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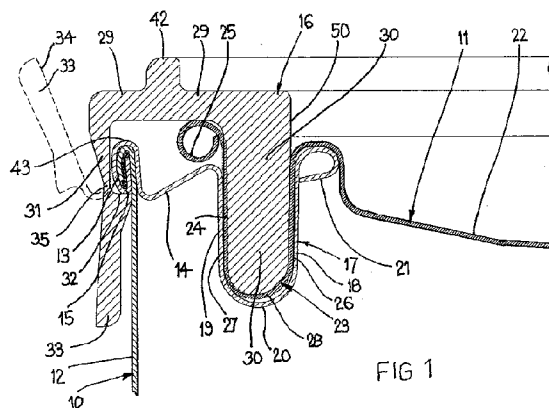


FIG 1

(57) Abstract: An integrally formed lid retainer collar (16) for a container (10) having a first annular portion (29) adapted, in use, to span a rim region (14) of a container (10) with a closure lid (11) closing an open mouth region of said container (10), said collar (16) including a first radially inner leg (30) means depending in a first direction from said first annular portion (29) engageable in use in a hollow annular space defined by a retainer rib of said lid (11), said collar (16) further including a radially outer second leg (31) means depending from said first annular portion (29) in said first direction including an engagement region (15) engageable underneath an outer flange (13) of said container (10), said collar (16) being characterized by an at least partial circumferential region of weakness (35) enabling at least a zone of said engagement region to be disengaged from said outer flange (13) of said container (10).

WO 2011/041826 A1

## SAFETY RINGS FOR LIQUID CONTAINERS

### FIELD OF THE INVENTION

The present invention relates to improvements in safety retainer rings or collars adapted for use with transportable liquid storage containers to prevent unwanted detaching of the lids of such containers.

### BACKGROUND OF THE INVENTION

Safety regulations are in the process of being established requiring dangerous goods stored and transported in containers above a certain volume to be packaged in a way that the access lid cannot detach from the container if it is dropped or tipped over unintentionally. These regulations will apply to liquid chemicals, paints and other toxic liquids and while the regulations will apply to packaging of such goods above certain volume requirements, it is potentially wise for any volume container to be packaged safely.

Paint products are typically packaged in steel cylindrical containers having a closed bottom and an open upper face, closed after filling by a lid with a semi cylindrical annular rib portion around its periphery that engages with a friction fit sealingly into an annular recessed flange surrounding the open upper face of the container. These types of containers are preferred by the paint industry because when packed on a pallet or similar, they do not have excessive wasted storage space. Further they are easily openable or closable when required. They will not, however, satisfy safety regulations when sized above certain limits requiring the lid not to unintentionally de-latch from the container under certain abnormal conditions.

It is known to secure lids of the aforementioned type to their containers by additionally adding a steel locking ring with an over centre lever catch fitted over the lid and container rim. Such devices are known and will meet safety regulations, however, they are difficult for manufacturers of paint and similar goods to fit to the containers after filling in an automated manner. They also have disadvantages in use in that they occupy greater storage space when multiple containers with such rings attached are packed side by side on a pallet or similar. Paint manufacturing industry would prefer not to use such steel locking rings if at all possible.

US Patent No. 5193705 discloses a transportation ring made of moulded rigid plastics having a first inner annular leg fitting in use within the annular rib portion of the lid and a second annular outer leg with an inwardly directed finger or ledge engaging beneath an outer rim surface around the container mouth, the first and second legs being integrally connected by an annular ring portion. The arrangement is such that the first inner annular leg is spaced from the walls of the annular rib portion of the lid and moves radially within this space to provide an increased sealing effect in case of an abnormal pressure occurring within the container indicative of it being dropped or tipped. The transportation ring is removed by an external tab engageable by a screw driver or the like in a levering motion. It is believed that removal of the ring in this manner might be difficult to achieve if the ring is made of sufficiently rigid plastics material to function as claimed.

US Patent No. 5803298 discloses a similar lid retainer with a first annular leg engaging a section of the lid inwardly of the rim engagement rib with a second hooked leg engaging the outer rim flange of the container. US Patent No. 4728003 also discloses a similar lid retainer where the first annular leg also engages in the rim engagement rib space and substantially fills the radial width of at least part of this space. In US 4728003, the outer portion of the collar is formed by a plurality of spaced fingers, each having an abutment engaging under the flange of the container. In normal circumstances, the collar would retain the lid but with abnormal loadings such as the container being dropped, the more flexible nature of the fingers might allow unwanted detachment of the lid from the container.

US Patent No. 4932554 shows a still further lid retainer of the above discussed type similar to the construction of US Patent No. 4728003 except that it includes a radial split and a jacking screw passing through the retainer to engage with the rim of the container to allow the collar to be removed.

The objective of the present invention is to provide an improved security retainer ring or collar of plastics material engageable between a container and its lid to prevent the lid from being unintentionally de-latched in abnormal conditions such as being dropped or tipped. It is a preferred objective to provide such a retainer ring or collar that may be fitted using automatic machinery. It is a further

preferred objective to provide such a retainer ring or collar that does not prevent containers with such a ring or collar fitted being stacked on each other. It is yet another preferred objective to provide such a retainer ring or collar that does not substantially affect containers fitted with such a retainer ring or collar being stacked adjacent one another. It is a still further preferred objective to provide such a security ring having increased performance but which remains relatively easily removable when it is desired to open the container.

#### SUMMARY OF THE INVENTION

The present invention provides a lid retainer collar for a container having a lid with a peripheral annular hollow retainer rib which, in use, fits within an annular partially hollow closure flange of the container when the lid closes said container, said lid retainer collar having a rib portion with an annular configuration adapted to fit, in use, within the hollow retainer rib of said lid, said rib portion of the lid retainer collar being sized to form an interference fit with said hollow retainer rib of said lid, said lid retainer collar further including a radially outer, circumferentially continuous, depending wall connected to said rib portion, said depending wall including engagement means engageable, in use, below an outer flange of said container.

Preferably a first annular portion of the lid retainer collar connects said rib portion to said depending wall, an upper surface of said annular ring portion having stacking formation means extending upwardly to enable a said container to be stacked thereon.

In one preferred arrangement, the stacking formation means is a continuous upstanding abutment. Alternatively, the upstanding abutment might be discontinuous.

In a further preferred embodiment, the rib portion has first regions separated by second regions circumferentially spaced around said rib portion, said first regions providing said interference fit in the hollow retainer rib of said lid and said second regions having a radial dimension less than said first regions. The second regions each may include a void opening in an outward direction.

Conveniently a first annular portion of the retainer lid collar connects said rib portion to said depending wall, a plurality of circumferentially spaced abutment

members being formed on an inner surface of said first annular portion of the lid retainer collar adjacent said depending wall.

5 Preferably, an at least partial circumferential region of weakness is provided in said depending wall enabling at least a zone of said depending wall to be disengaged, in use, from said outer flange of said container.

10 Preferably the region of weakness comprises a hinge section integrally formed in the depending wall that, in use, is located at or above a lower extent of the outer flange of the container. The hinge section may extend circumferentially about the retainer collar. Alternatively, the hinge section may extend only partially circumferentially about the retainer collar. In a preferred embodiment, at least a portion of the depending wall below the hinge section is, in use, spaced from an outer wall surface of the container. Conveniently, the depending wall of the lid retainer collar may be annularly formed and divided into a plurality of circumferential sections.

15 In a further possible preferred arrangement, the region of weakness may be formed in the depending wall and includes at least a portion adjacent said first annular portion and further includes a breakable or tear away zone. Conveniently, the portion of the region of weakness is segmented into a plurality of circumferential sections. Preferably the second leg means below said portion  
20 of the region of weakness provides a radial space between said depending wall and an outer surface of the container.

In one preferred arrangement, the rib portion has a continuous annular configuration. Preferably, adjacent said sections in the rib portion are separated by a radial slot. Conveniently three to eight said radial slots are provided spaced  
25 around the annular configuration of said rib portion.

In one preferred arrangement, the rib portion has a uniform radial cross-section along its annular configuration. In a second preferred arrangement, the annular configuration of the rib portion has first peripheral regions separated by second peripheral regions, said first peripheral regions providing said interference  
30 fit in the hollow space defined by said retainer rib of the lid, and said second peripheral regions having a radial dimension less than said first peripheral regions. In one preferred embodiment, either an inner face or an outer face of the rib portion is formed as a wave surface with the rib portion having first regions of

greater radial dimension separated by second regions of smaller radial dimension, the first regions forming said first peripheral regions. It has been found that providing a rib portion with a varying circumferential radial dimension, and preferably with a plurality of circumferentially spaced slots, allows for minor differences in the diametral dimensions of the rib portion relative to the hollow annular space of the retainer rib of the container lid without affecting the performance of the lid retainer collar.

The rib portion may have a length to substantially fill the hollow annular space of the retainer rib of the container lid. The inner leg means may engage a bottom zone of the hollow annular space defined by the retainer rib of the container lid or, in use, be spaced a short distance above the bottom zone.

In a preferred embodiment, the first annular portion may have a plurality of circumferentially spaced abutment means depending downwardly from an inner surface to engage, in use, an upper edge zone of the outer flange of the container. The abutment means prevents the lid retainer collar from being pressed downwardly into engagement with a container / lid when being fitted by automatic installation machinery such that regions of the lid might be damaged.

In a further aspect of the present invention, a lid retainer collar is provided for a container having a lid with a peripheral annular hollow retainer rib which, in use, fits within an annular partially hollow closure flange of the container when the lid closes said container, said lid retainer collar having a rib portion with an annular configuration adapted to fit, in use, within the hollow retainer rib of said lid, said rib portion of the lid retainer collar being sized to form an interference fit with said hollow retainer rib of said lid, said lid retainer collar further including a radially outer, circumferentially continuous, depending wall connected to said rib portion, said depending wall including engagement means engageable, in use, below an outer flange of said container, said rib portion having first regions separated by second regions circumferentially spaced around said rib portion, said first regions providing said interference fit in the annular hollow retainer rib of said lid and said second regions having a radial dimension less than said first regions.

In a still further aspect of the present invention, there is provided a lid retainer collar for a container having a lid with a peripheral annular hollow retainer

rib which, in use, fits within an annular partially hollow closure flange of the container when the lid closes said container, said lid retainer collar having a rib portion with an annular configuration adapted to fit, in use, within the hollow retainer rib of said lid, said rib portion of the lid retainer collar being sized to  
5 form an interference fit with said hollow retainer rib of said lid, said lid retainer collar further including a radially outer, circumferentially continuous, depending wall connected to said rib portion, said depending wall including engagement means engageable, in use, below an outer flange of said container, said lid retainer collar further including a first annular portion connecting said rib portion to  
10 said depending wall, a plurality of circumferentially spaced abutment members being formed on an inner surface of said first annular portion of the lid retainer collar adjacent said depending wall.

Preferred embodiments of the present invention will now be described with reference to the accompanying drawings.



**BRIEF DESCRIPTION OF THE DRAWINGS**

Fig 1 is a schematic cross-sectional view of a first preferred embodiment of a lid retainer collar applied to a closure lid closing a container;

Fig 2 is a schematic cross-sectional view similar to Fig 1 showing a second preferred embodiment of a lid retainer collar applied to a closure lid closing a container;

Fig 3 is a partial underneath plan view of a third preferred embodiment of a lid retainer collar;

Fig 4 is a side elevation view of the lid retainer collar shown in Fig 3;

Fig 5 is an enlarged detail view of the area Y of Fig 3;

Fig 6 is an enlarged detail view of the area X of Fig 3;

Fig 7 is a section view along line A-A of Fig 3;

Fig 8 is an enlarged detailed section view of the area W of Fig 7; and

Fig 9 is an enlarged detailed section view of the area marked Z of Fig 7.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to the drawings, Figs 1 and 2 show a relatively conventional container 10 with a closure lid 11, typically but not necessarily exclusively, used for storing, transporting and selling paint. The drawings show a diametral cross-section of one side of the container with an upright cylindrical wall 12 with a turned over upper peripheral flange 13 securing a closure rim flange 14 thereto. The assembly of the container 10 and closure rim flange 14 provides a lower circumferential ledge 15 providing an anchor point for the retainer collar 16 as described hereafter. The closure rim flange 14 has an upper edge 43 above the ledge 15 and includes an annular trough zone 17 having radially inner and outer walls 18, 19, a bottom section 20 and an inwardly facing flange part 21. The lid 11 includes a central cover part 22 and a peripheral rim region 23 having an annular trough zone 24 adapted in the normal way to frictionally engage via inner and outer walls 26, 27 and a bottom section 28 in the annular trough zone 17 of the closure rim flange 14 of the container 10. The lid 11 further includes a radially outer flange portion 25 which is engaged conventionally by a flat instrument such as a screw driver or the like in a levering action when it is desired to remove the lid 11 to open the container. The desire is to prevent the lid 11 from disengaging

from the container unintentionally but to not unnecessarily restrict opening of the container when it is desired to do so.

The retainer collar 16 is an integrally moulded plastic ring that is sufficiently strong and rigid to function as described hereafter. The collar 16 includes a first annular ring portion 29 having a first annular leg member 30 sized to fit within the trough zone 24 of the peripheral rim region 23 of the lid 11. The leg member 30 preferably has a radial width greater than the distance between the walls 26 and 27 of the trough zone 24 in the rim of the lid 11 to provide an interference fit within this space when installed as illustrated. This provides an increased load and sealing effect between the walls 18, 26 and the walls 19, 27 to both assist with prevention of the escape of contents from the container as well as to prevent de-latching of the lid. This structure strengthens this region against damage if the container is dropped and has been found to prevent the lid 11 unintentionally de-latching. When a container of this type is dropped, tipped or impacted, the liquid within the container can press against the cover part 22 of the lid to dome it upwardly (in the drawings). This action can press against the retainer collar 16 to provide a dislodging force thereon. The retainer collar 16 has a vertical inner circular face 50 to prevent any contact between the part 22 and the collar 16 in such circumstances. The collar 16 may further include a second radially outer annular leg portion 31 positioned at a radially outer zone of the first annular ring portion 29. The second leg portion 31 may be continuous with an inwardly facing ledge 32 engageable in use underneath the circumferential ledge 15 on the container 10. The portion 33 of the second leg portion 31 below the ledge 32 is at least partially spaced from the outer wall 12 of the container 10 to allow it to be levered outwardly about a weakened region 35 to be hinged at least partially to the dashed position 34 illustrated in Fig 1. The weakened region 35 may extend fully about the collar 16 or may only be in a portion of the circumference of the leg portion 31. So long as sufficient circumferential region of the second leg portion 31 can be moved to the position 35, the collar 16 can then be pulled from the lid / container 10, 11 and the lid can be accessed normally.

Referring now to Fig 2, a second possible preferred embodiment is illustrated where like features have been given the same reference numbers as in Fig 1. In this embodiment, the outer second leg portion 31 is circumferentially

segmented to provide a plurality of lower segments 40 below the weakened region 35. The weakened region 35 may include a tear away strip or may be capable of being broken away at least partially along a circumferential line defined by the weakened region 35. Again a space 41 between the segments 40 and the container wall 12 allows these segments to be gripped and separated about or from the weakened region 35. Once this has occurred, the remainder of the collar 16 can be pulled from the container / lid 10/11 so that the lid can be opened or closed normally.

The retainer collar structures described and illustrated secure the lid to the container, can be applied easily and in an automatic machine manner, and can be readily removed when the container is to be opened. In both of the above described embodiments a ring flange 42 can be provided extending upwardly from the ring portion 29 oppositely to the leg portions 30, 31. The ring flange 42 might be continuous or semi-continuous and be used to support or locate a similar container 10 stacked on the lower illustrated container 10.

Referring now to Figs 3 to 9, a third preferred embodiment is illustrated. In the following description like features with the earlier embodiments have been given the same reference numbers. The lid retainer collar 16, like earlier embodiments, has a first annular ring portion 29 with a first, radially inner, leg member 30 with an annular configuration, the leg member 30 being sized to fit within the trough zone 29 of the peripheral rim region of the lid 11. In this embodiment, however, the leg member 30 has a cylindrical inner wall 50 and a wave formed outer wall 51 providing first peripheral regions 52 separated by second peripheral regions 53, the first peripheral regions 52 having a radial dimension to provide an interference fit within the trough zone 24 of the lid 11. The second peripheral regions 53 have a radial dimension significantly less than that of the first peripheral regions 52. In the illustrated embodiment, the regions 53 are formed with flat surfaces 70 and the regions 52 are formed with curved surfaces 71, however, other configurations are possible. It will be recognized that the wave surface could be formed on the wall 50 with the wall 51 being formed as a cylindrical surface. Other arrangements are also possible to provide separate adjacent peripheral sections where some of the sections provide an interference

fit and others do not provide such an interference fit in the trough zone 24 of the lid 11.

As is further illustrated in Figs 3 and 6, the annular configuration of the leg member 30 is separated into peripheral regions by a plurality of radial slots 54. In the illustrated embodiment, four equally spaced slots 54 are provided although the number of slots could be varied. Moreover the radial slots 54 are conveniently formed also in the ring portion 29. The separation of the peripheral regions of the leg member 30 and the ring portion 29 by the slots 54 and the wave configuration of the leg member 30 together permit the leg member 30 to adjust for small dimensional differences relative to the dimensions of the trough zone 24 without significantly affecting performance of the lid retainer collar 16.

Figs 3, 5, 8 and 9 also illustrate abutment members 55 formed downwardly depending from the inner surface 56 of the first annular ring portion 29. In the illustrated embodiment, twelve equally spaced abutment members 55 are provided. The abutment members, in the installed position of the retainer collar 16 engage the upper edge zone 43 of the container flange 13 and prevent installing machinery pressing the first annular ring portion 29 downwardly too far to potentially damage the flange 25 and trough zone 24 of the lid 11. The number of the abutment members 55 might also be varied.

Referring to Figs 3, 4 and 9, the second radially outer leg portion 31 is annularly formed and is generally circumferentially continuous. The outer leg portion 31 is, like the earlier embodiments, formed with an inwardly directed ledge 32 adapted, in use, to engage under the ledge 15 formed by the lower face of the container flange 13. The leg portion 31 includes a circumferentially extending zone of weakening 57 adapted to form a hinge region 58 to allow the lower section 33 of the outer leg 31 to be pivoted outwardly to some extent about the hinge region 58 to free the ledge 32 from the flange ledge 15 to remove the lid retainer collar 16 from the container. This, however, is prevented while the outer leg 31 remains unbroken or continuous in the installed position. The outer leg portion 31 includes three spaced apertures 59, 60 and 61. The two outer apertures 59 and 61 are connected via regions of weakening 62 and 63 to a lower edge 64 of the outer leg portion 31. A further region of weakening 65 circumferentially connects the two outer apertures 59 and 61. The central

aperture 60 allows a person desiring to open the container to insert a flat edged tool (*eg* a conventional screw driver or similar) into the aperture 60 to lever the section 66 of the outer leg portion 31 outwardly to break the lines of weakness 62, 63 and allow the section 66 to be hinged upwardly about the line of weakening 65  
5 or alternatively to allow the line of weakening 65 to also be broken to enable the section 66 to be removed. Either action will then be sufficient to permit the remainder of the outer leg portion 31 to be pivoted outwardly sufficiently to enable the lid retainer collar 16 to be removed.

It will be apparent to those skilled in this art that further modifications to the  
10 lid retainer collar 16 can be made without departing from the inventive concepts defined in the annexed claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A lid retainer collar for a container having a lid with a peripheral annular hollow retainer rib which, in use, fits within an annular partially hollow closure flange of the container when the lid closes said container, said lid retainer collar  
5 having a rib portion with an annular configuration adapted to fit, in use, within the hollow retainer rib of said lid, said rib portion of the lid retainer collar being sized to form an interference fit with said hollow retainer rib of said lid, said lid retainer collar further including a radially outer, circumferentially continuous, depending wall connected to said rib portion, said depending wall including engagement  
10 means engageable, in use, below an outer flange of said container.
2. A lid retainer collar according to claim 1 further including a first annular portion connecting said rib portion and said depending wall, an upper surface of said first annular portion having stacking formation means extending upwardly to locate a second said container stacked thereon.
- 15 3. A lid retainer collar according to claim 2 wherein said stacking formation means is a continuous upstanding abutment.
4. A lid retainer collar according to claim 2, wherein said stacking formation means is a discontinuous upstanding abutment.
5. A lid retainer collar for a container having a lid with a peripheral annular  
20 hollow retainer rib which, in use, fits within an annular partially hollow closure flange of the container when the lid closes said container, said lid retainer collar having a rib portion with an annular configuration adapted to fit, in use, within the hollow retainer rib of said lid, said rib portion of the lid retainer collar being sized to form an interference fit with said hollow retainer rib of said lid, said lid retainer  
25 collar further including a radially outer, circumferentially continuous, depending wall connected to said rib portion, said depending wall including engagement means engageable, in use, below an outer flange of said container, said rib portion having first regions separated by second regions circumferentially spaced around said rib portion, said first regions providing said interference fit in the

annular hollow retainer rib of said lid and said second regions having a radial dimension less than said first regions.

5 6. A lid retainer collar according to any one of claims 2 to 4 wherein said rib portion has first regions separated by second regions circumferentially spaced around said rib portion, said first regions providing said interference fit in the annular hollow retainer rib of said lid and said second regions having a radial dimension less than said first regions.

7. A lid retainer collar according to claim 5 or claim 6 wherein said second regions each include a void opening in an outward direction.

10 8. A lid retainer collar according to any one of claims 2 to 6 wherein a first annular portion of the lid retainer collar connects said rib portion to said depending wall, a plurality of circumferentially spaced abutment members being formed on an inner surface of said first annular portion of the lid retainer collar adjacent said depending wall.

15 9. A lid retainer collar for a container having a lid with a peripheral annular hollow retainer rib which, in use, fits within an annular partially hollow closure flange of the container when the lid closes said container, said lid retainer collar having a rib portion with an annular configuration adapted to fit, in use, within the hollow retainer rib of said lid, said rib portion of the lid retainer collar being sized  
20 to form an interference fit with said hollow retainer rib of said lid, said lid retainer collar further including a radially outer, circumferentially continuous, depending wall connected to said rib portion, said depending wall including engagement means engageable, in use, below an outer flange of said container, said lid retainer collar further including a first annular portion connecting said rib portion to  
25 said depending wall, a plurality of circumferentially spaced abutment members being formed on an inner surface of said first annular portion of the lid retainer collar adjacent said depending wall.

10. A lid retainer collar according to any one of claims 1 to 9 wherein an at least partial circumferential region of weakness is provided enabling at least a zone of said depending wall to be disengaged, in use, from said outer flange of said container.
- 5 11. A lid retainer collar according to claim 10 wherein said region of weakness comprises a hinge section integrally formed in said depending wall that, in use, is located at or above a lower extent of said outer flange of said container.
12. A lid retainer collar according to claim 11 wherein said hinge section extends circumferentially about said lid retainer collar.
- 10 13. A lid retainer collar according to claim 11 wherein said hinged section extends only partially circumferentially about said lid retainer collar.
14. A lid retainer collar according to any one of claims 1 to 13 wherein said rib portion has a continuous annular configuration.
- 15 15. A lid retainer collar according to any one of claims 1 to 13 wherein said rib portion is formed by a plurality of sections, said sections together forming an annular configuration, adjacent said sections of said rib portion being separated by a radial slot.
16. A lid retainer collar according to claim 15 wherein three to eight said radial slots are provided spaced around the annular configuration of said rib portion.
- 20 17. A lid retainer collar according to claim 14 wherein said rib portion has a uniform radial cross-section along said annular configuration.
18. A lid retainer collar according to any one of claims 1 to 16 wherein said rib portion has a length to engage a bottom zone of said annular hollow retainer rib of said lid.



19. A container having a rim region surrounding an open mouth region, a closure lid adapted to close the open mouth region of the container, and an integrally formed lid retainer collar according to any one of claims 1 to 18.

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**VIP STEEL PACKAGING PTY LTD**

WATERMARK PATENT & TRADE MARKS ATTORNEYS

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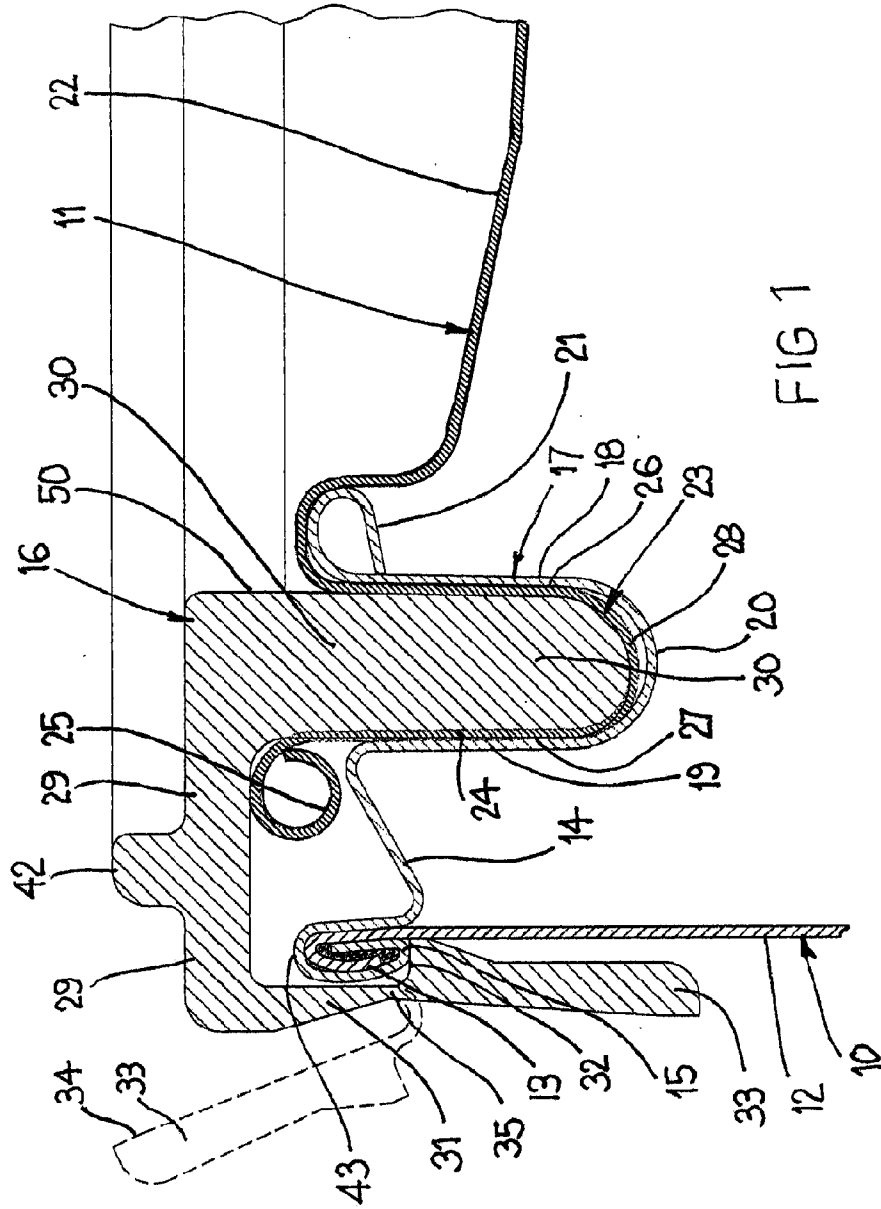


FIG 1



3/4

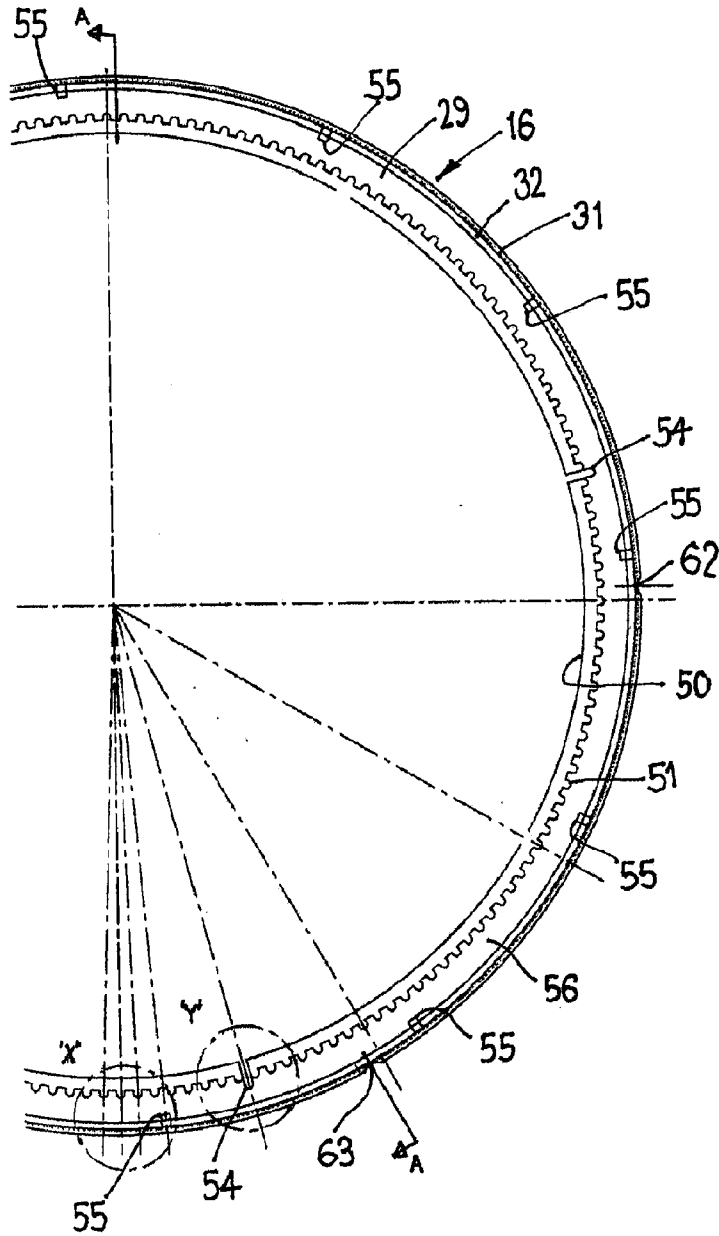


FIG 3

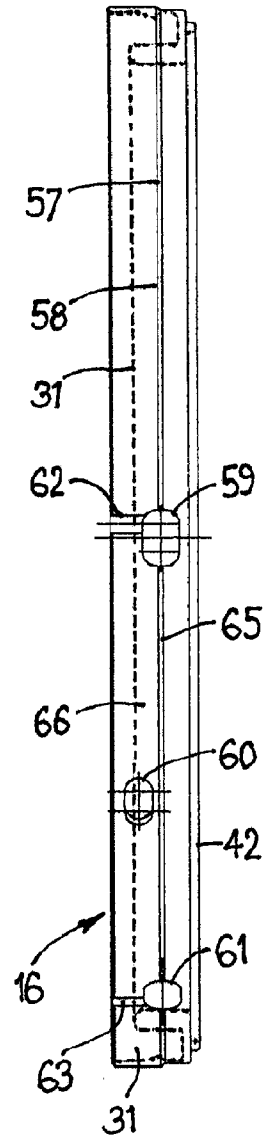


FIG 4

4/4

