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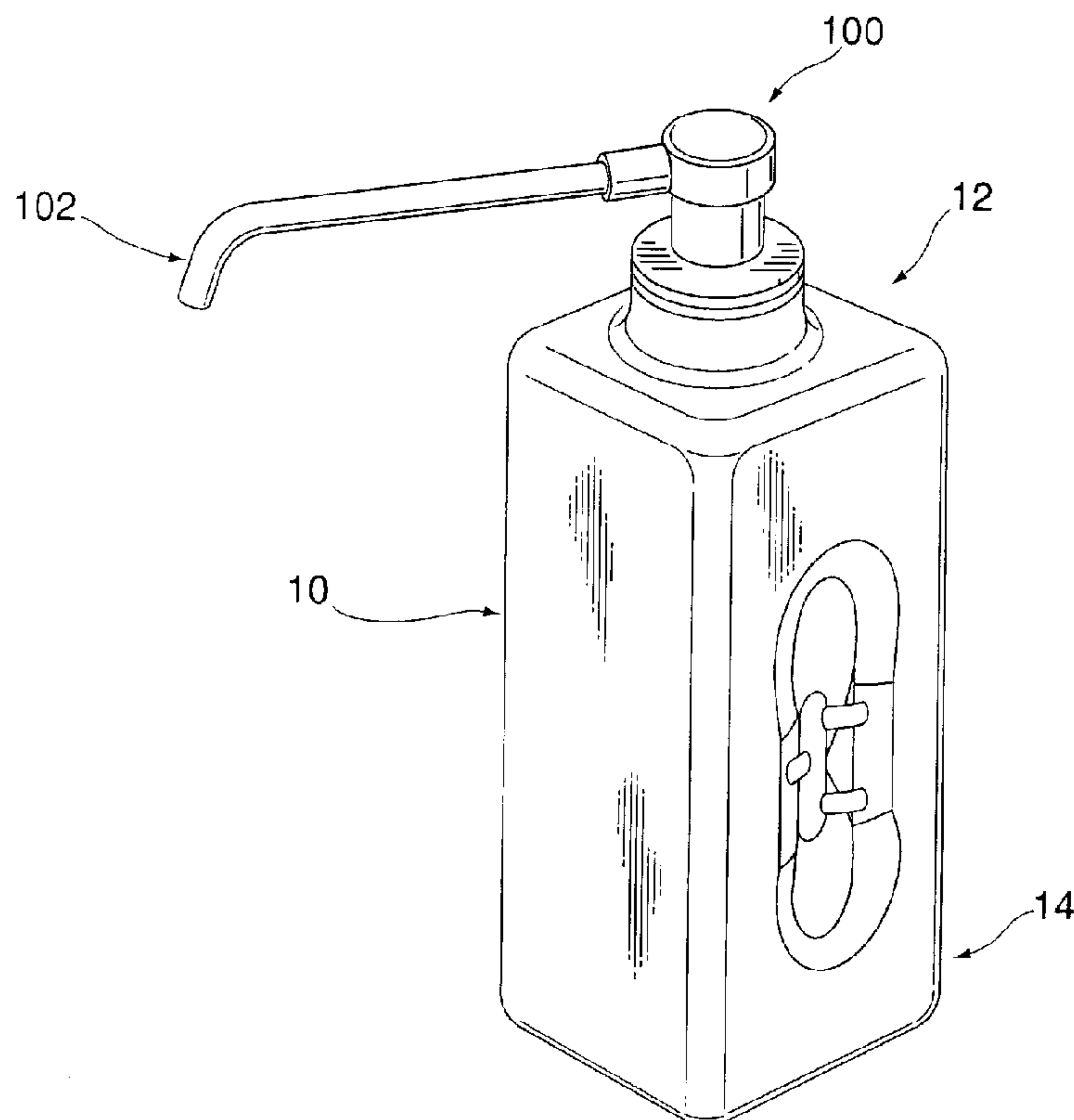
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(54) Titre : BOUTEILLE COMPRESSIBLE AUTOPORTANTE

(54) Title: SELF SUPPORTING COLLAPSIBLE BOTTLE



(57) Abrégé/Abstract:

A collapsible container closed but for an opening from an outlet end and having at the other base end, a three dimensional structure formed by a bottom wall, a central portion and peripheral edge portions which are sufficiently strong to resist deflection and maintain support portions of the base end in desired positions, preferably disposed in a flat plane both while a container is full and while in a collapsed or uncollapsed condition of the container. Preferably, the base has the support portions disposed in a flat plane normal to a longitudinal of the container and will support the container on a horizontal support surface with a longitudinal of the container to extend vertically upwardly therefrom, preferably, in all collapsed and uncollapsed conditions of the container.

## ABSTRACT

A collapsible container closed but for an opening from an outlet end and having at the other base end, a three dimensional structure formed by a bottom wall, a central portion and peripheral edge portions which are sufficiently strong to resist deflection and maintain support portions of the base end in desired positions, preferably disposed in a flat plane both while a container is full and while in a collapsed or uncollapsed condition of the container. Preferably, the base has the support portions disposed in a flat plane normal to a longitudinal of the container and will support the container on a horizontal support surface with a longitudinal of the container to extend vertically upwardly therefrom, preferably, in all collapsed and uncollapsed conditions of the container.

Title:

## **SELF SUPPORTING COLLAPSIBLE BOTTLE**

### Scope of the Invention

[0001] This invention relates to collapsible containers for fluids and, more particularly, to a collapsible bottle which, on collapsing, continues to provide a self supporting structure.

### Background of the Invention

[0002] Collapsible dispensers for soap and other fluids are known which are self supporting as when filled with material yet are provided to collapse upon themselves.

[0003] The inventors of this application have appreciated a disadvantage of previous known collapsible containers that when they collapse, the collapsed container does not provide a self supporting structure which can be relied upon to locate the container relative to other elements. More particularly, previously known collapsible containers have been appreciated to not be capable of continuing to support themselves in a vertical orientation supported on a base of the container both in an uncollapsible condition and in a collapsed condition. Further, the present inventors have appreciated that previously known collapsible dispensers suffer the disadvantage that back, side or front surfaces of the container also do not adopt consistent configurations when collapsed which can serve to assist in locating the collapsed dispenser relative to other surfaces such as the housing or support for a dispenser.

### Summary of the Invention

[0004] To at least partially overcome these disadvantages of previously known devices, the present invention provides a collapsible container closed but for an opening from an outlet end and having at the other base end, a three dimensional structure formed by a bottom wall, a central portion and peripheral edge portions which are sufficiently strong to resist deflection and maintain support portions of the base end in desired positions, preferably disposed in a flat plane both while a container is full and while in a collapsed or uncollapsed condition of the container. Preferably, the base has the support portions disposed in a flat plane normal to a longitudinal of the container and will support the container on a horizontal support surface

with a longitudinal of the container to extend vertically upwardly therefrom, preferably, in all collapsed and uncollapsed conditions of the container.

**[0005]** An object of the present invention is to provide a collapsible container which has an inherent structure which, whether collapsed or uncollapsed, assists in supporting the container against the environment in which the container may be disposed.

**[0006]** In accordance with the present invention, there is provided a thin walled collapsible container preferably formed from plastic material such as polyethylene as by blow moulding. The container is preferably rectangular and has an outlet end, a closed base end, front wall, rear wall and two side walls. The container is closed but for an opening from the outlet end. The outlet end has a top wall with a generally rectangular perimeter as seen in end view. The end wall includes an annular central portion about an axially extending neck open to the opening and peripheral edge portions about the central portion merging with the front, rear and two side walls. The front, rear and two side walls extend longitudinally of the container from the outlet end to the base end about a longitudinal of the container. The container is symmetrical about a flat central plane including the longitudinal which is intermediate the side walls. The base end has a bottom wall with a generally rectangular perimeter as seen in end view. The bottom wall includes a central portion and peripheral edge portions about the central portion merging the central portion into the front, rear and two side walls. The base end preferably has support portions of the peripheral rounded edge portions of the base end disposed in a flat plane normal to the longitudinal of the container and serving to support the container on a horizontal support surface with the longitudinal of the container to extend upwardly. Each of the front wall and the rear wall carry a respective front and rear valley having left and right valley side walls extending centrally into each front wall and rear wall towards a respective other of the rear and front wall to a respective front and rear valley apex. Each valley apex extends longitudinally of the container in a central plane from an outlet end of the respective front and rear valley apex to a base end of the respective front and rear valley apex. Each of the front and rear valleys end longitudinally at respective front and rear valley end walls which bridge between the right and left valley side walls of the respective front and rear valley. Each end valley wall is located between its

respective valley and either the outlet end or the base end. Each end valley wall preferably presents a generally frusto-conical surface symmetrical about the central plane and curving 180° about its respective valley apex.

**[0007]** The base end has a three dimensional structure formed by its bottom wall central portion and peripheral edge portions which is sufficiently strong to resist deflection and preferably maintain its support portions in a flat plane on collapsing of the container. One preferred embodiment, the central annular portion of the bottom wall, is inwardly convex and the peripheral edge portions about the central portion are inwardly concave rounded edge portions.

**[0008]** On collapsing of the container in a vacuum applied to withdraw fluid from the outlet end, the side walls are drawn together towards the common plane with the front and rear walls folding about the front valley apex and the rear valley apex.

**[0009]** Each of the front wall and rear wall preferably have a planar portion surrounding their respective valley. Each left and right valley wall is preferably disposed in a flat plane with a perimeter of each left and right valley side wall merging along a straight line with such planar portion extending parallel to the longitudinal. A perimeter of each of the valley end walls preferably merges along a curved line with such planar portion and joins an end of the straight line of the right valley perimeter with an end of the straight line at the left valley perimeter.

**[0010]** Preferably, the outlet end also has a three dimensional structure formed by its top wall, central portion, neck and peripheral edge portions sufficiently strong to resist deflection and maintain its peripheral edge portion in the same positions relative the neck on collapsing the container.

**[0011]** Preferably, the front and rear valley apexes are spaced from each other providing a channelway therebetween along their length from the base towards the outlet end in all collapsed and uncollapsed conditions of the container, preferably, at least adjacent each valley apex.

### Brief Description of the Drawings

[0012] Further aspects and advantages of the present invention will become apparent from the following description taken together with the accompanying drawings in which:

[0013] Figure 1 is a pictorial view of a collapsible bottle in combination with a pump mechanism in accordance with a first embodiment of the present invention;

[0014] Figure 2 is a front view of the bottle shown in Figure 1;

[0015] Figure 3 is a side view of the bottle shown in Figure 2;

[0016] Figure 4 is a bottom view of the bottle shown in Figure 2;

[0017] Figure 5 is a cross-sectional view along section line 5-5' in Figure 2;

[0018] Figure 6 is a cross-sectional side view along section line 6-6' in Figure 2;

[0019] Figure 7 is a front view similar to Figure 2 but showing the bottle of Figure 1 without the pump assembly and in a substantially fully collapsed condition;

[0020] Figure 8 is a side view of the collapsed container of Figure 7;

[0021] Figure 9 is a cross-sectional side view along section line 9-9' in Figure 7;

[0022] Figure 10 is a cross-sectional side view along section line 1-1' in Figure 7;

[0023] Figure 11 is a cross-sectional side view along either of the two section lines 2-2' in Figure 7;

[0024] Figure 12 is a pictorial view of the collapsible bottle similar to that shown in Figure 1 as mounted to a wall plate;

[0025] Figure 13 is a partially exploded view of the bottle and wall plate shown in Figure 12;

[0026] Figure 14 is a schematic cross-sectional view of a portion of the cap for the bottle shown in Figures 12 and 13 in vertical cross-section through key member;

[0027] Figures 15 and 16 are alternate embodiments of key members for securing a bottle to a wall plate as shown in Figure 13;

[0028] Figure 17 is a schematic pictorial view showing an embodiment similar to the embodiment of Figure 12 with a bottle in a partially collapsed condition; and

[0029] Figure 18 is a partial side view of the embodiment of Figure 17 but additionally showing the use of a suction cup.

### Detailed Description of the Drawings

**[0030]** Reference is made to Figure 1 which shows a bottle 10 in accordance with the present invention having a piston pump assembly 100 sealably secured to its outlet end 12. The pump mechanism 100 is a piston pump mechanism which when manually actuated by urging the pump downwardly dispenses an allotment of soap out of a nozzle 102 of the pump. The pump piston when returned to its extended position is ready to pump additional allotments of fluid from the bottle 10. The pump mechanism 100 sealably engages the outlet end 12 of the bottle such that on dispensing fluid by use of the pump mechanism 100, the bottle 10 becomes collapsed and moves to a collapsed condition as is illustrated in Figures 7 to 11.

**[0031]** In a preferred manner of use of the bottle as illustrated in Figure 1, the outlet end 12 is considered to be an upper end of the bottle and a base end 14 as a lower end of the bottle. This is not necessary and the bottle can be used in any position such as inverted or on its side or the like since dispensing by use of the pump draws fluid out of the bottle with collapse of the bottle.

**[0032]** Preferably, with the bottle entirely filled with fluid to be dispensed and containing no gas, pumping the fluid from the bottle will occur irrespective of the up or down orientation of the bottle. Nevertheless, in this disclosure, when referred to as up or as down, this is intended to refer to a configuration with the outlet end 12 being an upper end and the base end 14 a lower end.

**[0033]** The bottle has a generally rectangular cross-section and, as best seen in Figure 4, includes a front wall 16, a rear wall 18 and two side walls 20 and 22. The bottle 10 is closed but for an opening 24 from the outlet end 12. The outlet end has a top wall 26 with a generally rectangular perimeter if seen in an end view similar to that shown in Figure 4. The top wall 26 includes an annular central portion 28 about an axially extending neck 30. The neck 30 is open to the opening 24. The top wall 26 includes peripheral edge portions 32 about the central portion 28 which central edge portions 32 merge with the front wall 16, rear wall 18 and two side walls 20 and 22.

**[0034]** In the preferred embodiment, the neck 30 has an axis extending coaxially therethrough which axis is coincident with a longitudinal 34 through the bottle 10. The bottle

10 is symmetrical about a flat central plane 35 intermediate the side walls 20 and 22 which flat central plane includes the longitudinal 34.

[0035] The base end 14 has a bottom wall 36 with a generally rectangular perimeter as seen in end view in Figure 4. The bottom wall 36 includes a central portion 38 and peripheral side portions about the central portion 38. Peripheral edge portions merge the central portion 38 into the front wall 16, rear wall 18 and two side walls 20 and 22. The base end 14 preferably has support portions 42 and 43 disposed in a flat plane normal to the longitudinal 34 of the bottle 10 and serving to support the container on a horizontal support surface 44, schematically illustrated in Figure 6, with the bottle in a position with the longitudinal 34 of the bottle to extend vertically upwardly normal to the horizontal support surface 44. The support portions in the preferred embodiment comprise the two portions 42 and 43 of the bottom wall 36.

[0036] The front wall 16 carries a front valley 50 defined by left valley wall 51 and right valley wall 52 which extend centrally into the front wall 16 to a front valley apex 53 extending longitudinally of the bottle 10 in the central plane 35 from an outlet end 54 of the front valley apex to a base end 55 of the front valley apex. The front valley 50 ends longitudinally proximate the outlet end as an outlet end valley end wall 56 which bridges between the left valley side wall 51 and the right valley side wall 52 of the front valley 50. The front valley 50 ends longitudinally proximate the base end as a base end valley end wall 57 which bridges between the left valley side wall 51 and the right valley side wall 52 of the front valley 50.

[0037] In each of Figures 2 to 6, dashed lines are shown which indicate the location of a change of plane in the surface of the bottle 10. For example, referring to Figure 3, on the side wall 20, a rectangular central portion 60 is defined between lines 302, 303, 304 and 305 with the central portion 60 preferably being a flat planar surface disposed in a plane parallel to the longitudinal 34 and the central plane 35. Referring to Figure 2, a central portion 62 is shown on the front wall 16 defined within dashed lines 202, 203, 204 and 205. The central portion 62 is a flat planar surface normal to central plane 35.

[0038] Referring to Figure 4, corner portions 64, 65, 66 and 67 are shown. Referring to Figure 5, corner portion 64 is disposed between dashed lines 409 and 406. In Figures 2 and 3, corner portion 64 is disposed between dashed lines 202 and 203 and between dashed lines 303

and 304, respectively. The corner portions 65, 66 and 67 are thus similar and disposed between similarly disposed dashed lines.

**[0039]** Referring further to Figure 4, the central portion 38 of the bottom wall 36 is defined between dashed lines 405, 406, 407 and 408. As seen in Figure 3, the central portion 38 is inwardly concave. Bridging between the central portion 38 and the central portion 62 on the front wall 16 is a front peripheral rounded edge portion 68 defined between dashed lines 409, 203, 406 and 408. A similar rounded rear edge portion 69 mirrors the front edge portion 68. Referring to Figure 4, a side edge portion 70 is defined between a dashed line 406 and line 303 between lines 405 and 407. A similar side edge portion 71 is defined on the other side outward of dashed line 408. Figure 4 shows on the base end the support surface 42 as a panel disposed between lines 406, 409 408 and 407 and the support surface 43 as a similar panel between lines 406, 405, 408 and 410. As best seen in Figure 3, these support portions 42 and 43 serve to join the front and rear edge portions 68 and 69 with the concave central portion 38. Corner edge portions 72 and 73 near the front and rounded corner edge portions 74 and 75 near the rear end serve to bridge between one of the curved side edge portions and one of the curved end edge portions.

**[0040]** Referring to Figure 2, the front valley 50 has an outer perimeter generally indicated by lines 220, 221, 222 and 223 forming the boundary between the flat central portion 62 and the front valley 50. The left valley side wall 51 merges with the central portion 62 as the straight line 221. The right valley side wall 52 merges with the central portion 62 at the straight line 222. The outlet end valley end wall 56 merges with the flat central portion 62 as the curved line 220 with the ends of line 223 joining an outlet end of line 221 and an outlet end of line 222. The front valley 50 has a base end valley end wall 57 which bridges between the right valley side wall 52 and the left valley side wall 51. The base end valley end wall 57 merges with the central portion 62 at the curved line 223 which extends from a base end of the line 221 to a base end of the line 222. The line 220 effectively extends 180° about the outlet end 54 of the valley apex 53. The line 223 effectively extends and curves about 180° about the base end 55 of the end valley apex 53.

**[0041]** The outlet end valley end wall 56 is formed from two different portions including an outer portion 76 and an inner portion 77 with the outer portion 76 defined between the line 220 and intermediate line 227 and the inner portion 77 defined interior of line 227. Similarly, the base end valley end wall 57 is defined as an outer portion 78 and interior portion 79 with the outer portion 78 defined between line 223 and an intermediate line 230 and the interior portion 79 defined inside line 230. Each of the valley end walls 56 and 57 are symmetrical about the central plane 35.

**[0042]** Each end valley wall 56 and 57 effectively present a generally frusto-conical surface symmetrical about the central plane 35 and curving 180° about its respective apex end 54 or 55. This is best seen in Figure 6, in any plane normal to the central plane 35 and passing through the apex end 54 or 55, the valley end wall 56 or 57 will be at a greater depth from the central portion 62 with distance from the central portion 62.

**[0043]** It is to be seen that the lines 220 and 223 define, in effect, an ovaloid shape as seen in Figure 2 and the lines 227 and 230 similarly define a relatively ovaloid shape. In this description, the contours of the outer portion 76 and the interior portion 77 of the outlet end valley end wall 56 are referred to as being frusto-conical in the sense of curving about 180° about the apex end 54 and angling away from the end 54 and outwardly towards the central portion 62. Each forms a somewhat conical surface in the sense of tapering upwardly and outwardly albeit the conical surfaces in the embodiment illustrated in Figure 2 are not coaxially about the apex end 54.

**[0044]** Longitudinally about the front valley apex 53, an apex channel member 80 is provided having, as seen in side view in Figure 2, to have an elongate oval configuration and having as seen in cross-sectional view in Figure 5, a generally U-shape which is inwardly concave and outwardly convex. As seen in Figure 2, three side channel members 82 extend from the apex channel member 80 normal to the longitudinal 34. As best seen in side view in Figure 6, each side channel member 82 is U-shaped and inwardly concave and outwardly convex. Each of the side channel members 82 have an inner end 83 in the apex channel member 80 and an outer end 84 which terminates within the left valley side wall 51 or right valley side wall 52. As shown in Figure 2, three side wall members 82 are provided, one in the

middle of the apex channel member 80 on the left valley side wall 51 and two side channel members 82 on the right valley side wall 52 equally spaced about the side channel member 82 on the left valley side wall 51. While merely three side channel members 82 are shown in each valley in the preferred embodiment, an increased number of the side channel members 62 may be provided. While in Figure 2 the side channel members 82 are shown as being offset from each other on the left and right valley side walls, this is not necessary and they could be provided at the same longitudinal locations along the side walls.

**[0045]** The left valley side wall 51 comprises a generally rectangular outer portion 86 defined between lines 221, 235, 236 and 237. The left valley side wall 51 also includes a generally triangular inner portion 87 defined between the lines 237, 227 and 230. The side channel member 82 is formed so as to extend from the apex channel member 80 as a U-shaped inwardly directed channel on the left valley side wall 51.

**[0046]** Similarly, the right valley side wall 52 has a generally rectangular outer portion 88 defined within the lines 222, 243, 244 and 245 and a generally triangular inner portion 89 defined between the lines 245, 227 and 230.

**[0047]** Each of the apex channel member 80 and the side channel members 82 provide stiffening reinforcements to the front valley 50 and, as well, serve in a collapsed bottle as non-collapsible portions which assist in maintaining communication longitudinally and laterally within the interior of the bottle when collapsed.

**[0048]** The description has been made principally with reference to the front wall 16 and its front valley 50 and the side wall 20. With the bottle symmetrical about the central plane 35, it is to be appreciated that the rear wall 18 and its rear valley 50 and the side wall 22 will have the same identical configuration to that described albeit as a mirror image in respect of the side channel member 82.

**[0049]** Reference is made to Figures 7 to 11 which illustrate the bottle 10 in a substantially fully collapsed condition. Figure 7 shows a side view of the collapsed bottle 10.

**[0050]** In collapse of the bottle, the side walls 20 and 22 are drawn together. The front wall 16 folds within its front valley 50 along the front valley apex 53 such that the left valley side wall 51 and right valley side wall 52 come to extend generally parallel to the central plane

35 in opposition to each other spaced by the channel member 80. In effect, the opposing portions 86 and 88 of the valley side walls come to be disposed substantially parallel to the central plane in opposition to each other as folded about the apex 53. As seen, for example, in the cross-section of Figures 10 and 11, the front wall 16 becomes folded upon itself, about a central fold 90 and two edge folds 92 and 94. Similarly, the rear wall 18 becomes folded upon itself about a central fold 91 and two edge folds 93 and 95.

**[0051]** In collapse of the bottle, the overall longitudinal dimension of the bottle becomes reduced as can be seen by a comparison of the uncollapsed bottle in Figures 2, 3 and 6 with the collapsed bottle in corresponding Figures 7, 8 and 9. In collapse of the bottle, the front wall 16 and rear wall 18 are drawn together while folded about their center as about the central folds 90 and 91. A base end front wall portion 501 and a base end rear wall portion 502 become folded at folds 503 and 504 to overlie the bottom wall 36 reducing the bottle length. Similarly, outlet end front wall portion 505 and outlet end rear wall portion 506 become folded at folds 507 and 508 to underlie the top wall 26 reducing the bottle length.

**[0052]** As seen in Figure 7, a base end front wall portion 510 and a base end rear wall portion 511 become folded at folds 512 and 513 to overlie the bottom wall 36 reducing the length of the bottle. Similarly, an outlet end front wall portion 514 and an outlet end rear wall portion 515 become folded at folds 516 and 518 to underlie the top wall 26 reducing the bottle length. As seen in Figure 7, the folds 512 and 513 overlie the front fold 503, and the folds 516 and 518 overlie the fold front 507 by reason that the front wall 16 becomes drawn first in a gusseted type manner. Similarly, while not shown, the folds 512 and 513 will overlie the rear fold 504 and the folds 516 and 518 will overlie the rear fold 508.

**[0053]** Referring to Figures 7, 10 and 11, the central fold 90 of the front wall extends from each end of the channel member 80, that is, from the base end 55 of the front valley apex 55 to the base end and from the outlet end 54 of the front valley apex 55 to the outlet end.

**[0054]** In collapse of the bottle, the opposed front and rear channel members come to be moved inwardly towards each other. This can be seen firstly by a comparison of the cross-sectional views of Figure 5 when uncollapsed and Figure 10 when collapsed, with the channel members 80 spaced a significantly greater distance in Figure 5 than in Figure 10. This can also

be seen secondly by a comparison of the cross-sectional views of Figure 6 when uncollapsed and Figure 9 when collapsed with the channel members spaced a significantly greater distance in Figure 6 than in Figure 9.

**[0055]** Referring to Figure 10, it can be seen that the side wall 20 has become collapsed about fold lines 92 and 93 at each end onto a respective half of the front wall 16 and the rear wall 18, forming a collapsed front arm 601 and a collapsed rear arm 602. Similarly, the side wall 22 has become collapsed about fold lines 94 and 95 at each end onto a respective half of the front wall 16 and the rear wall 18, forming a collapsed front arm 603 and a collapsed rear arm 604. The arms 601, 602, 603 and 604 extend generally parallel the central plane 35 spaced the width of the channel members 80 and form together with the channel members an I-shaped beam member providing strength and resisting deflection.

**[0056]** As seen in Figure 7, over a longitudinal portion 520 of the side walls 20 and 22, the folds 92 and 94 of the arms 601 and 603 extend substantially parallel to each other symmetrically about the central plane 35. Below the portion 520, the folds 92 and 94 diverge outwardly forming a triangulated truss like structure, providing strength and resistance to deformation and assisting to rigidly support the bottom wall 36 substantially normal to the central plane. Similarly, above the portion 520 the folds 32 and 94 diverge outwardly forming a triangulated truss like structure, assisting to rigidly support the top wall 26 substantially normal to the central plane.

**[0057]** The longitudinal portion 520 of the side wall 16 is indicated by the cross-hatched label area 550 on Figure 13. This area 550 and a corresponding area on the rear wall 18 is each a preferred area to carry labelling information about the material in the bottle to be dispensed since the area 550 is effectively always disposed to be substantially parallel to the central plane 35 in all uncollapsed and collapsed positions of the bottle.

**[0058]** As seen in Figures 9 and 10, a central channelway 556 is provided longitudinally of the bottle between the channel members 80. As seen in Figure 11, two apex channelways 557 and 558 are provided inward of the central folds 90 and 91 where the tension in the side walls 20 and 22 of the bottle effectively keeps the side walls apart. The channelway 556 will continue to some extent from each end of the each channel member 80 towards the base end or

outlet end. The apex channelways 557 and 558 will extend to provide communication with the channelway 556 at one end and the base end or outlet end at the other. Thus the channelway 556 and the apex channelways 557 and 558 provide for communication longitudinal through the entire length of the bottle in all collapsed and uncollapsed positions as is advantageous to ensure that substantially all fluid in the bottle may be withdrawn in a manner as taught in the applicant's U.S. patent publication US 2006/0032865, published February 16, 2006. Each side channel members 82 provides a shunt channelway therein extending from the channelway 556 laterally. These side channel members 82 together with the channel 556 provide lateral shunt passages towards ensuring that compartment portions of the bottle on each side of the central plane 35 maintain in communication laterally to assist in ensuring that all fluids in the bottle may be withdrawn.

**[0059]** The side channel members 82 assist with the channel members 80 in stiffening the front wall 16 and rear wall 18, particularly when fully collapsed in which the side channel members 82 will assume positions as seen in Figure 7 in solid lines and schematically illustrated in Figure 9 in dashed lines.

**[0060]** On advantageous use of a bottle in accordance with the present invention is as a collapsible dispenser which is self-supporting by having its base end engaged on a support surface 44 as seen in Figure 6 whether uncollapsed as seen in Figure 6 or when collapsed as seen in Figures 7 to 9.

**[0061]** Another advantageous use of a bottle in accordance with the present invention is with its outlet end 12 secured as in a dispenser or to a wall and with the base end 14, in collapsing of the bottle on dispensing fluid, being drawn upwardly.

**[0062]** Preferably one of the side walls 20 or 22 will be directed towards a user, as for example, away from a wall and labelling 550 carried on the portion 520 over the exposed side will be visible for reading in all collapsed and uncollapsed conditions.

**[0063]** The bottle in accordance with the present invention substantially does not increase its cross-sectional area normal to the longitudinal as it collapses and the bottle may be used inside dispensers having an interior cavity designed to receive a rigid non-collapsible bottle of similar cross-sectional shape and size as a bottle in accordance with the present invention.

[0064] Preferably the bottle may be suspended by its outlet end 12 in a dispenser. More preferably when the bottle is suspended by its outlet end 12, one of the sides 20 and 22 will be directed towards a use to carry labelling on the portion 500 and the other of the sides 20 and 22 will be adjacent a vertical support surface or wall for engagement by such other side 20 or 22 where uncollapsed and/or by the ends of the fold lines 512 or 513 and 516 or 518 seen in Figure 7 towards assisting in keeping the bottle disposed vertically and any labelling vertical and visible.

[0065] An advantage of the bottle in accordance with the present invention is that the bottle is substantially rectangular in shape and has but minimal inward protrusion of the front and rear valleys, such that the volume of the fluid retained inside the bottle is a large proportion of the overall volume represented by the overall width, depth and length of the bottle.

[0066] The bottle in accordance with the present invention is preferably disposable for one time use and made to have the pump assembly 100 secured to the bottle against removal to prevent unauthorized tampering or refilling which could result in contamination.

[0067] The bottle is preferably to be used in a manner to collapse the bottle with a vacuum developed inside the bottle on dispensing, however the bottle may also be used as a non-collapsible bottle by permitting air to replenish fluid dispensed.

[0068] The base end 14 has a three dimensional structure formed by its bottom wall 36 having the central portion 38 and the peripheral edge portions 40 to be sufficiently strong to resist deflection when collapsed. As seen in Figure 9, the distance of the central fold 90 of the front wall 16 and the center fold 91 of the rear wall 18 to the longitudinal 34 varies increasing toward the base end and increasing toward the outlet end. As seen in Figures 10 and 11, the front wall 16 is folded where it merges with the side wall 20 at a fold 92 and is folded where it merges with the side wall 22 at fold 94. Similarly, the rear wall 18 is folded at fold 93 where it merges with the side wall 20 and is folded at fold 95 where it merges with the side wall 22. The fold lines 90, 92 and 94 and the set of fold lines 91, 93 and 95 effectively represent a forced deformation of the valley end walls 56 and 57 represented by the curved portions 76, 77, 78 and 79 as shown in Figure 4. As seen in Figures 7, 10 and 11, as the folds 92,94 and 93,95 become closer to the base end 14, the folds diverge from the central plane 35 so as to

join with the corners of the rectangular base end 14. As seen in Figure 9, the center folds 90 and 91 diverge outwardly towards the base end 14. This divergence in the double layers forming at the folds 92,94 and 93,95 provide effectively a triangular truss structure which assists to form on the side of the bottle as seen in Figure 7, a relatively rigid three dimensional structural triangle which tends to provide rigidity to the collapsed bottle. A similar three dimensional triangular truss structure is formed on the other side with the collapsed rear wall 18.

**[0069]** The outlet end 12 has a three dimensional structure formed by its top wall 26 including its central portion 28, axially extending neck 30 and peripheral edge portions 32. This three dimensional structure is provided to be sufficiently strong to substantially resist deformation and maintain its peripheral edge portions 32 substantially in the same positions relative to the neck 30 on collapsing of the container. In an analogous manner to that described with reference to the folding of the front wall 16 to form a triangular reinforcing truss with the base end 14, the front wall 16 similarly adopts an imaged folded structure forming a reinforcing triangular truss structure with the outlet end 12 as seen in Figure 8.

**[0070]** In respect of the base end 14 having a three dimensional structure to resist deformation, it is preferred that the central portion 38 of the bottom wall 36 is inwardly convex and the peripheral edge portions 72, 68, 73, 71, 74, 69, 75 and 70 about the central portion 38 are inwardly concave rounded edge portions as shown. As best seen in Figures 3 and 9, the central portion 38 of the base end bottom wall 36 is concave as seen in side view perpendicular to the central plane 35.

**[0071]** The configuration of the base end valley end walls are advantageously selected so as in collapse of the bottle, the relative stresses applied to the front wall 16 and the rear wall 18 will come to be distributed relatively evenly about the center longitudinal plane on each of their folds 92/94 and 93/95 and the portions of the side walls and front or rear wall involved in these folds. Preferably, the walls of the bottle are formed to be of a material having a thickness which is uniform or at least uniformly symmetrical about the central plane 35 so that the valley side walls 51 and 52 and the base end valley end wall 58 as well as the outlet end valley end wall 56 will serve to develop stresses uniformly, notably, on each of the folds 91 and 93 on the

front wall and similarly on folds 92 and 94 on the rear wall. With such uniform tensioning and deformation of the front wall 16 and rear wall 18 and with the base end 12 having a relatively uniform resistance to deformation, at least symmetrically about the longitudinal central plane 35, with withdrawal of fluid from the bottle, the bottle has an inherent tendency to collapse in a symmetrical manner and develop on collapsing a reinforced triangular truss-like structures which serves to maintain the collapsed bottle generally symmetrical about the central plane 35 and maintain the base end 14 and notably its support portions 42 and 43 in a flat plane which is perpendicular to the central plane 35.

[0072] Similarly, the outlet end 12, particularly by reason of being reinforced by its coaxial generally cylindrically extending neck 30, resist deformation and with symmetrically directed stresses being developed with triangular folding collapse of the outlet end portions of the front wall 16 and rear wall 18, in the collapsed bottles, the folds developed in the front wall 16 and rear wall 18 provide for maintaining the outlet end 12 disposed normal to the central longitudinal plane and supported by the collapsed folded front wall 16 and rear wall 18 with its peripheral edge portions in substantially the same positions relative to the neck 30 on collapsing of the bottle.

[0073] Through the middle of the collapsed bottle as seen in Figure 8, the apex channel member 80 in each of the front valley 50 and the opposed rear valley in being inwardly concave provide a longitudinal support member resisting deflection of the folded front wall 16 and folded rear wall 18 out of a configuration in which they are aligned about the center plane 35. In addition, each of the side channel members 82 serve a stiffening purpose tending to resist folding of the left and right valley side walls upon themselves assisting in distributing forces tending to fold the front wall 16 and rear wall 17 over broad areas so as to resist localized folding or deformation which might tend to cause one area of the front wall 16 or rear wall 18 to collapse in a non-symmetrical manner relative to the central plane 35.

[0074] The fact that each valley end wall presents a generally frusto-conical surface symmetrical about the central plane 35 and curving approximately 180° provides a structure which assists in uniformly distributing the forces in collapse of the bottle in a manner distributing the forces uniformly onto the opposed folds such as 93 and 95 or 92 and 94.

**[0075]** The particular shape of the curve formed by the valley end walls at least where they intersect with the central portions of the front wall and rear wall is to be selected by a person skilled in the art bearing in mind the relative proportion of the bottle, that is, the length and width of each of the front and rear panels and the length and width of each of the side walls. For example, insofar as the bottle had a reduced longitudinal extent but the same width and depth, then the lines 220 and 223 may preferably be reduced in dimension along the longitudinal.

**[0076]** Each valley end wall is shown as comprising two portions, for example, in respect of the base end valley end wall 57, an outer portion 78 and an inner portion 79. This is not necessary, however, it is preferred to provide these two separate portions 78 and 79 disposed in different planes and at different angles as seen in Figure 6 as another feature which assists to ensure that there is a three dimensional structure to the valley end wall which resists localized folding other than uniformly at the desired fold lines 91, 93 and 95 as discussed.

**[0077]** Reference is made to Figures 12 to 14 which illustrate a bottle substantially shown in Figure 1 as coupled to a wall plate system of the type described in the applicant's U.K. patent application GB 2,427,120 published December 20, 2006. Figure 12 shows the wall plate 710 as having an upper edge 720, lower edge 721 and side edges 722 and 723. The wall plate 710 illustrated is formed from a unitary sheet of metal. The wall plate 710 has a plate portion 726 which extends between side edges 722 and 723 from the lower edge 721 to a first fold line 727. The wall plate 710 has a securement portion 728 which compromises the wall plate 710 from the first fold line 727 between the side edges 722 and 723 to the upper edge 720. The wall plate extends from the first fold line 727 forwardly and upwardly at a diagonal to a plane in which the plate portion 726 lies to a second fold line 729 and hence from the second fold line 729 rearwardly and upwardly at an angle to the upper edge 720. The upper edge 720 is disposed in the same plane as a plane through a rear surface of the plate portion 726.

**[0078]** The securement portion 728 is in the form of a channelway member extending longitudinally along the upper edge 720 of the wall plate open at its rear enclosed at its front by a lower flange 730 between the first fold line 727 and the second fold line 729 and an upper

flange 732 between the second fold line 729 and the upper edge 720. The securement portion finds a channelway 34 therein.

**[0079]** A T-shaped key way opening 738 extends through the lower flange 32 into the slotway 34. The key way opening 38 has a generally T-shape in appearance with an enlarged width upper passage portion 739 and a reduced width lower catch portion 740.

**[0080]** The bottle 10 carries approximate upper end 12 a key member 746 generally in the shape of a "T" as seen in front view and having an enlarged width distal tab portion 747 sized to pass through the upper passage portion 739 of the key way opening 738 however of a sufficient width to not pass through the lower catch portion 740 of the key way opening 738. The distal tab portion 747 is connected to the bottle 10 via bridge portion 748 sized to be of a width less than the width of the lower catch portion 740 of the key way opening 742. To couple the bottle 10 to the wall plate 710, the bottle 10 is manually manipulated in positions such that distal tab portion 747 of the key member 746 is passed through the upper passage portion 739 of the key way opening 738 into the channelway 734 and then moved downwardly inside the channelway 734 with the bridge portion 748 of the key member 746 extending through the lower catch portion 740 of the key way opening 738 and the distal tab portion 747 engaging the rear of the lower flange 730 in the channelway 734 on either side of the lower catch portion 740 of the key way opening. With the key member 736 so engaged in the key way opening 738, the bottle 10 may be released and will hang supported at its upper end 12 by the key member 746 being engaged in the key way openings 734. The bottle 10 hangs vertically downward with its side surface 20 planar with the forward surface 725 of the plate portion 726.

**[0081]** In the embodiment illustrated in Figure 12 and 13, the piston pump assembly 100 includes a cap 800 adapted to removably engage about the upper opening of the bottle. This cap is shown schematically in Figure 14 in a cross-section pictorial view showing the cap as having a cylindrical side wall 801 and the bridge portion 748 is intricately formed therewith as for example by injection moulding from plastic.

**[0082]** Figure 15 shows an alternate embodiment in which the key member 746 is provided at one end of the bridge portion 748 with an annular securing ring 780 adapted to be engaged

annularly about an outlet of the bottle and an annular shoulder provided on the bottle or the cap to be secured to the bottle. The embodiment in Figure 14 the key member 746 may be made from relatively flexible plastic material.

**[0083]** Reference is made to the embodiment in Figure 16 which shows another embodiment of a key member 746 however in which the key member may be provided to be rigid as for example stamped from metal. The key member has its bridge portion 748 than to form a right angle so that the bridge member may extend vertically downwardly adjacent the plate portions 726 of the wall plate 710 and then horizontally outwardly.

**[0084]** Reference is made to Figure 17 which illustrates a bottle similar to that shown in Figure 13 as mounted to a similar wall plate 710 via key member 746 similar to that shown in Figure 16 and with the bottle being in a partially collapsed condition. The bottle 10 is shown partially collapsed and with the folds 516 and 512 of the side wall 20 engaging the forward surface 725 of the plate portion 726 so as to hold the bottle substantially vertically. As can be seen, labelling indicated in the area 550 on the side wall 22 is directed forwardly and remains visible to a user.

**[0085]** While not necessary, various mechanisms may be utilized to hold the lower portion of the side wall against the plate portion 726. For example a magnet may be secured to the side wall 20 approximate where the side wall forms its fold 512 which magnet while being attracted to metal of the wall plate would not have sufficiently great strength to inhibit the bottle 10 from being collapsed in length and the fold 512 moving upwardly on the plate portion as fluid is dispensed.

**[0086]** Similarly, as seen schematically in Figure 18 suction cup 900 mechanism could be provided to secure the base end of the side wall 20 as with a flexible or extendable connection member 902 to permit length reduction of the bottle 10 as fluid is dispensed accommodating for relative movement relative the suction cup 900 secured to plate portions 726. The suction cup 900 may alternatively be provided so as to permit sliding vertically on the plate portion 726 without disengagement.

**[0087]** In use of the bottle 10 and the embodiments illustrated in Figures 12, 13 and 17 it is to be appreciated that it is not necessary that the bottom wall 36 strictly speaking be maintained

perpendicular to the central plane 35. In the embodiment for example is illustrated in Figure 17, the fact that the bottom wall extend somewhat horizontally rearwardly from the substantially vertically disposed portions of the side walls 20 and 22 will permit the bottle to be supported at an acceptable orientations that the labelling on the side wall 22 of the bottle may be viewed.

**[0088]** While the invention has been described with reference to preferred embodiments, many modifications and variations will now occur to persons skilled in the art. For a definition of the invention, reference is made to the following claims.

## WE CLAIM:

1. A thin walled collapsible container,
  - the container comprising an outlet end, a closed base end, a front wall, a rear wall and two side walls,
  - the container closed but for an opening from the outlet end,
  - the outlet end having a top wall with a generally rectangular perimeter as seen in end view, the top wall including an annular central portion about an axially extending neck open to the opening and peripheral edge portions about the central portion merging with the front, rear and two side walls,
  - the front, rear and two side walls extending longitudinally of the container from the outlet end to the base end about a longitudinal of the container parallel an axis coaxially through the neck,
  - a flat central plane including the longitudinal,
  - the container symmetrical about the central plane,
  - the base end having a bottom wall with a generally rectangular perimeter as seen in end view, the bottom wall including a central portion and peripheral edge portions about the central portion merging the central portion into the front, rear and two side walls,
  - the base end having support portions of the peripheral edge portions of the base end disposed in a flat plane normal to the longitudinal of the container and serving to support the container on a horizontal support surface with the longitudinal of the container to extend vertically upwardly,
  - the front wall and rear wall each carrying a respective front and rear valley having left and right valley side walls extending centrally into each front and rear valley toward a respective other of the rear and front wall to a respective front and rear valley apex each extending longitudinally of the container in the central plane from an outlet end of the respective front and rear valley apex to a base end of the respective front and rear valley apex,

each of the front and rear valley ending longitudinally in a respective front and rear valley outlet end valley end wall which bridges between the right and left valley side walls of its respective front and rear valley, the front and rear outlet end valley end wall being located between its respective front and rear valley and the outlet end,

each of the front and rear valley ending longitudinally in a respective front and rear valley base end valley end wall which bridges between the right and left valley side walls of its respective front and rear valley, the front and rear base end valley end wall being located between its respective front and rear valley and the base end,

each valley end wall presenting a generally frusto-conical surface symmetrical about the central plane and curving 180 degrees about its respective outlet end or base end of its front and rear valley apex,

wherein on collapsing of the container under a vacuum applied to withdraw fluid from the opening the side walls are drawn together towards the common plane with the front and rear walls folding about the front valley apex and the rear valley apex,

the base end having a three dimensional structure formed by its bottom wall, central portion and peripheral edge portions sufficiently strong to resist deflection and maintain its support portions in a flat plane on collapsing of the container.

2. A container as claimed in claim 1 wherein

each of the front wall and rear wall have a substantially planar portion surrounding their respective valley,

each left and right valley side wall being disposed in a flat plane with a perimeter of each left and right valley side wall merging along a straight line with the planar portion extending parallel to the longitudinal,

a perimeter of each valley end wall merging along a curved line with the planar portion and joining an end of the straight line of the right valley wall perimeter with an end of the straight line of the left valley wall perimeter,

each perimeter of each valley end wall curving 180 degrees about its outlet end and base end of its front and rear valley apex.

3. A container as claimed in claim 1 or 2 wherein the outlet end having a three dimensional structure formed by its top wall, central portion, neck and peripheral edge portions sufficiently strong to resist deflection and maintain its peripheral edge portions in the same positions relative the neck on collapsing of the container.
4. A container as claimed in claim 1, 2 or 3 wherein the annular central portions of the top wall is inwardly concave.
5. A container as claimed in any one of claims 1 to 4 wherein the peripheral edge portions of the top wall are inwardly concave, rounded edge portions.
6. A container as claimed in any one of claims 1 to 5 wherein the annular central portion of the bottom wall is inwardly convex.
7. A container as claimed in any one of claims 1 to 6 wherein the peripheral edge portions of the bottom wall are inwardly concave, rounded edge portions.
8. A container as claimed in any one of claims 1 to 7 wherein the front and rear valley apex are spaced from each other and providing a channelway therebetween along their length from the base end toward the outlet end in all collapsed and uncollapsed conditions of the container.
9. A container as claimed in any one of claims 1 to 8 wherein on collapsing of the container under a vacuum applied to withdraw fluid from the opening, the side walls are drawn together about the front valley apex and the rear valley apex with the channelway provided at least as a front continuous channel substantially from the base end adjacent the front valley apex and a rear continuous channel substantially from the base end adjacent the rear valley apex.

10. A container as claimed in claim 9 wherein:

a first compartment is defined on a first side of the channelway bounded by an interior of a first of the side walls and the interiors of the front valley side wall and the rear valley side wall opposed thereto, and

a second compartment is defined on a second side of the channelway bounded by an interior of a second of the side walls and the interiors of the front valley side wall and the rear valley side wall opposed thereto.

11. A container as claimed in claim 10 wherein each compartment is in communication with the opening in the outlet end throughout its length longitudinally of the container via the channelway in all collapsed conditions of the container.

12. A container as claimed in claim 9, 10 or 11 wherein front and rear valley apex comprises a part-cylindrical wall portion about an axis extending longitudinally of the container, the part-cylindrical wall portion providing a portion of the channelway longitudinally therein under all collapsed conditions of the container.

13. A container as claimed in claim 9, 10 or 11 including lateral channelways on the interior of the side walls or the valley side walls extending transversely of the channelway and opening at one end into communication with the channelway.

14. A container as claimed in claim 13 wherein lateral channelways comprise lateral part-cylindrical wall portion about an axis extending transversely of the channelway, the lateral part-cylindrical wall portion providing a the lateral channelway longitudinally therein under all collapsed conditions of the container.

15. A container as claimed in claim 9 wherein the container is formed from a continuous tube of plastic material by steps including cutting a length of the tube, closing one end of the tube to form the base end of the container along a generally linear seal joint extending across

the tube, blow moulding the length of tube to form the tube into the shape of the container when uncollapsed,

wherein the seal extends across the middle of base end from one side wall toward the other side wall.

16. A container as claimed in any one of claims 1 to 15 in which the front wall and rear wall each being generally a symmetrical mirror image of each other,

the side walls each being generally a symmetrical mirror image of each other.

17. A thin walled collapsible container,

the container comprising an outlet end, a closed base end,

a front wall, a rear wall and two side walls,

the container closed but for an opening from the outlet end,

the outlet end having a top wall with a generally rectangular perimeter as seen in end view, the top wall including an annular central portion about an axially extending neck open to the opening and peripheral edge portions about the central portion merging with the front, rear and two side walls,

the front, rear and two side walls extending longitudinally of the container from the outlet end to the base end about a longitudinal of the container parallel an axis coaxially through the neck,

a flat central plane is disposed intermediate the side walls, the longitudinal lies in the flat central plane,

the container symmetrical about the flat central plane,

the base end having a bottom wall with a generally rectangular perimeter as seen in end view, the bottom wall including a central portion and peripheral rounded edge portions about the central portion merging the central portion into the front, rear and two side walls,

the base end having support portions of the peripheral rounded edge portions of the base end disposed in a flat plane normal to the longitudinal of the container and serving to

support the container on a horizontal support surface with the longitudinal of the container to extend vertically upwardly,

the front wall and rear wall each carrying a respective front and rear valley having left and right valley side walls extending centrally into each front and rear valley toward a respective other of the rear and front wall to a respective front and rear valley apex each extending longitudinally of the container in the flat central plane from an outlet end of the respective front and rear valley apex to a base end of the respective front and rear valley apex,

each of the front and rear valley ending longitudinally in a respective front and rear valley outlet end valley end wall which bridges between the right and left valley side walls of its respective front and rear valley, the front and rear outlet end valley end wall being located between its respective front and rear valley and the outlet end,

each of the front and rear valley ending longitudinally in a respective front and rear valley base end valley end wall which bridges between the right and left valley side walls of its respective front and rear valley, the front and rear base end valley end wall being located between its respective front and rear valley and the base end,

each valley end wall presenting a generally frusto-conical surface symmetrical about the flat central plane and curving 180 degrees about its respective outlet end or base end of its front and rear valley apex,

wherein on collapsing of the container under a vacuum applied to withdraw fluid from the opening the side walls are drawn together towards the flat central plane with the front and rear walls folding about the front valley apex and the rear valley apex,

the base end having a three dimensional structure formed by its bottom wall, central portion and peripheral edge portions sufficiently strong to resist deflection and maintain its support portions in a flat plane on collapsing of the container.

18. A thin walled collapsible container comprising an outlet end, a closed base end, a front wall, a rear wall and two side walls,

the container closed but for an opening from the outlet end,

the outlet end having a top wall with a generally rectangular perimeter as seen in end view, the top wall including an annular central portion about an axially extending neck open to the opening and peripheral edge portions about the central portion merging with the front, rear and two side walls,

the front, rear and two side walls extending longitudinally of the container from the outlet end to the base end about a longitudinal of the container parallel an axis coaxially through the neck,

a flat central plane is disposed intermediate the side walls, the longitudinal lies in the flat central plane,

the container symmetrical about the flat central plane,

the base end having a bottom wall with a generally rectangular perimeter as seen in end view, the bottom wall including a central portion and peripheral rounded edge portions about the central portion merging the central portion into the front, rear and two side walls,

the base end having support portions of the peripheral rounded edge portions of the base end disposed in a flat plane normal to the longitudinal of the container and serving to support the container on a horizontal support surface with the longitudinal of the container to extend, vertically upwardly,

the front wall and rear wall each carrying a respective front and rear valley having left and right valley side walls extending centrally into each front and rear valley toward a respective other of the rear and, front wall to a respective front and rear valley apex each extending longitudinally of the container in the flat central plane from an outlet end of the respective front and rear valley apex to a base end of the respective front and rear valley apex,

each of the front and rear valley ending longitudinally in a respective front and rear valley outlet end, valley end wall which bridges between the right and, left valley side walls of its respective front and rear valley, the front and rear outlet end valley end wall being located between its respective front and rear valley and the outlet end,

each of the front and rear valley ending longitudinally in a respective front and rear valley base end valley end wall which bridges between the right and left valley side walls of

its respective front and rear valley, the front and rear base end valley end wall being located between its respective front and rear valley and the base end,

each valley end wall presenting a generally frusto-conical surface symmetrical about the flat central plane and curving 180 degrees about its respective outlet end or base end of its front and rear valley apex,

wherein on collapsing of the container under a vacuum applied to withdraw fluid from the opening the side walls are drawn together towards the flat central plane with the front and rear walls folding about the front valley apex and the rear valley apex,

the base end having a three dimensional structure formed by its bottom wall, central, portion and peripheral edge portions sufficiently strong to resist deflection and maintain its support portions in a flat plane on collapsing of the container,

each of the front wall and rear wall have a substantially planar portion surrounding their respective valley,

each left and right valley side wall being disposed in a flat plane with a perimeter of each left and right valley side wall merging along a straight line with the planar portion extending parallel to the longitudinal,

a perimeter of each valley end wall merging along a curved line with the planar portion and joining an end of the straight line of the right valley wall perimeter with an end of the straight line of the left valley wall perimeter,

each perimeter of each valley end wall curving 180 degrees about its outlet end and base end of its front and rear valley apex.

19. A container as claimed in claim 18 wherein the outlet end having a three dimensional structure formed by its top wall, central portion, neck and peripheral edge portions sufficiently strong to resist deflection and maintain its peripheral edge portions in the same positions relative the neck on collapsing of the container.

20. A container as claimed in claim 19 wherein the front and rear valley apex are spaced from each other and providing a channelway therebetween along their length from the base end toward the outlet end in all collapsed and uncollapsed conditions of the container.

21. A container as claimed in claim 19 wherein on collapsing of the container under a vacuum applied to withdraw fluid from the opening, the side walls are drawn together about the front valley apex and the rear valley apex with the channelway provided at least as a front continuous channel substantially from the base end adjacent the front valley apex and a rear continuous channel substantially from the base end adjacent the rear valley apex.

22. A container as claimed in claim 21 wherein:

a first compartment is defined on a first side of the channelway bounded by an interior of a first of the side walls and the interiors of the front valley side wall and the rear valley side wall opposed thereto, and

a second compartment is defined on a second side of the channelway bounded by an interior of a second of the side walls and the interiors of the front valley side wall and the rear valley side wall opposed thereto.

23. A thin walled collapsible container,

the container comprising an outlet end, a closed base end, a front wall, a rear wall and two side walls,

the container closed but for an opening from the outlet end,

the outlet end having a top wall with a generally rectangular perimeter as seen in end view, the top wall including an annular central portion about an axially extending neck open to the opening and peripheral edge portions about the central portion merging with the front, rear and two side walls,

the front, rear and two side walls extending longitudinally of the container from the outlet end to the base end about a longitudinal of the container parallel an axis coaxially through the neck,

a flat central plane is disposed intermediate the side walls, the longitudinal lies in the flat central plane,

the container symmetrical about the flat central plane,

the base end having a bottom wall with a generally rectangular perimeter as seen in end view, the bottom wall including a central portion and peripheral rounded edge portions about the central portion merging the central portion into the front, rear and two side walls,

the base end having support portions of the peripheral rounded edge portions of the base end disposed in a flat plane normal to the longitudinal of the container and serving to support the container on a horizontal support surface with the longitudinal of the container to extend vertically upwardly,

the front wall and rear wall each carrying a respective front and rear valley having left and right valley side walls extending centrally into each front and rear valley toward a respective other of the rear and front wall to a respective front and rear valley apex each extending longitudinally of the container in the flat central plane from an outlet end of the respective front and rear valley apex to a base end of the respective front and rear valley apex,

each of the front and rear valley ending longitudinally in a respective front and rear valley outlet end valley end wall which bridges between the right and left valley side walls of its respective front and rear valley, the front and rear outlet end valley end wall being located between its respective front and rear valley and the outlet end,

each of the front and rear valley ending longitudinally in a respective front and rear valley base end valley end wall which bridges between the right and left valley side walls of its respective front and rear valley, the front and rear base end valley end wall being located between its respective front and rear valley and the base end,

each valley end wall presenting a surface symmetrical about the flat central plane about its respective outlet end or base end of its front and rear valley apex,

wherein on collapsing of the container under a vacuum applied to withdraw fluid from the opening the side walls are drawn together towards the flat central plane with the front and rear walls folding about the front valley apex and the rear valley apex,

the base end having a three dimensional structure formed by its bottom wall, central portion and peripheral edge portions sufficiently strong to resist deflection and maintain its support portions in a flat plane on collapsing of the container,

wherein the surface of each valley end wall extends 180 degrees about its respective outlet end or base end of its front and rear valley apex.

24. A container as claimed in claim 23 wherein the surface of each valley end wall curves about its respective outlet end or base end of its front and rear valley apex.

25. A container as claimed in claim 23 wherein the surface of each valley end wall curves 180 degrees about its respective outlet end or base end of its front and rear valley apex.

26. A thin walled collapsible container,

the container comprising an outlet end, a closed base end, a front wall, a rear wall and two side walls,

the container closed but for an opening from the outlet end,

the outlet end having a top wall including an annular central portion about an axially extending neck open to the opening and peripheral edge portions about the central portion merging with the front, rear and two side walls,

the front, rear and two side walls extending longitudinally of the container from the outlet end to the base end about a longitudinal of the container parallel an axis coaxially through the neck,

a flat central plane is disposed intermediate the side walls, the longitudinal lies in the flat central plane,

the container symmetrical about the flat central plane,

the base end having a bottom wall and peripheral edge portions merging into the front, rear and two side walls,

the base end having support portions serving to support the container on a horizontal support surface with the longitudinal of the container to extend vertically upwardly,

the front wall and rear wall each carrying a respective front and rear valley having left and right valley side walls extending centrally into each front and rear valley toward a respective other of the rear and front wall to a respective front and rear valley apex each extending longitudinally of the container in the flat central plane from an outlet end of the respective front and rear valley apex to a base end of the respective front and rear valley apex,

each of the front and rear valley ending longitudinally in a respective front and rear valley outlet end valley end wall which bridges between the right and left valley side walls of its respective front and rear valley, the front and rear outlet end valley end wall being located between its respective front and rear valley and the outlet end,

each of the front and rear valley ending longitudinally in a respective front and rear valley base end valley end wall which bridges between the right and left valley side walls of its respective front and rear valley, the front and rear base end valley end wall being located between its respective front and rear valley and the base end,

each valley end wall presenting a surface symmetrical about the flat central plane about its respective outlet end or base end of its front and rear valley apex,

wherein on collapsing of the container under a vacuum applied to withdraw fluid from the opening the side walls are drawn together towards the flat central plane with the front and rear walls folding about the front valley apex and the rear valley apex,

the base end having a three-dimensional structure formed by its bottom wall and peripheral edge portions sufficiently strong to resist deflection and maintain its support portions in a flat plane on collapsing of the container,

wherein the surface of each valley end wall extends 180 degrees about its respective outlet end or base end of its front and rear valley apex.

27. A container as claimed in claim 26 wherein the surface of each valley end wall curves 180 degrees about its respective outlet end or base end of its front and rear valley apex.

28. A container as claimed in claim 26 wherein the surface of each valley end wall is a generally frusto-conical surface symmetrical about the flat central plane and curving 180 degrees about its respective outlet end or base end of its front and rear valley apex.

29. A container as claimed in claim 26 wherein:

the bottom wall including a central portion with the peripheral edge portions about the central portion merging the central portion into the front, rear and two side walls,

the support portions of the base end provided on the edge portions and disposed in a flat plane normal to the longitudinal of the container and serving to support the container on a horizontal support surface with the longitudinal of the container to extend vertically upwardly.

30. A container as claimed in claim 27 wherein:

the bottom wall including a central portion with the peripheral edge portions about the central portion merging the central portion into the front, rear and two side walls,

the support portions of the base end provided on the edge portions and disposed in a flat plane normal to the longitudinal of the container and serving to support the container on a horizontal support surface with the longitudinal of the container to extend vertically upwardly.

31. A container as claimed in claim 28 wherein:

the bottom wall including a central portion with the peripheral edge portions about the central portion merging the central portion into the front, rear and two side walls,

the support portions of the base end provided on the edge portions and disposed in a flat plane normal to the longitudinal of the container and serving to support the container on a horizontal support surface with the longitudinal of the container to extend vertically upwardly.

32. A container as claimed in claim 26 wherein:

the top wall having a generally rectangular perimeter as seen in end view, and

the bottom wall having a generally rectangular perimeter as seen in end view.

33. A container as claimed in claim 27 wherein:  
the top wall having a generally rectangular perimeter as seen in end view, and  
the bottom wall having a generally rectangular perimeter as seen in end view.
34. A container as claimed in claim 28 wherein:  
the top wall having a generally rectangular perimeter as seen in end view, and  
the bottom wall having a generally rectangular perimeter as seen in end view.
35. A container as claimed in claim 29 wherein:  
the top wall having a generally rectangular perimeter as seen in end view, and  
the bottom wall having a generally rectangular perimeter as seen in end view.
36. A container as claimed in claim 30 wherein:  
the top wall having a generally rectangular perimeter as seen in end view, and  
the bottom wall having a generally rectangular perimeter as seen in end view.
37. A container as claimed in claim 31 wherein:  
the top wall having a generally rectangular perimeter as seen in end view, and  
the bottom wall having a generally rectangular perimeter as seen in end view.

Fig.1

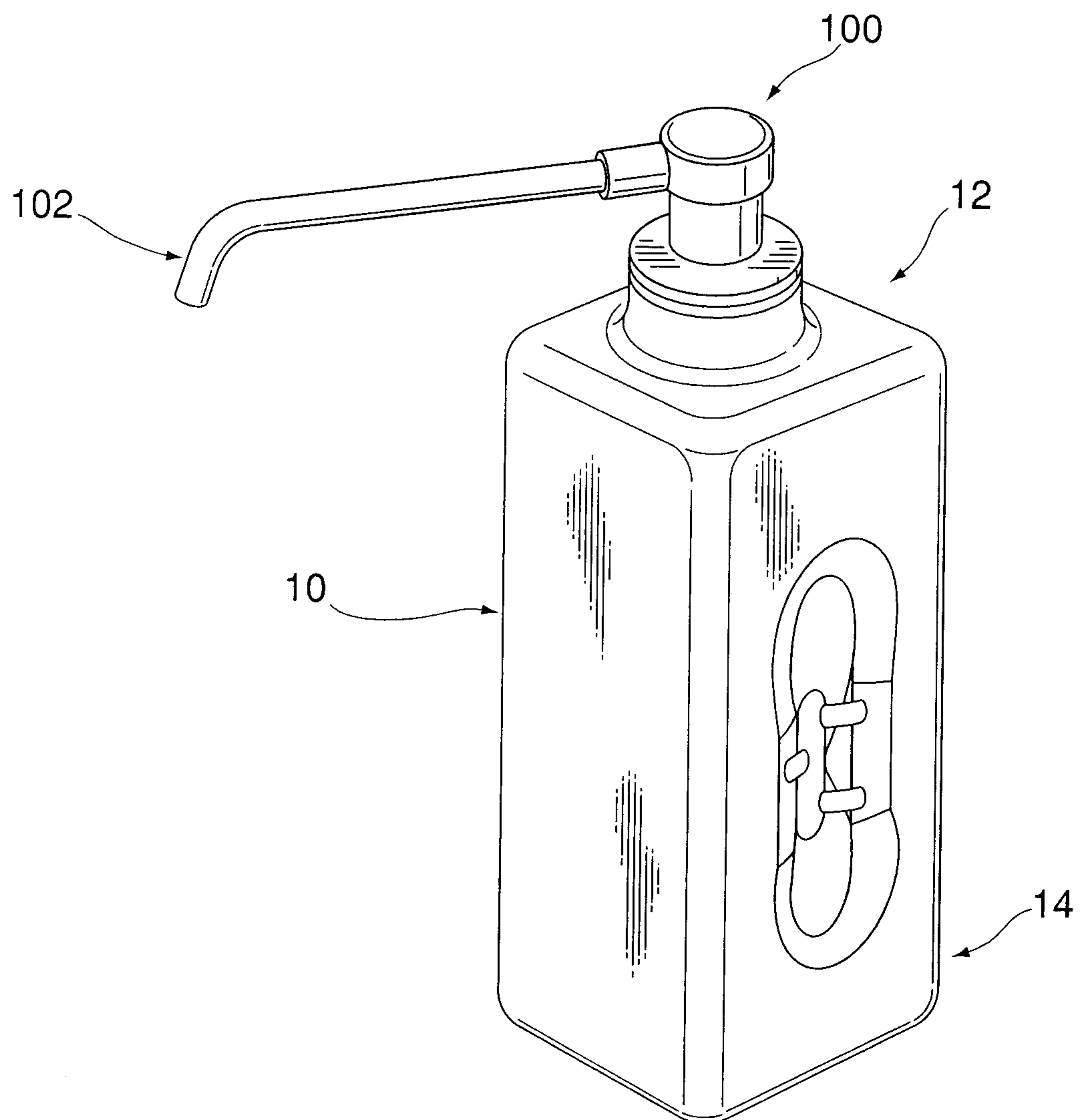


Fig.2

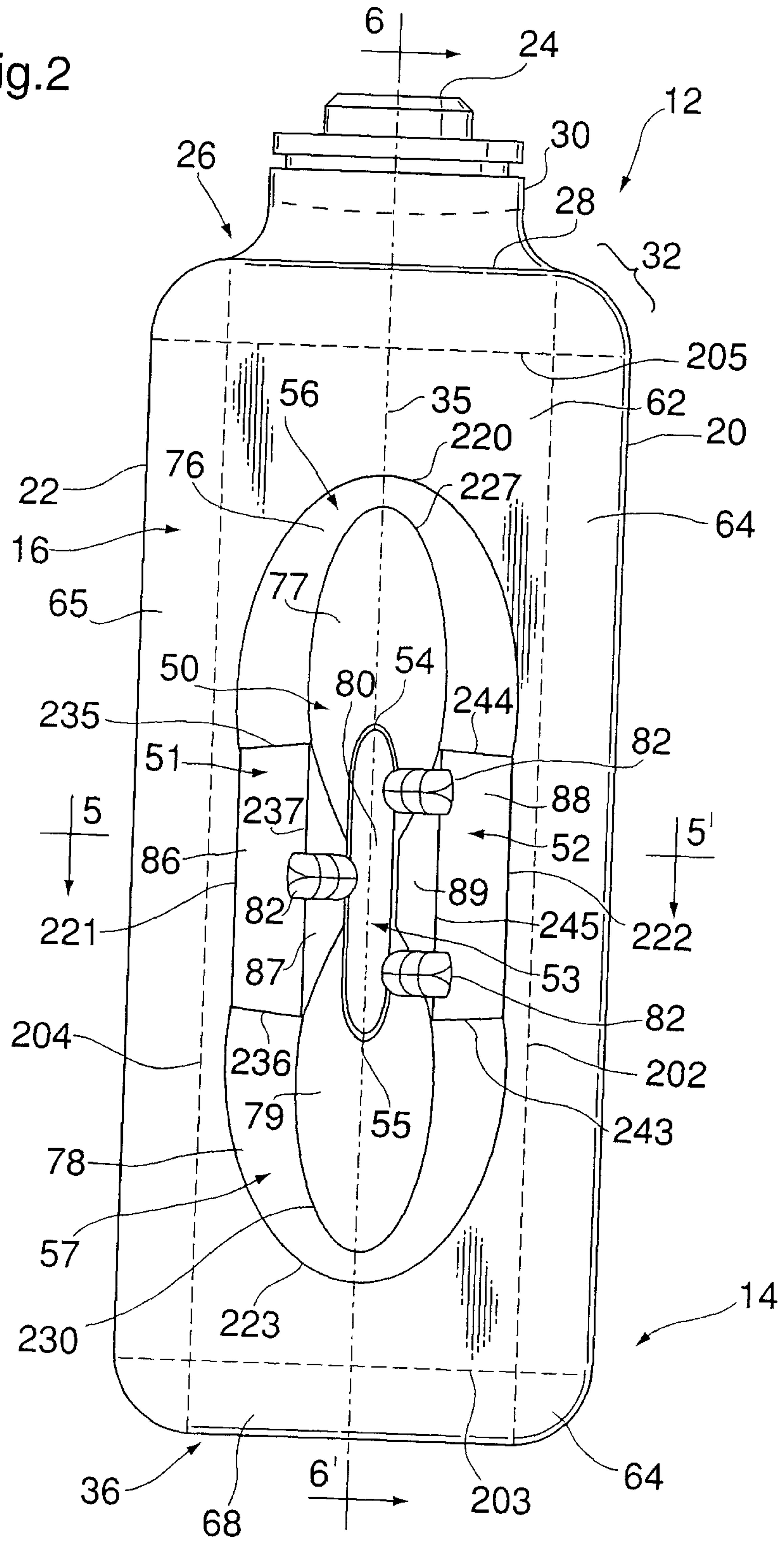


FIG. 3.

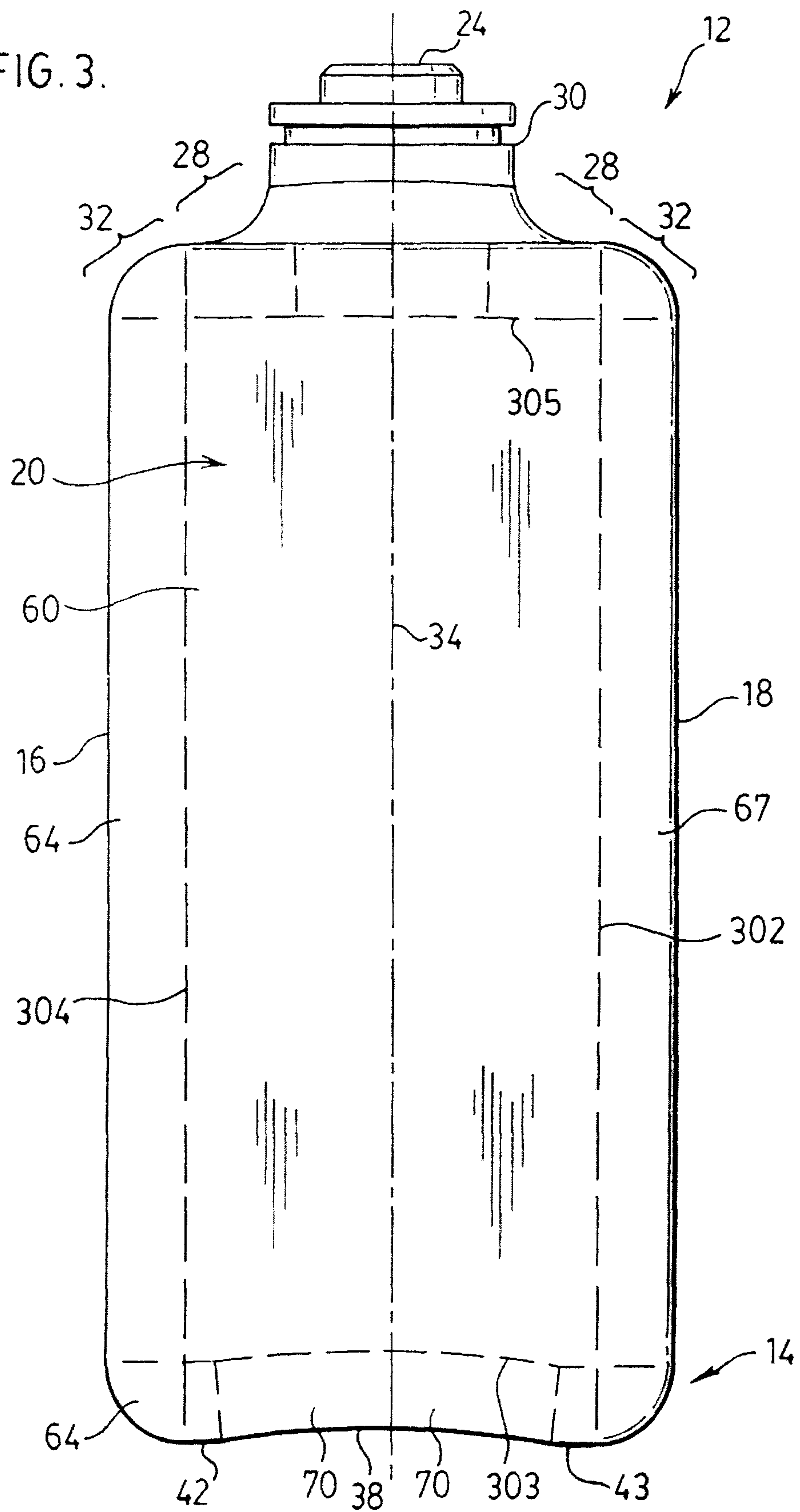


FIG. 4.

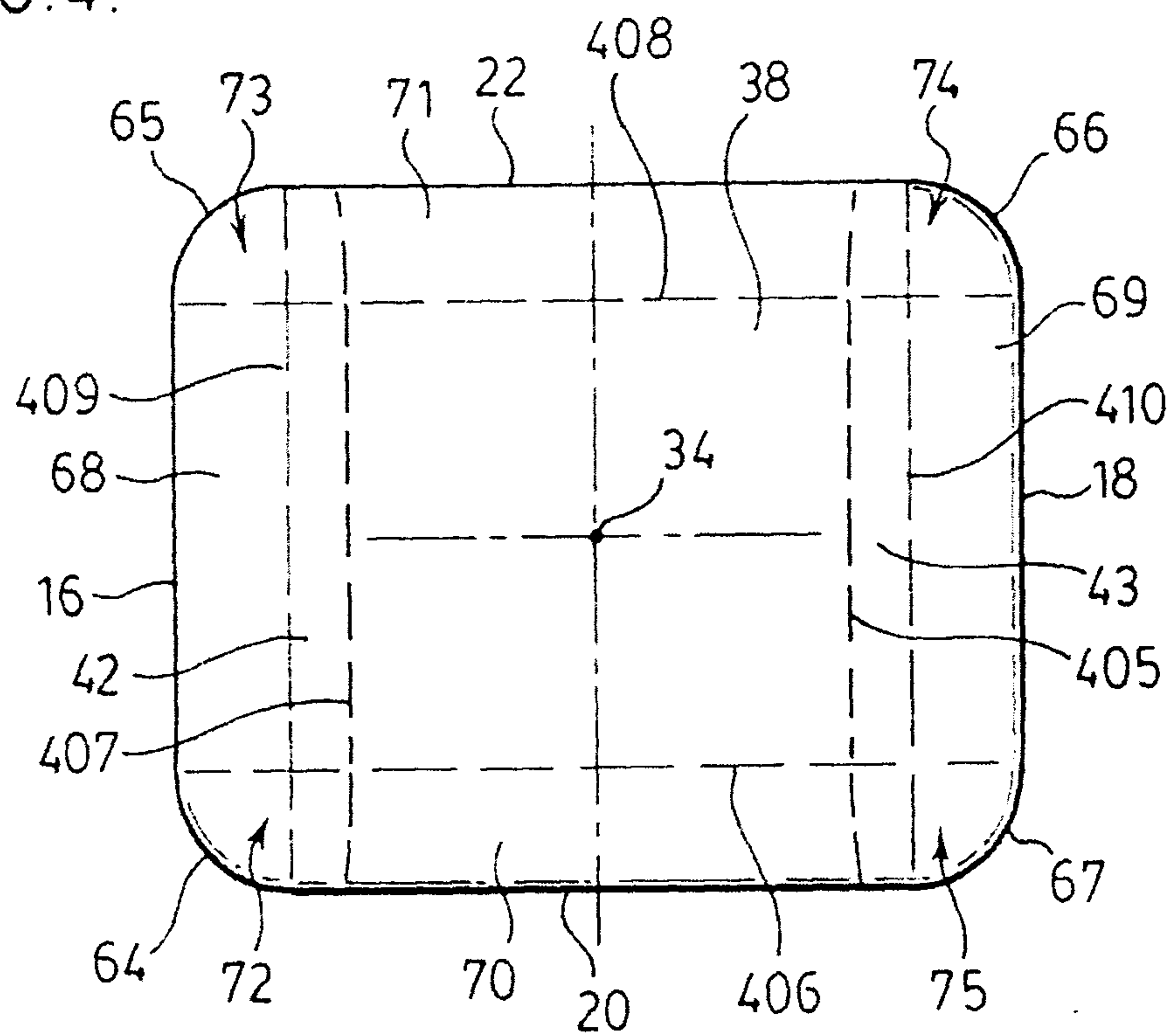
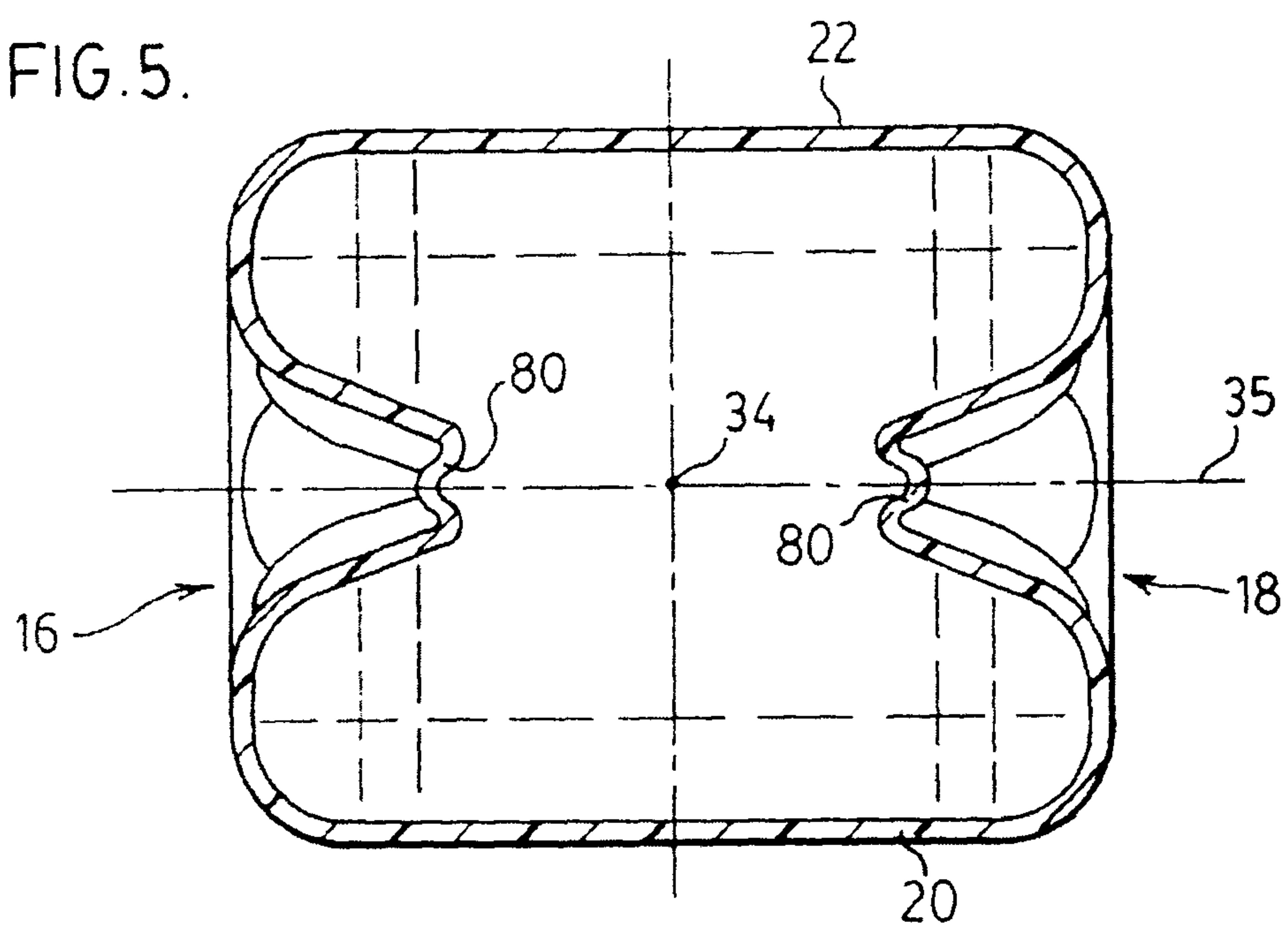


FIG. 5.



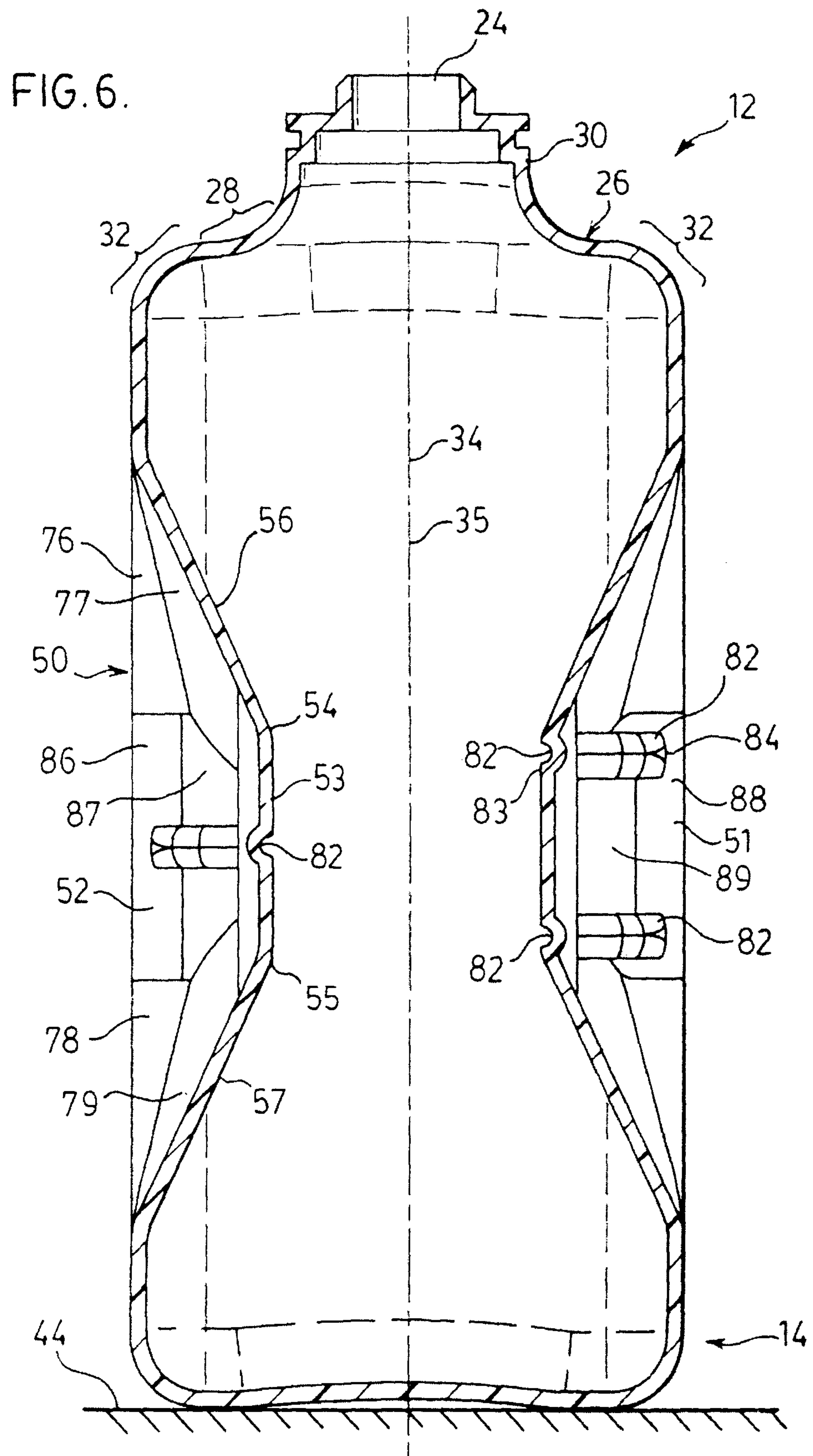


Fig.7

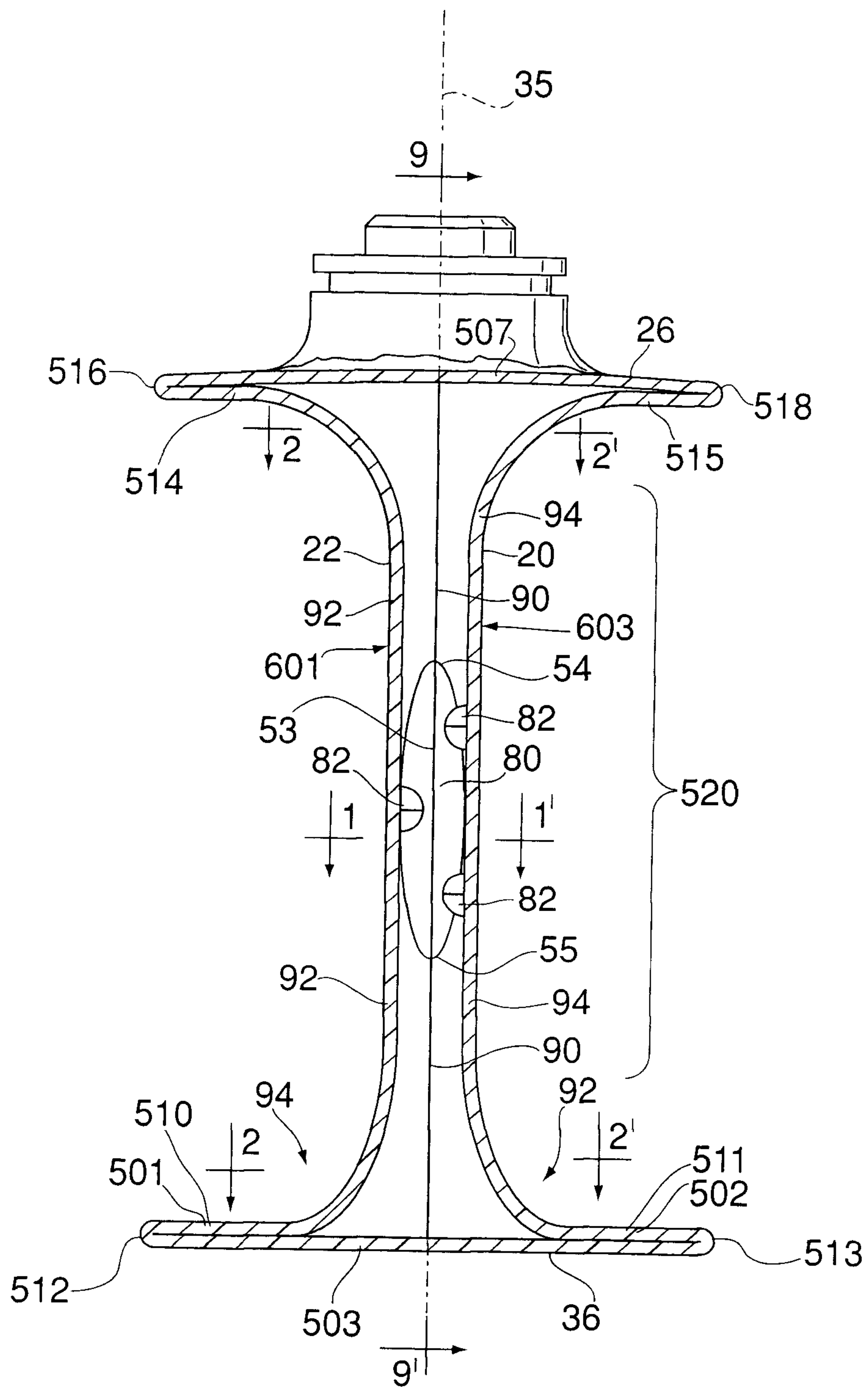


Fig.8

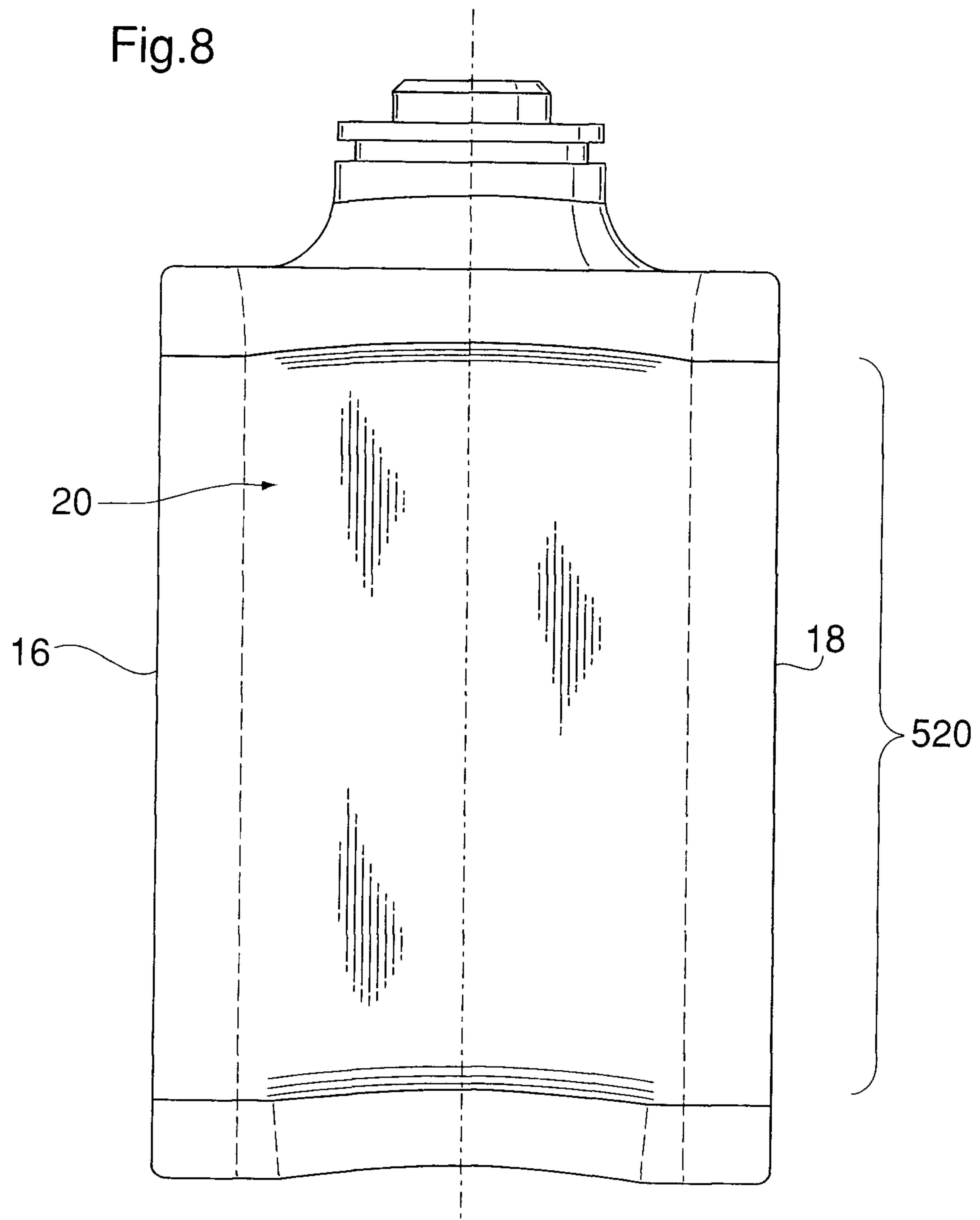


Fig.9

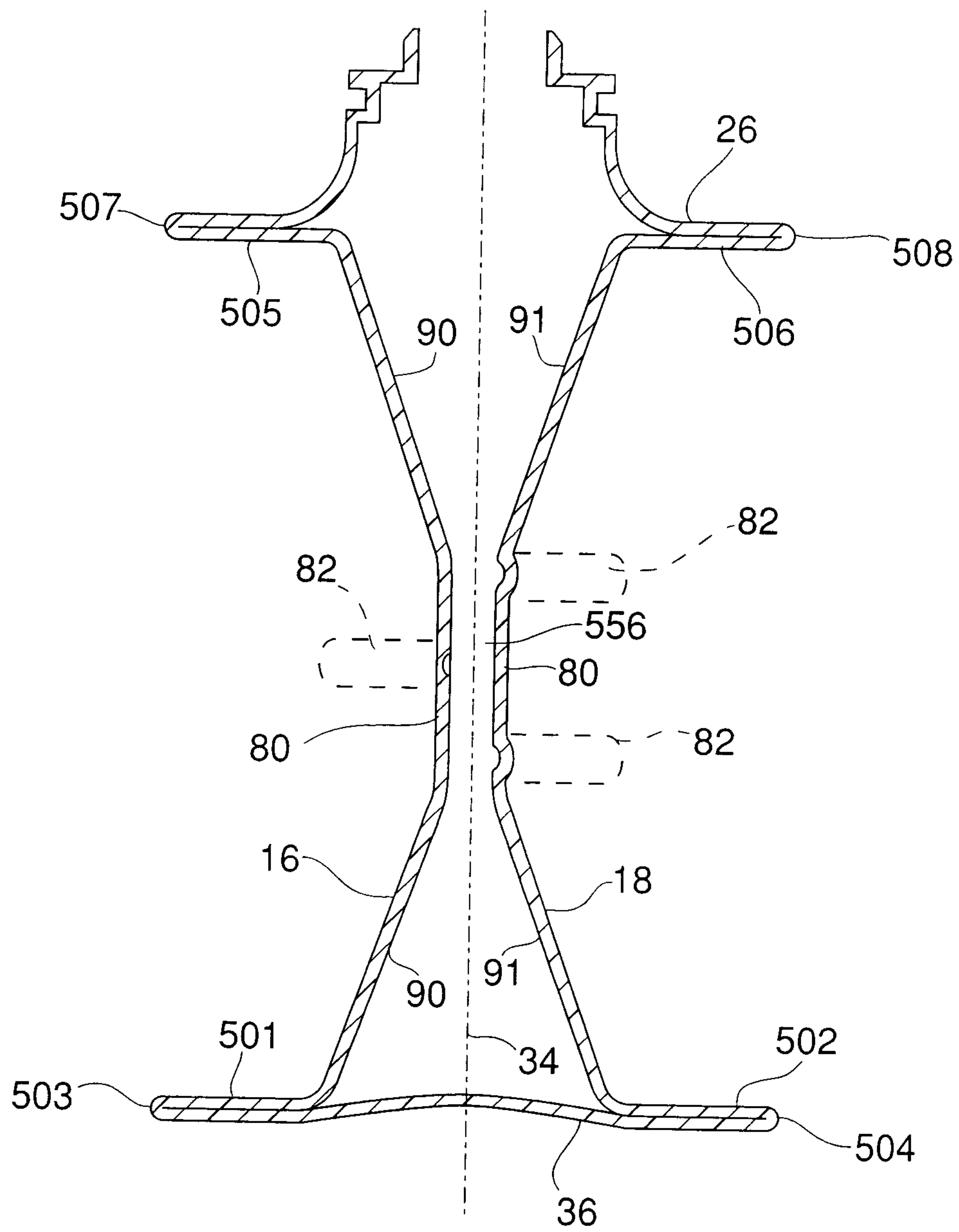


Fig.10

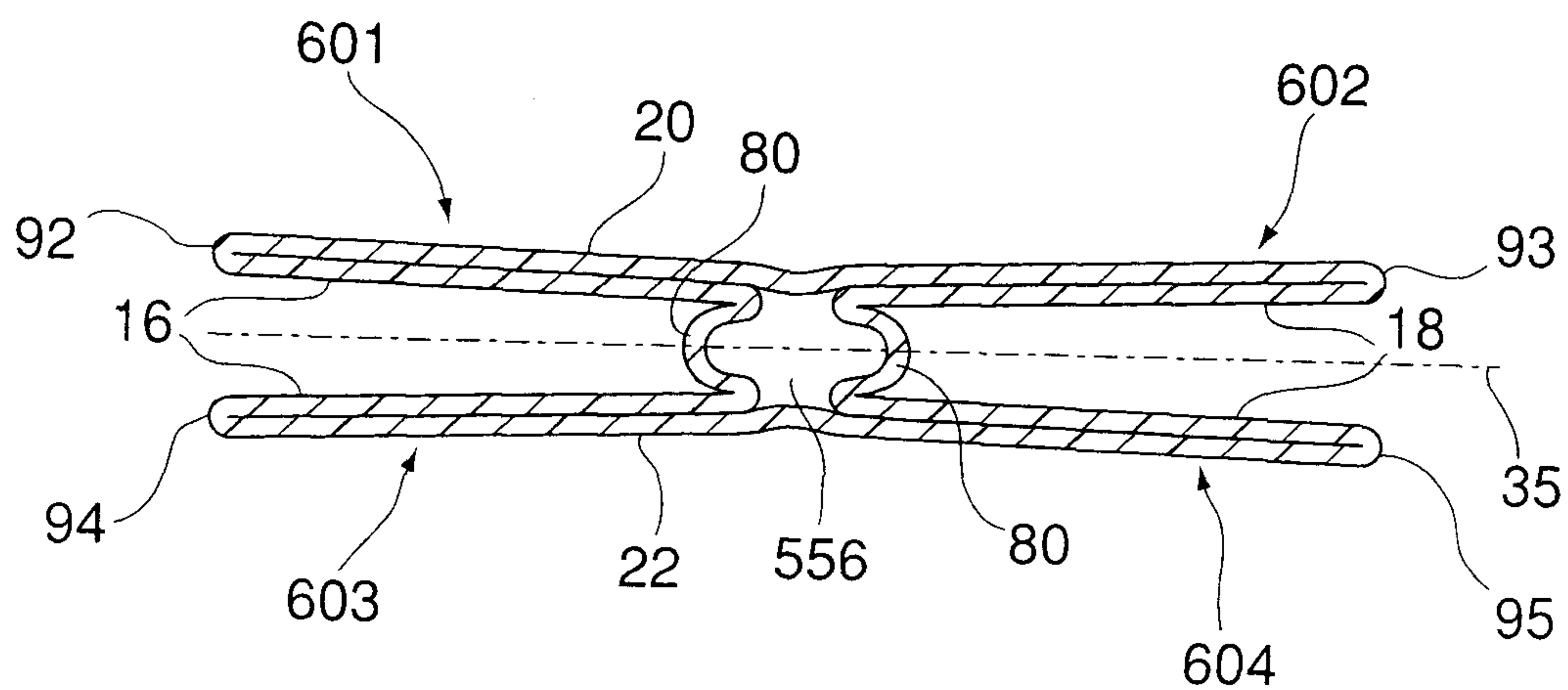


Fig.11

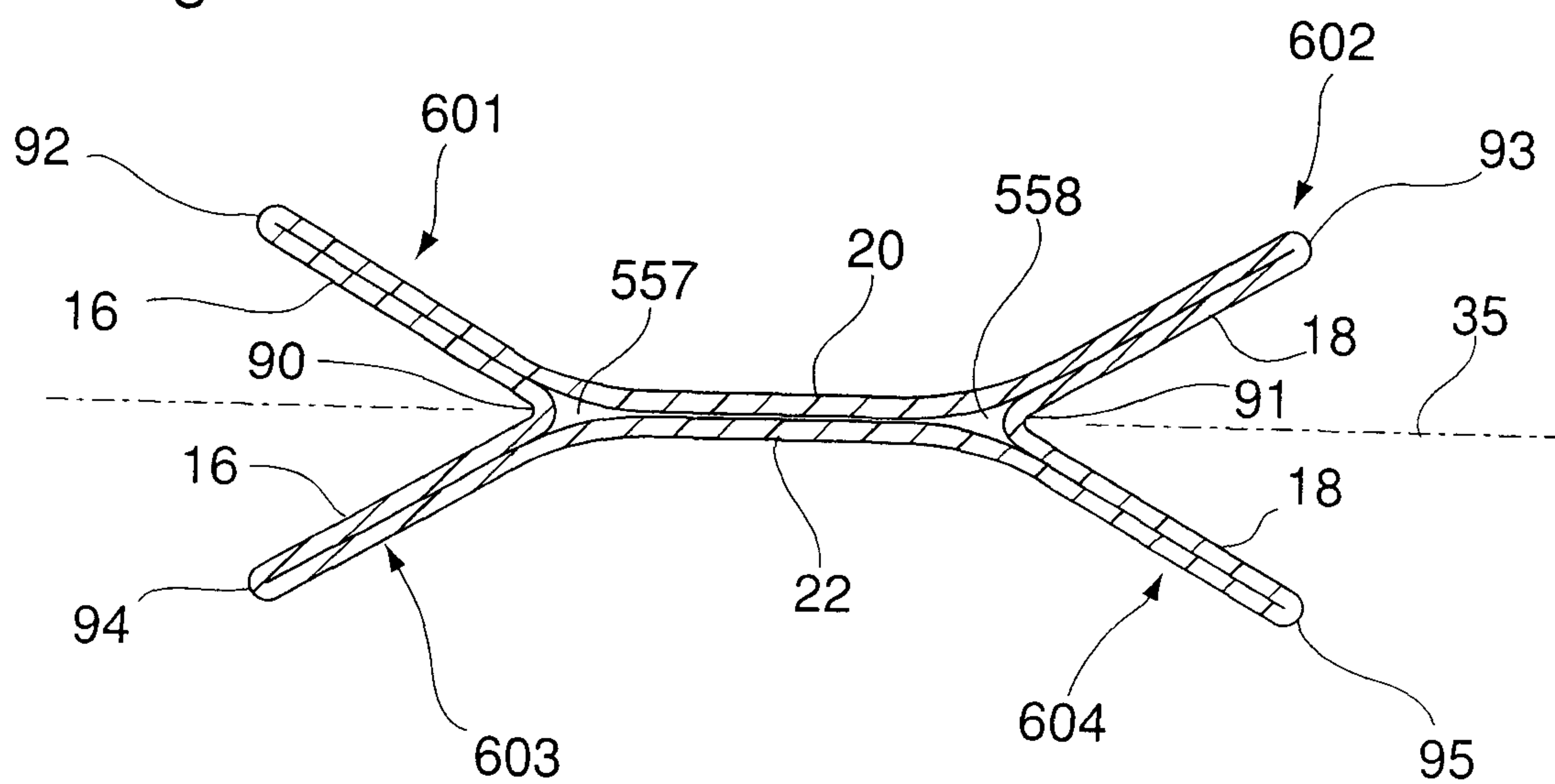


Fig.12

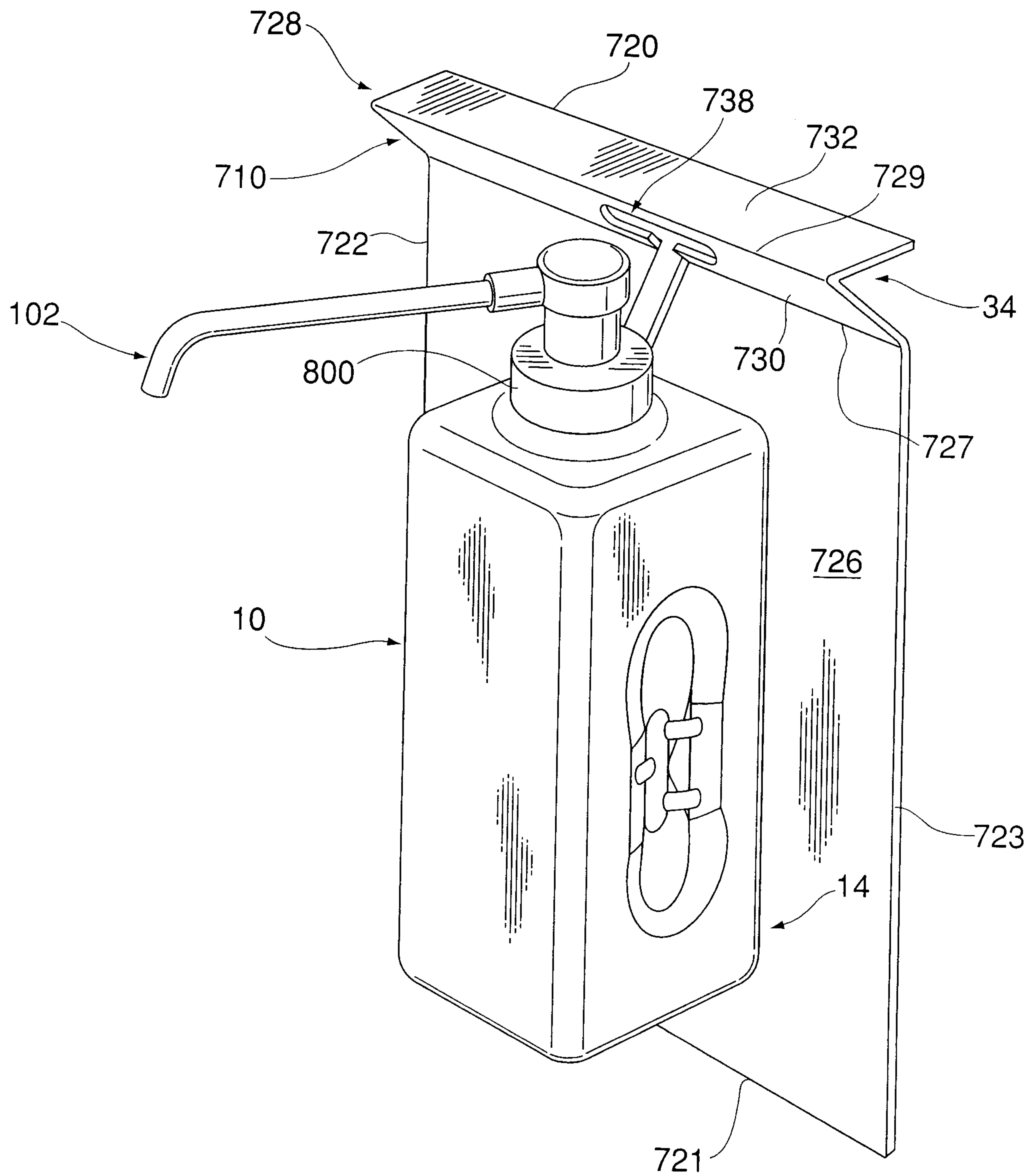
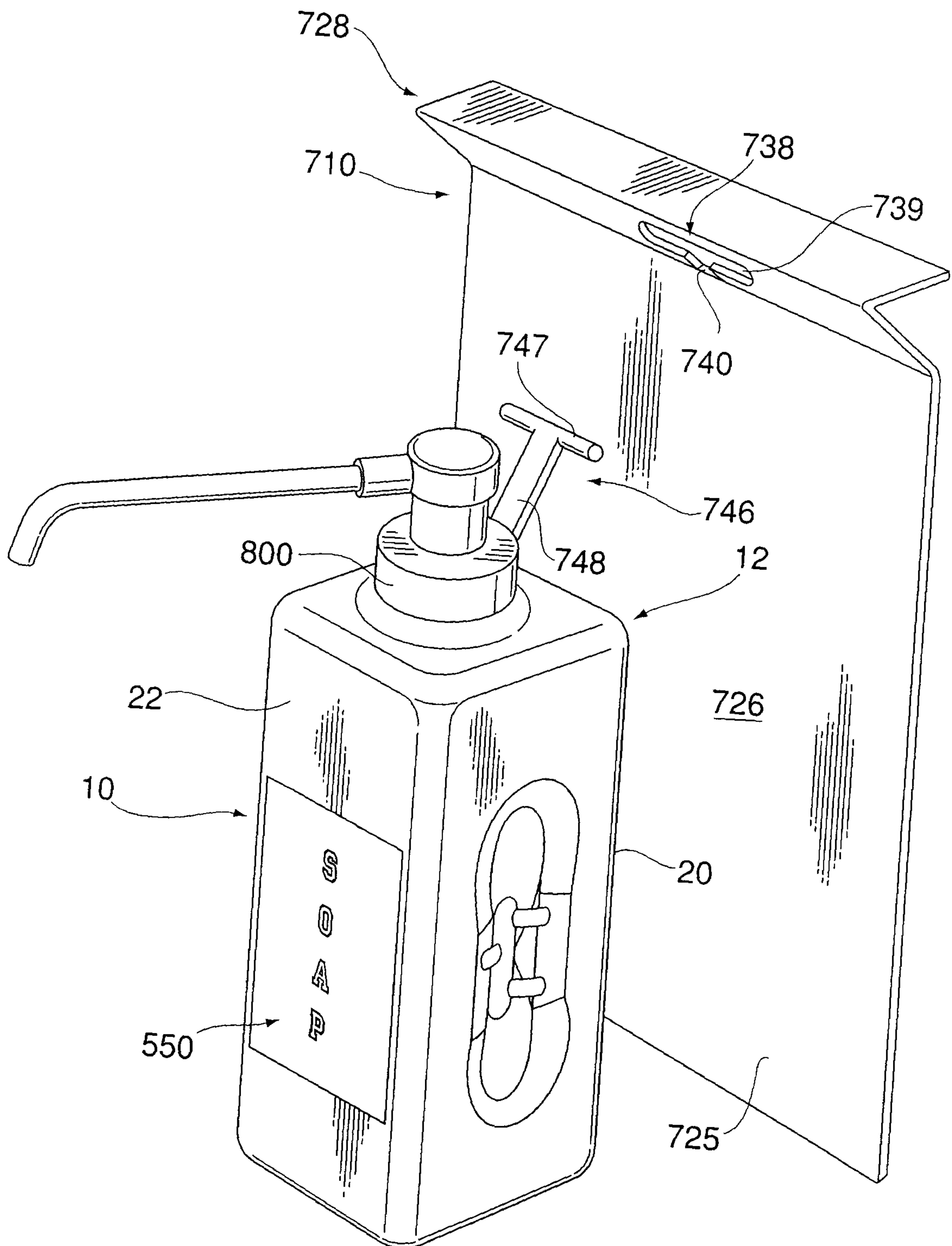


Fig.13



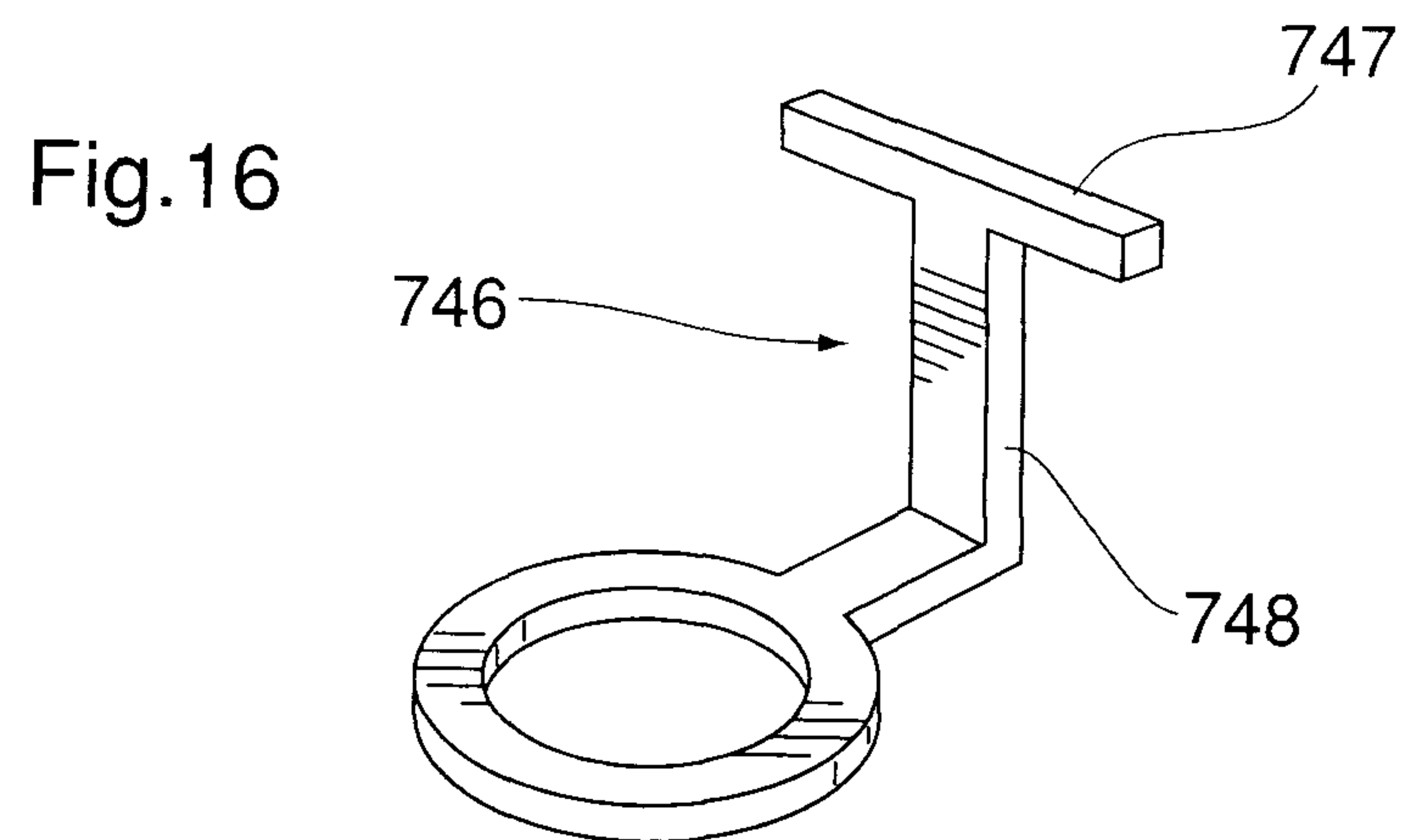
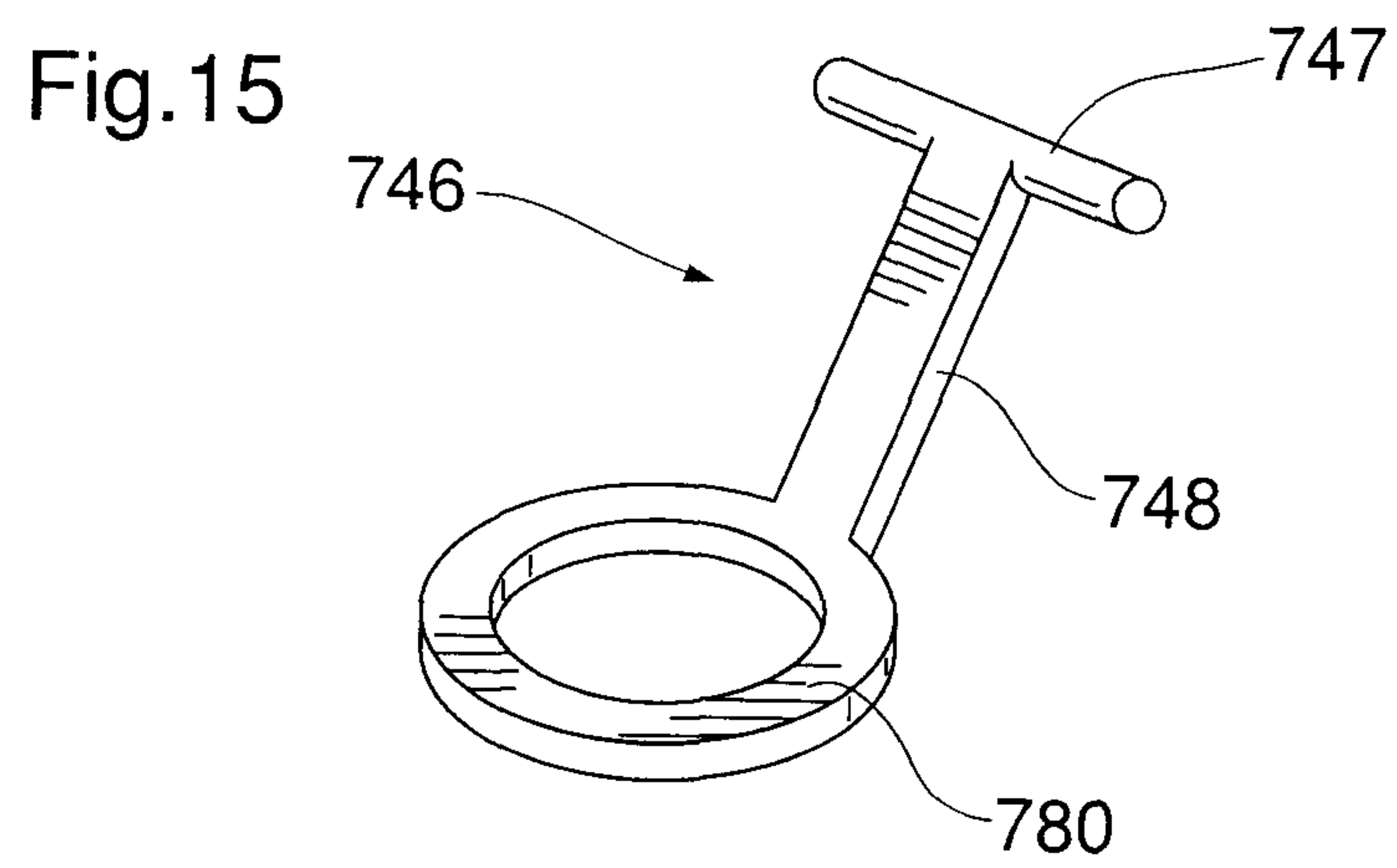
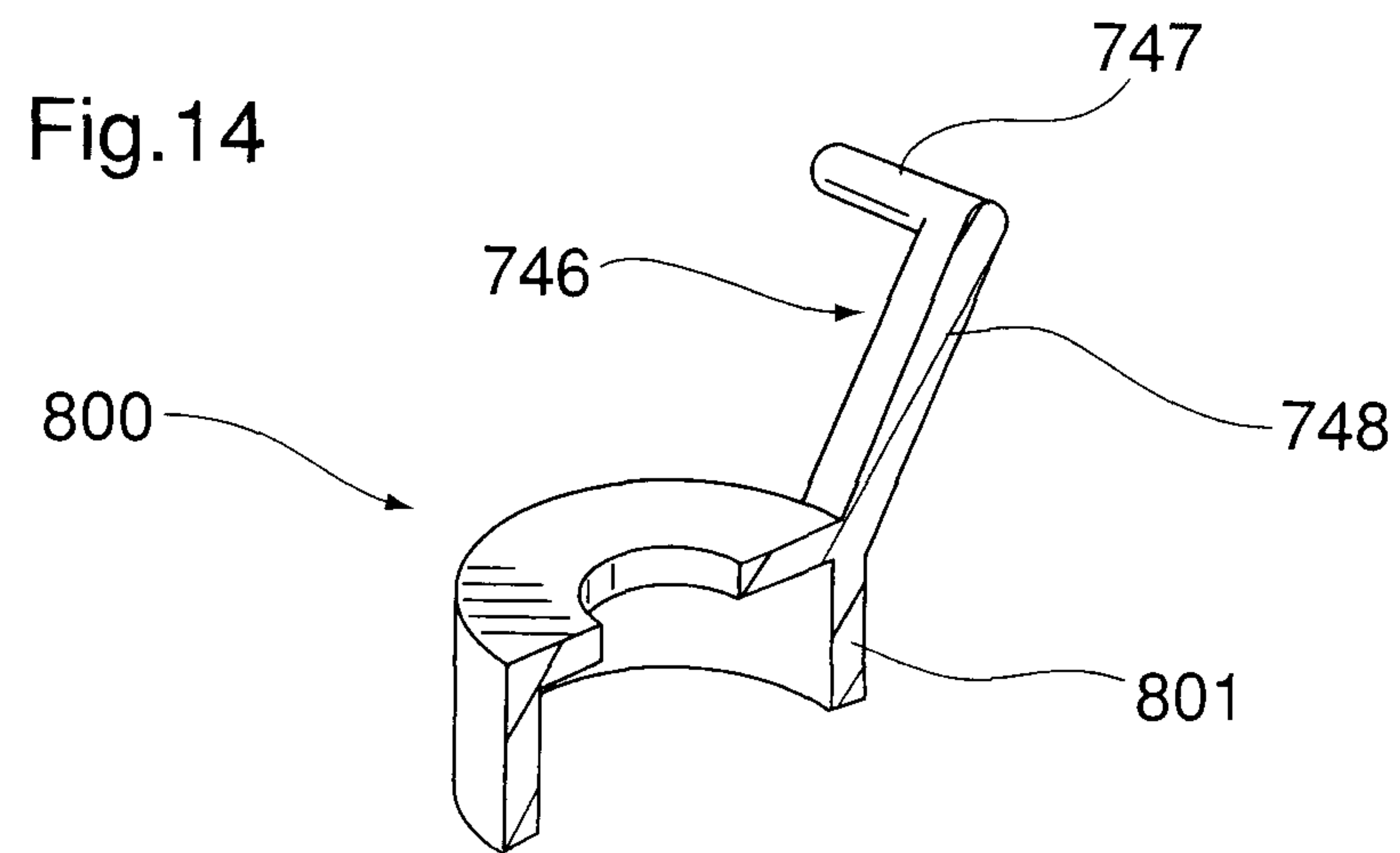


Fig.17

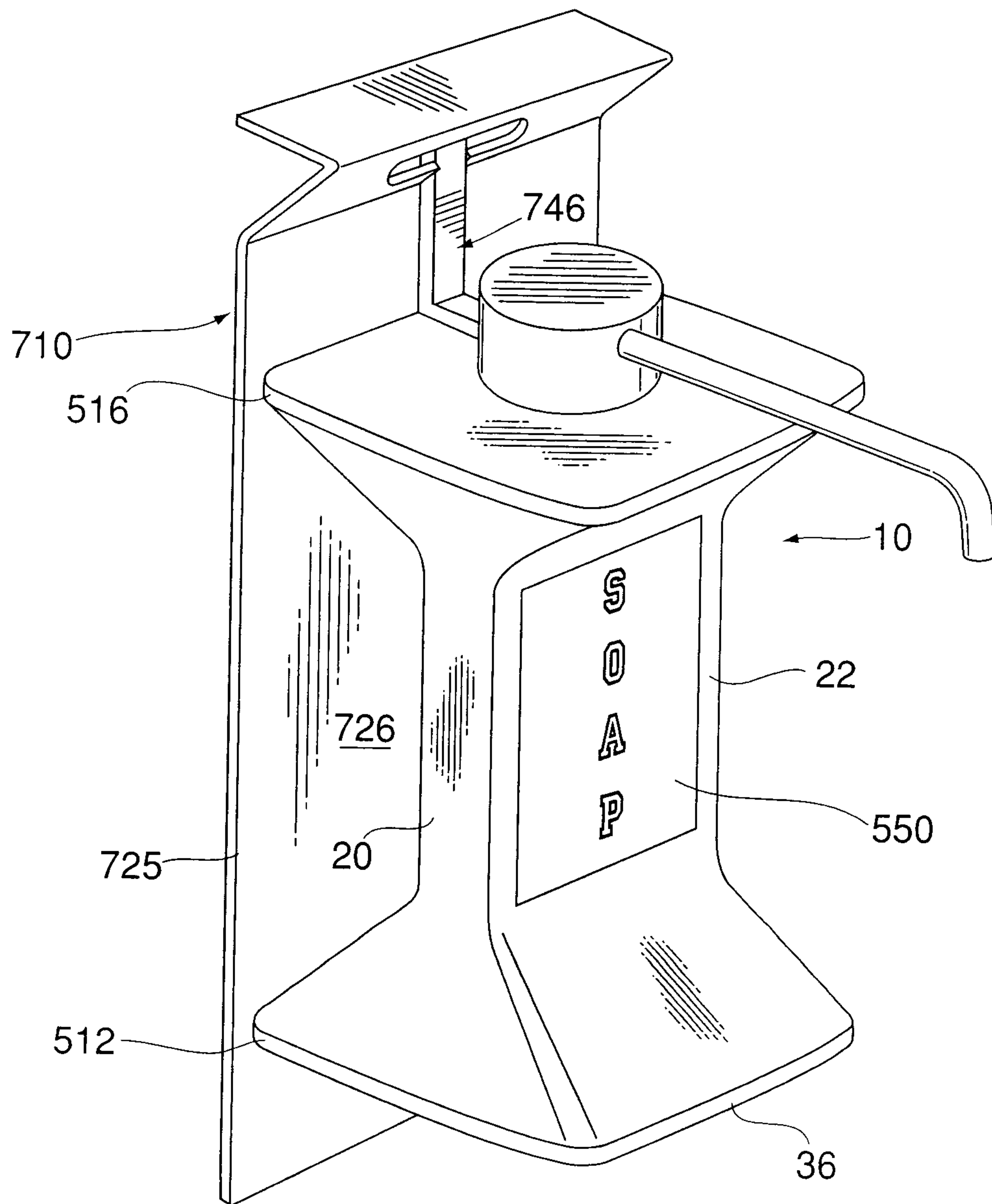


Fig.18

