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(54) **PACKAGED DAIRY PRODUCT**

(57) The present invention belongs to the field of packaging dairy products, in particular the object of the present invention is a packaged dairy product (1), e.g. mozzarella, a machine (100) and a packaging method. The packaged dairy product (1) comprises a packaging envelope (2) containing a preserving liquid (3) and at least one dairy product (4) at least partially submerged in said preserving liquid (3). The packaging envelope (2) consists of a pair of main walls (21, 22) opposite to each other, and a pair of side walls (23, 24) arranged between and connected to said main walls (21, 22). Moreover, the packaging envelope (2) is made of a material and/or a thickness such that it is deformable when the packaged dairy product (1) is placed in contact with a supporting surface (S), in such a way that three different transport, storage and/or display configurations are possible as a result of the weight of the preserving liquid (3) and of the at least one dairy product (4).

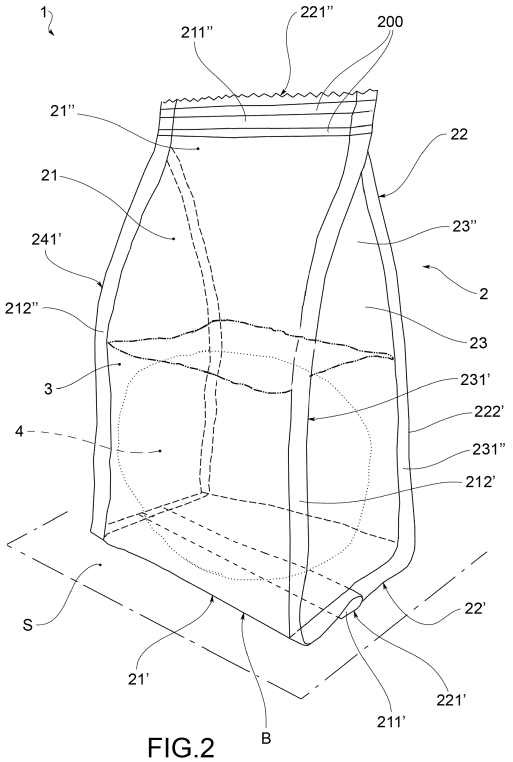

FIG.2

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Description

[0001] The present invention belongs to the field of dairy product packaging. The object of the present invention in particular is a packaged dairy product, e.g. mozzarella, a machine and a method for packaging such a packaged dairy product.

[0002] In the case of mozzarella packaging, the prior art includes some different types of packages also comprising, in addition to the mozzarella, a preserving liquid in which the mozzarella is partially submerged.

[0003] A first type is the "Brick" type (Figure 1) package, provided with a square shape, which allows it to remain stably in a vertical position.

[0004] Disadvantageously, the prestige resulting from being a compact and stable package is also the greatest limitation thereof because the rigidity of the Brick allows it to be transported and stored only while keeping it in such a vertical position.

[0005] A second type of package is the "Pillow" package in the two "flat Pillow" (Figure 1a) and "Pillow with Tuft" variants (Figure 1b).

[0006] Disadvantageously, the Pillow packages, both in the Flat Pillow and the Pillow with Tuft variants, are made of a flexible material which is deformed when it comes into contact with a supporting surface or if gripped by a user.

[0007] There are two requirements in order for the mozzarella to be preserved under the best conditions and for its shelf-life to be increased, i.e. the mozzarella is substantially to be submerged in the preserving liquid and the weight ratio between the mozzarella and the preserving liquid is to be 1:1.

[0008] Experimentally, it has been noted that if the mozzarella is not completely submerged in the preserving liquid, the portion of mozzarella which remains uncovered oxidizes, compromising the goodness of the dairy product.

[0009] Vice versa, if the optimal weight ratio between the mozzarella and the preserving liquid is not complied with, and therefore there is abundant preserving liquid, an osmotic process is activated such that the mozzarella releases water, thus losing weight. Such an osmotic process in reality is always present, but it becomes more consistent as the preserving liquid increases. Since the preserving liquid has a greater salt content than the mozzarella due to the salt concentration gradient, the mozzarella release water through the osmosis, attempting to rebalance the salt level between mozzarella and preserving liquid.

[0010] Disadvantageously, the flexibility of the Pillow package does not allow these two requirements to be simultaneously met, therefore, there is a tendency to exceed with the preserving liquid in order to submerge the mozzarella.

[0011] A third type of package is the "Tub" (Figure 1c) made of a rigid polymeric material, and therefore which is not deformed when touched by a user or when it comes into contact with a supporting surface.

[0012] Disadvantageously, the rigidity of the tub is due to the thickness of the polymeric material with which it is made. Such a thickness is between about 700 and 1000 microns and requires the use of a significant amount of polymeric material. The non-negligible use of such a polymeric material results in just as significant an impact on the environment. Moreover, due to the rigidity thereof, the tub may only be transported by keeping it upright and not resting on a side.

[0013] A fourth type of package is the "Doypack" (Figure 1d) package made of a flexible material, but provided with a support base.

[0014] Disadvantageously, the Doypack package is flexible and therefore it does not allow the mozzarella to be kept substantially submerged with an optimal weight ratio of 1:1 between mozzarella and preserving liquid.

[0015] Independently of the type of package, the flexible packages do not allow the simultaneous fulfilment of the two requirements of optimal preservation, i.e. mozzarella substantially submerged in the preserving liquid and weight ratio of 1:1 between the mozzarella and the preserving liquid; instead, the rigid packages, or packages provided with support base, have a single preferential transport and storage direction.

[0016] A further disadvantage of the flexible packages results from the fact that they are positioned on the supermarket shelves by stocking staff operating quickly, often heedless of the fact that there is or is not a preferential direction in which the package should be displayed.

[0017] The object of the present invention is to propose a packaged dairy product, a machine and a method for packaging such a packaged dairy product so that a plurality of display configurations on the shelf are possible.

[0018] Said object is achieved with a packaged dairy product according to claim 1, with a machine for packaging a packaged dairy product according to claim 11, ad with a method for packaging the packaged dairy product according to claim 13. The dependent claims describe preferred embodiments of the invention.

[0019] The features and advantages of the packaged dairy product, the machine and the method for packaging such a packaged dairy product according to the invention will in any case be apparent from the following description of preferred embodiments thereof, given only by way of nonlimiting, indicative example, with reference to the accompanying drawings, in which:

- Figure 1 shows a "Brick" package according to the prior art;
- Figure 1a shows a "Flat Pillow" package according to the prior art;
- Figure 1b shows a "Pillow with Tuft" package according to the prior art;
- Figure 1c shows a "Tub" package according to the prior art;
- Figure 1d shows a "Doypack" package according to the prior art;

- Figure 2 shows a perspective view of a packaged dairy product according to the present invention, in a first transport, storage and/or display configuration;
- Figure 2a shows a front view of the packaged dairy product in Figure 2, with an opening spout;
- Figure 3 shows a perspective view of a packaged dairy product in a second transport, storage and/or display configuration;
- Figure 4 shows a perspective view of a packaged dairy product in a third transport, storage and/or display configuration;
- Figure 5 shows a perspective view of a reel of a film on which the blueprint of the package is outlined;
- Figure 5a shows a top view of the film;
- Figure 6 shows a front view of a packaging machine of the packaged dairy product; and
- Figure 7 shows a perspective view of a forming tube.

[0020] Numeral 1 in said drawings indicates a packaged dairy product and numeral 100 indicates a packaging machine of such a packaged dairy product according to the invention, as a whole.

[0021] The packaged dairy product 1 comprises a packaging envelope 2, a preserving liquid 3 and at least one dairy product 4, e.g. mozzarella. The packaging envelope 2 contains the preserving liquid 3 in which the at least one dairy product 4 is at least partially submerged.

[0022] According to an aspect of the invention, the packaging envelope 2 consists of a pair of main walls 21, 22 opposite to each other, and a pair of side walls 23, 24 arranged between and connected to such main walls 21, 22. In other words, the two side walls 23, 24 face each other and space the two main walls 21, 22 apart from each other.

[0023] The main walls 21, 22 have respective main wall end portions 21', 21"; 22', 22" facing one another, converging with one another and ending with respective first main wall edges 211', 211"; 221', 221" welded together. Moreover, each main wall 21, 22 is laterally delimited by second main wall edges 212', 212"; 222', 222", opposite to one another and extending between the first main wall edges 211', 211"; 221', 221". In other words, a first main wall 21 is delimited by two first main wall first edges 211', 211", opposite to each other, and by two first main wall second edges 212', 212" connecting such first main wall first edges 211', 211". The first main wall 21 further comprises two first main wall end portions 21', 21", each obtained close to the corresponding first main wall first edge 211', 211". Similarly, a second main wall 22, opposite to the first, is delimited by two second main wall first edges 221', 221", opposite to each other, and by two second main wall second edges 222', 222" connecting such second main wall first edges 221', 221". The second main wall 22 further comprises two-second main wall end portions 22', 22", each obtained close to the corresponding second main wall first edge 221', 221". Each first main wall end portion 21', 21" converges towards a respective second main wall end portion 22', 22" so as to form two pairs of main wall end portions which are adjacent to each other.

[0024] The side walls 23, 24 are delimited by side wall edges 231', 231"; 241', 241, opposite to one another and welded to the respective second main wall edges 212', 212"; 222', 222". Each side wall 23, 24 further comprises side wall end portions 23', 23"; 24', 24" opposite to one another, folded towards the inside of the packaging envelope 2 and also welded to the respective first main wall edges 211', 211"; 221', 221". In other words, a first side wall 23 is delimited by first side wall edges 231', 231" which are opposite to each other. The first side wall 23 further comprises first side wall end portions 23', 23" folded towards the inside of the packaging envelope 2 and also welded to the respective first main wall edges 211', 211"; 221', 221" so as to form a pocket or a concavity facing the outside of the packaging envelope. Similarly, a second side wall 24 is delimited by second side wall edges 241', 241" which are opposite to each other. The second side wall 24 further comprises second side wall end portions 24', 24" folded towards the inside of the packaging envelope 2 and also welded to the respective first main wall edges 211', 211"; 221', 221" so as to form a pocket or a concavity facing the outside of the packaging envelope.

[0025] According to one embodiment, the weight ratio between the preserving liquid 3 and the at least one dairy product 4 is about 1:1. Therefore, the dairy product 4 minimizes the release of water suitable for balancing the salt level with the preserving liquid 3 through an osmotic process.

[0026] According to an aspect of the invention, the packaging envelope 2 is made of a material and/or has a thickness such that it is deformable when the packaged dairy product 1 is placed in contact with a supporting surface S. Each of the two main walls 21, 22, each of the two side walls 23, 24 and each of the two adjacent pairs of the main wall end portions welded together along the respective first main wall edges alternatively form a stable supporting base B when placed in contact with the supporting surface S, as a result of the weight of the preserving liquid 3 and at least one dairy product 4.

[0027] In an embodiment, the two main walls 21, 22 are identical to each other. In other words, the two main walls are interchangeable with each other, apart from possible labels or graphic elements differentiating them.

[0028] The two side walls 23, 24 preferably are identical to each other. In other words, the two side walls are interchangeable with each other, apart from possible labels or graphic elements differentiating them.

[0029] Figure 2 shows a first transport, storage and/or display configuration of the packaging envelope 2, in which one of the two adjacent pairs of main wall end portions is welded together along the respective first main wall edges and defines a supporting base B resting on the supporting surface S. In the first configuration, the packaging envelope 2 is arranged "upright" and the at least one dairy product 4 is substantially submerged in

the preserving liquid 3.

[0030] Figure 3 shows a second transport, storage and/or display configuration of the packaging envelope 2, in which one of the two side walls 23, 24 sags due to the effect of the weight of the preserving liquid 3 and of the at least one dairy product 4 and defines a supporting base B resting on the supporting surface S. In the second configuration, the packaging envelope 2 is arranged "on its side" and the at least one dairy product 4 is substantially submerged in the preserving liquid 3.

[0031] Figure 4 shows a third transport, storage and/or display configuration of the packaging envelope 2, in which one of the two main walls 21, 22 sags due to the effect of the weight of the preserving liquid 3 and of the at least one dairy product 4 and defines a supporting base B resting on the supporting surface S. In the third configuration, the packaging envelope 2 is arranged "on its front (or on its back)" and the at least one dairy product 4 is substantially submerged in the preserving liquid 3 for at least 55% of the volume thereof.

[0032] In a preferred embodiment, when the stable supporting base B is formed by one of the two adjacent pairs of main wall end portions, the respective first main wall edges 211', 211"; 221', 221" welded together fold over one of the adjacent main wall end portions 21', 21"; 22', 22" so that the two adjacent main wall end portions 21', 21"; 22', 22" are substantially coplanar with each other.

[0033] The packaging envelope 2 preferably is formed of a film 5 made of a polymeric material or of a biopolymer.

[0034] According to one embodiment, film 5 comprises a single-layer film or a multi-layer polymeric film. When the film is multi-layer polymeric, it preferably comprises polypropylene, polyamide and polyethylene.

[0035] According to an embodiment, film 5 has a thickness between about 60 and 110 microns.

[0036] Preferably, the packaging envelope 2 is obtained from a film 5 comprising a multi-layer polymeric film, which comprises polypropylene, polyamide and polyethylene.

[0037] Preferably, the packaging envelope 2 is obtained from a film 5 comprising a single-layer polymeric film. Advantageously, when the polymeric film is single-layer, the packaging envelope is recyclable.

[0038] Optionally, film 5 comprises a biopolymer, i.e. a biodegradable or compostable polymer. Advantageously, when film 5 consists of a biopolymer, the packaging envelope is recyclable or compostable.

[0039] According to one embodiment, the welding between the respective first main wall edges 211', 211"; 221', 221" comprises at least two primary heat-sealing wires 200.

[0040] According to an embodiment, the welding between the side wall edges 231', 231"; 241', 241" and the respective second main wall edges 212', 212"; 222', 222" comprises at least one secondary heat-sealing wire.

[0041] Preferably, only one among the four welds made between the side wall edges 231', 231"; 241', 241" and the respective second main wall edges 212', 212"; 222', 222" is suitable for closing the packaging envelope 2 laterally. In other words, among the four welds made between the side wall edges 231', 231"; 241', 241" and the respective second main wall edges 212', 212"; 222', 222", only one is real and the other three only serve to stiffen the packaging envelope 2, in addition to giving the envelope a gradual symmetry. Figure 5a shows the film from the top, how it is wrapped about a forming tube 7 (not shown in the drawing). Observing Figure 5a, it can be noted how only one weld serves to seal together one of the side wall edges 231', 231"; 241', 241" with one of the respective second main wall edges 212', 212"; 222', 222"; the other welds are dummies.

[0042] Preferably, at least one of the side wall end portions 23', 23"; 24', 24" folded towards the inside of the packaging envelope 2 is movable between a packaged position, in which the packaging envelope is sealed, and an open position, in which the side wall end portion is separated from the weld between the respective first main wall edges and faces outwards so as to create an opening spout 200' suitable for pouring out the preserving liquid 3 (Figure 2a).

[0043] According to an aspect of the invention, machine 100 for packaging a packaged dairy product comprises a forming collar 6, a forming tube 7, a plurality of vertical welders 8 and at least one horizontal welder 9.

[0044] The forming tube 7 is of a substantially cylindrical shape and internally delimits a cavity suitable for the passage of the preserving liquid 3 and the at least one dairy product 4. Such a forming tube 7 is further provided with a plurality of ribs 70, preferably four, protruding externally and arranged symmetrically relative to a forming tube axis T. Such ribs 70 preferably are parallel to the forming tube axis T.

[0045] The plurality of vertical welders 8, preferably four, face the respective ribs 70 and each vertical welder is suitable for welding between the side wall edges 231', 231"; 241', 241" and the respective second main wall edges 212', 212"; 222', 222".

[0046] The at least one horizontal welder 9, preferably two, is arranged downstream of the forming tube 7 and is suitable for welding between the respective first main wall edges 211', 211"; 221', 221".

[0047] The packaging machine of a packaged dairy product 1 preferably further comprises a hopper 10 arranged upstream of the forming tube 7 and suitable for conveying the at least one dairy product 4 into the cavity of the forming tube 7.

[0048] According to an aspect of the invention, a packaging method of the packaged dairy product provides making available the packaging machine 100. A polymeric film 5 is unrolled from a reel 50 and then such a film 5 is wrapped on the forming collar 6. Film 5 is fitted about the forming tube 7 and then folded by means of the ribs 70 which protrude externally from the forming tube 7 and are arranged parallel to the forming tube axis T. In other words, the ribs 70 fold film 5 and prepare it

for the welding. The side wall edges 231', 231"; 241', 241" are welded with the respective second main wall edges 212', 212"; 222', 222" in order to define the pair of main walls 21, 22 and the pair of side walls 23, 24. A first edge of the first main wall 211' is welded together with a corresponding first edge of the second main wall 221'. The preserving liquid 3 and at least one dairy product 4 are introduced into the packaging envelope 2. The other first edge of the first main wall 211" is welded together with the other corresponding first edge of the second main wall 221".

[0049] Innovatively, the packaged dairy product, the machine and the method for packaging such a packaged dairy product achieve the set object.

[0050] Advantageously, the dairy product may be displayed in any of the three transport, storage and/or display configurations, therefore there is no need to pay special attention to positioning the product on the shelf because the weight of the preserving liquid and the at least one dairy product deform the packaging envelope so that it takes on one among the three possible configurations.

[0051] According to an advantageous aspect, the ratio between the preserving liquid and the at least one dairy product is 1:1, therefore the dairy product does not oxidize and the release of water into the preserving liquid is minimized.

[0052] According to a further advantageous aspect again, the shelf-life of the packaged dairy product is longer or in any case comparable with the one of mozzarella packages according to the prior art because there is a need for the dairy product to be submerged in the preserving liquid so it does not deteriorate; indeed, in this regard, the dairy product is substantially submerged in the first and in the second configuration.

[0053] A person skilled in the art may make changes and adaptations to the embodiments of the packaged dairy product, the machine and the packaging method of such a dairy product according to the invention or can replace elements with others which are functionally equivalent to satisfy contingent needs without departing from the scope of protection of the following claims. Each of the features described above as belonging to a possible embodiment may be implemented irrespective of the other described embodiments.

Claims

1. Packaged dairy product (1), e.g. mozzarella, comprising a packaging envelope (2) containing a preserving liquid (3) and at least one dairy product (4) at least partially submerged in said preserving liquid (3), wherein said packaging envelope (2) consists of a pair of main walls (21,22) opposite to each other, and a pair of side walls (23,24) arranged between and connected to said main walls (21,22),
the main walls (21,22) having respective main wall end portions (21',21";22',22") facing each other, converging with each other and ending with respective first main wall edges (211',211";221',221") welded together, each main wall (21,22) being laterally delimited by second main wall edges (212',212";222',222"), opposite each other and extending between the first main wall edges (211', 211";221', 221"),
the side walls (23,24) being delimited by side wall edges (231',231";241',241"), opposite to each other and welded to the respective second main wall edges (212',212";222',222"), each side wall (23,24) further comprising side wall end portions (23',23";24',24") opposite to each other, folded towards the inside of the packaging envelope (2) and also welded to the respective first main wall edges (211',211";221',221"),
wherein the packaging envelope (2) is made of a material and/or a thickness such that it is deformable when the packaged dairy product (1) is placed in contact with a supporting surface (S), in such a way that each of the two main walls (21,22), each of the two side walls (23,24) and each of the two adjacent pairs of the main wall end portions welded together along the respective first main wall edges alternately form a stable supporting base (B) as a result of the weight of the preserving liquid (3) and at least one dairy product (4).

2. Packaged dairy product (1) according to claim 1, wherein the ratio by weight between the preserving liquid (3) and at least one dairy product (4) is about 1:1.

3. Packaged dairy product (1) according to any one of the preceding claims, wherein, when the stable supporting base (B) is formed by one of the two adjacent pairs of main wall end portions, the respective first main wall edges (211',211";221',221") welded together fold over one of the adjacent main wall end portions (21',21";22',22"), so that the two adjacent main wall end portions (21',21";22',22") are substantially coplanar with each other.

4. Packaged dairy product (1) according to any one of the preceding claims, wherein the packaging envelope (2) is formed of a film (5) made of a polymeric material or of a biopolymer.

5. Packaged dairy product (1) according to the preceding claim, wherein the film (5) comprises either a single-layer film or a multi-layer polymeric film comprising polypropylene, polyamide and polyethylene.

6. Packaged dairy product (1) according to claim 4 or 5, wherein the film (5) has a thickness between about 60 and 110 microns.

7. Packaged dairy product (1) according to any one of the preceding claims, wherein the welding between the respective first main wall edges (211',211";221',221") comprises at least two primary heat-sealing wires (200).

8. Packaged dairy product (1) according to any one of the preceding claims, wherein the welding between the side wall edges (231',231";241',241") and the respective second main wall edges (212',212";222',222") comprises at least one secondary heat-sealing wire.

9. Packaged dairy product (1) according to any one of the preceding claims, wherein only one among the four welds made between the side wall edges (231',231";241',241") and the respective second main wall edges (212',212";222',222") is suitable for closing the packaging envelope (2) laterally.

10. Packaged dairy product (1) according to any one of the preceding claims, wherein at least one of the side wall end portions (23',23";24',24") folded toward the inside of the packaging envelope (2) is movable between a packaged position, wherein the packaging envelope is sealed, and an open position, wherein the side wall end portion is separated from the weld between the respective first main wall edges and faces outwards, so as to create an opening spout (200') suitable for pouring out the preserving liquid (3).

11. Machine for packaging a packaged dairy product (1) according to any one of the preceding claims, comprising:

- a forming collar (6);
- a forming tube (7) of a substantially cylindrical shape delimiting internally a cavity suitable for the passage of the preserving liquid (3) and at least one dairy product (4), said forming tube (7) being also provided with a plurality of ribs (70), preferably four, protruding externally and arranged symmetrically relative to a forming tube axis (T);
- a plurality of vertical welders (8), preferably four, facing the respective ribs (70), each vertical welder being suitable for welding between the side wall edges (231',231";241',241") and the respective second main wall edges (212',212";222',222"); and
- at least one horizontal welder (9), preferably two, arranged downstream of the forming tube (7) and suitable for welding between the respective first edges of the main wall (211',211";221',221").

12. Machine for the packaging of a packaged dairy product (1) according to claim 11, further comprising a hopper (10) located upstream of the forming tube (7) and suitable for conveying at least one dairy product (4) into the cavity of the forming tube (7).

13. Method for packaging a packaged dairy product (1) according to any one of claims 1 to 10, comprising the following steps:

- providing a packaging machine according to claim 11 or 12;
- unrolling a polymeric film (5) from a reel (50);
- wrapping the film (5) around the forming collar (6);
- fitting the film (5) around the forming tube (7);
- folding the film (5) by means of the ribs (70) protruding externally from the forming tube (7) and arranged parallel to the forming tube axis (T);
- welding the side wall edges (231',231";241',241") with the respective second main wall edges (212',212";222',222") in order to define the pair of main walls (21,22) and the pair of side walls (23,24);
- welding together a first edge of the first main wall (211') with a corresponding first edge of the second main wall (221');
- introducing the preserving liquid (3) and at least one dairy product (4) into the packaging envelope (2);
- welding together the other first edge of the first main wall (211") with the other corresponding first edge of the second main wall (221").

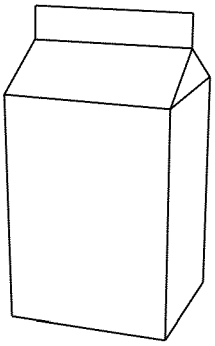

FIG.1

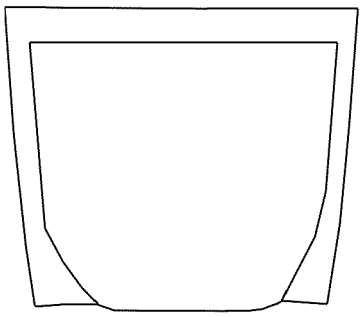

FIG.1d

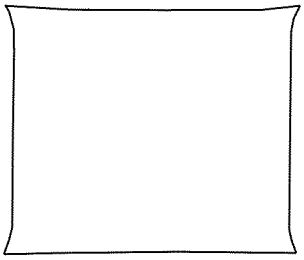

FIG.1a

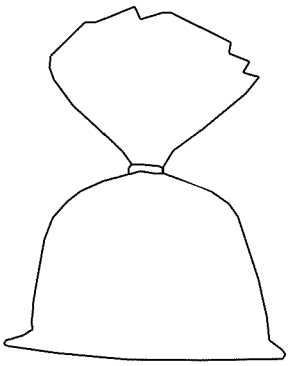

FIG.1b

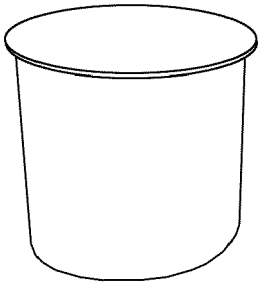

FIG.1c

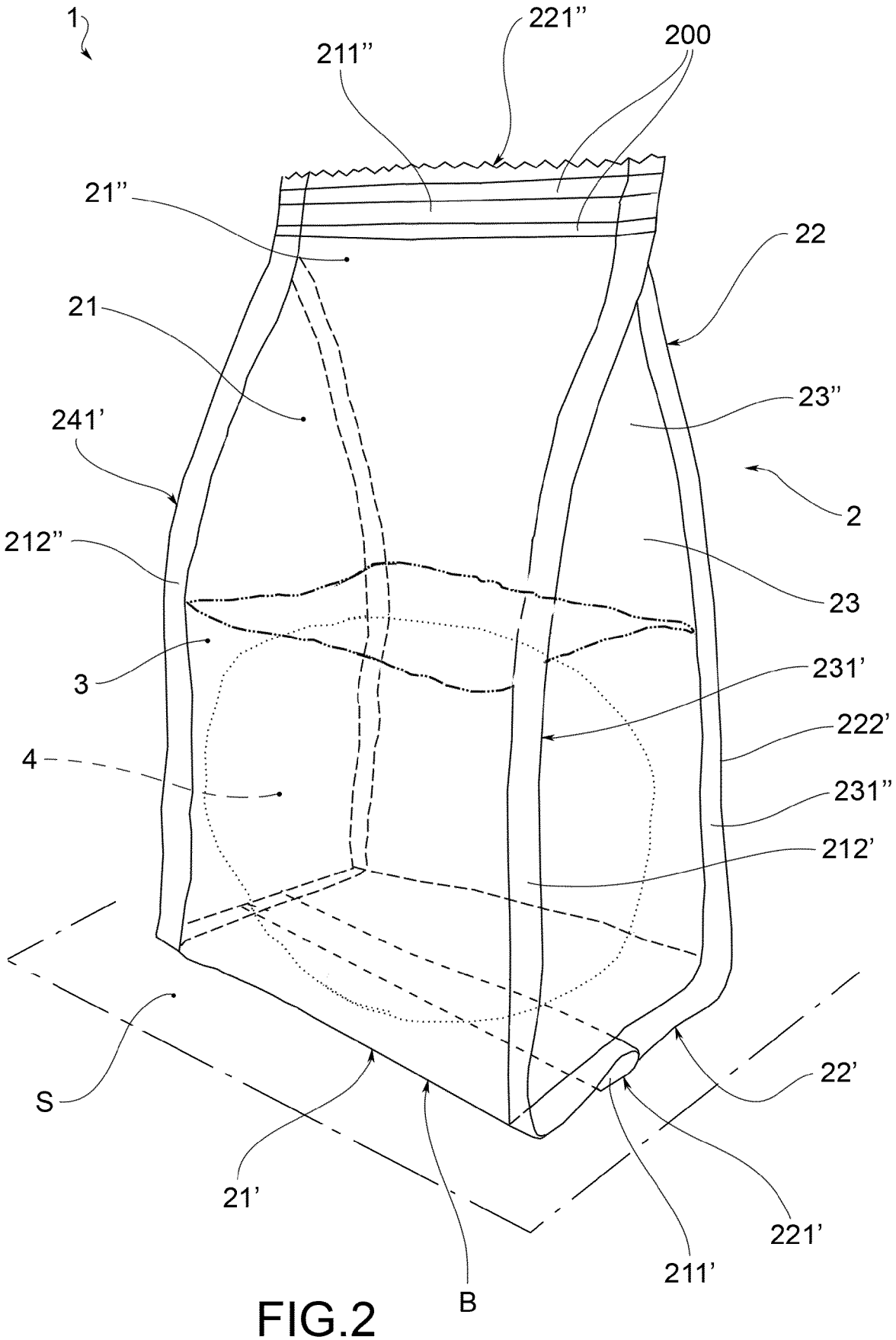
1
221''
211''
200
21''
22
21
23''
241'
2
212''
23
3
231'
222'
4
231''
212'
S
22'
21'
221'
211'
B

FIG.2

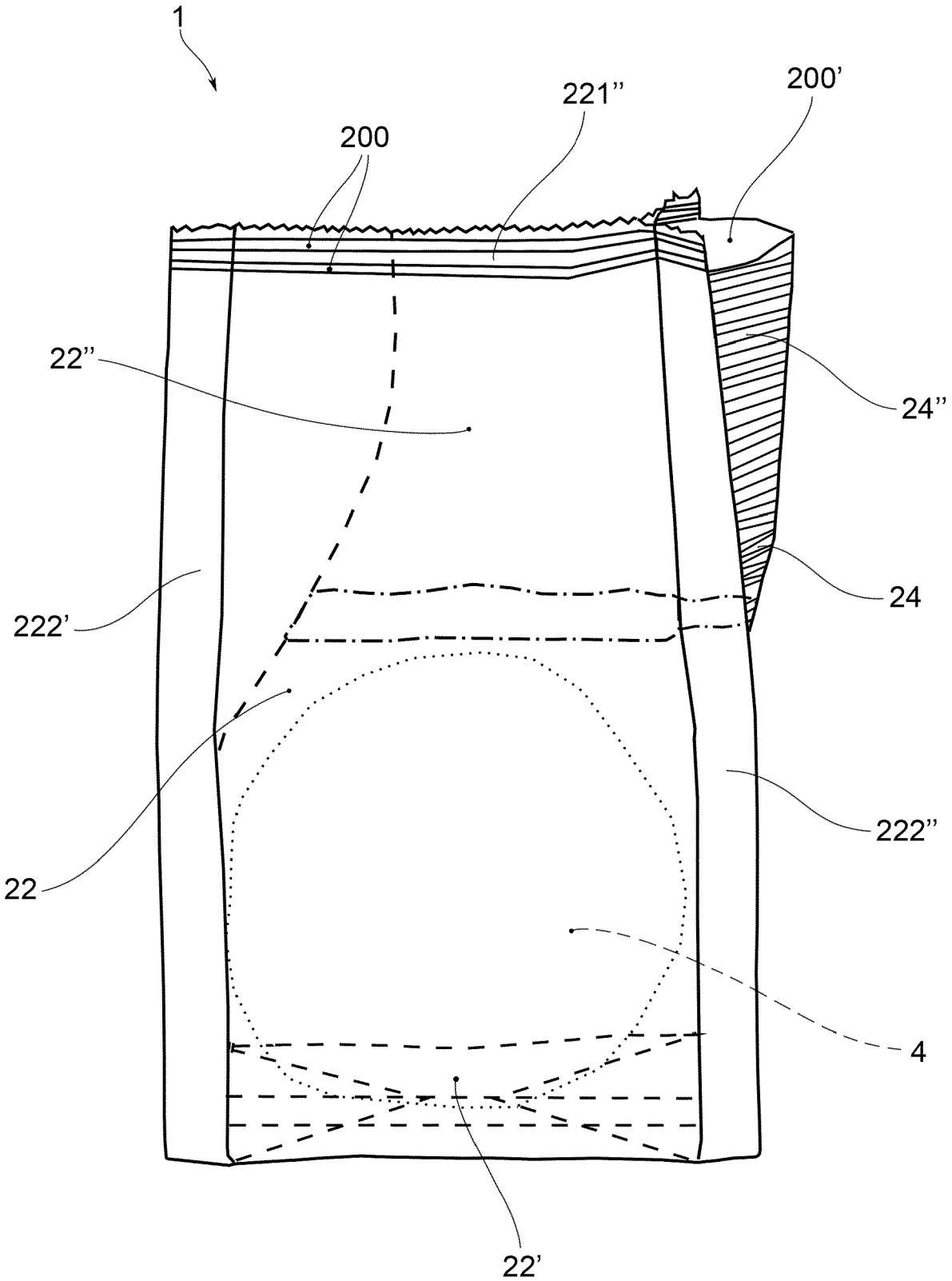

FIG.2a

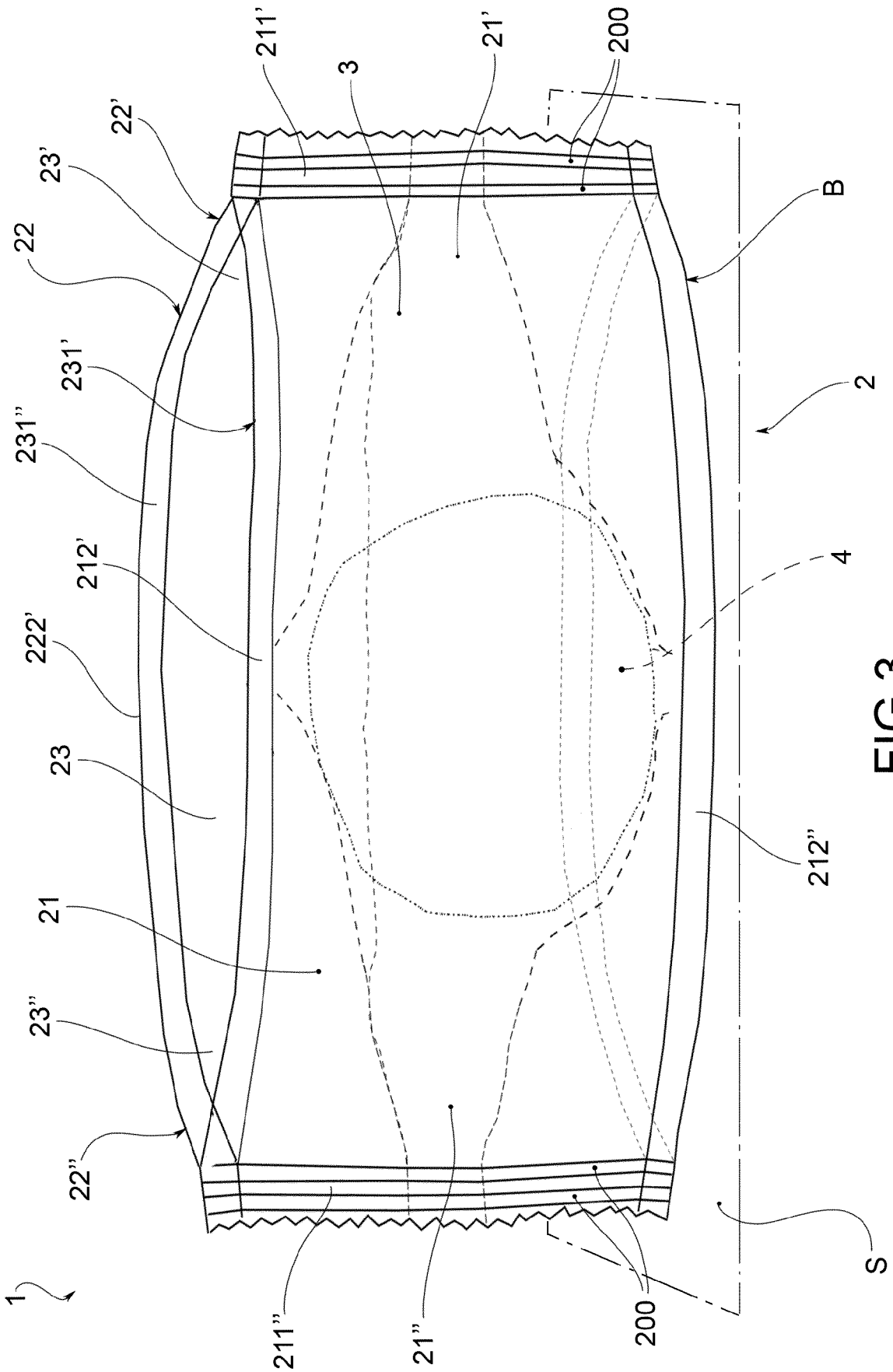
211'
3
21'
200
22'
23'
22
B
231'
2
231''
212'
4
222'
23
212''
21
23''
22''
S
1
211''
21''
200

FIG.3

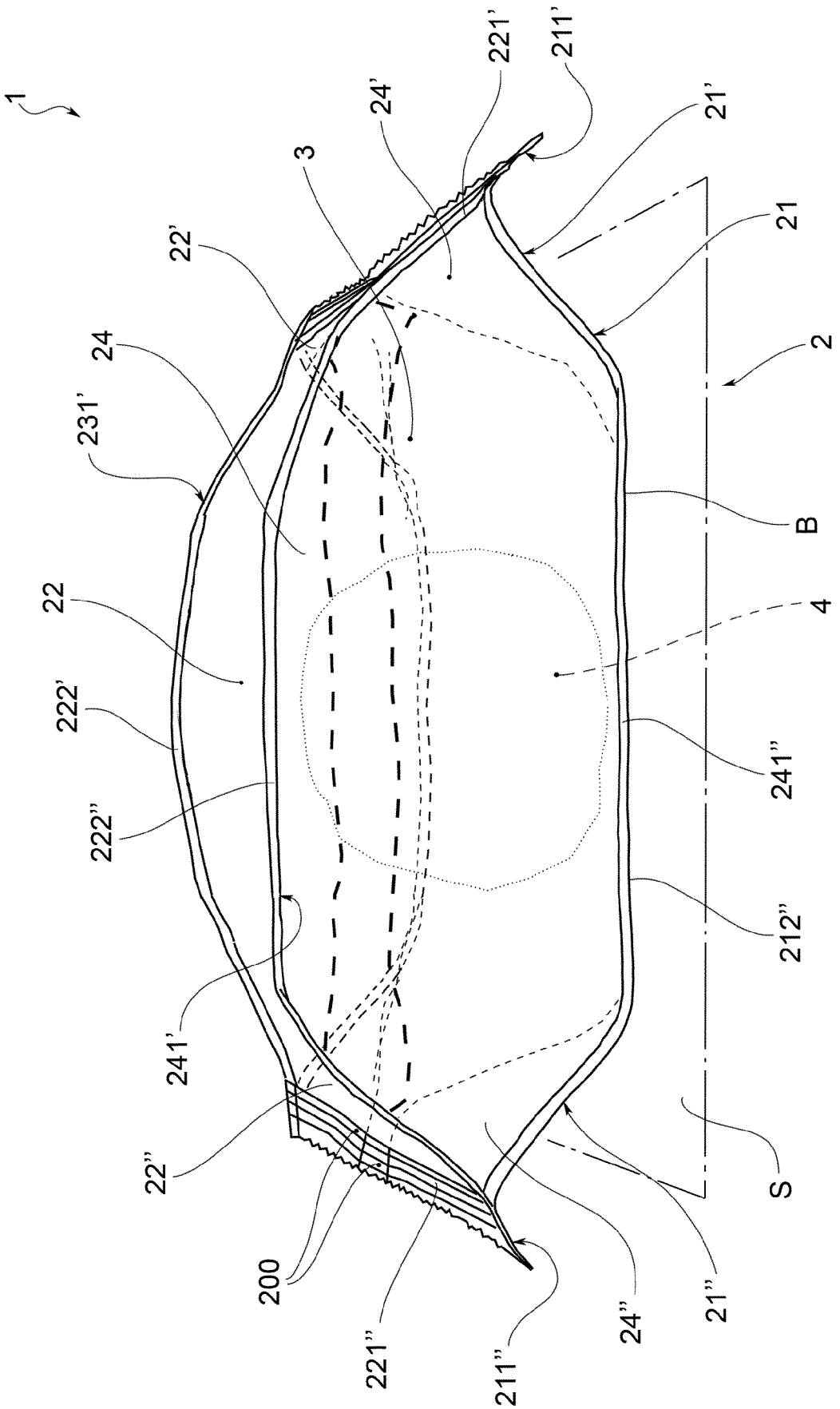
1
3
24'
221'
211'
21'
22'
21
24
2
231'
B
22
4
222'
241''
222''
212''
241'
22''
S
200
21''
24''
221''
211''

FIG.4

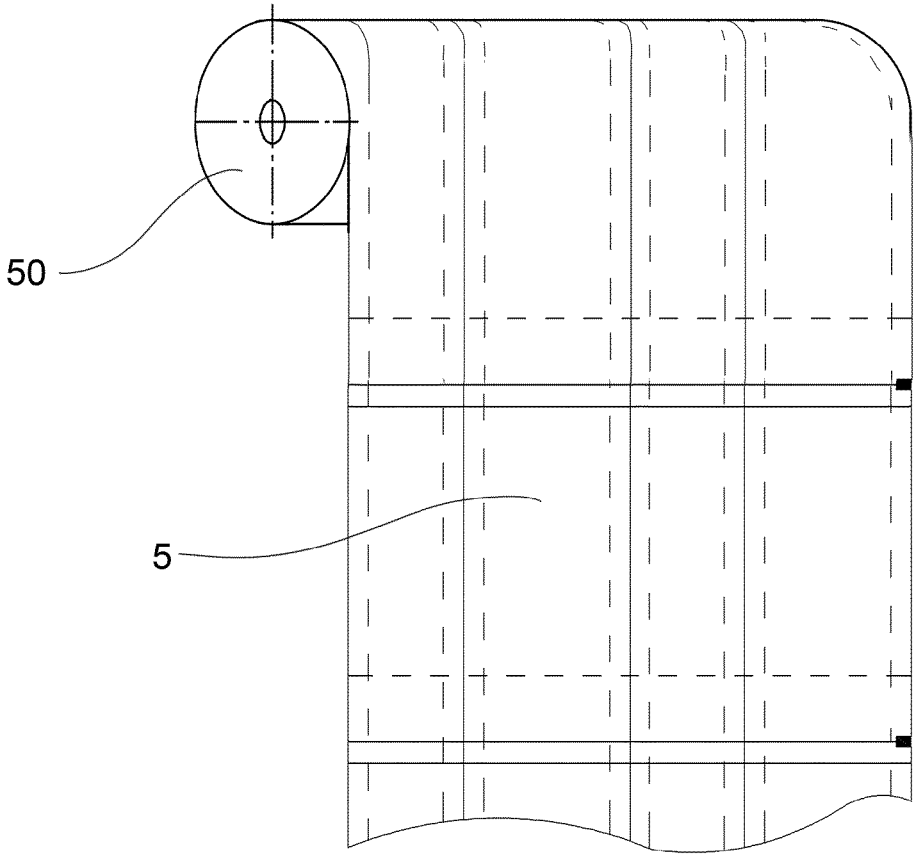

FIG.5

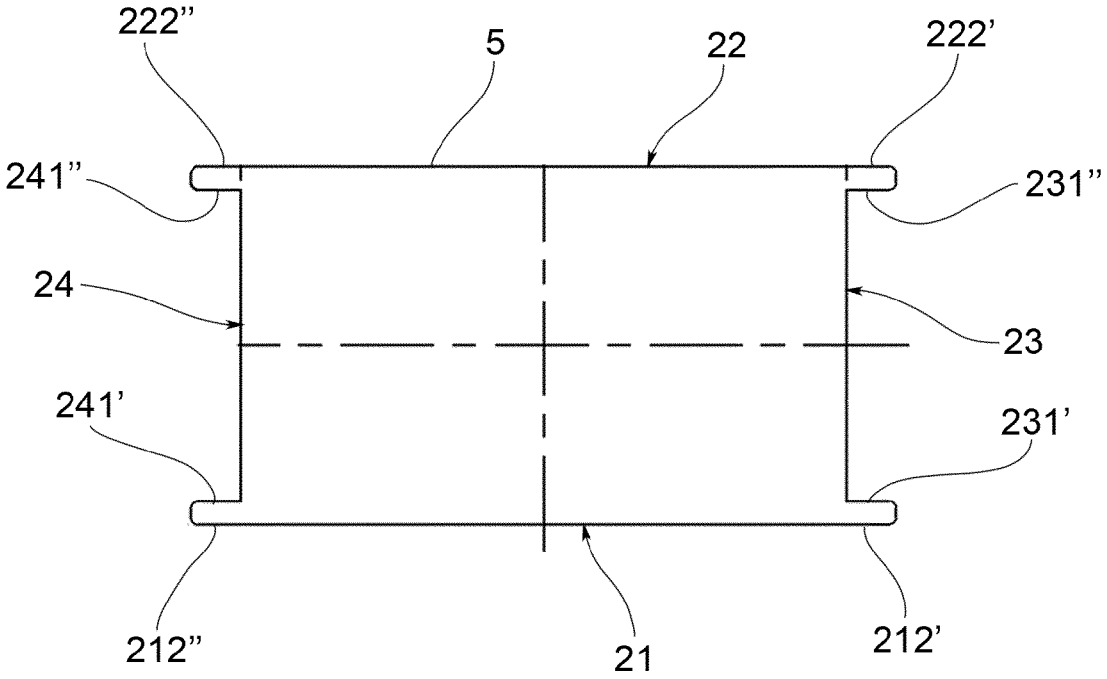

FIG.5a

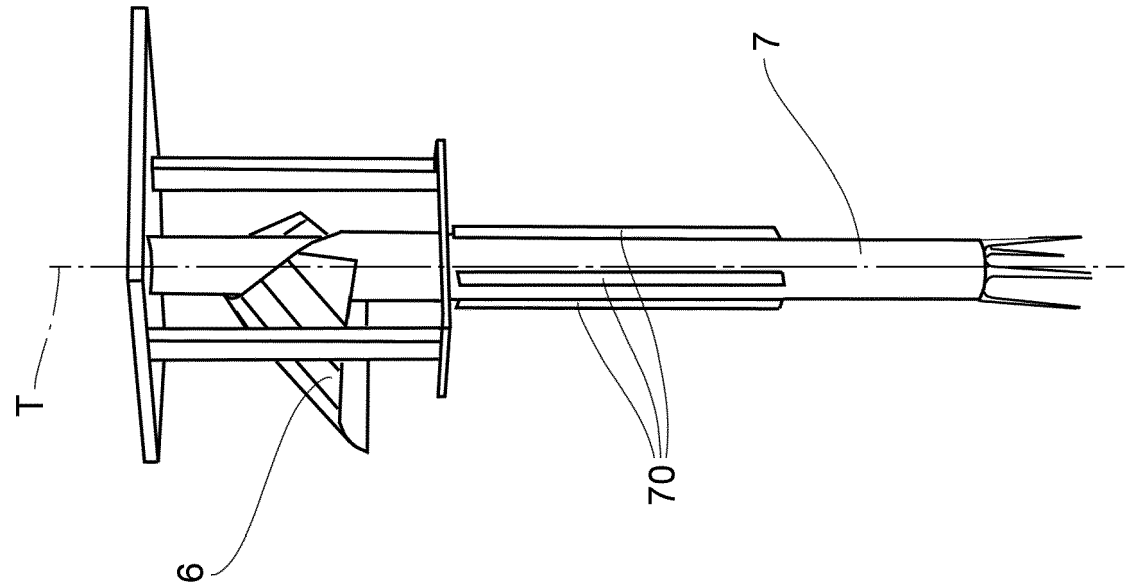

FIG.7

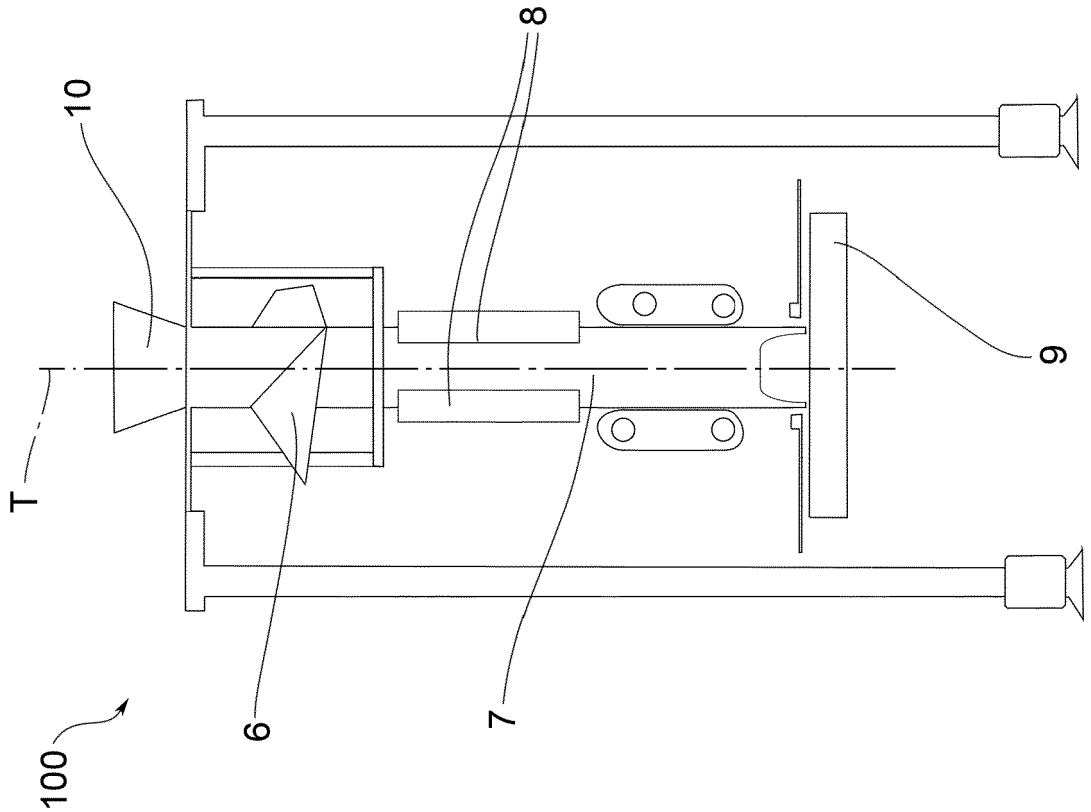

FIG.6