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(71) Applicant: **RPC CONTAINERS LIMITED**
Raunds, Northamptonshire NN9 6ED (GB)

(72) Inventor: **Edwards, Brian**
Oakham, Rutland, LE15 6HE (GB)

(74) Representative: **Leckey, David Herbert**
Frank B. Dehn & Co.,
European Patent Attorneys,
179 Queen Victoria Street
London EC4V 4EL (GB)

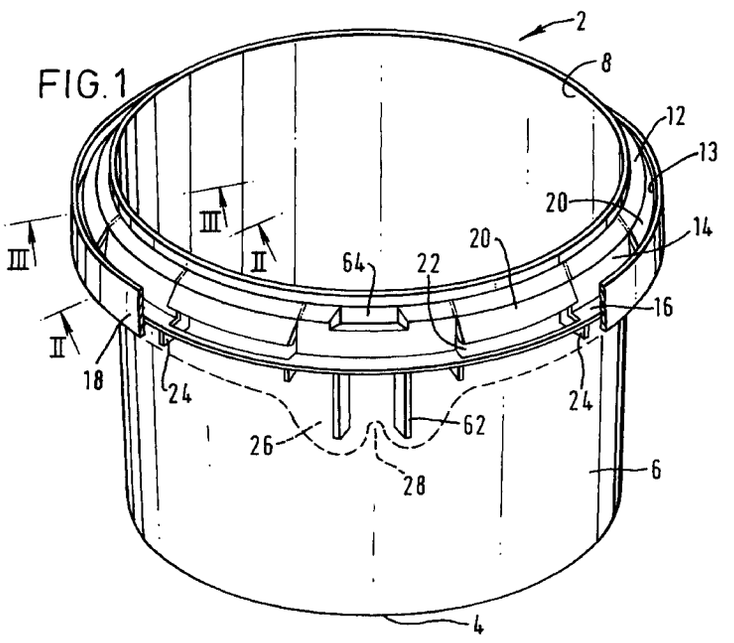
(54) Moulded container with peripheral channel for receiving a lid

(57) A container (2) has an upwardly open peripheral channel (13) formed around its rim for receiving a depending skirt (32) of a lid (10), and the channel has a plurality of clips (20) extending outwardly from its inner wall (14). The channel (13) is formed with apertures (22) arranged below each of the clips (20). The channel can have a tamper-evident portion which must be removed or deformed to allow the container to be opened. The apertures (22) are formed in the inner wall (14) of the channel, and can also extend into the bottom wall (16). Projections can be provided between the outer (18) and bottom (16) walls of the channel, to hinder unauthorized removal of the lid.

The container can also have a handle (48), pivotable between a vertical carrying position and a horizontal stowed position, with means (54, 18; 56, 60) to prevent the handle (48) dropping below its horizontal position.

The invention also extends to a method of moulding the container.

FIG.1



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Description

The present invention relates to a container, and more particularly to moulded plastics containers of the type having an upwardly open channel formed around the rim of the container to receive a depending skirt of a container lid.

Such containers are used particularly, but not exclusively, as tamper-evident containers, with a portion of the channel wall being removable or displaceable to permit access to the lid skirt to allow the lid to be removed.

To retain the lid in position, the outwardly facing surface of the inner channel wall is typically provided with a bead, under which a corresponding bead on the inwardly facing surface of the skirt of the lid engages when the lid is placed on the container.

In production, the bead is normally formed by a groove formed in a single mould piece which extends down into the channel. However, the distance the bead can project into the channel, and thus effectively the strength of the engagement with the lid, is limited, since the bead must be small enough to disengage from the mould piece when the mould piece is removed from the channel. If it is desired to use a larger bead, it is necessary to provide more complicated, multiple-piece mould parts, which are more costly.

The present invention seeks to mitigate the above problems, and from a first aspect, the invention provides a method of moulding a container with an upwardly open peripheral channel formed around its rim for receiving a depending skirt of a lid for the container, and having a clip extending outwardly from an inner wall of the channel, wherein the inner profile of said channel is defined substantially by a first mould part which after moulding is removable from the moulded channel through its open end in a first direction, and wherein at least a portion of the outer profile of the channel and the lower edge of the clip is defined by a second mould part which forms an aperture in the inner wall of the channel below the clip and which is removable in a direction substantially opposite to that of said first mould part.

From a second aspect, the invention provides a container with an upwardly open peripheral channel formed around its rim for receiving a depending skirt of a lid for the container, wherein said channel has a plurality of clips extending outwardly from the inner wall of the channel, the channel being formed with respective apertures arranged below said clips.

Thus, in accordance with the invention, the lower edge of each clip is defined by a lower mould part, which after moulding can be withdrawn in the opposite direction to the mould part forming the channel. As the mould part is withdrawn, it leaves an aperture beneath each clip. With such an arrangement, the amount by which the clip extends into the channel is not limited by considerations of having to remove the mould part defining the channel, and so the clip can be made deeper, to allow a more substantial engagement with the lid.

The openings in the inner wall of the channel may be formed to extend into the bottom wall of the channel. This arrangement has the advantage that the openings in the bottom wall can act as drain holes, allowing for drainage of material entering the channel, for example during filling of the container. However, it may be preferable to have an aperture only in the inner channel wall so as to prevent access to the lower end of the lid skirt from below when it is in position, thereby making it more difficult to remove in an unauthorised manner.

A further way in which removal of the lid can be made more difficult is by providing one or more projections on the inner surface of the outer channel wall in the region of the clips. This projection is intended to prevent the lower end of the lid being moved outwardly to disengage from the container clip. This is better than having a relatively tight fit of the channel outer wall and the lid, since it will allow a greater amount of clearance when fitting the lid. Preferably the projection is relatively short in the circumferential direction. Most preferably, a pair of spaced projections may be provided at each clip location, most preferably towards the circumferential ends of the clip.

For ease of manufacture, the projection is preferably formed to extend between the outer wall of the channel and the bottom wall of the channel. The projection may therefore take the form of a rib extending between these two walls. Most preferably, the rib tapers inwardly towards the bottom wall, so as to guide the lid into engagement with the container clip.

The provision of means provided on the outer wall of a channel as described above is believed to be novel in its own right, so from a third aspect, the invention provides a container with an upwardly open peripheral channel formed around its rim for receiving a depending skirt of a lid for the container, wherein said channel has clip means formed on an inner wall of the channel, the outer wall of the channel being formed with inwardly extending projections for preventing the lower end of a lid skirt from being deflected outwardly.

As mentioned above, the container is preferably a tamper-evident container. Accordingly, the channel may be formed with a region which can be deformed or removed to allow access to the lid skirt for its removal.

The clips on the channel wall engage with suitable retaining means on the lid of the container. Such means may comprise a continuous bead extending around an inwardly facing surface of the lid. However, providing clips on the inner wall of the channel, in accordance with the invention, substantially increases the degree of engagement between the container and the lid. If the bead on the lid extends around the entire circumference of the lid, then the entire length of all of the clips contributes to the engagement. Whilst this may be desirable in certain applications, this can make the lid difficult to peel from the container. To facilitate removal of the lid, therefore, the lid preferably has a plurality of discrete projec-

tions on the inner wall of the skirt for engaging with said clips. This reduces the length along which the clips engage with the lid, and so the lid is not held on as strongly, and is thus easier to remove.

Preferably, the lid projections and the clips are positioned and sized such that at least some and preferably all of the clips are engaged by the projections irrespective of the orientation of the lid on the container, to ensure adequate retention of the lid. This avoids any need to align the lid during closing of the container. More preferably, the projections and the clips are positioned and sized such that the length along which the projections engage with the clips when the lid is on the container is generally constant, irrespective of the orientation of the lid on the container. This ensures that the lid is held on the container with a consistent force.

In a particularly preferred embodiment, said projections are equispaced and of equal length, said clips are equispaced and of equal length, with the gaps between the clips being of the same length as the clips themselves, and the circumferential distance between the centres of adjacent projections is equal to the circumferential length of each clip. This ensures that the length along which the projections engage with the clips when the lid is on the container is constant.

The container may also have a carrying handle, pivotable between a vertical carrying position and a horizontal stowed position. Means may be provided to prevent the handle from moving below the horizontal stowed position. This is desirable during manufacture and filling of such containers to prevent, for example, the handle interfering with printing on the container body. Up to now, this has been achieved by moulding locating pips onto the container body and upon which the handle rests in its horizontal position. A problem arises, however, if the handle is pushed over the pips, since it may be extremely difficult to move the handle back over the pips. In accordance with a further aspect of this invention, there is provided a container comprising a body and a carrying handle, said handle being pivotable between a vertical carrying position and a horizontal stowed position wherein the pivot portion of the handle is provided with a cam which in the horizontal position of the handle engages with a stop provided on the container body.

Preferably, for cosmetic reasons, the pivot portion of the handle extends through an aperture formed in a depending rim of the container, with the cam surface preferably provided on an enlarged portion of the pivot portion arranged behind the depending rim which prevents the handle being pulled through the aperture.

The depending rim through which the handle extends is preferably attached to the container through a radially extending wall. In the context of the embodiments described above, the depending rim may be a downward axial extension of the outer wall of the channel, with the radially extending wall comprising the bottom wall of the channel. In one embodiment, the cam surface is arranged so as to have an elongate portion which engages along a portion of the radial wall in the handle's horizontal position, so that it cannot be rotated further in that direction. In another embodiment, the cam surface may be provided with a step which engages behind a stop in the handle's horizontal position, the stop being formed, for example, as a vertical rib on the container.

Some preferred embodiments of the invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a container embodying the invention, with certain parts cut away for purposes of clarity;

Figure 2 is a cross-section showing the container of Figure 1 with a lid, taken along the line II-II of Figure 1;

Figure 3 is a cross-section showing the engagement of the container with the lid, taken along the line III-III of Figure 1;

Figure 4 illustrates the moulding of a slightly modified embodiment of the invention;

Figure 5 is a view similar to Figure 3 but showing a variant embodiment;

Figure 6 is a view similar to Figure 3 but showing a further variant embodiment;

Figure 7 is a schematic view of the underside of a lid of the container, showing the arrangement of projections for engaging with the clips;

Figures 8 and 9 are schematic views showing how the lid engages with the container;

Figure 10 shows an embodiment of the container with a handle in a horizontal position;

Figure 11 shows the embodiment of Figure 7 with the handle in a vertical position;

Figure 12 is a view similar to Figure 7 but showing a variant embodiment; and

Figure 13 is a view similar to Figure 8 but showing a variant embodiment.

As best shown in Figure 1, in one embodiment of the invention, a moulded plastics container in the form of a pail 2 has a circular base 4 and a side wall 6 which, for ease of manufacture, tapers from the bottom outwardly. This taper also allows containers to be nested, one inside the other. The rim 8 of the wall 6 is cylindrical, to receive a lid 10, as shown in Figures 2 and 3. An annular ring 12 slopes outwardly and downwardly and from this ring depends an upwardly open channel 13, which co-operates with the lid 10 to close the pail as will be described further below.

The channel comprises an inner wall 14, a bottom wall 16 and an outer wall 18. Six equispaced clips 20 are formed on the inner wall 14. In the embodiment shown in Figures 1 to 3, and as can be seen most clearly from Figure 1, each clip 20 is formed as a resilient tongue which extends outwardly and downwardly from

the outer edge of the ring 12 at a smaller angle to the horizontal than the portions of the inner wall 14 between the clips. Each clip 20 extends circumferentially for 30° around the inner wall 14. Directly underneath each clip 20 an aperture 22, whose purpose will be described later, is formed in the inner and bottom walls of the channel 13. These apertures act as drain holes to allow any liquid in the channel to drain out.

Vertical ribs 24 extend between the walls of the channel and the wall 6 of the pail at certain points around the pail, to strengthen the channel.

As shown in Figure 1 the outer channel wall 18 extends downwardly beyond the bottom wall 16. The wall is provided on opposite sides of the container with a pair of lugs 26 (shown schematically in phantom in Figure 1), each having a slot 28 for receiving a handle for the containers as will be described in further detail below. The vertical ribs 62 behind the lugs are longer than the ribs elsewhere on the container, and a recess 64 is provided in the ring 12 above the ribs 62. When one container is placed inside another, the ribs 62 on the upper container engage in the recess 64 of the lower container, which allows the empty containers to nest stably.

As can be seen in Figures 2 and 3, the container lid 10 is generally planar, but has a rim 30 in the form of an inverted channel, with a depending skirt 32. The inner wall 34 of the lid rim engages sealingly within the mouth of the container, whilst the skirt 32 is received in the channel 12.

The inner surface 36 of the skirt 32 has an inwardly projecting bead 38 formed around its complete circumference. As shown in Figure 2, in the regions of the channel 12 that do not have clips 20, the bead 38 confronts the inner wall 14 of the channel 12, and may abut against it. However, in the regions where there are clips, the bead 36 engages beneath the clip 20, to retain the lid 10 in position, as shown in Figure 3. The clips 20 are resilient, and so are able to deflect inwardly and downwardly, so that when the lid 10 is pushed onto the container 2, the clips 20 are deflected by the bead 38, and then snap back into place, above the bead, when the bead enters the apertures 22.

The outer wall 16 of the channel 12 prevents access to the skirt of the lid. In order to gain access, the channel may be formed with an area (not shown) which can be deformed or broken away to allow a user to access the skirt 32 to allow the lid to be pushed off. Such an arrangement may be tamper-evident, as is well known in the art, and need not, therefore, be described in greater detail here.

The advantage of the container described above is that a greater degree of engagement can be achieved between the clip 20 on the container and the lid. This is made possible by the way in which the container is moulded. As shown schematically in Figure 4, the channel 12 is formed in a cavity defined between an upper mould part 40 and a lower mould part 42. Unlike the conventional moulding process in which a retaining bead formed on the container was formed completely by the upper mould part, in accordance with the invention, the lower mould part 42 forms the lower edge of the clip 20. The upper and lower mould parts substantially abut one another along a parting line 44, this contact forming the apertures 22 in the finished container. As can be seen very clearly from Figure 4, after moulding, the mould parts may be moved in opposite directions to release the container without the lower end of the clip having to deflect over any formation on the upper mould part 40.

Because there are apertures in the bottom wall 16 of the channel 12, it may be possible to gain access to the bottom of the skirt of the lid, using an elongate implement such as a knife, screwdriver or the like. This can be pushed against the bottom of the skirt, to force it outwardly, freeing its engagement with the clip. This is undesirable, particularly in tamper-evident containers.

In order to further hinder unauthorized access to the container, triangular ribs 46 can be provided to extend between the channel outer wall and the bottom wall, as shown in Figure 5. A pair of ribs 46, of about the same width as the strengthening ribs 24, are provided opposite the end parts of each clip 20. These ribs 46 prevent the outward deflection of the lower end of the skirt 32 so as to disengage the lid from the clips 20. Furthermore, they guide the skirt 32 of the lid 29 so that the bead 38 engages beneath the clip 20. This has the advantage of allowing a good fit between the lid skirt and the channel 12 without requiring close tolerances around the channel which could make fitting difficult.

Unauthorized access can be further hindered by dispensing with the part of the aperture 22 formed in the bottom wall 16, and to merely provide an opening 40 in the inner wall 14, as shown in Figure 6. This opening is of sufficient size to receive the bead 38 of the skirt 32, but is extremely difficult to access from underneath. This profile can be produced just as easily as the embodiment described above, with the upper edge of the inner aperture 22 formed by the upper mould part 40 and the lower edge of the clip 20 by the lower mould part 42.

As mentioned above, a greater degree of engagement between the container and the lid can be achieved by forming the clip as described above. However, in certain situations this greater degree of engagement may make the lid difficult to remove.

As will be appreciated, the only part of the skirt of the lid which the user can access to remove the lid from the container is the region of the skirt which is exposed when the tamper-evident feature is opened or removed. To remove the lid, the user hooks a finger or thumb under this region of the skirt and levers it upwardly and outwardly. This deforms the skirt and the lid, and there is a tendency for other parts of the skirt to move inwardly, towards the clip. In particular, the regions of the skirt which are 90° displaced from the region engaged by the user tend to deform inwardly, and thus are brought into greater engagement with the clips. This greater engage-

ment can make the lid difficult to peel away from the container.

To facilitate removal of the lid, the bead on the lid is not formed as a continuous circumferential bead, but rather as a series of discrete projections, to reduce the degree of engagement between the lid and the container.

The lid 10 is provided with twelve equispaced projections 70 of equal lengths, as shown in Figure 7. Since there are twelve equispaced projections, it follows that the distance *d* from the centre of one of the projections to the centre of an adjacent projection will be a twelfth of the circumference of the lid, or 30°, which is the same as the circumferential extent of the clips 20 and of the gaps 21 therebetween. Because of this spacing, it is certain that each of the clips 20 will engage with at least one of the projections 70, irrespective of the orientations of the lid 10 and the container 2, which avoids the need to align the container 2 and the lid 10 when closing the container.

Figures 8 and 9 show the engagement between the clips 20 on the container 2 and the discrete projections 70 on the lid 10, with the lid and container in two different orientations. In Figure 8, the lid and container are arranged so that a projection 70 is positioned in the centre of the clip 20. Figure 9 shows the lid rotated by 15° from the position in Figure 8, with the ends of two projections 70 engaging with each clip 20. It will be seen that in both positions, the clips 20 engage with the projections 70, and that the engagement length (ie the lengths of all of the parts of the projections which engage with clips) is the same. Indeed, because of the sizes and spacing of the projections and the clips, the engagement length is always the same, no matter what the orientation of the lid and container is, and is always equal to the circumferential length of six of the projections. It is desirable for the engagement length to be constant irrespective of orientation, in order to give a consistent force holding the lid on to the container.

The length of the projections is not critical, and can be varied if desired, to make it easier or harder to remove the lid. Of course, there is a compromise between making the lid easy to peel off and ensuring that the lid will not come off accidentally if the container is dropped or the like. It is also important to provide an adequate degree of retention, to ensure that the only way to gain access to the contents of the container is to open or remove the tamper-evident feature.

The embodiment shown has six clips 20 and twelve projections 70, but different numbers of clips and projections can be used. In order for the engagement length to remain constant, the projections 70 should be of equal length and equispaced, the clips 20 should be of equal length and equispaced, with the length *l* of the gap 21 between adjacent clips being equal to the length *l* of the clip 20, and the distance *d* between the centres of adjacent projections should be equal to the length *l* of the clip. This will give an engagement length equal to the total circumferential length of half of the projections, no matter how the lid and container are orientated with respect to each other.

As mentioned above, the container may have a handle 48 in the form of a semicircular strap, the radius of which is greater than the radius of the outer wall 18 of the channel, to allow the handle to pass over the outer wall 18. To allow the containers to be stacked, the handle can be moved between a vertical position, used when the container is to be carried, and a horizontal position. Containers are often provided with markings on their side, for example stating what the pail contains. Clearly, it is preferable if the handle does not obscure these markings. Indeed, if the markings are to be applied to the pail after it is moulded and the handle is attached, then it is imperative that the handle does not get in the way of the marking process.

To ensure that the handle does not get in the way, the pail and handle are configured to ensure that the handle cannot drop beneath its horizontal position. Two methods of achieving this are shown in Figures 10 to 13.

In Figures 10 and 11, each end of the handle is formed with a pivot shaft 50 which projects radially inwardly. The shaft 50 engages in the slot 28 formed in the mounting lug 26, as shown in Figure 1. At the end of each shaft is an enlarged head 52, which prevents the handle being pulled out of the slot 28. The heads locate in recesses formed beneath the channel. The head is formed with a cam surface around its edge, having a pair of parallel surfaces 54. When the handle is in its upright position, the heads are free to rotate in the recesses. However, if the handle is rotated through 90°, one or other surface 54 jams against the underside of the channel 13, preventing further rotation of the handle in that direction. The handle is thus prevented from falling below the horizontal.

In the embodiment shown in Figures 12 and 13, a web 56 is formed projecting downwardly from the underside of the channel 12. Furthermore, the enlarged head 58 is formed with a cam surface in the shape of two semicircles with coincident diameters, one semicircle having a larger radius than the other, so as to define steps 60. The semicircle with the smaller radius can rotate freely without contacting the web 56, but the larger one cannot. When the handle is in its vertical carrying position, the semicircle with the smaller radius is uppermost, and the handle is free to rotate. If the handle is rotated through 90°, then one of the steps 60 contacts the web 56, and prevents further rotation.

Although the invention has been specifically described in the context of a pail, it will be appreciated that the invention can of course be applied to other containers, such as rectangular containers for food and the like.

Claims

1. A container with an upwardly open peripheral chan-

nel formed around its rim for receiving a depending skirt of a lid for the container, wherein said channel has a plurality of clips extending outwardly from the inner wall of the channel, the channel being formed with respective apertures arranged below said clips.

2. A container as claimed in claim 1, wherein said apertures are in the form of openings in the inner wall of the channel.

3. A container as claimed in claim 1 or claim 2, wherein said apertures extend into the bottom wall of the channel.

4. A container as claimed in any preceding claim, wherein one or more inward projections are provided on the inner surface of the outer channel wall in the region of the clips.

5. A container as claimed in claim 4, wherein each said projection is relatively short in the circumferential direction.

6. A container as claimed in claim 4 or 5, wherein a pair of spaced projections are provided at each clip location.

7. A container as claimed in claim 6, wherein said projections are provided towards the circumferential ends of the clip.

8. A container as claimed in any of claims 4 to 7, wherein each said projection is formed to extend between the outer wall of the channel and the bottom wall of the channel.

9. A container as claimed in claim 8, wherein said projection takes the form of a rib extending between these two walls.

10. A container as claimed in claim 9, wherein said rib tapers inwardly towards the bottom wall, so as to guide the lid into engagement with the container clip.

11. A container as claimed in any preceding claim, wherein said channel are formed with a region which can be deformed or removed to allow access to the skirt lid for its removal.

12. A container as claimed in any preceding claim, wherein said container has a carrying handle, pivotable between a vertical carrying position and a horizontal stowed position.

13. A container as claimed in claim 12, wherein means are provided to prevent the handle from moving below the horizontal stowed position.

14. A container as claimed in claim 12 or claim 13, wherein the handle has at least one pivot portion which extends through an aperture formed in a depending rim of the container.

15. A container as claimed in claim 14, wherein a cam surface is provided on an enlarged portion of the pivot portion arranged behind the depending rim which prevents the handle being pulled through the aperture.

16. A container as claimed in claim 14 or claim 15, wherein the depending rim through which the handle extends is attached to the container through a radially extending wall.

17. A container as claimed in claim 16, wherein the depending rim is a downward axial extension of the outer wall of the channel, with the radially extending wall comprising the bottom wall of the channel.

18. A container as claimed in claim 16 or claim 17, wherein the cam surface is arranged so as to have an elongate portion which engages along a portion of the radially extending wall in the handle's horizontal position, so that it cannot be rotated further in that direction.

19. A container as claimed in any of claims 15 to 17, wherein the cam surface is provided with a step which engages behind a stop in the handle's horizontal position.

20. A container comprising a body and a carrying handle, said handle being pivotable between a vertical carrying position and a horizontal stowed position wherein the pivot portion of the handle is provided with a cam which in the horizontal position of the handle engages with a stop provided on the container body.

21. A container with an upwardly open peripheral channel formed around its rim for receiving a depending skirt of a lid for the container, wherein said channel has clip means formed on an inner wall of the channel, the outer wall of the channel being formed with projections for preventing the lower end of a lid skirt from being deflected outwardly.

22. A method of moulding a container with an upwardly open peripheral channel formed around its rim for receiving a depending skirt of a lid for the container, and having a clip extending outwardly from an inner wall of the channel, wherein the inner profile of said channel is defined substantially by a first mould part which after moulding is removable from the mould-

ed channel through its open end in a first direction, and wherein at least a portion of the outer profile of the channel and the lower edge of the clip is defined by a second mould part which forms an aperture in the inner wall of the channel below the clip and which is removable in a direction substantially opposite to that of said first mould part.

23. A container moulded by the method of claim 22.

24. A container as claimed in any of claims 1 to 21 or 23 further comprising a lid, the lid having a plurality of discrete projections on the inner wall of the skirt for engaging with said clips.

25. A container as claimed in claim 24, wherein said projections and said clips are positioned and sized such that at least some of the clips are engaged by the projections irrespective of the orientation of the lid on the container.

26. A container as claimed in claim 25, wherein said projections and said clips are positioned and sized such that all of the clips are engaged by the projections irrespective of the orientation of the lid on the container.

27. A container as claimed in any of claims 24 to 26, wherein said projections and said clips are positioned and sized such that the length along which the projections engage with the clips when the lid is on the container is constant, irrespective of the orientation of the lid on the container.

28. A container as claimed in any of claims 24 to 27, wherein said projections are equispaced and of equal length, said clips are equispaced and of equal length, with the gaps between the clips being of the same length as the clips themselves, and the circumferential distance between the centres of adjacent projections is equal to the circumferential length of each clip.

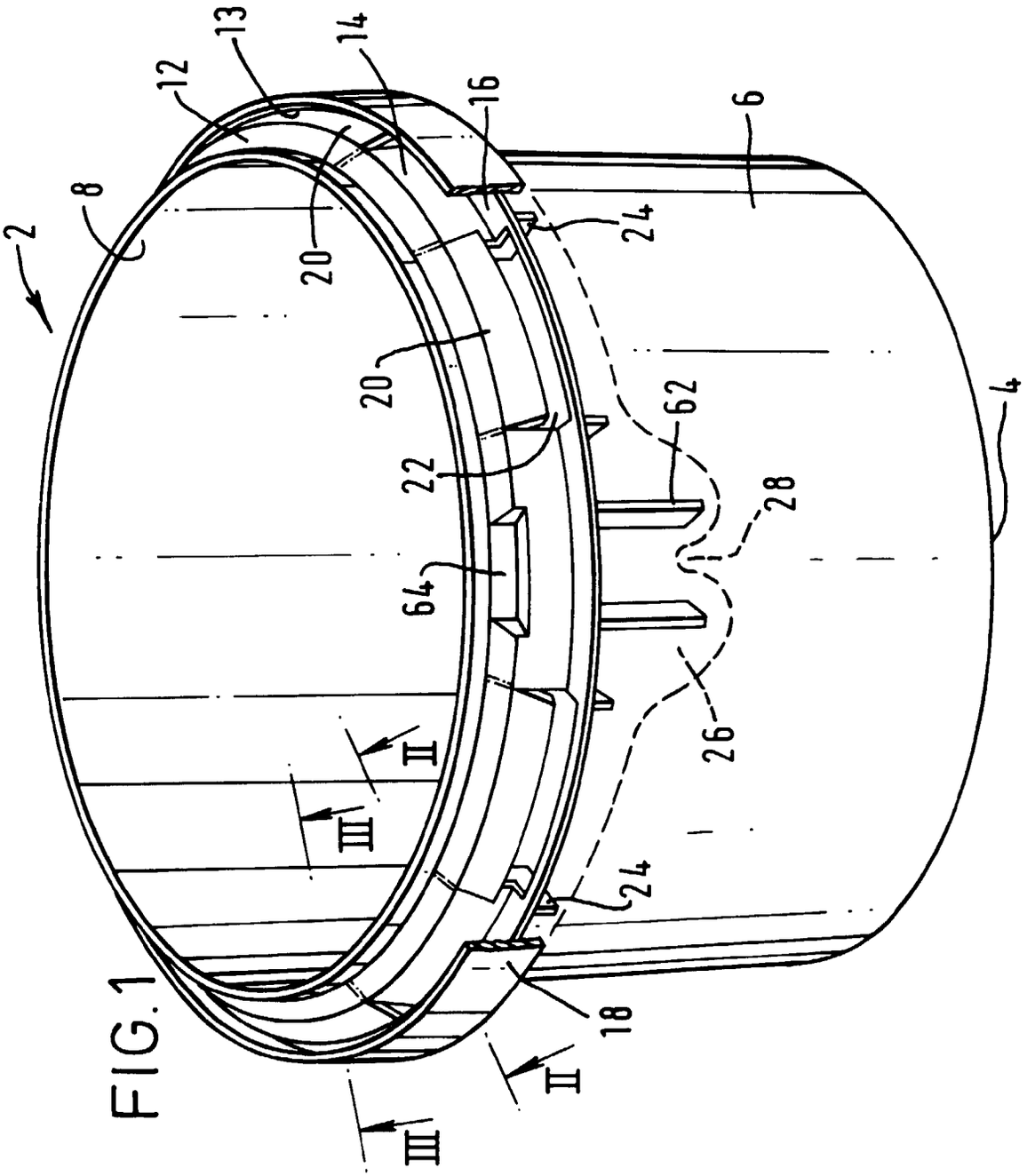


FIG.1

FIG. 2.

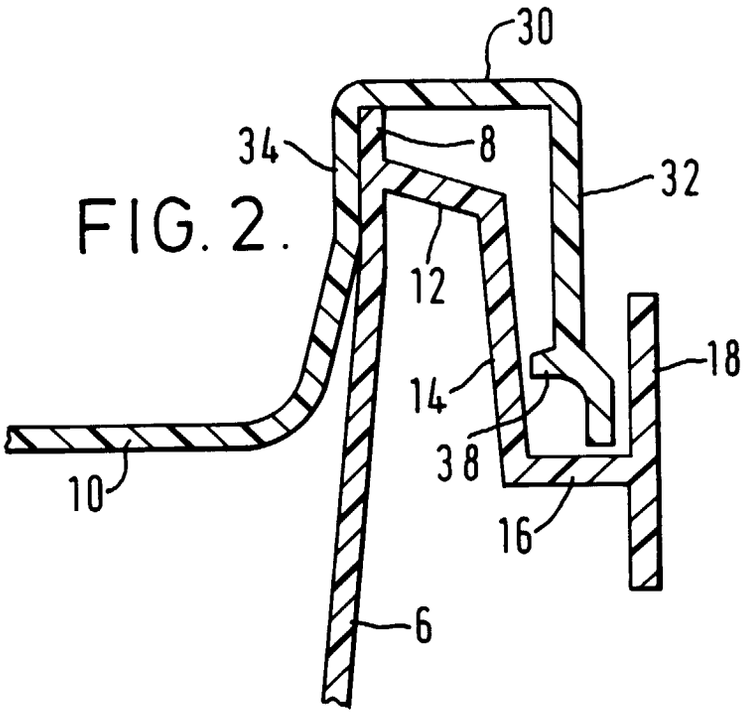
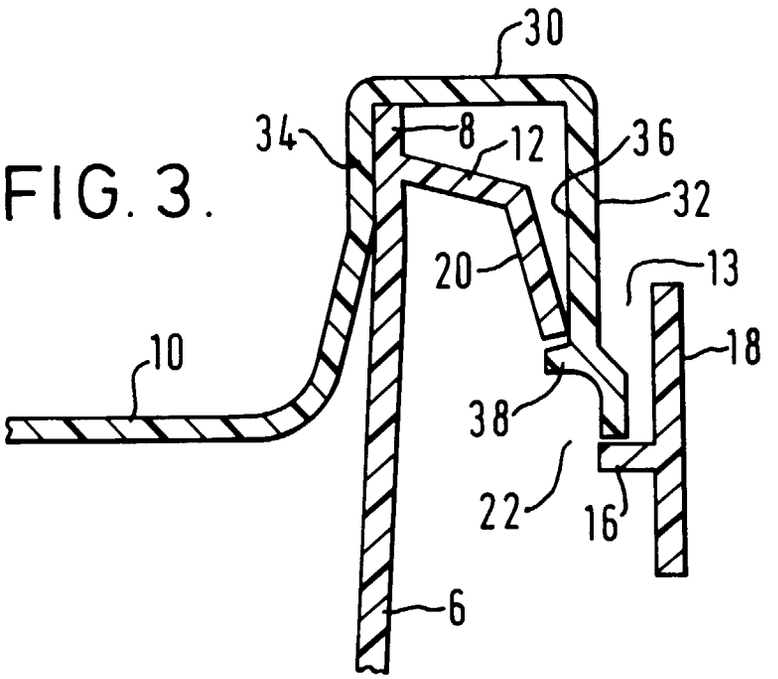


FIG. 3.



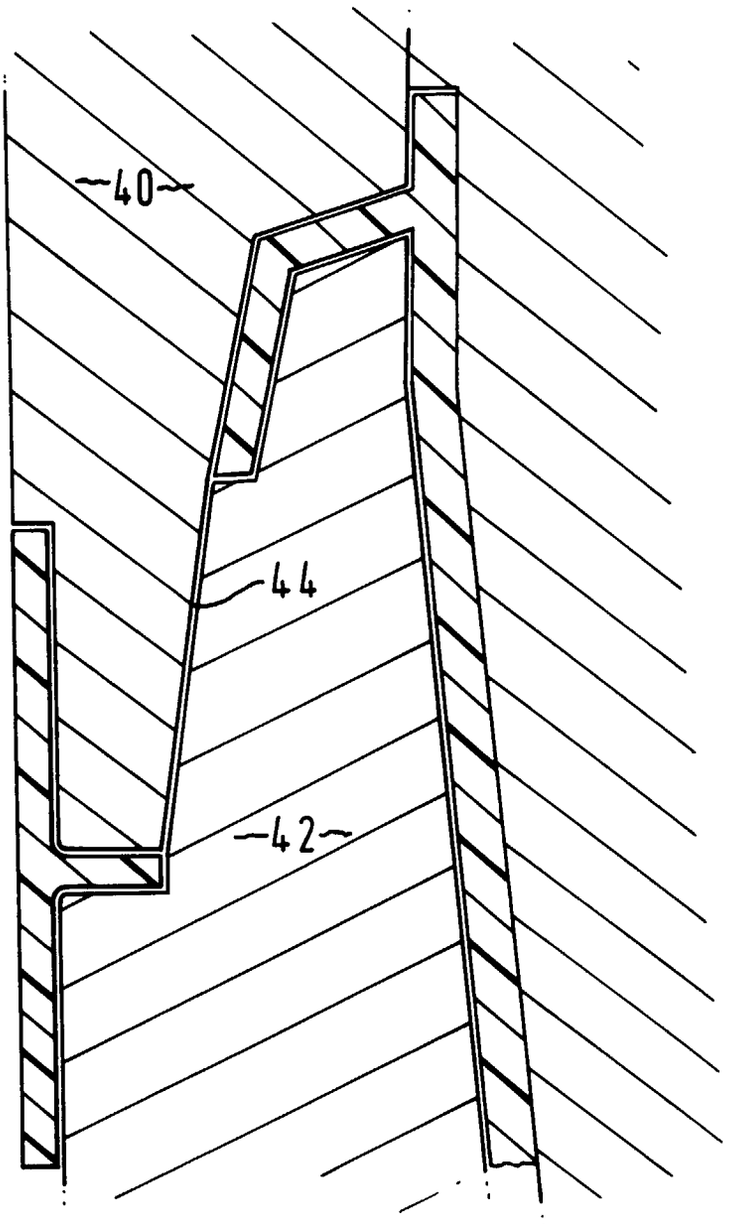


FIG. 4.

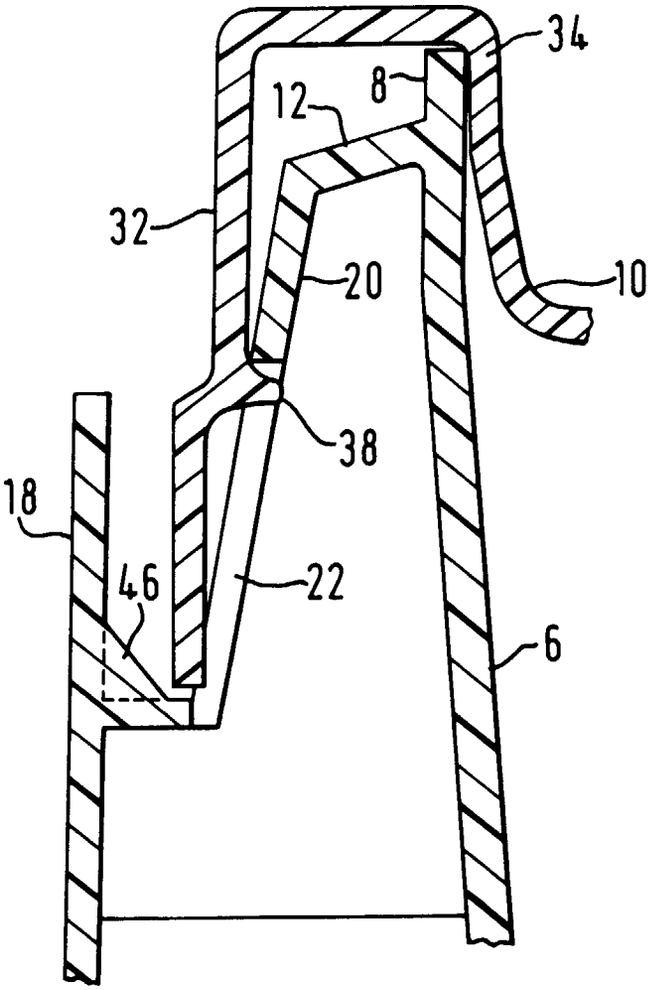


FIG. 5.

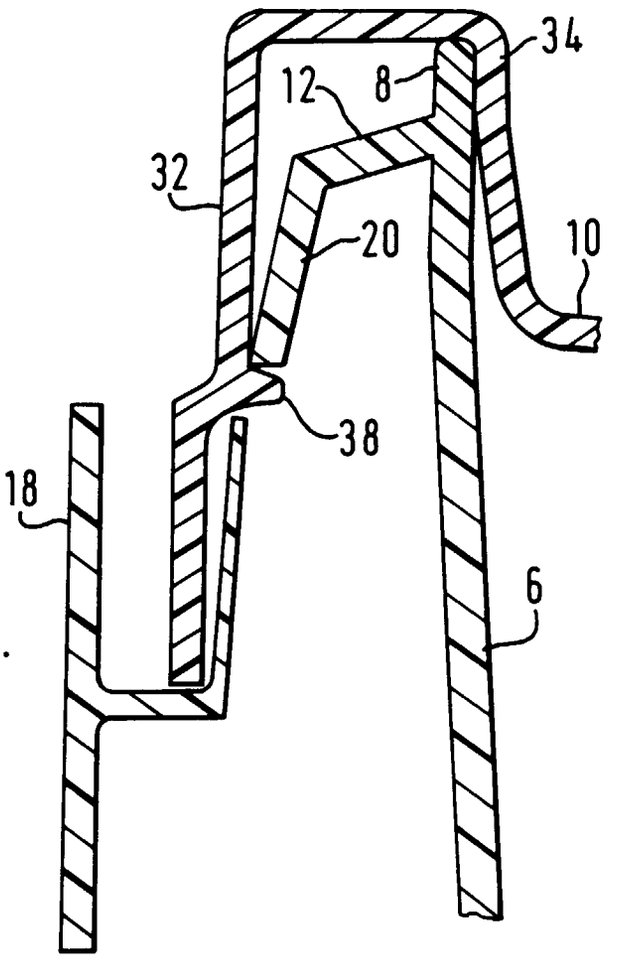


FIG. 6.

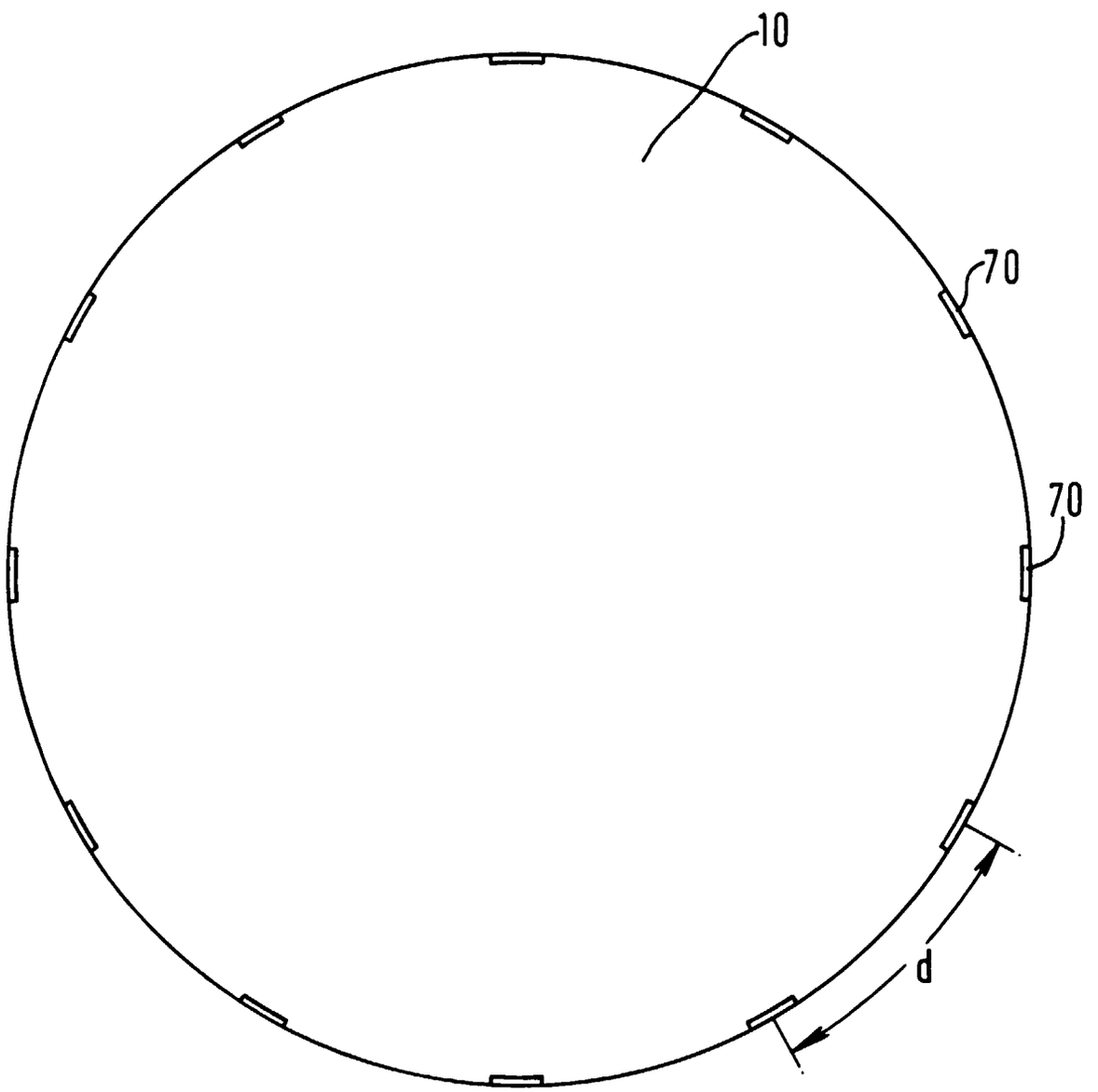


FIG. 7.

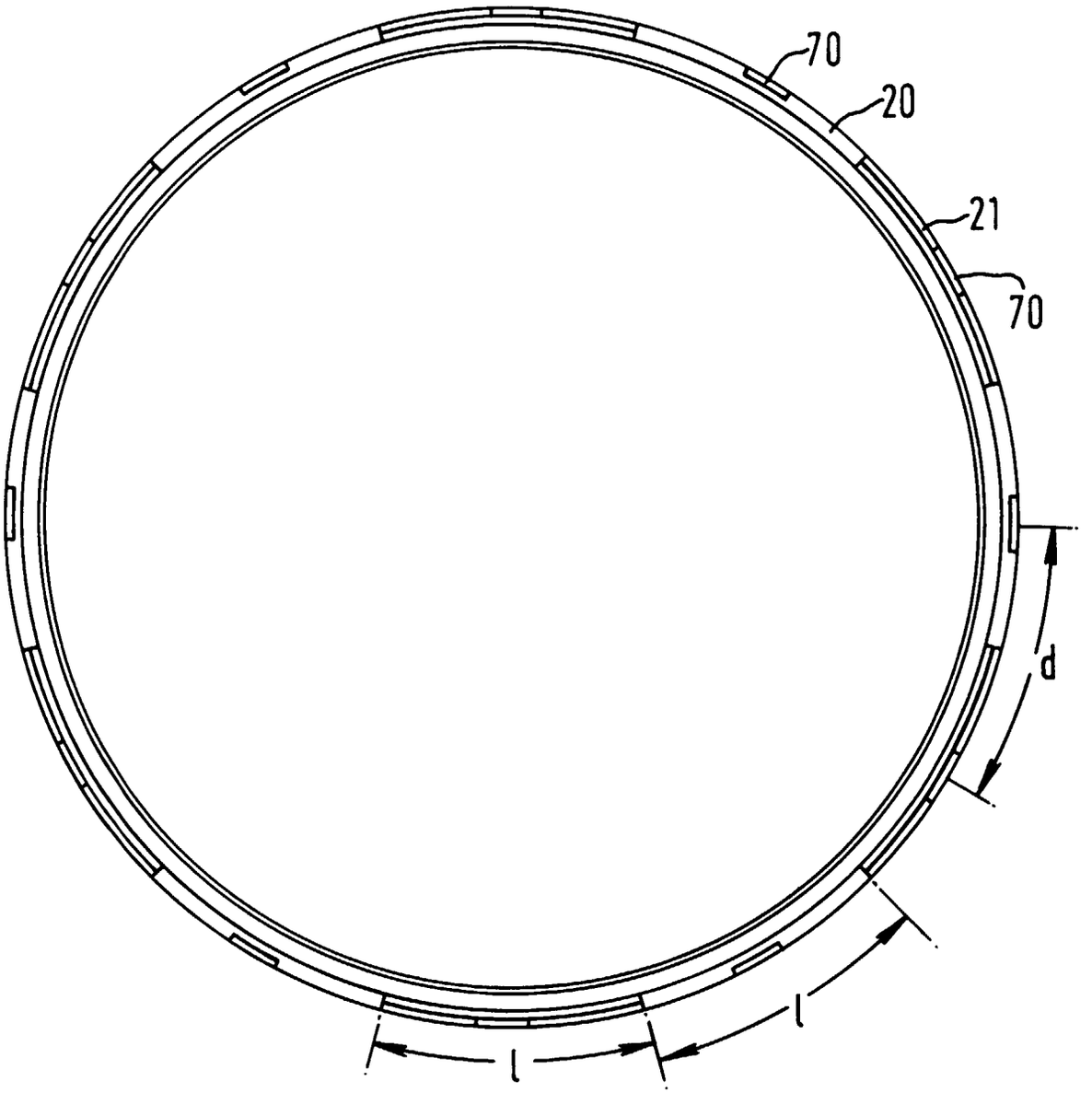


FIG. 8.

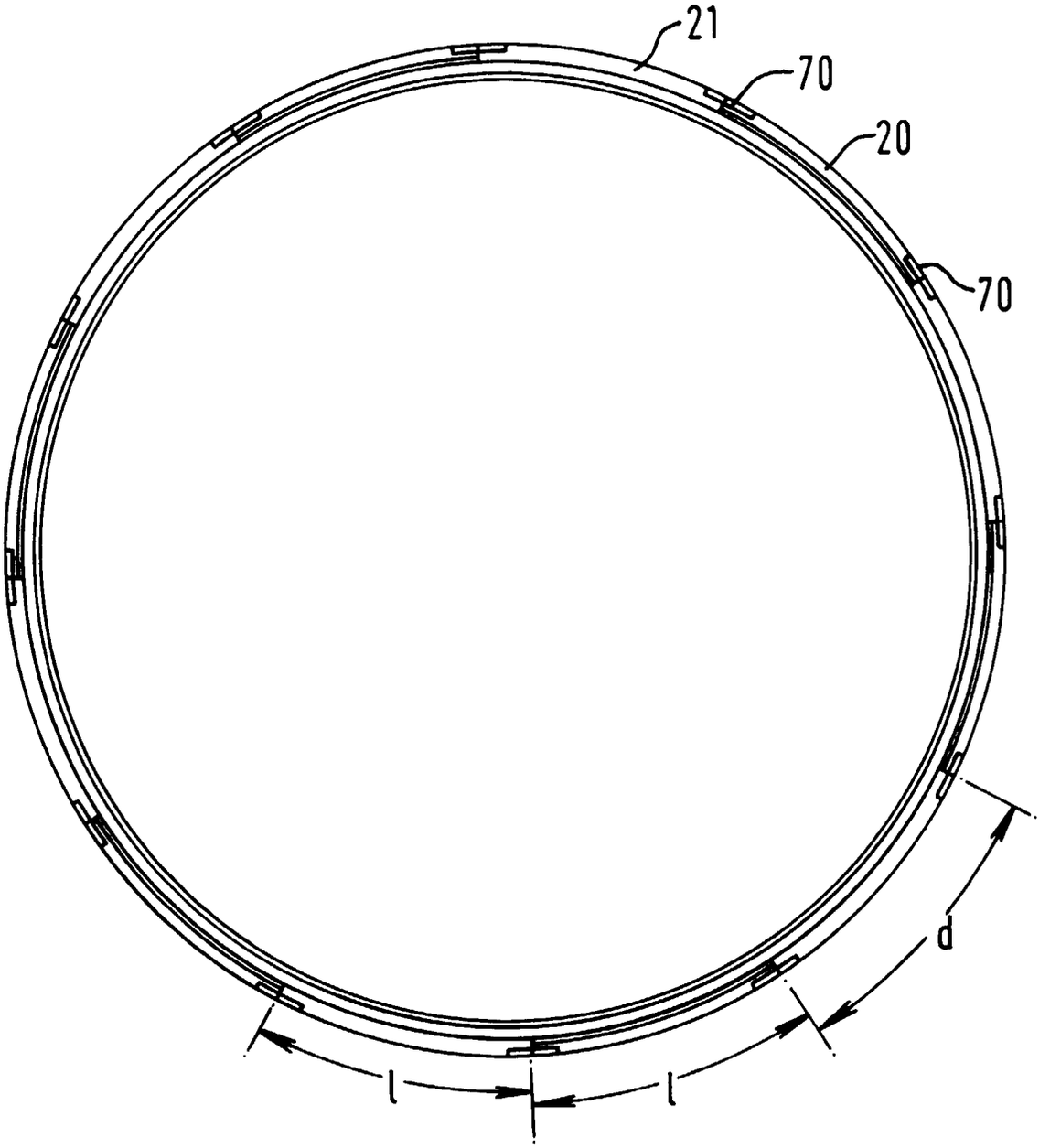


FIG. 9.

FIG. 10.

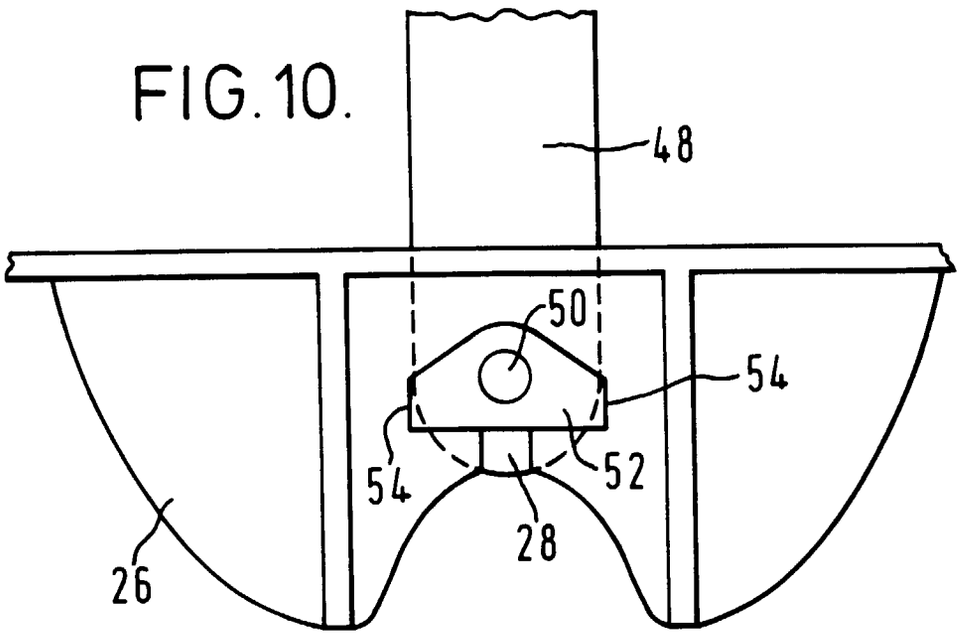


FIG. 11.

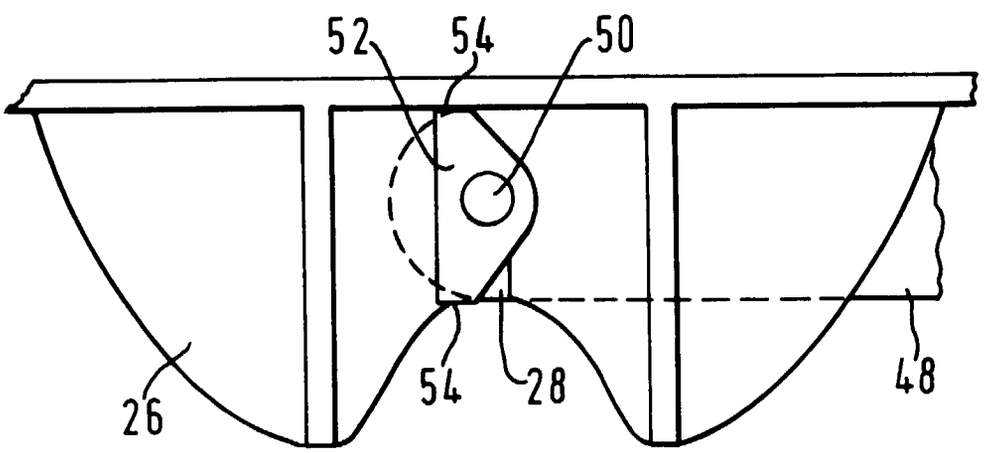


FIG. 12.

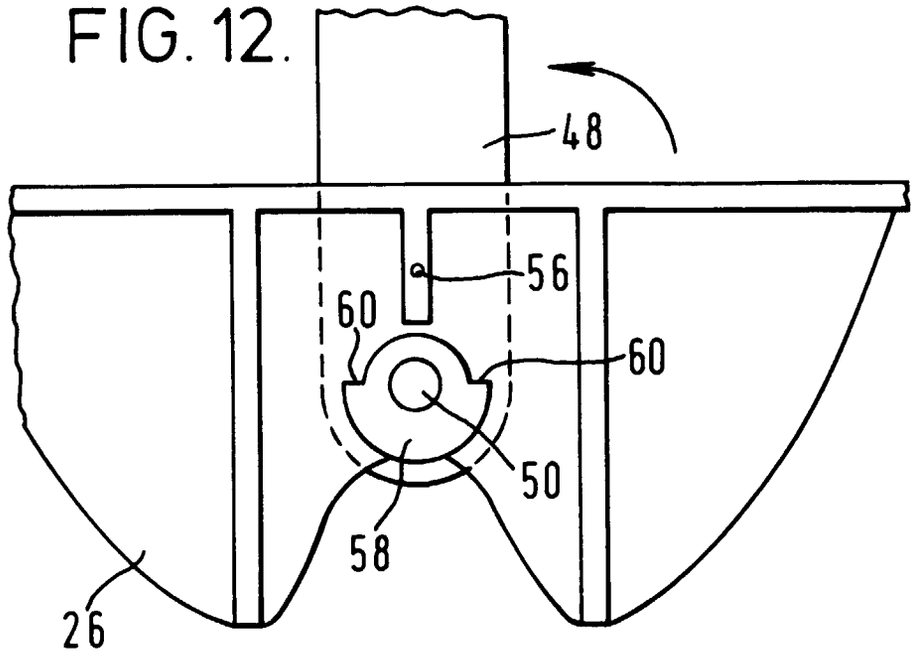


FIG. 13.