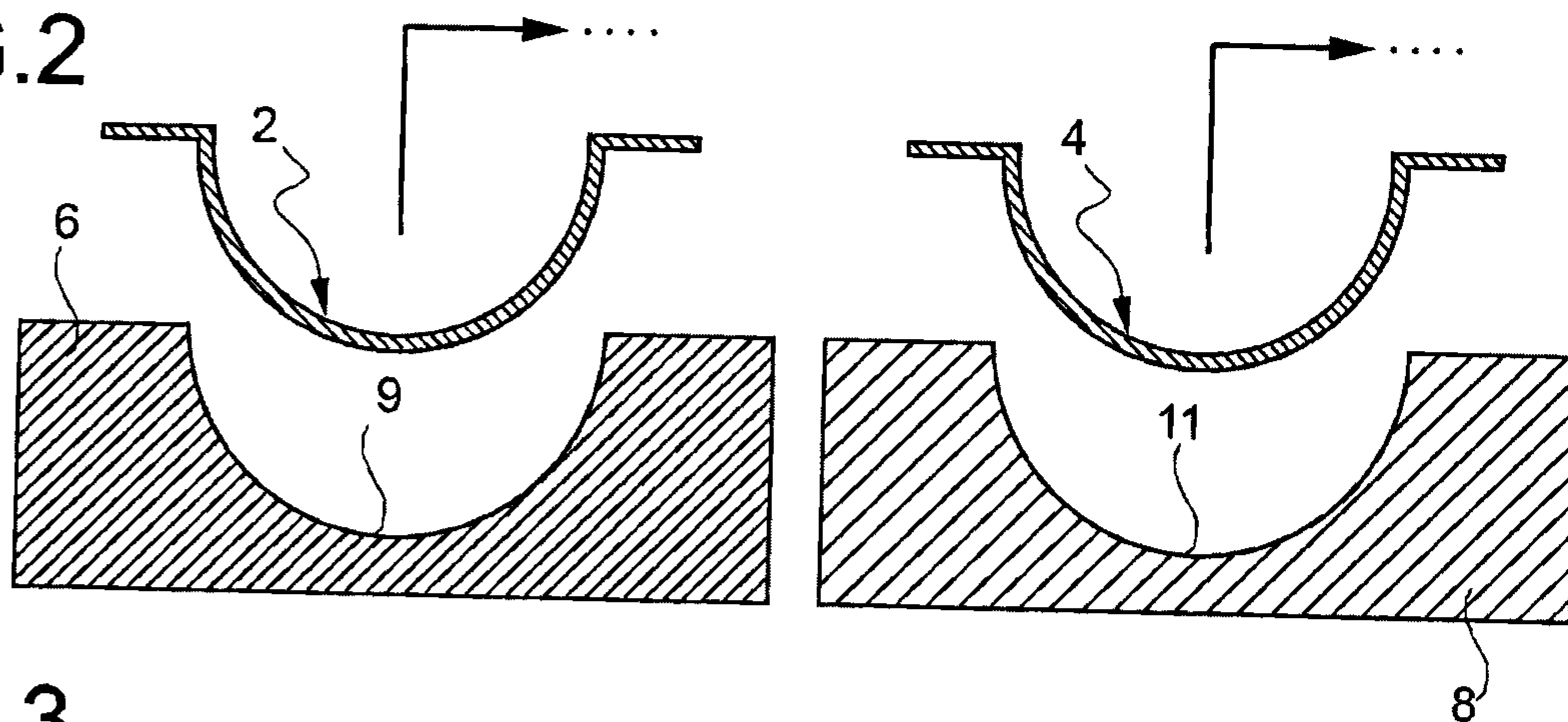


FIG.3

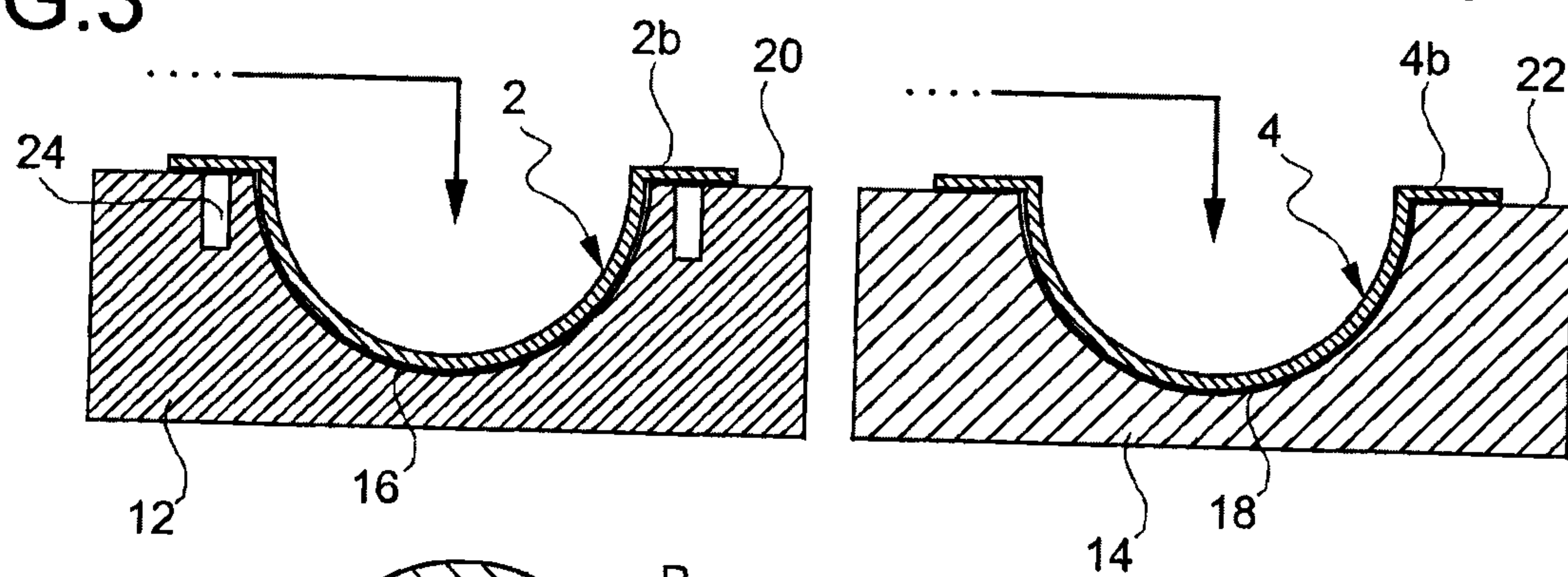
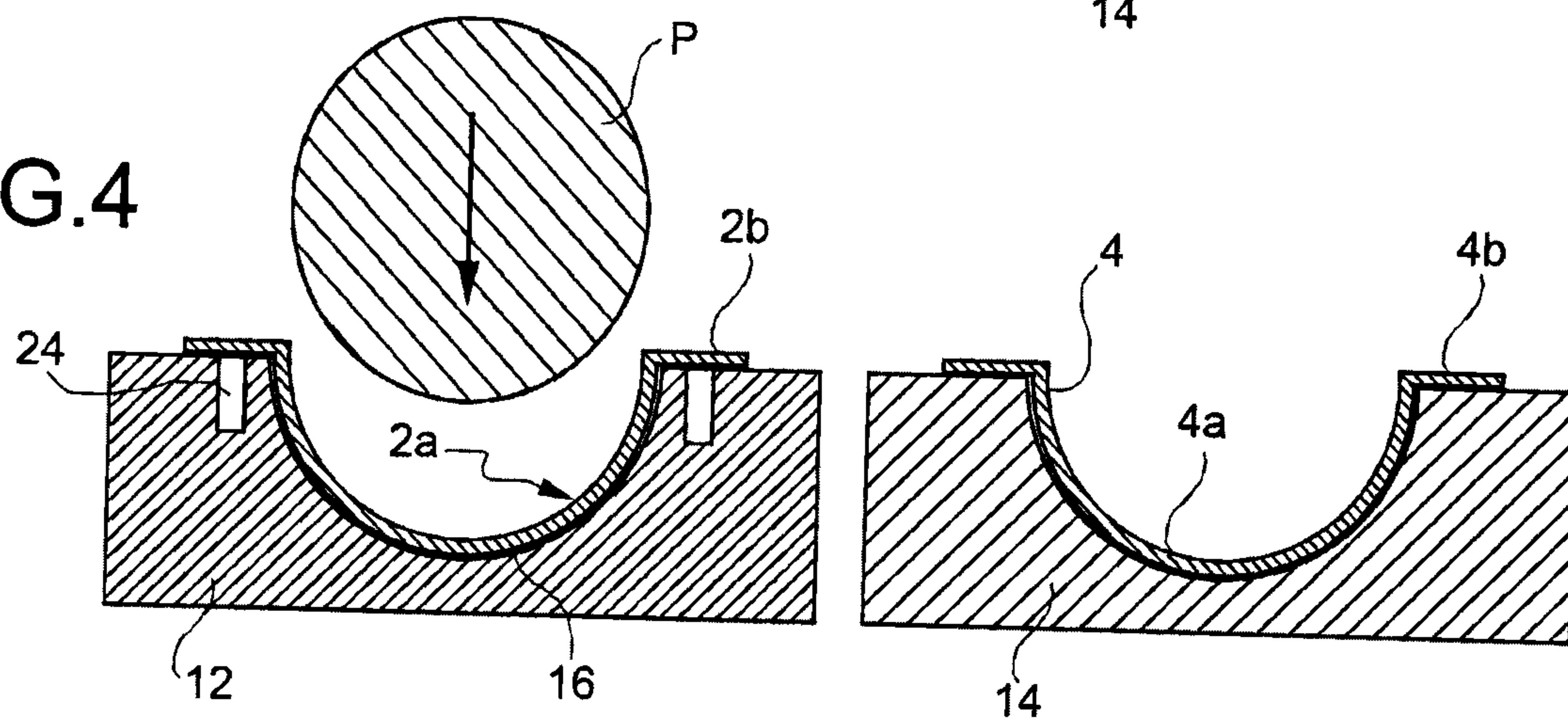


FIG.4



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FIG.5

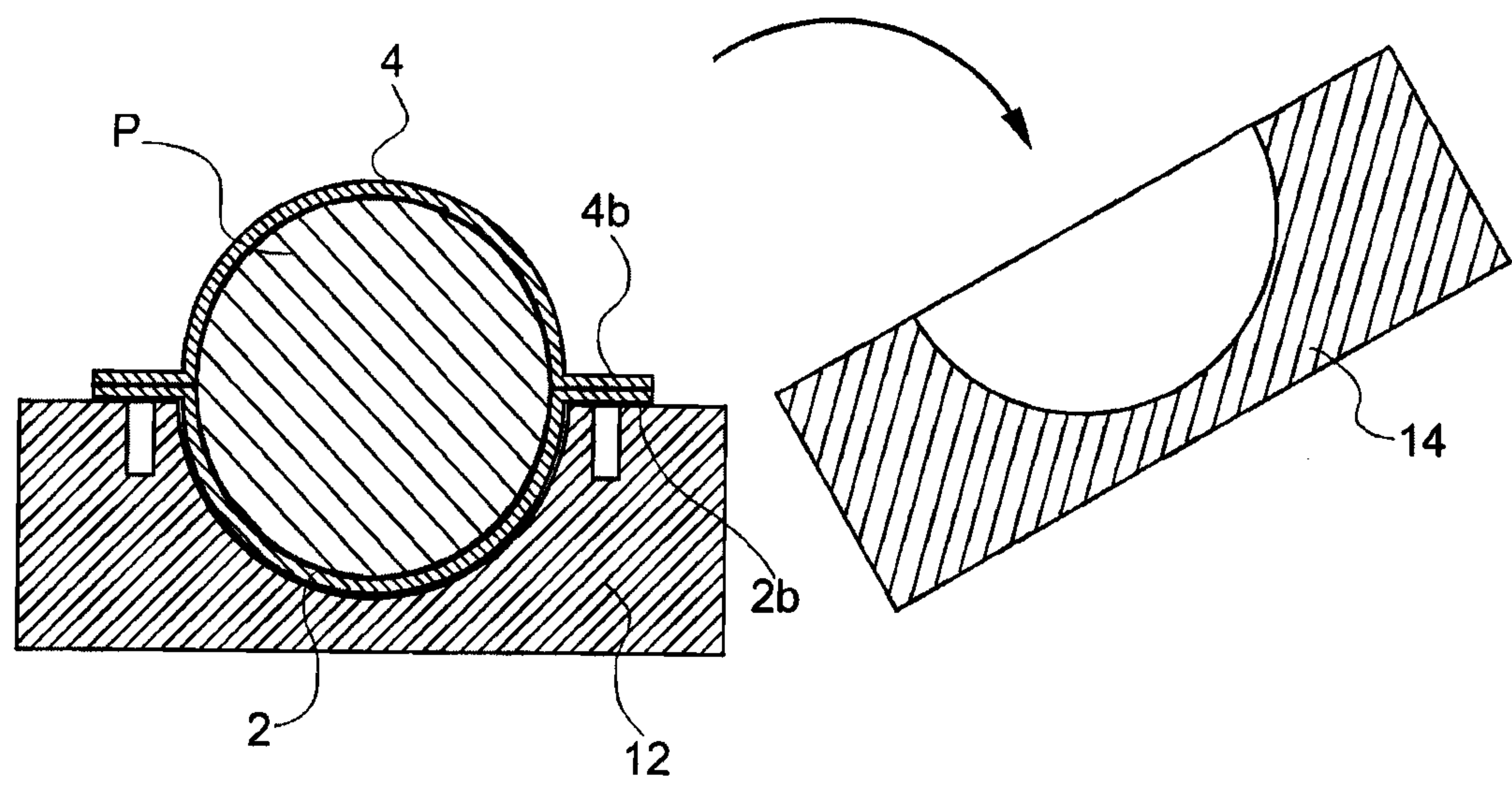
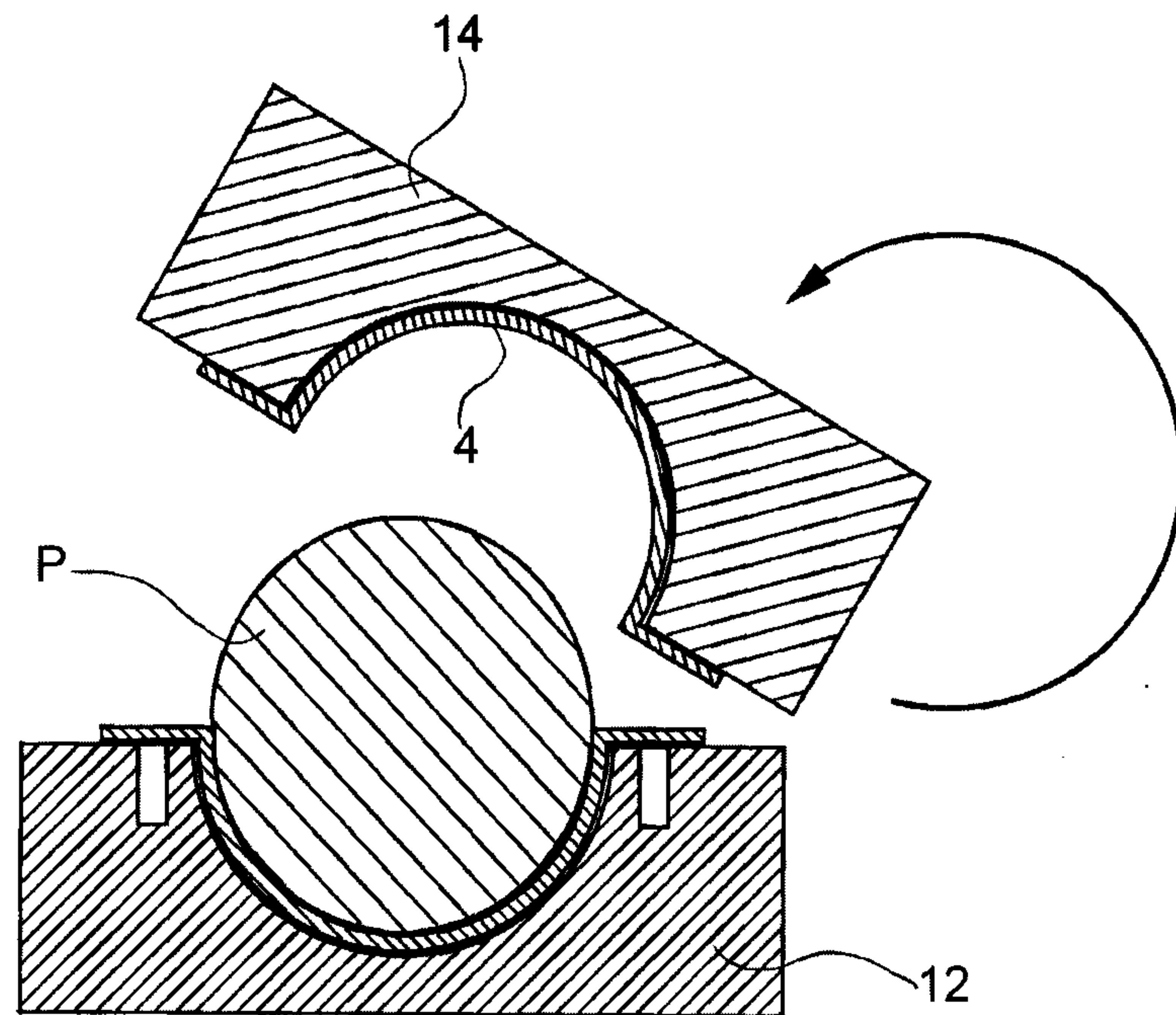


FIG.6

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FIG.7

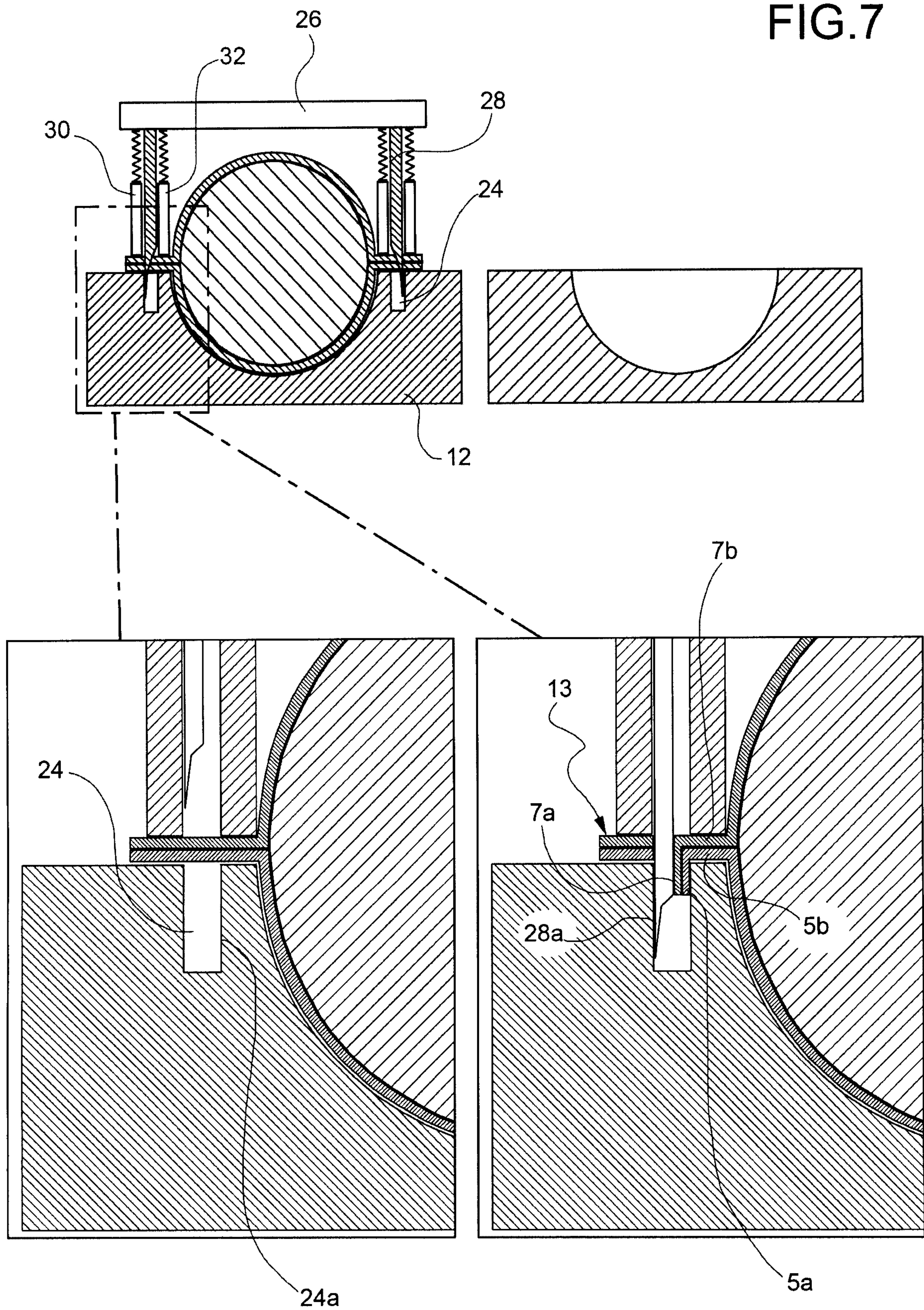


FIG.7a

FIG.7b

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FIG.8

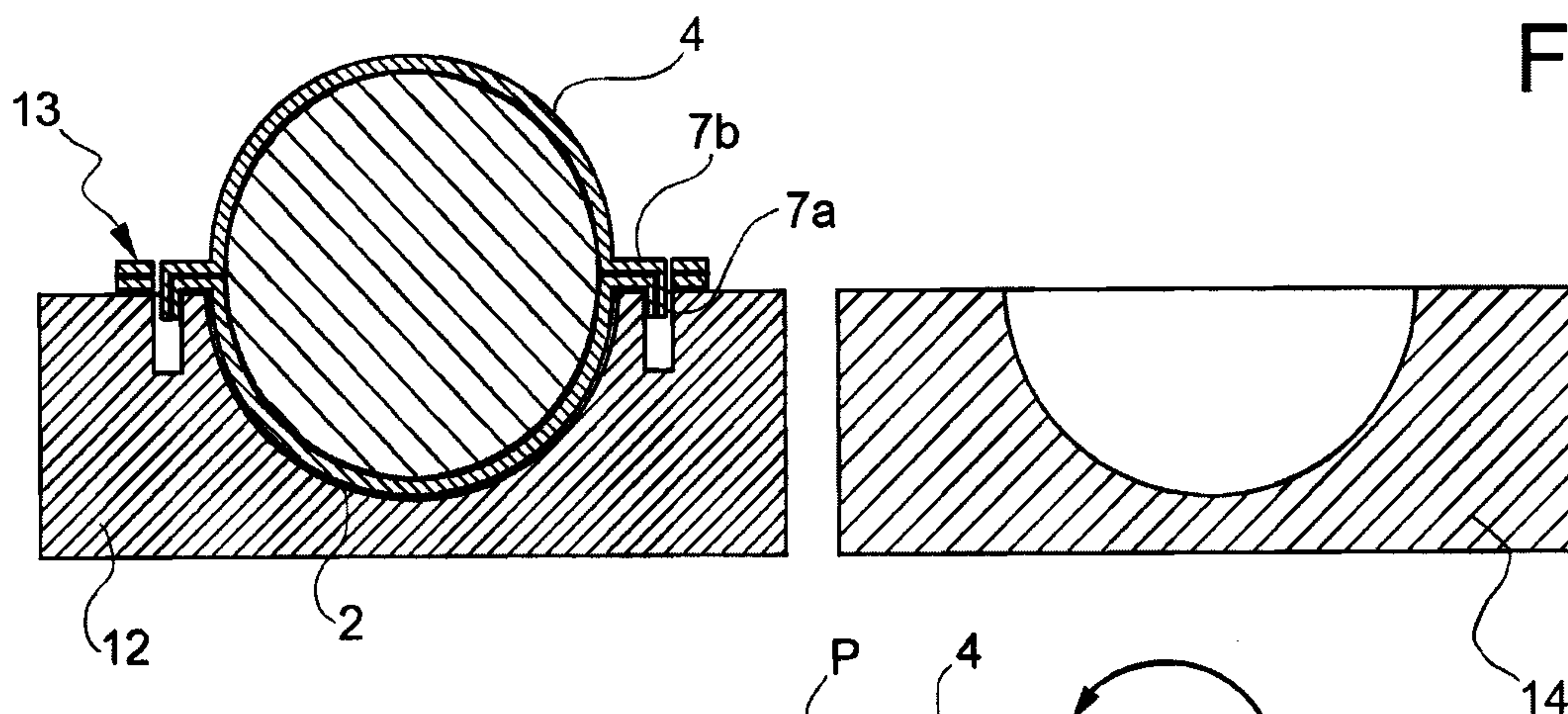


FIG.9

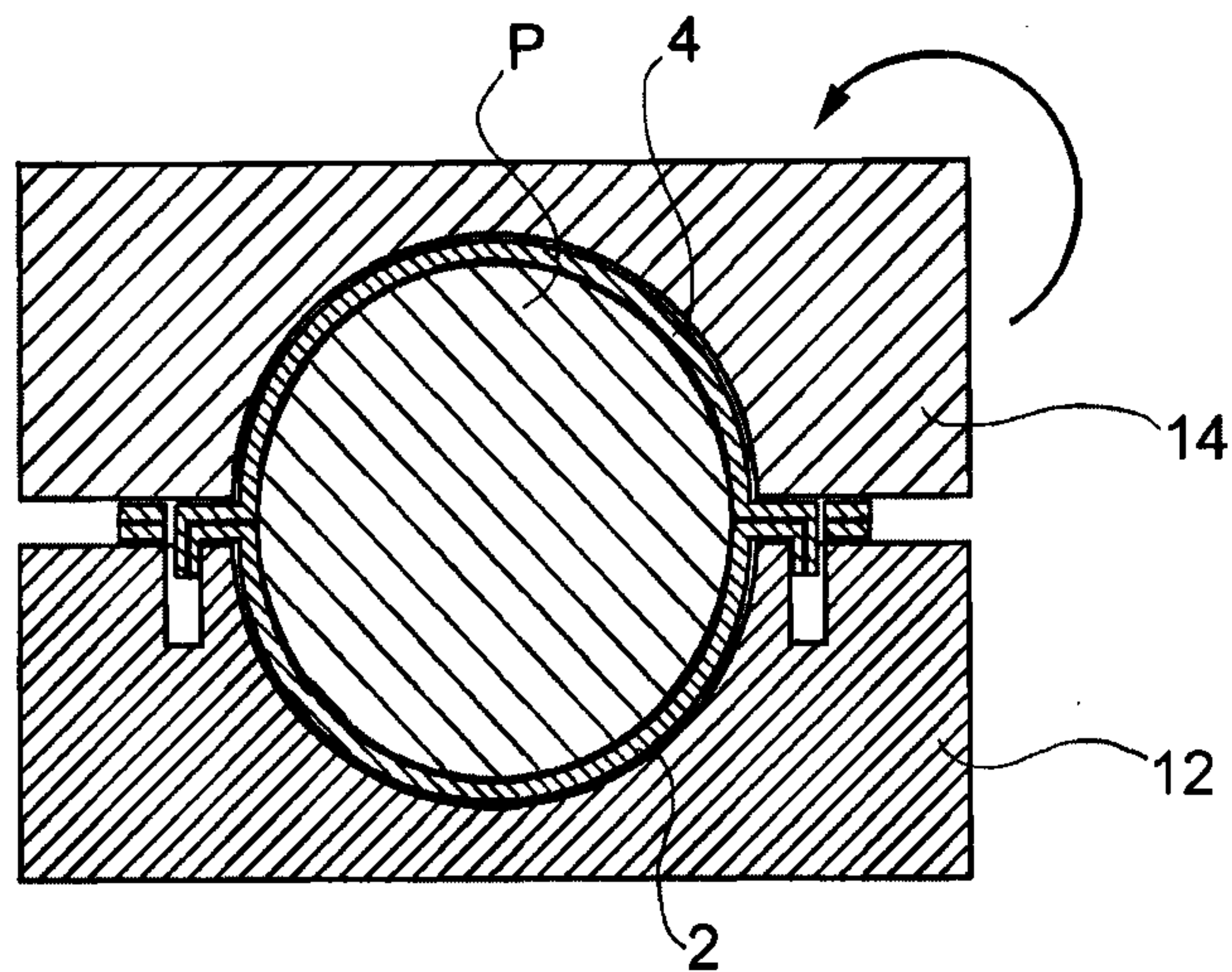


FIG.10

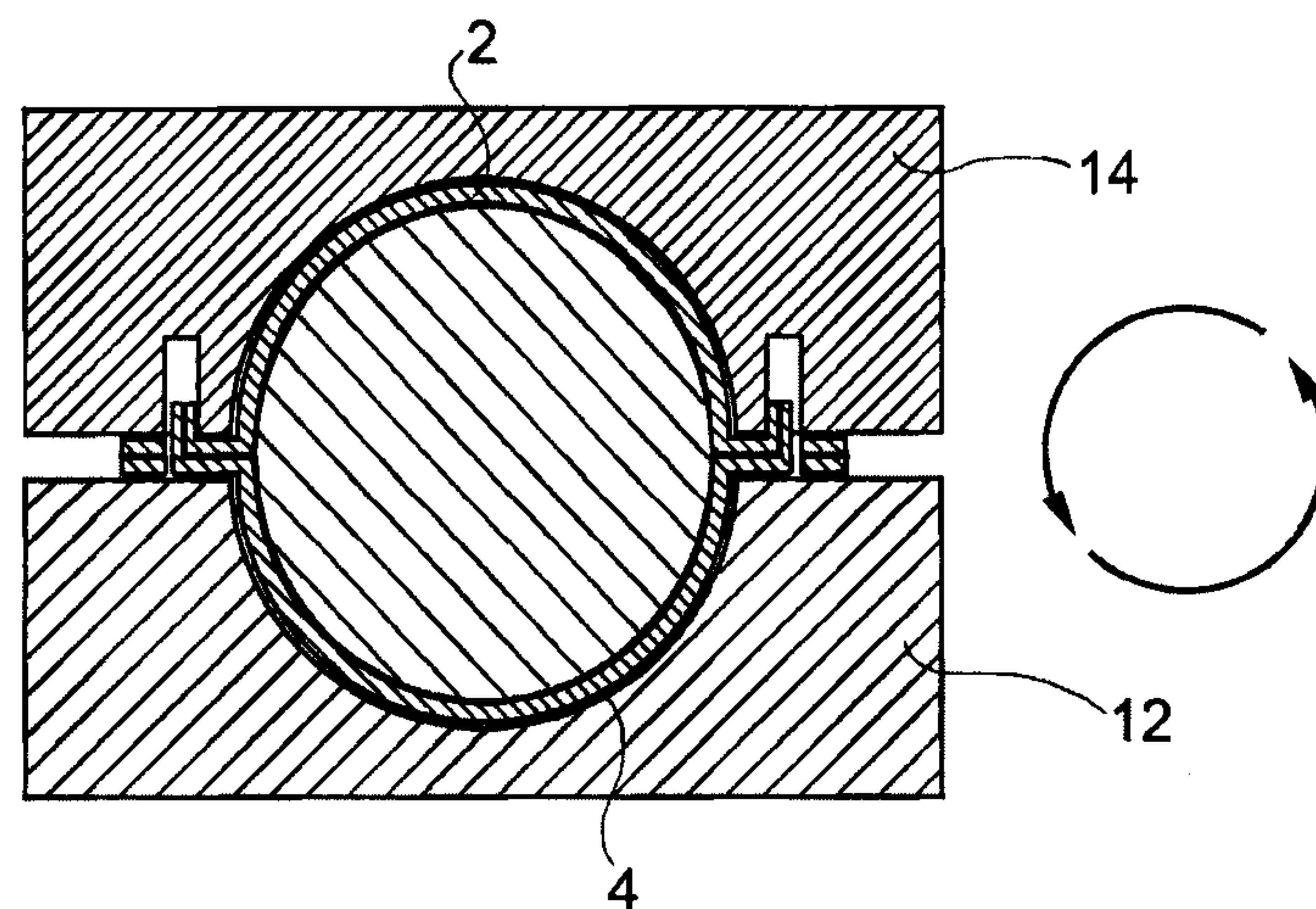


FIG.11

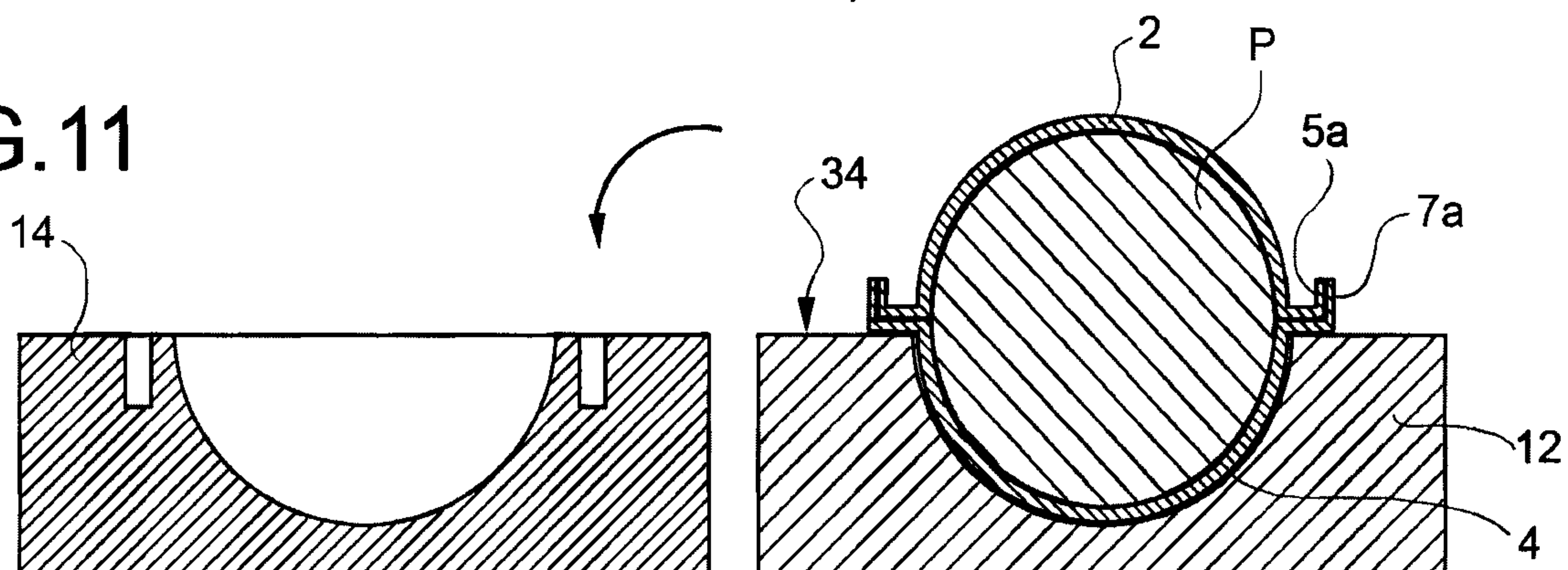


FIG.12

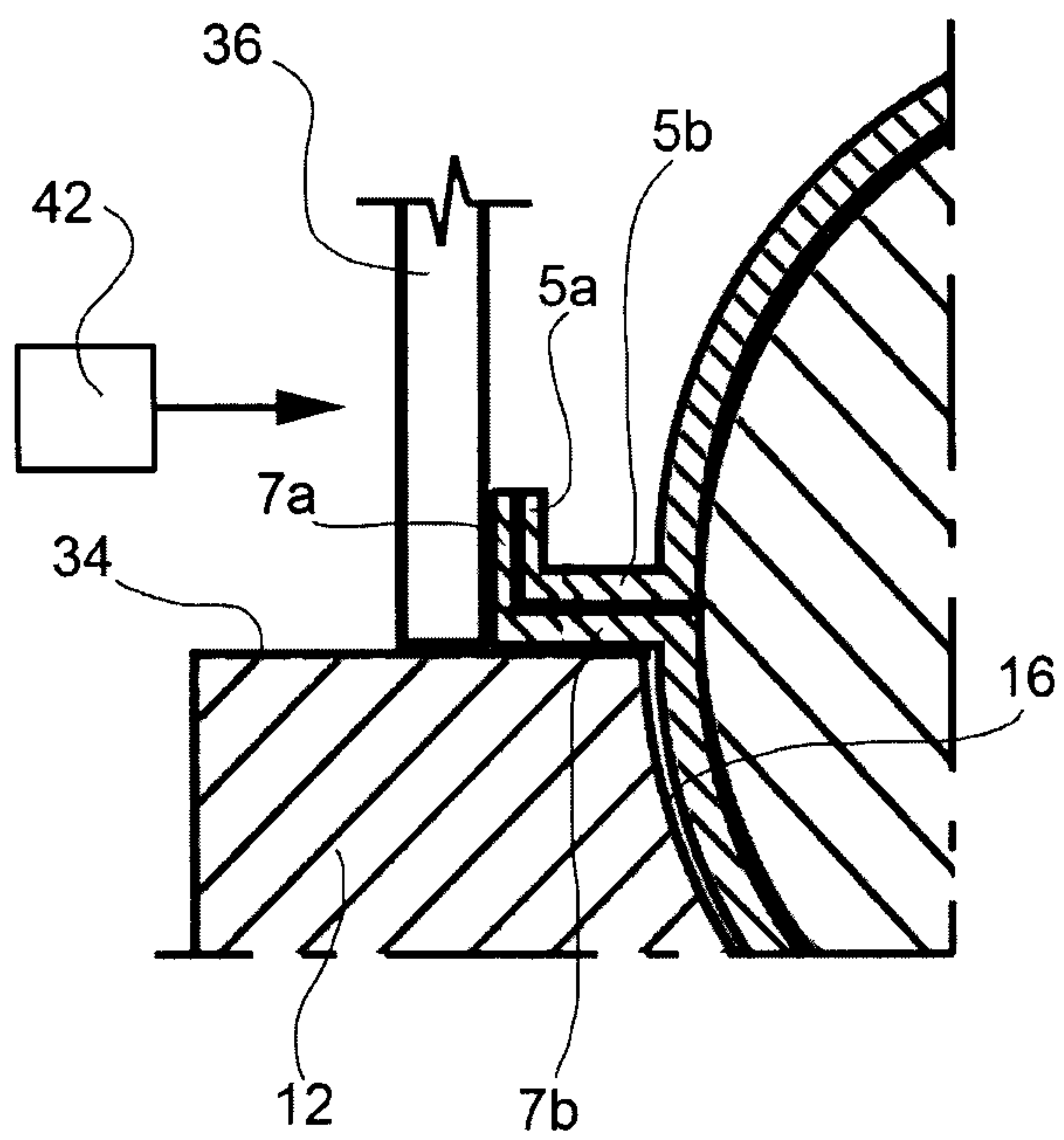


FIG.13

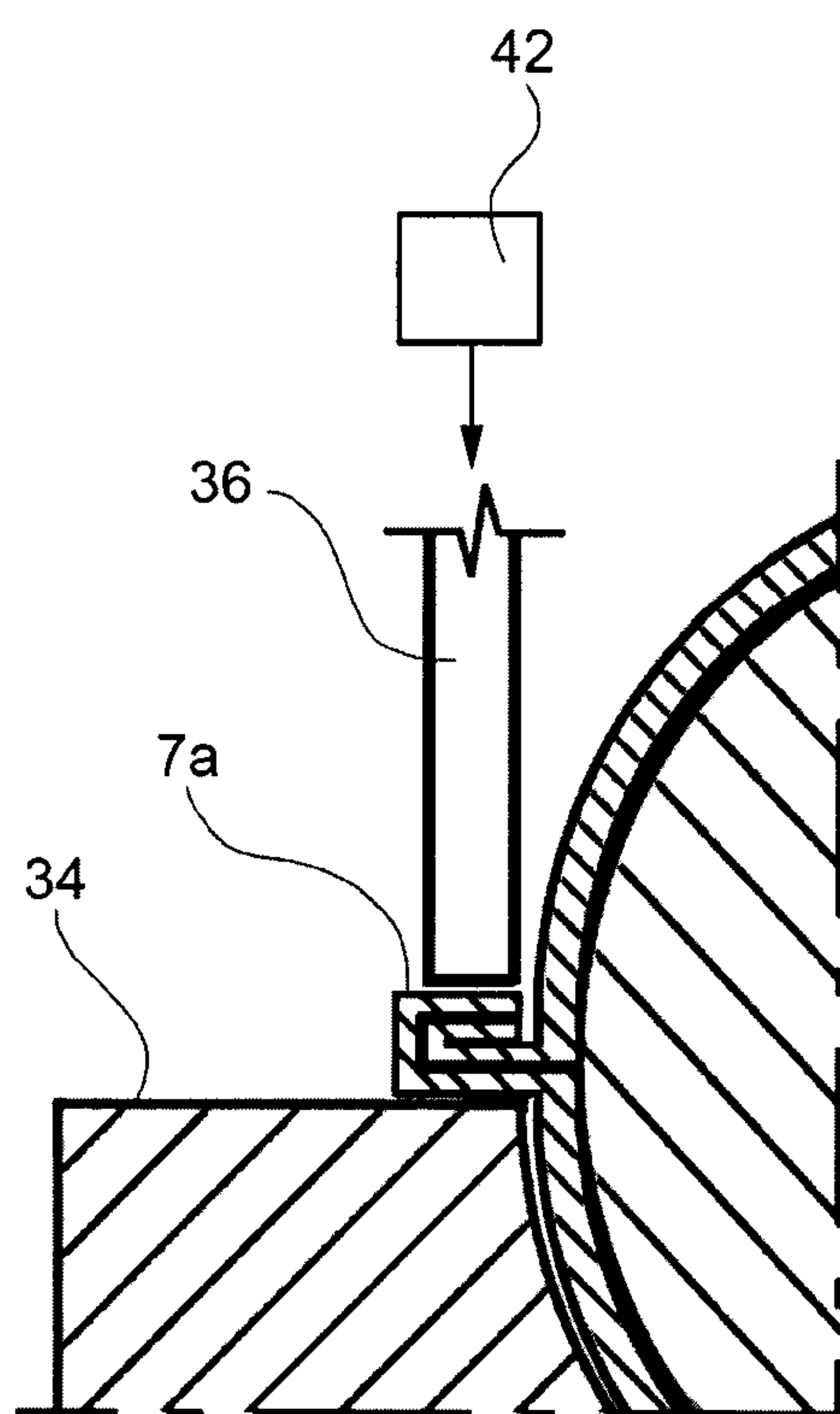
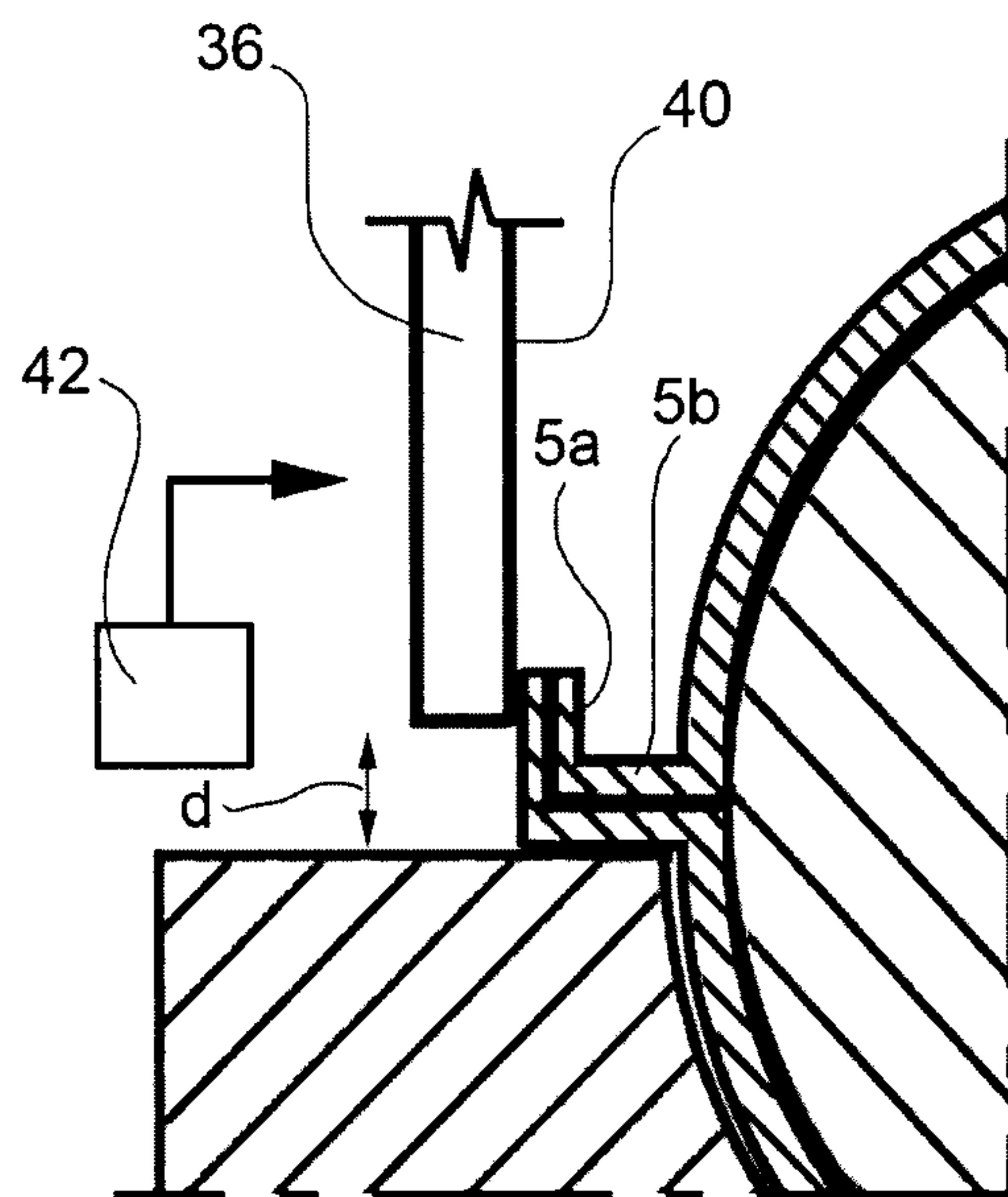


FIG.14

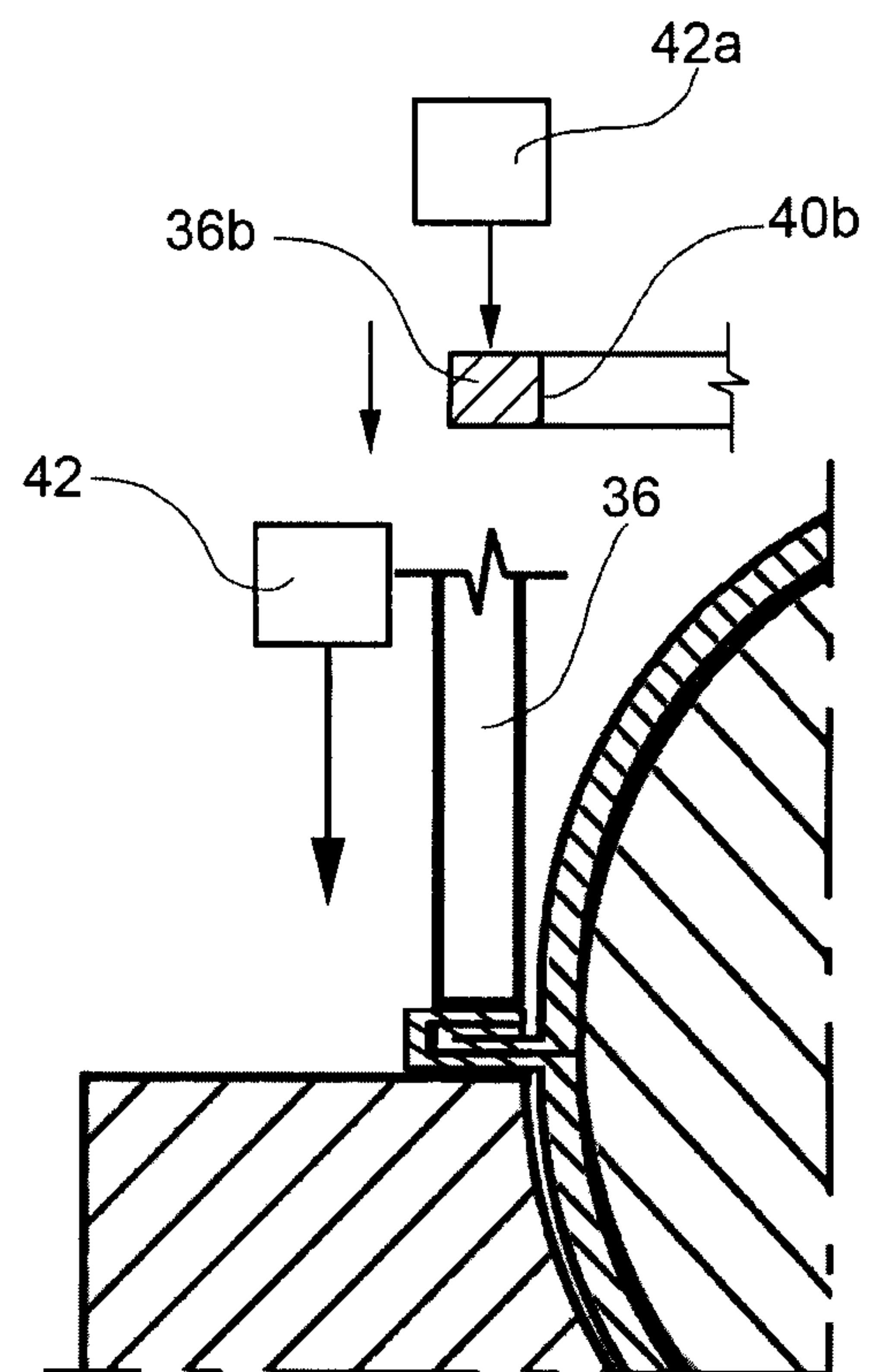


FIG.15

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FIG.17

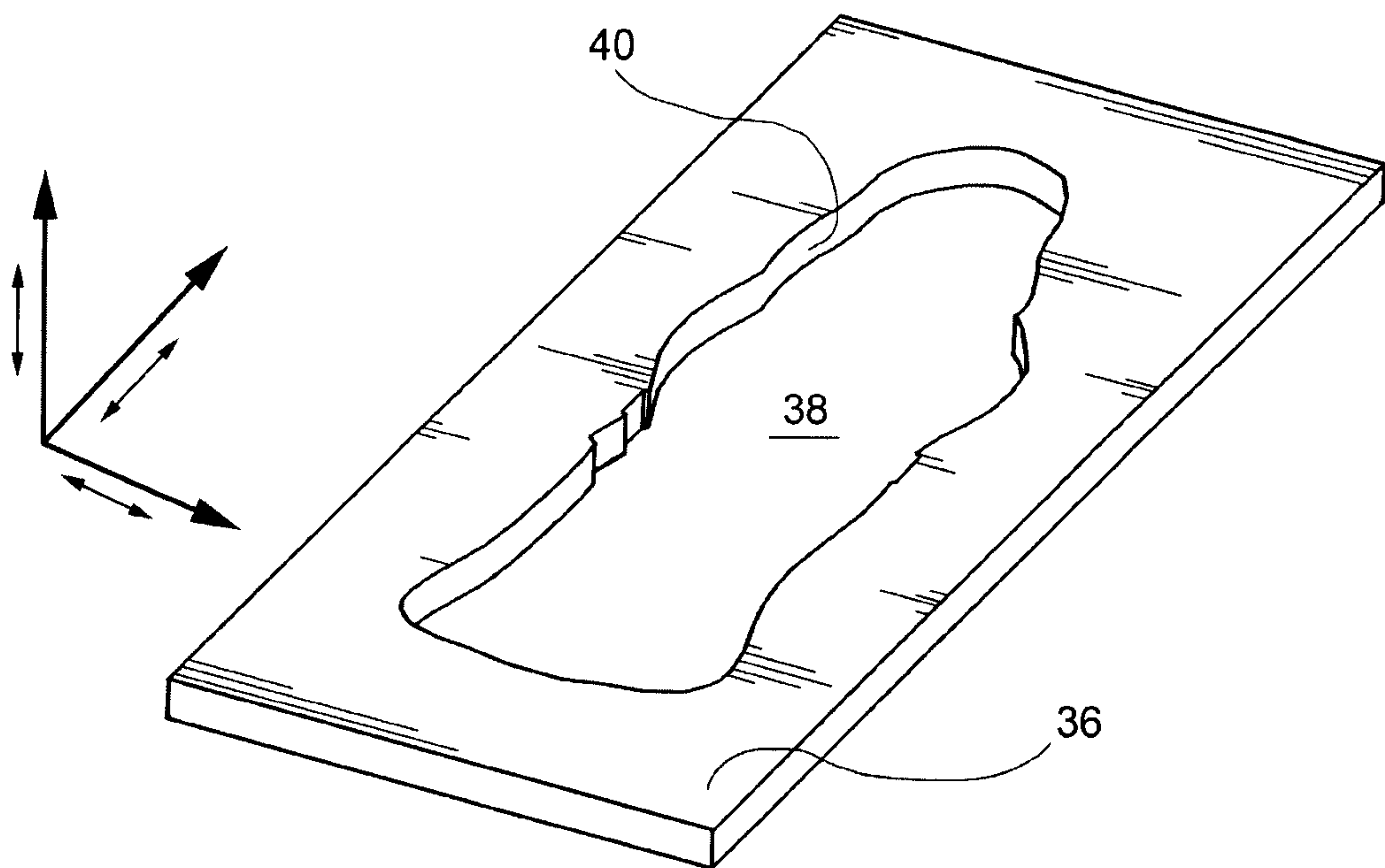
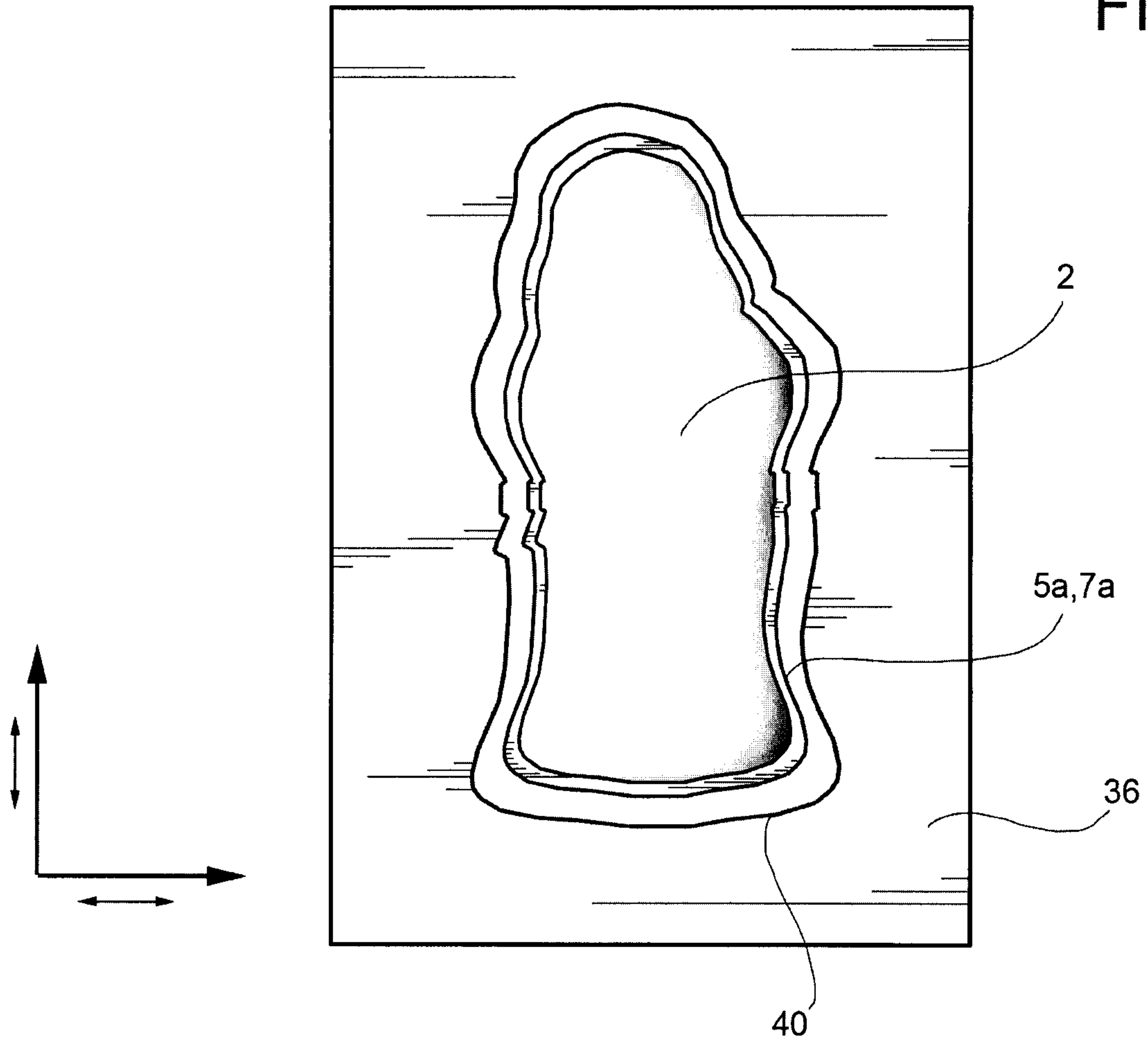


FIG.16

