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(54) **A SEAL FOR CLOSING A CONTAINER**

(57) The present invention relates to a seal for capping containers, such as bottles or the like.

In particular, the invention relates to a seal or operculum (1, 101) for closing a container (C), comprising an edge portion (2, 102), a partially removable central por-

tion (3, 103) and a connection portion (4, 104) comprising a semi-circular groove (5, 105), wherein said seal or operculum (1, 101) is made of a plastic material and wherein said edge portion (2, 102) is weldable to the edge (B) of the neck (CL) of said container (C).

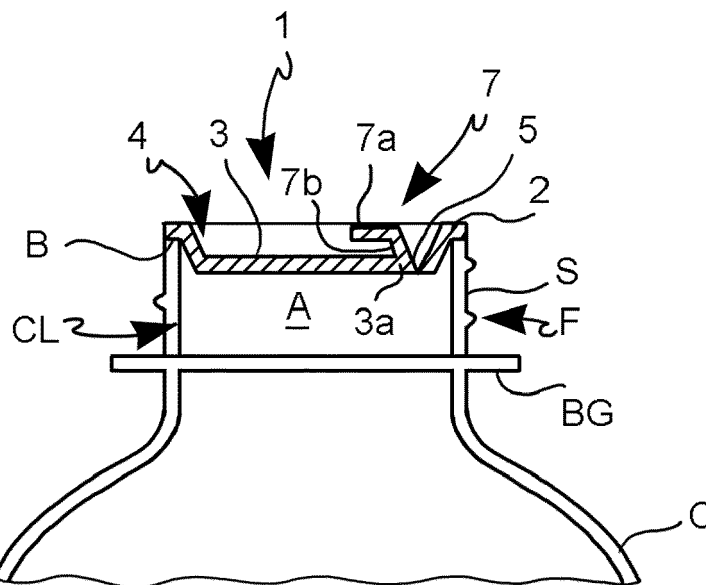


FIG. 1A

Description

[0001] The present invention relates to a seal for capping containers, such as bottles or the like.

[0002] Two different types of capping are known for bottles made of plastic material, in particular bottles intended to contain milk, yoghurt or similar products: reclosable and non reclosable closures.

[0003] Crown or screw caps belong to the first type, while seals or opercula made of aluminum belong to the second type. In this latter case, the bottle can also be provided with a screw cap to be placed over the seal, so that once the latter has been removed, the bottle can still be closed. The choice of using a screw cap in addition to a seal often depends on the volume of the bottle, i.e. if the latter is not of the single-dose type.

[0004] It is apparent that, in all cases, whether the closure is a cap or a seal, it must provide a perfect sealing, so as to ensure sterility inside the package until the initial opening.

[0005] In the case of bottles with a non-calibrated neck, such as bottles made of HDPE (high density polyethylene), for example, it is not possible to apply sealing screw tops, as is the case, instead, for bottles made of PET. This technical problem thus binds to use seals made of aluminum, which are welded to the edge of the bottle so as to ensure a perfect sealing. As said, a non-sealing cap can then be screwed to the neck of the bottle, depending on the needs.

[0006] One disadvantage of opercula made of aluminum is that they must be sterilized separately and then introduced into the sealing machine. This is a technical complication in the capping procedure.

[0007] Furthermore, opercula made of aluminum, a non-biodegradable material, involve ecological problems because very often the consumer disposes of the operculum in the environment after opening the bottle. This problem is particularly felt especially in the case of single-dose bottles, the consumption of which is frequently related to use on the street.

[0008] Therefore, the problem addressed by the present invention is the provision of a seal for containers, in particular bottles with a non-calibrated neck, which overcomes the disadvantages of known closures.

[0009] Such a problem is solved by a seal made of plastic material as defined in the appended claims, the definitions of which form an integral part of the present description.

[0010] Therefore, the present invention relates to a seal or operculum made of sterilizable plastic material which can be applied by means of welding to the edge of the neck of a container, as defined in any one of the claims from 1 to 12.

[0011] The invention further relates to a package of a sterile product, preferably a food, dietary, pharmaceutical, cosmetic or supplement product, as defined in claims 13-14, comprising a container having a neck ending in an edge surrounding an opening, wherein the seal or

operculum of the invention is welded to said edge, and wherein said seal or operculum or parts thereof are not totally removable from said package.

[0012] The invention further relate to a package comprising a seal or an operculum as defined above, characterized in that it is reclosable, as well as to the respective seal or operculum.

[0013] Further features and advantages of the present invention will become more apparent from the description of some embodiments, given below by way of a non-limiting example, with reference to the following drawings:

Figure 1A shows a sectional side view of a seal or operculum according to the invention applied to the neck of a bottle;

Figure 1B shows a sectional side view of a seal or operculum according to a different embodiment of the invention;

Figure 2 shows a top plan view of the seal or operculum in figure 1;

Figure 3 shows a sectional side view of the seal or operculum in figure 1 in an open condition;

Figure 4 shows a sectional side view of a third embodiment of the seal or operculum of the invention; Figure 5 shows a top plan view of the seal or operculum in figure 4.

[0014] With reference to the figures, numeral 1, 101 denotes a seal or operculum according to the invention.

[0015] The seal 1, shown in figure 1A, is applied to the edge B of the opening A of a container C. The opening A is placed at the upper end of the neck CL of the container C. The outer surface S of the neck CL, above the finish BG, comprises, in the example shown in the figure, a thread F so as to screw a screw cap (not shown) thereto. However, in other embodiments, the thread can be omitted, as in the case of single-dose bottles.

[0016] The seal 1 is substantially discoidal in shape and comprises an edge portion 2, a partially removable central portion 3, and a connection portion 4, comprising a semi-circular groove 5.

[0017] The semi-circular groove 5 corresponds to a weakening line, having a reduced thickness (side section as in figure 1) with respect to the thickness of the seal 1, and forms a tear line.

[0018] The semi-circular groove 5 runs along an arc of circle of less than 360°, but preferably greater than 350°, so that the connection portion 4 comprises a stem element 6 arranged on the same circumference as the semi-circular groove 5 and configured to keep the central portion 3 constantly connected to the connection portion 4 and/or to the edge portion 2. To this end, the stem element 6 has a side section thickness which is substantially equal to that of the seal 1.

[0019] In preferred embodiments, the semi-circular groove 5 has a V-shaped section.

[0020] In the embodiment in figures 1 and 3, the con-

nection portion 4 has a truncated-cone shape, so as to connect the edge portion 2 and the central portion 3 on different planes, in detail, the plane in which the central portion 3 lies is lower than the plane of the edge portion 2.

[0021] The central portion 3, arranged inside the semi-circular groove 5, is discoidal in shape and comprises a tongue 7 to facilitate the tearing and partial removal of the central portion 3, which, as said, will however remain connected to the seal 1, and thus to the container C, by means of the stem element 6 (see figure 3).

[0022] In preferred embodiments, the tongue 7 is placed on the edge 3a of the central portion 3, close to the semi-circular groove 5 and in a diametrically opposite position with respect to the stem element 6, or at an angle of $\pm 5^\circ$ with respect thereto along the edge 3a.

[0023] In preferred embodiments, the tongue 7 comprises a flat portion 7a and a joining portion 7b.

[0024] The flat portion 7a is substantially parallel to the plane in which the central portion 3 lies, and lies on a plane which is lower than or coincides with the plane in which the edge portion 2 of the seal 1 lies.

[0025] The joining portion 7b is preferably inclined with an angle of less than 90° with respect to the plane of the central portion 3.

[0026] A different embodiment of the invention is shown in figure 1B, where the numbering 101, 102, 103, 103a, 104, 105, 106, 107, 107a and 107b identifies elements corresponding to the same elements numbered as 1, 2, 3, 3a, 4, 5, 6, 7, 7a and 7b, respectively, in figure 1A.

[0027] In this embodiment, the plane in which the central portion 103 lies is the same as that of the edge portion 102, whereby the tongue 107 protrudes above the plane of the edge portion 102.

[0028] The embodiment in figures 4 and 5 shows a different embodiment of the seal of the invention, characterized in that it is reclosable once the seal has been broken. The term "reclosable" is not meant to indicate a watertight seal, but the reclosing for an indefinite number of times without the aid of a cap. This embodiment is particularly useful in the case of beverages in multi-dose containers, such as milk, fruit juices and the like, which can thus be kept, for example in the fridge, even for several days.

[0029] The seal 201 is substantially discoidal in shape and comprises an edge portion 202 and a partially removable central portion 203.

[0030] A semi-circular groove 205 is placed between the edge portion 202 and the central portion 203.

[0031] The semi-circular groove 205 corresponds to a weakening line, having a reduced thickness (side section as in figure 4) with respect to the thickness of the seal 201, and forms a tear line.

[0032] The semi-circular groove 205 runs along an arc of circle of less than 360° , but preferably greater than 350° , so as to define a stem element 206 arranged on the same circumference as the semi-circular groove 205, configured to keep the central portion 203 constantly con-

nected to the edge portion 202. To this end, the stem element 206 has a side section thickness which is substantially equal to that of the seal 201.

[0033] In preferred embodiments, the semi-circular groove 205 has a V-shaped section.

[0034] As shown in figure 4, the plane in which the central portion 203 lies is lower than the plane of the edge portion 202.

[0035] To this end, the central portion 203, arranged inside the semi-circular groove 205, comprises a lowered portion 203a and a connection portion 203b with the edge portion 202, where said connection portion 203b has a substantially cylindrical shape and rises up from the lowered portion 203a.

[0036] One or more annular projections 208 configured to insist against the inner surface of the neck CL of the container C are arranged on the outer surface of the connection portion 203b, thus ensuring the pressurized reclosing of the seal 201 once it has been opened. Such a pressurized reclosing is ensured by the interference between the annular projections 208 and the neck CL, due to the pliability of the material of the seal 201, which is normally flexible plastic material.

[0037] The lowered portion 203a comprises a tongue 207 to facilitate the tearing and partial removal of the central portion 203, which, as said, will however remain connected to the seal 201, and thus to the container C, by means of the stem element 206. The tongue 207 can be ring-shaped, for example, as shown in figure 5.

[0038] The tongue 207 does not protrude beyond the edge portion 202 of the seal 201, so as to remain always hidden in the cavity formed between the edge portion 202 and the lowered portion 203a.

[0039] In preferred embodiments, the tongue 207 is placed on the edge of the lowered portion 203a, in a diametrically opposite position with respect to the stem element 206, or at an angle of $\pm 5^\circ$ with respect thereto.

[0040] The seal or operculum 1, 101 is made of plastic material, preferably of the same material as the container C. For example, if the container C is made of HDPE, the seal 1, 101 will also preferably be made of HDPE.

[0041] The seal or operculum 1, 101 is weldable to the edge B of the container C by means of the edge portion 2, 102. The welding systems normally used for welding parts made of plastic material could be used, without the aid of intermediate materials, such as mastics or glues. For example, an ultrasound welding, using for example suitable sonotrodes mounted to traditional capping machines replacing the capping heads could be used.

[0042] The seal or operculum 1, 101 can be sterilized in the same system used for sterilizing the container C.

[0043] The advantages of the present invention are apparent from the above.

[0044] The seal 1, 101 is welded to the edge B of the container C, while the central portion 3 is always associated with the seal due to the stem element 6, 106. This allows the seal not to be disposed of in the environment once the package has been opened.

[0045] The possibility of manufacturing the seal 1, 101 of the same material as the container C makes the production, sterilization and welding thereof particularly inexpensive and simple to produce.

[0046] With respect to conventional closures made of plastic material (typically screw caps), the seal 1, 101 has the advantage of being applied to non-calibrated necks, such as those made of HDPE, for example, making the seal of the invention similar to the opercula made of aluminum, from which it differs, however, due to a lower cost and easier sterilization and welding.

[0047] Furthermore, with respect to the opercula made of aluminum, the seal 1, 101 of the invention can be opened more easily due to the presence of the tongue 7.

[0048] If necessary, the use of the seal 1, 101 does not exclude the further application of a screw cap, which will be placed thereon.

[0049] It is apparent that only some particular embodiments of the present invention have been described, to which those skilled in the art can make the necessary changes for the adaption thereof to particular uses, without departing from the scope of protection of the present invention.

Claims

1. A seal or operculum (1, 101, 201) for closing a container (C), comprising an edge portion (2, 102, 202), a partially removable central portion (3, 103, 203), optionally a connection portion (4, 104) and a semi-circular groove (5, 105), wherein said seal or operculum (1, 101) is made of a plastic material and wherein said edge portion (2, 102) is weldable to the edge (B) of the neck (CL) of said container (C).
2. A seal or operculum (1, 101, 201) according to claim 1, wherein the semi-circular groove (5, 105, 205) has a reduced side section thickness with respect to the thickness of the seal (1, 101, 201) and forms a tear line.
3. A seal or operculum (1, 101, 201) according to claim 1 or 2, wherein the semi-circular groove (5, 105, 205) runs along an arc of circle of less than 360°, preferably greater than 350°, and wherein the connection portion (4, 104) or the central portion (203) comprises a stem element (6, 106, 206) arranged on the same circumference as the semi-circular groove (5, 105, 205), configured to keep the central portion (3, 103, 203) constantly connected to the connection portion (4, 104) and/or to the edge portion (2, 102, 202), the semi-circular groove (5, 105, 205) preferably having a side section thickness, which is substantially equal to the thickness of the seal (1, 101, 201).
4. A seal or operculum (1, 101, 201) according to any one of the claims from 1 to 3, wherein the semi-circular groove (5, 105, 205) has a V-shaped section.
5. A seal or operculum (1, 101) according to any one of the claims from 1 to 4, wherein the central portion (3, 103, 203) is arranged inside the semi-circular groove (5, 105, 205) and wherein the central portion (3, 103, 203) comprises a tongue (7, 107, 207) to facilitate the tearing and partial removal of the central portion (3, 103, 203).
6. A seal or operculum (1, 101) according to claim 5, wherein the tongue (7, 107) is placed close to the semi-circular groove (5, 105, 205) and in a diametrically opposite position with respect to the stem element (6, 106, 206), or at an angle of $\pm 5^\circ$ with respect thereto.
7. A seal or operculum (1, 101), wherein the tongue (7, 107) comprises a flat portion (7a, 107a) and a joining portion (7b, 107b), wherein the flat portion (7a, 107a) is preferably substantially parallel to the plane in which the central portion (3, 103) lies and the joining portion (7b, 107b) is preferably inclined with an angle of less than 90° with respect to the plane of the central portion (3, 103).
8. A seal or operculum (1) according to any one of the claims from 1 to 7, wherein the connection portion (4) has a truncated-cone shape, so as to connect the edge portion (2) and the central portion (3) on different planes, wherein the plane in which the central portion (3) lies is lower than the plane of the edge portion (2).
9. A seal or operculum (1) according to claim 8, wherein the flat portion (7a) of the tongue (7) lies on a plane, which is lower than, or coincides with the plane in which the edge portion (2) of the seal or operculum (1) lies.
10. A seal or operculum (201) according to any one of the claims from 1 to 6, wherein the central portion (203) comprises a lowered portion (203a) and a connection portion (203b) with the edge portion (202), wherein said connection portion (203b) has a substantially cylindrical shape and rises from the lowered portion (203a), and wherein, one or more annular projections (208) configured to insist against the inner surface of the neck (CL) of the container (C) are arranged on the outer surface (209) of the connection portion (203b).
11. A seal or operculum (1, 101, 201) according to any one of the claims from 1 to 10, wherein the seal or operculum is made of the same plastic material as the container (C), said material preferably being HDPE.

12. A seal or operculum (1, 101, 201) according to any one of the claims from 1 to 11, wherein said seal or operculum is weldable to the edge (B) of the neck (CL) of said container (C) by means of ultrasound welding. 5
13. A package for a sterile product, comprising a container (C) having a neck (CL) ending in an edge (B) surrounding an opening (A), wherein a seal or operculum (1, 101, 201) according to any one of the claims from 1 to 12 is welded to said edge (B), wherein said seal or operculum, or parts thereof, are not completely removable from said package. 10
14. A package according to claim 13, wherein said package is reclosable. 15

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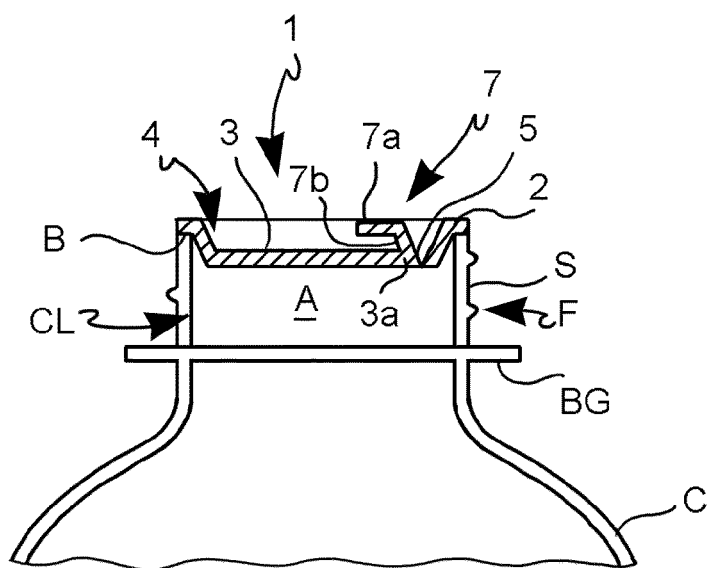


FIG. 1A

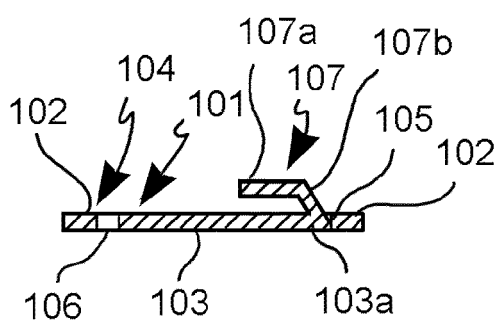


FIG. 1B

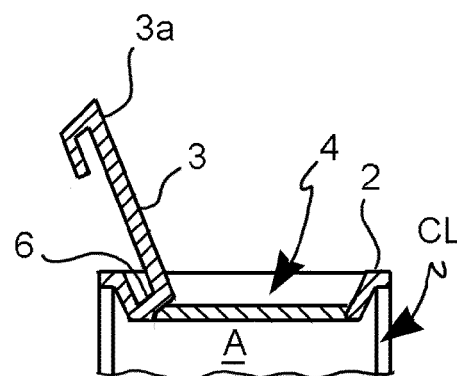


FIG. 3

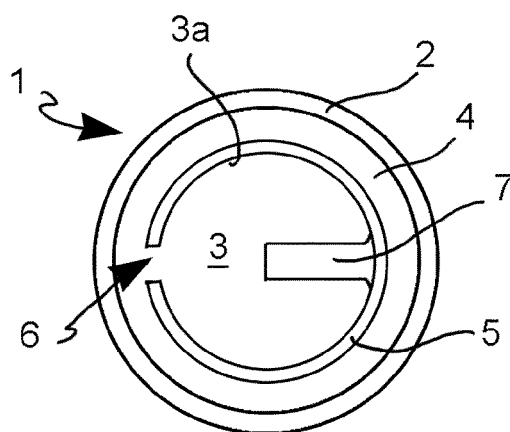


FIG. 2

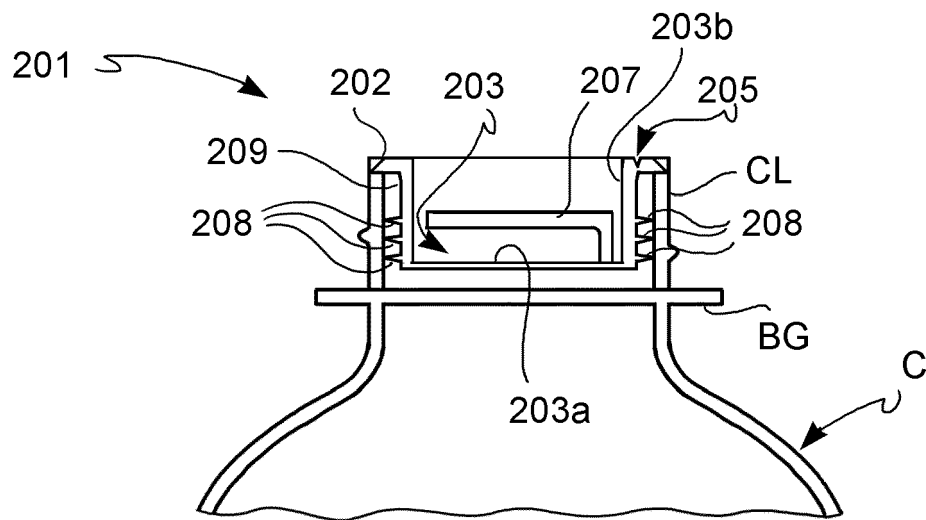


FIG. 4

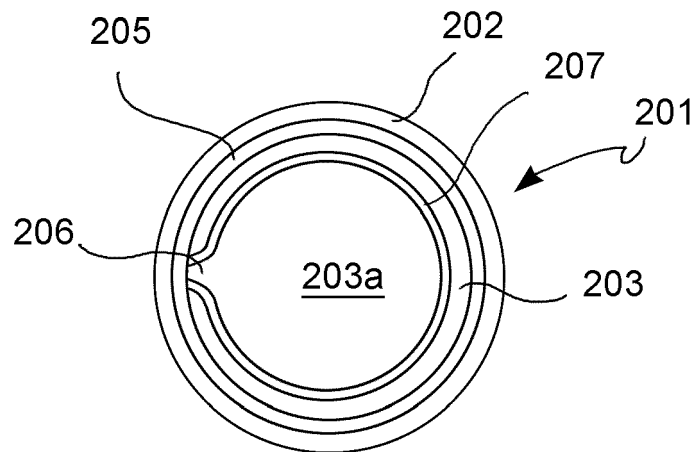


FIG. 5



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 Application Number
 EP 19 19 0173

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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