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## (54) Clamping ring and barrel assembly

(57) The present invention relates to a clamping ring for securing a lid on a beaded-over edge of a barrel in a clamping manner which is made using less material, but the performance of which equals that of existing clamping rings. This clamping ring comprises a profiled strip (1) with a first edge (2a) and a second edge (2b) which, in the fitted state of the clamping ring, are situated above the top edge of the lid and below the bottom edge of the beaded-over edge, respectively, the profiled strip (1) comprising, on at least one of said edges (2a, 2b), a thickened section (9a, 9b) which is solid or has been made solid. The present invention also relates to a barrel assembly comprising such a clamping ring.

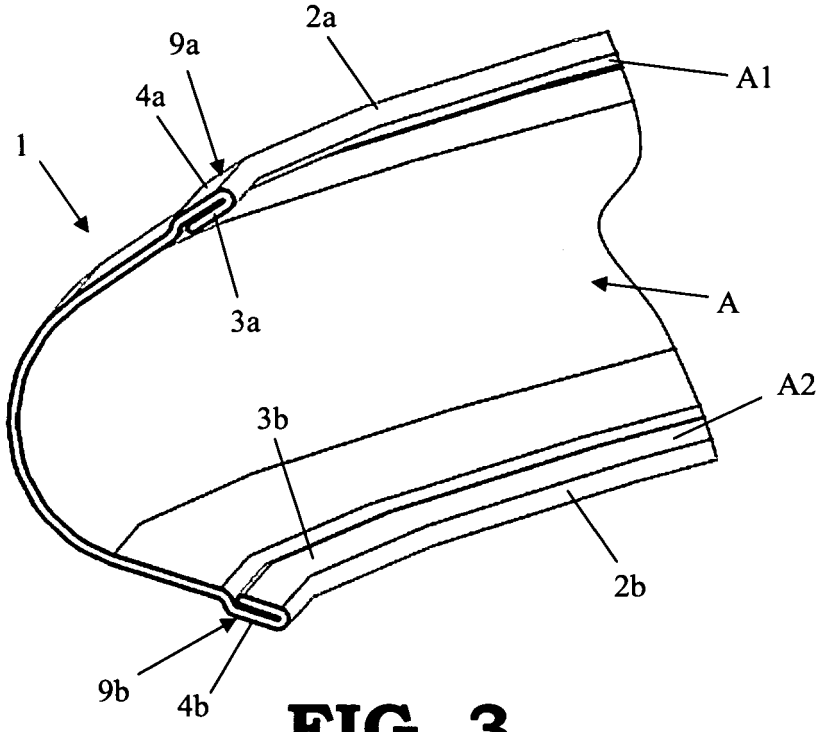


**FIG. 3**

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## Description

**[0001]** The present invention relates to a clamping ring for securing a lid on a beaded-over edge of a barrel in a clamping manner, comprising a profiled strip with a first edge which, in the fitted state of the clamping ring, at least partly engages with the top edge of the lid, and a second edge which, in the fitted state of the clamping ring, at least partly engages with the bottom edge of the beaded-over edge.

**[0002]** The present invention also relates to a barrel assembly, comprising a barrel with a beaded-over edge, a lid and a clamping ring for securing the lid on the beaded-over edge of the barrel in a clamping manner.

**[0003]** The barrel of such a barrel assembly is usually filled with a liquid, such as for example fruit juice, or a solid substance, such as for example aluminium powder. The lid is then fixed to the barrel by means of a clamping ring.

**[0004]** The clamping rings usually comprise a steel profiled strip which is rounded, so that it can engage the edge of the lid and the beaded-over edge. A section of such a profiled strip is illustrated in Figure 1. Often, the steel profiled strip is also provided with a coating, such as for example a layer of zinc.

**[0005]** Furthermore, these clamping rings comprise a closure system in order to pull the ends of the profiled strip towards one another after the strip has been fitted around the lid and the beaded-over edge, and attach them to each other, so that the clamping ring is secured around the lid and the beaded-over edge in a clamping manner. A bolt and nut closure or a lever closure, etc. may for example be used as a closure system.

**[0006]** Such clamping rings have already been described on numerous occasions in the patent literature, inter alia in the patent publications EP 1 367 002 A1, FR 2 595 081 A1, EP 1 908 699 B1, US 420,967 A, US 2,108,944 A, US 2,303,625 A, US 2,310,901 A, US 2,453,792 A and US 2,313,459 A.

**[0007]** Such systems often require similar amounts of material to produce clamping rings which can withstand similar loads and thus are identical in performance.

**[0008]** With such clamping rings, as have been described in CH 484 788 A, US 3,339,962 A, US 1,521,599 A, US 1,521,731 A, US 3,637,257 A, it is possible to fold over or roll over an edge in order to prevent someone from injuring themselves on this edge and/or to reinforce the clamping ring. In this way, less material is required to produce clamping rings which can withstand similar loads and are identical in performance to the clamping rings described above.

**[0009]** It is the object of the present invention to provide a clamping ring which is similar in performance to the prior art clamping rings while using even less material.

**[0010]** The object of the present invention is achieved by providing a clamping ring for securing a lid on a beaded-over edge of a barrel in a clamping manner, comprising a profiled strip with a first edge which, in the fitted state of the clamping ring, is situated at least partly above the top edge of the lid, and a second edge which, in the fitted state of the clamping ring, is at least partly below the bottom edge of the beaded-over edge, in which case the profiled strip, on at least one of the said edges, comprises a thickened section which is solid or has been made solid.

**[0011]** Such a thickened section can then preferably also increase in the direction of the edge of the profiled strip.

**[0012]** Such a thickened section has to be solid in the sense that it does not comprise any cavities.

**[0013]** In order to produce such a thickened section, it is, for example, possible to add additional material to the edges by, for example, providing a U-shaped profile on the edges. Another possibility consists of (laser) welding a thicker section to this edge. Such thickened sections may, for example, also be produced by providing the profiled strip with thickened sections by means of cold deforming as is described, for example, in DE 197 43 093 C1 or in WO 2010/00989 A1. A further possible way of producing thickened sections is by continuous machining of the profiled strip.

**[0014]** However, in a preferred embodiment of a clamping ring according to the present invention, this profiled strip comprises, on at least one of said edges, a folded-over part which is situated on the inside or on the outside of the profiled strip, respectively, and which at least partly overlaps an overlapped part of the profiled strip, with the folded-over part and the overlapped part being pressed against each other in order to form said thickened section together.

**[0015]** The folded-over part and the overlapped part of such a profiled strip have to touch across the entire overlapping surface in order to make the thickened section as solid as possible. The gap between the overlapping parts has to be zero in order to achieve the best performance. The folded-over part and the overlapped part have to form a single entity, so that the clamping ring will behave like a ring produced by cold deformation or continuous machining, as described above. In order to achieve this, said parts can be bonded or rolled together or continuously or partly welded, or be connected to one another by mechanical, fastening or by soldering.

**[0016]** The width of the part of the strip which is folded over to form the folded-over part, is in this case preferably chosen as a compromise between technically simple folding, on the one hand, and the saving of material achieved thereby, on the other hand. Folding over a part having a relatively small width will be technically more difficult to achieve, but results in a greater saving of material. Folding over a part having a relatively large width will be technically simpler to achieve, but results in less saving of material.

**[0017]** By means of a thickened section, it is ensured that the clamping ring comprises more material towards its edges. A clamping ring is namely subjected to a higher load in the zones along these edges compared to the

rest of its surface. This higher load is then absorbed by means of the extra material which has been provided at these edges in the form of a thickened section which preferably consists of one or more folded-over parts, while the lower loads can be absorbed by the rest of the strip containing less material.

**[0018]** In the case of similar loads, a clamping ring according to the present invention can absorb similar loads using less material than the clamping rings according to the prior art having the same closure. The reinforced edge of a clamping ring according to the invention ensures inter alia that the deformation due to a tensile force as a result of manipulation of this edge is not higher than with a clamping ring from the prior art providing a similar performance and having a greater wall thickness. Even with an internal pressure in the barrel which pushes the lid against the top edge of the clamping ring, a reinforced edge according to the invention meets the requirements as well as a clamping ring with a similar performance from the prior art. When lateral forces act on a clamping ring according to the invention, for example when barrels are pushed against one another during handling, the reduction in the material of the strip at the location of these forces is no longer a problem, since the clamping ring is sufficiently supported at this location by the edge of the lid and the beaded-over edge. When external vertical forces act on the clamping ring, as is the case when the barrels are being stacked, an edge reinforced according to the invention meets the requirements as well as a clamping ring from the prior art having a similar performance.

**[0019]** Moreover, such a clamping ring according to the present invention offers some additional advantages compared to the clamping rings from the prior art.

**[0020]** A first additional advantage is the fact that the force which is required to open the ring is much smaller in the case of a clamping ring according to the present invention than the force which is required to open a prior-art clamping ring which performs equally well with regard to the exerted loads.

**[0021]** A further additional advantage is that manually fitting clamping rings according to the present invention is much more ergonomic than fitting clamping rings according to the prior art having a similar closure system. Due to the fact that a clamping ring according to the invention comprises less material, a lower weight has to be lifted per clamping ring. In addition, a clamping ring according to the invention is more flexible and therefore, partly due to the fact that the force required for opening it is smaller, can be fitted more easily over the beaded-over edge of the barrel and the edge of the lid. Furthermore, a person who handles a clamping ring according to the invention will not cut himself on the edges thereof which comprise a folded-over part or, for example, a U-shaped profile, since these edges are rounded either as a result of this part having been folded over or due to this U-shaped profile.

**[0022]** Such rounded edges also ensure that any packaging material of the clamping rings does not become damaged so easily. With existing clamping rings, the solution usually is to provide the clamping ring with additional coating in order to limit tears in the packaging material.

**[0023]** Another additional advantage is the fact that, since less material is now required to produce equally well-performing clamping rings, the performance of the profiling machines for producing equally well-performing clamping rings can also be reduced. In this way, the investment costs for profiling machines become smaller. Moreover, smaller profiling machines can achieve greater speeds, so that the production rate can be increased. In addition, thinner sheet metal requires fewer coil replacements than thicker sheet metal. The stock of sheet metal required for the same amount of clamping rings thus also becomes smaller.

**[0024]** If the folded-over part and the overlapped part are rolled against each other in order to form a solid thickened section by pressing, excess material is produced as the material of the folded-over part and the overlapped part is rolled out. A welding operation also produces such excess material due to irregular expansion caused by thermal stresses. In order to conceal such excess material, the folded-over part and the overlapped part together are, in a very preferred embodiment according to the invention, folded in such a manner with respect to the rest of the profiled strip, that the inner surface or the outer surface, respectively, of this folded-over part is situated in a flowing line with respect to the rest of the inner surface or the outer surface, respectively, of the profiled strip. Due to this additional folding of the folded-over part and the overlapped part with respect to the rest of the clamping ring, excess material which is produced when the folded-over and the overlapped part are made solid, can be concealed.

**[0025]** In a preferred embodiment of a clamping ring according to the present invention, each of said edges comprises a folded-over part which at least partly overlaps a respectively overlapped part of the profiled strip.

**[0026]** Typically, the edge which has been rolled by treating the folded-over and/or the overlapped part with the aim of forming a completely solid part will contain deformations.

**[0027]** If it is ensured that such a deformation extends along the edge of the clamping ring, an additional widening is created on the edges of the clamping ring which ensures that such clamping rings can be handled in an even more ergonomic way.

**[0028]** With regard to loads, the performance of a clamping ring according to the present invention will be increased significantly if the transition between the deformation and the rest of the folded-over part or the overlapped part comprises a dent.

**[0029]** The transition between the deformation and the rest of the folded-over part or the overlapped part is then clearly visible as this transition then has a sudden change in its curve.

**[0030]** Preferably, such a deformation forms a protuberance in the respective folded-over part or the respective overlapped part.

**[0031]** In a specific embodiment of a clamping ring according to the present invention, the deformation is situated on the outside of the profiled strip.

**[0032]** The reason for this is that if the protuberance becomes too wide towards the inside, there is a risk that the clamping ring is hampered behind the beaded-over edge of the barrel when it is released. Therefore the latter is preferably provided on the outside of the profiled strip in the case of such a wide protuberance.

**[0033]** In this way, the risk of the clamping ring getting being hampered behind on the free end of the folded-over part is significantly reduced. The overlapped part is then also preferably positioned with respect to the rest of the profiled strip in such a manner that the inner surface of this folded-over part is situated in a flowing line with respect to the rest of the inner surface of the profiled strip.

**[0034]** In a particular embodiment of a clamping ring according to the present invention, at least one said folded-over part is folded over several times.

**[0035]** An even higher performance of a clamping ring according to the present invention can be achieved using a profiled strip which is provided, across its surface, between said edges, with one or more local thickened sections which extend virtually along the length of the profiled strip.

**[0036]** These local thickened sections and thinned sections can again be produced in various ways, such as for example via cold rolling, as is described in DE 197 43 093 C1 or in WO 2010/009898 A1, or by continuous machining of the profiled strip, or by folding and making solid, etc.

**[0037]** The object of the present invention is furthermore also achieved by providing a barrel assembly, comprising a barrel with a beaded-over edge, a lid and a clamping ring for securing the lid on the beaded-over edge of the barrel in a clamping manner, with the clamping ring being a clamping ring according to the invention as described above.

**[0038]** The present invention will now be described in more detail by means of the following detailed description of some preferred clamping rings according to the present invention. The sole aim of this description is to provide illustrative examples and to indicate further advantages and features of these clamping rings, and can therefore not be interpreted in any way as a limitation of the area of application of the invention or of the patent rights defined in the claims.

**[0039]** In this detailed description, reference numerals are used to refer to the attached drawings, in which:

- *figure 1* shows a section of a profiled strip of a clamping ring according to the prior art in perspective;
- *figure 2* shows a section of a first embodiment of a profiled strip of a clamping ring according to the invention, with a folded-over part on a first edge and a rolled-up part on a second edge, in perspective;
- *figure 3* shows a section of a second embodiment of a profiled strip of a clamping ring according to the invention, with a folded-over part on a first edge and a folded-over part on a second edge, in perspective;
- *figure 4* shows a section of a third embodiment of a profiled strip of a clamping ring according to the invention, with a folded-over part with a deformation having a dent on a first edge and a folded-over part on a second edge, in perspective;
- *Figure 5* shows a section of a fourth embodiment of a profiled strip of a clamping ring according to the invention, with a twice folded-over part on a first edge, the edge thickness being three times the thickness of the strip and a once folded-over part on a second edge, in perspective;
- *figure 6* shows a section of a fifth embodiment of a profiled strip of a clamping ring according to the invention, with a thrice folded-over part on a first edge, the edge thickness being four times the thickness of the strip, and a folded-over part on a second edge, in perspective;
- *figure 7* shows a section of a sixth embodiment of a profiled strip of a clamping ring according to the invention, with thickened sections on the edges, produced by cold deforming or continuous machining, in perspective;
- *figure 8* shows a section of a seventh embodiment of a profiled strip of a clamping ring according to the invention, having thickened sections on the edges and locally in the centre, produced by cold deforming or continuous machining, in perspective.

**[0040]** A barrel assembly according to the present invention comprises a barrel with a beaded-over edge, a lid and a clamping ring according to the present invention for securing the lid to the beaded-over edge of the barrel in a clamping manner. Such a barrel and such a lid are usually, but not necessarily, made from steel which may optionally be provided with a coating. Barrels of this type are used to store and transport a wide variety of substances, both liquid and solid, such as for example fruit juices or chemical powders. Such barrels and lids are already known from the prior art and have therefore also not been illustrated and not described in detail.

**[0041]** A clamping ring according to the present invention comprises a profiled strip and a closure. Since various kinds of closures which are already known from the prior art can be used for these clamping rings, these closures are not described in any more detail either and they have also not been illustrated.

**[0042]** Sections of different embodiments of profiled strips (1) from clamping rings according to the present invention have been shown in figures 2 to 10 in perspective. The clamping rings according to the invention are in each case provided to secure a lid on the beaded-over edge of a barrel in a clamping manner. To this end, the profiled strips (1) comprise - just like the profiled strips

(1) of prior-art clamping rings illustrated in figure 1 - a first edge (2a) which, in the fitted state of the clamping ring, optionally engages partly, completely or not at all with the top edge of the lid, and a second edge (2b) which, in the fitted state of the clamping ring, optionally engages partly, completely or not at all with the bottom edge of the beaded-over edge of the barrel. In the fitted state, this first edge (2a) is at least partly above the top edge of the lid, while the second edge (2b), in the fitted state, is at least partly below the bottom edge of the beaded-over edge.

**[0043]** The illustrated profiled strips (1) are in each case profiled with a substantially semicircular cross section. However, the advantages and disadvantages which the various edges (2a, 2b) of these embodiments have, apply equally to profiled strips (1) having a different cross section, such as for example profiled strips (1) having a virtually trapezium-shaped cross section.

**[0044]** Such profiled strips (1) can be obtained by folding sheet metal into the desired shape. If desired, these may be provided with a coating, such as for example a layer of zinc. The strips (1) from figures 9 and 10 have furthermore been treated by means of cold deforming or by means of continuous machining in order to produce the various thickened sections (9a, 9b, 10).

**[0045]** A first embodiment of a profiled strip (1) of a clamping ring according to the present invention, as illustrated in figure 2, comprises a folded-over part (3a) on its first edge (2a) which overlaps an overlapped part (4a) of the profiled strip (1). Together they form an essentially solid thickened section (9a) on this edge (2a). The folded-over part (3a) and the overlapped part (4a) on this first edge (2a) have been folded together in such a manner with respect to the rest of the profiled strip (1) that the inner surface (A1) of this folded-over part (3a) is situated in a flowing line with respect to the rest of the inner surface (A) of the profiled strip (1). In this way, the clamping ring can fit tightly on the edge of the lid and on the beaded-over edge along its entire inner surface (A, A1).

**[0046]** Also in the other embodiments, where edges (2a, 2b) are provided with a folded-over part (3a, 3b) which at least partly overlaps an overlapped part (4a, 4b), these folded-over parts (3a, 3b) have in each case (except with the first edge from the embodiments in figures 7 and 8) together with the overlapped parts (4a, 4b) been made solid and folded in such a manner with respect to the rest of the profiled strip (1) that the inner surface (A1, A2) of this folded-over part (3a) is situated in a flowing line with respect to the rest of the inner surface (A) of the profiled strip (1).

**[0047]** The first embodiment from figure 2 furthermore comprises a rolled-up part (8) on the second edge (2b) of the profiled strip (1). Such a rolled-up part (8) does not form an essentially solid thickened section and therefore does not contribute to increasing the performance of the combination. Such rolled-up parts (8) have also already been used in the prior art to conceal the sharp edges of the profiled strips (1), so that people do not cut themselves when handling these strips (1). By folding over the folded-over part (3a) and making it solid, together with the overlapped part (4a), a rounding is also provided on the first edge (2a) whereby the sharp edge is removed. Also in this case, people will not cut themselves when handling this strip (1). In addition, such a folded-over part (3a) which at least partly overlaps an overlapped part (4a) ensures an improved performance of the combination.

**[0048]** Preferably, therefore, both edges (2a, 2b) of the profiled strip (1) will be provided with such a folded-over part (3a, 3b) which at least partly overlaps a respective overlapped part (4a, 4b), in which case the folded-over part (3a, 3b) and the overlapped part (4a, 4b) together are made solid in order to form a solid thickened section (9a, 9b) together.

**[0049]** If one compares such a clamping ring with a profiled strip (1), as illustrated in figure 3, to a clamping ring according to the prior art with a profiled strip (1), as illustrated in figure 1, both clamping rings having a similar closure, then a clamping ring according to the present invention with a strip thickness of 0.6 mm and a folded-over edge (3a, 3b) having a width of approximately 3 mm, provides the same performance as a clamping ring according to the prior art having a strip thickness of 0.9 mm.

**[0050]** If a deformation (5) is provided in the folded-over part (3a) on the first edge (2a) in the form of a protuberance in the folded-over part (3a) which extends along this first edge (2a), then this deformation (5) preferably forms a sharp transition, as is illustrated in figure 4 in the third embodiment, which forms a dent (7) with respect to the rest of the folded-over part (3a). In this way, this deformation (5) can also be made more solid and further increases the performance. Also, handling of the edge (2a) is thus made even more ergonomic than with a once folded-over part (3a) without deformation (5).

**[0051]** With respect to a once folded-over part (3a, 3b), in which case this folded-over part (3a, 3b) is made solid together with the overlapped part (4a, 4b), the performance can also be increased further by folding a folded-over part (3a, 3b) multiple times, as is the case in the embodiments from figures 5 and 6. In the embodiment in figure 5, a part of the profiled strip (1) on the first edge was folded over twice to form a folded-over part (3a) which at least partly overlaps an overlapped part (4a). The thickness of this first edge (2a) is in this case then approximately thrice the thickness of the strip (1). This thickness will be slightly smaller if folding over results in a reduction in thickness. This thickness will be slightly greater if, for example, highly resilient material is used which causes a minimal air gap to be present between the folds. In the embodiment in figure 6, a part of the profiled strip (1) on the first edge (2a) was folded over thrice to form a folded-over part (3a) which at least partly overlaps an overlapped part (4a). The thickness of this first edge (2a) is in this case then approximately four times the thickness of the strip (1). A part (12) of the

folded-over part (3a) of the profiled strip (1) which faces away from the edge (2a) remained once folded over in this case. In this way, it is also possible to provide combinations of single and multiple folds in order to produce a desired thickened section (9a). In this case, the thickened section (9a) may then, for example, increase in step by step in the direction of the edge (2a).

**[0052]** If one compares such a clamping ring with a profiled strip (1) with edges (2a, 2b) having twice folded-over parts (3a, 3b), as is illustrated in figure 5, to a clamping ring according to the prior art with a profiled strip (1), as is illustrated in figure 1, both clamping rings having a similar closure, then a clamping ring according to the present invention with a strip thickness of 0.6 mm and a folded-over edge (3a, 3b) having a width of approximately 3 mm, provides the same performance as a clamping ring according to the prior art having a strip thickness of 1.1 mm.

**[0053]** With the various possible edges (2a, 2b) with folded-over parts (3a, 3b), the width of these folded-over parts (3a, 3b) is preferably chosen as a compromise between technically simple folding and made solid, on the one hand, and the consumption of material and energy, on the other hand.

**[0054]** In addition to obtaining thickened sections (9a, 9b) by means of folding over parts of the profiled strip (1) for a clamping ring, it is also possible to provide this profiled strip (1) with thickened sections (9a, 9b, 10) by means of cold deforming or by means of continuous machining. Such profiled strips (1) are illustrated in figures 7 and 8.

**[0055]** Figure 7 shows a profiled strip (1) which is provided with analogue, essentially solid thickened sections (9a, 9b), but in this case these thickened sections have been obtained by means of cold deforming or by means of continuous machining.

**[0056]** In figure 8, such a profiled strip (1) has additionally been provided with a local thickened section (10) in the centre which extends virtually along the length of the profiled strip (1). Due to these thickened sections (9a, 9b, 10), it is in addition possible to achieve an extra saving on material while maintaining the same performance by producing thinned sections (11) at the same time as producing the thickened sections (9a, 9b, 10).

**[0057]** The type of edge (2a, 2b) and the type of thickened section (9a, 9b) thereof, the optional provision of local thickened sections (10) and the optional provision of thinned sections (11) is preferably chosen according to the required performance.

## Claims

1. Clamping ring for securing a lid on a beaded-over edge of a barrel in a clamping manner, comprising a profiled strip (1) with a first edge (2a) which, in the fitted state of the clamping ring, at least partly engages with the top edge of the lid, and a second edge (2b) which, in the fitted state of the clamping ring, at least partly engages with the bottom edge of the beaded-over edge, **characterized in that** the profiled strip (1), on at least one of said edges (2a, 2b), comprises a thickened section (9a, 9b) which is solid or has been made solid.

2. Clamping ring according to Claim 1, **characterized in that** said thickened section (9a, 9b) increases in the direction of the respective edge (2a, 2b) of the profiled strip (1).

3. Clamping ring according to Claim 1 or 2, **characterized in that** the profiled strip (1) comprises, on at least one of said edges (2a, 2b), a folded-over part (3a, 3b) which is situated on the inside or on the outside of the profiled strip, respectively, and which at least partly overlaps an overlapped part (4a, 4b) of the profiled strip (1), with the folded-over part (3a, 3b) and the overlapped part (4a, 4b) being pressed against each other in order to form said thickened section (9a, 9b) together.

4. Clamping ring according to Claim 3, **characterized in that** the folded-over part and the overlapped part together are folded in such a manner with respect to the rest of the profiled strip, that the inner surface or the outer surface, respectively, of this folded-over part is situated in a flowing line with respect to the rest of the inner surface or the outer surface, respectively, of the profiled strip.

5. Clamping ring according to Claim 3 or 4, **characterized in that** each of said edges (2a, 2b) comprises a folded-over part (3a, 3b) which at least partly overlaps a respectively overlapped part (4a, 4b) of the profiled strip (1).

6. Clamping ring according to one of Claims 3 to 5, **characterized in that** said folded-over part (3a, 3b) and/or said overlapped part (4a, 4b) is provided with a deformation (5, 6) which extends at least partly along said respective edge (2a, 2b), with the transition between the deformation (5, 6) and the rest of the folded-over part (3a, 3b) or the overlapped part (4a, 4b) comprising a dent (7).

7. Clamping ring according to Claim 6 , **characterized in that** the deformation (5, 6) forms a protuberance in the respective folded-over part (3a, 3b) or the respective overlapped part (4a, 4b).

8. Clamping ring according to Claim 6 or 7, **characterized in that** the deformation (6) is situated on the outside of the profiled strip (1).

9. Clamping ring according to one of Claims 3 to 8, **characterized in that** said folded-over part (3a, 3b)

is folded over several times.

**10.** Clamping ring according to one of the preceding claims, **characterized in that** the profiled strip (1) is provided, across its surface, between said edges (2a, 2b), with one or more local thickened sections (10) which extend virtually along the length of the profiled strip (1).

**11.** Barrel assembly, comprising a barrel with a beaded-over edge, a lid and a clamping ring for securing the lid on the beaded-over edge of the barrel in a clamping manner, **characterized in that** the clamping ring is a clamping ring according to one of Claims 1 to 9.

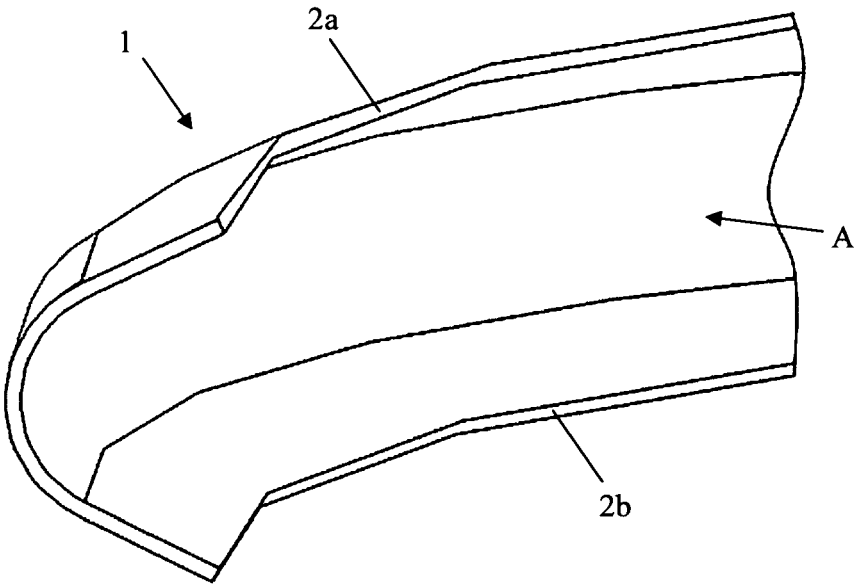


**FIG. 1** PRIOR ART

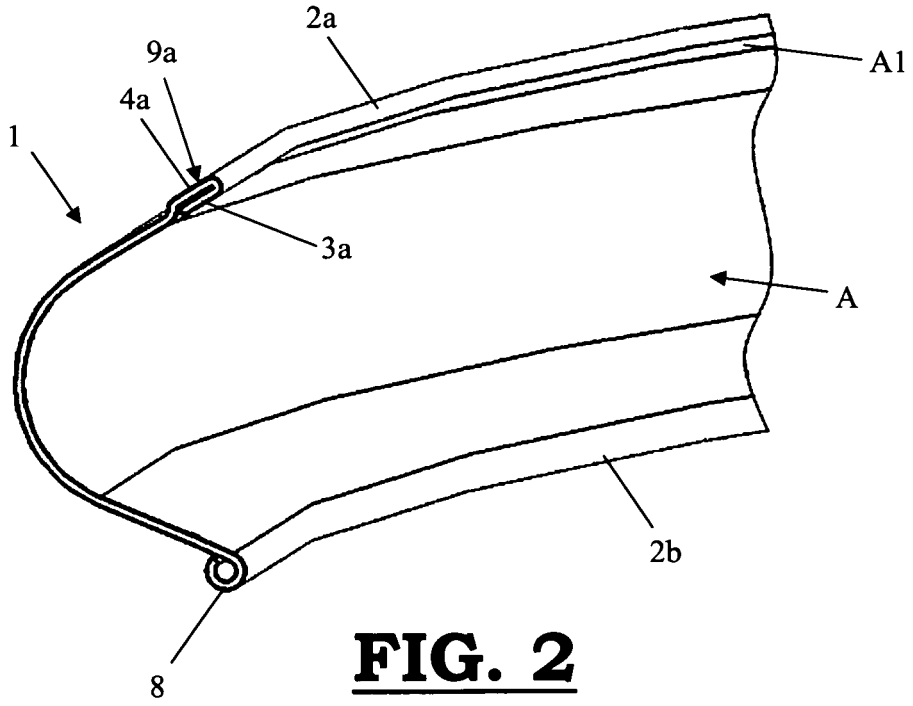


**FIG. 2**

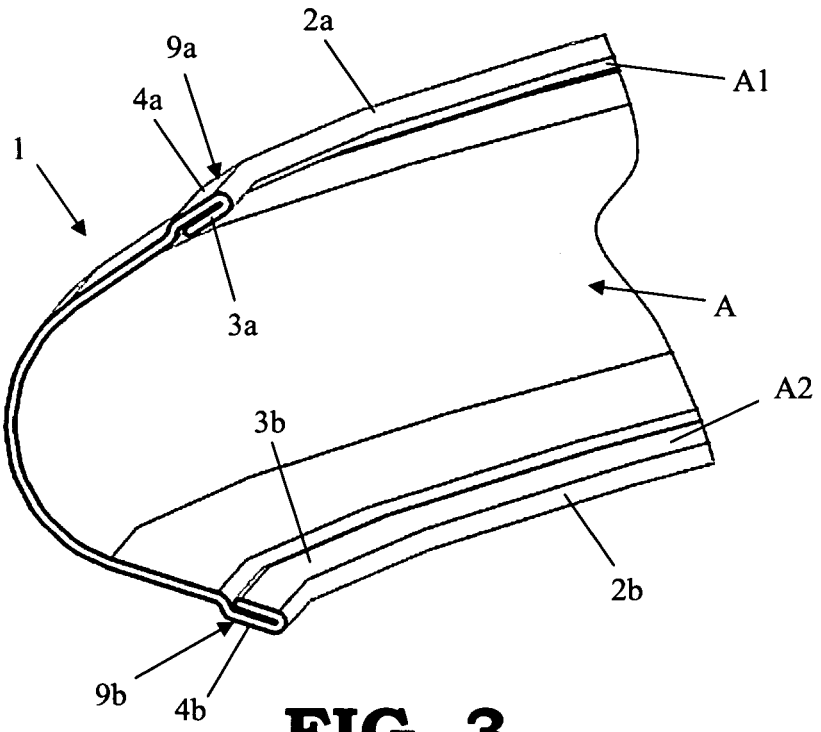


FIG. 3

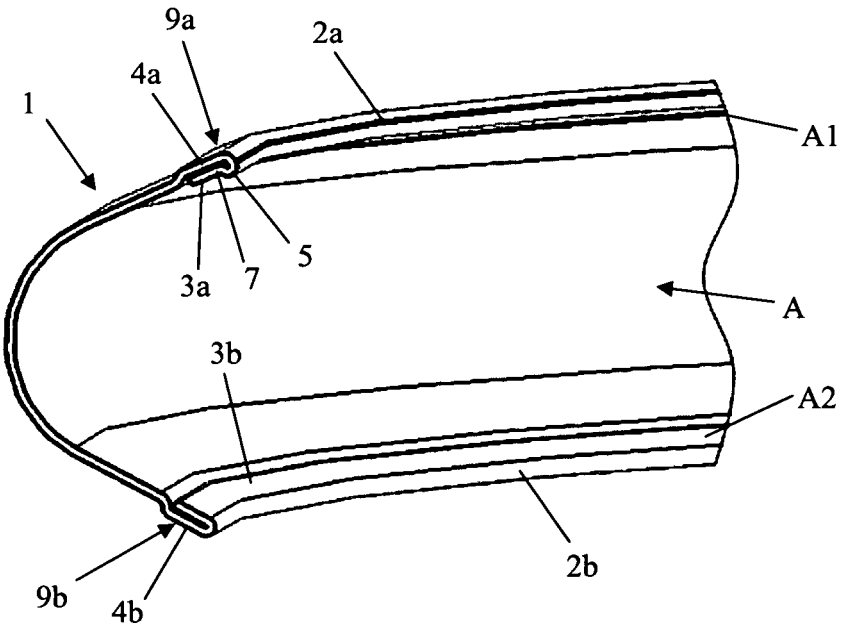


FIG. 4

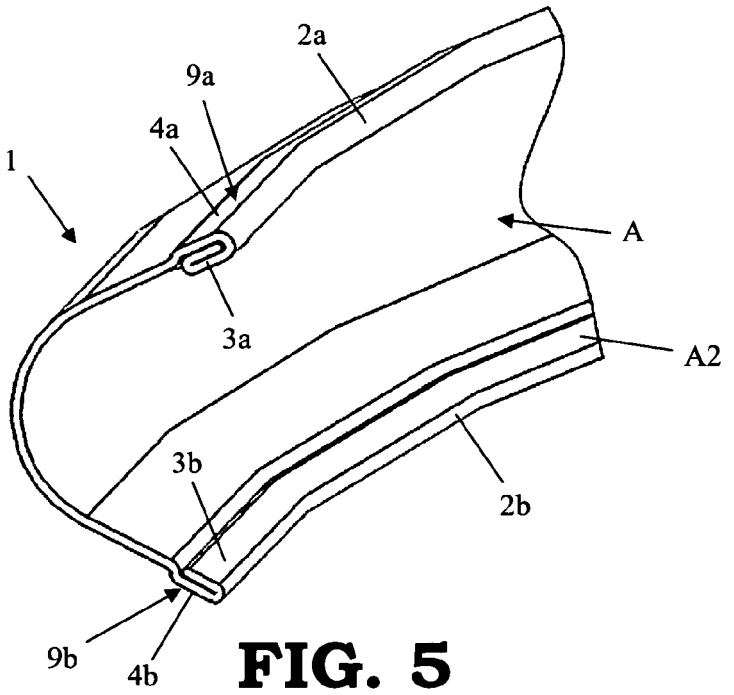


FIG. 5

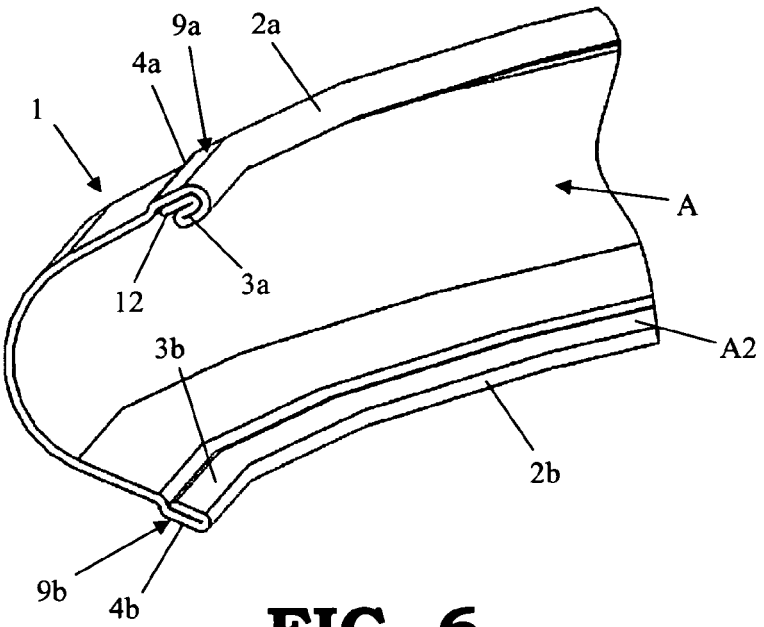


FIG. 6

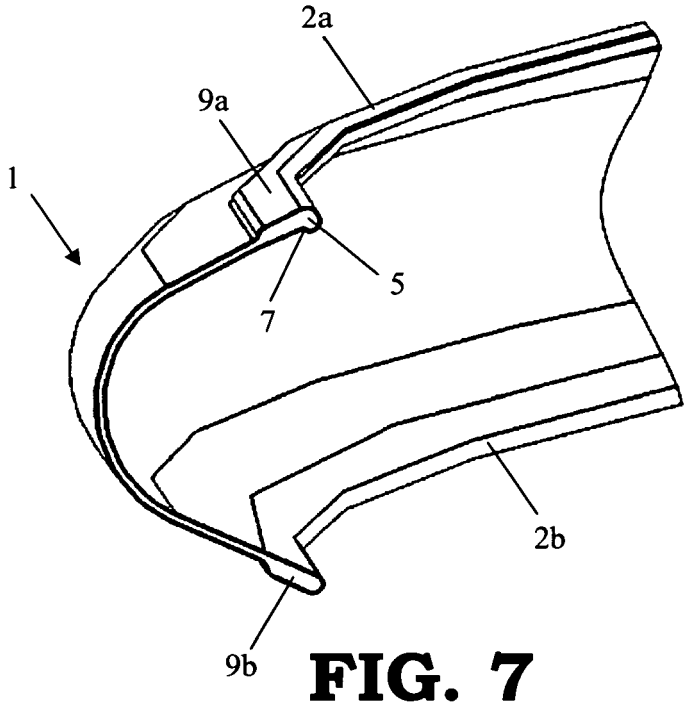


FIG. 7

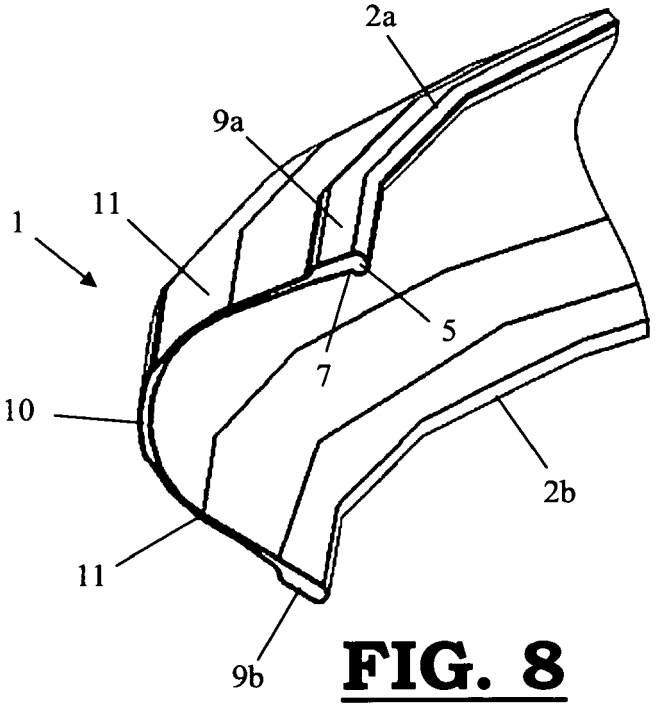


FIG. 8

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# EUROPEAN SEARCH REPORT

Application Number
EP 11 16 3578

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| Place of search | Date of completion of the search | Examiner |
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| The Hague | 6 July 2011 | Newell, Philip |

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